MOORE PUBLIC SCHOOLS

2026 SOUTHGATE ELEMENTARY KITCHEN UPGRADES and ADDITION

INDEPENDENT DISTRICT NO. 2
CLEVELAND COUNTY, MOORE, OKLAHOMA

500 NORTH NORMAN
MOORE, OKLAHOMA 73160

PROJECT MANUAL

APRIL 2026

AGP | the Abla Griffin Partnership

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500 NORTH NORMAN
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ARCHITECT:

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Not Used

SPECIAL CONDITIONS

TIME FOR COMPLETION AND LIQUIDATED DAMAGES:

A. Upon execution of the contract agreement between the Owner and the Contractor, it shall become an obligation of the contractor to complete all work to be performed under this agreement for the Construction of the 2026 Southgate Elementary Kitchen Upgrades and Addition located at 500 North Norman, Moore, OK - **within 180 Calendar Days.**

B. Penalty for noncompliance by the above date shall be cessation of all further periodical payments until the work is completed and can be fully used for the purpose intended.

PAYMENTS:

A. The Owner's payment schedule indicating the payment dates established by Moore Public Schools shall be provided to the contractor to establish a monthly payment schedule.

B. **Certificates of payment shall be submitted to the Architect on or before 7 days prior to Owner's cut-off date**.

C. Until the Work is 50 percent complete, the Owner will pay 95 percent of the amount due the Contractor on account of progress payments. At the time the Work is 50 percent complete, any **remaining** partial payments shall be paid at 97.5 percent of amount due. The retainage shall be retained until the project is completed.

INSURANCE AND BONDS:

A. Insurance provided shall be with a company or companies licensed to do business in the state of Oklahoma.

B. Policies shall be provided in the following types and amounts:

1. a. Workmen's Compensation-Statutory
   b. Employer's Liability-$500,000 each accident.

2. Comprehensive General Liability:
   a. Bodily Injury - $1,000,000 each occurrence.
   b. Personal Injury - $1,000,000
   c. Property Damage - $1,000,000 each occurrence

3. Automobile Liability:
   a. Bodily Injury - $500,000 each person/$1,000.000 each occurrence

b. Such Comprehensive Automobile Liability Insurance shall include all owned and non-owned hired motor vehicles.

4. Owner's Protective Liability - Same limits as above.

5. Products and Completed Operations - Same limits as above.

6. Contractual Liability - Same limits as above.

C. Furnish one copy of Certificates herein required for each copy of the Agreement; specifically set forth evidence of all coverage required by Subparagraphs 11.1 and 11.2. Furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

D. T**he Contractor shall provide property insurance in the amount of the initial contract sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. This insurance coverage shall be the "all-risk" form for completed value.**

TEMPORARY SERVICES:

A. Sanitary Facilities: The Contractor shall provide and maintain necessary sanitary conveniences for the use of those employed on/or about the work. The sanitary facilities shall be properly secluded from public observation and shall be such locations as shall be approved by the Owner, and their use shall be strictly enforced.

SHOP DRAWINGS and SUBMITTALS:

A. Unless otherwise specified, the shop drawings and product data shall be submitted **electronically**. Physical samples of materials shall be submitted to the Architect as required.

B. Construction Manager is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after as well as before final approval.

C. Shop drawings and samples shall be dated and marked to show the names of the Project, Architect, CM, originating Sub-Contractor,

manufacturer or supplier, and separate detailer if pertinent. Shop drawings shall completely identify Specifications section and locations at which materials or equipment are to be installed. Reproduction of Contract Drawings are acceptable as Shop Drawings only when specifically authorized in writing by the Architect &/or applicable Engineer/Consultant.

D. If materials or specified items other than those specified in these Contract Documents are supplied - and approved by the Architect - it shall be the Construction Manager's responsibility to provide **ALL** additional materials, accessories, substrates, utility connections, etc. for a complete and operational installation at **NO** additional cost to the Owner.

CHANGES IN THE WORK:

A. Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits under collective bargaining agreements; workmen's compensation insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following; supervision, superintendence, wages of timekeepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost".

B. Subcontractor Change Order markups shall be limited to 10% overhead and 10% profit.

Constructor Manager markups shall be limited to 7% profit UNLESS a time extension has been approved by the Owner and the Architect allowing for an increase of G.C.s as per original base agreement times the number of approved additional days. No other markups shall be allowed.

AS BUILT DRAWINGS:

A. Provide and maintain in proper order and in good, clean condition in the field office at the project site, one complete full-size set of all working drawings. On this set of drawing prints, in red ink, neatly and accurately inscribe any and all changes in the work.

B. Upon completion of work, the Contractor shall furnish one set of "**as built**" drawings. These drawings shall be contract drawings

corrected in **red ink** to show any differences between contract drawings and actual construction. All changes made during construction shall be noted. Each drawing showing changes in dimensions, details, or containing supplemental information shall be plainly marked "**As Built**" and shall contain the signature of both the Architect and the Contractor.

CLOSEOUT SUBMITTALS:

Prepare project data in the form of an instructional manual supplied electronically on media as requested by Owner (CD or flash drive). The following information shall be included and arranged under a Table of Contents:

1. Directory listing names, addresses, and telephone numbers of the Architect/Engineer(s), General Contractor, Subcontractors, and major material/equipment suppliers.
2. Operation and Maintenance Instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and Suppliers. Include equipment, parts list for each, operating instructions, maintenance instructions for equipment, special finishes, etc.
3. Project documents and certificates, including shop drawings and product data, air and water balance reports, photocopies of warranties.
4. Record As-Built Drawings as described above.
5. Completed Non-Asbestos Affidavit.

DEBRIS DISPOSAL:

Waste disposal shall be the responsibility of the Contractor. The Contractor shall make arrangements with the local authorities having jurisdiction for accommodation of all waste disposal. If local facilities are not available, the contractor shall be responsible for all other arrangements for waste disposal.

SUPPLEMENTARY CONDITIONS AND SPECIAL CONDITIONS:

In the following sections where the term "General Conditions" is used, it shall include the "Supplementary Conditions" and/or "Special Conditions" bound in this project manual.

MISCELLANEOUS PROVISIONS:

A. TESTS AND INSPECTIONS

Add the following clarification: **Regardless of how it is described elsewhere in the drawings and specifications, the CM shall engage all testing laboratories / subcontractors as approved by the Architect; and, pay for ALL testing as required by the drawings and specifications.** The CM shall pay for any additional testing due to defective work. The Owner shall pay for any additional testing requested and found to be non-defective.

B. EQUAL OPPORTUNITY

The Contractor shall maintain policies of employment as follows:

The Construction Manager and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated fairly during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment advertising; layoff or termination; rates of pay or any other forms of compensation; and selection for training, including apprenticeship. The CM agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

C. COOPERATION WITH BUILDING OFFICIALS

Cooperate with applicable Federal, State, City or other governmental officials and inspectors at all times. If such officials or inspectors deem special inspections are necessary, provide assistance and facilities that will expedite their inspection.

Construction Manager shall be responsible for obtaining and paying for ALL building permits required for this project. This cost shall be included in the Construction Manager's General Conditions.

D. MEASUREMENTS

Before doing any work or ordering any materials, the Contractor shall verify all measurements of existing and new work and shall be responsible for their correctness.

Quantities obtained during bidding &/or construction shall not be from the scaling of the drawings. Only dimensions obtained from dimensioned documents &/or existing on-site conditions shall be utilized for quantities determination, pricing, and ordering. Any scaling of the Construction Documents will be at the bidder's risk and any discrepancies shall be corrected by and paid for by the bidder.

If differences are found, they shall be submitted to the Architect for consideration and verification before proceeding with the work. No extra compensation will be allowed because of differences between actual dimensions and measurements indicated on the working drawings.

E. MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS

Install all manufactured items of materials or equipment in strict accordance with manufacturer's recommended specifications, except that the specifications herein, where more stringent, shall be complied with.

At the completion of the project and prior to final acceptance by the Owner, provide the Owner with three complete sets of operating and maintenance instructions, and demonstrate to him the procedures for proper operation and maintenance of all equipment.

F. CONFLICTS BETWEEN DRAWINGS AND SPECIFICATIONS:

Conflicts between the drawings and specifications shall be brought to the immediate attention of the Architect. Failure to bid items(s) noted on the drawings and omitted from the specifications **does not** remove responsibility from the Construction Manager and applicable Subcontractor(s) to provide and install such with no additional cost to the Owner.

These Contract Documents – including but not limited to the Drawings, Project Manual, and any subsequent Addenda – are issued as a "whole" and shall be bid as such. Each

discipline / subcontractor shall review the **entire set** of Contract Documents and include applicable work in their bid **regardless of location within the Contract Documents**. Reviewing only a portion of the Contract Documents shall not absolve the construction manager or subcontractor of the requirements to perform all the work required of their respective disciplines and/or trade to provide a complete and properly functioning product, system, device, material, etc.

G. JOB MAINTENANCE

During the course of their work, all crafts and trades shall protect all work which preceded theirs from damage, and they shall make repairs or replacements to any damage caused either directly or indirectly by them.

H. COMPLIANCE WITH STATE AND FEDERAL LAWS

Construction Manager assumes full responsibility for the payment of all contributions and payroll taxes (state and federal) as to all subcontractors and employees engaged in the performance of work pursuant hereto and further agrees to check and meet all requirements that might be specified under regulations of the administrative officials or board charged with the enforcement of any state or federal act on the subject referred. CM agrees to furnish Owner, upon request, a certificate or other evidence of compliance therewith.

I. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA)

The Construction Manager shall comply with the latest edition and revision of The Federal Occupational Safety and Health Act of 1970 for construction.

J. GUARANTY BONDS

1. Prior to the Owner signing the contract agreement, they will require the Construction Manager to furnish performance and payment bonds covering the faithful performance of the entire construction contract agreement. The performance bond and the payment bond shall each be made out in one hundred percent (100%) of the contract sum and shall be in a company or companies against which the Owner has no reasonable objection.

2. Bonds shall be signed by an official of the bonding company and shall be accompanied by the bonding agent's written power-of-attorney in order that one copy may be attached to each copy of the contract agreement.

3. The Construction Manager shall include in his proposal amount the total premiums for all required bonds.

4. Unless otherwise noted, the Contraction Manager does hereby warrant and/or guarantee against defects in all workmanship and materials performed or furnished by him directly or by his subcontractors for a period of one (1) year from the date of completion, as evidenced by the date of the Final Certificate or final acceptance of the project. Said warranty and/or guarantee shall be in the form of a good and sufficient bond in a sum equal to one hundred percent (100%) of the contract price.

End of Special Conditions

Geotechnical Engineering Report

Proposed Building Addition
Southgate Elementary School
500 North Norman Avenue
Moore, Oklahoma

September 9, 2015
Terracon Project No. 03155149

Prepared for:
AGP – the Abla Griffin Partnership LLC
Moore, Oklahoma

Prepared by:
Terracon Consultants, Inc.
Oklahoma City, Oklahoma

September 9, 2015

Terracon

AGP – the Abla Griffin Partnership LLC
201 North Broadway, Suite 210
Moore, Oklahoma 73160

Attn: Mr. Michael L. Abla, AIA
P: [405] 735 3477
E: mabla@theAGP.net

Re: Geotechnical Engineering Report
Proposed Building Addition
Southgate Elementary School
500 North Norman Avenue
Moore, Oklahoma
Terracon Project No. 03155149

Dear Mr. Abla:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in accordance with the Proposal for Geotechnical Services No. P03150424 dated July 20, 2015. This report presents the findings of the subsurface exploration and provides geotechnical recommendations regarding the design and construction of foundations and floor slabs for the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.
Cert. Of Auth. #CA-4531 exp. 6/30/17

Diana Vargas-Suaza, E.I.
Consultant

Jeremy Basler, P.E.
Oklahoma No. 20233

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
9-9-15
20233
OKLAHOMA

DCVS:JB\cn\n:\projects\2015\03155149\project documents\sep2015

Copies to: Addressee (1 via email)

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EXECUTIVE SUMMARY

Geotechnical Engineering Services have been performed for the proposed new addition to the existing Southgate Elementary School in Moore, Oklahoma. Terracon's geotechnical scope of work included two test borings to approximate depths of 34 to 34.5 feet below existing site grades.

Based on the information obtained from our subsurface exploration, the site is suitable for development of the proposed project. The following geotechnical considerations were identified:

- The site surface cover generally consisted of grass and topsoil. The soil profile generally encountered lean to fat clays and shaley lean clays, with varying amounts of sand to depths of approximately 13.5 to 14 feet. The overburden soils were underlain by highly weathered shale extending to the boring termination depths of about 34 to 34.5 feet. Groundwater was encountered in the borings at depths of about 7.5 to 26 feet at the time of the exploration.

- Based on the subsurface conditions encountered and expected structural loads the building addition may be supported by drilled piers bearing on the highly weathered shale.

- On-site soils exhibit moderate to high expansion potential under light loading conditions such as those imposed by floor slabs. A minimum of 2 feet of low volume change materials are recommended beneath the floor slab to reduce the potential vertical rise to less than 1 inch. Increasing the low volume change soil thickness to 3 feet could reduce the potential vertical rise to less than 3/4 inch.

- Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during construction.

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled General Comments should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
PROPOSED BUILDING ADDITION
SOUTHGATE ELEMENTARY SCHOOL
500 NORTH NORMAN AVENUE
MOORE, OKLAHOMA

Terracon Project No. 03155149
September 9, 2015

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the new Southgate Elementary School Building Addition located in Moore, Oklahoma. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- floor slab design and construction
- groundwater conditions
- foundation design and construction
- seismic site class

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site layout	See Exhibits A-1 and A-2 in Appendix A.
Structures	The project will include construction of a classroom building addition.
Maximum loads	Columns: 10 to 200 kips (provide) Walls: 2 to 4 klf (assumed) Slabs: 125 psf max (assumed)
Grading	Grade changes for the proposed site were not provided to us at the time of this report; but, based on the boring elevations and the existing topography, we anticipate less than 2 feet of fill will be necessary for this site.

2.2 Site Location and Description

Item	Description
Location	The site is located at 500 North Norman Avenue in Moore, Oklahoma.
Existing improvements	Existing buildings, pavement, grass and topsoil.
Current ground cover	Grass and topsoil.
Existing topography	The site is relatively flat.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Subsurface Profile

Specific conditions encountered at each boring location are indicated on the individual boring logs included in Appendix A. Stratification boundaries on the boring logs represent the approximate location of changes in soil and rock types; in-situ, the transition between materials may be gradual. Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered	Consistency/Density
Stratum 1	13.5 to 14	Lean to fat clay and shaley lean clay with varying amounts of sand	Stiff to hard
Stratum 2	Below the boring termination depths	Highly weathered shale	Soft to moderately hard

Laboratory tests were conducted on selected soil and rock samples and the test results are presented on the boring logs in Appendix A.

3.2 Groundwater

The borings were monitored while drilling, immediately after completing the drilling activities and approximately 24 hours after drilling completion for the presence and level of groundwater. As reported in the lower left corner of the boring logs, groundwater was encountered in the borings at the following depths.

Boring No.	While Drilling (ft)	After Boring (ft)	24 HR After Boring (ft)
DB-1	7	26	7.5
DB-2	Not Encountered	Not Encountered	24.5

To obtain more accurate groundwater level information, longer observations in a monitoring well or piezometer that is sealed from the influence of surface water would be needed. Fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered natural drainage paths, and other factors not evident at the time the borings were advanced. Consequently, the designer and contractor should be aware of this possibility while designing and constructing the building.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

The borings generally encountered moderate to high plasticity clays extending to depths of about 13.5 to 14 feet. The overburden soils were underlain by highly weathered shale extending to the boring termination depths. The moderate to high plasticity clays encountered at the site will experience significant volume changes with variation in subgrade moisture content. To reduce the potential floor slab movement, some overexcavation and replacement of the on-site soils will be required.

Based on the subsurface conditions encountered and the expected structural loads, drilled piers can be used to support the proposed building addition.

Expansive soils are present at this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion. However, even if these procedures are followed, some movement and cracking in the structure should be anticipated. The severity of cracking and other cosmetic damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and cosmetic distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. We would be pleased to discuss other construction alternatives with you upon request.

Geotechnical engineering recommendations for foundations and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in Appendices A and B), engineering analyses, and our current understanding of the proposed project.

4.2 Earthwork

The following presents recommendations for site preparation, subgrade preparation, and placement and compaction of engineered fill on the project. The recommendations presented

for design and construction of earth supported elements including the building foundations and floor slab are contingent upon following the recommendations outlined in this section. Grading for the structure should incorporate the limits of the proposed structure plus a minimum pad blow-up of five feet beyond proposed perimeter building walls and any exterior columns.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing materials, and other geotechnical conditions exposed during the construction of the project.

4.2.1 Site Preparation

Site preparation for the proposed project should include removing the vegetation, topsoil and any other unsuitable surface materials from the areas of new construction. The depressions or excavations should be cleaned of loose material and backfilled as outlined in the following paragraphs. Actual removal depths should be determined at the time of construction by a representative of the geotechnical engineer.

4.2.2 Subgrade Preparation

The soils encountered in the borings within the anticipated depth of seasonal moisture change included moderate to high plasticity clays. These soils have the potential to exhibit significant volume changes with variations in the subgrade moisture content. Based on test method TEX 124E and an 8-foot depth of moisture fluctuation, we estimate the potential PVR for this site to generally be 1-3/4 inches. Therefore, the near surface soils should not be used to provide direct support for conventional on-grade floor slabs.

We recommend constructing a minimum 2-foot thickness of low volume change engineered fill within the building addition footprint to improve support for conventional on-grade floor slab and reduce the potential vertical rise PVR to less than one inch. Increasing the low volume change soil thickness to 3 feet could reduce the PVR to less than 3/4 inch.

The zone of fill compacted to meet this criteria should extend beyond the building footprint at least 1 foot laterally for each foot of fill required to develop design grade.

After performing any required undercut but before placing any fill, we recommend the building addition area be proofrolled with a loaded, tandem-axle dump truck weighing at least 25 tons (under the observation of Terracon personnel) to locate any soft or unstable zones. The proofrolling should involve overlapping passes in mutually perpendicular directions. Where rutting or pumping is observed during proofrolling, the unstable soils should be overexcavated and replaced with an approved low volume change soil as described in the following sections if it cannot be effectively compacted in-place.

After a successful proofroll, we recommend scarifying the exposed subgrade soils to a minimum depth of 8 inches in the building addition area. The scarified soil should be adjusted to a workable moisture content that is at or above its optimum value, as determined by test method ASTM D-698 (standard Proctor), prior to being compacted to at least 95 percent of its maximum dry density. The scarification and moisture conditioning process is important to reducing the future subgrade volume change and should be observed and documented during construction.

4.2.3 Fill Material Requirements

All fill required to develop the design subgrade elevation should be an approved cohesive material that is free of organic matter and debris as outlined in the following table.

Fill Type[1]	Acceptable Location for Placement
Imported Low Volume Change Soils (Cohesive Materials with LL<40, 5<PI<15)	All locations, but particularly for low volume change zone beneath on-grade floor slabs

1. Prior to any filling operations, samples of the proposed borrow and on-site materials should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained. Controlled, compacted fill should consist of approved materials free of organic matter and debris and contain a maximum rock size of 3 inches. The proposed fill materials should be approved by the geotechnical engineer prior to placement.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

4.2.4 Fill Placement and Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Item	Description
Fill Lift Thickness	■ 9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. ■ 4 to 6 inches in loose thickness when hand-guided equipment (i.e., a jumping jack or plate compactor) is used.
Compaction Requirements[1]	At least 95% of the material's maximum dry density as determined by the standard Proctor test method, ASTM D-698.
Moisture Content	Cohesive materials: Workable moisture content at or above its optimum value as determined by the standard Proctor test method, ASTM D-698 at the time of placement and compaction.

1. We recommend that each lift of fill be tested by Terracon for moisture content and compaction prior to the placement of additional fill or concrete. If the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.2.5 Earthwork Construction Considerations

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proofrolling, placement and compaction of controlled compacted fills, backfilling of excavations, and just prior to construction of the building floor slab.

Care should be taken to avoid disturbing prepared subgrades. Unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. New fill compacted several percentage points above optimum moisture content or that accumulates water during construction can also become disturbed under construction equipment. Construction traffic over the completed subgrade should be avoided to the extent practical. If the subgrade becomes saturated, desiccated or disturbed, the affected materials should either be scarified and compacted or be removed and replaced. Subgrades should be observed and tested by Terracon prior to construction of slabs.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local, state, and federal safety regulations. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed those specified by these safety regulations. Flatter slopes than those dictated by these regulations may be required depending upon the soil conditions encountered and other external factors. These regulations are strictly enforced and if they are not followed, the owner, contractor, and/or earthwork and utility subcontractor could be liable and subject to substantial penalties.

4.2.6 Grading and Drainage

Effective drainage should be developed during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features that could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately five percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce moisture infiltration.

Downspouts, roof drains or scuppers should discharge in a manner that carries the water several feet away from the building when the ground surface adjacent to the structure is not

protected by exterior slabs or paving. Sprinkler systems should not be installed within 5 feet of foundation walls. Landscape irrigation adjacent to the foundation systems should be minimized or eliminated.

4.2.7 Utility Trench Backfill

All trenches created for utility access under the building should be effectively sealed to restrict water intrusion and flow along the trenches. We recommend using a clay soil to construct an effective clay trench plug that extends at least 5 feet out from the face of the building. The clay should have a minimum plasticity index (PI) of 15 and be placed in controlled lifts not exceeding 9 inches in loose thickness so as to surround the utility line and fill the trench. Each lift of clay backfill should be compacted to at least 95 percent of the material's maximum standard Proctor dry density, ASTM D-698, at a minimum moisture content that is above its optimum value.

4.2.8 Corrosion Potential

Results of soluble sulfate testing indicate that ASTM Type I Portland cement is suitable for all concrete on and below grade. Foundation concrete can be designed for low sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

Laboratory test results indicate that on-site soils have pH values of 7.74 to 8.49 and indicates the soils to be mildly corrosive. These values should be used to determine potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Refer to Summary of Laboratory Results contained in Appendix B for the complete results of the various corrosivity testing conducted on the site soils in conjunction with this geotechnical exploration.

4.3 Drilled Pier Foundations

4.3.1 Design Recommendations - Drilled Pier Foundations

Description	Value
Foundation Type	Drilled pier foundation system
Bearing Material	Highly weathered shale that was encountered at depths of approximately 13.5 to 14 feet below the existing grade.
Minimum Embedment	2 feet into approved highly weathered shale.
Net Allowable Bearing Pressure[1]	15,000 psf
Maximum Allowable Skin Friction[2]	1,500 psf

Description	Value
Minimum Shaft Diameter[3]	18 inches
Minimum Grade Beam Embedment Depth Below Finished Grade[4]	30 inches
Minimum Void Space Beneath Grade Beam[5]	4 inches
Total Estimated Settlement	1/2 inch
Estimated Differential Settlement	Negligible

1. Due to the potential variations in the quality of the highly weathered shale bearing strata between borings, the geotechnical engineer or his representative should be present during pier drilling to verify that suitable highly weathered shale is adequately penetrated.
2. Use skin friction for the portion of the drilled pier that penetrates the weathered highly weathered shale at least 2 feet.
3. Assume that enough steel reinforcement is provided to provide adequate structural integrity.
4. Grade beams should be structurally connected to the top of the piers.
5. Excavations for grade beams should be free of loose material and protection should be provided to prevent future filling of the void by sloughing soils.

4.3.2 Drilled Pier Foundation Construction Considerations

Our drilling rig used an earth auger to penetrate the overburden soils and highly weathered shale. However, a rock bit may be required to extend the drilled pier excavations into the highly weathered shale. We do not expect temporary casing will be needed to prevent caving of the excavation sides; however, the final determination should be made at the time of construction.

Groundwater was encountered in the borings during the field exploration; therefore, we anticipate dewatering will be required during pier construction. However, the need for dewatering will also depend on the actual groundwater conditions at the time of construction. The bottom of the pier excavation should be cleaned of debris, loose or disturbed soil, and water if any prior to placing reinforcing steel and concrete. If water is encountered and cannot be removed, the concrete should be placed using a tremie pipe and placed from the bottom of the pier excavation to the top, displacing the water to the surface. Concrete should be placed as soon as possible after the foundation excavation is completed to reduce the potential for disturbance of the bearing surface. To facilitate pier construction, concrete should be on-site and ready for placement as pier excavations are completed. In no event should the pier excavation be allowed to remain open over night.

4.4 Seismic Considerations

Description	Value
2009 International Building Code Site Classification (IBC)	**C**

Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2. The 2009 International Building Code (IBC) uses a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. Borings extended to a maximum depth of 34.5 feet. This seismic site class definition considers that highly weathered shale continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

4.5 Floor Slab Design Recommendations

Description	Value
Interior floor system	Slab-on-grade concrete.
Floor slab support	2 to 3 feet of low volume change soils placed and compacted in accordance with section **4.2 Earthwork**.[1]
Modulus of subgrade reaction	125 pounds per square inch per inch (psi/in)[2]

1. Floor slabs should be structurally independent of building foundations and walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundations.
2. A slab constructed on the subgrade prepared as described herein.

4.5.1 Floor Slab Construction Considerations

By constructing a low volume change fill layer beneath the slab, closely controlling the moisture and density of the scarified soils and controlling the potential for moisture migration beneath the slab, the potential for floor slab movements should be reduced. However, because of the remaining thickness of moderate to high plasticity clay soils, the potential for some future movement still exists. Based on constructing a minimum 2 foot thick low volume change LVC fill layer beneath the floor slab, we anticipate potential slab movement could approach 1 inch. A 3 foot thick LVC layer could approach 3/4 inch of slab movement. This magnitude of slab movement could occur differentially. To further reduce the potential for slab movements, a greater thickness of low volume change fill could be placed beneath the slab.

In areas of exposed concrete, control joints should be saw cut into the slab after concrete placement in accordance with ACI Design Manual, Section 302.1R-37 8.3.12 (tooled control joints are not recommended). Additionally, dowels should be placed at the location of proposed construction joints. To control the width of cracking (should it occur) continuous slab reinforcement should be considered in exposed concrete slabs.

