S P E C I F I C A T I O N S

Sedgwick County...
working for you

Juvenile Services Building

Project Manual

Book 1 – Architectural

Sedgwick County
RFB # 26-0021

881 S. Minnesota
Wichita, Kansas 67211

HANNEY & ASSOCIATES ARCHITECTS
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Juvenile Services Building
2026

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SECTION 001500

GENERAL PROPOSAL
FOR THE

JUVENILE SERVICES BUILDING

SEDGWICK COUNTY, KANSAS

JUVENILE SERVICES BUILDING
Sedgwick County, Kansas

Date: _____

The undersigned, in compliance with your invitation for bids for the **Juvenile Services Building, Sedgwick County, Kansas,** having examined the site of the work, and being familiar with all the conditions surrounding the work, hereby propose to furnish all labor, materials and supplies and do all work necessary for the project in accordance with the contract documents at the price stated below. These prices are to cover all expenses incurred in performing the required work under the Contract Documents, of which this Proposal is a part.

PROPOSAL: JUVENILE SERVICES BUILDING
For all the work described in the specifications and shown on the plans for the **Juvenile Services Building, located at 881 Minnesota, Wichita, Sedgwick County, Kansas**; I or (we) agree to perform all the work and furnish all materials
complete for the sum of:

_____

_____ Dollars ($ _____).

TIME OF COMPLETION
The undersigned agrees, if awarded the Contract; to complete all work by _____.

The undersigned further agrees that, from the compensation otherwise to be paid; the Owner may retain the sum of Two Hundred Dollars ($200.00) for each day thereafter, Sundays and Holidays excluded, that the Contract remains incomplete, which sum is agreed upon as the proper measure of liquidated damages which the Owner will sustain per diem by the failure of the undersigned to complete the work at the time stipulated, and this amount is not to be construed as in any sense of penalty.

DECLARATION

The undersigned declares that he/she has carefully examined and understands all Bid Documents, including Invitation to Bid, Instructions to Bidders, Drawings, Specifications, and Addenda, that he/she has visited the location of the work and has familiarized themselves with all conditions under which the work is to be performed, including all pertinent codes and the conditions of labor and material markets, that he/she has checked quantities and prices, that he/she has made allowance in his bid for all work and all contingencies, and understands that in signing this bid he/she waives all right to plead any misunderstanding regarding the same.

The undersigned acknowledges receipt of the following Addenda to the Drawings and or Specifications.

(Give number and date of each.)

_____ _____

_____ _____

_____ _____

Respectfully Submitted, (signature) (legal name of bidder)

_____ _____

(Title) (address of bidder)

_____

(Signed by authorized officer) Seal (If bid is by a corporation)

End of Section 001500

SECTION 003000

SPECIAL CONDITIONS

1. GENERAL

In the event of any conflict or inconsistency between the terms and provisions of this section, "Section 00300 – Special Conditions", and the terms and provisions of the "Sedgwick County Division 100 – General Clauses and Covenants", the provisions and terms of the "Sedgwick County Division 100 – General Clauses and Covenants" shall prevail.

2. A.I.A. GENERAL CONDITIONS

A.I.A. Document A201 "General Conditions of the Contract for Construction", most recent edition, hereinafter referred to as the "A.I.A. General Conditions", is hereby made a part of this Specification, as if hereto attached or herein repeated. Contractor shall consult this document and become intimately familiar with its contents before submitting their proposal. Copies are available for purchase from the American Institute of Architects, 1735 New York Avenue, N.W., Washington D.C. and from local A.I.A. offices.

3. WORK INCLUDED

These Specifications and the accompanying Drawings are intended to provide for scope of design for all materials and labor necessary for the work outlined in the Drawings and Specifications for the **Juvenile Services Center, Wichita, Kansas.**

4. CONTRACTOR'S STATEMENT OF RESPONSIBILITY

4.1 Contractor shall submit a written statement of responsibility to the authority of jurisdiction, the responsible design professional, and the Owner or Owner's authorized agent prior to the commencement of work on the system or component. The statement shall contain:

4.1.1 Acknowledgement of awareness of the special requirements contained in the quality assurance plan.

4.1.2 Acknowledgement that control will be exercised to obtain compliance with the construction documents.

4.1.3 Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of reports.

4.1.4 Identification and qualifications of the person exercising such control and their position in the organization.

4.2 The contractor for each trade (building, electric, mechanical, plumbing, etc.) who is working on the project will need to sign a document acknowledging that they will adhere to each of the listed requirements; then the document will be uploaded to the Documents Folder of the MABCD Plan Review Portal (PLR). The signed document must be submitted by each contractor before that contractor begins work on the project. Each contractor shall comply with all requirements from Sedgwick County and MABCD from the beginning of the project.

4.3 A written statement of responsibility shall not be required for the fabrication of emergency operation center components that have been inspected and labeled by an approved agency as meeting the requirements of the applicable code and standard.

4.4 For more information related to the MABCD plan review system, please visit the MABCD website at: https://www.sedgwickcounty.org/mabcd/plan-review/.

5. INTERPRETATION OF DOCUMENTS

If any person contemplating submitting a bid for the proposed Contract is in doubt to the meaning of any part of the Plans, Specifications, or other proposed Contract Documents, they may submit to the Architect a written request for an interpretation thereof, prior to 48 hours of the hour of opening bids. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by Addendum duly issued and a copy of such Addendum will be mailed, faxed, or delivered to each person receiving a set of such documents.

6. VERIFICATION OF DOCUMENTS

Before submitting their proposal, each bidder shall check their set of Specifications and Drawings and advise the Architect if any sheets are missing.

6.1 Enumeration of Specifications appears in the Specifications Index.

6.2 Enumeration of Drawings appears on Sheet Number One (1) of the Plans.

7. CONTRACT DOCUMENTS

Refer to "Sedgwick County Division 100 – General Clauses and Covenants".
The Contract Documents consist of: The Agreement, the conditions of the Contract (General Conditions, Revisions in General Conditions and Supplementary General Conditions), the Drawings, the Specifications, all Addenda issued prior to the execution of the Agreement, and Change Orders thereafter.

8. PROPOSALS

Bidders are required to use the Proposal Form furnished by the Architect, which shall be made part of the Contract Documents.

9. EXAMINATION OF PREMISES

The Contractor shall carefully examine the premises before submitting a bid. No allowance will be made for lack of full knowledge of all conditions, except underground conditions as are indeterminable before the commencement of the work.

10. PAD CERTIFICATION

The General Contractor shall hire a surveyor to prepare a report for the minimum pad certification, and the General Contractor shall obtain the minimum pad certification from Sedgwick County, prior to beginning framing. The General Contractor shall pay for all costs associated with the minimum pad certification, as part of the Base Bid.

10.1 The minimum pad certification is to be submitted to Kelly Dixon prior to any framing inspection. Kelly Dixon's email address is kelly.dixon@sedgwick.gov, and his phone number is (316) 660-1792. The required form document is located in the Documents Folder of the MABCD Plan Review Portal (PLR). The minimum pad certification is required regardless of what the plans indicate. Contact Kelly for further information. If not provided, the MABCD system will stop the project and will not allow any framing.

11. THE COMPLETE SET OF PLANS AND SPECIFICATIONS ARE BEING ISSUED FOR BIDS. AS SUCH, EACH BIDDER IS REQUIRED TO REVIEW THE ENTIRE SET OF DOCUMENTS FOR WORK THAT MAY BE REQUIRED/DESCRIBED OUTSIDE THE EXPECTED AREA.

12. CHANGES

It is understood that the Owner shall have the right during the progress of construction to make any alterations, additions, or omissions that they may desire, to work or material herein specified or shown on the Drawings. The same shall be carried into effect by the Contractor without in any way violating the Contract, but if such changes are made, the value of same must be agreed upon in writing between Owner, Architect, and Contractor. No omissions will be allowed, or extra work paid for unless ordered in writing by the Architect.

13. SPECIAL WORK NOT INCLUDED

The Owner reserves the right to have special work, not included in the Contract, done during the course of the work herein included.

14. PERMITS

The MABCD Plan Review is complete and the General Contractor shall be responsible for pulling and paying for the building permit. Also, refer to "Sedgwick County Division 100 – General Clauses and Covenants".

15. RESPONSIBILITY FOR ACCIDENTS

The Contractor must bear all loss of damage from any accident(s) which may occur to any person or persons, by or on account of the execution of the work, until possession is taken by the Owner. The Contractor must provide all legal and necessary guard railing, lights, warning signs, etc., during the progress of the work.

16. SECURITY

Security work and security consultation will be conducted by Sandifer Engineering, Wichita, Kansas.

17. INSURANCE

Refer to "Sedgwick County Division 100 – General Clauses and Covenants".
The Contractor shall purchase and maintain coverages required by the General Conditions of the Contract, Paragraph 11.1 and these Specifications in the following minimum amounts, and provide the Owner, through the Architect, three copies of a Certificate of Insurance on A.I.A. form G705.

18. PROJECT SIGN

Provide and erect a project sign of a size approximately 8'-0" wide x 4'-0" high in accordance with detail as provided by the Architect. Sign shall be painted in three (3) colors on a white and black background on 3/4" plastic faced marine plywood. The sign shall contain name of the project, name of the Architect, Engineers and names of the prime Contractors.

19. DETAIL AND WORKING DRAWINGS

Additional detail and working drawings will be furnished in amplification of the Contract Drawings as they may be required; all such additional drawings are to be considered of equal force with those which accompany these specifications. A complete set of the drawings and specifications must be kept in the building at all times during the progress of the work.

20. DIMENSIONS

Figures given on the Drawings govern scale measurements and larger scale govern smaller.

21. FOREMAN

The Contractor must have at the building from start to finish one responsible foreman throughout the entire job; in addition, the Contractor must give the work their personal supervision; the foreman must be on duty during all working hours. Any instructions for notices given to him shall have the same force as if given to the Contractor in person.

22. MATERIALS AND WORKMANSHIP

All materials and workmanship are to be the best of their several kinds, unless specified to the contrary. The Contractor is to furnish all accessories needed, such as scaffolding, forms, protection, and all other temporary work, unless otherwise specified distinctly.

23. DEFECTIVE OR IMPROPER WORK

Any work or materials not conforming to the specifications must be removed by the Contractor and replaced by approved materials or work without extra compensation. All condemned material must be removed from the premises immediately.

24. PROTECTION

All materials in or designed for the work shall be at all times suitably housed or protected, particular care being taken of all finished parts.

25. PRIVY

The General Contractor is to provide and maintain a temporary toilet for the duration of the work.

26. TEMPORARY OFFICES AND STORAGE

26.1 The General Contractor shall erect or provide a temporary office building for the joint use of the Contractor, the Contractor's superintendent, the Owner, and the Architect.

This building shall be weatherproof, provided with wood or equal floor, provided with ample light and equipped with tables to facilitate inspection of plans. This building shall be located on the site and shall be retained throughout the construction and shall be removed upon completion of the work.

26.2 Each Subcontractor shall make their own arrangements with the General Contractor for office and storage facilities on the Site. If necessary, each Subcontractor shall provide and maintain their own offices and storage facilities at the site.

26.3 The location of any temporary facilities and the extent of the facilities and services to be provided shall be subject to the requirements of the General Contractor. Locate temporary structures to avoid interference with the Work. Relocate temporary structures as required by the progress of the Work.

27. DISRUPTION OF SERVICES

Before digging or trenching commences, or before demolition of walls or cutting of floor slabs commences, the General Contractor shall verify with Public Service Companies all known plumbing, gas and underground electrical lines.

28. CLOSING-IN WORK

28.1 The General Contractor shall notify the Owner, all Contractors and subcontractors under the Owner, when the G.C. is ready for them to install their portions of their work and see that they comply with any reasonable period of time. Neither enclose nor cover any piping, wiring, ducts, equipment or other items until proper tests, observations, and/or inspections have been made by the Architect and/or proper authorities.

28.2 Notify the Architect to observe any work when placing of subsequent work would prevent observation of previous work.

29. FINISHING

29.1 Adjust windows, doors, drawers, hardware, appliances, motors, valves, controls, and other equipment for proper operations.

29.2 Seal exterior joints between materials to form a waterproof enclosure.

29.3 Touch-up imperfections in surfaces, paint and other finishes after all Contractors and Tradesmen have completed their work.

29.4 Clean surfaces using appropriate materials and methods that will thoroughly clean but not damage materials and their finishes, nor damage or adversely affect other materials in the project.

30. COMPLETED WORK

30.1 Completed work shall find materials structurally sound, free from scratches, abrasions, distortions, chips, breaks, blisters, holes, splits or other disfigurement considered as imperfections for the specific material. Equipment shall operate properly to design performance capacities and requirements.

30.2 Finished installations shall illustrate first class workmanship.

30.3 Completed surfaces shall be thoroughly clean and free form foreign materials and stains.

31. PERMANENT SYSTEMS

Install, connect, service and operate permanent systems at earliest practical dates, except as may be modified by special conditions of these specifications.

32. COLOR SCHEDULE

A color schedule has been included with the Room Finish Schedule, on the Plans for bidding purposes. The Contractor and their subcontractors and material suppliers shall cooperate in furnishing required color samples to aid in the final selections. Where special colors are selected by the Architect, furnish accurate reproductions of these colors, on actual material to be furnished to the Project, for review.

33. GUARANTEE

Refer to "Sedgwick County Division 100 – General Clauses and Covenants".
The General Contractor shall be responsible for and shall make good any defects due to faults in labor and materials, which may arise or be discovered within one (1) year after the completion of the work and its acceptance by the Owner.

34. RETURNING DRAWINGS & SPECIFICATIONS

All drawings and Specifications must be returned to the Architect before the final certificate will be issued to the Contractor.

35. WRITTEN WORDS IN PROPOSAL

In case of a difference between words and figures in a proposal, the amount stated in written words shall govern.

36. TRASH AND DEBRIS

The General Contractor shall be responsible for keeping the construction area clean and to remove all debris from the site. The General Contractor remove all loose paper, cardboard, etc. from the site in a consistent manner to avoid blowing of trash and debris. The General Contractor shall be responsible for maintaining a central trash receptacle that can be used by all contractors.

37. TEMPORARY LIGHTING & POWER

The General Contractor is responsible for making application and paying for electrical service for construction of this project until the Owner takes possession at substantial completion. It shall be the electrical contractor's responsibility to provide power and lighting at the site for all trades during construction.

38. TEMPORARY ROADS AND PAVED AREAS

38.1 Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

38.2 Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

38.3 Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing. This applies to any area that will not be paved.

38.4 Delay installation of final course of permanent hot-mix asphalt pavement until immediately before substantial completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 2- Section "Hot-Mix Asphalt Paving".

39. TEMPORARY HEATING AND COOLING

39.1 New equipment can be utilized providing the warranty on the equipment does not start until substantial completion is reached for the building.

39.2 Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity.

40. TEMPORARY WATER & SEWER

The General Contractor is responsible for all costs of water to bring water to the site during construction for use by all trades, until the Owner takes possession of the fire station until substantial completion.

41. SALES TAX EXEMPTION

41.1 Materials and equipment incorporated into this project are exempt from payment of Kansas Sales Tax and such Sales Tax shall be excluded from bidder's proposal.

41.2 The Owner will provide the Contractor with a proper exemption certificate number within ten (10) days of Contract date. Upon issuance of a proper exemption certificate number to the Contractor, the Contractor shall assume full responsibility for their own proper use of the certificate number and shall pay all costs of any legally assessed penalties relating to the Contractor's improper use of the exemption certificate number.

41.3 Should the Owner fail to provide a proper exemption certificate number, the amount of the Sales Tax for the project shall be allowed as an extra to the Contract amount.

42. TAXES

The Contractor shall make all necessary forms for and shall pay for all taxes on labor and materials, such as Sales Tax, Social Security Tax, Withholding Tax, etc., without additional cost to the Owner, where such taxes are required by the State and Federal Laws.

43. OMISSIONS

43.1 The Drawings and Specifications are intended to cooperate anything shown on the Drawings but not mentioned in the Specifications or vice versa, or anything not expressly set forth in either, but which is reasonable implied, shall be furnished as though specifically shown and mentioned in both, without any charge.

43.2 Should anything be omitted from the Drawings, necessary to the proper construction of the work herein described, it shall be the duty of the Contractor to so notify the Architect before signing the Contract and in the event of the Contractor failing to give such notice, they shall make good any damages of defects in the work caused thereby without extra charge.

44. PROTECTION OF WORK AND PROPERTY

The General Contractor shall take charge of and assume general responsibility for proper protection of the building during construction. They shall further provide substantial enclosures at all openings as necessary for protection, including doors and locks. Each Contractor shall assume responsibility for their own materials stored on the premises.

45. EQUAL EMPLOYMENT OPPORTUNITY

Sections 1 through 5 of K.S.A. 44-1030 (as follows) shall be included in this Contract except those sub-contractors, vendors or suppliers whose cumulative dollar total in any fiscal year is $5,000 or less, or who have fewer than four (4) employees:

45.1 The contractor shall observe the provisions of the Kansas Act against discrimination and shall not discriminate against any person in the performance of work under the present Contract because of race, religion, color, sex, physical handicap unrelated to such person's ability to engage in the particular work, national origin or ancestry;

45.2 In all solicitations or advertisements for employees, the contractor shall include the phrase, “equal opportunity employer,” or a similar phrase to be approved by the commission;

45.3 If the contractor fails to comply with the manner in which the contractor reports to the commission in accordance with the provisions of K.S.A. 1976 Supp. 44-1030, as amended, they shall be deemed to have breached the present Contract and it may be cancelled, terminated or suspended, in whole or in part, by the contracting agency;

45.4 If the contractor is found guilty of a violation of the Kansas Act against discrimination under a decision or order of the commission which has become final, the contractor shall be deemed to have breached the present Contract and it may be cancelled, terminated or suspended, in whole or in part, by the contracting agency;

45.5 The contractor shall include the provisions of Paragraphs (1) through (4) inclusively of this Subsection (a) in every subcontract or purchase order so that such provisions will be binding upon such subcontractor or vendor.

46. EQUIPMENT VERIFICATION

46.1 Contractor check physical sizes of all material and equipment furnished under this Contract and require other Contractors and Owner to verify sizes of their equipment, in time to allow ample room for transporting equipment to and installing in its final location before enclosing spaces for it. Notify Architect in writing of any openings, ceiling heights or enclosures that are insufficient to accommodate equipment; such notice in ample time for Architect to direct necessary adjustments before such openings, ceilings or enclosures are placed.

46.2 Before construction proceeds to point that would prevent necessary modifications, Contractor check Drawings, Specifications, Shop Drawings and Change Orders and notify Architect, in writing, of any Mechanical/Electrical services and/or connections required but not indicated, or incorrectly indicated, for equipment furnished. Failing to do so, Contractor furnishing equipment provide required services and/or connections at the Contractor's expense.

47. REPAIRS

Unless the Architect grants permission to repair any defective work, remove defective work from project and replace with new work in accordance with Contract Documents, permission to repair such work shall not constitute a waiver of Architect's right to require complete replacement of defective work if repair operation does not restore quality and appearance of member or surface to Architect's satisfaction. If permission is granted, repair according to Architect's direction.

48. CONSTRUCTION REPORT

The Contractor shall submit to the Owner through the Architect schedules of costs and quantities of materials and of other items; schedules shall be in such form and shall be supported as to correctness by the estimates upon which they are based as the Owner may require.

The Contractor shall also submit to the Owner the following records on forms to be supplied by the Owner.

48.1 Detailed estimates.

48.2 Periodical estimates for partial payment.

48.3 Construction Schedule Dates with critical path chart.

49. LAWS AND ORDINANCES

The Contractor is required to familiarize himself with and observe all laws, ordinances and regulations relating to the work, and such laws, ordinances and regulations are hereby incorporated in and made a part of these specifications and the Contract for this work.

All work shall comply with the Americans with Disabilities Act.

50. COMMENCE WORK

Refer to "Sedgwick County Division 100 – General Clauses and Covenants". Work may commence with Owner's approval.

51. APPROVED EQUALS

Company's approved equals to the original specified suppliers are required to meet all requirements of the plans, specifications, and standards of performance and construction as established by the first named originally specified manufacturers product.

52. CLAIMS FOR ADDITIONAL TIME DUE TO ADVERSE WEATHER CONDITIONS

Refer to "Sedgwick County Division 100 – General Clauses and Covenants".

52.1 Bad weather day means a day that a contractor is unable to proceed with the stage or stages of the Work that is scheduled for that day due to weather conditions.

52.2 If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by data substantiating that weather conditions were abnormal for a period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

52.3 The average number of bad weather days reasonably anticipated for each month are as follows: January (10), February (5), March (4), April (5), May (8), June (8), July (6), August (5), September (6), October (5), November (3), December (8).

52.4 The contractor will provide the Architect with a monthly bad weather day report within five (5) days of the end of a month. If the contractor fails to report bad weather days five (5) days from the end of the month, then it will be assumed that there were no bad weather days for the month.

End of Section 003000

SECTION 011000

SUMMARY

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

- 2.1.1 Project information
- 2.1.2 Work covered by Contract Documents
- 2.1.3 Contractor's use of site and premises
- 2.1.4 Work restrictions
- 2.1.5 Specification and Drawing conventions
- 2.1.6 Miscellaneous provisions

2.2 Related Requirements

Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

3. PROJECT INFORMATION

Project Identification: Sedgwick County Juvenile Services Building

3.1 Project Location: 881 S. Minnesota, Wichita, Kansas

4. WORK COVERED BY CONTRACT DOCUMENTS

4.1 The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

- 4.1.1 New building and related sitework, as shown on Drawings, including related site and utility work.

4.2 Type of Contract: Project will be constructed under a single prime contract.

5. CONTRACTOR'S USE OF SITE AND PREMISES

5.1 Use of Site

Contractor shall have use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

5.2 Limits on Use of Site

Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

- 5.2.1 Limits on Use of Site

  Confine construction operations to area indicated on Drawings.

5.2.2 Driveways, Walkways and Entrances: Keep driveways, streets and entrances serving premises clear and available to Owner, Architect, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

5.2.3 Schedule deliveries to minimize use of driveways and entrances by construction operations.

5.2.4 Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

6. WORK RESTRICTIONS

6.1 Comply with restrictions on construction operations.
Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

6.2 On-Site Work Hours
Limit work to between 7:00 a.m. to 7:00 p.m., 7 days a week, unless otherwise indicated.

6.3 Existing Utility Interruptions
Do not interrupt utilities serving adjacent facilities occupied by others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

6.3.1 Notify adjacent property owners by phone and in writing not less than 5 days in advance of proposed utility interruptions.

6.4 Noise, Vibration, Dust, and Odors
Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to adjacent occupied facilities.

6.5 Smoking Restrictions
Use of tobacco products and vaping is allowed on exterior portions of the site, not within the buildings as they are being constructed, or renovated.

7. SPECIFICATION AND DRAWING CONVENTIONS

7.1 Specification Content
The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

7.1.1 Imperative mood and streamlined language are generally used in the Specifications. The words “shall”, “shall be”, or “shall comply with”, depending on the context, are implied where a colon (:) is used within a sentence or phrase.

7.1.2 Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.

7.1.3 Specification requirements are to be performed by Contractor unless specifically stated otherwise.

7.2 Division 00 Contracting Requirements
General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

7.3 Division 01 General Requirements
Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

7.4 Drawing Coordination
Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

7.4.1 Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

7.4.2 Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 011000

SECTION 012500

SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1. GENERAL

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for substitutions.

2.2 Related Requirements
Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

3. DEFINITIONS

Substitutions
Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

3.1 Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

3.2 Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

4. ACTION SUBMITTALS

Substitution Requests
Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

4.1 Substitution Request Form: Use form acceptable to Architect.

4.2 Documentation: Show compliance with requirements for substitutions and the following, as applicable:

4.2.1 Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

4.2.2 Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

4.2.3 Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

4.2.4 Product Data, including drawings and descriptions of products and fabrication and installation procedures.

4.2.5 Samples, where applicable or requested.

4.2.6 Certificates and qualification data, where applicable or requested.

4.2.7 List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.

4.2.8 Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

4.2.9 Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

4.2.10 Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

4.2.11 Cost information, including a proposal of change, if any, in the Contract Sum.

A. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

4.2.12 Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

4.3 Architect's Action

If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

4.3.1 Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

4.3.2 Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

5. QUALITY ASSURANCE

Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

6. PROCEDURES

Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

7. SUBSTITUTIONS

7.1 Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

7.1.1 Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

A Requested substitution is consistent with the Contract Documents and will produce indicated results.