Effective separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines penetrating the slab to allow independent movement. Interior trench backfill placed beneath slabs should be compacted in accordance with

recommendations outlined in section **4.2 Earthwork**. Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

The use of a vapor retarder or barrier should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 and ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder/barrier.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

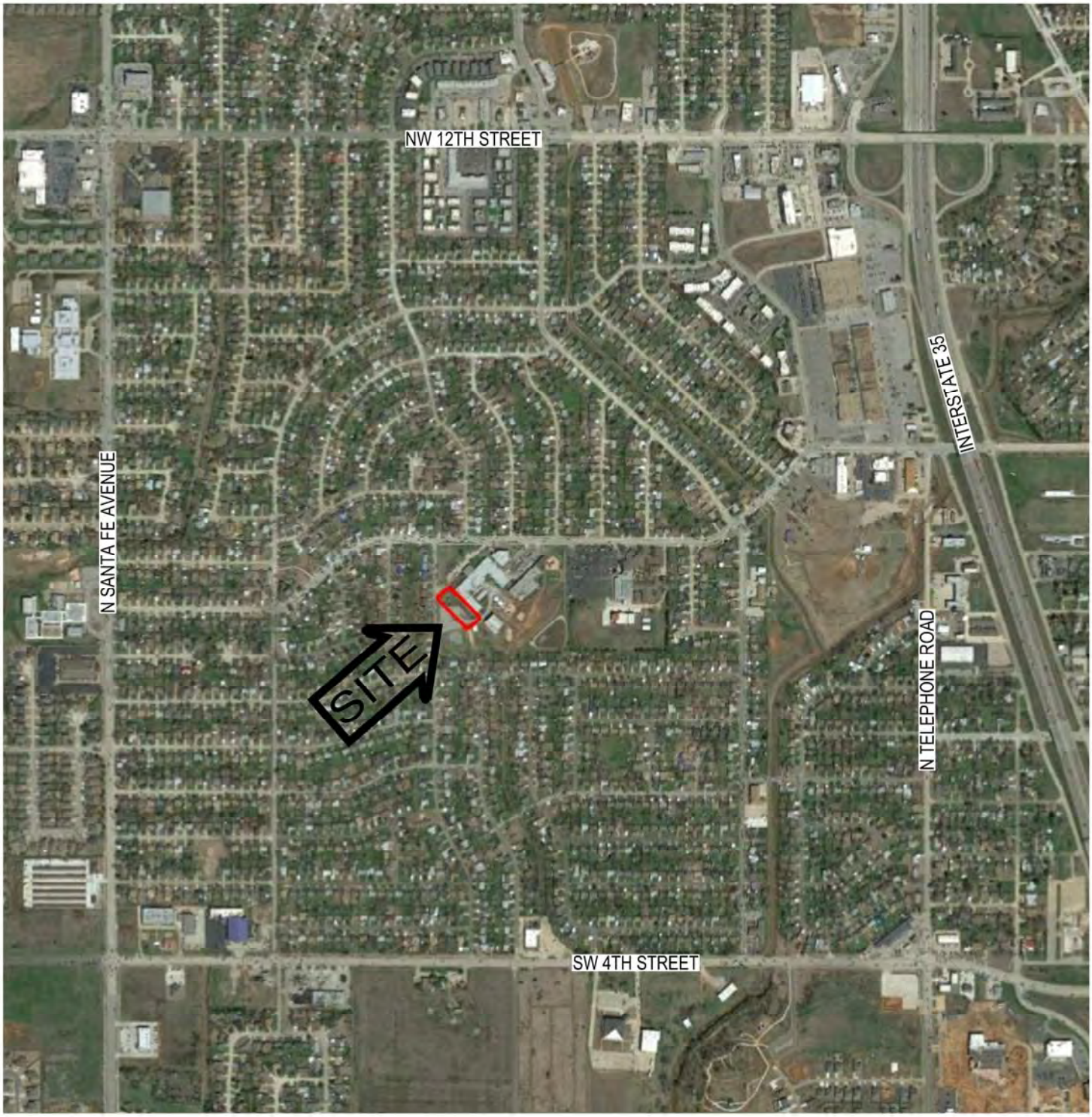
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION



N

DIAGRAM IS FOR GENERAL LOCATION ONLY,
AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr: DCVS Drawn By: CAN Checked By: DCVS Approved By: JWB	Project No. 03155149 Scale: NTS File No. 03155149 (A1-A2) Date: SEPT 2015	Terracon Consulting Engineers and Scientists 4701 N STILES AVE OKLAHOMA CITY, OKLAHOMA 73105 PH. (405) 525-0453 FAX. (405) 557-0549	SITE LOCATION PLAN PROPOSED BUILDING ADDITION SOUTHGATE ELEMENTARY SCHOOL 500 NORTH NORMAN AVENUE MOORE, OKLAHOMA	EXHIBIT A1

LEGEND

⊙ BORING LOCATION

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Mngr: DCVS	Project No. 03155149
Drawn By: CAN	Scale: NTS
Checked By: DCVS	File No. 03155149 (A1-A2)
Approved By: JWB	Date: SEPT 2015

Terracon
Consulting Engineers and Scientists
4701 N STILES AVE OKLAHOMA CITY, OKLAHOMA 73105
PH. (405) 525-0453 FAX. (405) 557-0549

BORING LOCATION PLAN

PROPOSED BUILDING ADDITION
SOUTHGATE ELEMENTARY SCHOOL
500 NORTH NORMAN AVENUE
MOORE, OKLAHOMA

EXHIBIT

A2

Field Exploration Description

As requested, two test borings were drilled at the site on August 13, 2015. The borings were drilled to 34 to 34.5 feet below the ground surface at the approximate locations shown on the attached Boring Location Plan, Exhibit A-2.

Terracon personnel located the borings in the field by taping distances from the references shown on the attached boring location plan. The surface elevations at the boring locations were determined using differential leveling procedures. An assumed benchmark elevation of 100 feet was used and referenced to the top nut of the fire hydrant located approximately as shown on the boring location plan. Based on this benchmark, the surface elevations at borings DB-1 and DB-2 locations were 99.5 and 98.5 feet respectively. The elevations on the boring logs have been rounded to the nearest 1/2 foot. The locations and elevations of the borings should be considered accurate only to the degree implied by the methods used to define them.

A truck-mounted rotary drill rig equipped with continuous flight augers was used to advance the boreholes. Representative samples were obtained by the split-barrel and thin-walled tube sampling procedures.

The split-barrel sampling procedure uses a standard 2-inch O.D. split-barrel sampling spoon that is driven into the bottom of the boring with a 140-pound drive hammer falling 30 inches. The number of blows required to advance the sampling spoon the last 12 inches, or less, of a typical 18-inch sampling interval or portion thereof, is recorded as the standard penetration resistance value, N. The N value is used to estimate the in-situ relative density of cohesionless soils and, to a lesser degree of accuracy, the consistency of cohesive soils and the hardness of sedimentary bedrock. In the thin-walled tube sampling procedure, a seamless steel tube with a sharpened cutting end is hydraulically pushed into the bottom of the boring to obtain a relatively undisturbed cohesive soil sample. The sampling depths, penetration distances, and the N values are reported on the boring logs. The samples were tagged for identification, sealed to reduce moisture loss and returned to the laboratory for further examination, testing and classification.

An automatic Standard Penetration Test (SPT) drive hammer was used to advance the split-barrel sampler. The automatic drive hammer achieves a greater mechanical efficiency when compared to a conventional safety drive hammer operated with a cathead and rope. We considered this higher efficiency in our interpretation and analysis of the subsurface information provided with this report.

Field logs were prepared as part of the drilling operations. These boring logs included visual classifications of the materials encountered during drilling and the field personnel's interpretation of the subsurface conditions between samples. The final boring logs included with this report may include modifications based on observations and tests of the samples in the laboratory.

As required by the Oklahoma Water Resources Board, any borings deeper than 20 feet, or borings that encounter groundwater or contaminated materials must be grouted or plugged in accordance with Oklahoma State statutes. One boring log must also be submitted to the Oklahoma Water Resources Board for each 10 acres of project site area. Terracon grouted the borings and submitted a log in order to comply with the Oklahoma Water Resources Board requirements.

BORING LOG NO. DB-1

PROJECT: Proposed Building Addition - Southgate Elementary School

CLIENT: AGP - the Abla Griffin Partnership, LLC
Moore, Oklahoma

SITE: 500 North Norman Avenue
Moore, Oklahoma

LOCATION See Exhibit A-2

Approximate Surface Elev: 99.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
				X	7	5-6-6 N=12		16			
				X	14	3-4-5 N=9		19		40-15-25	
		5									
			▽	■			2100	19	111	39-15-24	
8.5	91+/-		▼								
				X	16	15-22-30 N=52		15			
		10									
14.0	85.5+/-			X	8	30-50/6"		14			
		15									
				X	6	50/6"		15			
		20									
				X	9	38-50/3"		14			
		25									

LEAN CLAY (CL), trace sand, dark brown with trace red, stiff

-no sand, reddish-brown with trace gray and dark brown below 3.5'

-red below 6'

SHALEY LEAN CLAY (CL), red, hard

+HIGHLY WEATHERED SHALE red, soft

-soft to moderately hard below 23.5'

Stratification lines are approximate. In-situ, the transition may be gradual.
+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Power Auger

Abandonment Method:
Backfilled with cuttings above 4'; grouted 4' to 14'; backfilled with cuttings from 14' to termination depth.

See Exhibit A-3 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:
Grass

WATER LEVEL OBSERVATIONS

▽ *7 ft While Drilling*
▽ *26 ft After Boring*
▼ *7.5 ft After 24 Hours*

Terracon
4701 North Stiles Avenue
Oklahoma City, Oklahoma

Boring Started: 8/13/2015 | Boring Completed: 8/13/2015
Drill Rig: 747 | Driller: R. Peters
Project No.: 03155149 | Exhibit: A-4

BORING LOG NO. DB-1

PROJECT: Proposed Building Addition - Southgate Elementary School

CLIENT: AGP - the Abla Griffin Partnership, LLC
Moore, Oklahoma

SITE: 500 North Norman Avenue
Moore, Oklahoma

LOCATION See Exhibit A-2

Approximate Surface Elev: 99.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		+HIGHLY WEATHERED SHALE red, soft *(continued)*										
						8	36-50/4"		15			
			30									
34.0	65.5+/-	-moderately hard below 33.5'				4	50/4"		12			
		Boring Terminated at 34 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.
+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Power Auger

Abandonment Method:
Backfilled with cuttings above 4'; grouted 4' to 14'; backfilled with cuttings from 14' to termination depth.

See Exhibit A-3 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

- 7 ft While Drilling
- 26 ft After Boring
- 7.5 ft After 24 Hours

Terracon
4701 North Stiles Avenue
Oklahoma City, Oklahoma

Boring Started: 8/13/2015 | Boring Completed: 8/13/2015
Drill Rig: 747 | Driller: R. Peters
Project No.: 03155149 | Exhibit: A-4

BORING LOG NO. DB-2

PROJECT: Proposed Building Addition - Southgate Elementary School

CLIENT: AGP - the Abla Griffin Partnership, LLC
Moore, Oklahoma

SITE: 500 North Norman Avenue
Moore, Oklahoma

LOCATION See Exhibit A-2

Approximate Surface Elev: 98.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)
0	98.5+/-
3.5	95+/-
6.0	92.5+/-
13.5	85+/-

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			10	7-7-9 N=16		18		52-19-33	
			12	7-7-9 N=16		18			
5									
					2200	15	118		
			18	9-12-20 N=32		14			
10									
			7	50/6"		12			
15									
			13	15-22-49 N=71		12			
20									
	▼		14	35-37-50/5"		10			
25									

FAT CLAY (CH), trace sand, dark grayish-brown, very stiff

SANDY LEAN CLAY (CL), dark grayish-brown, very stiff

LEAN CLAY (CL), red

-red to dark brown, hard below 8.5'

+HIGHLY WEATHERED SHALE red, soft

Stratification lines are approximate. In-situ, the transition may be gradual.
+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Power Auger

Abandonment Method:
Backfilled with cuttings above 4'; grouted 4' to 14'; backfilled with cuttings from 14' to termination depth.

See Exhibit A-3 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:
Grass

WATER LEVEL OBSERVATIONS

Dry While Drilling

Dry After Boring

▼ *24.5 ft After 24 Hours*

Terracon
4701 North Stiles Avenue
Oklahoma City, Oklahoma

Boring Started: 8/13/2015 | Boring Completed: 8/13/2015

Drill Rig: 747 | Driller: R. Peters

Project No.: 03155149 | Exhibit: A-5

BORING LOG NO. DB-2

PROJECT: Proposed Building Addition - Southgate Elementary School

CLIENT: AGP - the Abla Griffin Partnership, LLC
Moore, Oklahoma

SITE: 500 North Norman Avenue
Moore, Oklahoma

LOCATION See Exhibit A-2

Approximate Surface Elev: 98.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		+HIGHLY WEATHERED SHALE, red, soft *(continued)*									
					15	15-35-50/6"		14			
30											
					8	25-50/6"		11			
34.5	64+/-	***Boring Terminated at 34.5 Feet***									

Stratification lines are approximate. In-situ, the transition may be gradual.
+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Power Auger

Abandonment Method:
Backfilled with cuttings above 4'; grouted 4' to 14'; backfilled with cuttings from 14' to termination depth.

See Exhibit A-3 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Dry While Drilling

Dry After Boring

▼ *24.5 ft After 24 Hours*

Terracon
4701 North Stiles Avenue
Oklahoma City, Oklahoma

Boring Started: 8/13/2015 | Boring Completed: 8/13/2015

Drill Rig: 747 | Driller: R. Peters

Project No.: 03155149 | Exhibit: A-5

APPENDIX B

LABORATORY TESTING

Laboratory Testing

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. Samples of bedrock were classified in accordance with the general notes for Sedimentary Rock Classification. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil and rock samples and the test results are presented on the logs in Appendix A. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- Visual Classification (ASTM D2488)
- In-situ Water Content (ASTM D2216)
- Atterberg Limits (ASTM D4318)
- Unconfined Compression Test: (ASTM D2166)
- In-Situ Dry Density (ASTM D2166)
- Sulfate content (EPA Method 300.0)
- pH (EPA Method)

Procedural standards noted above are for reference to methodology in general. In some cases variations to methods are applied as a result of local practice or professional judgment.

CORROSION TEST RESULTS

PROPOSED BUILDING ADDITION
SOUTHGATE ELEMENTARY SCHOOL
500 NORTH NORMAN AVENUE
MOORE, OKLAHOMA

Terracon Project No. 03155149

Boring No.	Depth (ft.)	Sulfate mg/kg	pH
DB-1	1.0 - 2.5	806	7.74
DB-2	3.5 - 5.0	384	8.49

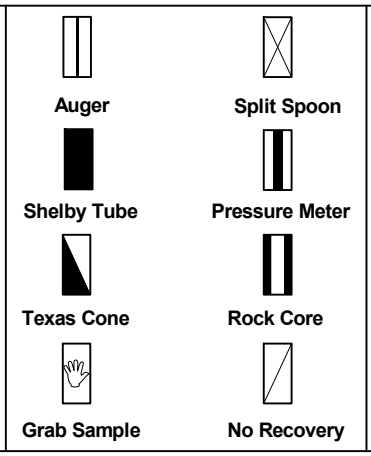
APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer
(TCP)	Texas Cone Penetrometer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

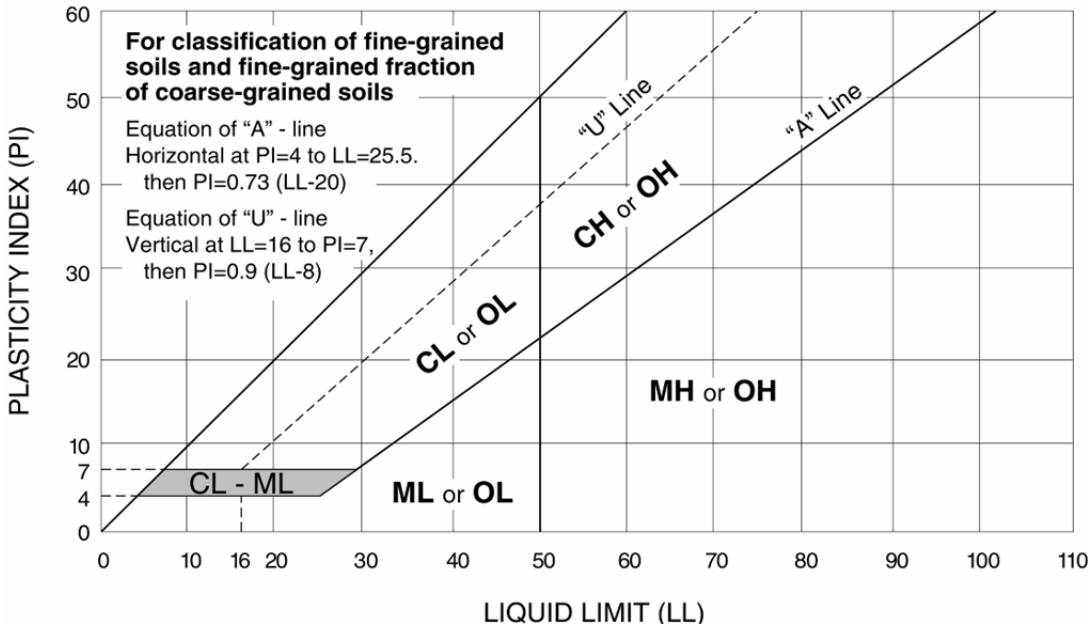
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



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GENERAL NOTES

Sedimentary Rock Classification

DESCRIPTIVE ROCK CLASSIFICATION:

Sedimentary rocks are composed of cemented clay, silt and sand sized particles. The most common minerals are clay, quartz and calcite. Rock composed primarily of calcite is called limestone; rock of sand size grains is called sandstone, and rock of clay and silt size grains is called mudstone or claystone, siltstone, or shale. Modifiers such as shaly, sandy, dolomitic, calcareous, carbonaceous, etc. are used to describe various constituents. Examples: sandy shale; calcareous sandstone.

LIMESTONE	Light to dark colored, crystalline to fine-grained texture, composed of $CaCo_3$, reacts readily with HCl.
DOLOMITE	Light to dark colored, crystalline to fine-grained texture, composed of $CaMg(CO_3)_2$, harder than limestone, reacts with HCl when powdered.
CHERT	Light to dark colored, very fine-grained texture, composed of micro-crystalline quartz ($Si0_2$), brittle, breaks into angular fragments, will scratch glass.
SHALE	Very fine-grained texture, composed of consolidated silt or clay, bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone or mudstone.
SANDSTONE	Usually light colored, coarse to fine texture, composed of cemented sand size grains of quartz, feldspar, etc. Cement usually is silica but may be such minerals as calcite, iron-oxide, or some other carbonate.
CONGLOMERATE	Rounded rock fragments of variable mineralogy varying in size from near sand to boulder size but usually pebble to cobble size (½ inch to 6 inches). Cemented together with various cementing agents. Breccia is similar but composed of angular, fractured rock particles cemented together.

PHYSICAL PROPERTIES:

DEGREE OF WEATHERING

Slight	Slight decomposition of parent material on joints. May be color change.
Moderate	Some decomposition and color change throughout.
High	Rock highly decomposed, may be extremely broken.

HARDNESS AND DEGREE OF CEMENTATION

Limestone and Dolomite:

Hard	Difficult to scratch with knife.
Moderately Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Soft	Can be scratched with fingernail.

Shale, Siltstone and Claystone

Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be easily dented but not molded with fingers.

Sandstone and Conglomerate

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING AND JOINT CHARACTERISTICS

Bed Thickness	Joint Spacing	Dimensions
Very Thick	Very Wide	> 10′
Thick	Wide	3′ - 10′
Medium	Moderately Close	1′ - 3′
Thin	Close	2″ - 1′
Very Thin	Very Close	.4″ - 2″
Laminated	—	.1″ - .4″

Bedding Plane	A plane dividing sedimentary rocks of the same or different lithology.
Joint	Fracture in rock, generally more or less vertical or transverse to bedding, along which no appreciable movement has occurred.
Seam	Generally applies to bedding plane with an unspecified degree of weathering.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy (Pitted)	Rock having small solution pits or cavities up to ½ inch diameter, frequently with a mineral lining.
Porous	Containing numerous voids, pores, or other openings, which may or may not interconnect.
Cavernous	Containing cavities or caverns, sometimes quite large.

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DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010-SUMMARY OF THE WORK

Part 1 - General

1.01 Work Included:

A. The General Conditions, Bidding Requirements, and Division I are hereby made a part of each of the technical sections that follow, and shall be understood to apply and shall apply in full to all individuals or corporations who contract or subcontract to perform any part or all of the project work.

B. Indications on the working drawings or in any section of the specifications of an article or material, operation, or method, requires that the Contractor shall provide each item or service or quality or is subject to qualifications noted; and, the Contractor shall perform each operation prescribed according to the conditions stated providing, therefore, all necessary labor, equipment and incidentals to complete the project work.

C. The project:

1. Name: **Southgate Elementary 2026 Kitchen Upgrades and Addition** - Moore Public Schools.
2. Location: 500 North Norman – Moore, Oklahoma.

1.02 Summary of Work:

A. **Base Bid:** Provide and pay for all materials, labor, services, equipment, licenses, taxes, permits, and other items necessary for the partial demolition, new addition, and renovations/upgrades of an existing (approximately) 2,300 total s.f. kitchen in the existing elementary school noted above plus new sidewalks, and applicable site utilities. Contractor shall maintain all barriers, guards and other environmental items required at the site during construction.

B. Owner: Moore Public Schools

1. Owner's Representative:
   Tara Malbrough, Director
   Arthur Drain, Assistant Director
   Jimmy Welch, Procurement / Distribution Manager
   Moore Public Schools – Child Nutrition
   615 Tower Drive
   Moore, OK 73160
   405-735-4030

C. Design Team:

1. Architect:
   Mike Abla, Principal Architect
   Clay Griffin, Project Manager
   AGP
   313 SE 5th Street
   Moore, OK 73160
   405-735-3477
2. Structural Engineer:
   Brandon Birch, Structural Engineer
   KFC Engineering, Inc.
   1300 N. Walker, Suite 200
   Oklahoma City, OK 73103

3. Mechanical, Electrical and Plumbing Engineers:
   Dwayne Gordon, Mechanical Engineer
   Salas O'Brien LLC
   2900 S. Telephone Rd., Suite 120
   Moore, OK 73160
   405-364-9926
4. Construction Manager:
   Joe Sherga, Project Manager
   Omni Construction LLC
   1909 S. Eastern Ave.
   Moore, OK 73160
   405-735-3992

1.04 Work to be Provided and Installed By Others:

A. Replacement of existing sanitary sewer which serves this area of the building. Work is being performed by Omni Construction LLC under a separate contract / agreement with Moore Public Schools.

1.05 Use of the Site:

A. Confine operations at the site to the areas permitted under the contract. Portions of the site beyond areas on which work is indicated are not to be disturbed.
B. Keep facility free from accumulation of waste material, rubbish or construction debris.

1.06 Safety of Persons and property:

A. Contractor shall at all times protect the building from damage from rainwater.
B. Contractor shall provide barricades and clearly mark work zone areas.
C. Refer to Special Conditions "Temporary Services" for additional information.
D. During the period of construction, the OSHA Standards shall be followed as applicable by law.
E. The Contractor shall post emergency telephone numbers.

1.07 Preconstruction Conference:

A. A preconstruction meeting will be held at a time and place designated by the Architect or Owner's Representative, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explanation of administrative procedures.
B. The Contractor shall use this meeting for the following minimum agenda:
   1. Construction Schedule/Project Phasing.
   2. Use of areas of the site.
   3. Delivery and storage.
   4. Safety.
   5. Security.
   6. Cleaning up.
   7. Subcontractor procedures relating to:
      a. Submittals.
      b. Change orders.
      c. Applications for payment.
      d. Record documents.

C. The attendees shall include:
   1. The Owner's Representative(s).
   2. The Architect.
   3. The Contractor and its superintendent.

1.08 Project Scheduling:

A. The Contractor is responsible for the scheduling of construction and must prepare a schedule and charting system described below. This schedule is to ensure adequate planning and execution of the work by the contractor and to assist the Architect in appraising the schedule and evaluating the progress of the work.

B. The project schedule shall be presented within ten (10) days after receipt of the Notice to Proceed. Electronic copies of the schedule shall be submitted to the Architect for review and approval.

C. The schedule logic must be in the form of a "fenced" bar chart or Critical Path Method network indicating the planned start and completion dates of the activity, logical constraints between activities, and total float of each activity.

D. An updated project schedule shall be provided when requested by the Architect.

1.09 Environmental Controls:

A. Water Resources:
   1. Oily substances: prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
   2. Mosquito abatement: prevent ponding of stagnant water conducive to mosquito breeding habitat.

B. Land Resources:
   1. Erodible soils: plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use the areas developed. Immediately protect side slopes and back slopes upon completion of rough grading.

C. Air resources:
   1. Prevent creation of dust, air pollution, and odors.
   2. Use water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to locate practical level.
   3. Store volatile liquids, including fuels and solvents, in closed containers.
   4. Properly maintain equipment to reduce gaseous pollutant emissions.

D. Comply with all applicable environmental control guidelines as required by the City of Moore.

1.10 Temporary Utilities:

A. The Contractor shall provide and pay for all temporary utilities required for the complete construction of the project including, but not limited to, electricity, lighting, heating, cooling, ventilating, telephone, water, sanitary facilities, exterior and interior enclosures, access roads and parking areas, cleaning and waste removal, project identification and

signs, etc.

1.11 Cleaning:

A. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.

B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's published instructions.

C. Complete cleaning operations prior to requesting a Final / Substantial Completion Inspection.

1.12 Project Sign:

A. Provide and install painted plywood project sign on wooden posts securely erected at the project site in a location approved by the Owner.

B. No other project signs or advertisement shall be allowed at the project site unless approved by the Owner.

C. Graphics and form of letter of the project sign shall be as indicated in the attached detail.

1.13 Additional Requirements:

A. The Construction Manager and all is to take all precautions necessary and required by code to protect the existing masonry walls, etc. to remain including structural support, care in performing work to prevent the possibility of damaging, collapsing, etc. of said walls.

End of Section

DIVISION 2 - SITE WORK

SECTION 02110 - TEMPORARY CONSTRUCTION FENCING

Part 1 - General

1.01 Summary
- A. Section includes: Erection, maintenance and dismantling of temporary fencing around construction site and materials storage areas. This section does not apply where security fencing is required.
- B. Refer to Drawings for temporary fencing layout and location of gates.

1.02 Submittals
- A. Submit the following:
  1. Shop drawing indicating layout of temporary fencing, location and size of gates, existing pavement and roads, access to fire hydrants and hose connections, and other site specific conditions. Prepare drawing after site observation and verification of existing conditions.

Part 2 - Products

2.01 Temporary Chain Link fencing:
- A. Unless otherwise indicated, type of temporary chain link fencing shall be Contractor's option. Following types are acceptable:
  1. New materials or previously used salvaged chain link fencing in good condition.
  2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.
  3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.
  4. Height: Minimum Height shall be 8'-0".
- B. Gates: Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site.
  1. Fabricate of same material as used for fencing.
  2. Vehicle gates:
     a. Minimum width: 20 feet to allow access for emergency vehicles.
     b. Capable of manual operation by one person.

Part 3 - Execution:

3.01 Layout:
- A. Installation of temporary fencing shall not deter or hinder

access to existing and new hose connections and fire hydrants.
1. Maintain 3 feet diameter clear space around fire hydrants.
2. Where fire hydrant or hose connection is blocked by fencing, provide access gate.

B. Access: Provide gates for personnel, delivery of materials, and access by emergency vehicles.

3.02 Installation:

A. Chain link posts:
1. Space at 10'-0" maximum.
2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.
3. For soft and unstable ground conditions, cast concrete plug around post.
4. Posts over pavement: Use steel post plates or precast concrete blocks.
5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

B. Fabric: Securely attach to posts.

C. Gates: Install with required hardware.

D. Plastic mesh fencing: Space steel support posts to ensure mesh remains vertical and at proper height. Securely tie mesh to posts.

3.03 Maintenance and Removal:

A. Maintain fencing in good condition. If damaged, immediately repair.

B. Remove temporary fencing upon completion of Work or when no longer required for security or control. Backfill holes and compact. Holes in pavement shall be surfaced to match existing paving. Repair damage caused by installation of temporary fencing.

End of Section

DIVISION 3 – CONCRETE

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 Section Includes
- A. Concrete formwork.
- B. Slabs on grade.
- C. Concrete foundation walls and retaining walls.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads and equipment pits.
- G. Concrete curing.

1.02 Related Requirements
- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints, construction joints and isolation joints in slabs.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- C. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- D. ACI 301 - Specifications for Structural Concrete.
- E. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- F. ACI 302.2R - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
- G. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- H. ACI 305R - Guide to Hot Weather Concreting.
- I. ACI 305.1 - Specification for Hot Weather Concreting.
- J. ACI 306R - Guide to Cold Weather Concreting.
- K. ACI 308R - Guide to External Curing of Concrete.
- L. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- M. ACI 347R - Guide to Formwork for Concrete.
- N. ACI SP-66 - ACI Detailing Manual.
- O. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- P. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

Q. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
R. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
S. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
T. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
U. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
V. ASTM C150/C150M - Standard Specification for Portland Cement.
W. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
X. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
Y. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
Z. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
AA. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
AB. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
AC. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
AD. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
AE. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
AF. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
AG. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
AH. CRSI (DA4) - Manual of Standard Practice.
AI. ICC (IBC)-2015 - International Building Code.

1.04 Definitions

A. Cold Weather: A period when for more than three successive days the average daily outdoor temperature drops below 40 F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50 F occur during more than half of any 24 hr duration, the period shall no longer be regarded as cold weather.

B. Hot Weather: Hot weather is any combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise causing detrimental results:
   1. High ambient temperature
   2. High concrete temperature
   3. Low relative humidity
   4. Wind speed
   5. Solar radiation

1.05 Submittals

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 26 - Concrete Documents and Inspection.

D. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

E. Test Reports: Submit report for each test or series of tests specified.

F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

G. Formwork Design Submittal: As required by authorities having jurisdiction.

H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 Quality Assurance

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for placement as required by the manufacturer's warranty.

1.07 Warranty

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

C. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.

1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

2. Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer's material defect warranty.

PART 2 PRODUCTS

2.01 Formwork

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces of trenched footings unless expressly allowed in the General Notes in the structural drawings. Natural rock formations that maintain a stable vertical edge may be used as side forms for below-grade concrete.

3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

4. Form Ties: Cone snap type that will leave no metal within the clear cover zone of the concrete surface as specified in the Minimum Concrete Cover for Cast-in-Place Non-Prestressed Members table included in the General Notes of the structural drawings.

2.02 Reinforcement Materials

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars, weldable.
   1. Unfinished.

C. Reinforcement Accessories:
   1. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (60,000 psi) plain-steel bars, cut true to length with ends square and free of burrs.
   2. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
      a. Continuous slab bolsters shall be used to support the bottom reinforcing bars of all reinforced slabs-on-grade.
   4. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement of reinforcing steel within 1-1/2 inches of weathering surfaces and for concrete surfaces that will be exposed to view.

D. Fabrication of Reinforcing:
   1. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
   2. Welding of reinforcement is permitted only with the specific approval of Architect/Engineer. Perform welding in accordance with AWS D1.4/D1.4M.
   3. Locate reinforcing splices not indicated on drawings at point of minimum stress.

2.03 Concrete Materials

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 Admixtures

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

D. Water Reducing Admixture: ASTM C494/C494M Type A.

E. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
   1. Provide admixture in slabs to receive adhesively applied flooring.
   2. Manufacturers:
      a. Barrier One, Inc; Barrier One Moisture Vapor Reduction Admixture: www.barrierone.com/#sle.
      b. Substitutions: Substitutions shall comply with the use of concrete staining/dye products. See Section 01 6000 - Product Requirements.

2.05 Accessory Materials

A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.

2.06 Bonding And Jointing Products

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
C. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
D. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness.
   1. Material: ASTM D1751, cellulose fiber.

2.07 Evaporation Retarders

A. Evaporation Retarder: Liquid thin film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement. These products provide a protective film shield over plastic concrete, dissipate as soon as the concrete is no longer plastic, and are not curing products.
   1. Manufacturers:
      a. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/#sle.
      b. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/#sle.
      c. W. R. Meadows, Inc ; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2.08 Liquid Floor Treatments

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. ChemMasters; Chemisil Plus.
   b. ChemTec Int'l; ChemTec One.
   c. Conspec by Dayton Superior; Intraseal.
   d. Curecrete Distribution Inc.; Ashford Formula.
   e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
   f. Edoco by Dayton Superior; Titan Hard.
   g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
   h. Kaufman Products, Inc.; SureHard.
   i. L&M Construction Chemicals, Inc.; Seal Hard.
   j. Meadows, W. R., Inc.; LIQUI-HARD.
   k. Metalcrete Industries; Floorsaver.
   l. Nox-Crete Products Group; Duro-Nox.
   m. Symons by Dayton Superior; Buff Hard.
   n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
   o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

2.09 Curing Materials

A. Moisture-Retaining Sheet: ASTM C171.

1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

B. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

C. Water: Potable, not detrimental to concrete.

2.10 Concrete Mix Design

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
D. Normal Weight Concrete: Refer Structural General Notes for mix requirements for various classes of concrete.

2.11 Mixing
A. Transit Mixers: Comply with ASTM C94/C94M.
B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 Examination
A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 Preparation
A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
B. Verify that forms are clean and free of rust before applying release agent.
C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent according to bonding agent manufacturer's instructions.
    1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
    2. Use latex bonding agent only for non-load-bearing applications.
E. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.
F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, clean out drilled holes, inject the adhesive indicated on drawings and/or General Notes, and insert steel dowels, all in accordance with adhesive manufacturer's installation instructions.

G. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade in accordance with manufacturer's instructions, ASTM E1643, ASTM F710 and ACI 302.2R.
   1. Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.
   2. Lap vapor retarder sheet over footings and seal to previously placed concrete foundations.
   3. Lap joints minimum 6 inches (150 mm).
   4. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
   5. No penetration of vapor retarder is allowed except for reinforcing steel and permanent utilities.
   6. Repair damaged vapor retarder before covering with other materials.
   7. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 Installing Reinforcement And Other Embedded Items

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement, waterstops and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 Placing Concrete

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 48 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish slab-on-grade and shored elevated floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 Slab Jointing

A. Locate and install joints as indicated on drawings and Slab-On-Grade Schedule or as submitted by Contractor and approved by structural engineer.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler, total height equal to thickness of slab, set flush with top of slab.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.

E. Saw Cut Contraction Joints: Saw cut joints shall be installed with early-entry dry-cut saw before concrete begins to cool, within 1 to 4 hours after completing the slab finishing operations; commence in approximately 1 hours in hot weather or approximately 4 hours in cold weather. Use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab. Refer to Slab-On-Grade Schedule in drawings for additional requirements.

3.06 Floor Flatness And Levelness Tolerances

A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.

B. Maximum Variation of Surface Flatness:

1. Exposed Concrete Floors: 1/4 inch in 10 feet.
2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
3. Under Carpeting: 1/4 inch in 10 feet.

C. Correct the slab surface if surface variations exceed specified tolerances.

D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 Concrete Finishing

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
   4. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal (approximately 1/8 inch per foot).

3.08 Curing And Protection

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Uniformly apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss due to evaporation approaching 0.2 lb/sq.ft./h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing. A methodology for calculating the moisture loss due to evaporation is provided in ACI 305.1.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven (7) days.

D. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

E. Surfaces Not in Contact with Forms:

1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than seven (7) days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.

a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for seven (7) days.

b. Spraying: Spray water over floor slab areas and maintain wet.

c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

2. Final Curing: The surface shall be protected against rapid moisture loss upon the termination of initial curing by replacing wet burlap or similar coverings with plastic sheets until the surface has dried under the sheets.

a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.09 Liquid Floor Treatments

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

2. Do not apply to concrete that is less than 28 days old.

a. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.10 Field Quality Control

A. An independent testing agency will perform Special Inspections and field quality control tests as required by

Chapter 17 of ICC (IBC)-2015. The testing outlined below includes some, but not all, of the testing and observations required to meet the Special Inspection provisions of the building code. Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Table 1705.3 titled "Required Special Inspections and Tests of Concrete Construction"

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit approved mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure four concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed each day.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Air Content: ASTM C173/C173M, one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

I. Concrete Temperature: ASTM C1064/C1064M, one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

J. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

3.11 Defective Concrete

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.12 Protection

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

DIVISION 4 – MASONRY

SECTION 04810 – UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.01 Related Documents:

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

1.02 Summary

A. Section Includes:
   1. Clay facing brick.
   2. Mortar and grout.
   3. Reinforcement and anchorage.
   4. Lintels.
   5. Accessories.

1.03 Related Sections:

A. Section 05500 - Metal Fabrications: Loose steel lintels and fabricated steel items.

B. Section 07620 – Sheet Metal Flashing and Trim: Through-wall masonry flashings.

C. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.04 References:

A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2008.

B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.

C. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2005a.

D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

E. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2006.

F. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.

G. ASTM C 150 - Standard Specification for Portland Cement; 2005.

H. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.
   ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2007.

I. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 2006.

J. ASTM C 476 - Standard Specification for Grout for Masonry;

2002.

1.05 Submittals:

A. Product Data: Provide data for masonry units, mortar, and masonry accessories.

B. Samples: Submit 10 samples of facing brick units to illustrate color, texture, and extremes of color range.

1.06 Quality Assurance:

A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents

1.07 Pre-Installation Meeting:

A. Convene one week before starting work of this section.

1.08 Delivery, Storage, and Handling:

A. Deliver, handle, and store masonry materials by means that will prevent mechanical damage and contamination by other materials.

1.09 Project Conditions:

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.01 Face Brick (Veneer):

A. Type and Finish: Velour Modular Brick.

B. Quality: ASTM C-216, Type FBS.

C. Size: Nominal 4″ x 2 2/3″ x 8″ or as directed / approved by Architect.

D. Units shall be uniform in all dimensions and texture, straight and free from cracks, spalls and other defects.

E. Color: as manufactured by Acme Brick -
   1. Color A – to be selected by Architect to match existing. Confirm colors, blend, and layout with Architect.

2.02 Mortar and Grout Materials:
A. Portland Cement: ASTM C 150, Type I.
   1. Hydrated Lime: ASTM C 207, Type S.
   2. Mortar Aggregate: ASTM C 144.
   3. Grout Aggregate: ASTM C 404.
B. Water: Clean and potable.

2.03 Reinforcement and Anchorage (where applicable):
A. Manufacturers of Joint Reinforcement and Anchors:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohmann & Barnard, Inc: www.h-b.com.
   3. Masonry Reinforcing Corporation of America: www.wirebond.com.
   4. Substitutions: as approved by Architect / Engineer.
B. Reinforcing Steel: ASTM A 615/A 615M Grade 40 (280) deformed billet bars; galvanized.
C. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.
E. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Triangular shape, 0.1875 inch (4.75 mm) thick.
   3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

2.04 Flashings:
A. Metal Flashing Materials: Galvanized Steel / Prefinished

Metal as specified in Section 07600.

2.05 Accessories:

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

B. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35%; formulated from neoprene, urethane or PVC.

C. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt).

D. Weeps: Free-draining mesh made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe.

1. Manufacturers:

a. Mortar Net USA, Ltd; Product – Mortar Net Weep Vents: www.martarnet.com

b. Substitutions: as approved by Architect / Engineer.

Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 Mortar and Grout Mixes:

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Limit cementitious materials in mortar to portland cement and lime.

B. Mortar for Unit Masonry: ASTM C 270, using the Proportion Specification.

1. All masonry: Type S.

a. Portland Cement Mixture: One part Grey Portland Cement; 1/4 to 1/2 part lime; sand, not less than 2-1/4 and not more than three times the sum of the volumes of cement and lime used, measured in damp, loose conditions.

b. Exterior Mortar Color: SM270 Tanglewood as manufactured by SPEC MIX.

C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measure according to ASTM C 143/C 143M.

D. Mortar Mixing
   1. All mortars shall be machine mixed in equipment that is free of dirt, oil or grease and which is thoroughly cleaned and rinsed after each day's use. Mix no more mortar than can be used before setting takes place.
   2. Mortars shall be mixed placing all dry ingredients in the mixer first and mixing until uniform in color. Then mixed for 3 to 5 minutes with the maximum amount of water to provide workable consistency.
   3. No add-mixtures shall be used at any time in the mortar on this project, unless approved in writing by the Engineer.
   4. A waterproofing additive will be used in the mortar for brick.
   5. Construct one or two wooden boxes 12"x12"x6" deep and use them to measure the sand required in a batch. Add the cement or lime by the bag. Then add water, measuring by pail. When the desired consistency of mix is determined, mark the level of the mortar in the mixing drum. Use that as the mark for later batches when sand will be added by the shovel full. Repeat the measuring process halfway through the day or whenever the inspector requests it.
   6. Testing: General Contractor will observe a minimum of three (3) observed mixing sessions to verify that the quantities are being mixed as described in the proportions paragraph for Type "S" mortar.

PART 3 - EXECUTION

3.01 Examination:
   A. Verify that field conditions are acceptable and are ready to receive masonry.
   B. Verify that related items provided under other sections are properly sized and located.
   C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 Erection:
   A. Construction Requirements (Masonry Being Worked On)
      1. Air Temperature 40 F to 32 F: Heat sand or mixing water to minimum of 70 F and maximum of 160 F.
      2. Air Temperature 32 F to 25 F: Heat sand and mixing water to minimum of 70 F and maximum of 160 F.
      3. Air Temperature 25 F to 20 F: Heat sand and mixing

water to minimum of 70 F and maximum of 160 F. Use salamanders or other sources of heat on both sides of walls under construction. Employ windbreaks when wind is in excess of 15 mph.

4. Air Temperature 20 F and Below: Heat sand and mixing water to minimum of 70 F and maximum of 160 F. Provide enclosure and auxiliary heat to maintain air temperature above 32 F. Temperature of units when laid shall be not less than 20 F.

B. Protection Requirements (Completed Masonry or Sections Not Being Worked On)
   1. Mean Daily Air Temperature 40 F to 32 F: Protect masonry from rain or snow for 24 hrs.
   2. Mean Daily Air Temperature 32 F to 25 F: Completely cover masonry for 24 hrs.
   3. Mean Daily Air Temperature 25 F to 20 F: Completely cover masonry with insulating blankets for 24 hrs.
   4. Mean Daily Air Temperature 20 F and Below: Maintain masonry temperature above 32 F for 24 hrs. by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps or other approved method.

C. No masonry shall be laid when the ambient temperature is below 40 degrees F. All masonry shall be laid plumb, true to line and level, with accurately spaced courses, with each course breaking joints with the course below, unless noted otherwise on the drawings. A story pole and template shall be used and work checked with a surveying instrument to maintain level coursing.

D. Work required to be built into masonry, including anchors, frames, bolts, sleeves, inserts, compressible fillers, expansion joints and flashing shall be built in as erection progresses. Concrete block into which anchor bolts will be installed shall be filled solid with mortar.

E. Laying Out Block Work: All concrete block work shall be laid out with uniform joints approximately 3/8” thick and shall be bonded at corners where possible and as consistent with good appearance. Where cutting is required, the cuts shall be made symmetrical above openings and as a general rule with no cuts less than 4” with power equipment designed for purpose.

F. Corners shall be made using half blocks in order to maintain head joints centered over block in adjoining courses above and below. Where intersecting masonry

partitions occur, galvanized Durowall Joint Reinforcing shall be used at every 2nd course.

1. Concrete blocks shall be laid dry in a full bed of mortar and ends buttered on both edges. Care shall be used to prevent smearing mortar on exposed faces of the blocks and such accumulations that occur shall be removed immediately. The exposed face of blocks shall be wiped clean with burlap as the work proceeds. Those surfaces exposed to sight in their final position shall be further cleaned to provide for the application of finishes as required.
2. Joints in block work shall be tooled concave in such a manner as to squeeze the mortar back into the joints and to ensure complete contact is made along the edges of the units, compressing and sealing the surface of the joints.
3. Control joints shall be provided in concrete block partitions at door heads where masonry extends above the door frames, where partitions abut exterior walls and elsewhere as noted on the drawings. Joints shall be raked out 3/8" deep and caulked as specified in Division 7. Bond beams shall be installed as indicated and shall be filled with concrete and reinforced with two (2) No. 4 bars unless noted otherwise.

G. Lintels shall be provided where shown and for all openings in masonry work where other types of lintels have not been provided. Concrete block lintels shall bear not less than six inches (6") on each jamb. Lintel blocks shall be solid bottom trough block filled with concrete and reinforced as detailed on drawings.

H. Masonry Reinforcement: Joint reinforcement shall be installed in all concrete block partitions in the joints of every second block course for the full height of the wall.

I. Brick: Provide a 3/8" mortar bed with concave tooled horizontal and vertical joints. Refer to drawings for vertical coursing as related to openings and other features. Brickwork is to be brushed down daily to remove large pieces of mortar slag. At completion of brick masonry work, all exposed masonry surfaces shall be thoroughly cleaned and washed down with clean water and a stiff bristled brush or as recommended by the brick manufacturer and as approved by the Design/Builder. The brick masonry work shall be left in a state exhibiting

properly and fully pointed joints and completely clean surfaces. Subcontractor shall build-in all features of brickwork as shown or indicated on the drawings including weeps, special coursing and or patterned elements.

J. The Subcontractor shall be responsible for furnishing all required labor, tools, and equipment as required to complete all areas of masonry work on the project. This shall be inclusive of all scaffolding, walk-boards and bracing as required to support the work until fully incorporated into the structure.

K. Subcontractor shall also furnish all materials save for the brick units as called out above. These materials include concrete block, mortar, reinforcing, ties and other accessories necessary for the execution of the masonry work.

3.03 Preparation:

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.04 Coursing:

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

D. Brick Units:

1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

3.05 Placing and Bonding:

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Masonry work shall be laid true to dimensions, plumb, square and in bond and properly anchored with vertical joints in line, plumb and true.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

D. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
E. Remove excess mortar and mortar smears as work progresses.
F. Interlock intersections and external corners.
G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
I. Provide a 3/8" joint around hollow metal door jambs and window frames to allow for sealant and expansion.

3.06 Weeps/Cavity Vents:

Install weeps in veneer walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.07 Reinforcement and Anchorage – General:

A. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.
B. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (900 mm) around perimeter.
C. Locate anchor sections to allow maximum vertical differential movement of ties up and down.

3.08 Reinforcement And Anchorage - Concrete Masonry Units:

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 8 inches on center.
B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
C. Place continuous joint reinforcement in first and second joint below top of walls.
D. Lap joint reinforcement ends minimum 6 inches (150 mm).
E. Reinforce joint corners and intersections with strap anchors 16 inches on center.

3.09 Reinforcement and Anchorage - Masonry Veneer:

A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally.

Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 Masonry Flashings:

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.

C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.11 Lintels:

A. Install loose steel lintels over openings.

3.12 Control Joints:

A. Do not continue horizontal joint reinforcement through control joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joint in accordance with Section 07900 for sealant performance.

3.13 Built-In Work:

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 Tolerances:

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 Cutting And Fitting:

A. Cut and fit for pipes and conduit. 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.

3.16 Cleaning:

A. Remove excess mortar and mortar droppings.
B. Clean soiled surfaces with cleaning solution.

3.17 Protection Of Finished Work:

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

End of Section

DIVISION 5 – STRUCTURAL STEEL

SECTION 05120 – STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.01 Section Includes
- A. Structural steel framing members.
- B. Base plates, shear stud connectors and anchor rods.
- C. Grouting under base plates.

1.02 Related Requirements
- A. Section 05 2100 - Steel Joist Framing.
- B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
- C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. AISC (MAN) - Steel Construction Manual.
- C. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
- D. AISC 360 - Specification for Structural Steel Buildings.
- E. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- F. ASTM A29/A29M - Standard Specification for Steel Bars, Carbon Alloy, Hot-Wrought, General Requirements.
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- J. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- K. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- L. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- M. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- N. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- O. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric).

P. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
Q. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
R. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
S. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
T. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film.
U. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
V. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry.
W. ASTM E709 - Standard Guide for Magnetic Particle Testing.
X. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
Y. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
Z. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
AA. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
AB. AWS D1.1/D1.1M - Structural Welding Code - Steel.
AC. ICC (IBC)-2015 - International Building Code.
AD. MPI #79 - Primer, Alkyd, Anti-Corrosive for Metal.
AE. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.
AF. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
AG. SSPC-SP 3 - Power Tool Cleaning.
AH. SSPC-SP 6 - Commercial Blast Cleaning.

1.04 Submittals

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
D. Product Data: For shop primers, include manufacturer's technical information including basic materials analysis and application instructions.
E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
F. Delegated Connection Design Submittal: Provide delegated connection design submittals as required by the General Notes included in the Project Drawings.
G. Erection Sequence: Provide erection sequence submittal as required by the General Notes included in the Project Drawings.

1.05 Quality Assurance

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
B. Fabricator Qualifications:
   1. A steel fabricator specializing in performing the work of this section with minimum 10 years of experience.
C. Erector Qualifications:
   1. An erector specializing in performing the work of this section with minimum 5 years of experience.
D. Delegated Connection Designer Qualifications: Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of steel connections and licensed in the State in which the Project is located.

1.06 Delivery, Storage And Handling

A. Comply with the requirements of the General Conditions and of ASTM A6/A6M, including the following.
B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
C. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.01 Materials

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.
B. Steel W Shapes and Tees: ASTM A992/A992M.
C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.
D. Pipe: ASTM A53/A53M, Grade B, Finish black.
E. Headed Stud Anchors: AWS D1.1 Type B, ASTM A29 Grades 1010 through 1020.
F. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
G. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade C heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
H. Tension Control Bolts: Twist-off type: ASTM F1852.
I. Unheaded Anchor Rods: ASTM F1554, Grade 55 , Supplementary Requirement S1, Weldable, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.
J. Deformed Bar Anchors: AWS D1.1/D1.1M Type C, ASTM A1064 Grade 70.
K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
    1. Minimum Compressive Strength at 48 Hours: 3000 pounds per square inch.
    2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
    3. Height Change, Plastic State; when tested according to ASTM C827/C827M:
        a. Maximum: Plus 4 percent.
        b. Minimum: Plus 1 percent.
M. Shop and Touch-Up Primers: As required below, complying with VOC limitations of authorities having jurisdiction.
    1. Steel Exposed to Exterior Weather or an Uncontrolled Environment: Two-component, high performance, zinc-rich, aromatic urethane, compatible with topcoat and complying with SSPC-Paint 20.

2. Interior Steel: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI #79 and compatible with topcoat.

N. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.02 Fabrication

A. Shop fabricate to greatest extent possible. Fabricate according to AISC 303 and to AISC 360.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Develop required camber for members.

D. Fabricated uncambered beams with rolling camber up.

2.03 Finish

A. Prepare structural component surfaces in accordance with SSPC-SP3 for interior steel or SSPC-SP6 for all steel exposed to exterior weather or an uncontrolled environment.

B. Shop prime structural steel members:

1. Do not prime surfaces that will be galvanized, fireproofed, field welded, in contact with concrete, or [in slip surfaces of slip-critical connections].
2. All steel exposed to exterior weather or an uncontrolled environment shall be blast cleaned and primed with a submitted and approved zinc-rich primer.
3. Interior steel shall be shop primed with the fabricators standard shop primer.

C. Galvanize structural steel members to comply with ASTM A123/A123M.

2.04 Source Quality Control & Quality Assurance

A. Unless the fabricator is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel, an independent testing agency will perform Special Inspections and field quality control and quality assurance tests in the fabricator's shop as required by Chapter 17 of ICC (IBC)-2015 and Chapter N of AISC 360. Refer to the following parts of the structural drawings for additional Special Inspection requirements.

1. Statement of Special Inspection Notes
2. Two tables titled "Required Verification and Inspection of Steel Construction"

PART 3 - EXECUTION

3.01 Examination

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 Erection

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing. Refer to the "Construction Loads and Stability" section of the General Notes in the Project Drawings for additional information and requirements.

C. Field weld components, deformed bar anchors and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Structural Engineer.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 Field Quality Control & Quality Assurance

A. An independent testing agency will perform Special Inspections and field quality control and quality assurance tests as required by Chapter 17 of ICC (IBC)-2015 and Chapter N of AISC 360. Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Two tables titled "Required Verification and Inspection of Steel Construction"

END OF SECTION

DIVISION 5 – STRUCTURAL STEEL

SECTION 05310 – STEEL DECKING

PART 1 – GENERAL

1.01 Section Includes
- A. Roof deck.
- B. Supplementary framing for openings up to and including 8 inches.
- C. Bearing plates and angles.

1.02 Related Requirements
- A. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 8 inches and shear stud connectors.
- B. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 8 inches.
- C. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
- G. ICC (IBC)-2015 - International Building Code.
- H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks.
- I. SDI (QA/QC) - Standard for Quality Control and Quality Assurance for Installation of Steel Deck.
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.04 Submittals
- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D. Submit manufacturer's installation instructions.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 Quality Assurance

A. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck shall be in accordance with the quality assurance inspection requirements of SDI (QA/QC).

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.06 Delivery, Storage, And Handling

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 - PRODUCTS

2.01 Steel Deck

A. Roof Deck: Non-composite type, fluted steel sheet:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G60/Z180 galvanized coating.

2. Structural Properties: As indicated in General Notes.

2.02 Accessory Materials

A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.

B. Welding Materials: AWS D1.1/D1.1M.

C. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

E. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.03 Fabricated Deck Accessories

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gauge, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 - EXECUTION

3.01 Examination

A. Verify existing conditions prior to beginning work.

3.02 Installation

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 2 inch bearing at discontinuous ends of deck and minimum 3 inch bearing length of continuous roof deck over interior supports.

D. Fasten deck to steel support members as indicated at spacings indicated on the drawings using methods specified.

E. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

F. Where roof deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Attach both sides of cover plate to roof deck below with the same fasteners and spacings as required for deck to supports.

G. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

H. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

3.03 Field Quality Control

A. An independent testing agency will perform Special Inspections and field quality control tests as required by Chapter 17 of ICC (IBC)-2015 and SDI (QA/QC). Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Table titled "Required Inspection of Cold-Formed Steel Deck"

B. Concurrent with the submittal of special inspection reports to the Owner's Representative, the special inspector shall submit to the Owner's Representative and the Installer a list of nonconforming items.

END OF SECTION

DIVISION 5 – METALS

SECTION 05400 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:
   1. Exterior and interior non-load-bearing wall framing.
   2. Soffit joist framing.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
   2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.03 Performance Requirements

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: Design loads shall be calculated components and cladding load per ASCE/SEI 7 edition indicated on the drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of wall height at areas backing up brick veneer, and 1/240 of wall height at areas backing up other materials.
      b. Soffit Joist Framing: Vertical deflection of 1/240 of the span.
   3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 1 inch.

B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
   2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

SECTION 05400 – COLD-FORMED METAL FRAMING

1.04 Submittals

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Research/Evaluation Reports: For cold-formed metal framing.

1.05 Quality Assurance

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.06 Delivery, Storage, And Handling

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

SECTION 05400 – COLD-FORMED METAL FRAMING

PART 2 - PRODUCTS

2.01 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
   1. Allied Studco.
   2. AllSteel Products, Inc.
   3. California Expanded Metal Products Company.
   4. Clark Steel Framing.
   5. Consolidated Fabricators Corp.; Building Products Division.
   6. Craco Metals Manufacturing, LLC.
   7. Custom Stud, Inc.
   8. Dale/Incor.
   9. Design Shapes in Steel.
   10. Dietrich Metal Framing; a Worthington Industries Company.
   11. Formetal Co. Inc. (The).
   12. Innovative Steel Systems.
   13. MarinoWare; a division of Ware Industries.
   14. Quail Run Building Materials, Inc.
   15. SCAFCO Corporation.
   16. Southeastern Stud & Components, Inc.
   17. Steel Construction Systems.
   18. Steeler, Inc.
   19. Super Stud Building Products, Inc.
   20. United Metal Products, Inc.

2.02 Materials

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: ST33H (ST230H).
   2. Coating: G60 (Z180).

B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: 50 (340), Class 1 or 2.
   2. Coating: G90 (Z275).

2.03 Exterior Non-Load-Bearing Wall Framing

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0428 inches (1.09 mm).
   2. Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inches (1.37 mm)
   2. Flange Width: 1-1/2 inches.

C. Vertical Deflection Clip Option: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dietrich Metal Framing; a Worthington Industries Company.
      b. MarinoWare, a division of Ware Industries.
      c. SCAFCO Corporation
      d. The Steel Network, Inc.

D. Single Deflection Track Option: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
   2. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Double Deflection Track Option: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
   1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
      a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
      b. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
   2. Inner Track: Of web depth indicated, and as follows:
      a. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
      b. Flange Width: Equal to sum of outer deflection track flange width plus 1 inch.

2.04 Soffit Joist Framing

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depth indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As indicated on drawings.
   2. Flange Width: 1-5/8 inches (41 mm) minimum.