B. Substitution request is fully documented and properly submitted.

C. Requested substitution will not adversely affect Contractor's construction schedule.

D. Requested substitution has received necessary approvals of authorities having jurisdiction.

E. Requested substitution is compatible with other portions of the Work.

F. Requested substitution has been coordinated with other portions of the Work.

G. Requested substitution provides specified warranty.

H. If requested substitution involves more than 1 contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

7.2 Substitutions for Convenience: Not allowed unless otherwise indicated.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 012500

SECTION 012600

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

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

3. MINOR CHANGES IN THE WORK

Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

4. PROPOSAL REQUESTS

4.1 Owner-Initiated Proposal Requests

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

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

4.1.2 Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

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

B. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

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

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

E. Quotation Form: Use forms acceptable to Architect.

4.2 Contractor-Initiated Proposals
If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

4.2.1 Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

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

4.2.3 Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

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

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

4.2.6 Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of 1 product or system for product or system specified.

4.2.7 Proposal Request Form: Use form acceptable to Architect.

5. CHANGE ORDER PROCEDURES
On Owner’s approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

6. CONSTRUCTION CHANGE DIRECTIVE

6.1 Construction Change Directive
Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

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

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 012600

SECTION 012900

PAYMENT PROCEDURES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

2.2 Related Requirements

2.2.1 Section 012600 “Contract Modification Procedures” for administrative procedures for handling changes to the Contract.

2.2.2 Section 013200 “Construction Progress Documentation” for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

3. DEFINITIONS

Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.

4. SCHEDULE OF VALUES

4.1 Coordination

Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

4.1.1 Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.

4.1.2 Submit the schedule of values to Architect at earliest possible date, but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.

4.1.3 Subschedules for Separate Elements of Work: Where the Contractor’s construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

4.2 Format and Content

Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least 1 line item for each Specification Section.

4.2.1 Identification: Include the following Project identification on the Schedule of Values:

A. Project name and location

B. Owner’s name

C. Name of Architect

D. Architect's Project number

E. Contractor's name and address

F. Date of submittal

4.2.2 Arrange schedule of values consistent with format of AIA Document G703.

4.2.3 Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

A. Related Specification Section or division

B. Description of the Work

C. Name of subcontractor

D. Name of manufacturer or fabricator

E. Name of supplier

F. Change Orders (numbers) that affect value

G. Dollar value of the following, as a percentage of the Contract Sum to nearest one hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

1) Labor

2) Materials

3) Equipment

4.2.4 Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of 5 percent of the Contract Sum.

4.2.5 Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

A. Differentiate between items stored on-site and items stored off-site.

4.2.6 Overhead Costs, Separate Line Items: Show cost of other major cost items that are not direct cost of actual work-in-place as separate line items.

4.2.7 Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.

4.2.8 Schedule of Values Revisions: Revise the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least 1 separate line item for each Change Order and Construction Change Directive.

5. APPLICATIONS FOR PAYMENT

5.1 Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.

5.2 Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

5.2.1 Submit draft copy of Application for Payment 7 days prior to due date for review by Architect.

5.3 Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

5.4 Application Preparation

Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

5.4.1 Entries shall match data on the Schedule of Values and Contractor's construction schedule. Use updated schedules if revisions were made.

5.4.2 Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

5.4.3 Include amounts of fully executed with all signatures of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

5.4.4 Indicate separate amounts for work being carried out under Owner-requested Project acceleration.

5.5 Stored Materials

Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

5.5.1 Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.

5.5.2 Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

5.5.3 Provide summary documentation for stored materials indicating the following:

A. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

B. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

C. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

5.6 Transmittal

Submit four (4) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

5.6.1 Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

5.7 Waivers of Mechanic's Lien

With each Application for Payment, if requested by Owner, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

5.7.1 Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

5.7.2 When an application shows completion of an item, submit conditional final or full waivers.

5.7.3 Owner reserves the right to designate which entities involved in the Work must submit waivers.

5.7.4 Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5.7.5 Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

5.8 Initial Application for Payment

Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

5.8.1 List of subcontractors

5.8.2 Schedule of values

5.8.3 Contractor's construction schedule (preliminary if not final)

5.8.4 Products list (preliminary if not final)

5.8.5 Schedule of unit prices

5.8.6 Submittal schedule (preliminary if not final)

5.8.7 List of Contractor's staff assignments

5.8.8 List of Contractor's principal consultants

5.8.9 Copies of building permits

5.8.10 Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work

5.8.11 Initial progress report

5.8.12 Report of preconstruction conference

5.8.13 Photographic documentation of existing conditions

5.8.14 Certificates of insurance and insurance policies, required prior to beginning Work

5.8.15 Performance and payment bonds, required prior to beginning Work if accepted as an Alternate

5.8.16 Data needed to acquire Owner's insurance, required prior to beginning Work

5.9 Application for Payment at Substantial Completion

After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

5.9.1 Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

A. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."

5.9.2 This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

5.10 Final Payment Application

After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

5.10.1 Evidence of completion of Project closeout requirements

5.10.2 Certification of completion of final punch list items

5.10.3 Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid

5.10.4 Updated final statement, accounting for final changes to the Contract Sum

5.10.5 AIA Document G706

5.10.6 AIA Document G706A

5.10.7 AIA Document G707

5.10.8 Evidence that claims have been settled

5.10.9 Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work

5.10.10 Final liquidated damages settlement statement

5.10.11 Proof that taxes, fees, and similar obligations are paid

5.10.12 Waivers and releases

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 012900

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

2.1.1 General coordination procedures

2.1.2 Coordination drawings

2.1.3 Requests for Information (RFIs)

2.1.4 Digital project management procedures

2.1.5 Project meetings

2.2 Related Requirements

2.2.1 Section 013200 “Construction Progress Documentation” for preparing and submitting Contractor’s construction schedule.

2.2.2 Section 017300 “Execution” for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

2.2.3 Section 017700 “Closeout Procedures” for coordinating closeout of the Contract.

3. DEFINITIONS

3.1 RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

4. INFORMATIONAL SUBMITTALS

4.1 Subcontract List

Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

4.1.1 Name, address, telephone number, and email address of entity performing subcontract or supplying products.

4.1.2 Number and title of related Specification Section(s) covered by subcontract.

4.1.3 Drawing number and detail references, as appropriate, covered by subcontract.

4.2 Key Personnel Names
Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities, list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

4.2.1 Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

5. GENERAL COORDINATION PROCEDURES

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

5.1.1 Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.

5.1.2 Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.

5.1.3 Make adequate provisions to accommodate items scheduled for later installation.

5.2 Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

5.2.1 Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

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

5.3.1 Preparation of Contractor’s construction schedule

5.3.2 Preparation of the schedule of values

5.3.3 Installation and removal of temporary facilities and controls

5.3.4 Delivery and processing of submittals

5.3.5 Progress meetings

5.3.6 Preinstallation conferences

5.3.7 Project closeout activities

5.3.8 Startup and adjustment of systems

6. COORDINATION DRAWINGS

6.1 Coordination Drawings, General

Prepare coordination drawings according to Project requirements, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one (1) entity.

6.1.1 Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

A. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

B. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

C. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, electrical, plumbing and audio/visual systems.

D. Indicate dimensions. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

7. REQUEST FOR INFORMATION (RFI)

7.1 General

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

7.1.1 Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.

7.1.2 Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

7.2 Content of the RFI

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

7.2.1 Project name

7.2.2 Owner name

7.2.3 Name of Architect

7.2.4 Architect's Project number

7.2.5 Date

7.2.6 Name of Contractor

7.2.7 RFI number, numbered sequentially

7.2.8 RFI subject

7.2.9 Specification Section number and title and related paragraphs, as appropriate

7.2.10 Drawing number and detail references, as appropriate

7.2.11 Field dimensions and conditions, as appropriate

7.2.12 Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

7.2.13 Contractor's signature

7.2.14 Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

A. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

7.3 RFI Forms

Procore software-generated form with substantially the same content as indicated above, acceptable to Architect and Owner.

7.3.1 Attachments shall be electronic files in PDF format.

7.4 Architect's Action

Architect will review each RFI, determine action required, and respond. Allow 7 days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

7.4.1 The following Contractor-generated RFIs will be returned without action:

A. Requests for approval of submittals

B. Requests for approval of substitutions

C. Requests for approval of Contractor's means and methods

D. Requests for coordination information already indicated in the Contract Documents

E. Requests for adjustments in the Contract Time or the Contract Sum

F. Requests for interpretation of Architect's actions on submittals

G. Incomplete RFIs or inaccurately prepared RFIs

7.4.2 Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.

7.4.3 Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

A. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.

7.5 RFI Log

Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web-based Project management software with not less than the following:

7.5.1 Project name

7.5.2 Name and address of Contractor

7.5.3 Name and address of Architect

7.5.4 RFI number, including RFIs that were returned without action or withdrawn

7.5.5 RFI description

7.5.6 Date the RFI was submitted

7.5.7 Date Architect's response was received

7.5.8 Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

7.5.9 Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate

7.6 On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

8. DIGITAL PROJECT MANAGEMENT PROCEDURES

8.1 Web-Based Project Management Software Package

Employing a web-based Project management software package is solely up to the General Contractor's discretion. If employed, the Contractor shall provide procedures and licenses as required to the Design Team (Architect and Engineers), subcontractors, and Owner.

8.2 PDF Document Preparation

Where PDFs are required to be submitted to Architect, prepare as follows:

8.2.1 Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

8.2.2 Name file with submittal number or other unique identifier, including revision identifier.

8.2.3 Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

9. PROJECT MEETINGS

9.1 General

Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

9.1.1 Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.

9.1.2 Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

9.1.3 Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.

9.2 Preconstruction Conference

Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

9.2.1 Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

9.2.2 Agenda: Discuss items of significance that could affect progress, including the following:

A. Responsibilities and personnel assignments

B. Tentative construction schedule

C. Phasing

D. Critical work sequencing and long lead items

E. Designation of key personnel and their duties

F. Lines of communications

G. Use of web-based Project software

H. Procedures for processing field decisions and Change Orders

I. Procedures for RFIs

J. Procedures for testing and inspecting

K. Procedures for processing Applications for Payment

L. Distribution of the Contract Documents

M. Submittal procedures

N. Preparation of Record Documents

O. Use of the premises and existing buildings

P. Work restrictions

Q. Working hours

R. Owner's occupancy requirements

S. Responsibility for temporary facilities and controls

T. Procedures for moisture and mold control

U. Procedures for disruptions and shutdowns

V. Construction waste management and recycling

W. Parking availability

X. Office, work, and storage areas

Y. Equipment deliveries and priorities

Z. First aid

AA. Security

BB. Progress cleaning

9.3 Minutes
Entity responsible for conducting meeting will record and distribute meeting minutes.

9.4 Preinstallation Conferences
Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.

9.4.1 Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

9.4.2 Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

A. Contract Documents

B. Options

C. Related RFIs

D. Related Change Orders

E. Purchases

F. Deliveries

G. Submittals

H. Review of mockups

I. Possible conflicts

J. Compatibility requirements

K. Time schedules

L. Weather limitations

M. Manufacturer's written instructions

N. Warranty requirements

O. Compatibility of materials

P. Acceptability of substrates

Q. Temporary facilities and controls

R. Space and access limitations

S. Regulations of authorities having jurisdiction

T. Testing and inspecting requirements

U. Installation procedures

V. Coordination with other work

W. Required performance results

X. Protection of adjacent work

Y. Protection of construction and personnel

9.4.3 Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

9.4.4 Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

9.4.5 Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

9.5 Project Closeout Conference

Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.

9.5.1 Conduct the conference to review requirements and responsibilities related to Project closeout.

9.5.2 Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

9.5.3 Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

A. Preparation of Record Documents

B. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance

C. Procedures for completing and archiving web-based Project software site data files

D. Submittal of written warranties

E. Requirements for preparing operations and maintenance data

F. Requirements for delivery of material samples, attic stock, and spare parts

G. Requirements for demonstration and training

H. Preparation of Contractor's punch list

I. Procedures for processing Applications for Payment at Substantial Completion and for final payment

J. Submittal procedures

K. Coordination of separate contracts
   l. Owner's partial occupancy requirements

M. Installation of Owner's furniture, fixtures, and equipment

N. Responsibility for removing temporary facilities and controls

9.5.4 Minutes: Entity conducting meeting will record and distribute meeting minutes.

9.6 Progress Meetings

Conduct progress meetings at regular weekly intervals, unless otherwise agreed by Owner, Architect, and Contractor.

9.6.1 Coordinate dates of meetings with preparation of payment requests.

9.6.2 Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

9.6.3 Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

A. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
   1) Review schedule for next period.

B. Review present and future needs of each entity present, including the following:
   1) Interface requirements
   2) Sequence of operations
   3) Resolution of BIM component conflicts

4) Status of submittals
5) Deliveries
6) Off-site fabrication
7) Access
8) Site use
9) Temporary facilities and controls
10) Progress cleaning
11) Quality and work standards
12) Status of correction of deficient items
13) Field observations
14) Status of RFIs
15) Status of Proposal Requests
16) Pending changes
17) Status of Change Orders
18) Pending claims and disputes
19) Documentation of information for payment requests

9.6.4 Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

A. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

9.7 Coordination Meetings

Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

9.7.1 Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

9.7.2 Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

A. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind

schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

B. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

C. Review present and future needs of each contractor present, including the following:
1) Interface requirements
2) Sequence of operations
3) Resolution of BIM component conflicts
4) Status of submittals
5) Deliveries
6) Off-site fabrication
7) Access
8) Site use
9) Temporary facilities and controls
10) Work hours
11) Hazards and risks
12) Progress cleaning
13) Quality and work standards
14) Status of RFIs
15) Proposal Requests
16) Change Orders
17) Pending changes

9.7.3 Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 013100

SECTION 013200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

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

2.1.1 Startup construction schedule

2.1.2 Contractor's Construction Schedule

2.1.3 Construction schedule updating reports

2.1.4 Daily construction reports

2.1.5 Material location reports

2.1.6 Site condition reports

2.1.7 Unusual event reports

2.2 Related Requirements

2.2.1 Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

2.2.2 Section 014000 "Quality Requirements" for schedule of tests and inspections.

3. DEFINITIONS

3.1 Activity

A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

3.3.1 Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.

3.3.2 Predecessor Activity: An activity that precedes another activity in the network.

3.3.3 Successor Activity: An activity that follows another activity in the network.

3.2 Cost Loading

The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

3.3 CPM
Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

3.4 Critical Path
The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

3.5 Event: The starting or ending point of an activity.

3.6 Float
The measure of leeway in starting and completing an activity.

3.6.1 Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

3.6.2 Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3.6.3 Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

3.7 Resource Loading
The allocation of manpower and equipment necessary for completing an activity as scheduled.

4. INFORMATIONAL SUBMITTALS

4.1 Format for Submittals: Submit required submittals in the following format:

4.1.1 Working electronic copy of schedule file

4.1.2 PDF file

4.1.3 Two paper copies, of sufficient size to display entire period or schedule, as required.

4.2 Startup construction schedule.
Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

4.3 Startup Network Diagram
Of size required to display entire network for entire construction period. Show logic ties for activities.

4.4 Contractor's Construction Schedule
Initial schedule, of size required to display entire schedule for entire construction period. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

4.5 CPM Reports

Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

4.5.1 Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.

4.5.2 Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.

4.5.3 Total Float Report: List of activities sorted in ascending order of total float.

4.5.4 Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

4.5.5 Construction Schedule Updating Reports: Submit with Applications for Payment.

4.5.6 Daily Construction Reports: Submit at weekly intervals.

4.5.7 Material Location Reports: Submit at monthly intervals.

4.5.8 Site Condition Reports: Submit at time of discovery of differing conditions.

4.5.9 Unusual Event Reports: Submit at time of unusual event.

4.5.10 Qualification Data: For scheduling consultant.

5. QUALITY ASSURANCE

5.1 Scheduling Consultant Qualifications

An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect’s request.

5.2 Prescheduling Conference

Conduct conference at Project site to comply with requirements in Section 013100 “Project Management and Coordination”. Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

5.2.1 Review software limitations and content and format for reports

5.2.2 Verify availability of qualified personnel needed to develop and update schedule

5.2.3 Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy

5.2.4 Review delivery dates for Owner-furnished products

5.2.5 Review schedule for work of Owner's separate contracts

5.2.6 Review submittal requirements and procedures

5.2.7 Review time required for review of submittals and resubmittals

5.2.8 Review requirements for tests and inspections by independent testing and inspecting agencies, and Special Inspections

5.2.9 Review time required for Project closeout and Owner startup procedures

5.2.10 Review and finalize list of construction activities to be included in schedule

5.2.11 Review procedures for updating schedule

6. COORDINATION

Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

6.1 Secure time commitments for performing critical elements of the Work from entities involved.

6.2 Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

7. CONTRACTOR'S CONSTRUCTION SCHEDULE

7.1 Computer Scheduling Software

Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

7.2 Time Frame

Extend schedule from date established for the Notice to Proceed to date of Substantial Completion and Final Completion.

7.2.1 Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Owner.

7.3 Activities

Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

7.3.1 Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.

7.3.2 Temporary Facilities: Indicate start and completion dates for the following as applicable:

A. Securing of approvals and permits required for performance of the Work
B. Temporary facilities
C. Construction of mock-ups, prototypes and samples
D. Owner interfaces and furnishing of items
E. Interfaces with Separate Contracts
F. Regulatory agency approvals
G. Punch list

7.3.3 Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

7.3.4 Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.

7.3.5 Startup and Testing Time: Include no fewer than 15 days for startup and testing.

7.3.6 Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

7.3.7 Punch List and Final Completion: Include not more than 14 days for completion of punch list items and Final Completion.

7.4 Constraints

Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

7.4.1 Phasing: Arrange list of activities on schedule by phase.

7.4.2 Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

7.4.3 Work Restrictions: Show the effect of the following items on the schedule:

A. Coordination with existing construction

B. Limitations of continued occupancies

C. Uninterruptible services

D. Use-of-premises restrictions

E. Provisions for future construction

F. Seasonal variations

G. Environmental control

7.4.4 Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

A. Subcontract awards

B. Submittals

C. Purchases

D. Fabrication

E. Sample testing

F. Deliveries

G. Installation

H. Tests and inspections

I. Adjusting

J. Curing

7.4.5 Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

A. Structural completion

B. Completion of mechanical installation

C. Completion of electrical installation

D. Substantial Completion

7.4.6 Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

A. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

7.4.7 Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

A. Unresolved issues

B. Unanswered Requests for Information

C. Rejected or unreturned submittals

D. Notations on returned submittals

E. Pending modifications affecting the Work and the Contract Time

7.4.8 Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before regularly scheduled progress meeting.

A. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

B. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

C. As the Work progresses, indicate Final Completion percentage for each activity.

7.4.9 Recovery Schedule: When periodic update indicates the Work is 7 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

7.4.10 Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

A. Post copies in Project meeting rooms and temporary field offices.

B. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

8. CPM SCHEDULE REQUIREMENTS

8.1 Prepare network diagrams using AON (activity-on-node) format.

8.2 Startup Network Diagram

Submit diagram within 14 days of date established for the Notice of Award. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

8.3 CPM Schedule

Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

8.3.1 Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.

A. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

8.3.2 Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

8.3.3 Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

8.3.4 Use "1 workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

8.4 CPM Schedule Preparation

Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

8.4.1 Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

A. Preparation and processing of submittals

B. Mobilization and demobilization

C. Purchase of materials

D. Delivery

E. Fabrication

F. Utility interruptions

G. Installation

H. Work by Owner that may affect or be affected by Contractor's activities

I. Testing and inspection

J. Commissioning

K. Punch list and Final Completion

1) Activities occurring following Final Completion

2) Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3) Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

4) Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

5) Cost- and Resource- Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training.
   a. Each activity cost shall reflect an appropriate value subject to approval by Architect.

   b. Total cost assigned to activities shall equal the total Contract Sum.

8.5 Contract Modifications

For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

8.6 Initial Issue of Schedule

Prepare initial network diagram from a sorted activity list indicating straight "early start-total float". Identify critical activities. Prepare tabulated reports showing the following:

8.6.1 Contractor or subcontractor and the Work or activity

8.6.2 Description of activity

8.6.3 Main events of activity

8.6.4 Immediate preceding and succeeding activities

8.6.5 Early and late start dates

8.6.6 Early and late finish dates

8.6.7 Activity duration in workdays

8.6.8 Total float or slack time

8.6.9 Average size of workforce

8.6.10 Dollar value of activity (coordinated with the schedule of values)

8.7 Schedule Updating

Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

8.7.1 Identification of activities that have changed

8.7.2 Changes in early and late start dates

8.7.3 Changes in early and late finish dates

8.7.4 Changes in activity durations in workdays

8.7.5 Changes in the critical path

8.7.6 Changes in total float or slack time

8.7.7 Changes in the Contract Time

8.8 Value Summaries

Prepare two (2) cumulative value lists, sorted by finish dates.

8.8.1 In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

8.8.2 In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

8.8.3 In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.

8.8.4 Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

A. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

B. Submit value summary printouts 1 week before each regularly scheduled progress meeting.

9. REPORTS

9.1 Daily Construction Reports

Prepare a daily construction report recording the following information concerning events at Project site:

9.1.1 List of subcontractors at Project site

9.1.2 List of separate contractors at Project site

9.1.3 Approximate count of personnel at Project site

9.1.4 Equipment at Project site

9.1.5 Material deliveries

9.1.6 High and low temperatures and general weather conditions, including presence of rain or snow

9.1.7 Testing and inspection

9.1.8 Accidents

9.1.9 Meetings and significant decisions

9.1.10 Unusual events

9.1.11 Stoppages, delays, shortages, and losses

9.1.12 Meter readings and similar recordings

9.1.13 Emergency procedures

9.1.14 Orders and requests of authorities having jurisdiction

9.1.15 Change Orders received and implemented

9.1.16 Construction Change Directives received and implemented

9.1.17 Services connected and disconnected

9.1.18 Equipment or system tests and startups

9.1.19 Partial completions and occupancies

9.1.20 Substantial Completions authorized

9.2 Material Location Reports
At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

9.2.1 Material stored prior to previous report and remaining in storage

9.2.2 Material stored prior to previous report and since removed from storage and installed

9.2.3 Material stored following previous report and remaining in storage

9.3 Site Condition Reports
Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

9.4 Unusual Event Reports
When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

9.4.1 Submit unusual event reports directly to Owner within 1 day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 013200

SECTION 013233

PHOTOGRAPHIC DOCUMENTATION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for the following:

- 2.1.1 Preconstruction photographs
- 2.1.2 Concealed Work photographs
- 2.1.3 Periodic construction photographs
- 2.1.4 Final Completion construction photographs

2.2 Related Requirements

- 2.2.1 Section 017700 “Closeout Procedures” for submitting photographic documentation as Project Record Documents at Project closeout.
- 2.2.2 Section 311000 “Site Clearing” for photographic documentation before site clearing operations commence.

3. INFORMATIONAL SUBMITTALS

3.1 Key Plan

Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording.

3.2 Video Recordings

Unless otherwise approved by Owner, submit video recordings within seven (7) days of recording.

- 3.2.1 Submit video recordings on CD-ROM or thumb drive or by uploading to web-based Project management software site. Include copy of key plan indicating each video's location and direction.
- 3.2.2 Identification: With each submittal, provide the following information in file metadata tag or on web-based Project management software site:
  - A. Name of Project
  - B. Name and address of photographer
  - C. Name of Architect
  - D. Name of Contractor
  - E. Date video recording was recorded
  - F. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction

4. INDEXING

Provide sortable matrix and index including identification data for all photographic documentation.

5. QUALITY ASSURANCE

Photographer Qualifications: An individual who proficient as a photographer of construction projects.

6. FORMATS AND MEDIA

6.1 Digital Video Recordings

Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode. Provide supplemental lighting in low light levels or backlit conditions.

6.2 Digital Images

Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

6.3 Metadata: Record accurate date and time from camera.

6.4 File Names: Name media files with date and sequential numbering suffix.

7. CONSTRUCTION PHOTOGRAPHS

7.1 General

Take photographs with maximum depth of field and in focus.

7.1.1 Maintain key plan or location identification with each set of construction photographs that identifies each photographic location.

7.2 Preconstruction Photographs

Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

7.2.1 Flag excavation areas and construction limits before taking construction photographs.

7.2.2 Take adequate quantity of photographs to show existing conditions adjacent to property before starting the Work.

7.2.3 Take adequate quantity of photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.

7.2.4 Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

7.3 Concealed Work Photographs
Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

7.3.1 Underground utilities

7.3.2 Under-slab services

7.3.3 Piping

7.3.4 Electrical conduit

7.3.5 Waterproofing and vapor barriers

7.4 Periodic Construction Photographs
Take a minimum of 24 weekly photographs coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

7.5 Final Completion Construction Photographs
Take adequate quantity of photographs after date of Substantial Completion for submission as Project Record Documents.