2.05 Framing Accessories

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Web stiffeners.
   4. Anchor clips.
   5. End clips.
   6. Foundation clips.
   7. Gusset plates.
   8. Stud kickers, knee braces, and girts.
   9. Joist hangers and end closures.
   10. Hole reinforcing plates.
   11. Backer plates.

2.06 Anchors, Clips, And Fasteners

A. Anchor Bolts: ASTM F 1554, Grade 55, threaded carbon-steel headless bolts, with encased end threaded, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C or mechanically deposition according to ASTM B 695, Class 50.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

E. Welding Electrodes: Comply with AWS standards.

2.07 Miscellaneous Materials

A. Galvanizing Repair Paint: ASTM A 780.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.08 Fabrication

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening

requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.01 Examination

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation, General

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for

which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.03 Exterior Non-Load-Bearing Wall Installation

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Fast both flanges to top track if required by deflection option selected. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm).

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Single Deflection Track Option: Install single-leg deflection tracks and anchor to building structure.
2. Double Deflection Track Option: Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Deflection Clip Option: Connect vertical deflection clips to infill studs and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track Option: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      a. Install solid blocking at maximum 96-inch (2440-mm) centers and as shown on approved Shop Drawings.
   2. Bridging Options:
      a. Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
      b. Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      c. Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.04 Joist Installation

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
   1. Unless shown otherwise in drawings, install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
   2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on drawings.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
   1. Joist Spacing: As indicated.

D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
E. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
   1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
F. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.05 Field Quality Control

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Field and shop welds will be subject to testing and inspecting.
C. Testing agency will report test results promptly and in writing to Contractor and Architect.
D. Remove and replace work where test results indicate that it does not comply with specified requirements.
E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.06 Repairs And Protection

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensures the cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

DIVISION 5 – STRUCTURAL STEEL

SECTION 05500 – METAL FABRICATIONS

PART 1 – GENERAL

1.01 Section Includes
- A. Shop fabricated steel items.

1.02 Related Requirements
- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
- E. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- F. Section 05 5100 - Metal Stairs.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- K. MPI #79 - Primer, Alkyd, Anti-Corrosive for Metal.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

SECTION 05500 – METAL FABRICATIONS

1.04 Submittals

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.

a. Include the following, as applicable:

1) Design criteria.

2) Engineering analysis depicting stresses and deflections.

3) Member sizes and gauges.

4) Details of connections.

5) Support reactions.

6) Bracing requirements.

PART 2 – PRODUCTS

2.01 Materials - Steel

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: As required below, complying with VOC limitations of authorities having jurisdiction.

1. Steel Exposed to Exterior Weather or an Uncontrolled Environment: Two-component, high performance, zinc-rich, aromatic urethane, compatible with topcoat and complying with SSPC-Paint 20.

2. Interior Steel: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI #79 and compatible with topcoat.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.02 Fabrication

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 Fabricated Items

A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking and joists; prime paint finish.

B. Lintels: As detailed; prime paint finish.

C. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

D. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

E. Toilet Partition Suspension Members: Steel channel sections; prime paint finish.

2.04 Finishes - Steel

A. Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.

2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP3 for interior steel or SSPC-SP6 for all steel exposed to exterior weather or an uncontrolled environment.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 Fabrication Tolerances

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.
D. Maximum Bow: 1/8 inch in 48 inches.
E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 – EXECUTION

3.01 Examination
A. Verify that field conditions are acceptable and are ready to receive work.
3.02 Preparation
A. Clean and strip primed steel items to bare metal where site welding is required.
B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
3.03 Installation
A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Field weld components as indicated on drawings.
D. Perform field welding in accordance with AWS D1.1/D1.1M.
E. Obtain approval prior to site cutting or making adjustments not scheduled.
F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
3.04 Tolerances
A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.
C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

DIVISION 6 - WOOD & PLASTIC

SECTION 06100 - ROUGH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Wood Treatment - Section 06300

1.03 Quality Assurance:
- A. Grades specified shall conform to the most recent grading rules as established by the following bureaus and associations.
  1. PS 20 - American Softwood Lumber Standard.
  2. Western Wood Products Association
  3. Southern Pine Inspection Bureau
- B. Grade and trade mark each piece of lumber or bundle on bundled stock. Use only the recognized official marks of association under whose rules it is graded. Grade and trade marks will not be required if each shipment is accompanied by certificate of inspection issued by grading association.

1.04 Submittals:
- A. Product Data: for each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing and finishing treated material.
  2. As requested by authorities having jurisdiction include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply wit requirements. Include physical properties of treated materials both before and after exposure to elevated temperatures when tested according to ASTM D5516 and ASTM D 5664.
  3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

4. Research / evaluation reports – for the following, showing compliance with building code in effect for Project:
    a. Fire-retardant treated wood.
    b. Power-driven fasteners.
    c. Power-actuated fasteners.
    d. Expansion anchors.
    e. Metal framing anchors.

1.05 Delivery, Storage and Handling:

A. Stack lumber, plywood, sheathing, and other materials: provide spacers between each bundle to provide air circulation around bundled material. Provide proper air circulation between stacks and under coverings.

Part 2 - Products

2.01 General:

A. Provide best quality of respective grades and kinds. Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, “FSC Principles and Criteria for Forest Stewardship”. Factory mark each piece of lumber with grade stamp of grading agency.

B. Maximum moisture content of lumber 19%.

C. Provide dressed lumber (S4S) unless otherwise indicated.

D. Where nominal sizes are indicated, provide actual sized required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

2.02 Grades and Applications of Lumber:

A. Framing lumber for the following shall be "Standard" grade Douglas Fir (WCLIB or WWPA).
    1. Concealed blocking/nailers, cants, grounds, and miscellaneous wood items used in conjunction with the roofing work and as indicated on the Drawings.
    2. Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the Grading Agency indicated.

2.03 Fire-retardant Treated Materials:

A. General – where fire-retardant treated materials are required by authorities having jurisdiction, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant treated wood with appropriate classification

marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

2.04 Panel Products:

A. Miscellaneous Concealed Plywood: shear wall sheathing, span rating to suit framing in each location, and thickness indicated. Refer to Structural Drawings.

B. Telephone and Electrical Equipment Backing Panels: DOC PS 1, C-D Plugged, fire-retardant treated, in thickness indicated, or if not indicated, not less than ½ inch thick.

2.05 Fasteners:

A. All nails, spikes, bolts, connectors and other fasteners used in connections with this work shall be galvanized.

1. Nails, wire, brads and staples – FS-FF-N-105.
2. Power-driven Fasteners – CABO NER-272.
3. Wood screws – ASME B18.6.1.
4. Screws for fastening to cold formed metal framing: ASTM C954 length as recommended by screw manufacturer for material to be fastened.
5. Lag bolts – ASME B18.2.1.
6. Bolts – steel bolts complying with ASTM A 307, Grade A with ASTM C563 hex nuts and, where indicated, flat washers.
7. Expansion anchors – anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   a. Material for interior applications: carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   b. Material for exterior applications: stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, alloy group 1 or 2.

2.06 Metal Framing Anchors:

A. General: provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.

B. Galvanized Steel Sheet: hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

SECTION 06100 - ROUGH CARPENTRY

Part 3 - Execution

3.01 Sizes and Applications (General Framing):

A. Members shall be accurately cut and fitted, true to line and level, avoiding shims and wedges as much as possible. Discard material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Where applicable, apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

C. At wood ground, blocking and nailer installation: install where indicated and required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

D. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless noted otherwise.

3.02 Rough Hardware:

A. Provide all sufficient nails, screws, etc. to insure rigidity and structural soundness. Provide hot-dipped galvanized fasteners at all weather exposed locations.

B. Spiking and nailing shall be done using largest size spikes and nails practicable and as indicated on the drawings. Securely attach carpentry according to applicable codes and recognized standards.

C. Bolt nailers and blocking to steel or concrete members with bolts of proportionate strength of members attached, length required, spaced 4'-0" o.c. maximum and 4" from each end, except as otherwise indicated. Countersink fastener heads on exposed carpentry work and fill holes with wood fiber.

D. Predrill members when necessary to avoid splitting of wood.

3.03 Panel Product Installation:

A. Wood structural panels: comply with applicable recommendations contained in APA Form No. E30K, “APA Design/Construction Guide: Residential and Commercial”, for types of structural-use panels and applications indicated. Comply with “Code Plus” provisions in above referenced guide.

End of Section

DIVISION 6 - WOOD & PLASTIC

SECTION 06200 - FINISH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.
- B. The erection of wall and partition wood finish materials, installation of door and hardware, and shelving incidentals necessary to finish the carpentry.

1.02 Related Work Specified Elsewhere:
- A. Wood Doors - Section 08200
- B. Hardware and Specialties - Section 08700
- C. Painting – Section 09900

1.03 Quality Assurance:
- A. Standards:
  1. Architectural Woodwork Institute:
     a. Architectural Woodwork Quality Standards.
  2. National Electrical Manufacturers Association:
     a. NEMA Publication LD-1.
  3. Western Wood Products Association:
     a. Standard Grading Rules for Western Lumber.
  4. American Plywood Association:

1.05 Product Delivery, Storage and Handling:
- A. All finish materials, trim, etc. shall be inspected to ensure that no sub-grade, defective, or machine-marked pieces are installed.

Part 2 - Products

2.01 General:
- A. Grades specified shall conform to the most recent grading rules of the association or bureau under whose rules the lumber is produced.
- B. Quality standards specified shall conform to the latest edition of the Architectural Woodwork Institute's "Quality Standards".
- C. Lumber shall be kiln-dried to 10% to 12% moisture content which shall be maintained during the fabrication of millwork and cabinetry.

Part 3 - Execution

3.01 Miscellaneous Trim and Frames:
- A. Install all trim in longest possible lengths. Stagger joints in adjacent member. Cope at returns and miter at corners. Attach securely in place with fine finishing nails where exposed; set for filling.

B. Immediately prior to final inspection of building, the contractor shall repair or replace all millwork or cabinetry items which have been damaged in any way.

End of Section

DIVISION 6 - WOOD & PLASTIC

SECTION 06300 - WOOD TREATMENT

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  - 1. American Wood Preservers Association:
    - a. AWPA Standard P-5 (Preservative)
    - b. AWPA Standard Commodity Standards (Treating Process).
  - 2. Federal Specifications:
    - a. TT-W-550 (Preservative).
    - b. TT-W-571 (Treating Process).
- B. All lumber and plywood receiving wood treatment shall bear the trademark of the process used.
- C. Submit certificate and guarantee of the lumber treated.

Part 2 - Products

2.01 Materials:
- A. Description: Waterborne chemical salts intended for pressure impregnation as a wood preservative. Preservatives with a petroleum vehicle are not permitted.

Part 3 - Execution

3.01 Installation:
- A. Location of treated lumber:
  - 1. All blocking, plates, nailers and curbs used in conjunction with gravel guards, roof edges and all other wood components used in the roofing project.
- B. Materials shall be pressure treated in accordance with the standards of the American Wood Preservers Institute and the chemical manufacturer's specifications.
- C. Treated material shall conform to AWPB LD-2 and treated to a maximum retention of 0.23 pound of oxide per cubic foot.
- D. Moisture content of finish products shall not exceed 19%.

End of Section

DIVISION 7 -THERMAL & MOISTURE PROTECTION

SECTION 07100 - WATERPROOFING

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  - 1. Federal Specifications:
    - a. SS-C-153B, Cement, Bituminous, Plastic.
    - b. SS-A-701B, Asphalt, Weatherproofing.
    - c. LLL-1-535A, Insulation Board, Thermal.

1.03 Submittals:
- A. Provide submittals in the form of samples, and documentation, to the Architect for review.

Part 2 - Products

2.01 Materials:
- A. Solvent Based Asphalt Water Barrier: FS-SS-A-701B.
- B. Flashing Membrane: 20 mil elastomeric modified sheet vinyl.
- C. Asphalt Plastic Cement: SS-C-153B, Type 1.
- D. Accessories: As recommended by manufacturer.
- E. Protection Board: Insulation Board, FS-LLL-1-535A, Class A.
- F. Vapor Barrier under floor slab: refer to Section 07195 - Vapor Retarder.

Part 3 - Execution

3.01 Installation - Wall Waterproofing:
- A. Location: Apply to all exterior concrete and masonry wall surfaces below grade.
- B. General:
  - 1. Repoint all holes cracks and joints and allow to dry before waterproofing.
  - 2. Do not apply until all surfaces are completely dry and clean. Apply only during favorable weather conditions.
- C. Joint Membrane:
  - 1. Location: Apply to all joints in exterior concrete walls below grade.
  - 2. Embed a strip of flashing membrane in plastic cement. Membrane shall be a minimum of 12" wide.
- D. Water Barrier:
  - 1. Hold 4" down from finish grade line so that at no time is the mastic or membrane exposed to view.
  - 2. Apply two (2) coats to form a membrane water barrier, allowing the first coat to dry before applying the second

coat. Apply in strict accordance with manufacturer's instructions. Do not apply until surfaces are completely dry.

3. Apply in a continuous unbroken film free from pin holes or other surface breaks. Take care to seal around all ties, inserts, anchor slots, conduit, pipes, electrical boxes, etc.

E. Protection:

1. Install protection board over all waterproofing prior to backfilling.
2. All back filling shall be carefully done to protect waterproofing. Repair all damaged areas.

3.02 Under Slab Vapor barrier:

A. Refer to Section 07260 – Vapor Barrier.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07150 - DAMPPROOFING

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Waterproofing - Section 07100
- B. Sealants - Section 07900

1.03 Quality Assurance
- A. Standards:
  - 1. Federal Specifications:
  - a. SS-C-153B, Cement, Bituminous, Plastic.
  - b. SS-A-701B, Asphalt, Weatherproofing.
  - 2. American Society for Testing and Materials:
    - a: ASTM D-250, Asphalt Saturated Asbestos Felts.

Part 2 - Products

2.01 Materials:
- A. Solvent Based Asphalt Water Barrier: FS-SS-A-701B
- B. Flashing Membrane: 20 mil elastomeric modified sheet vinyl.
- C. Asphalt Plastic Cement: SS-C-153B, Type 1.
- D. Asphalt Saturated Felt: ASTM D-250, Un-perforated,#15.
- E. Accessories: As recommended by manufacturer.

Part 3 - Execution

3.01 Installation - Cavity Wall Dampproofing:
- A. General - Masonry and Concrete:
  - 1. Repoint all holes, cracks and mortar joints and allow to dry before waterproofing and dampproofing.
  - 2. Sweep wall base, including concrete slab, clean of dirt and mortar droppings immediately prior to application of waterproofing and dampproofing cavity walls.
  - 3. Do not apply until all surfaces are completely dry and clean.
  - 4. Do not apply until all surfaces are completely dry and clean.
  - 5. Sight exposed mastic and membrane not allowed.
- B. Wall Base Waterproofing:
  - 1. Location: Apply at base of outer face of concrete walls and outer face of inner wythe at all exterior masonry cavity walls.
  - 2. At intersection of outer face of inner wythe with concrete slab, provide a 2" radius cove built up with asphalt plastic cement.

3. At wall base, embed a strip of plastic flashing in Plastic Cement. Lap all joints 8" minimum and seal with joint sealant. Seal completely around piping, conduit, etc. provide minimum joints using longest sheets of flashing practicable. Seal all punctures. Top edge of membrane shall be a minimum of 8" above concrete slab, worked into curve of plastic cement cover, down, and outward on concrete slab or steel shelf angle to outer wythe.

C. Cavity Wall Dampproofing:
1. Apply to outer face of inner wythe masonry cavity walls.
2. Apply two (2) coats to form a membrane water barrier, allowing the first coat to dry before applying the second coat. Apply in strict accordance with manufacturer's instructions. Do not apply until surfaces are completely dry.
3. Apply in a continuous unbroken film free from pin holes or other surface breaks. Take care to seal around all masonry ties, inserts, anchor slots, conduit, pipes, electrical boxes, etc.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07200 – INSULATION

Part 1 - General

1.01 Work Included:
- A. All materials, labor and services and incidentals necessary for the completion of this section of work.

1.02 Quality Assurance:
- A. Standards:
  - 1. Federal Specifications:
    - a. HH-I-524C, Type IV, Class C, Rigid Insulation.
    - b. ASTM C 665-84, Type 1, Insulation Blankets.
    - c. ASTM D1621, Compressive Strength.
    - d. ASTM E84, Flame Spread and Smoke Developed.
- B. Submittals:
  - 1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.03 Product Delivery, Storage and Handling:
- A. Rigid insulation board is combustible. During storage and insulation, observe good fire safety practice, including job site housekeeping.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Rigid Insulation: FS-HH-I-1972/1, Class 2 Rigid Insulation.
  - 1. Type: Glass fiber reinforced polyisocyanurate core with foil facing each side (glass fiber facing at roof insulation), and a compressive strength of 25 p.s.i. and a maximum water vapor transmission rate of >.03 perm-inch.
    - a. Application: 2 layers of rigid insulation. First layer shall be 2″ thick / second layer shall be 2″ thick for a total thickness of 4″ with a minimum total thermal resistance of R-24, for installation above metal decking and exterior wall at cavities. Refer to Drawings.
  - 2. Type: expanded polystyrene insulation.
    - a. Application: 2" thick with a thermal resistance of R-10.4, **for foundation wall perimeter below grade installation only**.
  - 3. Adhesive: as recommended by manufacturer of rigid insulation board.

B. Fibrous Insulation: ASTM C 665-84, Type 1
   1. Type:
      a. 6" thick (approx.) mineral wool or fiberglass fire resistant insulating blanket or batt, with kraft paper facing. Thermal resistance R-19. Refer to Drawings for locations.

C. Vapor Retarder:
   1. Roof Deck Installation:
      a. Two layers of high strength kraft paper laminated with an adhesive and reinforced at edges with fiberglass yarns.
      b. Type Example: Permstop - Owens Corning.

Part 3 - Execution

3.01 Installation - Rigid Insulation:

A. Install rigid insulation horizontally against back-up wall, or to roof deck, as shown on the Drawings.

B. **Rigid insulation and other components applied to metal decking at membrane roofing shall be fastened with approved fasteners at the rate of 1 per 2 square feet to meet FM I-90 requirements.**

C. Install 2 layers of rigid insulation to metal roof deck and at wall cavity. Stagger joints of insulation to provide continuous insulation coverage.

D. Cut insulation by means of a saw, knife, or other sharp tool to fit around obstructions across the wall, such as vents, louvers, pipes and conduit.

E. If mastic adhesive is used to supplement holding the insulation in place, observe label directions.

End of Section

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07260 – VAPOR BARRIER

PART 1 - GENERAL

1.01 Work Included

A. Furnish all labor, materials, services and equipment required in conjunction with or properly incidental to the installation of under-slab vapor barriers described herein and/or as shown on the drawings.

1.02 Related Work

A. Section 03300: Cast-In-Place Concrete.

1.03 Job Conditions

A. Subbase: Smooth and level, free from damaging protrusions that would puncture vapor barrier.

1.04 References

A. ASTM E 1643 - Standard Practice for Installation of Water Vapor Barriers Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. ASTM E 1745 - Standard Specification for Plastic Water Vapor Barriers Used in Contact with Soil or Granular Fill under Concrete Slabs: Exceeds Class B

C. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E 154 – Standard Test Methods for Water Vapor Barriers Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

E. ASTM D 1709 - Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

F. ASTM F 1249 – Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

G. ACI 302.1R – Vapor barrier component (plastic membrane) not less than 10 inches thick.

1.05 Submittals

A. Submit in accordance with Division 1 requirements.

B. Product Data: Provide manufacturers printed product literature and description, including tests and standards that have been performed on the vapor barrier material.

C. Samples: Submit two, 8 1/2 x 11 inch in size, illustrating the vapor barrier and two (2) 8-1/2-in long sample strips of the joint tape.

D. One each of all accessories that will be used in the installation.

E. Verification by Independent testing labs indicating that materials comply with specified requirements.

F. Certificates: Certify that products of this section meet or exceed specified requirements.

G. Manufacturer's Instructions: Indicate complete installation instructions.

PART 2 - PRODUCTS

2.01 Available Products
- A. Stego Wrap 15 mil Vapor Barrier by Stego Industries, L.L.C.
- B. Perminator™ 15 mil by W.R. Meadows .
- C. Vapor Block 15 (mil) by Raven Industries, Inc.
- D. Moistop Ultra 15 (mil) by Fortifiber Building Systems Group
- E. Viper Vaporcheck II 15 mil by Insulation Solutions, Inc.

2.02 Source Quality Control And Testing
- A. Vapor barrier membrane shall have following properties:
  1. Water Vapor Barrier: Meets or exceeds Class A according to ASTM E 1745.
  2. Water Vapor Transmission Rate: 0.012 grains/ft2/hour or lower according to ASTM E 96.
  3. Water Vapor Permeance: 0.01 perms or lower according to ASTM E 154 Sec. 7 or F 1249 (max.).
  4. Tensile Strength: 45.0 lbf/in according to ASTM E 154 Sec. 9. .
  5. Puncture Resistance: 2200 g according to ASTM D 1709, Method B

2.03 Accessories
- A. Tape:
  1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4".
- B. Pipe Boot:
  1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.01 Examination
- A. Verify that conditions are acceptable for the placement of the vapor barrier.

3.02 Preparation
- A. Ensure that subsoil is approved by Geotechnical Engineer.
  1. Vapor Barrier shall be installed on top of the aggregate, sand or tamped earth base or carton forms. At carton forms provide a vertical leg down to grade and adhered the vapor barrier to the grade beam at or just below the dirt line. Vapor barrier may be placed either above or beneath any carton form slip sheet.

3.03 Installation

A. Install vapor barrier per manufacturer's instructions, illustrations and ASTM E 1643 Standard Practice for Installation of Water Vapor Barriers Used in Contact with Earth or Granular Fill Under Concrete Slabs.

1. Level and tamp or roll granular base.
2. Place Vapor Barrier with the longest dimension parallel with the direction of the pour.
3. Lap Vapor Barrier over footings and seal to foundation walls. Seal all penetrations.
4. Lap joints 6 inches and seal with the recommended pressure sensitive tape.
5. Seal pipe penetrations with pipe boot made from vapor barrier and tape.
6. Protect vapor barrier from damage during installation of reinforcing steel and utilities.
7. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with pressure sensitive tape.

3.04 Interface With Other Work

A. Coordinate work of all other trades related to the slab base and utility services.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07550 – MODIFIED BITUMEN MEMBRANE ROOFING SYSTEM

Part 1 - General

1.01 Section Includes:
- A. Preparation of Substrate to Receive Roofing Materials
- B. Roof Insulation Application to Prepared Substrate
- C. Roof Membrane Application
- D. Roof Flashing Application
- E. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System

1.02 Products Installed But Not Furnished Under This Section:
- A. Sheet Metal Flashing and Trim
- B. Sheet Metal Roofing Specialties

1.03 Related Sections:
- A. Roof Decks - Section 05310
- B. Rough Carpentry - Section 06100
- C. Insulation - Section 07200
- D. Flashing & Sheet Metal Section 07600

1.04 Reference Standards:

References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

ASTM	American Society for Testing and Materials Philadelphia, PA
FM	Factory Mutual Engineering and Research Norwood, MA
NRCA	National Roofing Contractors Association Rosemont, IL
OSHA	Occupational Safety and Health Administration Washington, DC
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
UL	Underwriters Laboratories, Northbrook, IL

1.05 Description Of Work:
- A. **Project Type:** New installation.
  Deck: Metal Slope: **3/8 inch ±** per foot.
- B. **Rigid Insulation:**
  1. Top and Bottom Layers: Polyisocyanurate, having a total thickness of **4"** – top layer of 2" and bottom layer of 2". Refer to Section 07200, Insulation.
  2. Crickets: Polyisocyanurate (tapered) providing a roof slope to roof drains (refer to Drawings.)
- C. **Gypsum sheathing panel:** having a thickness of 1/2 inch, mechanically attached, as per FM I-90 requirements.
- D. **Roof System:** Modified Bitumen Base, applied in cold adhesive; stripping and Flashing, applied in cold adhesive.

Modified Bitumen Finish Ply applied in cold adhesive.

E. **Flashing System:** SBS with continuous metal-foil surfacing, torch applied.

1.06 Submittals:

A. Submittals Prior to Contract Award:

1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.
2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

B. Submittals Prior to Project Close-out:

1. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.07 Quality Assurance:

A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.

B. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.

1. Underwriters Laboratories Class A acceptance of the proposed roofing system without additional requirements for coatings.

C. Acceptable Contractor: Contractor shall have a minimum of 10 years of experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products for a minimum of 5 years prior to the date of bid opening.

1. Torch Applicators: Contractor shall employ torch applicators who have successfully passed the CERTA (Certified Roofing Torch Applicator) program requirements as provided by the National Roofing Contractors Association (NRCA).
2. The Contractor shall have an office, warehouse with supplies, and permanent roofing crews within a 50 mile radius of Moore, Oklahoma. Contractor shall have had "NDL" (No Dollar Limit) approval for 5 years AT THIS AREA OFFICE from manufacturer and shall perform a

minimum of ten (10) NDL manufacturer guarantees per year.

3. **Owner's Roofing Contractor (Universal Roofing and Sheet Metal located in Moore, Oklahoma) shall be utilized on this project. The bid shall be based on the provided drawings, specifications, and agreed-to pricing.**

D. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full-time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors Association, amended to include the acceptance of a phased roof system installation.

E. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

F. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

G. Contractor shall have one of the following approved Contractor Certification levels prior to bid opening:
   Johns Manville - Peak Advantage Contractor
   Soprema – Soprema Certified Applicator
   Siplast – Siplast Select Applicator
   GAF - Master Select Contractor

1.08 Product Delivery Storage And Handling:

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives, and asphalt cutback products away from open flames, sparks, or excessive heat.

Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed, and replaced at the Contractor's expense.

1.09 Project/Site Conditions:

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.
2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements:

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application.
   Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.
2. Temperature Restrictions: At ambient temperatures between 40F and 50F, prepare / warm adhesive as directed by manufacturer.

C. Protection Requirements:

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
2. Torch Safety: Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas of roof construction. Continue the fire watch after roofing material application has been suspended for the day.
3. Limited Access: Prevent access by the public to materials, tools, and equipment during the course of the project.

4. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.
5. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10 Guarantee/Warranty:

A. Roof Membrane Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with **the manufacturer's ten year labor and materials membrane guarantee.** The guarantee shall be a term type, without deductibles or limitations on coverage amount, and shall be issued at no additional cost to the Owner. This guarantee shall not exclude random areas of ponding from coverage.

1.11 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Only the four systems listed in 2.02 Description of Systems below will be accepted for installation on this project.**

Part 2 - Products:

2.01 Roofing System Assembly/Products:

A. Rigid Roof Insulation: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly. Refer to Section 07200.

B. Recover Board Sheathing Panel for Roof Membrane Substrate: A panel composed of high density fiberboard, non-structural water resistant core material integrally bonded having a nominal thickness of 1/2 inch.
   1. Acceptable Manufacturer: Fiberboard Coated High Density Roof Insulation, by Huebert.

C. Gypsum Sheathing Panel for Wood/Plywood Surfaces to Receive Flashing Coverage: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 1/2 inch. The panel surface shall be factory primed with a non-asphaltic primer.
   1. Acceptable Manufacturer: DensDeck Prime Gypsum Roof Board, by Georgia Pacific Corporation; Atlanta, GA

2.02 Description Of Systems:

A. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared

substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14F - or show evidence of other independent testing indicating resistance fatigue, membrane cracking and delamination. Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

1. Acceptable Manufacturer: Johns Manville roof system:
   a. Modified Bitumen Base, Stripping, and Flashing Reinforcing Ply.
      JM DynaBase
   b. Modified Bitumen Finish Ply
      JM DynaGlas FR
   c. Stripping Ply and Flashing Reinforcing Sheet
      JM DynaPly

B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.