7.6 Additional Photographs
Architect may request photographs in addition to periodic photographs specified.

7.6.1 Three days' notice will be given, where feasible.

7.6.2 In emergency situations, take additional photographs within 8 hours of event.

7.6.3 Circumstances that could require additional photographs include, but are not limited to, the following:

A. Special events planned at Project site

B. Immediate follow-up when on-site events result in construction damage or losses

C. Substantial Completion of a major phase or component of the Work

D. Extra record photographs at time of final acceptance

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 013233

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Submittal schedule requirements

2.1.2 Administrative and procedural requirements for submittals

2.2 Related Requirements

2.2.1 Section 012900 “Payment Procedures” for submitting Applications for Payment and the schedule of values.

2.2.2 Section 013100 “Project Management and Coordination” for submitting coordination drawings and subcontract list and for requirements for web-based Project software.

2.2.3 Section 013200 “Construction Progress Documentation” for submitting schedules and reports, including Contractor's construction schedule.

2.2.4 Section 013233 “Photographic Documentation” for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.

2.2.5 Section 014000 “Quality Requirements” for submitting test and inspection reports, and schedule of tests and inspections.

2.2.6 Section 017700 “Closeout Procedures” for submitting closeout submittals and maintenance material submittals.

2.2.7 Section 017823 “Operation and Maintenance Data” for submitting operation and maintenance manuals.

2.2.8 Section 017839 “Project Record Documents” for submitting record Drawings, record Specifications, and record Product Data.

3. DEFINITIONS

3.1 Action Submittals

Written and graphic information and physical samples that require Architect’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as “action submittals”.

3.2 Informational Submittals
Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals".

4. SUBMITTAL SCHEDULE

Submittal Schedule
Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

4.1 Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

4.2 Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

4.3 Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

4.3.1 Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

4.4 Format: Arrange the following information in a tabular format:

4.4.1 Scheduled date for first submittal

4.4.2 Specification Section number and title

4.4.3 Submittal Category: Action; informational

4.4.4 Name of subcontractor

4.4.5 Description of the Work covered

4.4.6 Scheduled date for Architect's final release or approval

4.4.7 Scheduled dates for purchasing

4.4.8 Scheduled date of fabrication

4.4.9 Scheduled dates for installation

4.4.10 Activity or event number

5. SUBMITTAL FORMATS

5.1 Submittal Information: Include the following information in each submittal:

5.1.1 Project name

5.1.2 Date

5.1.3 Name of Architect

5.1.4 Name of Contractor

5.1.5 Name of firm or entity that prepared submittal

5.1.6 Names of subcontractor, manufacturer, and supplier

5.1.7 Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals

5.1.8 Category and type of submittal

5.1.9 Submittal purpose and description

5.1.10 Number and title of Specification Section, with paragraph number and generic name for each of multiple items

5.1.11 Drawing number and detail references, as appropriate

5.1.12 Indication of full or partial submittal

5.1.13 Location(s) where product is to be installed, as appropriate

5.1.14 Other necessary identification

5.1.15 Remarks

5.1.16 Signature of transmitter

5.2 Options: Identify options requiring selection by Architect.

5.3 Deviations and Additional Information
On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

5.4 Paper Format for Electronic Submittals

5.4.1 Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.

5.4.2 Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

5.4.3 Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.

5.4.4 Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

5.4.5 Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

6. SUBMITTAL PROCEDURES

6.1 Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

6.1.1 Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

6.2 Coordination

Coordinate preparation and processing of submittals with performance of construction activities.

6.2.1 Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

6.2.2 Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

6.2.3 Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

6.2.4 Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

A. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

6.3 Processing Time

Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

6.3.1 Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

6.3.2 Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

6.3.3 Resubmittal Review: Allow 15 days for review of each resubmittal.

6.3.4 Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is necessary for coordination, allow 21 days for initial review of each submittal.

6.4 Resubmittals

Make resubmittals in same form and number of copies as initial submittal.

6.4.1 Note date and content of previous submittal.

6.4.2 Note date and content of revision in label or title block, and clearly indicate extent of revision.

6.4.3 Resubmit submittals until they are marked with approval notation from Architect's action stamp.

6.5 Distribution
Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

6.6 Use for Construction
Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

7. SUBMITTAL REQUIREMENTS

7.1 Product Data
Collect information into a single submittal for each element of construction and type of product or equipment.

7.1.1 If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.

7.1.2 Mark each copy of each submittal to show which products and options are applicable.

7.1.3 Include the following information, as applicable:

A. Manufacturer's catalog cuts
B. Manufacturer's product specifications
C. Standard color charts
D. Statement of compliance with specified referenced standards
E. Testing by recognized testing agency
F. Application of testing agency labels and seals
G. Notation of coordination requirements
H. Availability and delivery time information

7.1.4 For equipment, include the following in addition to the above, as applicable:

A. Wiring diagrams that show factory-installed wiring
B. Printed performance curves
C. Operational range diagrams
D. Clearances required to other construction, if not indicated on accompanying Shop Drawings

7.1.5 Submit Product Data before Shop Drawings, and before or concurrently with Samples.

7.1.6 Submit product data electronically using a web-based Project management system (Procore).

7.2 Shop Drawings

Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

7.2.1 Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

A. Identification of products

B. Schedules

C. Compliance with specified standards

D. Notation of coordination requirements

E. Notation of dimensions established by field measurement

F. Relationship and attachment to adjoining construction clearly indicated

G. Seal and signature of professional engineer if specified

7.2.2 Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

7.2.3 Submit shop drawings electronically using web-based Project management system (Procore).

7.3 Samples

Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

7.3.1 Transmit Samples that contain multiple, related components, such as accessories together in one (1) submittal package.

7.3.2 Identification: Permanently attach label on unexposed side of Samples that includes the following:

A. Project name and submittal number

B. Generic description of Sample

C. Product name and name of manufacturer

D. Sample source

E. Number and title of applicable Specification Section

F. Specification paragraph number and generic name of each item

7.3.3 Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.

7.3.4 Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

7.3.5 Paper Transmittal: Include paper transmittal, including complete submittal information indicated.

7.3.6 Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

A. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

B. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

7.3.7 Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

A. Number of Samples: Submit two (2) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7.3.8 Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

A. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned. Mark up and retain returned Sample set as a Project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

7.3.9 Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

A. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

B. Manufacturer and product name, and model number if applicable

C. Number and name of room or space

D. Location within room or space

7.3.10 Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

7.3.11 Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

7.3.12 Certificates

A. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

B. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

C. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

D. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.

E. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.

F. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

7.3.13 Test and Research Reports

A. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.

B. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

C. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

D. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

E. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

F. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1) Name of evaluation organization
2) Date of evaluation
3) Time period when report is in effect
4) Product and manufacturers' names
5) Description of product
6) Test procedures and results
7) Limitations of use

8. DELEGATED-DESIGN SERVICES

8.1 Performance and Design Criteria

Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

8.1.1 If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

8.2 Delegated-Design Services Certification
In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

8.2.1 Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

9. CONTRACTOR'S REVIEW

9.1 Action Submittals and Informational Submittals
Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

9.2 Contractor's Approval
Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

9.2.1 Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

10. ARCHITECT'S REVIEW

10.1 Action Submittals
Architect will review each submittal, indicate corrections or revisions required, and return.

10.1.1 PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

10.1.2 Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

10.1.3 Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.

10.2 Informational Submittals
Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.

10.3 Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

10.4 Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

10.5 Architect will return without review submittals received from sources other than Contractor.

10.6 Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 013300

SECTION 014000

QUALITY REQUIREMENTS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for quality assurance and quality control.

2.2 Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

2.2.1 Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.

2.2.2 Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.

2.2.3 Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

3. DEFINITIONS

3.1 Experienced

When used with an entity or individual, “experienced”, unless otherwise further described, means having successfully completed a minimum of 5 previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

3.2 Field Quality-Control Tests and Inspections

Tests and inspections that are performed on-site for installation of the Work and for completed Work.

3.3 Installer/Applicator/Erector

Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

3.3.1 Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

3.4 Mockups
Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

3.4.1 In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

3.5 Product Tests
Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

3.6 Source Quality-Control Tests and Inspections
Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

3.7 Testing Agency
An entity engaged to perform specific tests, inspections, or both. The term "testing Laboratory" shall have the same meaning as the term "testing agency".

3.8 Quality-Assurance Services
Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

3.9 Quality-Control Services
Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

4. DELEGATED-DESIGN SERVICES

4.1 Performance and Design Criteria
Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

4.1.1 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

4.2 Delegated-Design Services Statement
Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

4.2.1 Design professional shall be legally licensed to practice in the State of Kansas.

5. CONFLICTING REQUIREMENTS

5.1 Conflicting Standards and Other Requirements
If compliance with 2 or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

5.2 Minimum Quantity or Quality Levels
The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

6. ACTION SUBMITTALS

Mockup Shop Drawings
For integrated exterior mockups.

6.1 Include plans, sections, elevations, and details, indicating materials and size of mockup construction.

6.2 Indicate manufacturer and model number of individual components.

6.3 Provide axonometric drawings for conditions difficult to illustrate in two (2) dimensions.

7. INFORMATIONAL SUBMITTALS

7.1 Contractor’s Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

7.2 Qualification Data: For Contractor's quality-control personnel.

7.3 Testing Agency Qualifications
For testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

7.4 Schedule of Tests and Inspections
Prepare in tabular form and include the following:

A. Specification Section number and title
B. Entity responsible for performing tests and inspections
C. Description of test and inspection
D. Identification of applicable standards
E. Identification of test and inspection methods
F. Number of tests and inspections required
G. Time schedule or time span for tests and inspections
H. Requirements for obtaining samples
I. Unique characteristics of each quality-control service

7.5 Reports: Prepare and submit certified written reports and documents as specified.

7.6 Permits, Licenses, and Certificates
For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

8. CONTRACTOR'S QUALITY-CONTROL PLAN

8.1 Quality-Control Plan, General
Submit quality-control plan within ten (10) days of Notice to Proceed, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.

8.2 Quality-Control Personnel Qualifications
Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

8.2.1 Project quality-control manager shall not have other Project responsibilities.

8.3 Submittal Procedure
Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

8.4 Testing and Inspection
In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

8.4.1 Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.

8.4.2 Special inspections required by authorities having jurisdiction or indicated on the Statement of Special Inspections shall be performed by the Contractor through a separate agreement with a third party for special inspections that are mandated by the Building Code.

8.5 Continuous Inspection of Workmanship
Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

8.6 Monitoring and Documentation
Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

9. REPORTS AND DOCUMENTS

9.1 Test and Inspection Reports
Prepare and submit certified written reports specified in other Sections. Include the following:

A. Date of issue

B. Project title and number

C. Name, address, telephone number, and e-mail address of testing agency

D. Dates and locations of samples and tests or inspections

E. Names of individuals making tests and inspections

F. Description of the Work and test and inspection method

G. Identification of product and Specification Section

H. Complete test or inspection data

I. Test and inspection results and an interpretation of test results

J. Record of temperature and weather conditions at time of sample-taking and testing and inspection

K. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements

L. Name and signature of laboratory inspector

M. Recommendations on retesting and reinspecting

9.2 Manufacturer's Technical Representative's Field Reports
Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

A. Name, address, telephone number, and email address of technical representative making report

B. Statement on condition of substrates and their acceptability for installation of product

C. Statement that products at Project site comply with requirements

D. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken

E. Results of operational and other tests and a statement of whether observed performance complies with requirements

F. Statement of whether conditions, products, and installation will affect warranty

G. Other required items indicated in individual Specification Sections

9.3 Factory-Authorized Service Representative's Reports
Prepare written information documenting manufacturer's factory-authorized service Representative's tests and inspections specified in other Sections.
Include the following:

A. Name, address, telephone number, and e-mail address of factory-authorized service representative making report

B. Statement that equipment complies with requirements

C. Results of operational and other tests and a statement of whether observed performance complies with requirements

D. Statement of whether conditions, products, and installation will affect warranty

E. Other required items indicated in individual Specification Sections

10. QUALITY ASSURANCE

10.1 Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

10.2 Manufacturer Qualifications
A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

10.3 Fabricator Qualifications
A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

10.4. Installer Qualifications
A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

10.5 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 the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

10.6 Specialists
Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.
10.6.1 Requirements of authorities having jurisdiction shall supersede requirements for specialists.

10.7 Testing and Inspecting Agency Qualifications
An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

10.8 Manufacturer's Technical Representative Qualifications
An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

10.9 Factory-Authorized Service Representative Qualifications
An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

10.10 Preconstruction Testing
Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
10.10.1 Provide test specimens representative of proposed products and construction.

10.10.2 Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

10.10.3 Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

10.10.4 Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.

10.10.5 Build laboratory mockups at testing facility, using personnel, products, and methods of construction indicated for the completed Work.

10.10.6 When testing is complete, remove test specimens and test assemblies; do not reuse products on Project.

10.10.7 Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

10.10.8 Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

A. Build mockups of size indicated.

B. Build mockups in location indicated or, if not indicated, as directed by Architect.

C. Notify Architect 7 days in advance of dates and times when mockups will be constructed.

D. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.

E. Demonstrate the proposed range of aesthetic effects and workmanship.

F. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.

G. Allow 7 days for initial review and each re-review of each mockup.

H. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.

I. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

J. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

K. Demolish and remove mockups when directed unless otherwise indicated.

11. QUALITY CONTROL

11.1 Special Inspections

Where code-mandated Special Inspection services are indicated or required, Contractor shall engage a qualified testing agency to perform these services.

11.1.1 Contractor shall furnish names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.

11.1.2 Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.

11.2 Contractor Responsibilities

All tests and inspections are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

11.2.1 Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

11.2.2 Engage a qualified testing agency to perform quality-control services.

11.2.3 Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.

11.2.4 Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

11.2.5 Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

11.2.6 Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

11.3 Retesting / Reinspecting

Provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

11.4 Testing Agency Responsibilities

Cooperate with Architect in performance of duties. Provide qualified personnel to perform required tests and inspections.

11.4.1 Notify Architect promptly of irregularities or deficiencies observed in the Work during performance of its services.

11.4.2 Determine the locations from which test samples will be taken and in which in-situ tests are conducted.

11.4.3 Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.

11.4.4 Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service to Architect.

11.4.5 Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

11.4.6 Do not perform duties of Contractor.

11.5 Manufacturer's Field Services

Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

11.6 Manufacturer's Technical Services

Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

11.7 Contractor's Associated Requirements and Services

Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

A. Access to the Work

B. Incidental labor and facilities necessary to facilitate tests and inspections

C. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples

D. Facilities for storage and field curing of test samples

E. Delivery of samples to testing agencies

F. Preliminary design mix proposed for use for material mixes that require control by testing agency

G. Security and protection for samples and for testing and inspection equipment at Project site

11.8 Coordination

Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

11.8.1 Schedule times for tests, inspections, obtaining samples, and similar activities.

11.9 Schedule of Tests and Inspections
Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.

11.9.1 Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.

11.9.2 Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

12. SPECIAL TESTS AND INSPECTIONS

Contractor shall engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction, as indicated on the Structural Drawings, and as follows:

12.1 Notifying Owner, and Architect promptly of irregularities and deficiencies observed in the Work during performance of its services.

12.2 Submitting a certified written report of each test, inspection, and similar quality-control service to Owner and Architect, with copy to authorities having jurisdiction.

12.3 Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

12.4 Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

12.5 Retesting and reinspecting corrected Work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

13. TEST AND INSPECTION LOG

13.1 Test and Inspection Log
Prepare a record of tests and inspections. Include the following:

A. Date test or inspection was conducted

B. Description of the Work tested or inspected

C. Date test or inspection results were transmitted to Architect

D. Identification of testing agency or special inspector conducting test or inspection

13.2 Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Owner's, and authorities' having jurisdiction reference during normal working hours.

13.2.1 Submit log at Project closeout as part of Project Record Documents.

14. REPAIR AND PROTECTION

14.1 General

On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

14.1.1 Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 “Execution”.

14.2 Protect construction exposed by or for quality-control service activities.

14.3 Repair and protection are Contractor’s responsibility, regardless of the assignment of responsibility for quality-control services.

End of Section 014000

SECTION 014100

TESTING SERVICES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes Project testing and inspections by agencies employed or engaged by the Contractor for verification of compliance with requirements.

2.2 Related Sections

2.2.1 Owner-Contractor Agreement and "Conditions of the Contract" requiring performance of all inspections and testing required by laws, ordinances, rules, regulations, or orders of public authorities, whether included herein or not.

2.2.2 Division 01 Section "Quality Requirements" for administration requirements for testing and inspections.

2.2.3 Division 01 Section "Geotechnical Report".

2.2.4 Divisions 02 through 42 Sections for required certifications and testing of materials, products or equipment.

2.2.5 Divisions 02 through 42 Sections for additional materials testing, adjusting and balancing of products or equipment and special inspections to comply with building code requirements.

2.2.6 Divisions 02 through 42 Sections for product, material, and system test standards, may require additional Special Inspections Services and Testing Services. This is not intended to be an exhaustive list. Refer to individual specification sections.

3. EMPLOYMENT OF TESTING LABORATORY

3.1 Testing Agency Qualifications

An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

3.2 Testing laboratory must demonstrate to the Owner/Architect/Engineer's satisfaction, based on evaluation of laboratory submitted criteria conforming to ASTM C1093, that it has experience and skills to satisfactorily conduct testing indicated without delaying the progress of the Work.

3.3 The Contractor shall employ and pay for the services of an independent testing laboratory and special inspection company to perform all testing services specified herein, and upon occasion which, in the opinion of the Architect/Engineer, are required due to any of the following:

A. Failure of materials or workmanship to meet Contract requirements

B. Materials or practices not complying with the Specifications which could possibly result in defective work, thereby rendering it necessary or advisable to perform tests to determine whether or not work is acceptable

C. Changes in source, quality or characteristics of materials

D. Failure of any special inspection test or evaluation

4. PURPOSES

4.1 Service of a testing laboratory as specified in this Section is intended for the Owner's verification of the Contractor's compliance with the requirements of the Contract Documents and shall in no way relieve the Contractor of his responsibility to provide his own inspection and quality control.

4.2 Services and quantities of testing as specified herein are approximate and may vary. Actual services and quantities of testing will be determined by the Owner and Architect during the construction period.

4.2.1 Basic testing and inspections will be as required by the State of Kansas in addition to tests and inspections required by the Specifications, the Drawings, and current building codes in effect for the Project.

5. SUBMITTALS

5.1 Test Reports

Unless otherwise indicated or directed, after each test/inspection promptly submit copies of report to Architect, Contractor, and Owner. E-mail distribution with follow-up hard copy is preferred.

5.1.1 Include:

A. Reports of all tests performed on soils, concrete, masonry, structural steel, joists, deck, cold-formed framing and paving.

B. Testing agency shall state whether the tested materials meet the Project Specifications.

PART 2 – BASIC TESTING AND SPECIAL INSPECTIONS

6. CONTRACTOR RESPONSIBILITIES

The Contractor is responsible and shall pay firms selected for testing and special inspections. The following indicates some basic requirements, but the Contractor is required to complete all testing and special inspections as indicated on the Drawings, in the Specifications, and as required by building codes.

7. EXISTING SUBGRADES

Field Verification

7.1 Observe proof rolling operations.

7.2 Identify location and extent of soft, loose, or yielded subgrade material that must be removed or undercut.

7.3 Inspect undercut subgrade.

8. SOILS

8.1 Laboratory Tests

8.1.1 Existing Site Material

A. Cohesive soils and semi cohesive soils: Provide 1 optimum moisture maximum density curve for each type of subgrade soil encountered in accordance with ASTM D1557.

B. Non-Cohesive soils: Provide maximum and minimum index densities and relative densities for each type of subgrade soil encountered in accordance with ASTM D4254.

8.1.2 Borrow Materials: Analyze each type of borrow materials before acceptance and delivery to the site. Any change in the source or quality of the material will require a new series of tests to determine acceptability.

A. Particle size analysis of soils ASTM D422, ASTM D421, ASTM D420, ASTM C117 recommended practice.

B. Plasticity index determination ASTM D4318.

C. Moisture density curve determination ASTM D1557 or relative density (ASTM D4253 or ASTM D4254) as specified above.

D. Frost susceptibility analysis.

8.2 Field Tests

8.2.1 The soils testing agency's authorized representative shall be present during delivery and compaction of fill materials.

8.2.2 Establish suitable bearing grades for foundations and structural fill below foundations and slabs-on-grade.

8.2.3 Verify natural soil and structural fill subgrades for all foundations for a design bearing pressure as determined in the Geotechnical Report.

8.2.4 In Place Density Tests: Test in accordance with ASTM D1556 (sand cone method) or ASTM D2922 (nuclear method) on compacted natural soils or structural fill materials as determined in the Geotechnical Report.

8.2.5 Verify and monitor all compaction operations and equipment.

8.2.6 Monitor all proof rolling operations for foundation and slab-on-grade subgrades.

8.2.7 Monitor placement of lean concrete fill to proper bearing elevation under building foundations.

9. CONCRETE

9.1 Sampling

9.1.1 Concrete samples shall be taken in accordance with ASTM C172 “Sampling Fresh Concrete”.

9.1.2 Inspection/testing proposed materials.

9.1.3 Aggregate analysis.

9.1.4 Conduct compression tests to verify that design mix complies with Contract Documents.

9.2 Formwork and Reinforcing

Inspect formwork and reinforcing prior to placing of concrete.

9.3 Batching Inspection

Inspect batching, mixing and delivery operations for compliance with the Specifications.

9.4 Compression Tests

9.4.1 Label each compression test cylinder identifying the truckload of concrete from which sample was taken and the exact location in construction where deposited.

9.4.2 Test specimens in accordance with ASTM C39 “Methods of Tests for Compressive Strength of Molded Concrete Cylinders”. Include weight test.

9.4.3 One compression test, as used herein, shall consist of three (3) test cylinders made from composite samples secured from a single truckload of concrete.

9.5 One compression test will be required for each of the following conditions:

9.5.1 Each 50 cu. yd. of concrete or fraction thereof.

9.5.2 Each class of concrete placed in one (1) day.

9.6 Slump Tests

9.6.1 Slump test shall be made in accordance with ASTM C143 “Methods for Slump of Portland Cement Concrete”.

9.6.2 Test slump of concrete at same frequency and from same truckload as compression tests and more often when directed by the Owner’s representative.

9.7 Air Content Tests

9.7.1 Determine air content by ASTM C231 “Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method”.

9.7.2 Determine air content at same frequency and from same truckload as for compression tests.

9.8 Moisture Tests
Determine that the concrete floor slab meets the moisture emission rate and alkalinity levels of ASTM F716 and the floor finish manufacturer's recommendation.

(Verify with ACI 318: Chapter 16) rebar and "Unit Masonry, Masonry Veneer, and Anchored Stone Masonry Veneer".

9.8.1 Concrete Masonry Units: Test each type, class and grade per ASTM C140.

9.8.2 Inspect rebar reinforcing, joint reinforcing, ties and anchors for general compliance with the Contract Documents.

9.8.3 Mortar: Test one (1) set of three (3) cubes per ASTM C780 for each days' work or every 5,000 sq. ft. of wall area, whichever is the lesser.

9.8.4 Grout: Test one (1) set of three (3) compression test cylinders per ASTM C1019 for each days' work or every 25 cu. yds., whichever is the lesser.

9.8.5 Masonry Prisms

A. Prism tests shall be performed for the purpose of checking the compressive strength of each masonry assembly, including grouted cells but excluding reinforced cells and face brick.

B. Test one (1) set of three (3) prisms per ASTM E447, Method B, for each 5,000 sq. ft. of each type of wall construction or a minimum of three (3) sets for the Project, whichever provides the greater number of sets.

10. STRUCTURAL STEEL AND STEEL JOISTS

10.1 Shop Testing and Inspection

10.1.1 Verify and monitor all welder qualifications, welding procedures and welding processes.

10.1.2 Monitor fabrication operations.

10.1.3 Review all mill reports.

10.1.4 Visually inspect and measure weld profiles, at random, prior to application of paint.

10.1.5 Review Shop Quality Control Manual and Procedures with shop foreman.

10.2 Field Testing and Inspection

10.2.1 Visual Inspection

A. Verify and monitor welder qualifications and welding processes.

B. Inspect field erection of structural elements.

C. Inspect field bolting operations.

D. Inspect field welding operations.

E. Inspect anchor bolt installation and tightening.

10.2.2 High-Strength Bolted Connections
Test all bolted connections for conformance with the AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts," current edition.

10.2.3 Magnetic Particle Testing
Test 5 percent of field fillet welds, at random, final pass only for conformance with ASTM E109.

10.2.4 Ultrasonic Testing
Test 100 percent of all field partial and full penetration welds, at random, for conformance with ASTM E164 and AWS D1.1.

11. COLD-FORMED METAL FRAMING

11.1 Pre-Erection: Approval of welder qualifications.

11.2 Fabrication and Erection – Visual Inspection:

11.2.1 Inspect field erection for cold-formed metal framing.

11.2.2 Inspect field welding operations.

11.2.3 Inspect field mechanical fastening operations.

11.2.3 Verify size, location and alignment for general compliance with Contract Documents.

12. METAL DECKING

Visual Inspection

12.1 Verify and monitor welder's qualifications and welding processes.

12.2 Inspect field erection procedures for metal decking.

12.3 Inspect field welding operations.

12.4 Inspect mechanical fastening operations.

13. EXTERIOR INSULATION FINISHING SYSTEM (EIFS)

EIFS tests and inspections shall comply with building code requirements.

14. METAL COMPOSITE MATERIAL WALL PANELS

14.1 Water-spray test.

14.2 Manufacturer's field service inspection and tests, including report of results.

15. THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

Roof system manufacturer's technical personnel inspection and report.

16. PENETRATION FIRESTOPPING

Inspection of through-penetration firestops.

17. FIRE-RESISTIVE JOINT SYSTEMS

Installation of fire-resistive joint systems.

PART 3 – CONTRACTOR'S RESPONSIBILITIES

18. COOPERATION AND ACCESS

Cooperate with laboratory personnel and provide access to the work and to manufacturers. Fabricator's facilities as required for the performance of their services.

19. CASUAL LABOR AND FACILITIES

19.1 Provide Casual Labor and Facilities

19.1.1 To provide access to the work to be inspected or tested.

19.1.2 To obtain and handle samples at the site.

19.1.3 To facilitate inspections and tests.

19.1.4 To construct a storage box on the site of sufficient size to store cylinders which will afford protection required by ASTM C31.

20. SAMPLES

20.1 Provide the laboratory with preliminary representative samples of materials to be tested, in requested quantities.

20.2 When the source, quality or characteristic of an approved material changes or indicates lack of compliance with Contract requirements, submit additional samples of materials to testing laboratory.

21. MISCELLANEOUS REPORTS, LISTS, ETC.

When requested by the Architect/Engineer or the testing laboratory, the Contractor shall immediately provide copies of mill reports, cutting lists, material bills, shipping bills, time and place of shipment of materials to shop and field and any relevant data on previous testing and investigations of materials.

22. NOTIFICATION

22.1 To facilitate the timely sequence of inspection and testing, the Contractor shall give advanced notification to the testing laboratory and the Architect/Engineer that work has progressed to a point where inspection and testing may proceed.

22.2 Advanced notification shall be 48 hours (minimum) prior to commencement of the following:

22.2.1 Site Preparation

A. Excavation for foundations and slab-on-grade.

B. Proof-rolling of foundation and slab-on-grade subgrade.

22.2.2 Soil Compaction

A. Delivery of fill to the site.

B. Placement and compaction of fill or backfill.

22.2.3 Irrigation: Flushing and testing.

22.2.4 Concrete
- A. Setting of reinforcing and formwork
- B. Placing concrete

22.2.5 Masonry
- A. Delivery of masonry units
- B. Setting of reinforcement
- C. Installation of mortar, grout and masonry units

22.2.6 Structural Steel and Steel Joists
- A. Shop fabrication
- B. Delivery
- C. Erection
- D. Alignment and leveling of structure
- E. Welding and bolting of connections

22.2.7 Metal Deck
- A. Delivery
- B. Erection and fastening to structure
- C. Shop fabrication

22.2.8 Roofing
- A. Pre-installation site inspection
- B. Delivery
- C. Daily evaluation of welded seams
- D. Roof surveys

23. CONTRACTOR'S QUALITY CONTROL

23.1 It is the Contractor's responsibility to provide his own inspection and testing so as to comply with the Contract Documents.

23.2 Services of testing laboratory and special inspection firm retained by the Contractor is for verification of compliance and if such tests or inspection indicates failure to comply with the Contract Documents, the Contractor shall bear all cost associated with additional testing and inspection, after the work has been corrected, to verify compliance.

24. PATCHING

Areas where samples are taken for purposes of testing shall be patched to the satisfaction of the Architect.

End of Section 014100

SECTION 014200

REFERENCES

PART 1 - GENERAL

1. RELATED DOCUMENTS

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

2. DEFINITIONS

2.1 General: Basic Contract definitions are included in the Conditions of the Contract.

2.2 "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

2.3 "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

2.4 "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

2.5 "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

2.6 "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

2.7 "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

2.8 "Provide": Furnish and install, complete and ready for the intended use.

2.9 "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

3. INDUSTRY STANDARDS

3.1 Applicability of Standards

Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

3.2 Publication Dates
Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
3.2.1 For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

3.3 Copies of Standards
Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
3.3.1 Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

4. ABBREVIATIONS AND ACRONYMS

4.1 Industry Organizations
Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

4.2 Code Agencies
Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
4.2.1 IAPMO – International Association of Plumbing and Mechanical Officials; www.iapmo.org.

4.2.2 ICC – International Code Council; www.iccsafe.org.

4.2.3 ICC-ES – ICC Evaluation Service, LLC; www.icc-es.org.

4.3 Federal Government Agencies
Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
4.3.1 CPSC – Consumer Product Safety Commission; www.cpsc.gov.

4.3.2 DOC – Department of Commerce; National Institute of Standards and Technology; www.nist.gov.

4.3.3 FG – Federal Government Publications; www.gpo.gov/fdsys.

4.3.4 OSHA – Occupational Safety & Health Administration; www.osha.gov.

4.3.5 SD – Department of State; www.state.gov.

4.4 Standards and Regulations

Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

4.4.1 CFR – Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.

4.4.2 FED-STD – Federal Standard; (See FS).

4.4.3 FS – Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

A. Available from Defense Standardization Program; www.dsp.dla.mil.

B. Available from General Services Administration; www.gsa.gov.

C. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.

4.4.4 MILSPEC – Military Specification and Standards; (See DOD).

4.4.5 USAB – United States Access Board; www.access-board.gov.

4.4.6 USATBCB – U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 014200

SECTION 014533

STRUCTURAL TESTING AND OTHER SPECIAL INSTRUCTIONS

PART 1 – GENERAL

1. INTENT AND CONDITIONS

1.1 Intent

1.1.1 Define and coordinate structural testing and special inspection services.

1.1.2 Provide a greater level of confidence that the specified Work is constructed in compliance with the Contract Documents and the intent of applicable codes including the Building Code (IBC) as adopted by the City in which the Project is located.

1.1.3 Structural testing and special inspection services are intended to assist in determining probable compliance of the Work with requirements specified. These services do not relieve the Contractor of responsibility for compliance with the requirements of the Contract Documents.

1.1.4 Also refer to Project Manual and Structural Drawings for special inspections for additional testing and inspection requirements.

1.2 Conditions

1.2.1 If inspection of a fabricator's work is required, special inspections representative may require testing and inspection of the Work at the plant, before shipment. Owner and Architect reserve the right to reject material not complying with the Contract Documents.

1.2.2 Refer to individual technical Specification Sections for specific qualifications, inspections, tests, frequency and standards required. Testing and inspection shall be performed in accordance with the referenced standard for the specific material or procedure unless other criteria are specified. In the absence of a referenced standard, tests shall be performed in accordance with generally accepted industry standards.

1.2.3 Work shall be checked as it progresses. Failure to detect any defective Work or materials shall not prevent later rejection if defective Work or materials are discovered, nor shall it obligate Owner to accept such Work.

1.2.4 Structural testing, special inspection, and periodic inspections by the building official do not preclude the normal field involvement and site observations by design professionals.

1.2.5 Structural testing, special inspection, and periodic inspections by the building official do not relieve the Contractor of any responsibility to complete the Work in accordance with the approved Drawings and Specifications.

1.2.6 Testing agents and/or special inspectors may not waive or alter Contract requirements or approve or accept any portion of the Work unless specifically authorized by the Architect/Structural Engineer of Record (SER) or other Consultant. They may not assume any duties of the Contractor, and they have no authority to stop or reject Work.

2. RELATED REQUIREMENTS

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

3. DEFINITIONS

3.1 Testing
Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

3.2 Inspection: Evaluation of systems primarily requiring observation and judgment.

3.3 Structural Special Inspections
Structural special inspections include inspections of structural items required by the current Building Code, and other items, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the requirements of the building code.

3.4 Structural Testing
Structural testing includes those tests of structural items required by the building code, or its referenced standards, and other tests, which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure and are indicated to be performed under the requirements of this Section.

3.5 Architect of Record
The prime consultant in charge of overall design and coordination of the Project.

3.6 Structural Engineer of Record (SER)
The licensed Professional Engineer in responsible charge of the structural design for the Project.

3.7 Licensed Structural Engineer
A Professional Engineer with education and experience in the design of structures similar to this Project, licensed to practice in the state in which the Project is located.

3.8 Testing Agency (TA): The properly qualified firm performing testing services.

3.9 Special Inspector (SI)
A properly qualified individual or firm performing special inspections.

3.10 Building Official
The officer or his duly authorized representative charged with the administration and enforcement of the building code for the Project.

4. REFERENCES

4.1 ASTM C1077-02 – Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

4.2 ASTM C1093-95 – Practice for the Accreditation of Testing Agencies for Unit Masonry

4.3 ASTM D3740-01 – Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

4.4 ASTM E329-02 – Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

4.5 ASTM E543-02 – Practice for Agencies Performing Non-Destructive Testing

4.6 International Building Code (IBC)

5. QUALIFICATIONS

5.1 Testing Agency

An approved independent testing agency acceptable to the Owner, Architect, and SER and meeting the following:

5.1.1 Authorized to operate in the state in which the Project is located and experienced with the requirements and testing methods specified in the Contract Documents.

5.1.2 Meet applicable requirements of references stated in Paragraph 1.4.

5.1.3 Have available testing equipment that is calibrated, at reasonable intervals, by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.

5.1.4 Provide individuals performing tests and taking samples with appropriate certifications for work performed.

5.2 Special Inspector

Either an appropriately certified inspector or a civil/structural engineer performing under the direct supervision of a licensed structural engineer (as defined earlier in this Section) and acceptable to the SER and building official. Unique special inspector requirements for specific materials and systems are noted in related technical Specification Sections.

6. RESPONSIBILITIES

6.1 Special Inspectors

6.1.1 Inspect the Work assigned for conformance with the building department approved Plans, Specifications, and applicable material and workmanship provisions of the code. Perform inspection in a timely manner to avoid delay of work.

6.1.2 Bring nonconforming items to the immediate attention of the Contractor for correction. If not corrected within 24 hours or if inspector will not be on-site the following day, bring to the attention of the SER by the end of the business day. If uncorrected after a reasonable period of time, bring to the attention of the Architect. Notify SER immediately if non-conforming items are enclosed, embedded, or obscured prior to verification of correction.

6.1.3 Submit inspection reports to the building official, Contractor, the Architect, the SER, or other Consultant and other designated persons in accordance with the structural testing and special inspection schedule and as required by authorities having jurisdiction.

6.1.4 Submit a final signed report stating whether the Work requiring special inspection was, to the best of his/her knowledge, in conformance with the approved Plans, Specifications and the applicable workmanship provisions of the code.

6.1.5 Sign the structural testing and special inspection schedule in conjunction with other responsible parties.

6.1.6 Attend preconstruction meeting to review scope of special inspections.

6.2 Testing Agency

6.2.1 Test the Work assigned for conformance with the building department approved Plans, Specifications, and applicable material provisions of the Documents. Perform tests in a timely manner to avoid delay of work.

6.2.2 Submit test reports to the building official, Contractor, the Architect, the SER, or other Consultant and other designated persons in accordance with the structural testing and special inspection schedule.

6.2.3 Sign the structural testing and special inspection schedule in conjunction with other responsible parties.

6.2.4 Attend a preconstruction meeting to review scope of structural testing.

6.3 Contractor

6.3.1 Contractor shall engage special inspectors and testing agencies as required in Project Manual, Structural Drawings, current building code, and as required by authorities having jurisdiction.

6.3.2 Attend a preconstruction meeting to review scope of structural testing and special inspection.

6.3.3 Post or make available the structural testing and special inspection schedule within its office at the jobsite. Also, provide adequate notification to those parties designated on the Schedule so they may properly prepare for and schedule their work.

6.3.4 Provide special inspectors access to the approved Plans and Specifications at the jobsite.

6.3.5 Review all reports issued by special inspectors.

6.3.6 Retain, at the jobsite, all reports submitted by the special inspectors for review on the building official's request.

6.3.7 Correct deficiencies identified in inspection or testing reports in a timely manner.

6.3.8 Provide safe access to the Work requiring inspection or testing.

6.3.9 Provide labor and facilities to provide access to the Work, to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.

6.3.10 Verify conformance of the Work with specified construction tolerances.

6.3.11 Inspections by Building Official: Provide adequate notice for inspections performed by the building official, as required by IBC Section 110, the State Building Code, and local ordinances.

6.3.12 Sign the structural testing and special inspection schedule in conjunction with other responsible parties prior to commencing construction.

6.3.13 Also refer to Project Manual for special inspections for additional testing and inspection requirements.

6.4 Fabricator

6.4.1 Submit a Certificate of Compliance to the building official, special inspector, and SER that the Work was performed in accordance with the approved Plans and Specifications.

6.4.2 Sign the structural testing and special inspection schedule in conjunction with other responsible parties prior to commencing construction.

7. PAYMENT

7.1 General Contractor shall employ and pay for services of the special inspectors and testing agencies to perform required quality control, testing and special inspections.

7.2 Unless noted otherwise, the Contractor shall provide and pay for all materials, samples, mock-ups, and assemblies required for testing and inspection and shall pay for shipping costs related to delivery of such items. Testing agency shall pay for shipping costs of samples transported from site to lab.

7.3 If items requiring testing or inspection are enclosed, embedded or obscured prior to testing or inspection or if such items are placed without tests or inspections, the Contractor shall pay for the costs of any exploratory work deemed necessary by the Architect/SER or other Consultant to verify compliance with the Contract Documents.

7.4 Contractor shall pay for the costs of any retests or re-inspections caused by Work that does not comply with the Contract Documents based on initial tests or inspections, or Work that is later revised or replaced by the Contractor. This does not include revisions requested by the Owner.

8. INSPECTION NOTICE

Provide minimum of 24 hours' notice for all items requiring testing or inspection. Items requiring testing and inspection services prior to or during placement shall not be placed until testing and inspection services are available. Items requiring testing and inspection services after placement shall not be enclosed or obscured until testing and inspection services are performed.

9. REPORTS

9.1 Testing agency and special inspectors shall submit reports for structural testing and special inspection in a timely manner to the Contractor, building official, SER, and Architect of Record. Provide reports of daily activities to the SER and Contractor. Submit reports to the Contractor on a daily basis, and to the SER and Architect on a daily or weekly basis. Provide summary reports to the building official on a monthly basis unless they request otherwise.

9.2 Provide reports for ongoing work, containing the following information:

A. Date issued

B. Project title and number

C. Firm name and address

D. Name and signature of tester or inspector

E. Date and time of sampling, test, or inspection

F. Identification of product and Specification Section

G. Location in Project, including elevations, grid location and detail

H. Type of test or inspection

I. Whether test specimens, test results or observations indicate compliance with Contract Documents. Specifically state any discrepancies

J. Types and locations of discrepancies found in Work

K. Work required to be performed to correct discrepancies and Work performed to correct previously noted discrepancies. Discrepancies corrected during an inspection need not be reported

L. Submit certified final special inspection report stating that, to the best of the special inspector's knowledge, the Work requiring special inspection conformed to the Construction Documents

10. FREQUENCY OF TESTING AND INSPECTION

For detailed requirements, see Drawings and individual technical Specification Sections and the testing and special inspections schedule.

11. PROTECTION AND REPAIR

Upon completion of testing, sample-taking, or inspection, the Contractor shall repair damaged Work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the Architect/SER or other Consultant. Protect Work exposed by or for testing and/or inspection and protect repaired Work. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

12. TESTS TO DEMONSTRATE QUALIFICATION

12.1 Any tests required to qualify the Contractor or the workers for any phase of the Work shall be performed at no additional cost to the Owner.

12.2 If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the Architect/SER or other Consultant may require applicable tests to establish a basis for acceptance or rejection. The Contractor shall pay for these tests.

12.3 The Architect/Engineer of Record reserves the right to require certification or other proof that the system proposed is in compliance with specified tests, criteria or standards. A representative of an independent testing agency shall sign the certificate.

13. STRUCTURAL TESTING AND SPECIAL INSPECTION SCHEDULE

13.1 The parties involved shall complete and sign the structural testing and special inspection schedule. Schedule shall be complete at time of permit issuance.

13.2 The completed schedule is an element of the Construction Documents and after permit issuance, becomes part of the building department approved Plans and Specifications.

End of Section 014533

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

2.2 Related Requirements
Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

3. USE CHARGES

3.1 Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

3.2 Sewer Service: Not applicable.

3.3 Water Service
Pay water-service use charges for water used by all entities for construction operations.

3.4 Electric Power Service
Pay electric-power-service use charges for electricity used by all entities for construction operations.

4. INFORMATIONAL SUBMITTALS

4.1 Site Utilization Plan
Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

4.2 Implementation and Termination Schedule
Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

4.3 Project Identification and Temporary Signs
Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

4.4 Fire-Safety Program
Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

5. QUALITY ASSURANCE

5.1 Electric Service

Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

5.2 Tests and Inspections

Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

6. PROJECT CONDITIONS

Temporary Use of Permanent Facilities

Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 – PRODUCTS

7. MATERIALS

Portable Chain-Link Fencing

Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum six (6) feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

8. TEMPORARY FACILITIES

8.1 Field Offices

Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

8.2 Common-Use Field Office

Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

8.2.1 Furniture required for Project-site documents, including file cabinets, plan tables, plan racks, and bookcases.

8.2.2 Conference room of sufficient size to accommodate meetings of ten (10) individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.

8.2.3 Drinking water and private toilet.

8.2.4 Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.

8.2.5 Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

8.3 Storage and Fabrication Sheds
Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
8.3.1 Store combustible materials apart from building.

9. EQUIPMENT

Fire Extinguishers
Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 – EXECUTION

10. TEMPORARY FACILITIES, GENERAL

10.1 Conservation
Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
10.1.1 Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that may be designated as Owner's property.

11. INSTALLATION, GENERAL

11.1 Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
11.1.1 Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

11.2 Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

12. TEMPORARY UTILITY INSTALLATION

12.1 General
Install temporary service or connect to existing service.
12.1.1 Arrange with utility company for time when service can be interrupted, if necessary, to make connections for temporary services.

12.2 Sewers and Drainage
Provide temporary utilities to remove effluent lawfully.

12.3 Water Service
Install water service and distribution piping in sizes and pressures adequate for construction.

12.4 Sanitary Facilities
Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

12.5 Isolation of Work Areas in Occupied Facilities
Prevent dust, fumes, and odors from entering occupied areas.

12.6 Electric Power Service
Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
12.6.1 Install electric power service overhead unless otherwise indicated.

12.7 Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
12.7.1 Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

12.8 Telephone Service
Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment and 1 land-based telephone line for each field office.

At each telephone, post a list of important telephone numbers.
A. Police and fire departments
B. Ambulance service
C. Contractor's home office
D. Contractor's emergency after-hours telephone number
E. Architect's office
F. Engineers' offices
G. Owner's office
H. Principal subcontractors' field and home offices

12.9 Electronic Communication Service
Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

12.10 Project Computer
Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
12.10.1 Processor: Intel Core i5 or i7.

12.10.2 Memory: 16 gigabyte.

12.10.3 Disk Storage: 1-terabyte hard-disk drive and combination DVD-RW/ CD-RW drive.

12.10.4 Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.

12.10.5 Full-size keyboard and mouse.

12.10.6 Network Connectivity: 10/100BaseT Ethernet.

12.10.7 Operating System: Microsoft Windows 10 Professional.

12.10.8 Productivity Software:
A. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook

B. Adobe Reader DC

C. WinZip 10.0 or higher

12.10.9 Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three (3) functions.

12.10.10 Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 10.0-Mbps upload and 15-Mbps download speeds at each computer.

12.10.11 Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

12.10.12 Backup: External hard drive, minimum 2 terabytes, with automated backup software providing daily backups.

13. SUPPORT FACILITIES INSTALLATION

13.1 Comply with the following:

13.1.1 Provide temporary field offices, shops, and sheds located within construction area that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.

13.1.2 Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion.

13.2 Temporary Roads and Paved Areas

Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

13.2.1 Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

13.3 Temporary Use of Planned Permanent Roads and Paved Areas

Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

13.3.1 Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

13.3.2 Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.

13.3.3 Delay installation of final course of permanent pavement until immediately before Substantial Completion. Repair base-course pavement before installation of final course.

13.4 Traffic Controls
Comply with requirements of authorities having jurisdiction.
13.4.1 Protect existing site improvements to remain, including curbs, pavement, and utilities.

13.4.2 Maintain access for fire-fighting equipment and access to fire hydrants.

13.5 Parking: Provide on-site parking for construction personnel.

13.6 Storage and Staging: Use designated areas of Project site for storage and staging needs.

13.7 Dewatering Facilities and Drains
Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
13.7.1 Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

13.7.2 Remove snow and ice as required to minimize accumulations.

13.8 Project Signs
Provide temporary directional signs for construction personnel and public as required. All other signs are unauthorized and are not permitted.
13.8.1 Provide temporary, directional signs for construction personnel and visitors.

13.8.2 Maintain and touch up signs, so they are legible at all times.

13.9 Waste Disposal Facilities
Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

13.10 Lifts and Hoists
Provide facilities necessary for hoisting materials and personnel.
13.10.1 Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.

13.11 Street Cleaning: Maintain in clean condition with regularly scheduled street cleaning detail.

14. SECURITY AND PROTECTION FACILITIES INSTALLATION

14.1 Protection of Existing Facilities

Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

14.1.1 Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

14.2 Environmental Protection

Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

14.2.1 Comply with work restrictions specified in Section 011000 "Summary."

14.3 Temporary Erosion and Sedimentation Control

Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

14.3.1 Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.

14.3.2 Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

14.3.3 Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

14.3.4 Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

14.5 Stormwater Control

Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

14.6 Pest Control

Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

14.7 Site Enclosure Fence

Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

14.7.1 Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

14.7.2 Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one (1) set of keys to Owner.

14.8 Barricades, Warning Signs, and Lights
Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

14.9 Temporary Fire Protection
Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

14.9.1 Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

14.9.2 Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.

14.9.3 Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

15. OPERATION, TERMINATION, AND REMOVAL

15.1 Supervision
Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

15.2 Maintenance
Maintain facilities in good operating condition until removal.

15.3 Temporary Facility Changeover
Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

15.4 Termination and Removal
Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

15.4.1 Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

15.4.2 Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

15.4.3 At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 “Closeout Procedures.”

End of Section 015000

SECTION 015723

TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

Section Includes: Temporary stormwater pollution controls as required by authorities having jurisdiction, including but not limited to, the City of Wichita, Kansas, and Sedgwick County, and KDHE.

3. STORMWATER POLLUTION PREVENTION PLAN

The Stormwater Pollution Prevention Plan (SWPPP) shall be prepared by the Contractor.

4. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

4.1 Meet with Owner, Architect, and earthwork subcontractor.

4.2 Review requirements of the SWPPP, including permitting process, worker training, and inspection and maintenance requirements.

5. INFORMATIONAL SUBMITTALS

5.1 Stormwater Pollution Prevention Plan (SWPP)
Within 15 days of date established for commencement of the Work, submit completed SWPPP.

5.2 EPA authorization under the EPA's "2017 Construction General Permit (CGP)."

5.3 Stormwater Pollution Prevention (SWPP) Training Log
For each individual performing Work under the SWPPP.

5.4 Inspection reports.

6. QUALITY ASSURANCE

6.1 Stormwater Pollution Prevention Plan (SWPPP) Coordinator
Experienced individual or firm with a record of successful water pollution control management coordination of projects with similar requirements.

6.1.1 SWPPP Coordinator shall complete and finalize the SWPPP form.

6.1.2 SWPPP Coordinator shall be responsible for inspections and maintaining of all requirements of the SWPPP.

6.2 Installers: Trained as indicated in the SWPPP.

PART 2 – PRODUCTS

7. TEMPORARY STORMWATER POLLUTION CONTROLS

Provide temporary stormwater pollution controls as required by the SWPPP and authorities having jurisdiction, including but not limited to, City of Wichita, Kansas and Sedgwick County.