1. Acceptable Manufacturer: Johns Manville flashing system, aluminum finish
   a. Cant Backing Sheet for Wood/Plywood Surfaces to Receive Flashing Coverage: applicable JM product.
   b. Metal-Clad Modified Bitumen Flashing Sheet: JM DynaClad Flashing
   c. Cant Strip: JM FesCant Plus Cant Strips

C. Catalyzed Acrylic Resin Flashing System: A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

1. Acceptable Manufacturer: Flashing System by Johns Manville; Denver, CO

D. Additional Roof Systems: The following additional roof systems are acceptable for use in lieu of the specified roof system.

1. GAF Materials Corp., Wayne, NJ
   Base Ply B Ruberoid Mop Smooth
   Finish Ply B Ruberoid Mop FR - cap ply Plus
   Flashing Sheet B Ruberoid Ultraclad SBS
   Stripping Ply and Flashing Reinforcing Sheet - Ruberoid Mop Smooth
2. Soprema, Inc., Wadsworth, OH
   Base Ply – Elastophene Sanded 2.2
   Finish Ply – Elastophene LS FR GR
   Flashing Sheet – Sopralast 50 TV ALU
   Stripping Ply and Flashing Reinforcing Sheet - Elastophene Sanded 2.2

2.03 Roofing Accessories:

A. Roofing Adhesives:

1. Membrane Cold Adhesive: An asphalt, solvent blend conforming to ASTM D 3019, Type III requirements.
   a. Acceptable Manufacturer: MBR Cold Application Adhesive by Johns Manville; Denver, CO

B. Bituminous Cutback Materials:

1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.
2. Mastics: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.

C. Sealant: A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials.

D. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

E. Metallic Powder: A finely graded metal dust as supplied or approved by the membrane manufacturer, used for covering of bitumen overruns over the foil surfaced membrane.

F. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

G. Fasteners:
   1. Gypsum Sheathing Panel Fasteners for Roofing Substrates and Wood/Plywood Flashing Surfaces: Gypsum sheathing panel fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The fastening pattern for each panel to be used shall be as recommended by the panel manufacturer and approved by the manufacturer of the primary roofing products. Acceptable panel fastener manufacturers for specific substrate types are listed below.
      a. Wood/Plywood Flashing Surfaces: Gypsum sheathing panel mechanical fasteners shall be factory coated for corrosion resistance. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable fastener types for wood/plywood substrates are listed below.
         1) A fluorocarbon coated screw type roofing fastener having a minimum 0.220 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.
      b. Acceptable Manufacturer=s:
         1) Ultrafast Fastener with UltraFast Round Metal Plates by Johns Manville; Denver, CO
         2) Dekfast #12 with Dekfast Steel Hexagonal Plates by Construction Fasteners, Inc.; Wyomissing, PA
         3) Standard Roofing Fastener by Olympic Manufacturing Group, Agawam; MA
   2. Flashing Reinforcing Sheet Fasteners: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.
      a. Wood/Plywood Substrates
         1) A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.
         2) Square Cap by W.H. Maze Co.; Peru, IL
            12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co., Americus, GA
         3) Fasteners shall be applied to meet FM-I90 requirements. At crickets, if insulation

thickness prohibits satisfactory application of fasteners, use adhesive similar to Para-STIK insulation adhesive.

H. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.
   1. Thickness: 0.25 in
   2. Width: 32 in
   3. Acceptable Manufacturer: DynaTred Roof Walkway Pads by Johns Manville; Denver, CO

I. Pipe Supports Typical:
   1. Roller System: A Aroller-bearing@ pipe support for roof-mounted gas pipes, RTU condensate lines, and electrical conduit up to 4" I.D. or 5"O.D. Pipes rest on a self-lubricating roller system which is made of a stainless steel or glass-filled nylon rod and a sturdy polycarbonate resin roller. Pipe support base shall be manufactured of polycarbonate resin with a roller rod of glass-filled nylon, and stainless steel metal parts.
   2. Load Weight: Maximum load weight may not exceed 125 lbs. per pipestand.
   3. Spacing: Not to exceed 10 foot centers. Do not exceed 125 lbs. load weight and adjust pipe stand in height to even load.
   4. Acceptable Manufacturer: Pillow Block Pipestand Model 4-R, Miro Industries, Inc., 1780 West 2300 South, Salt Lake City, Utah 84119.

J. Pipe Supports at Turns In Large Piping:
   1. Pipe Support Hangers: A Aclevis hanger@ pipe support hanger for roof mounted gas pipes at all large (over 4" I.D.) piping corners, bends, and Atees@/pipe intersections. Pipes rest on a clevis hanger with a support base of stainless steel polycarbonate. All other metal parts are hot-dip galvanized steel.
   2. Load Weight: Maximum load weight not to exceed 310 lbs. per pipestand or 155 lbs. on each base.
   3. Spacing: Locate Aclevis@ type pipe hangers at all corners, bends, and Atees@/pipe intersections not to exceed 10'-0" o.c. maximum. Do not exceed 310 lbs. load weight (155 lbs. on each base) and make certain each pipestand is adjusted in height to even load at all pipestands.
   4. Acceptable Manufacturer: Pillow Block Pipestand Model 6-H, Miro Industries, Inc., 1780 West 2300 South, Salt Lake City, Utah 84119.

K. Penetration Dam/Sealer Pockets shall be similar to: **ChemCurb System:** gray polyester resin exterior forms, structural sealant and One (1) part self-leveling moisture cure pourable sealer (gray).

Part 3- Execution

3.01 Preparation:

A. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

3.02 Substrate Preparation - Metal Deck / Insulation:

A. Preparation of Wood/Plywood Substrates to Receive Flashing Materials: Mechanically attach the gypsum sheathing panels to all wood/plywood substrates that will be covered with the specified flashing membrane, using the specified screws/plates, at 12 inches o.c. staggered. Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place extending 6 inches onto the field of the roof area and 6 inches up the gypsum sheathing panel surface utilizing minimum 3 inch side laps. Set the cant into place prior to installation of the roof membrane base ply.

B. Insulation Panel - two layers: Mechanically attach the insulation panels, using the specified fasteners, at a rate of 1 fastener for every 2.7 square feet of panel area (12 per 4' x 8' panel). Increase the fastening frequency by 50% at the perimeter of the roof area and by 75% at the corners. Meet FM I-90 requirements.

C. Gypsum Sheathing Panels: Install sheathing panels, and any tapered insulation in hot asphalt, with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions.

3.04 Roof Membrane Installation:

A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.

B. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules and metallic powder, and exercise care in ensuring that the finished application is acceptable to the Owner.

C. Priming: Prime metal and concrete and masonry surfaces with a uniform coating of the specified primer.

D. Membrane Adhesive Application: Membrane adhesive can be applied by roller, squeegee or spray unit. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids. Utilize an application rate of 2 to 2 1/2 gal/sq over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq for interply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. In the areas surrounding details that are to receive the catalyzed acrylic resin primer and flashing system, apply membrane plies in a full coating of the specified elastomeric sealant in lieu of the solvent based adhesive a minimum 8 inches from the base of the penetration or curb.

E. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.

F. Roofing Application: Apply all layers of roofing free of wrinkles, creases, or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.

1. Apply all layers of roofing perpendicular to the slope of the deck.
2. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the asphalt applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.
3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.
4. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds 1/2 inch per foot. The manufacturer shall

provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.

G. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.

H. Flashing Application - masonry surfaces: Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and 3 inches up the parapet wall above the cant. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

I. Flashing Application B surfaces sheathed with gypsum sheathing panels: After the gypsum sheathing panel and cant backing sheet have been installed, flash parapet walls and curbs with the specified reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and to the top of the parapet wall or curb. Using the specified fasteners, mechanically attach the reinforcing sheet through the field of the sheet to the vertical flashing surface on 12 inch centers from the top of the cant to the top of the wall or curb. Fully adhere the remainder of the flashing reinforcing sheet that extends over the cant and roof level. Using a Leister Hand Welding Tool, seal the laps

between flashing reinforcing sheets. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

J. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer=s printed installer=s guidelines and other applicable written recommendations as provided by the manufacturer.

K. Use of Metallic Powder: Broadcast metallic powder over all bitumen overruns on the metal foil membrane surface while the bitumen is still hot to ensure a monolithic surface color.

L. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.05 Roof System Interface With Related Components:

A. Walktread: Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.

B. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal

flashings incorporated into the roof system.

3.06 Field Quality Control And Inspections:

A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment, and related items after completion of job.

B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Inspection:

1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

D. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07600 - FLASHING AND SHEET METAL

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Modified Bitumen Membrane Roofing System - Section 07550
- B. Sealants - Section 07900

1.03 Quality Assurance:
- A. Standards:
  - 1. American Society of Testing and Materials
    - a. ASTM A-526, Steel Sheet, Zinc-Coated (Galvanized), Commercial Quality.
    - b. ASTM B-32, Solder Metal
  - 2. Federal Specifications:
    - a. SS-C-153B, Cement, Bituminous, Plastics
  - 3. Sheet Metal and Air Conditioning Contractors National Association:
    - a. Architectural Sheet Metal Manual

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Prefinished Sheet Metal overflow scuppers and Prefinished Metal Coping:
  - 1. Galvanized iron, prefinished one side.
  - 2. Gauge: 24 gauge, of design and width as detailed.
  - 3. Acceptable manufacturer: Color Klad - Vincent Brass and Aluminum Co.
  - 4. Finish: Kynar 500 - Refer Color Schedule
- B. Sheet Metal:
  - 1. Galvanized Sheet Steel: ASTM A-526, Commercial Quality.
  - 2. Gauge: 22 Gauge minimum or as required by Drawings or Specifications.
- C. Fasteners: Nails, screws, and other fasteners used in conjunction with this work shall be galvanized or cadmium plated.
- D. Solder: ASTM B-32, alloy grade 58, 50% tin, 50% lead.
- E. Flux: Muriatic acid with zinc.
- F. Sealants: Rubber based compound - refer to Section 07900.
- G. Bituminous Plastic Cement: FS SS-C-153B.

H. Accessories: Provide accessories as recommended by manufacturer or as indicated on Drawings.

Part 3 - Execution

3.01 Fabrication:

A. Shape and install sheet metal as indicated on Drawings. Comply with recommendations of SMACNA "Architectural Sheet Metal Manual."

B. Form exposed faces flat and free of buckles, excessive wave and tool marks. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

C. Hem all exposed edges.

D. Make waterproof corner joints by soldering solidly. Joints shall be full-lapped.

E. Soldering: Shall be done slowly with well heated coppers to thoroughly heat the sheet and completely sweat the solder through the full width of the seam. Ample solder shall be used and the seam shall show a least one full inch of evenly flowed solder. Soldering coppers: Shall be heavy and blunt design, properly tinned before using. Neutralize all excess flux.

F. Provide for thermal expansion of running trim, flashing and other items exposed for more than 15'-0" continuous length. Locate expansion seams at 10'-0" intervals and 2'-0" each side of corners and intersections.

G. Angle bottom edges of exposed vertical surfaces to form drips.

3.02 Installation and Application:

A. General:

1. Furnish those items to be installed by other trades to proper grade for installation.
2. Cooperate with and coordinate installation of sheet metal with roofing work as specified under Modified Bitumen Membrane Roofing System - Section 07550.
3. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
4. Embed all flashing in plastic cement. Coat dissimilar metals from contact with bituminous coating.

B. Metal Coping:

1. Material: 24 gauge, prefinished sheet metal.
2. Fabricate and install in accordance with drawings, and recognized sheet metal practices.
3. Secure coping bedded in plastic cement to blocking.
4. At joints, bed coping in plastic cement and secure on side to backing strip by soldering solid. Do not use screws

or nails in exposed face to coping.

5. Lower edge of coping to be securely hooked to hook strip. Secure to wood blocking with No. 8 x 1" galvanized sheet metal screws at 8 o.c.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07840 - FIRESTOPPING

Part 1 - General

1.01 Related Documents:

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

1.02 Definitions:

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.03 General Description of the Work:

A. Only tested firestop systems shall be used in specific locations as follows:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
2. Safing slot gaps between edge of floor slabs and curtain walls.
3. Openings between structurally separate sections of wall or floors.
4. Gaps between the top of walls and ceilings or roof assemblies.
5. Expansion joints in walls and floors.
6. Openings and penetrations in fire-rated partitions or walls containing fire doors.
7. Openings around structural members which penetrate floors or walls.

1.04 Related Work Specified Elsewhere:

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03300 - Cast-In-Place Concrete
2. Section 04810 - Masonry
3. Section 07900 - Sealants
4. Section 09250 - Gypsum Wallboard
5. Section ***** - Fire Suppression Piping
6. Section ***** - Common Work Results for Plumbing
7. Section ***** – Common Work Results for HVAC
8. Section ***** - HVAC Insulation
9. Section ***** - Basic Electrical Materials and Methods

SECTION 07840 - FIRESTOPPING

1.05 References:

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops".

B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops".

C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems".

D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through-Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)
   f. Joint Systems (XHBN)
   g. Perimeter Fire Containment Systems (XHDG)
2. Alternate Systems: "Omega Point Laboratories Directory" (updated annually).

E. Test Requirements: ASTM E 1966, "Standard Test Method for Fire Resistive Joint Systems".

F. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops".

H. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials".

I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.

J. All major building codes: ICBO, SBCCI, BOCA, IBC

K. NFPA 101 - Life Safety Code

L. NFPA 70 - National Electric Code

THROUGH-PENETRATION UL CLASSIFICATION SYSTEM

Fire Stopping Systems			UL Classification System	
		Construction Penetrated	Type Of Construction	System Identification
1	No Penetrating Items:	F, W, C	A, B, J, K, L	0001-0999
2	Metallic Pipes, Conduit or Tubing:	F, W, C	A, B, J, K, L	1001-1999
3	Nonmetallic Pipe, Conduit or Tubing:	F, W, C	A, B, J, K, L	2001-2999
4	Electric Cables:	F, W, C	A, B, J, K, L	3001-3999
5	Cable, Trays with Electric Cables:	F, W, C	A, B, J, K, L	4001-4999
6	Insulated Pipes:	F, W, C	A, B, J, K, L	5001-5999

7	Electrical Bussduct Penetrations:	F, W, C	A, B, J, K, L	6001-6999
8	Mechanical Ductwork Penetrations:	F, W, C	A, B, J, K, L	7001-7999
9	Multiple Penetrations Through Common Openings:	F, W, C	A, B, J, K, L	8000-8999

Construction Penetration

F	Floor penetration
W	Wall penetration
C	Either floor or wall penetration

Type of Construction

A-	Concrete floors equal to of less than 5-inches thick
B-	Concrete floors greater than 5-inches thick
J-	Concrete or masonry walls equal to or less than 8-inches thick
K-	Concrete of masonry walls greater than 8-inches thick
L-	Framed walls

JOINT UL CLASSIFICATION SYSTEM

Fire-Resistant Joint Systems		Joint System	UL Classification System Movement Capability	Joint Width
1	Floor-to-Floor	FF	D	0000-0999
2	Wall-to-Wall	WW	D	0000-0999
3	Floor-to-Wall:	FW	D	0000-0999
4	Head of Wall:	HW	D	0000-0999

Movement Capability

D-	Has movement capability

Joint Width

0000-0999 Less than or equal to 2-inches

1.06 Quality Assurance

A. Installer Responsibilities: A firm experienced installing through-penetration firestop systems similar in material, design and extent to that indicated for this Project, whose

work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.

B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

E. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

1.07 Submittals:

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions.

B. Submit Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 Installer Qualifications:

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.

B. The work is to be installed by a contractor with at least one of the following qualifications:

1. FM 4991 Approved Contractor
2. UL Approved Contractor
3. Hilti Accredited Fire Stop Specialty Contractor

C. Installer shall have not less than 3 years of experience with fire stop installation.

1.09 Delivery, Storage and Handling:

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at jobsite.

C. Store materials under cover and protect from weather and

damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 Project Conditions:

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

1.11 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers, providing they meet or exceed that specified.**

Part 2 – Products

2.01 Firestopping, General:

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

2.02 Acceptable Manufacturers:

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers

as identified below:

1. Hilti, Inc., Tulsa, Oklahoma
   800-879-8000 / www.us.hilti.com

2.03 Materials:

A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:
   1. Hilti CP 680-P Cast-In Place Firestop Device
      a. Add Aerator adaptor when used in conjunction with aerator ("solvent") system.
   2. Hilti CP 681 Tub Box Kit for use with tub installations.
   3. Hilti CP 680-M Cast-In Place Firestop Device for use with noncombustible penetrants.
   4. Hilti CP 653 Speed Sleeve for use with cable penetrations.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 604 Self-leveling Firestop Sealant
   3. Hilti CP 620 Fire Foam
   4. Hilti CP 606 Flexible Firestop Sealant
   5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
   1. Hilti CP 601s Elastomeric Firestop Sealant
   2. Hilti CP 606 Flexible Firestop Sealant
   3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
   1. Hilti CP 672 Speed Spray
   2. Hilti CP 601s Elastomeric Firestop Sealant
   3. Hilti CP 606 Flexible Firestop Sealant
   4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
   1. Hilti CP 777 Speed Plugs
   2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 620 Fire Foam
   3. Hilti CP 601s Elastomeric Firestop Sealant
   4. Hilti CP 606 Flexible Firestop Sealant

I. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti CP 618 Firestop Putty Stick
   2. Hilti CP 658T Firestop Plug

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
   1. Hilti CP 617 Firestop Putty Pad
   2. Hilti Firestop Box Insert

K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
   1. Hilti CP 643N Firestop Collar
   2. Hilti CP 644 Firestop Collar
   3. Hilti CP 648E/CP648S Wrap Strips

L. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
   1. Hilti CP 637 Firestop Mortar
   3. Hilti FS 657 FIRE BLOCK
   4. Hilti CP 620 Fire Foam
   5. Hilti CP 675T Firestop Board

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
   1. Hilti FS 657 FIRE BLOCK
   2. Hilti CP 675T Firestop Board

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
   1. Hilti CP 672 Speed Spray
   2. Hilti CP 601s Elastomeric Firestop Sealant

3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-Leveling Firestop Sealant

O. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 658T Firestop Plug

P. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

Q. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

Part 3 - Execution

3.01 Preparation:

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 Coordination:

A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 Installation:

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
1. Seal all holes or voids made by penetrations to ensure

an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 Field Quality Control:

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
B. Keep areas of work accessible until inspection by applicable code authorities.
C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 Identification:

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
   1. The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's Name, address, and phone number.
   3. Through-Penetration firestop system designation of applicable testing and inspecting agency.
   4. Date of Installation.
   5. Through-Penetration firestop system manufacturer's name.
   6. Installer's Name.

3.06 Adjusting and Cleaning:

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07900 - SEALANTS

Part 1 - General

1.01 Work Included:
- A. All materials, labor services, and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  - 1. TT-S-00230C, Sealing Compound, One Component.
  - 2. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.03 Submittals:
- A. Submit manufacturer's specifications and color chart for each type of sealant.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.
- D. Product test reports.
- E. Preconstruction compatibility and adhesion test reports.
- F. Preconstruction field-adhesion test reports.
- G. Field-adhesion test reports.

1.04 Warranty:
- A. All work done under this section of the work shall be guaranteed for a period of two years from date of final acceptance of the building. Guarantee shall include materials and workmanship required to repair any leaks or the repairs thereof.
- B. Special Warranty: Manufacturer’s standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for a period of 10 years from date of final acceptance.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Building Sealant: One part high performance polyurethane waterproofing sealant, FS-TT-S-00230C.
  - 1. Acceptable Manufacturer: Sonneborn NP1 Building Sealant.
  - 2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall

comply with the following limits for VOC content when calculated according to 40 CPR 59, Subpart D (EPA Method 24):
a Architectural Sealants: 250 gIL.
b. Sealant Primers for Nonporous Substrates: 250 gIL.
c. Sealant Primers for Porous Substrates: 775 gIL.

3. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   a. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
4. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
5. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CPR 177.2600.

B. Silicone Joint Sealants:
1. Mildew-Resistant Neutral-Curing Silicone Joint Sealant: ASTM C 920.
   a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      1. BASF Building Systems.
      2. Dow Corning Corporation.
      3. GE Advanced Materials - Silicones.
      4. Pecora Corporation.
      5. Sika Corporation; Construction Products Division.
      6. Tremco Incorporated.

C. Urethane Joint Sealants: Urethane Joint Sealant: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work

include, but are not limited to, the following:
a. BASF Building Systems.
b. Bostik, Inc.
c. Lymtal, International, Inc.
d. Pecora Corporation.
e. Sika Corporation; Construction Products Division.
f. Tremco Incorporated.

D. Latex Joint Sealants: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, GradeNF.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. BASF Building Systems.
b. Bostik, Inc.
c. Pecora Corporation.
d. Tremco Incorporated.

E. Preformed Joint Sealants: Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Dayton Superior Specialty Chemicals.
b. EM SEAL Joint Systems, Ltd.
c. Sandell Manufacturing Co.
d. Schul International, Inc.
e. Willseal USA, LLC.

F. Acoustical Joint Sealants: Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Pecora Corporation.
b. USG Corporation.

G. Joint Sealant Backing: cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type 0 (open-cell material) or any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   1. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

H. Miscellaneous Materials: as recommended by sealant manufacturer.
   1. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
   2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
   3. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
   4. Joint Cleaner
   5. Joint Primer/Sealer
   6. Bond Breaker Tape
   7. Joint Backer-Rod: Closed-cell compressible rod stock, size and shape as required by application.

I. Caulking compound: Watertight, gun consistency, conforming to FS-TT-C-598, Type 1.

J. Accessories: As recommended by sealant manufacturer.

K. Color: to be selected from manufacturer’s standard colors.

Part 3 - Execution

3.01 Preparation:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
   1. Remove laitance and form-release agents from concrete.
   2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to

areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.02 Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

A. Do not leave gaps between ends of sealant backings.

B. Do not stretch, twist, puncture, or tear sealant backings.

C. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

G. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.

H. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning

materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.03 Joint Sealant Schedule:

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non traffic surfaces.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal non traffic surfaces.

3.04 Additional Information:

A. Application: All sight exposed caulking, and all exterior applications.

B. Comply with sealant manufacturer's printed instructions.

C. Any surfaces requiring priming, shall be prepared according to manufacturer's recommendations.

D. Install sealants to depths as shown or as recommended by sealant manufacturer. Smooth uneven surfaces.

F. Do not disturb compound by touching, washing, or otherwise until it has cured tack free.

G. Excess compound shall be removed from surfaces after curing.

H. Follow manufacturer's recommendations for painting over sealant.

End of Section

DIVISION 8 - DOORS & WINDOWS

SECTION 08100 - METAL DOORS AND FRAMES

Part 1 - General

1.01 Work Included:
- A. All material labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Hardware and Specialties - Section 08700

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     - a. ASTM A-366, Steel Sheets, Carbon, Cold-Rolled, Commercial Quality.
     - b. ASTM A-569, Steel, Carbon, Hot-rolled Sheet and strip, commercial quality.
  2. Underwriters' Laboratories, Inc.
  3. Steel Door Institute (SDI): Recommended specifications for Steel Doors and Frames.
- B. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- C. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door Frame Assemblies: Assemblies complying with IBC 2009 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire protection ratings indicated.
  1. Test Pressure: Test according to NFPA 252. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
  2. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
  3. Smoke-Control Door Assemblies: Comply with NFPA 105.

1.04 Submittals:
- A. Shop Drawings: Product Data: Include construction details, material descriptions, core descriptions, label compliance, and finishes for each type of steel door and frame specified.
  1. Submit shop Drawings showing details for each frame and door type, elevations and details of construction. Provide a schedule of doors and frames referenced to detail and openings as shown on the Drawings.
     - a. Elevations of each door design.
     - b. Details of doors, including vertical and horizontal edge details.
     - c. Frame details for each frame type, including dimensioned profiles.
     - d. Details and locations of reinforcement and

preparations for hardware.
e. Details of each different wall opening condition.
f. Details of anchorages, accessories, joints, and connections.
g. Details of glazing frames and stops showing glazing.
h. Details of conduit and preparations for electrified door hardware and controls.

2. It is the manufacturer's responsibility to obtain templates of finish hardware. The shop Drawings must indicate all hardware applications to the doors and frames.
3. Begin fabrication only after receiving approved shop Drawings.
4. Qualification Data: For Installer.

1.05 Product Delivery, Storage and Handling:

A. All materials shall be protected for shipping so that they may arrive at the job site without undue damage or damage from storage at the job.
B. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
D. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber.
1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 114-inch space between each stacked door to permit air circulation.

1.06 Project Conditions:

A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.07 Coordination:

A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in masonry. Deliver such items to Project site in time for installation.

1.08 Warranty: Provide manufacturer's standard warranty.

Part 2 - Products

2.01 Acceptable Manufacturers:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CURRIES Company; an ASSA ABLOY Group Company.
2. Steelkraft; and Ingersoll-Rand Company.
3. Or Approved Equal.

2.02 Materials:

A. Cold-Rolled Steel Sheet: ASTM A 100S/A 100SM, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 10111A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 5911A 59 1M, Commercial Steel (CS), Class B coating; mill phosphatized.

E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.

G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

H. Glazing: Comply with requirements in Division S Section "Glazing."

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for I5-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

J. Grout: In masonry construction use grout for masonry as specified in Division 4. In stud walls use cementitious sprayed fire-resistive material manufactured by the following:

1. Monokote Type MK-6; W.R. Grace Construction Products.
2. Cafco 300; Isolatek International Corp.

2.03 Requirements: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.

A. Doors – Flush Panel: (SDI Door Type III, Style 2, Seamless):
   1. Door, as indicated on the Drawings shall be constructed of 16 gauge cold-rolled, stretcher leveled sheet steel. Doors shall be insulated with foamed urethane, full length and width of doors. Construct doors with smooth, flush surfaces without visible joints or seams on exposed face or vertical edges. Doors shall be 1-3/4" thick unless noted otherwise.
   2. Close top and bottom edges with a recessed channel end closure or a flush end closure treatment.
   3. Vertical Edges for Single-Acting Doors: Square edge unless beveled edge is indicated.
      a. Beveled Edge: 1/8 inch in 2 inches.
   4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
   5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
   6. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

B. Frames:
   1. Hollow metal frames shall be of 16 gauge cold-rolled, pickled steel, except that all frames for single doors over 3'-0" wide, frames for pairs of doors over 4'-0" wide and frames for doors over 9'-0" high shall be of 14 gauge steel. Frames shall be neatly mitered and continuously welded and ground smooth for invisible joints.
   2. Furnish anchors as shown on Drawings or as recommended by manufacturer, to secure frames to adjacent construction, formed of not less than 18 gauge galvanized steel. Install anchors at a maximum of 24' centers of jamb height.
   3. Frames against masonry or concrete are to be slush filled.
   4. Knock-down frames are not permitted.
   5. Frames against masonry or concrete are to be slush filled.
   6. Jamb Anchors:
      a. Masonry Type: Adjustable strap-and-stirrup or T - shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated

straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

b. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

c. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

d. Ceiling Struts: Minimum 3/8-inch-thick by 2-inch-wide steel.

e. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

7. Sidelight Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

C. Hardware Reinforcement:

1. Reinforcements for locks shall be 3/16" for fronts, with 14 gauge for roses and escutcheons. Hinge reinforcements shall be at least 10 gauge x 1 2" x 9". Provide steel strike and hinge reinforcement cover for frames.

D. Jamb Anchors: Provide number and spacing of anchors as follows:

1. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Two anchors per jamb up to 60 inches in height.

b. Three anchors per jamb from 60 to 90 inches in height.

c. Four anchors per jamb from 90 to 120 inches in height.

d. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.

2. Stud-Wall Type: Locate anchors not more than 18 inches

from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Three anchors per jamb up to 60 inches in height.
b. Four anchors per jamb from 60 to 90 inches in height.
c. Five anchors per jamb from 90 to 96 inches in height.
d. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
e. Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

E. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
1. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
2. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

F. Stops and Moldings:
1. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
2. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.
3. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

G. Labeled Doors and Frames:
1. Where doors and frames are called for on Drawings as labeled, their construction shall conform to all requirements and bear the appropriate U.L. label.