PART 3 – EXECUTION

8. INSTALLATION

8.1 Comply with all best management practices, general requirements, performance requirements, reporting requirements, and all other requirements included in the SWPPP.

8.2 Locate stormwater pollution controls in accordance with the SWPPP.

8.3 Conduct construction as required to comply with the SWPPP and that minimize possible contamination or pollution or other undesirable effects.

8.3.1 Inspect, repair, and maintain SWPPP controls during construction.

A. Inspect all SWPPP controls not less than every seven (7) days, and after each occurrence of a storm event, as outlined in the SWPPP.

8.4 Remove SWPPP controls at completion of construction and restore and stabilize areas disturbed during construction.

End of Section 015723

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

2.1 Related Requirements

2.1.1 Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.

2.1.2 Section 012300 "Alternates" for products selected under an alternate.

2.1.3 Section 012500 "Substitution Procedures" for requests for substitutions.

2.1.4 Section 014200 "References" for applicable industry standards for products specified.

2.1.5 Section 017700 "Closeout Procedures" for submitting warranties.

3. DEFINITIONS

3.1 Products

Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

3.1.1 Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.

3.1.2 New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.

3.1.3 Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

3.2 Basis-of-Design Product Specification

A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other

designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

3.2.1 Evaluation of Comparable Products
In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

3.3 Subject to Compliance with Requirements
Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the Specifications, select another named product or product from another named manufacturer that does meet the requirements of the Specifications; submit a comparable product request or substitution request, if applicable.

3.4 Comparable Product Request Submittal
An action submittal requesting consideration of a comparable product, including the following information:

3.4.1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section Number and Title and Drawing numbers and titles.

3.4.2 Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

3.5 Basis-of-Design Product Specification Submittal
An action submittal complying with requirements in Section 013300 "Submittal Procedures."

3.6 Substitution
Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

4. QUALITY ASSURANCE

4.1 Compatibility of Options
If Contractor is given option of selecting between 2 or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

4.2 Identification of Products
Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

4.2.1 Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.

4.3 Equipment Nameplates
Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

A. Name of product and manufacturer

B. Model and serial number

C. Capacity

D. Speed

E. Ratings

4.4 See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

5. COORDINATION

Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

6. PRODUCT DELIVERY, STORAGE, AND HANDLING

6.1 Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

6.2 Delivery and Handling

6.2.1 Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

6.2.2 Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

6.2.3 Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

6.2.4 Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

6.3 Storage

6.3.1 Provide a secure location and enclosure at Project site for storage of materials and equipment.

6.3.2 Store products to allow for inspection and measurement of quantity or counting of units.

6.3.3 Store materials in a manner that will not endanger Project structure.

6.3.4 Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.

6.3.5 Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6.3.6 Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

6.3.7 Protect stored products from damage and liquids from freezing.

7. PRODUCT WARRANTIES

7.1 Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

7.1.1 Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.

7.1.2 Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.

7.2 Special Warranties

Prepare a written document that contains appropriate terms and identification, ready for execution.

7.2.1 Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

7.2.2 Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.

7.2.3 See other Sections for specific content requirements and particular requirements for submitting special warranties.

7.3 Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 – PRODUCTS

8. PRODUCT SELECTION PROCEDURES

8.1 General Product Requirements

Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

8.1.1 Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

8.1.2 Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

8.1.3 Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.

8.1.4 Where products are accompanied by the term "as selected," Architect will make selection.

8.1.5 Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

8.1.6 Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

A. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.

8.2 Product Selection Procedures

8.2.1 Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.

A. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."

8.2.2 Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

A. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."

8.2.3 Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

8.3 Visual Matching Specification

Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

8.3.1 If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

8.4 Visual Selection Specification
Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 – EXECUTION (Not Used)

End of Section 016000

SECTION 017300

EXECUTION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Work, including, but not limited to, the following:

2.1.1 Construction layout

2.1.2 Field engineering and surveying

2.1.3 Installation of the Work

2.1.4 Cutting and patching

2.1.5 Progress cleaning

2.1.6 Protection of installed construction

2.2 Related Requirements

2.2.1 Section 011000 “Summary” for coordination of Owner’s separate contracts, and limits on use of Project site.

2.2.2 Section 013300 “Submittal Procedures” for submitting surveys.

2.2.3 Section 017700 “Closeout Procedures” for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

3. DEFINITIONS

3.1 Cutting

Removal of in-place construction necessary to permit installation or performance of subsequent work.

3.2 Patching

Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

4. PREINSTALLATION MEETINGS

4.1 Cutting and Patching Conference

Conduct conference at Project site.

4.1.1 Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

A. Contractor’s superintendent

B. Trade supervisor responsible for cutting operations

C. Trade supervisor(s) responsible for patching of each type of substrate

D. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations

4.1.2 Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

4.2 Layout Conference

Conduct conference at Project site.

4.2.1 Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:

A. Contractor’s superintendent

B. Professional surveyor responsible for performing Project surveying and layout

C. Professional surveyor responsible for performing site survey serving as basis for Project design

4.2.2 Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.

4.2.3 Review requirements for including layouts on Shop Drawings and other submittals.

4.4.4 Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

5. CLOSEOUT SUBMITTALS

Final Survey: Submit ten (10) copies showing the Work performed and record survey data.

6. QUALITY ASSURANCE

6.1 Land Surveyor Qualifications

A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

6.2 Professional Engineer Qualifications: Refer to Section 014000 “Quality Requirements.”

6.3 Cutting and Patching

Comply with requirements for and limitations on cutting and patching of construction elements.

6.3.1 Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

6.3.2 Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

A. Primary operational systems and equipment
B. Fire separation assemblies
C. Air or smoke barriers
D. Fire-suppression systems
E. Plumbing piping systems
F. Mechanical systems piping and ducts
G. Control systems
H. Communication systems
I. Fire-detection and -alarm systems
J. Conveying systems
K. Electrical wiring systems
l) Operating systems of special construction

6.3.3 Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

A. Water, moisture, or vapor barriers
B. Membranes and flashings
C. Exterior curtain-wall construction
D. Sprayed fire-resistive material
E. Equipment supports
F. Piping, ductwork, vessels, and equipment
G. Noise- and vibration-control elements and systems

6.3.4 Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

6.3.5 Manufacturer's Installation Instructions
Obtain and maintain on-site manufacturer's written recommendations and Instructions for installation of specified products and equipment.

PART 2 – PRODUCTS

7. MATERIALS

7.1 Comply with requirements specified in other Sections.

7.2 In-Place Materials

Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

7.2.1 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

7.3 Cleaning Agents

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

PART 3 – EXECUTION

8. EXAMINATION

8.1 Existing Conditions

The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

8.1.1 Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.

8.1.2 Furnish location data for work related to Project that must be performed by public utilities serving Project site.

8.2 Examination and Acceptance of Conditions

Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

8.2.1 Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

8.2.2 Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

8.2.3 Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

8.3 Written Report
Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
- 8.3.1 Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable
- 8.3.2 List of detrimental conditions, including substrates
- 8.3.3 List of unacceptable installation tolerances
- 8.3.4 Recommended corrections

8.4 Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

9. PREPARATION

9.1 Existing Utility Information
Furnish information to local utility, Owner, and Architect that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

9.2 Field Measurements
Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

9.3 Space Requirements
Verify space requirements and dimensions of items shown diagrammatically on Drawings.

9.4 Review of Contract Documents and Field Conditions
Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

10. CONSTRUCTION LAYOUT

10.1 Verification
Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions.
If discrepancies are discovered, notify Architect promptly.

10.2 Engage a land surveyor or professional engineer experienced in laying out the Work, using the following accepted surveying practices:
- 10.2.1 Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
- 10.2.2 Establish limits on use of Project site.
- 10.2.3 Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

10.2.4 Inform installers of lines and levels to which they must comply.

10.2.5 Check the location, level and plumb, of every major element as the Work progresses.

10.2.6 Notify Architect when deviations from required lines and levels exceed allowable tolerances.

10.2.7 Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

10.3 Site Improvements
Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

10.4 Building Lines and Levels
Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

10.5 Record Log
Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

11. FIELD ENGINEERING

11.1 Identification
Contractor shall identify existing benchmarks, control points, and property corners.

11.2 Reference Points
Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

11.2.1 Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

11.2.2 Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

11.3 Benchmarks
Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

11.3.1 Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

11.3.2 Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

11.3.3 Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

11.4 Final Property Survey
Engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

11.4.1 Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, the distance and bearing from a site corner to a legal point, finish floor elevation, pipe invert elevations, elevations of rims and grades and other elevations and features required by authorities having jurisdiction.

12. INSTALLATION

12.1 Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

12.1.1 Make vertical work plumb, and make horizontal work level.

12.1.2 Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

12.1.3 Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

12.2 Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

12.3 Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.

12.4 Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

12.5 Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

12.6 Tools and Equipment
Select tools or equipment that minimize production of excessive noise levels.

12.7 Templates
Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

12.8 Attachment

Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

12.8.1 Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

12.8.2 Allow for building movement, including thermal expansion and contraction.

12.8.3 Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

12.8.4 Joints

Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect.
Fit exposed connections together to form hairline joints.

12.8.5 Repair or remove and replace damaged, defective, or nonconforming Work.

A. Comply with Section 017700 “Closeout Procedures” for repairing or removing and replacing defective Work.

13. CUTTING AND PATCHING

13.1 General

Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

13.1.1 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

13.2 Temporary Support: Provide temporary support of Work to be cut.

13.3 Protection

Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

13.4 Adjacent Occupied Areas

Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 “Summary.”

13.5 Existing Utility Services and Mechanical/Electrical Systems

Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

13.6 Cutting

Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

13.6.1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

13.6.2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

13.6.3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

13.6.4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

13.6.5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

13.6.6 Proceed with patching after construction operations requiring cutting are complete.

13.7 Patching

Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

13.7.1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

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

A. Clean piping, conduit, and similar features before applying paint or other finishing materials.

B. Restore damaged pipe covering to its original condition.

13.7.3 Floors and Walls: Where walls or partitions that are removed extend finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.

Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

A. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

13.7.4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

13.7.5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

13.7.6 Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

14. PROGRESS CLEANING

14.1 Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

14.1.1 Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

14.1.2 Do not hold waste materials more than seven days during normal weather or three (3) days if the temperature is expected to rise above 80 degrees F.

14.1.3 Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

A. Use containers intended for holding waste materials of type to be stored.

14.1.4 Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

14.2 Site: Maintain Project site free of waste materials and debris.

14.3 Work Areas

Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

14.3.1 Remove liquid spills promptly.

14.3.2 Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

14.4 Installed Work
Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

14.5 Concealed Spaces
Remove debris from concealed spaces before enclosing the space.

14.6 Exposed Surfaces
Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

14.7 Waste Disposal
Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

14.8 During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

14.9 Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

14.10 Limiting Exposures
Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

15. PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

15.1 Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

15.2 Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

15.3 Protection of Existing Items
Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

15.4 Comply with manufacturer's written instructions for temperature and relative humidity.

End of Section 017300

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

2.1.1 Substantial Completion procedures

2.2.2 Final completion procedures

2.2.3 Warranties

2.1.4 Final cleaning

2.2 Related Requirements

2.2.1 Section 012900 “Payment Procedures” for requirements for Applications for Payment for Substantial Completion and Final Completion.

2.2.2 Section 013233 “Photographic Documentation” for submitting Final Completion construction photographic documentation.

2.2.3 Section 017839 “Project Record Documents” for submitting Record Drawings, Record Specifications, and Record Product Data.

3. DEFINITIONS

List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect’s inspection, to determine if the Work is substantially complete.

4. ACTION SUBMITTALS

4.1 Product Data: For each type of cleaning agent

4.2 Contractor’s List of Incomplete Items: Initial submittal at Substantial Completion

4.3 Certified List of Incomplete Items: Final submittal at Final Completion

5. CLOSEOUT SUBMITTALS

5.1 Certificates of Release: From authorities having jurisdiction

5.2 Certificate of Insurance: For continuing coverage

5.3 Field Report: For pest-control inspection

6. MAINTENANCE MATERIAL SUBMITTALS

Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

7. SUBSTANTIAL COMPLETION PROCEDURES

7.1 Contractor's List of Incomplete Items

Prepare and submit a list of items to be completed and corrected (Contractor's "Punch List"), indicating the value of each item on the list and reasons why the Work is incomplete.

7.2 Submittals Prior to Substantial Completion

Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

7.2.1 Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

7.2.2 Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, damage or settlement surveys, property surveys, and similar final record information.

7.2.3 Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

7.2.4 Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

A. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

7.2.5 Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

7.3 Procedures Prior to Substantial Completion

Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

7.3.1 Advise Owner of pending insurance changeover requirements.

7.3.2 Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

7.3.3 Advise Owner of changeover in utility services.

7.3.4 Participate with Owner in conducting inspection and walkthrough with local emergency responders.

7.3.5 Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

7.3.6 Complete final cleaning requirements.

7.3.7 Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

7.4 Inspection

Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

7.4.1 Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

7.4.2 Results of completed inspection will form the basis of requirements for Final Completion.

8. FINAL COMPLETION PROCEDURES

8.1 Submittals Prior to Final Completion

Before requesting final inspection for determining Final Completion, complete the following:

8.1.1 Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."

8.1.2 Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

8.1.3 Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

8.1.4 Submit pest-control final inspection report.

8.1.5 Submit Final Completion photographic documentation.

8.2 Inspection

Submit a written request for final inspection to determine acceptance a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

8.2.1 Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

9. LIST OF INCOMPLETE ITEMS

9.1 Organization of List

Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

9.1.1 Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.

9.1.2 Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.

9.1.3 Include the following information at the top of each page:

A. Project name
B. Date
C. Name of Architect
D. Name of Contractor
E. Page number

9.1.4 Submit list of incomplete items in format acceptable to Owner and Architect.

10. SUBMITTAL OF PROJECT WARRANTIES

10.1 Time of Submittal

Submit written warranties for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

10.2 Partial Occupancy

Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

10.3 Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

10.4 Warranty Electronic File

Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

10.4.1 Submit in format acceptable to Owner and Architect.

10.5 Warranties in Paper Form

10.5.1 Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2- by 11-inch paper.

10.5.2 Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

10.5.3 Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

10.6 Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS

11. MATERIALS

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

PART 3 – EXECUTION

12. FINAL CLEANING

12.1 General

Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

12.2 Cleaning

Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

12.2.1 Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

A. Clean Project site of rubbish, waste material, litter, and other foreign substances.

B. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

C. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.

D. Remove tools, construction equipment, machinery, and surplus material from Project site.

E. Remove snow and ice to provide safe access to building.

F. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.

G. Remove debris and surface dust from limited-access spaces, including trenches, equipment vaults, manholes, and similar spaces.

H. Vacuum and mop concrete.

I. Leave Project clean and ready for occupancy.

12.3 Pest Control
Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

12.4 Construction Waste Disposal: Comply with waste-disposal requirements in Section 015000 "Temporary Facilities and Controls."

13. REPAIR OF THE WORK

13.1 Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

13.2 Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

13.2.1 Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.

End of Section 017700

SECTION 017823

OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

2.1.1 Operation and maintenance documentation directory manuals

2.1.2 Emergency manuals

2.1.3 Systems and equipment operation manuals

2.1.4 Systems and equipment maintenance manuals

2.1.5 Product maintenance manuals

2.2 Related Requirements

Section 013300 “Submittal Procedures” for submitting copies of submittals for operation and maintenance manuals.

3. DEFINITIONS

3.1 System

An organized collection of parts, equipment, or subsystems united by regular interaction.

3.2 Subsystem

A portion of a system with characteristics similar to a system.

4. CLOSEOUT SUBMITTALS

4.1 Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

4.1.1 Architect will comment on whether content of operation and maintenance submittals is acceptable.

4.1.2 Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

4.2 Format

Submit operation and maintenance manuals in the following format:

4.2.1 Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.

4.2.2 Submit one (1) paper copy. Architect will review and forward to Owner.

4.3 Final Manual Submittal
Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training.

4.4 Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

5. FORMAT OF OPERATION AND MAINTENANCE MANUALS

5.1 Manuals, Electronic Files
Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

5.1.1 Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

5.1.2 File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

5.2 Manuals, Paper Copy
Submit manuals in the form of hard-copy, bound and labeled volumes.

5.2.1 Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

A. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.

B. Identify each binder on front and spine, with printed title "Operation and Maintenance Manual," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

5.2.2 Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

5.2.3 Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.

5.2.4 Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.

5.2.5 Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

A. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

6. REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

6.1 Organization of Manuals

Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

A. Title page

B. Table of contents

C. Manual contents

6.2 Title Page: Include the following information:

A. Subject matter included in manual.

B. Name and address of Project

C. Name and address of Owner

D. Date of submittal

E. Name and contact information for Contractor

F. Name and contact information for Construction Manager

G. Name and contact information for Architect

H. Name and contact information for Commissioning Authority

I. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals

J. Cross-reference to related systems in other operation and maintenance manuals

6.3 Table of Contents

List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

6.3.1 If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

6.4 Manual Contents

Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

6.5 Identification

In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, “Preparation of Operating and Maintenance Documentation for Building Systems.”

7. PRODUCT MAINTENANCE MANUALS

7.1 Product Maintenance Manual
Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

7.2 Content
Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

7.3 Source Information
List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

7.4 Product Information
Include the following, as applicable:

A. Product name and model number
B. Manufacturer's name
C. Color, pattern, and texture
D. Material and chemical composition
E. Reordering information for specially manufactured products

7.5 Maintenance Procedures
Include manufacturer's written recommendations and the following:

A. Inspection procedures
B. Types of cleaning agents to be used and methods of cleaning
C. List of cleaning agents and methods of cleaning detrimental to product
D. Schedule for routine cleaning and maintenance
E. Repair instructions

7.6 Repair Materials and Sources
Include lists of materials and local sources of materials and related services.

7.7 Warranties and Bonds
Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

7.1 Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 017823

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes administrative and procedural requirements for Project Record Documents, including the following:

2.1.1 Record Drawings

2.2.2 Record Specifications

2.2.3 Record Product Data

2.2.4 Miscellaneous record submittals

2.2 Related Requirements:

2.2.1 Section 017300 “Execution” for final property survey

2.2.2 Section 017700 “Closeout Procedures” for general closeout procedures

3. CLOSEOUT SUBMITTALS

3.1 Record Drawings: Comply with the following:

3.1.1 Number of Copies: Submit 2 sets of marked-up record prints.

3.1.2 Number of Copies: Submit copies of Record Drawings as follows:

A. Initial Submittal

1) Submit PDF electronic files of scanned record prints and 1 set of file prints.

2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

B. Final Submittal

1) Submit PDF electronic files of scanned Record Prints and 3 sets of file prints.

2) Print each drawing, whether or not changes and additional information were recorded.

3.2 Record Specifications

Submit annotated PDF electronic files of Project’s Specifications, including Addenda and Contract modifications.

3.3 Record Product Data
Submit annotated PDF electronic files and directories of each submittal.
3.3.1 Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

3.4 Miscellaneous Record Submittals
See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories.

3.5 Reports
Submit written report monthly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

4. RECORD DRAWINGS

4.1 Record Prints
Maintain one (1) set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
4.1.1 Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
A. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
B. Accurately record information in an acceptable drawing technique.
C. Record data as soon as possible after obtaining it.
D. Record and check the markup before enclosing concealed installations.
E. Cross-reference record prints to corresponding photographic documentation.

4.1.2 Content: Types of items requiring marking include, but are not limited to, the following:
A. Dimensional changes to Drawings
B. Revisions to details shown on Drawings
C. Depths of foundations
D. Locations and depths of underground utilities
E. Revisions to routing of piping and conduits
F. Revisions to electrical circuitry
G. Actual equipment locations
H. Locations of concealed utilities
I. Changes made by Addenda, Change Order, Construction Change Directive, RFIs, or Architect's Supplemental Instructions
J. Changes made following Architect's written orders

K. Details not on the original Contract Drawings

L. Field records for variable and concealed conditions

M. Record information on the Work that is shown only schematically

4.1.3 Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4.1.4 Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

4.1.5 Mark important additional information that was either shown schematically or omitted from original Drawings.

4.1.6 Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

4.2 Record Digital Data Files

Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

4.2.1 Format: Annotated PDF electronic file with comment function enabled.

4.2.2 Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.

4.2.3 Refer instances of uncertainty to Architect for resolution.

4.3 Format: Identify and date each Record Drawing; include the designation "Project Record Drawing" in a prominent location.

4.3.1 Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

4.3.2 Format: Annotated PDF electronic file with comment function enabled.

4.3.3 Identification: As follows:

A. Project name

B. Date

C. Designation "Project Record Drawing"

D. Name of Architect

E. Name of Contractor

5. RECORD SPECIFICATIONS

5.1 Preparation

Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, Addenda, and Contract modifications.

5.1.1 Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

5.1.2 Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

5.1.3 Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

5.1.4 For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

5.1.5 Note related Change Orders, Record Product Data, and Record Drawings where applicable.

5.2 Format
Submit record specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

6. RECORD PRODUCT DATA

6.1 Recording
Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

6.2 Preparation
Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

6.2.1 Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

6.2.2 Include significant changes in the product delivered to Project site and changes in Manufacturer's written instructions for installation.

6.2.3 Note related Change Orders, Record Specifications, and Record Drawings where applicable.

6.3 Format
Submit Record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.

6.3.1 Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

7. MISCELLANEOUS RECORD SUBMITTALS

7.1 Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

7.2 Format

Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

7.2.1 Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

8. MAINTENANCE OF RECORD DOCUMENTS

8.1 Maintenance of Record Documents

Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and Owner's reference during normal working hours.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 017839

SECTION 017900

DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1. SUMMARY

1.1 Demonstration of products and systems where indicated in specific Specification Sections.

1.2 Training of Owner personnel in operation and maintenance is required for:

- 1.2.1 All software-operated systems
- 1.2.2 HVAC systems and equipment
- 1.2.3 Plumbing equipment
- 1.2.4 Electrical systems and equipment
- 1.2.5 Landscape irrigation
- 1.2.6 Items specified in individual product Sections

1.3 Training of Owner personnel in care, cleaning, maintenance, and repair is required for:

- 1.3.1 Roofing, waterproofing, and other weather-exposed or moisture-protection Products
- 1.3.2 Finishes, including flooring, wall finishes, and ceiling finishes
- 1.3.3 Fixtures and fittings
- 1.3.4 Items specified in individual product Sections

2. RELATED REQUIREMENTS

2.1 Section 017800 “Closeout Submittals”: Operation and Maintenance (O&M) manuals.

2.2 Other Specification Sections: Additional requirements for demonstration and training.

3. SUBMITTALS

3.1 See Section 013000 “Administrative Requirements,” for submittal procedures.

3.2 Training Plan
Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.

- 3.2.1 Submit to Architect for transmittal to Owner.
- 3.2.2 Submit not less than 4 weeks prior to start of training.
- 3.2.3 Revise and resubmit until acceptable.
- 3.2.4 Provide an overall schedule showing all training sessions.

3.2.5 Include at least the following for each training session:

A. Identification, date, time, and duration

B. Description of products and/or systems to be covered

C. Name of firm and person conducting training; include qualifications

D. Intended audience, such as job description

E. Objectives of training and suggested methods of ensuring adequate training

F. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.

G. Media to be used, such as slides, hand-outs, etc.

H. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor

3.3 Training Manuals

Provide training manual for each attendee; allow for minimum of 2 attendees per training session.

3.3.1 Include applicable portion of O&M manuals.

3.3.2 Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.

3.3.3 Provide 1 extra copy of each training manual to be included with O&M data.

3.4 Training Reports

3.4.1 Identification of each training session, date, time, and duration.

3.4.2 Sign-in sheet showing names and job titles of attendees.

3.3.3 List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

4. QUALITY ASSURANCE

Instructor Qualifications

Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

4.1 Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.

4.2 Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

5. DEMONSTRATION - GENERAL

5.1 Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this Section, unless approved in advance by Owner.

5.2 Demonstration may be combined with Owner personnel training if applicable.

5.3 Operating Equipment and Systems
Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.

5.3.1 Perform demonstrations not less than 2 weeks prior to Substantial Completion.

5.3.2 For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months.

5.4 Non-Operating Products
Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.

5.4.1 Perform demonstrations not less than 2 weeks prior to Substantial Completion.

5.5 Contractor shall provide video format training for operating equipment and systems as well as non-operating products.

6. TRAINING – GENERAL

6.1 Conduct training on-site unless otherwise indicated.

6.2 Provide training in minimum 2-hour segments.

6.3 Training schedule will be subject to availability of Owner's personnel to be trained. Reschedule training sessions as required by Owner. Once schedule has been approved by Owner, failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

6.4 Review of Facility Policy on Operation and Maintenance Data
During training, discuss:

6.4.1 The location of the O&M manuals and procedures for use and preservation; backup copies.

6.4.2 Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.

6.4.3 Typical uses of the O&M manuals

6.5 Product- and System-Specific Training

6.5.1 Review the applicable O&M manuals.

6.5.2 For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.

6.5.3 Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.