H. Steel Finishes
1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
a. Finish standard steel door and frames after assembly.
2. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

3. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP *6/NACE* No.3, "Commercial Blast Cleaning."

4. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

a. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

Part 3 - Execution

3.01 Fabrication:

A. All doors, and frames shall be cleaned of rust, grease and other impurities, and all welds ground and filled smooth, Metallic filler to conceal defects is not acceptable.

B. Doors and frames shall be mortised, reinforced, drilled, and tapped for all mortise hardware in accordance with Hardware schedule and templates furnished by the hardware supplier, except that drilling and tapping for surface door closers, door closer brackets, surface panic devices and/or other surface applied hardware shall be done in the field. Frames shall be accurate and done in a neat, workmanlike manner.

3.02 Installation:

A. Standard Steel Frames: Install standard steel frames for doors sidelights borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.

1. Bituminous coating and grout: Any material lost, removed or damaged during transportation or installation shall be replaced.

2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary

braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFP A 80.
b. Install frames with removable glazing stops located on secure side of opening.
c. Install door silencers in frames before grouting.
d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
e. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

B. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum ¾ inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFP A 80.
   3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.

3.03 Adjusting and Cleaning:

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.

B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

D. Galvannealed Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions. Do not use abrasive, caustic or acid cleaning agents.

E. Protect doors and frames from damage until final acceptance by Architect. Replace/repair any damaged items as directed above.

End of Section

SECTION 08700 - FINISH HARDWARE

Part 1 - General

1.01 Work Included:
- A. All materials, labor services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Finish Carpentry - Section 06200
- B. Metal Doors and Frames - Section 08100

1.03 Quality Assurance:
- A. This material shall be procured from a source of supply approved by the Architect as having a member of their firm registered by the American Society of Contracting Architectural Hardware Consultants, and with a proven record of several years of satisfactory experience in contract builder's hardware, both in furnishing material and properly servicing jobs. The supplier also must be an established contract builder's hardware firm who meets all the above requirements, and who maintains and operates an office, display room and stock.

1.04 Submittals:
- A. Prepare a complete schedule including all items processed for each opening and other miscellaneous item and submit four copies to the Architect for approval within 30 days submitted within that time, the supplier shall furnish the hardware specified by catalog number.
- B. Indicate on schedule name of manufacturer after each item.
- C. Upon receiving the approved schedule, the hardware supplier shall immediately forward a copy to the metal frame suppliers, when applicable; and as soon as they receive approved shop drawings, they will immediately forward a complete set to the hardware supplier who can then check the applications and make any necessary minor revisions. If revisions are necessary, notify Architect immediately.
- D. Mark each item of hardware for opening on which it is to be used and deliver a complete schedule to the contractor when hardware is delivered.

1.05 Schedule:
- A. This specification describes the quality, character and function that is required of items of hardware; however, it is not intended to mention each particular item.
- B. It is the responsibility of the supplier to thoroughly detail the entire project to assure that the items specified will properly function in the indicated locations.
- C. Quantities shall be determined by the bidder. Part 2, following, indicates the type and function of material applicable to the typical opening. Should an unlisted opening require different type of function of hardware than that specified, for similar opening, notify the Architect, and provide hardware for unlisted openings within the bid.

SECTION 08700 - FINISH HARDWARE

Part 2 - Products

2.01 Finish Hardware:

A. Standards of Quality:

1. Codes, specifications and published recommendations, latest editions of the following are hereby made part of this section of the specifications in so far as they apply to the material or work called for.
   a. National Builders Hardware Association (NBHA)
   b. American Society for Testing Materials (ASTM)
   c. Underwriters Laboratories (UL)
   d. National Fire Protection Association (NFPA)
   e. Code of Ethics of ASAHC & NBHA
   f. Federal Emergency Management Agency (FEMA)
2. Federal Specification, (ANSI Specifications):
   a. Hinges: FF-H-116C (ANSI A156.1)
   b. Locks and Door Trim: FF-H-106A (ANSI A 156.2)
   c. Auxiliary Locks: FF-H-106A (ANSI A 156.5)
   d. Exit Devices: FF-H-106A, FF-H-111B, FF-L486 (ANSI A156.3).
   e. Door Closers: FF-H-121C (ANSI A 156.4)
   f. Shelf and Miscellaneous Hardware: FF-H-00116 (ANSI A156.6).
   g. All Door hardware: Comply with ADAAG where applicable.

B. General:

1. All hardware relating to hollow metal doors and frames shall be to standard templates of each respective hardware manufacturer for items furnished.
   a. The related suppliers such as hollow metal doors and frames and such others as may be required will furnish the hardware supplier one copy of each of their approved shop drawings for proper coordination of their work and the finish hardware.

C. Manufacturers and Requirements:

1. Hardware manufacturers and brand names are for a guide as to type and standard required and all such hardware furnished must meet these standards as far as quality, weight, finish and design.

D. Keying:

1. All locks and cylinders to be masterkeyed as directed by the Architect/Owner. Supplier / Subcontractor shall be responsible for providing ALL materials for a complete and properly functioning installation.
2. Keys: Furnish the following keys:
   a. 2 change keys each lock or cylinder
   b. 6 masterkeys
   c. all EXTERIOR locks and cylinders shall be Primus Schlage Key System and keyed to Owner's Primus Master Key system. All remaining interior locks and cylinders shall be Classic Schlage and keyed to the Owner's Primus Master Key System.

SECTION 08700 - FINISH HARDWARE

2.02 Hardware Sets:

Hardware Group No. 001: Provide each SGL EXT door with the following:

Quantity		Description	Model Number	Finish	Mfr
1	EA	CONTINUOUS HINGE	224HD HEIGHT AS REQ	628	IVE
1	EA	PANIC HARDWARE	99L-F-BE-03 LENGTH AS REQUIRED	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4040XP SHCUSH MTG BKTS, SPCRS & PLATES AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	SEALS	700SA H & J (INSTALL PRIOR TO OTHER HARDWARE)	AL	NGP
1	EA	DOOR SWEEP	C627A LENGTH AS REQ	AL	NGP
1	EA	OVERHEAD RAIN DRIP	16A DW + 4"	AL	NGP
1	EA	THRESHOLD	896V LENGTH AS REQ	AL	NGP

REFER TO ELECTRICAL FOR ACCESS, CARD READER, ETC. INFORMATION, ETC.

Hardware Group No. 002: Provide each SGL door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	L9056R 03N OS-OCC	626	SCH
1	EA	STOP	WS407CCV OR FS436 AS REQUIRED	628	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 003: Provide each SGL door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	L9050T 03N	626	SCH
1	EA	CLASSIC CORE	23-030	626	SCH
1	EA	STOP	WS407CCV OR FS436 AS REQUIRED	628	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 004: Provide each SGL door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080T 03N	626	SCH
1	EA	CLASSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 OR P4041 MTG BRKTS, SPCRS & PLATES AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS407CCV OR FS436 AS REQUIRED	628	IVE
1	SET	SEALS	5050BR H & J (USE SILENCERS @ NON-RATED DOORS)	CLR	NGP

SECTION 08700 - FINISH HARDWARE

Hardware Group No. 005: Provide each SGL door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070T 03N	626	SCH
1	EA	CLASSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4041H OR P4041H MTG BRKTS, SPCRS & PLATES AS REQ 689		LCN
1	EA	KICK PLATE	8400 10" X 1" LDW	630	IVE
1	EA	STOP	WS407CCV OR FS436 AS REQUIRED	628	IVE
1	SET	SILENCER	SR64	GRY	IVE
1	EA	KICKDOWN HOLDER	FS544	628	IVE

The following list of products and manufactures are acceptable for this project.

Product	Manufacture and Approved Equals
1. Hinges	A. Ives B. Hager C. Bommer
2. Continuous Hinges	A. Pemko B. Roton C. Select
3. Key System	A. **Schlage (No substitutions)**
4. Lock/Latch	A. **Schlage (No substitutions)**
5. Closers	A. **LCN (No substitutions)**
6. Exit Devices	A. **Von Duprin (No substitutions)**
7. Push/Pull/Plates	A. Ives B. Rockwood C. Trimco
8. Misc. Stop, Bolts, etc.	A. Ives B. Glynn-Johnson C. Rockwood
9. Door Seal/Thresholds	A. National Guard B. Pemko C. Reese

Each Product, by category, shall be the product of one manufacturer. Complete lockset, including keyed lock cylinder, shall be the product of one manufacturer unless noted otherwise.

SECTION 08700 - FINISH HARDWARE

Part 3 - Execution

3.01 Installation:

A. Install all finish hardware in strict accordance with the manufacturer's recommendations and printed instructions. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate.

B. All hardware relating to hollow metal and aluminum doors and frames shall be to standard templates of each respective hardware manufacturer for items furnished.

C. Mounting Heights: Mount Hardware units at heights recommended by the National Builders Hardware Association, except as specifically indicated or required to comply with governing regulations, or as may be otherwise directed by the Architect.

3.02 Prior to the Final Inspection:

A. The supplier shall check all closers for proper operation after they have been installed and adjusted by the Contractor. He shall verify the keying to ensure proper location of locksets and shall assist the Contractor in correcting faulty operation of any locks.

B. Within 30 days after the acceptance of the entire project, the Contractor shall be responsible for this supplier meeting with the maintenance custodian at the job site for the purpose of instructing him thoroughly in the proper repair and adjustment of all finish hardware items, and items, and shall present to the custodian a full complement of tools to be used.

End of Section

DIVISION 8 - DOORS AND WINDOWS

SECTION 08800 - GLAZING

Part 1 - General

1.01 Work Included:
- A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.
- B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. Federal Specifications
     a. DD-G-451d, Glass, Plate, Sheet (for glazing and other uses).
  2. Flat Glass Jobber Association: Glazing Manual.
  3. Underwriter's Laboratories, Inc.: UL 9, UL 10B, & UL 10C.
  4. National Fire Protection Association: NFPA 80 & NFPA 257.
- B. Comply with UBC 2406, and ANSI 97.1 with testing requirements of 16 CFR 1201, Cat II.

1.03 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Glass Types and Examples:
  1. 1/4" Tempered Glass:
     a. Type example: 1/4" Clear Herculite - PPG.
  2. 1" Nominal Thickness Insulating Tempered Glass - 1/4" tinted glass @ exterior side and 1/4" 100 Low E glass @ interior side of 1/2" air space - **both sides tempered**. Low Emissivity coating on 3rd glass surface from building exterior.
     a. Type Example: Solexia Insulated with Low-E, Solarban 60. **Note: Color will be a factor in approval.**
- B. Glazing Compounds and Preformed Glaze Sealants: Suitable type as approved for the installation, in accordance with Glazing Materials section of the FGJA Glazing Manual.
- C. Glazing Accessories: Provide miscellaneous materials such as cleaners, primers, setting blocks, spacers, filler rods, beads, etc., as required for complete installation.

SECTION 08800 - GLAZING

Part 3 - Execution

3.01 Installation:

A. Glazing-General:

1. Items to be glazed may be field- or shop-glazed, using glass of the quality and thickness specified or indicated. Preparation of surrounds and glazing, unless otherwise specified, shall be in conformance with the details and general conditions governing glazing in the FGMA Glazing Manual, beads or stops which are furnished with the items to be glazed shall be used to secure the glass in place.
2. All glass shall be set with the waves parallel to the sill. Glass that has been misordered, i.e. with the width and height dimensions not properly correlated with the Drawing process in manufacturing, resulting in pronounced waviness at right angles to the sill, will be rejected.
3. Install plastic glass edging strips where indicated. Joints shall be as tight and imperceptible as possible.

B. Breakage: Replace all glass broken during or after setting. Breakage due to accident or carelessness or other will be charged to trade at fault.

C. Inspection: Prior to final acceptance of project, inspect all work done under this section and make all necessary adjustments, repairs or replacements of defective work, and clean all glass surfaces.

D. Clean-up: Remove all glass cuttings, scraps, packaging and rubbish upon completion of the work.

End of Section

DIVISION 9 - FINISHES

SECTION 09120 - CEILING SUSPENSION SYSTEMS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Gypsum Wallboard - Section 09250
- B. Acoustical Treatment - Section 09500

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     - a. ASTM C-635, Metal Suspension Systems for Acoustical Tile and Lay-In-Panel Ceilings.
     - b. ASTM C-636, Recommended Practice of Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In-Panels.
  2. All materials to comply with NFPA 101, 16-3.3.2, where applicable.
- B. Submittals:
  1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Suspended Acoustical Ceiling - Exposed Grid: ASTM C-635, intermediate structural classification.
  1. Main Beams, Cross Tees and Concealed Members: .015 cold rolled zinc coated steel.
  2. Wall Angle: .020 cold rolled zinc coated steel.
  3. Special Members: Provide special shaped members as shown on the Drawings.
  4. Member Finish: Exposed surfaces shall be flat white low-gloss grid.
  5. Hanger Wire: No. 12 gauge cold drawn, annealed, galvanized.
  6. Accessories: Provide wall clips, hold-down clips (shall be removable without damage to boards; two each panels opposite sides), beam clamps leveling splines, hanger clips, splice plates), (keep to a minimum), for a complete installation.

7. Acceptable Manufacturer: 200 Snap-Grid System, Chicago Metallic Corporation
8. Acoustical "Cloud" Edge Trim:
   a. Axiom Classic Trim as manufactured by Armstrong World Industries, Inc.
   b. Commercial quality extruded aluminum alloy 6063 trim channel with factory applied baked polyester paint finish.
   c. Color - white (to match ceiling grid).
   d. Height - 8".
   e. Provide all necessary accessories including, but limited to, corner posts, T-bar connection clips, galvanized steel splice plates, etc. Do not hang acoustical clouds from edge trim.

B. Suspended Gypsum Board Ceilings:
1. Structural Channels: Cold-rolled, 16 gauge, galvanized steel.
2. Furring Channels: Roll-formed, hat sections, 20 gauge.

Part 3 - Execution

3.01 General:
A. Coordinate with electrical and mechanical contractors in placement of light fixtures, grilles, etc. to conform with ceiling pattern.
B. Construct necessary scaffolding, adequate and safe, in accordance with applicable laws and ordinances. Maintain during this work and remove after completion.
C. Provide thorough and competent foreman and skilled mechanics.

3.02 Installation:
A. Suspended Acoustical Ceiling:
1. Deflection of any component shall not exceed 1/360 of the span.
2. Main tees shall be suspended on 48" centers by 12 gauge wire spaced not more than 48" o.c. along main tee.
3. Cross tees shall be placed at 24" o.c. or as required by the Drawings.
4. Install wall angles at intersection of suspended ceiling and all vertical surfaces. Miter corners where wall molding intersects.
5. Install grid system and ceiling panels with faces in a plane.
6. Provide intersection clips at intersection of all tees.
7. Provide additional hangar wire at four corners of light fixtures.
8. Provide additional hangar wires to insure proper placement

and alignment of grid system.

9. Prior to the final acceptance of the building, examine and adjust water level to be certain that all planes and lines are plumb, square and smooth. Replace all marked, marred or otherwise damaged materials.

B. Suspended Gypsum Board Ceilings:

1. Coordinate location of hangars with other work.
2. Install ceiling framing independent of walls, columns and above ceiling work.
3. Install ceiling framing system in accordance with manufacturer's recommendations.
4. Reinforce openings in ceilings in accordance with manufacturer's recommendations.
5. Laterally brace entire suspension system where required.

3.03 Clean-Up:

A. Completely remove from the job site, at the completion of the work, all cartons, packaging, etc., and all other scraps and waste caused by this trade.

End of Section

DIVISION 9 - FINISHES

SECTION 09250 - GYPSUM WALLBOARD

Part 1 - General

1.01 Work Included:
A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. American Society for Testing and Materials:
a. ASTM C-36, Gypsum Wallboard
b. ASTM C-475, Joint Treatment for Gypsum Wallboard Construction.
B. Federal Specifications:
1. FS-SS-L-30D, Type III, Grade X, Class 1, Gypsum Wallboard.

1.03 Submittals:
A. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 Product Delivery, Storage and Handling:
A. All materials shall be delivered to the job site with manufacturer's labels intact and stored in an enclosed shelter providing protection from damage and exposure to the elements.

Part 2 - Products

2.01 Gypsum Wallboard:
A. Type: **Impact Resistant, Fire-rated**, ASTM C-36 / C-1396, Impact Resistance ASTM E-695, Indentation Resistance ASTM D-5420, Abrasion Resistance ASTM D-4977
B. Size: 5/8" thick x 48" wide x 96" or as required.
C. Edges: Tapered.
D. Location: Where indicated on drawings and / or all exposed locations in entire project areas not receiving ceramic tile or stainless steel panels.

2.02 Gypsum Wallboard:
A. Type: **Moisture / Mold-Resistant,** ASTM C-36 / C-1396, Moisture / Mold Resistant ASTM D3273, ASTM C-473 (B), core encased in moisture and mold resistant, 100% recycled green face and brown back papers.
B. Size: 5/8" thick x 48" wide x 96" or as required.
C. Edges: Tapered.
D. Location: Where indicated on drawings and / or at substrates for ceramic tile and Stainless Steel panels.

2.03 Fasteners:
A. Screws: Self-drilling, self-tapping, bugle head, Type S.
B. Nails: Annular ring: GWB-54.

2.04 Joint Treatment Materials:
A. Joint Tape: Perforated Tape, ASTM C-475.

B. Joint Compound: ASTM C-475.

2.05 Accessories:

A. Metal Edge: Similar to United States Gypsum Trim No. 402.

B. Interior Trim: ASTM C 1047.

1. Material: Galvanized coated steel sheet.
2. Shapes:
   a. Cornerbead.
   b. L-Bead: L-shaped; exposed long flange receives joint compound.
   c. Expansion (control) joint.
   d. Curved-Edge Cornerbead: With notched or flexible flanges.

C. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

1. Minimum Base Metal Thickness: 0.0312 inch.

D. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

Part 3 - Execution

3.01 Installation:

A. Apply gypsum board to horizontal surfaces first, then to vertical.

B. Install gypsum board parallel to studs at vertical surfaces.

C. To minimize joints, use panels of maximum practical lengths.

D. Position all ends and edges of gypsum board over nailing or fastening members. Fit ends and edges closely; do not force together. Stagger end joints.

E. Cut ends, edges, scribe or make cutouts within field of panel in a workmanlike manner.

F. Install trim at all intersections of gypsum board and other surfaces. Provide corner bead at all vertical or horizontal corners.

G. Fasteners:

1. Drive fasteners in field of panel first, work toward ends and edges.
2. Perimeter fasteners shall be a least 3/8" from ends and edges.
3. Attach panels to wood framing members with specified nails spaced out 8" for ceiling, and 8" o.c. at ends and 12" o.c. at each support.
4. Drive nail head slightly below surface of panel in a uniform dimple without breaking face paper.
5. Screw fasteners shall be spaced 12" o.c. at each support in the field of the board and 8" o.c. at all edges and ends.
6. Screws shall be power-driven with an electric screwdriver

and screw heads shall provide a slight depression below surface of panel without breaking face paper.

3.02 Joint Treatment:

A. Treat all exposed joints and trim with a three-coat approved system applied in strict accordance with manufacturer's recommendations.

3.03 Applying Texture Finishes:

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns. Provide light orange peel finish.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.04 Clean-Up:

A. Use all necessary care during execution of the Work of this Section to prevent undue scattering of drywall scraps and dust and to prevent tracking of joint and finishing compounds onto floor surfaces. On completion of each installation segment in a room or space, promptly pick up and remove from the working area all scraps, debris and surplus material.

End of Section

DIVISION 9 - FINISHES

SECTION 09300 – CERAMIC WALL TILE

Part 1 - General

1.01 Work Included:
- A. All materials, labor services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. Tile Council of America:
     a. Handbook for Ceramic Tile Installation.
  2. American National Standards Institute:
     a. ANSI A108.6, Ceramic Tile installed with Epoxy Mortar.
     b. ANSI A108.4, Ceramic Tile installed water-resistant organic adhesive.
     c. ANSI A108.5, Ceramic Tile installed with latex Portland Cement.
     d. ANSI A118.4, Latex Portland Cement Mortar.
     e. ANSI A118.3, Epoxy Mortar and Grout.
     f. ANSI A136.1, Type 1 Organic Adhesive.
     g. ANSI A137.1, Ceramic Tile.
  3. American Society for Testing and Materials:
     a. ASTM C-144, Aggregate.
     b. ASTM C-150, Portland Cement, Type 1.
     c. ASTM C-206, Special Finish Hydrated Lime.
- B. All materials shall meet IBC 2009, where applicable.
- C. Floor surfaces and elevation changes shall comply with ADAABAAG 302 and 303.
- D. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  1. Level Surfaces: Minimum.
  2. Step Treads: Minimum.
  3. Ramp Surfaces: Minimum.
- E. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
  1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- F. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- G. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

SECTION 09300 – CERAMIC WALL TILE

1. Joint sealants.
3. Metal edge strips.

1.03 Submittals:

A. Submit samples of all tile and grout specified under this section for approval and color selection prior to installation.

B. Submit a "Master Grade Certificate" bearing signatures of both manufacturer and contractor.

C. Submit tile manufacturer's maintenance guides for owner's use in maintaining all tile work specified in this section.

D. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

F. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

G. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 24 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

H. Qualification Data: For qualified Installer.

I. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

J. Product Certificates: For each type of product, signed by product manufacturer.

1. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.04 Product Delivery, Storage and Handling:

A. Deliver all materials to job site in manufacturer's unopened containers with grade seal unbroken and labels intact. Keep containers dry. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required

characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.05 Project Conditions:

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 General:

A. All tile shall be standard grades conforming to ANSI 137.1 unless noted otherwise.

B. Both glazed and unglazed ceramic tile shall be manufactured by the same manufacturer.

C. Refer to Color Schedule for tile color. Colors will a determining factor in tile approval.

D. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI AlOS.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Daltile; Division of Dal-Tile International Inc.

2. Crossville, Inc.
3. American Olean; Division of Dal-Tile International Inc.

2.02 Ceramic Tile:

A. Wall Tile and Base Tile:
1. Type: Glazed porcelain – walls.
2. Nominal Face Size: 12″ x 24″ – orient as per Drawings.
3. Edge: All-purpose cushion.
4. Acceptable Manufacturer: Daltile – Synchronic.

B. Trim Shapes and Bases:
1. Type: Same as floor tile.
2. Includes bases, caps, stops, returns, trimmers and other shapes to finish installation.
   a. Base for Thin-Set Mortar Installations: Straight, module size 6 by 12 inches.
   b. External Corners for Portland Cement Mortar Installations: provide metal corner trim as manufactured by Schluter Systems LP unless otherwise indicated.
   c. External Corners for Thin-Set Mortar Installations: same as above.
   d. Internal Corners: Field-butted square corners. For base and cap use angle pieces designed to fit with stretcher shapes.

C. Setting Materials:
1. Epoxy Mortar: ANSI A118.3
2. Organic Adhesive: ANSI A136.1
3. Latex Portland Cement Mortar: ANSI A118.4
4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Boiardi Products; a QEP company.
   b. Bonsai American; an Oldcastle company.
   c. Bostik, Inc.
   d. C-Cure.
   e. Custom Building Products.
   f. Jamo Inc.
   g. Laticrete International, Inc.
   h. MAPEl Corporation.
   i. Southern Grouts & Mortars, Inc.
   j. Summitville Tiles, Inc.
   k. TEC; a subsidiary of H. B. Fuller Company.

D. Grouting Materials:
1. Wall Tile: Portland Cement Type.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Boiardi Products; a QEP company.
   b. BonsaI American; an Oldcastle company.
   c. Bostik, Inc.
   d. C-Cure.
   e. Custom Building Products.
   f. Jamo Inc.
   g. Laticrete International, Inc.
   h. MAPEl Corporation.
   i. Southern Grouts & Mortars, Inc.
   j. Summitville Tiles, Inc.
   k. TEC; a subsidiary of H. B. Fuller Company.

E. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as adjoining wall tile.
   1. Color and Finish: Match adjoining glazed wall tile.

F. Elastomeric Sealants:
   1. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
      a. Use sealants that have a VOC content of 250 gIL or less when calculated according to 40 CPR 59, Subpart D (EPA Method 24).
      b. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
   2. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
   3. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25;
      Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, 0; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
      a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
         1. DAP Inc.; 100 percent Silicone Kitchen and Bath Sealant.

2. Dow Corning Corporation; Dow Corning 786.
3. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
4. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
5. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
6. Tremco Incorporated; Tremsil 600 White.

H. Miscellaneous Materials:

1. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
2. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic base, designed specifically for required applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
   a. Equal to products manufactured by Schluter Systems LP.
   b. Provide in minimum lengths of 10’ where possible and practical.
   c. Provide at ALL exposed edges of ceramic wall tile – i.e. top, exterior corners, expansion joints, etc.
3. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
   a. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
   b. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
4. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
5. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change

color or appearance of grout.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   1. BonsaI American; an Oldcastle company; Grout Sealer.
   2. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
   3. C-Cure; Penetrating Sealer 978.
   4. Custom Building Products; Grout Sealer.
   5. Jamo Inc.; Penetrating Sealer.
   6. MAPEl Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout and 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
   7. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
   8. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
   9. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

Part 3 - Execution

3.01 Examination:

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   1. Verify that substrates for setting tile are firm, dry, clean, and free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI Al08.0 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with adhesives or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
   3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and

similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Preparation:

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tilesetting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI AlOS.IA and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.02 Installation:

A. All workmanship and materials shall conform in all respects to specifications and requirements and in accordance with the standard practice of the Tile Council of America.

B. All ceramic floor tile shall be installed using the following Tile Council of America specifications.

1. Wall Tile, (Gypsum Board).

C. Provide all required trim shapes required to module with field tile, unless otherwise noted on Drawings. All exterior corners shall have metal corner trim as manufactured by Schluter Systems LP.

D. Layout all tile work as to minimize cuts less than one-half tile in size. Align all joints to give straight uniform grout lines, plumb and level or parallel with walls. Strike all joints with a rounded, non-staining tool.

1. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated.

Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

2. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
3. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Layout tile work and center tile fields in both directions in each space or on each wall area. Layout tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
   a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints where applicable.
   b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
4. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   a. Wall Tile: 1/16 inch.
   b. Porcelain Wall Tile Panels: 1/16 inch.
5. Layout tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
6. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated or required by tile manufacturer. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   a. Where joints occur in substrates, locate joints in tile surfaces directly above them.
   b. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
   c. At Porcelain Wall Tile Panels: provide movement joint every 20’ to allow for needed movement of tile layer.
7. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

a. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
b. Do not extend cleavage membrane waterproofing or crack isolation membrane under thresholds set in dry-set portland cement mortar. Fill joints between such thresholds and adjoining tile set on crack isolation membrane with elastomeric sealant.
1. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

8. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

E. Slope entire room or area to floor drains.

3.03 Tile Backing Panel Installation:

A. Install cementitious backer units and treat joints according to ANSI AlOS.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.04 Waterproofing Installation:

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 Cleaning and Protecting:

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers

and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

E. Immediately prior to final inspection, replace all damaged tile.

F. Contractor will supply 2% of the total quantity of each tile used. Contractor will supply 3% of the total quantity of each grout used. Place materials in clean marked containers for future use at building.

End of Section

DIVISION 9 - FINISHES

SECTION 09301 - QUARRY TILE

PART 1 GENERAL

1.01 SUMMARY
- A. Section Includes: epoxy quarry tile for use as flooring
- B. Related sections:
  1. Division 03 Section: Self-Leveling Underlayment
  2. Division 07 Section: Joint Sealants
  3. Division 09 Section: Concrete and Masonry Coatings
  4. Division 09 Section: Waterproofing Membranes

1.02 REFERENCES
- A. American National Standards Institute (ANSI):
  1. ANSI A108.4, 2005 - Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
  2. ANSI A108.5, 2005 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
  3. ANSI A108.6, 2005 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
  4. ANSI A118.1, 2005 - Standard Specification for Dry-Set Portland Cement Mortar.
  5. ANSI A118.3, 2005 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
  6. ANSI A118.4, 2005 - Latex-Portland Cement Mortar.
  7. ANSI A118.6, 2005 - Standard Ceramic Tile Grouts.
  8. ANSI A136.1, 2005 - Organic Adhesives for Installation of Ceramic Tile.
- B. American Society of Testing and Materials (ASTM International)
  1. C144 Standard Specification for Aggregate for Masonry Mortar.
  2. C150 Specification for Portland Cement
  3. C207 Standard Specification for Hydrated Lime for Masonry Purposes.
- C. Tile Council of North America (TCNA
  1. TCA Handbook for Ceramic Tile Installation, 2011.

1.03 SYSTEM REQUIREMENTS
- A. Performance Requirements
  1. Absorption (ASTM C67): Not more than 12%.
  2. Freeze Thaw Resistance (ASTM C67): Unaffected after 50 cycles.
  3. Compressive Strength (ASTM C67): Not less than 4000 psi (27,560 kPa).
  4. Bond Strength (ASTM C482): 50 psi (0.3 MPa).

5. Coefficient of Friction (ASTM C1028): 0.6 dry; 0.6 wet.
6. Breaking Load (ASTM C67): Minimum load 300 lbs

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract Submittal Procedures Section.
B. Product Data: Submit product data for specified products.
C. Shop Drawings: Indicate layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, accessories and setting details.
D. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods and polishes and waxes.
E. Samples: Submit selection and verification samples of finishes, colors and textures.

1.05 QUALITY ASSURANCE

A. Qualifications
   1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project for a minimum of 5 years.
B. Regulatory Requirements and Approvals: as required.
C. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Architect's acceptance of finish color, texture and pattern and workmanship standard(s). Comply with Quality Control (Mock-Up Requirements) Section.
   1. Mock-Up Size: minimum of 4 tiles each direction.
   2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required
   3. Incorporation: Mock-up may be incorporated into final construction upon Architect's approval.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 01 Product Requirements Section.
B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at

temperature and humidity conditions recommended by the manufacturer

1.07 ENVIRONMENTAL REQUIREMENTS

A. Install mortar, set and grout tile when surface temperature is a minimum of 50 degrees F (10 degrees C) and rising but no greater than 90 degrees F (32 degrees C).

B. Do not install mortar, set or grout tile when inclement weather conditions are expected within 48 hours of completion.

1.08 EXTRA MATERIALS

A. Extra materials: Provide _ ft2 of each size, color and surface finish of tile specified.

1.09 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

PART 2 PRODUCTS

2.01 TILES

A. Manufacturer: Daltile; Division of Dal-Tile International Inc.

1. Contact: 7834 C.F. Hawn Freeway, Dallas, TX 75217; Telephone: (800) 933-8453; website: www.daltile.com.

B. Substitutions: As approved by Architect.

C. Refer to Color Schedule for tile color. Colors will a determining factor in tile approval.

2.02 TILES

A. Style: Quarry Tile Arid Gray DQ42

B. Size: 6″ x 6″

C. Color: refer to Room Finish / Color Schedules.

2.04 MATERIALS

A. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.

B. Epoxy Adhesive: ANSI A118.3, thinset bond type.

C. Mortar Bed Materials:

1. Portland cement: ASTM C150, type 1, gray.
2. Hydrated Lime: ASTM C207, Type S.
3. Sand: ASTM C144, fine.
4. Latex additive: As approved.
5. Water: Clean and potable.

D. Mortar Bond Coat Materials:

1. Dry-Set Portland Cement type: ANSI A118.1.
2. Latex-Portland Cement type: ANSI A118.4.
3. Epoxy: ANSI A118.3, 100 percent solids.

E. Standard Grout: Sanded cement grout as specified in ANSI A118.6; color as selected.
F. Epoxy Grout: ANSI A118.8, 100 percent solids epoxy grout; color as selected.
G. Cleavage Membrane:
    1. No. 15 (6.9 kg) asphalt saturated felt, ASTM D226, Type 1
    2. Polyethylene film, ASTM D4397, 4.0 mil thickness.
H. Waterproofing Membrane in accordance with ANSI A118.10:
    1. Chlorinated Polyethylene Sheet with polyester fabric reinforcing.
    2. Fabric Reinforced, Fluid-Applied elastomeric membrane.
    3. Un-Reinforced, Fluid-Applied elastomeric membrane.
    4. Polyethylene Sheet Product.
    5. Fabric-Reinforced, Modified-Bituminous Sheet Product.
    6. Urethane Waterproofing and Tile-Setting Adhesive Product.
I. Miscellaneous Materials:
    1. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
    2. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic base, designed specifically for required applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
        a. Equal to products manufactured by Schluter Systems LP.
        b. Provide in minimum lengths of 10′ where possible and practical.
    3. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
        a. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
        b. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
    4. Tile Cleaner: A neutral cleaner capable of removing

soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

5. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      1. BonsaI American; an Oldcastle company; Grout Sealer.
      2. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
      3. C-Cure; Penetrating Sealer 978.
      4. Custom Building Products; Grout Sealer.
      5. Jamo Inc.; Penetrating Sealer.
      6. MAPEl Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout and 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
      7. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
      8. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
      9. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
   1. Concrete slabs shall have roughened or troweled surfaces to allow for bonding.
   2. Test concrete slabs for moisture emission rate and alkalinity. Obtain instructions if not within the limits recommended by setting material manufacturer.

3. Ensure all substrates are clean and free of curing compounds and other contaminants.
4. Maximum substrate variation from required plane shall be 1/8" in 10 feet or as otherwise specified.

B. Movement joints
1. Verify that movement joints are installed as detailed in EJ171 of the TCA Handbook

3.03 PREPARATION

A. Protect surrounding work from damage.
B. Vacuum clean surfaces and damp clean.
C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
E. Prepare substrate surfaces for installation in accordance with adhesive manufacturer's instructions.

3.04 INSTALLATION

A. Install tile and grout in accordance with applicable requirements of ANSI A108, manufacturer's instructions, and TCA Handbook recommendations.
B. Consult TCA Handbook for details applicable to each specific installation type.
C. Layout all tile work as to minimize cuts less than one-half tile in size. Align all joints to give straight uniform grout lines, plumb and level or parallel with walls. Strike all joints with a rounded, non-staining tool.
1. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
2. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
3. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Layout tile work and center tile fields in both directions in each space or on each wall area. Layout tile work to minimize the use of pieces that are less than half of a tile. Provide

uniform joint widths unless otherwise indicated.
a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

D. Slope entire room or area to floor drains.

3.05 CLEANING

A. Clean with water and soft nylon brushes only; do not allow mortar to set up on surfaces.
1. Excessive water may affect curing of grout and mortar bed.

B. Do not use acid or alkali cleansers which may damage the surface of the tile.

C. Test all products before wholesale application.

3.06 PROTECTION

A. Do not permit traffic over finished floor surface for 72 hours after installation.

B. Cover floors and protect from dirt and residue from other trades.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

E. Immediately prior to final inspection, replace all damaged tile.

F. Contractor will supply 2% of the total quantity of each tile used. Contractor will supply 3% of the total quantity of each grout used. Place materials in clean marked containers for future use at building.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

KITCHEN ZONE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system – refer other sections.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings – refer other sections.
4. Perimeter Trim – refer other sections.

B. Related Sections

1. Section 09 500 – Acoustical Treatment
2. Section 09 120 - Ceiling Suspension Systems
3. Section 09 250 - Gypsum Wallboard
4. Division 23 - HVAC Air Distribution
5. Division 26 - Electrical

C. ALTERNATES

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted as approved by the Architect. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be noted. If included in a Bid are substitute products that have not been approved by the architect and included in the Addenda, the originally specified products shall be provided without additional compensation.
2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers; Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
   2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
   3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
   4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
   5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
   6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
   7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
   8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
   9. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
   10. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
   11. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
   12. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code

C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report
   1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report
   1. 0244 - Armstrong Single Span Suspension System

I. International Well Building Standard

J. Mindful Materials
K. Living Building Challenge
L. U.S. Department of Agriculture BioPreferred program (USDA BioPreferred).
M. Clean Rooms up to ISO Class 5 (Class 100)

1.4 SYSTEM DESCRIPTION

A. Continuous/Wall-to-wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
B. Samples: Minimum 6-inch x 6-inch samples of specified acoustical panel; 8-inch-long samples of exposed wall molding and suspension system, including main runner and 4-foot cross tees.
C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with or supported by the ceilings.
D. Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification, such as Underwriter’s Laboratory (UL), of NRC, CAC, and AC.
    1. If the material supplied by the acoustical subcontractor does not have an independent laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of, and replaced with complying product at the expense of the Contractor performing the work.

1.6 SUSTAINABLE MATERIALS

A. Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.
    1. Health Product Declaration (HPD). The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration Open Standard.

2. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).
3. Low Emitting products with VOC emissions data. Preference will be given to manufacturers that can provide emissions data showing their products meet any of the following: CDPH/EHLB/Standard Method v1.2-2017; Indoor Air Quality Certified to SCS-105 v4.2-2023
4. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.
5. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.
6. Products meeting LEED V4 requirements including:
    i. Storage & Collection of Recyclables
    ii. Construction and Demolition Waste Management Planning
    iii. Building Life-Cycle Impact Reduction
    iv. Building Product Disclosure and Optimization Environmental Product Declarations
    v. Building Product Disclosure and Optimization Sourcing of Raw Materials
    vi. Building Product Disclosure and Optimization Material Ingredients
    vii. Construction and Demolition Waste Management

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer to ensure fit and function.
B. Installer Qualifications: Company specializing in performing specified work type, a minimum of three years of documented experience, and approved by the manufacturer.
C. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
D. Surface Burning Characteristics: Tested per ASTM E 84 and complying with ASTM E 1264 Classification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.9 PROJECT CONDITIONS

A. Space Enclosure:
    1. HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless-steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

1.10 ALTERNATE CONSTRUCTION WASTE DISPOSAL

A. Ceiling material being reclaimed must be kept dry and free from debris.
B. Before disposing of ceilings, contact the Armstrong Recycling Center at 877-276-7876, select option #1 then #8 to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will help facilitate the process to recycle the ceiling.
C. Recycling may qualify for LEED Credits:
    1. LEED 2009 - Category 4: Material and Resources (MR)
        i. Credit MRc2: Construction Waste Management
    2. LEEDv4 - MRp2
        i. Construction Waste Management Planning Qualifies as a material stream (non-structural) targeted for diversion. Ceilings will be source-separated and diverted through the Armstrong Ceiling Recycling Program.

1.11 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
    1. Acoustical Panels with HumiGuard® Max and HumiGuard® Plus performance: sagging and warping
    2. Acoustical panels with BioBlock® performance: growth of mold and mildew
    3. Grid System: rusting and manufacturer's defects

B. Warranty Period:
    1. Ceiling System: Thirty (30) 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 the requirements of the Contract Documents.

1.12 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
    1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
    2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:
    1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panel Ceilings
    1. Surface Texture: Smooth Texture
    2. Composition: Mineral Fiber
    3. Color: White
    4. Size: 24 in x 24 in
    5. Edge Profile: Square Lay-in
    6. Ceiling Attenuation Class (CAC): ASTM E1414/E1414M; Classified with UL label on product carton: 33
    7. Flame Spread: ASTM E 1264; Class A
    8. Light Reflectance (LR) White Panel: ASTM E 1477; 0.89
    9. Dimensional Stability: HumiGuard Plus
    10. Recycle Content: Up to 36% total recycled content. (Total recycled content: pre-consumer, post-consumer and post-industrial)
    11. Material Ingredient Transparency: Health Product Declaration (HPD); Declare Label
    12. Life Cycle Assessment: Third Party Certified Environmental Product Declaration (EPD)
    13. Indoor Air Quality Certified to SCS-105 v4.2-2023
    14. Basis of Design: **KITCHEN ZONE** as manufactured by Armstrong World Industries, Inc.

15. Substitutions: Refer to Alternates in Part 1.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
    1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Follow manufacturer installation instructions.
B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
C. Suspend main beam from overhead construction with hanger wires spaced 4 feet on center along the length of the main runner. Install hanger wires plumb and straight.
D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09780 – STAINLESS STEEL WALL PANELS and TRIM

PART 1 – GENERAL

1.01 SECTION INCLUDES
- A. Stainless steel wall panel protection.

1.02 SCOPE OF WORK
- A. Furnish all labor, materials, equipment and incidentals governed by this section necessary to install the products as specified herein.

1.03 RELATED DOCUMENTS
- A. Drawings and general provisions of Project Specifications including the Special Conditions, apply to work of this section.

1.04 QUALITY ASSURANCE
- A. The material covered by these specifications shall be furnished by a certified manufacturer of proven ability who is regularly engaged in the manufacture, fabrication, and installation of stainless steel systems.
- B. Substitutions of any component or modification of system shall be made only when approved by the Architect.
- C. Fabricator Qualifications: firm experienced in successfully producing stainless steel fabrications similar to that indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.
- D. In addition to requirements of these specifications, comply with manufacturer’s instructions and recommendations for work.
- E. Material shall conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with ASTM E84 (method of test for surface burning characteristics of building materials) Wall Required Rating – Class C.
- F. Sanitary Standards: system components and finishes to comply with:
  1. United States Department of Agriculture (USDA) / Food Safety & Inspection Services (FSIS) requirements for food preparation facilities, incidental contact.
  2. Food and Drug Administration (FDA) 2013 Food Code 6-101.11.

1.05 DESIGN CRITERIA
- A. The design of stainless steel panel system, the support structure, and associated structural

connections, shall be in accordance with the governing building code(s) and approved standards as applicable.

1.06 SUBMITTALS

A. Comply with Special Conditions, unless otherwise indicated.

B. Product Data: Manufacturer's printed product data for each type of stainless steel wall panel system specified.

C. Detail Drawings: Mounting details with the appropriate adhesives, connections, anchorage methods, etc. for specific project substrates.

D. Manufacturer's Installation Instruction: Printed installation instructions for stainless steel wall panels.

1.07 PRODUCT HANDLING

A. Deliver materials in unopened factory packaging to the site.

B. Inspect materials at delivery to assure that specified products have been received.

C. Store in original packaging in an interior climate-controlled location away from the elements and direct sunlight.

D. Protect finished surfaces from soiling (including over exposure to sunlight) and damage during handling and installation. Any material which, in the opinion of the Architect, has become damaged and is unfit for use, shall be promptly replaced by the Construction Manager at no additional cost to the Owner.

1.08 JOB CONDITIONS

A. Environmental Requirements: Do not install panels until permanent HVAC systems are operating and temperature and humidity have been stabilized to less than 80% for 24 hours in advance of installation and maintained for at least 48 hours after installation as required by the manufacturer's recommendation.

1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for stainless steel panel installation areas.
2. After installation, control temperature and humidity to maintain relative humidity less than 80%.

B. Conditions: Do not install panels until interior concrete work, masonry, plastering and other wet operations are complete.

C. Provide ventilation to disperse fumes during application of adhesive.

1.09 WARRANTY

A. All materials and workmanship covered by this section shall carry a Standard IPC Limited Lifetime Warranty against material and manufacturing defects.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Inpro Corporation, IPC Door and Wall Protection Systems, P.O. Box 406, Muskego, WI 53150 USA; Telephone: 800-222-5556, Website: www.inprocorp.com or approved equal.

B. Product:
Standard FRP Panels with Smooth Surface with Greenguard Certification for low chemical emissions.

2.02 WALL PANELS:

A. Stainless Steel Wall Panels: provide stainless steel wall panel systems that include panels, top cap, divider trim, inside and outside corner trim.

1. Dimensions:
   a. Thickness – 18 gauge – Type 304 nominal
   b. Width - 4'-0″ nominal
   c. Length – 8′-0″ nominal or as indicated on the drawings.

2.03 BASE / MOLDINGS / TRIM:

A. Stainless Steel Inside and Outside Corner Trim, Stainless Steel Top Caps, and Staniless Steel Divider Trim:

1. 1″ x 1″ / 1″ sightline, 24 guage, 120″ height. Receives edge of adjacent panel and/or top edge of panels. Stainless steel – Type 304 (conforms to NSF Standard 51).
2. Attachment: adhesive mount.

2.04 MATERIALS:

A. Stainless Steel:

1. Wall Panels -
   a. Thickness – 18 and 20 gauge.
   b. Type 304 (conforms to NSF Standard 51).
2. Top Cap, Divider, Inside & Outside Corner Trim -
   a. Thickness – 24 gauge.
   b. Type 304 (conforms to NSF Standard 51).

SECTION 09780 – STAINLESS STEEL WALL PANELS and TRIM

2.05 COMPONENTS:

A. Attachment: Non-staining nylon drive rivets.
   1. Panels –
      a. Panels shall be adhered with field applied heavy duty adhesive and foam tape.
   2. Trim Pieces –
      a. Trim Pieces shall be adhered with field applied heavy duty adhesive.

2.06 FINISH:

A. Stainless Steel: Panels and corner guards shall have a No.4 satin finish.

PART 3- EXECUTION

3.01 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
B. Verify that stud spacing does not exceed 16″ (61cm) on-center.
C. Repair defects prior to installation.
D. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.
E. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorage materials and miscellaneous items to be mounted to walls / panels.
F. Surface Preparation: clean the substrate to remove dust, debris, and loose particles. Ensure the substrate is sound and per project plans.

3.02 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.
B. General – locate the wall panels as indicated on the approved detail drawing for the appropriate substrate and in compliance with the installation instructions. Install wall panels level and plumb at the height indicated on the drawings.
C. Apply panel moldings to all panel edges as required by manufacturer.

3.03 CLEANING

A. Refer to manufacturer's specific cleaning and maintenance instructions.

End of Section

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.
- B. Consult Drawings, finish schedules, details and specification section.

1.02 Quality Assurance:
- A. All painted surfaces shall be uniform in color, texture and finish to the satisfaction of the Architect.

1.03 Submittals:
- A. Submit manufacturer's specifications, including paint label analysis and application instructions for each material specified.
- B. Submit color samples for review of color and texture.
- C. Provide samples of all natural and stained wood finishes.
- D. Final samples: Prepare samples of finishes on the job to the satisfaction of the Architect. If required, a 4' x 8' portion of wall surface finished as final sample.

1.04 Product Deliver, Storage and Handling:
- A. Materials shall be delivered to the project site in strong, undamaged, waterproof containers with manufacturer's label intact. Materials in previously opened or unsealed containers, are not acceptable.
- B. Include on label of container: Manufacturer's name, type of paint, number and application instructions.
- C. Immediately upon delivery to the project site, all painter materials shall be stored and locked in a watertight shed with floor well off the ground. The shed shall remain locked at all times except for adding or removing materials.
- D. No materials of any manufacturer will be allowed on the project site any time during construction except those of the manufacturers specified or approved by the Architect.

1.05 Job Conditions:
- A. Comply with manufacturer's recommendations as to environmental conditions under which coating and coating systems can be applied.
- B. Do not apply finishes in areas where dust is being generated or where work in progress may affect finish quality.
- C. Protect finished work of other trades, and all surfaces not being painted concurrently, or not to be painted.

Part 2 - Products

2.01 General:
- A. The following specifications for Finishes is not intended to mention every particular item which will receive painter finish, but is intended to establish type and quality of finish which shall be required on various materials.
- B. **Products of Sherwin-Williams are specified herein to simplify descriptions of types and qualities of finishes required only.**

SECTION 09900 - PAINTING

Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.

C. Wherever the abbreviation "SW" appears in the following detailed specification, it shall be understood to mean Sherwin-Williams.

D. Primers shall be as specified by manufacturers of finish paint used and as approved by the Architect.

2.02 Acceptable Manufacturers:

A. Sherwin-Williams.

B. PPG Industries.

C. Cook Paint and Varnish Co.

D. Pratt and Lambert.

E Kelly-Moore.

2.02 Exterior Finishes:

A. Enamel on Ferrous Metals:
   1. One coat SW Kem Kromik Primer, (Alkyd primer).
   2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

B. Enamel on Exterior Door Frames and Doors:
   1. Shop coat by others-touch up as required.
   2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

C. Enamel on Galvanized Metal:
   1. One Coat SW Galvite primer.
   2. 2 Coats SW Industrial Enamel, (Alkyd gloss enamel).

D. Enamel on Exterior Concrete Block (if applicable):
   1. One coat SW Promar Latex Block Filler B25W25.
   2. Two coats SW A-100 Semi-Gloss Latex Enamel.

2.03 Interior Finishes:

A. Enamel on Metal: All miscellaneous and ornamental metal items which are left exposed, hollow metal doors and frames.
   1. Shop coat by others - touch up as required.
   2. Two coats SW Promar 200 Semi-Gloss. Enamel, (Alkyd semi-gloss enamel).

B. Enamel on Existing Concrete Block:
   1. One coat SW Promar 200 Block Filler (vinyl acrylic latex).
   2. Two coats SW Promar 200 Semi-Gloss Enamel.

C. Enamel on Gypsum Board Ceilings/Facias/Walls
   1. One coat SW Promar 200 Wall Primer with Medium Texture. (Vinyl Acrylic Latex Wall Primer.)
   2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

D. Tape and Float: Joints on Gypsum Board.
   1. As per manufacturer's instructions.
   2. All joints shall be sanded ready for primer's finish.

E. Interior Millwork and Cabinetry:
   1. One coat SW Promar 200 Alkyd Enamel Primer/Undercoat.
   2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

F. Enamel on Wood Trim:
   1. One coat SW Promar 200 Alkyd Enamel Primer/Undercoat.
   2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

G. Back-Painting, Interior Work:
   1. Two coats SW Promar 200 Alkyd Enamel Primer/Undercoat.

H. Enamel on Exposed Metal Piping:
   1. One coat SW Galvite primer.
   2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

Part 3 - Execution

3.01 Inspection:
   A. Notify Contractor of any surface not in proper condition to be finished before proceeding with the work. Starting work will constitute the painter's acceptance of preceding work, and conditions under which finish will be applied and his assumption of responsibility for results to be obtained.

3.02 Preparation of Surfaces:
   A. Wood:
      1. Sand to a smooth even surface, then dust off.
      2. Touch-up knots, resinous spots, etc., on all surfaces with shellac 18 hours before applying prime coat.
      3. Fill nail holes, cracks and blemishes flush after priming coat has dried.
   B. Concrete Block and Concrete:
      1. Repair cracks and irregularities to provide uniform surface texture.
   C. Ferrous Metal Surfaces:
      1. Remove rust and scale, clean grease or oil surfaces with turpentine or benzine before painting.

3.03 Application:
   A. Number of coats and quality of finish shall be in accordance with these specifications, which requires the use of material which will product first quality finish if properly applied.
   B. Apply coats of material in strict accordance with manufacturer's currently published specifications, except where requirements of these specifications are in excess or manufacturer's requirements.
   C. Except as otherwise approved by the Architect, the first two coats of painter's finish shall be applied by roller or brush application. Finish coats may be applied by spray application.
   D. Comply with recommendation of product manufacturer for drying time between succeeding coats allow additional as required until finish is dry.
   E. All work where a coat of material has been applied must be inspected and approved before application of succeeding coat, otherwise, no credit for the coat well be given. Notify Architect when a particular coat has been completed for inspection and approval.
   F. Shellacs, oils, turpentine, etc., shall be of the highest quality and subject to approval of Architect. Materials shall be mixed in and applied directly from containers which they are purchased except when use of other containers is approved.
   G. First Coat of all finishes, except of varnish and stains, shall be white.
   H. Sand lightly between coats where shellac, varnish or enamel

is used.

I. Remove all hardware, accessories, machined surfaces, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations.

3.04 Clean-up:

A. Clean and paint spots from work and touch-up or otherwise repair any defective or damaged work.

B. Remove all surplus materials and equipment after work is completed.

C. Leave entire job clean and acceptable to the Architect.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10100 - MARKERBOARDS AND TACKBOARDS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  - 1. American Society for Testing and Materials:
    - a. ASTM A-424, Steel Sheets for Porcelain Enameling.
  - 2. Federal Specifications:
    - a. LL-B-810B, Hardboard.
  - 3. Military Specifications:
    - a. MIL-C-15116C, Cork Sheet.

1.03 Submittals:
- A. Shop Drawings: Submit dimensioned ship Drawings indicating location, type, size, arrangement, adhesive, backing, anchor or mounting details, trim, and accessories.
- B. Submit samples showing the full range of colors available for each unit.

Part 2 - Products

2.01 Materials:
- A. Tackboard:
  - 1. Type: Factory-built aluminum framed unit.
  - 2. Construction: Vinyl covered surface bonded to a 2" thick insulation board core, with a 7/8" x 5/8" aluminum frame. Refer to Color Schedule.
  - 3. Mount System: Manufacturer’s standard.
  - 4. Acceptable manufacturer: Best-Rite Vin-Tak tackboards.

Part 3 - Execution

3.01 Installation:
- A. Install units straight, plumb, and level with metal splice system. Refer to Drawings.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10400 - INTERIOR SIGNAGE

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. UFAS Fed. Std. 795-Requirements for the physically handicapped.
  2. MIL Spec. L-P-387a, type NDP, rated self-extinguishing, for sign materials.

1.03 Submittals:
- A. Provide manufacturer's catalog cut and data sheets, complete parts list and installation requirements for each item specified.
- B. Schedules: Indicate location and placement for all graphic items.

1.04 Product Delivery, Storage and Handling:
- A. Handle and store all items with care to prevent damage and injury to finish surfaces.

Part 2 - Products

2.01 Products of the manufacturers listed below have been specified herein to simplify descriptions of design, construction, and materials only. All items have been selected for visual and performance design quality which shall serve as a basis for acceptance of equivalent products by other manufacturers.

2.02 Signage System:
- A. Material: 1/8 inch thick, type ES melamine plastic.
- B. Size: 8" x 8" x 1/8", with 1/2" radius corners. Custom design - refer to 2.04 for text and symbols.
- C. Mounting: All graphics shall be permanently mounted to wall or door surface with tamper resistant screws except where mounting to glazing is required. Provide adhesive for mounting and provide blank plates at opposite side of glass. Coordinate with Architect.
- D. Color: Black background with white letters/numbers, submit color samples with submittals, prior to approval. **Colors will be a factor in product acceptance.**
- E. Letter Style: Helvetica Medium.
- F. Standard Grade 2 braille shall be below all copy, all signs.
- G. All graphic material shall meet the requirements of UFAS Fed. Std. 795, and MIL spec L-P-387a.
- H. Acceptable Manufacturer: Series 200A, Type D format, Mohawk Sign systems.

SECTION 10400 - INTERIOR SIGNAGE

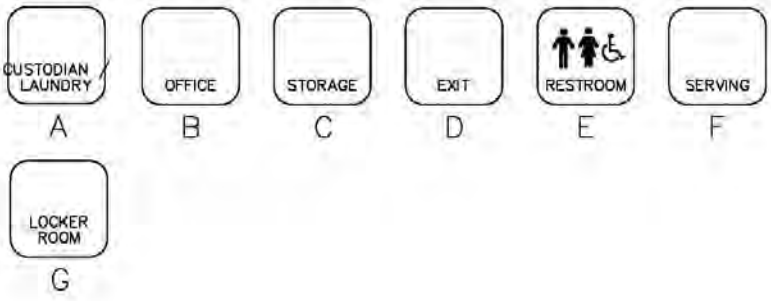
2.03 Plaque Groupings Required (letter designation refers to 2.04):

Quantity	Plaque	Mounting Location

**Coordinate location with Architect

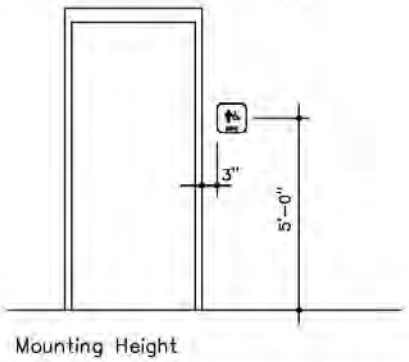
Plaque	**Quantity**	**Location**
A	1	@ room no. 6
B	1	@ door no. 5
C	2	@ door no. 4 & room no. 9
D	3	@ doors no. 1, 6, & existing
E	1	@ door no. 2
F	2	@ doors no. 6 & existing
G	3	@ door no. 3

2.04 Signage Plaques Required:



Note: all signage plaques shall have grade 2 braille translations under text.