6.5.4 Provide hands-on training on all operational modes possible, and preventive maintenance.

6.5.5 Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.

6.5.6 Discuss common troubleshooting problems and solutions.

6.5.7 Discuss any peculiarities of equipment installation or operation.

6.5.8 Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.

6.5.9 Review recommended tools and spare parts inventory suggestions of manufacturers.

6.5.10 Review spare parts and tools required to be furnished by Contractor.

6.5.11 Review spare parts suppliers and sources and procurement procedures.

6.5.12 Contractor shall provide video format training for equipment operations and preventive maintenance.

6.5.13 Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three (3) days.

End of Section 017900

SECTION 020051

GEOTECHNICAL DATA

1. GEOTECHNICAL DATA

1.1 This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

1.2 Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

1.3 Geotechnical Report and soil-boring data for the Project, obtained by GSI Engineering, LLC, a UES Company, Geotechnical Report, dated June 3, 2025, is available for viewing as appended to this Document.

1.3.1 The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.

1.3.2 Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

End of Document 020051

SOIL REPORT

SEE
GEOTECHNICAL EXPLORATION REPORT

Prepared by

GSI Engineering, LLC
a UES Company (UES)
Wichita, Kansas

GEOTECHNICAL EXPLORATION REPORT
Juvenile Services Building
811 S. Minnesota
Wichita, Kansas

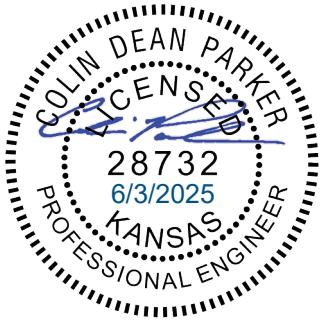
UES Project No. A24125.00062.000
June 3, 2025

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I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Kansas.

June 3, 2025
Colin D. Parker, P.E. Date

My license renewal date is April 30, 2027.
Sections covered by this seal: Sections 1 through 6 and all pages included as appendices within this bound document.

Important Information about This

Geotechnical-Engineering Report

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

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

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

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

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

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
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APPENDICES

Appendix A -	General Vicinity Map Boring Location Plan
Appendix B -	Boring Logs Key to Symbols Legend & Nomenclature Unified Soil Classification System (USCS)
Appendix C -	Field & Laboratory Test Results

1. INTRODUCTION

1.1 General

This report summarizes the findings of our geotechnical exploration for the proposed Juvenile Services Building located at the existing Sedgwick County Juvenile District Court in Wichita, Kansas. The scope of work was outlined in our proposal dated March 21, 2024. Mr. Martin Hanney with Hanney & Associates Architects authorized this exploration with a notice to proceed email on April 4, 2025.

The purpose of this geotechnical study is to explore the subsurface conditions at the proposed site with exploratory borings, evaluate the engineering properties of the subsurface materials with appropriate field and laboratory tests, and perform engineering analyses for developing design and construction recommendations for the proposed project.

1.2 Project Description

We understand the proposed project involves the demolition of the existing juvenile residential building and the construction of a new facility. The single- to multi-story structure will be of steel frame or masonry construction with a concrete slab-on-grade floor. We estimate the structure will have maximum column and continuous wall loads on the order of 125 kips and 3 kips per linear foot, respectively.

We anticipate that the pavements will support predominately light passenger cars with less frequent panel delivery vans, passenger vans, and trash trucks.

We assume site grading required to bring the building pad to the desired elevation will be minimal, with cuts or fills less than 2 feet. Please contact us if site grading will be more significant so we may evaluate and adjust our recommendations if necessary.

A site plan is included in Appendix A for reference.

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2. FIELD EXPLORATION

We drilled 6 borings for this geotechnical exploration on May 6, 2025, with a CME 45 truck-mounted drilling rig using 4-inch diameter continuous flight augers. We drilled our borings to depths of approximately 20 and 30 feet below the site grade at the time of our exploration.

We selected boring locations based on a preliminary site plan provided by Hanney & Associates Architects on March 20, 2024. UES personnel established field locations using a hand-held GPS unit with an accuracy of +/- 10 feet. Boring locations in relation to existing and proposed features are indicated on the Boring Location Plan included in Appendix A. The boring locations should be considered accurate only to the degree implied by the methods used in their determination.

We interpolated ground surface elevations at the boring locations using elevations obtained from ground surface profiling provided by Google Earth. The ground surface elevations at the borings are shown on the boring logs included in Appendix B. The boring elevations should be considered accurate only to the degree implied by the methods used in their determination.

Our drill crew obtained soil samples at the intervals shown on the boring logs in Appendix B. Recovered samples were sealed in plastic containers, labeled, and protected for transportation to the laboratory for further examination, testing, and classification.

We obtained split-barrel samples (designated "Split Spoon" or "S" samples) while performing Standard Penetration Tests (SPT) with a 1-3/8 inch I.D. thick-walled sampler, driven using an automatic hammer in general accordance with ASTM D1586, "*Penetration Test and Split-Barrel Sampling of Soils*." The "N" value, reported in blows per foot (bpf), equals the number of blows required to drive the sampler through the last 12 inches of the 18-inch sample interval using a 140-pound hammer falling 30 inches.

We obtained undisturbed samples (designated "Shelby Tube" or "U" samples) with 3-inch O.D. thin-walled tube samplers, hydraulically pushed in general accordance with ASTM D1587, "*Thin-Walled Tube Sampling of Soils for Geotechnical Purposes*."

Our drilling personnel prepared field boring logs during drilling operations. These field logs report drilling and sampling methods, sampling intervals, groundwater measurements and the subsurface conditions we encountered. At the conclusion of drilling, our drill crew made groundwater measurements and backfilled the borings in accordance with Kansas state regulations.

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3. SITE CONDITIONS

3.1 Regional Geology

The project site lies within the Arkansas River Lowlands region of western and central Kansas. The topography in this region is typified by flat alluvial plains. Soil stratigraphy generally comprises sand, silt and gravel of Pleistocene Age or younger, weathered from as far as the Rocky Mountains and transported by the Arkansas River. As the river flows eastward, the current slows, and the materials in the water column are deposited within the flood plain. In the project area, the alluvial deposits are underlain by the Wellington Shale of the Permian bedrock system.

3.2 Surface Conditions

The project site comprises the existing juvenile services facility with minimal elevation change across the area of the site. The site is bound to the north by south Kansas court and the Sedwick County Juvenile Intake building, to the east by South Kansas Court, to the south by the Sedgwick County Juvenile District Court building, and to the west by Bradford Glen Apartments.

3.3 Subsurface Conditions

Although we observed some variability, the subsurface materials we encountered within the depths of exploration generally comprised 4 to 6 inches of asphalt or 8 to 10 inches of concrete overlying lean to fat clay with varying amounts of sand which in turn overlies poorly graded sand with varying amounts of clay. General descriptions of the strata we encountered are presented below, while more detailed subsurface information is presented on the boring logs located in Appendix B. Please note that the indicated depths are relative to the site grade at the time of our exploration.

Stratum 1

We encountered lean to fat clay in each of our soil borings, underlying the asphalt or concrete at the surface, and extending to depths between approximately 5 and 18.5 feet below the site grade at the time of our exploration. This material was generally described as gray, black, or various shades of brown and slightly moist to very moist. We measured Standard Penetration Test (SPT) N-values between 2 and 13 blows per foot (bpf), and unconfined compressive strengths of 1.96 and 2.52 kips per square foot (ksf) indicating the clay soils are in a soft to stiff condition.

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Stratum 2

We encountered clayey sand to poorly graded sand in each of our soil borings, underlying the clay materials, and extending to the terminations depths of the borings at approximately 20 and 30 feet below the site grade at the time of our exploration. This material was generally described as various shades of brown and slightly moist to wet. We measured SPT N-values between 1 and 19 bpf, indicating the sand soils are in a very loose to medium dense condition.

3.4 Groundwater Conditions

Our drill crew made water level observations during drilling and after completion of the borings to evaluate groundwater conditions. We observed groundwater as indicated on the boring logs at depths between approximately 15 to 17 feet below site grade.

The groundwater conditions we observed during our exploration program should not be construed to represent an absolute or permanent condition. Uncertainty is involved with short-term water level observations in boreholes.

The free groundwater surface or groundwater table within unconfined aquifers is generally a subdued reflection of surface topography. Water generally flows downward from upland positions (recharge zones) to low lying areas or surface water bodies (discharge zones). As such, the groundwater level and the amount and level of any perched water on the site may be expected to fluctuate with variations in precipitation, site grading, drainage and adjacent land use. Long-term monitoring utilizing piezometers or observation wells is required to evaluate the potential range of groundwater conditions.

3.5 Seismic Site Classification

We have reviewed the boring logs and laboratory test data for this project. We have also reviewed other geologic data from the general area available to us for further information on the soils extending to a depth of 100 feet below the existing grade.

Based on the above resources, we estimate that the weighted average N-value for soil and rock across this depth is greater than 15, but less than 50 blows per foot (bpf). As defined in ASCE 7-16 as well as the 2018 version of the International Building Code, this building site is assigned a Site Class of D.

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4. LABORATORY TESTING

Our engineering staff reviewed the field boring logs to outline the depth, thickness and extent of the soil strata. The samples taken from the borings were examined in our laboratory and visually classified in general accordance with ASTM D2488, "*Description and Identification of Soils (Visual-Manual Procedure)*." We established a testing program to evaluate the engineering properties of the recovered samples. A UES technician performed laboratory testing in general accordance with the following current ASTM test methods:

- Moisture Content (ASTM D2216, "*Laboratory Determination of Water (Moisture) Content of Soil and Rock*")
- Unit Weight (ASTM D7263, "*Laboratory Determination of Density (Unit Weight) of Soil Specimens*")
- Atterberg Limits (ASTM D4318, "*Liquid Limit, Plastic Limit, and Plasticity Index of Soils*")
- Minus No. 200 Sieve Wash (ASTM D1140, *"Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve")*
- Unconfined Compressive Strength (ASTM D2166, *"Unconfined Compressive Strength of Cohesive Soil")*

Laboratory test results are presented on the boring logs in Appendix B and tabulated in Appendix C.

Moisture content and unit weight tests were used to evaluate the existing moisture-density condition of the soils. The Atterberg limits and Minus No. 200 sieve tests were used to help classify the soils under the Unified Soils Classification System. The Atterberg limits were also used to evaluate the plasticity characteristics of the soils. Unconfined compression tests were used to define the stress-strain characteristics and related shear strength of the soils.

The following data summarize our laboratory test results. We used these data to develop the allowable bearing values, anticipated settlements, and other geotechnical design criteria for the project.

- Natural Moisture Content ..... 5.5 to 53.0%
- Unconfined Compressive Strength ..... 1.96 to 2.52kips/ft^2
- Wet Density ..... 124.8 to 126.7pcf
- Dry Density ..... 105.0 to 109.9pcf
- Liquid Limit ..... 35 to 49
- Plastic Limit ..... 14 to 15

- Plasticity Index ..... 21 to 34
- Percent Passing the No. 200 Sieve ..... 34.0 to 73.3%
- Standard Penetration Test (SPT 'N' blows per foot) ..... 1 to 19

Based on the results of this testing program, we reviewed and supplemented the field logs to arrive at the final logs as presented in Appendix B. The final logs represent our interpretation of the field logs and reflect the additional information obtained from the laboratory testing. Stratification boundaries indicated on the boring logs were based on observations made during drilling, an extrapolation of information obtained by evaluating samples from the borings, and comparisons of similar engineering characteristics. Locations of these boundaries are approximate and the transitions between soil types may be gradual rather than clearly defined.

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5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General Geotechnical Considerations

The subsurface conditions at this site as encountered in Borings B-2 and B-3, include highly compressible and low-strength clays with allowable soil bearing capacities below 1,000 psf at depths between 0.5 and 8.5 feet below the current site grade. These soils are considered unsuitable bearing materials and must be improved in order to increase the allowable bearing pressure for the proposed project site.

Additionally, we understand that the new structure may comprise the footprint of the existing building to be demolished. All existing foundations elements should be removed in accordance with Section 5.2.1 below. Due to the limitations of our exploration, which prevented us from obtaining samples within the existing building pad, we note the potential for further encounter of unsuitable bearing materials at the time of construction once the existing structure has been removed.

Due to the soil improvement program and demolition activities as described above, we anticipate that the proposed structure may bear on multiple types of materials with varying settlement and compaction characteristics. To mitigate the potential for detrimental differential settlement resulting from constructing foundations on materials of various compositions and degrees of compaction, we recommend that the bearing materials below all foundation elements be over-excavated and replaced in accordance with Section 5.3 of this report. The soils we encountered in the test borings are generally capable of supporting the anticipated loads on shallow foundations after soil improvements as discussed later in this report.

The near-surface clay soils we encountered at the site generally contain 15% or more sand, and though moderately plastic in some areas, generally exhibit low plasticity and limited shrink/swell potential. These soils may be used for direct support of floor slabs or pavements, if properly moisture conditioned and compacted as outlined later in this report.

We observed groundwater as indicated on the boring logs at depths between approximately 15 to 17 feet below site grade. We did not encounter groundwater within the depth of expected excavation.

5.2 Earthwork

5.2.1 Site Preparation

Existing structures within the proposed building pad must be removed and the associated foundations excavated. Excavations resulting from demolition activities must be filled with an engineered structural fill that is placed, moisture conditioned and compacted in accordance with Section 5.2.4.

Adjacent foundations and structures that will remain must be protected (where applicable) while performing excavations and soil improvement programs. Roof drains and stormwater drainage from these structures as well as the surrounding area should be directed away from the proposed construction area.

We recommend that any existing utilities within the proposed building area be relocated to avoid passing beneath the new structure. Abandoned utility pipes that cannot be removed must be plugged with grout to reduce the potential for future collapse or moisture migration into the subgrade soils. Excavations resulting from utility removal must be replaced with engineered structural fill as outlined in Section 5.2.5.

In preparing the site for construction, existing pavements, surface vegetation and topsoil containing a significant percentage of organic matter should be removed from the areas beneath structures and any other areas that are to be paved, cut or receive fill. The removal depth for this site is expected to be approximately 4 to 10 inches. However, the removal depth should be monitored during stripping and adjusted as required. This material should either be removed from the site or stockpiled for later use in landscaping of unpaved or non-structural areas.

Trees within the areas to be prepared for development must be removed. The root-balls and surrounding soils containing observable organic material must also be removed. We expect the root-balls will extend to substantially greater depths than the topsoil stripping depth. The root-ball excavations must be filled with an engineered structural fill that is placed, moisture conditioned and compacted in accordance with Section 5.2.4.

Due to the large number of mature trees present in the building pad area, we emphasis the importance of the proper removal and replacement of any on-site materials containing organic matter and debris. All organic material (such as roots and root-balls) with a diameter greater than ½-inch should be completely removed beneath the structure and pavement areas to help prevent detrimental effects on subgrade stability.

If a substantial amount of organic material with a diameter greater than ½-inch cannot be removed in a reasonable manner from beneath the proposed slabs and pavements, the LVC layer may be increased to mitigate the harmful effect of the organic material. Please see Section 5.5 and Section 5.6 for further details on LVC thickness beneath floor slabs and pavements, respectively.

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Prior to fill placement, the top 9 inches of the ground surface in fill areas should be scarified, moisture conditioned and recompacted in accordance with Section 5.2.4 to eliminate a plane of weakness along the contact surface.

The subgrade should be proof rolled with a loaded tandem axle dump truck or equivalent (loaded water truck, loaded concrete mixer or motor grader with a minimum weight of 20 tons). A proof-roll is considered acceptable if no ruts greater than one inch deep appear behind the loaded vehicle, and no pumping or weaving is observed as the wheels pass over the area. Any soft or unsuitable areas should be compacted or removed and replaced with stable fill material similar in composition to the surrounding soils. If necessary, clean materials such as crushed concrete or crushed stone may be used to stabilize areas where wet soil or water is present. Geogrid or structural geotextile may be used in conjunction with crushed concrete or stone to provide additional stabilization.

Whether in cut or fill, the final subgrade surface must be maintained in a stable condition at the moisture content and level of compaction identified in Section 5.2.4. Verification and maintenance of the completed subgrade may require scarification, moisture conditioning, recompaction, and proof rolling.

5.2.2 General Structural Fill

General structural fill may be used for mass site grading, landscaping applications or as utility trench backfill outside of building areas. General structural fill may also be used to within 12 inches of the base of any granular cushion beneath floor slabs and to within 9 inches of the base of any vehicular and pedestrian pavements. In the former applications, low volume change materials are required immediately below the floor slabs or pavements (low volume change material is discussed in the following section).

General structural fill may comprise cohesive or granular material but should be free from organic matter or debris. Granular materials used as general structural fill should be well graded, have a maximum particle size of 1.5 inches, and meet KDOT freeze/thaw durability and sulfate soundness requirements. Off-site material used as general structural fill should have a liquid limit (LL) of less than 50 and a plastic index (PI) of less than 30.

If free of organic matter or debris, the on-site soils may be reused as general structural fill within the areas outlined above.

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5.2.3 Low Volume Change Material (LVC)

Low volume change (LVC) material as specified for use below floor slabs and pavements must consist of granular material or cohesive soil with a liquid limit (LL) less than 40 and a plasticity index (PI) between 10 and 20.

Granular material used as LVC must have sufficient cohesion to form a compactable, uniform, and stable subgrade. This typically translates to a material with greater than 15 percent fines (percent passing the No. 200 sieve) and a maximum particle size of 1.5 inches. Silty gravel (such as KDOT AB-3), crushed concrete with a maximum particle size of 1.5 inches, or limestone screenings are also acceptable LVC materials. Granular materials with less than 15 percent fines may be used within confined areas such as within foundation stem walls. LVC materials should be free of organic matter or debris.

If granular materials are used as LVC and are placed over less permeable or expansive soils, they should be constructed with edge drains or other drainage methods to prevent the ponding or collection of water in the granular layer.

The on-site soils found in the upper 2.5 feet of the borings may be considered LVC material as defined in this section, if properly moisture conditioned and recompacted in place as outline in Section 5.2.4 of this report.

5.2.4 Compaction of Engineered Structural Fills

Unless otherwise noted, fill materials should be placed in loose lifts not to exceed 9 inches and be compacted to a minimum of 95 percent of the maximum dry unit weight obtained from ASTM D698 (Standard Proctor). Moisture content at the time of compaction should be controlled to between optimum and 4 percent above optimum moisture content.

Granular fill materials which produce a definable moisture-density curve when tested according to ASTM D698 should be compacted to a minimum of 95 percent of the maximum dry unit weight obtained from ASTM D698. Granular fill materials which do not produce a definable moisture-density curve should be compacted to a minimum of 75 percent relative density (ASTM D4253, *"Maximum Index Density and Unit Weight of Soils Using a Vibratory Table"* and ASTM D4254, "*Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density"*). Granular materials should be placed at a moisture content that will achieve the desired densities. Please note that relative density and standard Proctor tests measure different parameters and are not interchangeable.

In general, proper compaction of cohesive soils can be achieved with sheepsfoot or pneumatic-type compactors, while compaction of granular soils can be achieved with smooth-drum or smooth-plate vibratory compactors. Water flooding is not an acceptable compaction method for any soil type.

5.2.5 Utility Trench Backfill

As a minimum, utility trench backfill material should meet the requirements of general structural fill as defined in Section 5.2.2. Where utility trenches pass beneath the structure, pavements or flatwork, the upper foot of utility backfill should meet the requirements of LVC material as defined in Section 5.2.3. Backfill soils in utility trenches must be placed in lifts of 6 inches or less in loose thickness and be compacted in accordance with Section 5.2.4.

Granular material could be used as utility trench backfill but may retain or pond water on the underlying expansive clay and present a higher potential for volume changes due to shrink and swell. We recommend that where utility trenches pass beneath the structure, that the use of granular backfill be limited to avoid creating a preferential pathway to the underlying expansive soils. We recommend that clay materials meeting the specifications of LVC material as specified in Section 5.2.3 or flowable fill as described in the following paragraph be used to backfill or plug utility penetrations beneath the structure.

Controlled low strength material (CLSM) or flowable fill may also be used for utility backfills. We recommend designing flowable fill with a compressive strength between 50 and 300 pounds per square inch (psi). CLSM with a maximum compressive strength less than 300 psi can be readily excavated with a backhoe. The intent for the CLSM is to provide a backfill that can be placed in a single lift, without personnel entering the excavation and without the need for compaction equipment.

Where used beneath pavements, flatwork or the structure, CLSM should be terminated a minimum of one foot below the structure, floor slab or pavement subgrade elevation. To provide uniform support beneath pavements, flatwork, and the structure, the fill placed over the CLSM should be of similar composition as the surrounding bearing materials and be constructed as moisture-conditioned and compacted engineered structural fill in accordance with Section 5.2.4.

5.2.6 Foundation Backfill

As a minimum, backfill soils for formed foundations should meet the requirements of general structural fill as defined in Section 5.2.2. However, we recommend fill around foundations meet the requirements of LVC material as defined in Section 5.2.3. The use of LVC material to backfill foundations is intended to help

reduce lateral swell pressures on the foundation wall and reduce desiccation cracking adjacent to the structure, which can provide a pathway for water to infiltrate the foundation subgrade. If other cohesive materials are used to backfill foundations, the risk of differential movements caused by water infiltration into the foundation subgrade may be increased.

We also recommend the upper 18 inches of exterior foundation backfill have sufficient cohesion to direct surface water away from the structure. Granular materials such as sand and gravel are not suitable for use as exterior foundation backfill in the surficial 18 inches.

Backfill soils around formed foundations must be placed in lifts of 6 inches or less in loose thickness and be moisture conditioned and compacted in accordance with Section 5.2.4. Care should be exercised during compaction to avoid applying excessive stress to the foundation surfaces. Where both sides of a foundation wall are backfilled, the fill should be placed simultaneously in uniform lifts on both sides of the wall to reduce unbalanced lateral loads.

5.2.7 Correction of Unsuitable Foundation Soils

If soft, loose, or otherwise unsuitable soils are encountered at the base of any foundations, an over-excavation and replacement/recompaction procedure will be required. The unsuitable soils beneath the foundations should be removed to the required depth, with the excavation extending laterally 9 inches in all directions for each vertical foot of over-excavation. Structural fill for the over-excavated areas should be of similar composition as the surrounding materials or meet the requirements of LVC material as defined in Section 5.2.3. Backfill material should be compacted in accordance with Section 5.2.4. CLSM, as defined in Section 5.2.5 may also be used to backfill over-excavated areas.

5.2.8 Excavation Slopes

Vertical cuts and excavations may stand for short periods of time, but should not be considered stable in any case. All excavations should be sloped back, shored, or shielded for the protection of workers. As a minimum, trenching and excavation activities should conform to federal and local regulations.

The clay soils we encountered in the test borings generally classify as a type “B” soil according to OSHA's Construction Standards for Excavations. In general, the maximum allowable slope for shallow excavations of less than 20 feet in a type “B” soil is 1.0H:1.0V, although other provisions and restrictions may apply. If different soil types are encountered, the maximum allowable slope may be different.

The Contractor is responsible for designing any excavation slopes or temporary shoring. The Contractor must also be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in federal, state, or local safety regulations, such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations.

Excavations performed near existing structures must not compromise the integrity or support of the existing foundation elements. Shoring, bracing, underpinning or other methods of maintaining foundation integrity may be required.

The information presented in this section is solely for our client's reference. **UES assumes no responsibility for site safety or the implementation of proper excavation techniques.**

5.3 Shallow Foundations

Based on the subsurface conditions revealed by the boring and testing program, this site appears suitable for use of a shallow foundation system after improvements as discussed in the following paragraphs. The selection of an allowable soil bearing pressure for shallow foundation elements must fulfill two requirements. First, the foundation load must be sufficiently less than the ultimate soil bearing capacity to ensure stability. Second, the total and differential settlements must not exceed amounts which will produce adverse behavior of the superstructure.

In order to meet the previous criteria, we have explored both the bearing capacity and the load settlement characteristics of the subsurface materials. The allowable soil bearing pressure is based on a factor of safety of three against the ultimate bearing capacity of the soil, with additional consideration given to limiting settlement to acceptable levels. In our analysis, we used a maximum allowable total vertical movement of 1 inch and a maximum allowable differential vertical movement of ¾ of an inch within 25 linear feet. These limits are generally considered acceptable for most structures.

The subsurface conditions at this site as encountered in Borings B-2 and B-3, include highly compressible and low-strength clays with allowable soil bearing capacities below 1,000 psf at depths between 0.5 and 8.5 feet below the current site grade. These soils are considered unsuitable bearing materials and must be improved in order to increase the allowable bearing pressure for the proposed project site.

Additionally, we understand that the new structure may comprise the footprint of the existing building to be demolished. All existing foundations elements should be removed in accordance with Section 5.2.1

below. Due to the limitations of our exploration, which prevented us from obtaining samples within the existing building pad, we note the potential for further encounter of unsuitable bearing materials at the time of construction once the existing structure has been removed.

Due to the soil improvement program and demolition activities as described above, we anticipate that the proposed structure may bear on multiple types of materials with varying settlement and compaction characteristics. To mitigate the potential for detrimental differential settlement resulting from constructing foundations on materials of various compositions and degrees of compaction, and in order to create a uniform and stable bearing stratum, we recommend that the bearing materials below all foundation elements be over-excavated and replaced as described below.

The soils beneath the proposed foundations must be excavated to 5 feet below the current site grade or 2 feet below the bottom of footing elevation, whichever is greater, while also extending laterally 9 inches in all directions for each vertical foot of over-excavation below the foundation element. The resulting excavation should then be backfilled with a material meeting the specifications of LVC material as defined in Section 5.2.3 and properly moisture conditioned and compacted in place in accordance with Section 5.2.4. A net allowable soil bearing pressure of 2,500 pounds per square foot (psf) may be used to size shallow foundation elements bearing on a minimum of 2 feet of properly constructed engineered fill.

The allowable bearing pressure is expressed in terms of the net pressure transferred to the soil. The net allowable bearing pressure is defined as the total structural dead load including the weight of the foundation elements, less the weight of the soil excavated for the foundation elements. This value may be increased by one-third for transient loading conditions such as wind or seismic forces.

Please note that proper construction of the fill is critical to the performance of the recompacted soil and the proposed structure. Therefore, we require that an engineer or technician from UES perform foundation subgrade observations and testing for this project during structural backfill and foundation placement to verify that structural fill is placed correctly and that foundation bearing conditions are acceptable. The net allowable bearing capacity indicated below is only valid if the structural backfill is properly constructed.

All exterior and any interior foundation elements exposed to freezing conditions should be constructed at least 3 feet below the surrounding exterior grade to help reduce the effects of frost and seasonal moisture changes. Interior footings, which will be protected from the effects of frost, may be founded 1.5 feet below finished floor elevation.

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We recommend that concrete be placed as soon as practical after footing excavation, with as little disturbance to the bearing soil as possible. Footing excavations should be free of loose soil or debris. Loose or disturbed soil must be removed or compacted prior to foundation construction. Water that collects in the excavations should be promptly removed to prevent softening of the foundation supporting soils prior to concrete placement. In addition, we recommend all excavations be observed by our geotechnical personnel prior to placement of concrete for the possible presence of unsuitable bearing soils. If unsuitable bearing soils are encountered during construction, these areas should be corrected in accordance with Section 5.2.7.

If shallow foundations are designed and constructed in accordance with the recommendations presented, total vertical movements are not expected to exceed 1 inch with differential vertical movements less than ¾ of an inch within 25 linear feet. If structurally connected to the existing structure, total vertical movement of the addition should be considered differential vertical movement when designing architectural and structural connections between the addition and the existing structure.

5.4 Floor Slabs

The clay-containing soils we encountered at this site, though moderately plastic in some areas, are generally sandy and exhibit a low swell potential. However, if improperly prepared, even these soils present a risk of causing slab movement. Most slabs-on-grade will experience some amount of vertical movement, which the Owner must be willing to accept. Recommendations to help reduce the risk of movement of a slab supported on the existing site soils are presented below.

To provide uniform support for floor slabs and reduce the potential for subgrade volume change, we recommend all floor slabs bear on a minimum of 12 inches of LVC material as defined in Section 5.2.3 The placement and compaction of the LVC material should conform to the recommendations in Section 5.2.4 of this report. Depending on final site grades, this LVC layer could comprise on-site soils, that have been moisture-conditioned and recompacted in place.

By constructing a 12-inch layer of low plasticity, low volume change material immediately beneath the floor slab and closely controlling the moisture and density of the scarified soil and new fill materials, it is our opinion that the potential for detrimental floor slab movement will be sufficiently reduced. If even slight slab movements are not acceptable, please contact UES for further floor slab recommendations.

We recommend a 2- to 4-inch thick granular cushion be placed beneath the floor slab in addition to the low plasticity, low volume change material. This layer should be free-draining, well-graded and compacted by vibration prior to placing the floor slab.

We also recommend the moisture content of upper 9 inches of the subgrade be checked prior to placement of a granular base, reinforcing steel or concrete floor slab. If the moisture content of the subgrade is below optimum, we recommend the subgrade be scarified, moisture conditioned and recompacted according to Section 5.2.4.

In many construction projects, the moisture content of the floor slab subgrade is tested during grading of the site. The subgrade then remains exposed until floor slab placement occurs several weeks later. In this situation, even LVC material is subject to some swell movement if not properly moisture conditioned prior to slab placement. Periodic applications of water will help maintain the proper moisture content of subgrade soils. The risk of differential movements can be reduced by creating and properly preparing a LVC zone beneath the slab as well as ensuring proper drainage is maintained around the structure at all times.

In finished areas, the floor covering manufacturer should be consulted regarding the use of a vapor retarder beneath floor slabs. If a vapor retarder is recommended by the floor covering manufacturer, it should conform to the manufacturer's specifications to maintain the product warranty. In other areas, vapor retarder should be placed in accordance with recommendations outlined in ACI 302.1R-15, "Guide to Concrete Floor and Slab Construction."

5.5 Pavement Recommendations

The asphalt and Portland cement concrete pavement recommendations provided below are separated into a regular duty and a heavy duty section. To perform properly, the pavement sections require that the subgrade be prepared in accordance with the recommendations in Section 5.5.1.

5.5.1 Pavement Subgrade Preparation

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of the subgrade. The stability and quality of the pavement subgrade is particularly important where high traffic volume and heavy axle loads are anticipated.

If vehicular and pedestrian pavements will be placed on native soils, we recommend the top 9 inches of the subgrade be moisture conditioned and recompacted as outlined in Section 5.2.4 of this report. If off-site soils are used to raise the site grade, we recommend these materials meet the requirements of LVC material as defined in Section 5.2.3.

The top 9 inches of pavement subgrade should be compacted to a minimum of 95 percent of the maximum dry unit weight determined by ASTM D698. The moisture content should also be controlled to between optimum and 4 percent above the optimum moisture content.

To detect any localized areas of instability, the final subgrade should be proof rolled with a loaded tandem axle dump truck or equivalent (loaded water truck, loaded concrete mixer or motor grader with a minimum weight of 20 tons) immediately prior to placement of the concrete or asphalt. Unstable areas should be removed and replaced or reworked to provide a more uniform subgrade. If necessary, clean materials such as crushed concrete or crushed stone may be used to stabilize areas where wet soil or water is present. Geogrid or structural geotextile may be used in conjunction with crushed concrete or stone to provide additional stabilization.

We also recommend the moisture content of the subgrade be checked prior to paving. If the moisture content is below optimum, we recommend the subgrade be scarified, moisture conditioned and recompacted according to Section 5.2.4.

5.5.2 Recommended Design Sections

The pavement sections for this project are based on our experience with similar pavements and a design life of 15 to 20 years. The regular duty pavement sections are intended for passenger car and light truck traffic and parking areas. The heavy duty pavement sections are intended for areas that will experience high traffic volumes or heavy axle loads such as main access drives or delivery truck routes. Portland cement concrete pavements are recommended for areas with frequent start-stop or turning traffic such as entrance and exit aprons or the parking stalls closest to buildings, as well as areas that support stationary loads such as dumpsters.

Our recommendations for full-depth asphalt and Portland cement concrete pavement sections are presented in the following tables.

Table 5.5.2-1: Full-Depth ACC Pavement Design Recommendations

	Regular Duty Section	Heavy Duty Section
KDOT BM-2 Wear Course (in.)	2.0	2.0
KDOT BM-2 Base Course (in.)	3.5	5.5
LVC Subgrade (in.)	9.0 (minimum)	9.0 (minimum)

**LVC subgrade placed and compacted in accordance with Section 5.5.1.*

Table 5.5.2-2: PCC Pavement Design Recommendations

	Sidewalks & Pedestrian Areas	Regular Duty Section	Heavy Duty Section
KDOT MA-2 Air Entrained Portland Cement Concrete (in.)	4.0	5.0	6.0
LVC Subgrade (in.)	9.0 (minimum)	9.0 (minimum)	9.0 (minimum)

**LVC subgrade placed and compacted in accordance with Section 5.5.1.*

5.5.3 Asphaltic Cement Concrete Pavement Construction

We recommend that both the asphalt surface and base coarse aggregate gradations meet KDOT SM-12.5A with a performance graded asphalt binder meeting KDOT PG 64-22. If asphalt mixes with recycled asphalt pavement are considered, we recommend that a maximum of 15% RAP be used in the surface course and that a maximum of 20% RAP be used in the base courses. If RAP is used, the aggregate gradation should meet KDOT SR-12.5A.

Asphalt should be placed at an ambient temperature above 40 degrees Fahrenheit. Asphalt temperature at the time of compaction should be between 265 and 330 degrees Fahrenheit. We recommend the initial asphalt lift placed directly on the subgrade should be compacted to a minimum of 94 percent of the Marshall density with subsequent asphalt lifts compacted to a minimum of 96 percent of the Marshall density. Please note that recommendations regarding compaction temperature and percentage for a specific pavement design should supersede these recommendations.

All asphaltic concrete mix designs should be submitted to UES and reviewed to determine if the designs are consistent with the recommendations given in this report. We also recommend a UES representative be present during paving operations to help ensure adherence to project pavement specifications.

5.5.4 General Pavement Considerations

Pavement service life can be significantly reduced if the pavement is constructed on a poor subgrade, if poor surface or subsurface drainage is present, or if the pavement is not maintained properly. We emphasize the importance of preparing the pavement subgrade in accordance with the procedures listed in the previous sections of this report.

Drainage of surface and subsurface water is also a critical component of pavement performance. Wetting of the subgrade soils or base course will cause loss of support strength resulting in premature pavement distress. Surface drainage should be designed to remove all water from paved areas. All curbs, including those surrounding pavement islands, should be backfilled as soon as possible after construction of the pavement. Backfill should be compacted and sloped to prevent water from ponding and infiltrating under the pavement. Regular active maintenance of pavements, which includes filling of cracks and joints, is required to minimize water infiltration and lengthen pavement life.

We recommend that parking lot islands be surfaced with low permeability paving to prevent water infiltration into the pavement subgrade.

5.6 Lateral Earth Pressures

Earth-retaining structures should be designed to withstand lateral earth pressures caused by adjacent soil and applied surcharge loads. The magnitude of the lateral earth pressure will depend on the height of the walls, stiffness of the walls, magnitude of the surcharge loads behind the walls, and the backfill and existing soil conditions behind the walls

Table 5.6-1: Lateral Earth Pressure Coefficients

Soil Type (USCS Symbol)	Wet Unit Weight (pcf)	Drained Friction Angle (Φ')	At Rest (K_o)	Active (K_a)	Passive (K_p)
Lean Clay w/ Varying Sand	125	25	0.58	0.41	2.46
Granular Backfill* (SP, SW)	115	32	0.47	0.31	3.25
Granular Backfill* (GP, GW)	125	35	0.43	0.27	3.69

Values for material compacted in accordance with Section 5.2.4

The values provided above are empirical and are based on basic testing as well as our experience with similar materials. These values also assume a vertical wall with a horizontal retained surface behind the wall. Lateral earth pressure parameters for granular backfill may be used only if the granular backfill extends upward from the heel of the wall at a slope shallower than 1.0H:1.0V. Please contact us if different backfill materials or wall geometries are a consideration for this project.

Static surcharge loads imposed on below-grade walls may be computed by multiplying the static surcharge load (q) by the appropriate lateral earth pressure coefficient (K_a or K_o). Sliding friction effects along the base of the wall may be evaluated using an ultimate sliding friction coefficient (μ) of 0.30 for the native clay soils, and 0.40 for properly constructed granular backfill. Appropriate factors of safety should be applied to the computed lateral earth pressures and sliding friction resistance.

5.7 Surface Drainage and Landscaping

The success of the shallow foundation system, slab-on-grade floor system, and pavement section is contingent upon keeping the moisture content of subgrade soils as constant as possible and not allowing surface drainage to have a path to the subsurface soils. Positive surface drainage away from structures must be maintained throughout the life of the structure. Landscaped areas should be designed and constructed such that irrigation and other surface water will be collected and carried away from foundation elements. Pavements should be sloped or crowned to direct surface water to storm sewer systems or detention/retention ponds.

During construction, temporary grades should be established to prevent runoff from entering excavations or footing trenches. Backfill should be placed as soon as concrete structural strength requirements are met and should be graded to drain away from the building.

The final grade of the foundation backfill and any overlying pavements should have a positive slope away from foundation walls on all sides. We typically recommend a minimum slope of one inch per foot for the first 5 to 10 feet for uncovered surfaces. However, the slope may be decreased if the ground surface adjacent to foundations is covered with concrete slabs or asphalt pavements. For other areas of the site, we recommend a minimum slope of two percent. Pavements and exterior slabs that abut structures should be carefully sealed against moisture intrusion at the joint. All downspouts and faucets should discharge onto splash blocks that extend at least five feet from the building line or be tied into the storm drain system. Splash blocks should slope away from the foundation walls.

The placement of vegetation and plantings next to foundations should be minimized. Where landscaping is required, we recommend considering plants and vegetation that require minimal irrigation. Irrigation within ten feet of the foundation should be carefully controlled and minimized.

5.8 Construction Considerations

If construction of the project is to be performed during periods of freezing temperatures, steps should be taken to prevent the soils under floor slabs, footings, or pavements from freezing. In no case should the fill materials, floor slabs, foundations, pavements, or other exterior flat work be placed on frozen or partially frozen materials. Frozen materials should be removed and replaced with a suitable material as described in earlier sections of this report.

Care should be exercised during excavation of new footings to avoid undermining the existing footings. Shoring, bracing, underpinning or other methods of maintaining foundation integrity may be required.

Construction performed during periods of high precipitation may result in saturated unstable soils, and caving or sloughing of excavations. Control of soil moisture will be necessary for successful soil compaction, and to maintain soil bearing capacity.

5.9 Construction Observation and Quality Assurance

We recommend that UES review those portions of the plans and specifications that pertain to foundations and earthwork to evaluate consistency with our findings and recommendations. UES will provide up to 2

hours of engineering support services at no charge to review project documents for adherence to our recommendations.

Site grading, including proof-rolling, replacement or recompaction of material, and placement of fill and backfill, should be observed by a quality assurance technician from UES under the direction of a registered professional engineer. The technician should perform density tests and make any other observations necessary to assure that the requirements of the specifications are being achieved.

It is the opinion of UES that construction observation by the geotechnical engineer of record or his designated representative is necessary to complete the design process. Field observation services are viewed as essential and a continuation of the design process. Unless these services are provided by UES, the geotechnical engineer will not be responsible for improper use of our recommendations or failure by others to recognize conditions which may be detrimental to the successful completion of the project.

UES will be available to make field observations and provide consultation services as may be necessary. A written proposal outlining the cost of construction testing services such as soil, concrete, steel, and pavement quality assurance can be provided upon request.

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6. CLOSING REMARKS AND LIMITATIONS

This report is presented in broad terms to provide an assessment of the subsurface conditions and their potential effect on the adequate design and economical construction of the proposed structure and pavement. The analyses, conclusions, and recommendations contained in this report are based on the site conditions existing at the time of the exploration, the project layout described herein, and the assumption that the information obtained from our 6 borings is representative of subsurface conditions throughout the site.

Any changes in the design or location of the proposed structure should be assumed to invalidate the conclusions and recommendations given in this report until we have had the opportunity to review the changes and, if necessary, modify our conclusions and recommendations accordingly. If subsurface conditions different from those encountered in the explorations are observed during construction or appear to be present beneath excavations, UES should be advised at once so that the conditions can be reviewed and recommendations reconsidered where necessary.

If there is a substantial lapse in time between the submission of this report and the start of construction, or if site conditions or the project layout have significantly changed (due to further development of grading plans, natural causes, or construction operations at or adjacent to the site), we recommend that this report be reviewed to determine the applicability of our previous conclusions and recommendations.

Our geotechnical exploration and subsequent recommendations address only the design and construction considerations contained in this report. We make no warranty for the contents of this report, neither expressed nor implied, except that our professional services were performed in accordance with engineering principles and practices generally accepted at this time and location.

The scope of services for this exploration did not include a wetlands evaluation, an environmental assessment, or an investigation for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air within or adjacent to this site. If contamination is suspected or is a concern, we recommend the scope of this study be expanded to include an environmental assessment.

This report was prepared by the firm of GSI Engineering, LLC (GSI) a UES Company (UES) under the supervision of a professional engineer registered in the State of Kansas. Report preparation was in accordance with generally accepted geotechnical engineering practices for the exclusive use of our client for evaluating the design of the project as it relates to the geotechnical aspects discussed herein.

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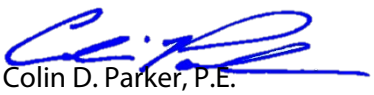
Recommendations are based on the applicable standards of the profession at the time of this report within this geographic area. GSI Engineering, LLC a UES Company (UES) will not be responsible for misrepresentation of this report resulting from partial reproduction or paraphrasing of its contents.

We appreciate the opportunity to be of service on this project. Please contact us if we can provide further information regarding the contents of this report or the scope and cost of additional services.

Respectfully submitted,
GSI Engineering, LLC a UES Company (UES)



Blake L. Gronlie
Staff Geologist

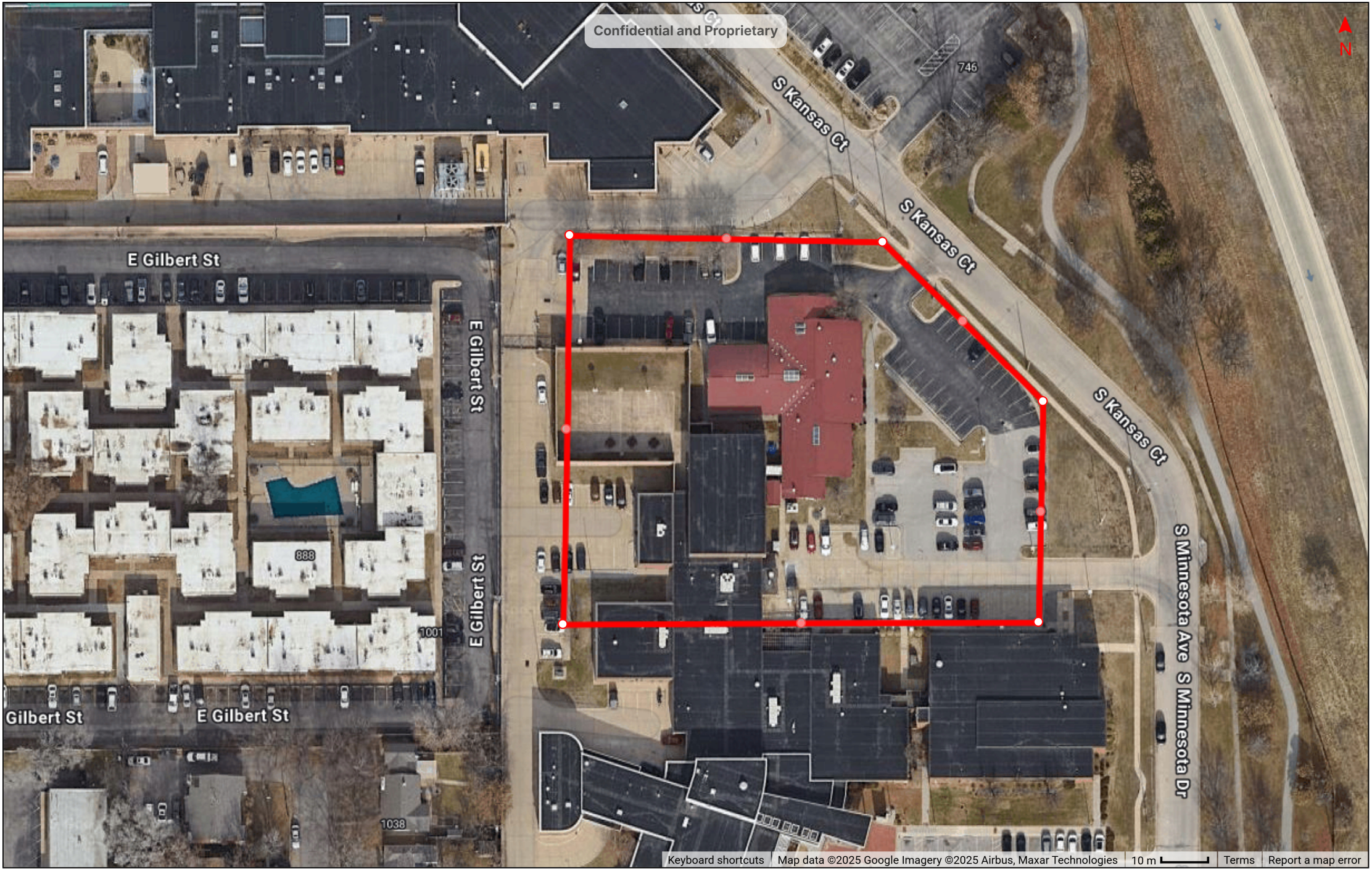


Colin D. Parker, P.E.
Project Geotechnical Engineer

BLG/ CDP

APPENDIX A

General Vicinity Map
Boring Location Plan



UES™	**PREPARED BY** GSI Engineering, LLC a UES Company Wichita, Kansas	**PROJECT** Name: Juvenile Services Building Number: A24125.00062.000	**LOCATION** 37.675248, -97.315015 Wichita, KS	**SYMBOL KEY** Soil Boring



UES™

PREPARED BY
GSI Engineering, LLC a UES Company
Wichita, Kansas

PROJECT
Name: Juvenile Services Building
Number: A24125.00062.000

LOCATION
37.675248, -97.315015
Wichita, KS

SYMBOL KEY
Soil Boring

APPENDIX B

Boring Logs
Keys to Symbols
Legend & Nomenclature
Unified Soil Classification System (USCS)

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-1

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025	**REMARKS:**
DRILLER: B. Ney-Cook	**BORING DEPTH:** 20'	
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1291'	
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84	
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands	**GW DEPTH:** 15' **DELAYED:** 15'

DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers **COORDINATES:** 37.675247, -97.315071

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
		S-1	8			ASPHALT 0.5 LEAN CLAY - black, moist, stiff 2.5	CL	22.6					1290
5		S-2	10			LEAN CLAY - dark brown, very moist, stiff, trace rust stains	CL	26.1				49-15-34	
		S-3	9			- as above 8.5	CL	25.4					1285
10		S-4	11			POORLY GRADED SAND - light brown, slightly moist, medium dense, fine to medium grained 13.5	SP	5.5					1280
	▽12	S-5	4			FAT CLAY - gray, very moist, soft, trace rust stains 18.5	CH	53.0					1275
20		S-6	1			CLAYEY SAND - brown, wet, very loose, medium to coarse grained 20.0	SC						

End of Boring at 20'

FIGURE B-1

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-2

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025	**REMARKS:**
DRILLER: B. Ney-Cook	**BORING DEPTH:** 30'	
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1291'	
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84	
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands	**GW DEPTH:** 17' **DELAYED:** 17'

DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers **COORDINATES:** 37.675223, -97.314253

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
						ASPHALT 0.5							1290
		S-1	2			LEAN CLAY - dark brown, very moist, very soft	CL	25.9				37-14-23	
		S-2	8			- stiff, else as above		25.7					
5						5.0							1285
		S-3	7			FAT CLAY - grayish brown, very moist, medium stiff, trace rust stains	CH	31.6					
10		S-4	9			8.5 SANDY LEAN CLAY - light brown, moist, stiff, trace rust stains	CL	22.4					1280
15		S-5	5			13.5 POORLY GRADED SAND - brown, slightly moist, loose	SP	10.3					1275
20		S-6	19			- medium dense, else as above							1270
25		S-7	6			23.5 CLAYEY SAND - grayish brown, wet, loose	SC						1265
30		S-8	4			- as above 30.0							

End of Boring at 30'