2.05 Typical Mounting:



Typical Wall Location

Verify location with architect.

SECTION 10400 - INTERIOR SIGNAGE

Part 3 - Execution

3.01 Installation:

A. Comply with manufacturer's installation instructions and details on the Drawings. Set all units plumb and level in location indicated on the Drawings or as directed.

B. Provide all necessary accessories: Items to support or attach Identifying Devices to result in a complete installation.

C. Protect all signage plaques to prevent damage after installation.

End of Section

SECTION 10500 - LOCKERS

Part 1 General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of this entire section of the work.

1.02 Submittals:
- A. Shop Drawings: Indicate details and dimensions of fabrication and installation including layouts and assemblies. Begin fabrication only after receiving approved shop Drawings.
- B. Manufacturer's Literature: Descriptive literature and installation instructions.

1.03 Product Delivery, Storage, and Handling:
- A. Handle and store all items with care to prevent damage and injury to finish surfaces.
- B. Protect adjacent existing surfaces from damage.

1.04 Quality Assurance:
- A. Standards:
  1. Federal Specification: AA-L-486.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. **Lockers Type 1** - Double Tier "Quiet" Lockers - at the Kitchen Locker Room – 4 / 8 units:
  1. Construction: Each unit shall have individual door and frame of cold rolled steel.
     - a. Body: shall be 16 gauge steel, flanged to give double thickness of metal at back vertical corners; 18 gauge backs.
     - b. Door Frame: shall be 16 gauge steel formed channels with vertical members having an additional flange to form continuous door strike. Corners shall be lapped and welded into a rigid assembly; in addition, bottom cross members shall have tang at each end that fits through slot in rear slot of upright frame member to prevent twisting out of alignment. Top and bottom cross members shall provide support for front edge of locker top and locker bottom.

SECTION 10500 - LOCKERS

c. Door: shall be 14 gauge steel, one piece, with both vertical edges formed into a channel shape and top and bottom flanged at 90 degree angle. Welded construction with reinforced top and bottom with intermediate stiffener ribs, grind and finish all edges smooth.
d. Coat Hooks: provide three single prong coat hooks made of cadmium-plated or zinc-plated steel.
e. Ventilation: door perimeter and verti-vents.

2. Quantity: Refer to Drawings.
3. Size: 15"w x 18"d x 36"h per tier for a total locker height of 72″.
4. Base: None - mount to top of continuous concrete masonry / wood framed base.
5. Hardware:
   a. Hinge to be full loop, 2" 5-knuckle hinges nested in door slot, welded to frame and double-riveted to door.
   b. Handle to be stainless steel recessed handle with plastic-protected lifting trigger. Must be able to accept padlock and meet ADA requirements for accessibility.
   c. Latching to be quiet, multi-point latching on heavy gauge frame hooks with rubber silencers. Concealed quiet lock bar locked in place and isolated from metal to metal contact by polyethylene glides.
6. Provide aluminum number plates – coordinate numbering system with Architect.
7. Provide end finishing panels to closeout to adjacent / perpendicular walls and at corners.
8. Color: refer to Color Schedule.

B. General: Locker manufacturer shall provide all appropriate matching trim and closure pieces for a complete and finished installation.
B. Acceptable Manufacturer: Republic Storage Systems.

Part 3 - Execution

3.01 Installation:
A. Field verify prepared bases are in correct position and configuration.
B. Install equipment as located on the Drawings and comply with manufacturer's written instructions for equipment

provided.
Secure lockers with anchor devices with a minimum pull-out force of 100 lbs.
Provide any additional items necessary for support or to complete installation.

C. Clean work after installation including locker interior and exterior surfaces.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10520 - FIRE PROTECTION SPECIALTIES

Part 1 General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.

1.02 Submittals:
- A. Submit Manufacturer's Literature: Descriptive literature, product data and installation instructions.

1.03 Product Delivery, Storage and Handling:
- A. Handle and store all items with care to prevent damage to equipment. Damaged equipment shall be rejected.

1.04 Quality Assurance:
- A. Standards:
  1. Conform to NFPA 10 requirements for portable fire extinguishers.
- B. Provide fire extinguishers, cabinets and accessories by a single manufacturer.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Fire Extinguishers:
  1. Model No. 10E - Cosmic multi-purpose dry chemical fire extinguisher. UL, 4A-60-BC.
- B. Fire Extinguisher Cabinets:
  1. Model No.: Academy 1026V10 with return trim as required with rolled edge.
  2. Door Style: Contemporary V, with flat trim.
  3. Glazing: 1/4" clear acrylic.
  4. Finish: Aluminum, mill finish, clear anodized.
  5. Fire Rated Enclosure: provide fire stopping material to protect integrity of fire rated partition as required by applicable codes and standards.

Part 3 - Execution

3.01 Installation:
- A. Install equipment as located on the Drawings and comply with manufacturer's written instructions for equipment provided.
- B. Prepare recesses in walls for fire extinguisher cabinets as required for type and size of cabinet and style of trim, and

to comply with manufacturer's instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to the structure, square and plumb, to comply with manufacturer's instructions.

D. Check extinguishers for proper charge operation.

E. Remove and replace damaged, defective or under charged units.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10800 - TOILET AND BATH ACCESSORIES

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

1.02 Submittals:
- A. Provide manufacturer's catalog cut and data sheets, complete parts list and installation requirements for each accessory item specified.
- B. Where applicable, submit maintenance data, operating instructions and keys required for each type of equipment and lock.

1.03 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 The following model numbers refer to products of Bradley Corporation (except where noted otherwise).

2.02 Accessories:
- A. Grab Bars:
  1. Model No. 8120-001360-36".
  2. Quantity: 1 each @ room 2
- B. Grab Bars:
  1. Model No. 8120-001420-42".
  2. Quantity: 1 each @ room 2
- C. Grab Bars:
  1. Model No. 8120-001180-18".
  2. Quantity: 1 each @ room 2
- D. Tilted Stainless Steel Mirror (Frame and Surface):
  1. Model No. 740-1830.
  2. Quantity: 1 each @ room 2 (above lavatory)
- E. Custodian's Utility Shelf/With Mop & Broom Holder:
  1. Model No. 9984, 36" long.
  2. Quantity: 1 @ room 6
- G. Toilet Paper Dispensers to be provided by Owner and installed by Contractor.
- H. Paper Towel Dispenser to be provided by Owner and installed by Contractor.
- I. Soap Dispenser to be provided by Owner and installed by Contractor.

SECTION 10800 - TOILET AND BATH ACCESSORIES

Part 3 - Execution

3.01 General:

A. Install where noted on the Drawings and mount as indicated or per manufacturer's recommendations.

B. Use concealed or tamper-proof fasteners of same material and finish as unit. Provide anchors, bolts, and other mounting devices and attach units securely.

End of Section

SECTION 11 – EQUIPMENT

11400 – KITCHEN EQUIPMENT

PART 1 – GENERAL

1.01 SCOPE

A. Include the work specified, shown or reasonably inferred as part of the foodservice equipment. Portions of the work may be subcontracted to those qualified to do the work as required by jurisdictional trade agreements and restrictions.

B. Kitchen equipment furnished and installed by the Foodservice Contractor In the base bid.

C. Provide itemized pricing providing both each pricing and total pricing for every item specified with a bid grand total.

1.02 RELATED SECTIONS

A. Division 03 - Floor depressions, reinforced wearing beds and the interior finished floor with a coved base at walk-in coolers and freezers.

B. Division 15 – Mechanical rough-ins, inter-connections of the equipment as required and final connections.

C. Division 16 – Electrical rough-ins, inter-connections of the equipment as required and final connections.

1.03 QUALITY ASSURANCE

A. All equipment and associated work must comply with all applicable laws, statutes, building codes and regulations of public authorities and comply with the following:

1. NSF (National Sanitation Foundation). All the equipment must bear the NSF label.
2. NEC (National electric Code).
3. UL (Underwriter's Laboratories, Inc.).
4. AGA (American Gas Association Laboratories).
5. NFPA (National Fire Protection Association).

B. The following are approved fabricators for providing the fabricated food service equipment:

Quality Food Equipment
812 Southeast 82nd Street
Oklahoma City, OK 73149

Jero Manufacturing, Inc.
5117 South 100th East Avenue
Tulsa, Oklahoma 74115

1.04 SUBSTITUTIONS

A. Equipment items and the components specified are intended to be the basis of the bid. All other manufacturers, including manufactures which may be

listed as "alternates" or "approved equals" must conform with the specifications, size, accessories, etc. of the original manufacturer specified.

B. Proposed substitutions will be substituted no later than fourteen (14) days prior to the bid date. Submit the proposed substitutions with the manufacturer's specification or catalog sheets, shop drawings, etc. indicating all modifications required to conform to the specified items.

C. Approved substitutions will be addressed in an addendum(s). Approved substitutions will be noted on the bid form as a substitution. All costs and fees for any design and engineering services required to make adjustments to the space, systems, utilities, etc. will be the responsibility of the successful bidder. All costs incurred for modifications of the utilities or construction or professional services will be the responsibility of the successful bidder.

D. The Owner reserves the right to accept or reject any or all of the substitutions proposed before the execution of the contract

1.05 DOCUMENT INTERPERTATION

A. An addendum(s) will be issued addressing questions and comments from contractors, suppliers or vendors pertaining to the intent or clarity of the construction documents.

B. All questions and comments will be submitted in writing by the contractors, suppliers and vendors for review.

1.06 SUBMITTALS

A. Submit brochure books, rough-in drawings, fabrication shop drawings and manufactures shop drawings. Refer to the Special Conditions for the required quantities and format (submittals are to be submitted by electronic files).

1. Brochures:
   a. Provide with a front and rear cover. Label the front cover with the project name.
   b. Provide a cover sheet for each item number. The cover sheet will indicate the item number, the item name, the quantity, the manufacture, all optional equipment and accessories, specified modifications, the utility requirements and any special instructions.
   c. The manufactures catalog specification sheets.
2. Submittal drawings:
   a. Indicate all equipment shown on the contract documents drawn at a 1/4" scale.

b. The contract documents are not to be traced or reproduced.
c. Provide an equipment schedule indicating all the equipment shown on the contract documents.
d. Drawings to be submitted on the same size drawing sheet as the Contract Documents in a PDF format. Provide the necessary required hard copies of the reviewed/stamped document to the General Contractor. Submit the drawings separately from the Brochure Book.

3. Rough-in drawings:
   a. Indicate all equipment shown on the contract documents drawn at a 1/4" scale.
   b. Indicate all general use and convenience utilities indicated on the contract documents.
   c. Include utilities shown on the contract documents but connected to equipment not furnished in this section.
   d. Fully dimension all the utilities for the plumbing, electrical and mechanical from the finished room surface to the point of the stub-up through the floor and the stub-out through the wall or ceiling.
   e. Drawings to be submitted on the same size drawing sheet as the Contract Documents in a PDF format. Provide the necessary required hard copies of the reviewed/stamped document to the General Contractor. Submit the drawings separately from the Brochure Book.
4. Manufacturer's and fabricators shop drawings:
   a. Indicate all equipment shown on the contract documents drawn at a 3/4" scale for the plan views and elevations. All sections and details to be drawn at a minimum of 1 1/2" scale.
   b. Include the equipment name, the item number and the quantity on the drawings.
   c. Include all required and necessary sections, details and elevations to reflect the drawings and the specifications.
   d. Indicate all adjacent equipment, walls and columns.
   e. Include all necessary plumbing and electrical schematic drawings.
   f. Include any ventilation or access panels as required by the manufactures of the built-in equipment.

g. Drawings to be submitted on the same size drawing sheet as the Contract Documents in a PDF format. Provide the necessary required hard copies of the reviewed/stamped document to the Construction Manager. Submit the drawings separately from the Brochure Book.

1.07 COORDINATION OF THE PROJECT AND DATA

A. Review the contract documents, rough-in drawings, shop drawings and brochure books for accuracy and completeness.
   1. Notify the Architect of any conflicts and required adjustments in writing.
   2. Coordinate the work with this section with the other sub-contractors on the job.
   3. Submit paint, stain, plastic laminate, vinyl coated surfaces, molded plastic, natural stone, man-made stone and solid surface material to the Owner for approval.
   4. Obtain serviceware samples for sizing and weight information from the Owner for coordination of all self-leveling equipment.
   5. Coordinate all mobile equipment will go through doors, wall openings and roll-in/roll-thru equipment. Notify the Architect of all conflicts or deviations from the approved submittals in writing.

1.08 FIELD VERIFICATION OF THE PROJECT AND DATA

A. Review the contract documents, rough-in drawings, shop drawings and brochure books for accuracy and completeness.
   1. Field verify all the under-slab rough-in locations and quantities before the concrete slab is poured. Notify the Architect in writing of all conflicts or omissions of the rough-ins.
   2. Field verify all the in-slab recess locations, sixes, depths and quantities before the concrete slab is poured. Notify the Architect in writing of all conflicts or omissions of the in-slab recess.
   3. Field verify all the in-wall rough-in locations and quantities before the drywall is installed. Notify the Architect in writing of all conflicts or omissions of the rough-ins.
   4. Obtain actual field dimensions or guaranteed measurements from the general contractor to insure the proper fit of the equipment at the job site. The dimensions shown in the contract documents are

approximate. The dimensions are for the bidding process only.

5. conditions before the fabrication and/or delivery of equipment to the job site. Notify the Architect of all conflicts or deviations from the approved submittals in writing.
6. Coordinate any exterior wall openings required for the delivery of all oversized equipment with the general contractor. The equipment must be manufactured to fit through standard door openings if this cannot be done.

1.09 WARRANTY

A. Provide manufacturer's warranty on each piece of specified equipment.
B. The warranty period will be for one year after acceptance from the Owner for parts and labor.
C. The warranty period will be for five years after acceptance from the Owner for compressor bodies for refrigeration equipment.
D. The warranty period will be for ten years after acceptance from the Owner for the walk-in panels.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Stainless steel.
   1. All stainless steel to 18-8, type 304, polished to a 180 grit number 4 finish unless noted otherwise in the item specifications or in the drawings.
   2. All seams and joints are to be heli-arc welded completely and free of flaws and pits. Grind the welds smooth and polish to a number 4 finish.
   3. The grain of the stainless steel is to run the length of the equipment including the backsplash. Provide a polished miter look where the tops form a corner.
B. Galvanized iron.
   1. All seams and joints are to be heli-arc welded completely and free of flaws and pits. Grind the welds.
   2. Thoroughly clean the welded and polished areas and prime and paint with Rustoleum in a color to match the metal.
C. Sound deadening.
   1. Apply 1/2" wide Schnee Butyl sealant rope continuously between all bracing/frame members and

the underside of the table/counter tops, overshelves, wall shelves and undershelves.

2. Weld stud bolts to the underside of the tops, overshelves, wall shelves and undershelves. Tighten the stud bolts for maximum compression of the sound deadening. Trim any excess that extends from out of the bracing.

D. Shop and field joints.
   1. Field joints are to be used only when the equipment size must be limited for access into the building.
   2. Indicate the field joint locations on the shop drawings.

PART 3 – EXECUTION

3.01 INSPECTION
   A. Verify and test that all equipment is plumbed, wired correctly, true and in good working order. Do not use until turned over to the Owner.
   B. Protect all appliances from construction dirt until the project is turned over to the Owner.

3.02 DELIVERY
   A. Coordinate with the construction progress and the Owner's operation schedule. Unless otherwise instructed by the general contractor or the Owner, the following procedures apply.
      1. Items that integrate into the building, such as, walk-in coolers and freezers, ventilators, hoods, equipment supports, ceiling mounted utensil racks, etc. will be sent to the job site after the building is water tight and directed by the general contractor. Protect the equipment as required after installation is complete.
      2. All the additional fixed equipment and mobile equipment requiring plumbing and electrical final connections will be delivered to the job site after the completion of the finished floor, wall finish, ceiling grid and tile or drywall and paint and the lighting system.
      3. The remaining mobile equipment will be delivered to the job site after the equipment can be inventoried and secured in a lockable area. If a secured area is not available, deliver the equipment when the job site when the installation is completed and the equipment clean-up process have been completed.

4. Small counter item, pans, flatware containers, etc. will be delivered only when the Owner is ready to receive and inventory the items.

3.03 INSTALLATION

A. Provide a competent supervisor at the job site during the entire installation process.

B. Install the equipment per the manufacture's recommendations. Install the equipment square and level. All equipment shall be ready for the final connections.

C. Protect the equipment after the installation process is complete.
   1. Protect the custom fabricated equipment with fiberboard or plywood taped to the tops and exposed body surfaces.
   2. Protect the buy-out equipment with fiberboard or plywood taped to the tops and exposed body surfaces.
   3. The general contractor must ensure the equipment is not used by other sub-contractors as work tables, scaffolding, tool and material storage, etc.

D. Provide and install 18 gauge stainless steel trim at all gaps between the equipment and the walls and/or other high equipment when the gap is larger than 7/16 of an inch wide. Turn the trim down 90 degrees at the equipment splashes, top and/or turn downs. Attach the trim with hidden fasteners and seal with silicone caulking.

3.04 CLEAN AND ADJUST

A. Leave the work area clean and free of debris.

B. Remove or replace panels, parts or frames that are bowed, warped, dented or scratched as a result of manufacturing defects, shipping and delivery to the job site.

C. The Foodservice Contractor is to deliver the foodservice equipment to the job sits, uncrate the equipment, remove all packing materials from the equipment, set the equipment into place per the floor plan and the job site conditions, level the equipment and make ready for final connection by the Mechanical, Plumbing and/or Electrical Contractor. All crating materials are to be removed from the job site by the Foodservice Contractor.

D. The Foodservice Contractor will final clean (not sanitizing) the foodservice equipment and seal the fixed foodservice equipment to the adjacent walls and/or fixed equipment with silicone caulking after all the utilities have been connected. The caulking will be neat, smooth

and level with the foodservice equipment. Concaved caulking will be rejected. Remove any smeared caulking from the foodservice equipment and adjacent surfaces.

3.05 SERVICE MANUAL

A. Provide manufacture's warranties and operating manuals on all appliances over to the Owner – provide both printed and electronic copies.

B. Each appliance shall have operating instructions and maintenance information.

C. The Foodservice Contractor will furnish to the Owner three (3) copies of an owner's and operations manual. The manual will be in three ring binders. The manuals will include a cover sheet for each equipment item, warranty information sheets, manufactures specification Sheets and the service agent's name, address and telephone number.

D. All warranties are not to begin until after the Owner accepts successful completion of the Start-up Demonstration and the kitchen.

3.06 EQUIPMENT DEMO AND START UP

A. The Foodservice Contractor must test, adjust and regulate all the equipment per the manufacturer's instructions.

B. The Foodservice Contractor will schedule, at the Owner's convenience, a date and time to demonstrate the foodservice equipment to the Owner. The Foodservice Contractor will start up and check out the foodservice equipment before the equipment is demonstrated to the Owner.

PART 4 – EQUIPMENT

ITEM NO. 01 - SOILED DISHTABLE & POT SINK (1 REQUIRED)

Custom fabricated soiled dishtable & pot sink to be constructed per drawings with a fully welded 14 gauge type 304 stainless steel top. Provide 12 gauge fully welded type 304 stainless steel channel underbracing under top with fully welded closed ends where they are exposed. Sound deadened between the top and the underbracing. Extend the top through the pass-through window. Provide a 1" high marine edge at the opening.

Features:

01 Provide with a 10" high x 2" thick backsplash at walls. Attach back splash to wall with stainless steel screws at a 4'-0" o.c.

maximum spacing with 14 gauge stainless steel Z-clips.

02 Provide with a 3" high rolled rim at exposed sides. Locate top of rolled rim 3’-1” above finish floor.

03 Provide a 1'-9" x 1'-9" x 12" deep 14 gauge type 304 stainless steel scrap sink welded integrally into top and 12 gauge type 304 stainless steel fully welded rack guide.

04 Provide an 8” wide x depth per drawings scrap trough at scrap sink. Slope the trough to collector per drawings. Provided a hinged silver saver in trough located near scrap sink. Pre-pipe trough per drawings.

05 Provide a 6" wide x 2" deep 14 gauge type 304 stainless steel scupper drain welded integrally into top. Provide a removable fully welded stainless steel basket with a perforated bottom. Full weld two (2) 1/4” stainless steel grab rods across the width in two places.

06 Provide three (3) 26 1/2" front-to-back x 21" x wide x 11" deep sink compartments constructed with 14 gauge type 304 stainless steel fully welded integrally into the top.

07 Provide type 304 stainless steel legs with stainless steel leg sockets and adjustable stainless steel bullet feet. Fully weld the leg sockets the underbracing.

08 Provide a 16 gauge type 304 stainless steel undershelves per the drawings. Turn the undershelves up 2” at rear and high equipment. Fully weld the undershelves to the legs. Provide 12 gauge fully welded type 304 stainless steel channel underbracing under the undershelves. Sound deadened between the undershelves and the underbracing.

09 Provide type 304 stainless steel crossrails per the drawings. Fully weld the crossrails to the legs.

07 Provide trash can space under top per drawings.

08 Provide a 7'-1" long cantilevered 16 gauge type 304 stainless steel slanted rack shelf with a 7'-1" long x 1" diameter rail fully welded stainless steel cantilevered rack

storage shelf. Provide adjustable socket mounts on uprights for shelves. Attach uprights to wall at upright top. Mount slant rack shelf 1'-4" above rolled rim and mount rack storage shelf 1'-9" above slanted rack shelf.

09 Provide 1'-1" wide x length indicated on the drawing x 1" diameter fully welded stainless steel three-bar wall shelf at the sinks. Mount the rail shelf 1'-9" above the work surface.

10 Support the shelf with 12 gauge type 304 stainless steel angled brackets fully welded to the uprights

11 Provide a 14 gauge type 304 stainless steel wall panel behind the shelf per the drawings. Attach the panel to the wall with industrial adhesive.

Accessories:

1 ea. Component Hardware model E38-1012 basket drain in scrap sink.
1 ea. Component Hardware model E18-1822 basket drain in scupper drain.
3 ea. Fisher model 2906 water inlets.
1 ea. Fisher model 2905 water inlet.
1 ea. T & S model B-0457 vacuum breaker.
2 ea. T & S model B-0290 faucets.
3 ea. Component Hardware model DBN-8000 twist waste valve. Shorten the handle to be flush with the front of the sink bowl. Provide 14 gauge type 304 stainless steel brackets to support the handles. Attach to the sink bottom with stainless steel anchors.
3 ea. Component Hardware model J19-4962 brackets.

ITEM NO. 02 - DISHWASHER WITH BOOSTER HEATER (1 REQUIRED)

Insinger Machine Company model Admiral 44VG with standard features and left hand feed.

Accessories:

1 ea. 208 volts, three phase – refer to Electrical Drawings.
1 ea. Dual Built-in booster heater(s).
1 ea. Electric heat.
1 ea. Provide with a 3/4" brass pressure regulator.
1 ea. Shock arrestor.

11400 – KITCHEN EQUIPMENT

ITEM NO. 04 – CLEAN DISHTABLE (1 REQUIRED)

Custom fabricated clean dishtable to be constructed per drawings with a fully welded 14 gauge type 304 stainless steel top. Provide 12 gauge fully welded type 304 stainless steel channel underbracing under top with fully welded closed ends where they are exposed. Sound deadened between top and underbracing.

Features:

A. Provide with a 10" high x 2" thick backsplash at walls. Attach back splash to wall with stainless steel screws at a 4'-0" o.c. maximum spacing with 14 gauge stainless steel Z-clips.

B. Provide with a 3" high rolled rim at exposed sides. Locate top of rolled rim 3’-1” above finish floor.

C. Provide type 304 stainless steel legs with stainless steel leg sockets and adjustable stainless steel bullet feet. Fully weld the leg sockets the underbracing.

D. Provide a 16 gauge type 304 stainless steel undershelves per the drawings. Turn the undershelves up 2” at rear and high equipment. Fully weld the undershelves to the legs. Provide 12 gauge fully welded type 304 stainless steel channel underbracing under the undershelves. Sound deadened between the undershelves and the underbracing.

E. Provide type 304 stainless steel crossrails per the drawings. Fully weld the crossrails to the legs.

ITEM NO. 06 – HAND SINK (1 REQUIRED)

To be supplied and connected by Plumbing Subcontractor – refer to Plumbing Drawings.

ITEM NO. 15 – ELECTRIC RESTAURANT RANGE (1 REQUIRED)

Vulcan model EV12-2FP240 electric restaurant range with all the standard features and 2 French Plates.

ITEM NO. 17 – VENTILATION AND FIRE SUPPRESSION SYSTEM

Refer to Mechanical, Fire Protection, Technology / Electrical drawings, etc.

ITEM NO. 24 - WALK-IN COOLER & FREEZER (1 REQUIRED)

The walk-in cooler & freezer to be manufactured by Thermo-Kool. The walk-in cooler & freezer to be

approximately 18′-2″W x 12′-10″D x 9′-3" high per the drawings. Provide a 4″ thick insulated panel floor. Provide stucco aluminum on the exterior and interior of the unit and white stucco aluminum on the ceiling.

Features:

01 Provide two (2) hinges on the doors.
02 Two (2) vapor proof lights.
03 Foot treadle at the doors.
04 One (1) 14″ x 24″ heated peep window in each door.
05 Two (2) pressure relief vents.
06 EC motors on the evaporator coils.
07 Provide wall trim and a closure panel constructed of stucco aluminum.
08 Provide all necessary refrigeration lines (hard copper), refrigerant and labor from the evaporator to the refrigeration rack system located on the ground.
09 All refrigerant line runs to be on the exterior of the walk-in with short runs only from the evaporators to above the ceiling. Seal the holes for the lines with a spray foam insulation to make an air-tight seal. Provide stainless steel or chrome covers at all exposed penetrations.
10 14 Gauge fully welded stainless steel bumper rails pre drawings and details on the exposed exterior walls and doors.
11 Provide 14 Gauge fully welded stainless steel trim pre drawings and details around the opening in the building and the walk-in box.

Accessories:

1 ea. ColdZone model MPL-2 refrigerated rack system per proposal number 25-0679. Locate the rack on the building roof. Verify the location at the job site.
1 ea. 208 volts, three phase.
2 ea. Berner model ASD36078 swing door. Install per the Manufactures requirements with stainless steel screws.
2 ea. Kason model 1810LCT40048″ LED light fixtures with bulbs as located per the drawings. Conduit shall not be run on the interior of the units except what is required to connect to the lights. Seal the holes for the

conduit and inside the conduit with a spray foam insulation to make an air-tight seal.

ITEM NO. 24 - WALK-IN SHELVING (1 LOT REQUIRED)

Quantum model WIRE storage shelves. Locate the bottom shelf at 10" above the finish floor and the remaining four (4) shelves at 17" O.C. at the balance of the shelving.

Accessories:

- 44 ea. Model 2142P shelves.
- 8 ea. Model P74P posts.
- 32 ea. Model P86P posts.
- 8 ea. Model FP foot plates. Mount the foot plates to the floor with stainless steel fasteners. Locate the foot plates on the units at the ingredient bins.

ITEM NO. 26 - AIR CURTAIN (1 REQUIRED)

Mars Air Systems model NH248-1UA-TS with all the standard features. Mount with stainless screws per the manufacturer's requirements.

Accessories:

- 1 ea. 120 volts, single phase with a cord and plug.
- 1 ea. Model 99-014 level 1 control package.
- 1 lot Model J2272 filter kit.

End of Section