FIGURE B-2

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-3

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025	**REMARKS:**
DRILLER: B. Ney-Cook	**BORING DEPTH:** 30'	
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1292'	
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84	
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands	**GW DEPTH:** 17' **DELAYED:** 17'

DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers **COORDINATES:** 37.675200, -97.314799

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
		S-1	8			ASPHALT 0.5 SANDY LEAN CLAY - reddish brown, moist, stiff, heavy rust stains and gravel 2.5		15.5					1290
5		S-2	2			SANDY LEAN CLAY - brown, moist, very soft, fine grained	CL	19.5			69.4		
		S-3	3			- soft, else as above 8.5		22.2					1285
10		S-4	5			CLAYEY SAND - light brown, moist, loose, fine grained		9.9					1280
15		S-5	9			- trace gravel, else as above 18.5		6.3					1275
20		S-6	3			CLAYEY SAND - light brown, wet, very loose, medium to coarse grained	SC						1270
25		S-7	3			- as above							1265
30		S-8	3			- as above 30.0							

End of Boring at 30'

FIGURE B-3

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-4

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025	**REMARKS:**
DRILLER: B. Ney-Cook	**BORING DEPTH:** 20'	
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1292'	
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84	
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands	**GW DEPTH:** 16' **DELAYED:** 16'
DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers	**COORDINATES:** 37.674888, -97.315149	

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
		S-1	5			CONCRETE 0.5 LEAN CLAY with SAND - black, moist, medium stiff 2.5		21.1			73.3		1290
5		S-2	13			LEAN CLAY with SAND - dark brown, moist, stiff		22.1				35-14-21	
		S-3	N/A			- as above 8.5	CL	20.6	126.7	1.96			1285
10		S-4	7			SANDY LEAN CLAY - grayish brown, moist, medium stiff 13.5		15.4					1280
15		S-5	13			CLAYEY SAND - grayish brown, slightly moist, medium dense, fine to coarse grained 18.5	SC	9.5					1275
20		S-6	6			CLAYEY SAND - brown, wet, loose, coarse grained 20.0							

End of Boring at 20'

FIGURE B-4

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-5

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025
DRILLER: B. Ney-Cook	**BORING DEPTH:** 30'
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1293'
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands

REMARKS:

GW DEPTH: N/A **DELAYED:** N/A

DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers **COORDINATES:** 37.674804, -97.314537

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
		S-1	6			CONCRETE 0.5		18.3					
		S-2	8			SANDY LEAN CLAY - grayish brown, moist, medium stiff, medium grained	CL	21.4			71.3		1290
5						- fine grained, else as above 5.0							
		S-3	9			FAT CLAY - dark brown, moist, stiff, trace rust stains 8.5	CH						1285
10		S-4	6			CLAYEY SAND - brown, wet, loose, fine to coarse grained, trace gravel		26.7					1280
15		S-5	5			- fine grained, no gravel, else as above 18.5		9.0					1275
20		S-6	3			CLAYEY SAND - grayish brown, wet, very loose, fine grained	SC						1270
25		S-7	4			- as above							1265
30		S-8	3			- as above 30.0							

End of Boring at 30'

FIGURE B-5

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Juvenile Services Building

1900 East Morris Street, Wichita, Kansas

Project No.: A24125.00062.000

Soil Boring: B-6

Sheet 1 of 1

DRILLING FIRM: UES	**DATE COMPLETED:** 05/06/2025	**REMARKS:**
DRILLER: B. Ney-Cook	**BORING DEPTH:** 20'	
LOGGED BY: E. Cook	**SURFACE ELEVATION:** 1291'	
RIG TYPE: CME 45	**ELEVATION DATUM:** WGS84	
HAMMER TYPE: Auto	**GEOLOGY:** Arkansas River Lowlands	**GW DEPTH:** 17' **DELAYED:** 17'
DRILLING METHOD: 3.25-inch Inside Diameter Hollow Stem Augers	**COORDINATES:** 37.674674, -97.314257	

Depth (ft)	Sample Graphic	Samples: Sample Number	Samples: Uncorrected N-Value	Samples: Recovery / RQD	Graphic Log	Soil Description and Remarks	USCS	Laboratory Results: Moisture Content (%)	Laboratory Results: Wet Density (pcf)	Laboratory Results: Compressive Strength (ksf)	Laboratory Results: Fines Content (%)	Laboratory Results: Atterberg Limits (LL-PL-PI)	Elevation (ft)
						CONCRETE 0.8							1290
		S-1	8			SANDY LEAN CLAY - black, moist, stiff		12.3			34.0		
		S-2	8			- as above		17.2					
5		S-3	N/A			- as above		13.5	124.8	2.52			1285
						8.5							
10		S-4	11			SANDY LEAN CLAY - dark brown, very moist, stiff, fine grained	CL	18.7					1280
15		S-5	13			- fine to coarse grained, else as above		13.4					1275
						18.5							
20		S-6	9			POORLY GRADED SAND - brown, wet, loose 20.0	SP						

End of Boring at 20'

FIGURE B-6

Juvenile Services Building
A24125.00062.000
1900 East Morris Street, Wichita, Kansas

Boring Log
Legend and Nomenclature

Items shown on boring logs refer to the following:

1. **Depth** - Depth below ground surface or drilling platform

2. **Sample** -Types designated by letter:

   A - Disturbed sample, obtained from auger cuttings or wash water.

   S - Split barrel sample, obtained by driving a 2-inch split-barrel sampler unless otherwise noted.

   C - California liner sample, obtained using a thick-walled liner sampler containing 2-inch-diameter liner tubes.

   U - Undisturbed sample, obtained using a thin-walled tube, 3-inch-diameter, or as noted, and open sampling head.

   Recovery - Recovery is expressed as a percentage of the length recovered to the total length pushed, driven or cored.

   Resistance - Resistance is designated as follows:

   P - Sample pushed in one continuous movement by hydraulic rig action.

   12 - The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of split spoon sampler, driven by a 140-pound hammer falling 30 inches.

   50/4" - Number of blows to drive sampler distance shown.

3. **Soil Description** - Description of material according to the Unified Soil Classification: word description giving soil constituents, consistency or density, and other appropriate classification characteristics. Geologic name or type of deposit and other pertinent information, where appropriate, is shown under Geologic Description or other Remarks. A solid line indicates the approximate location of stratigraphic change.

4. **Lab Data** – Laboratory test data.

5. **Legend**

A.D.	—	After drilling	N.A.	—	Not Applicable
A.T.D.	—	At time of drilling	N.D.	—	Not detectable due to drilling method
C.F.A.	—	Continuous flight auger			
D.W.L.	—	Drill water loss	N.E.	—	None encountered
D.W.R.	—	Drill water return	N.R.	—	Not recorded
E.D.	—	End of drilling	R.Q.D.	—	Rock quality designation
H.B.	—	Hole backfilled	R.W.B.	—	Rotary wash boring

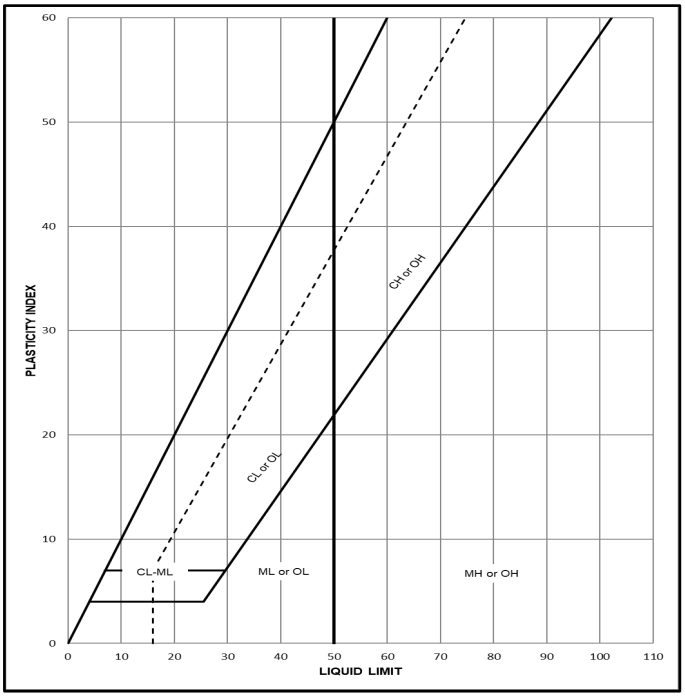
6. **Limitations** - The lines between materials shown on the boring logs represent approximate boundaries between material types and the changes may be gradual. Water level readings shown on the logs were made at the time and under the conditions indicated. Fluctuations in the water levels may occur with time. The boring logs in this report are subject to the limitations, explanations and conclusions of this report.

UNIFIED SOIL CLASSIFICATION SYSTEM

GROUP NAME	GROUP SYMBOL	SOIL DESCRIPTION	COMMENTS
Peat	Pt	Highly Organic Soils	50% or More Is Smaller than No. 200 Sieve
Fat Clay	CH	Clay - Liquid Limit => 50*	
Elastic Silt	MH	Silt - Liquid Limit => 50*	
Lean Clay	CL	Clay - Liquid Limit < 50*	
Silt	ML	Silt - Liquid Limit < 50*	
Silty Clay	CL-ML	Silty Clay*	
Clayey Sand	SC	Sands with 12 to 50 Percent Smaller than No. 200 Sieve	More than 50% Is Larger than No. 200 Sieve and % Sand > % Gravel
Silty Sand	SM		
Poorly-Graded Sand with Clay	SP-SC	Sands with 5 to 12 Percent Smaller than No. 200 Sieve	
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay**	SW-SC		
Well-Graded Sand with Silt**	SW-SM		
Poorly-Graded Sand	SP	Sands with Less than 5 Percent Smaller than No. 200	
Well-Graded Sand**	SW		
Clayey Gravel	GC	Gravels with 12 to 50 Percent Smaller than No. 200 Sieve	More than 50% Is Larger than No. 200 Sieve and % Gravel > % Sand
Silty Gravel	GM		
Poorly-Graded Gravel with Clay	GP-GC	Gravels with 5 to 12 Percent Smaller than No. 200 Sieve	
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay**	GW-GC		
Well-Graded Gravel with Silt**	GW-GP		
Poorly-Graded Gravel	GP	Gravels with Less than 5 Percent Smaller than No. 200	
Well-Graded Gravel**	GW		

*See Plasticity Chart for definition of silts and clays. If organic, use OL or OH.
**See definition of well-graded

PLASTICITY CHART



LEGEND OF TERMS

MOISTURE CONDITIONS
Dry, Slightly Moist, Moist, Very Moist, Wet (Saturated)

SOIL CONSISTENCY

Fine-Grained Soils

Description	SPT (N)	UCS (q_u, tsf)
Very Soft	0-2	0-0.25
Soft	2-4	0.25-0.50
Medium Stiff	4-8	0.50-1.0
Stiff	8-16	1.0-2.0
Very Stiff	16-32	2.0-4.0
Hard	>32	>4.0

Coarse-Grained Soils

Description	SPT (N)
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

CLASSIFICATION OF SANDS & GRAVELS

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Fines (Silt or Clay)
	10"	3"	3/4"	#4	#10	#40	#200

Well-Graded Sands (SW): $C_u \geq 6$ and $1 \leq C_c \leq 3$
Well-Graded Gravels (GW): $C_u \geq 4$ and $1 \leq C_c \leq 3$

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APPENDIX C

Field & Laboratory Test Results

SUMMARY OF FIELD AND LABORATORY TESTS

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT		VOID RATIO (e)	SAT. (%)	UNCONF. COMPR. STR. (ksf)	ATTERBERG LIMITS			PASS NO. 200 (%)	SPT "N" (blows /ft)	USCS SOIL CLASS.
					WET (pcf)	DRY (pcf)				LL	PL	PI			
B-1	S-1	0.5-2.0		22.6										8	CL
	S-2	2.5-4.0		26.1						49	15	34		10	CL
	S-3	5.0-6.5		25.4										9	CL
	S-4	8.5-10.0		5.5										11	SP
	S-5	13.5-15.0		53.0										4	CH
	S-6	18.5-20.0												1	SC
B-2	S-1	0.5-2.0		25.9						37	14	23		2	CL
	S-2	2.5-4.5		25.7										8	CL
	S-3	5.0-6.5		31.6										7	CH
	S-4	8.5-10.0		22.4										9	Sandy CL
	S-5	13.5-15.0		10.3										5	SP
	S-6	18.5-20.0												19	SP
	S-7	23.5-25.0												6	SC
	S-8	28.5-30.0												4	SC
B-3	S-1	0.5-2.0		15.5										8	Sandy CL
	S-2	2.5-4.5		19.5									64.9	2	Sandy CL
	S-3	5.0-6.5		22.2										3	Sandy CL
	S-4	8.5-10.0		9.9										5	SC
	S-5	13.5-15.0		6.3										9	SC
	S-6	18.5-20.0												3	SC
	S-7	23.5-25.0												3	SC
	S-8	28.5-30.0												3	SC
B-4	S-1	0.5-2.0		21.1									73.3	5	CL w/ Sand
	S-2	2.5-4.0		22.1						35	14	21		13	CL w/ Sand
	U-3	5.0-7.0	2.85	20.6	126.7	105.0	0.574	95	1.96					N/A	CL w/ Sand
	S-4	8.5-10.0		15.4										7	Sandy CL
	S-5	13.5-15.0		9.5										13	SC
	S-6	18.5-20.0												6	SC
B-5	S-1	0.5-2.0		18.3										6	CL w/ Sand
	S-2	2.5-4.5		21.4									71.3	8	CL w/ Sand
	U-3	5.0-7.0												9	CH
	S-4	8.5-10.0		26.7										6	SC
	S-5	13.5-15.0		9.0										5	SC
	S-6	18.5-20.0												3	SC
	S-7	23.5-25.0												4	SC
	S-8	28.5-30.0												3	SC

UES™

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PROJECT
Juvenile Services Building

LOCATION
Wichita, Kansas

PROJECT NUMBER
A24125.00062.000

DATE
June 2, 2025

SUMMARY OF FIELD AND LABORATORY TESTS

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT		VOID RATIO (e)	SAT. (%)	UNCONF. COMPR. STR. (ksf)	ATTERBERG LIMITS			PASS NO. 200 (%)	SPT "N" (blows /ft)	USCS SOIL CLASS.
					WET (pcf)	DRY (pcf)				LL	PL	PI			
B-6	S-1	0.5-2.0		12.2									34.0	8	SC
	S-2	2.5-4.5		17.2										8	SC
	U-3	5.0-7.0	2.88	13.5	124.8	109.9	0.504	71	2.52					N/A	Sandy CL
	S-4	8.5-10.0		18.7										11	Sandy CL
	S-5	13.5-15.0		13.4										13	SC
	S-6	18.5-20.0												9	SP

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SECTION 021500

SITE ISSUE COORDINATION INSTRUCTIONS

1. SUMMARY FOR DIVISION 31 – DIVISION 33

Directive: If any discrepancy or need for interpretation is necessary for Division 31 – Division 33 specifications, Contractor shall immediately request meeting with Owner, Architect, Contractor, Public Utilities, and other interested parties, to discuss issues and reach concurrence for resolution of conflicts of information.

End of Section 021500

SECTION 021513

SOILS FOR EARTHWORK

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes
- 1.1.1 Subsoil
- 1.1.2 Topsoil

1.2 Related Requirements
- 1.2.1 Section 020051 "Geotechnical Data."
- 1.2.2 Section 021516 "Aggregates for Earthwork" for coarse and fine aggregate materials.
- 1.2.3 Section 022113 "Rough Grading" for removal of topsoil, rough grading, and filling associated with contouring of Site.
- 1.2.4 Section 022115 "Excavation" for excavating as required for building foundations and utilities within building perimeter.
- 1.2.5 Section 022116 "Trenching" for excavating as required for building foundations and utilities within building perimeter.
- 1.2.6 Section 022117 "Fill" for backfilling as required at building perimeter and Site structures to subgrade elevations.

2. SUBMITTALS

2.1 Product Data
- 2.1.1 Subsoil
- 2.1.2 Topsoil

2.2 Samples
Submit, in airtight containers, 10-pound sample of each type of fill to testing laboratory.

2.3 Source Quality-Control Reports: For subsoil and topsoil materials.

3. QUALITY ASSURANCE

3.1 Furnish each subsoil and topsoil material from single source throughout Work.

3.2 Perform Work according to Section 020051 "Geotechnical Data."

PART 2 – PRODUCTS

4. PERFORMANCE REQUIREMENTS
Perform Work according to Section 020051 "Geotechnical Data."

5. SUBSOIL
5.1 Type S1, General Structural Fill: Comply with Section 020051 "Geotechnical Data".

5.2 Type S2, Low-Volume Change (LVC): Comply with Section 020051 "Geotechnical Data".

5.3 Type S3, Utility Trench Backfill: Comply with Section 020051 "Geotechnical Data".

5.4 Type S4, Foundation Backfill: Comply with Section 020051 "Geotechnical Data".

6. TOPSOIL
Type S5, Topsoil
6.1 Excavated and reused material
6.2 Graded and screened
6.3 Free of roots, rocks larger than 1/2-inch, subsoil, debris, large weeds, and foreign matter
6.4 Comply with ASTM D2487 Group Symbol OH or PT

7. SOURCE QUALITY CONTROL
7.1 Testing and Analysis
- 7.1.1 Subsoil and Topsoil Material: Comply with Section 020051 "Geotechnical Data".
- 7.1.2 If tests indicate materials do not meet specified requirements, change material and retest.

7.2 Owner Inspection
- 7.2.1 Make subsoil and topsoil available for inspection at source prior to packaging for shipment.
- 7.2.2 Notify Owner at least seven (7) days before inspection is allowed.

7.3 Owner Witnessing
- 7.3.1 Allow witnessing of source testing at supplier's test facility.
- 7.3.2 Notify Owner at least seven (7) days before tests are scheduled.

7.4 Certificate of Compliance
- 7.4.1 If supplier is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at source conforms to Contract Documents.
- 7.4.2 Specified source tests are not required for Work performed by approved supplier.

PART 3 – EXECUTION (Not Used)

End of Section 021513

SECTION 021516

AGGREGATES FOR EARTHWORK

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes: Aggregates for Earthwork

1.2 Related Requirements

1.2.1 Section 020051 “Geotechnical Data”.

1.2.2 Section 021513 “Soils for Earthwork” for granular fill, topsoil, and grading materials.

1.2.3 Section 022113 “Rough Grading” for removal of topsoil, rough grading, and filling associated with contouring of Site.

1.2.4 Section 022115 “Excavation” for excavating as required for building foundations and utilities within building perimeter.

1.2.5 Section 022116 “Trenching” for excavating as required for building foundations and utilities within building perimeter.

1.2.6 Section 022117 “Fill” for backfilling as required at building perimeter and Site structures to subgrade elevations.

1.2.7 Section 023306 “Site Water Utility Distribution Piping” for pipe materials, fittings, and valves.

1.2.8 Section 023310 “Sanitary Sewerage Piping” for pipe materials and accessories normally encountered with gravity sanitary building piping.

1.2.9 Section 023420 “Stormwater Conveyance” for drainage facilities to collect and provide for the flow of stormwater.

2. SUBMITTALS

2.1 Product Data

2.1.1 Aggregates for earthwork

2.1.2 Submit name of imported materials source

2.2 Samples

Submit, in airtight containers, 10-pound sample of each type of aggregate to testing laboratory

2.3 Source Quality-Control Reports: For aggregate materials

3. QUALITY ASSURANCE

3.1 Furnish each aggregate material from single source throughout Work.

3.2 Perform Work according to Section 020051 "Geotechnical Data" and Kansas Department of Transportation (KDOT) Division 1107 standards.

PART 2 – PRODUCTS

4. PERFORMANCE REQUIREMENTS

Perform Work according to Section 020051 "Geotechnical Data" and KDOT Division 1107 standards.

5. AGGREGATES FOR EARTHWORK

5.1 Type A1: Comply with KDOT Division 1107, Type SB-1

5.2 Type A2: Comply with KDOT Division 1107, Type SB-2

5.3 Type A3: Comply with KDOT Division 1107, Type SB-3

5.4 Type A4: Comply with KDOT Division 1107, Type PB-1

5.5 Type A5: Comply with KDOT Division 1107, Type PB-2

5.6 Type A6: Comply with KDOT Division 1107, Type PB-3

6. SOURCE QUALITY CONTROL

6.1 Testing and Analysis

6.1.1 Comply with Section 020051 "Geotechnical Data" and KDOT Division 1115.

6.1.2 If tests indicate materials do not meet specified requirements, change material and retest.

6.2 Owner or Authority Inspection

6.2.1 Make aggregate available for inspection at source prior to loading for shipment.

6.2.2 Notify Owner or Authority at least seven (7) days before inspection is allowed.

6.3 Owner or Authority Witnessing

6.3.1 Allow witnessing of source testing at supplier's facility.

6.3.2 Notify Owner or Authority at least seven (7) days before tests are scheduled.

6.4 Certificate of Compliance

6.4.1 If supplier is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at source conforms to Contract Documents.

6.4.2 Specified source tests are not required for Work performed by approved supplier.

PART 3 - EXECUTION (Not Used)

End of Section 021516

SECTION 021519

GEOTEXTILES FOR EARTHWORK

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Nonwoven geotextile materials

1.1.2 Woven geotextiles for erosion control

1.2 Related Requirements

1.2.1 Section Section 020051 “Geotechnical Data” for geotechnical report; borehole locations and findings of subsurface materials.

1.2.2 Section 021513 “Soils for Earthwork” for fill and grading materials.

1.2.3 Section 021516 “Aggregates for Earthwork” for fill and base coarse materials, and for fill over woven geotextiles at roadway applications.

1.2.4 Section 022116 “Trenching” for soil and subsoil materials for fill and grading purposes.

1.2.5 Section 022117 “Fill” for backfilling required at building perimeter and Site structures to subgrade elevations; fill under slabs on grade, pavement, and landscaped areas.

2. SUBMITTALS

Product Data: For the following:

2.1 Nonwoven geotextile materials

2.2 Woven geotextiles for erosion control

2.3 Submit manufacturer information including tensile strength, elongation, thickness, UV resistance, and other material specifications.

3. CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of geotextile materials, including placement depth.

4. QUALITY ASSURANCE

4.1 Manufacturers Qualifications

Company specializing in manufacturing products specified in this Section with minimum three (3) years’ documented experience.

4.2 Installers Qualifications

Company specializing in performing Work of this Section with minimum three (3) years’ documented experience.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Inspection
Accept materials on site in manufacturer's original packaging and inspect for damage.

5.2 Comply with ASTM D4873.

5.3 Store materials according to manufacturer instructions.

5.4 Protection

5.4.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

5.4.2 Provide additional protection according to manufacturer instructions.

PART 2 – PRODUCTS

6. PERFORMANCE REQUIREMENTS

6.1 Perform Work according to the State of Kansas Department of Transportation (KDOT) standards.

6.2 Ensure that terminology incorporated herein complies with ASTM D4439.

7. NONWOVEN GEOTEXTILE MATERIALS

7.1 Provide nonwoven geotextile that meets AASHTO M 288 Class 3 requirements for subsurface drainage, separation, and stabilization. Provide multipurpose fabrics with a felt-like appearance. The main functions for these products are filtration and separation. The most common nonwoven is a needle-punched product. Staple fibers or continuous filaments are bonded by mechanically entangling the fibers with barbed needles. Their optimum open area and 3 dimensionality provide effective erosion control and vegetation reinforcement, as well as resistance against high flow-induced shear forces. Provide material that has high interlock and reinforcement capacities with both soil and root systems and is designed for erosion control applications on steep slopes and vegetated waterways.

7.2 Furnish materials according to KDOT standards.

7.3 Non-biodegradable, UV-resistant, nonwoven geotextile fabric.

7.4 Edges: Selvaged or finished to prevent separation of outer material.

7.5 Calendar such that yarns will retain relative positions.

7.6 Performance and Design Criteria:

7.6.1 Minimum Unseamed Sheet Width: 12.5 by 15 feet.

7.6.2 Nominal Weight: 4.2 oz./sq. yd.

7.6.3 Apparent Opening Size (AOS)
- A. No. 70 U.S. standard sieve size
- B. Comply with ASTM D4751

7.6.4 Water Permittivity: 1.70 Hz per second, minimum average roll value

7.6.5 Water Flow Rate
- A. 135 gpm/sq. ft., minimum average roll value
- B. Comply with ASTM D4491/D4491M

7.6.6 Grab Tensile Strength
- A. 120 lbf, minimum average roll value
- B. Comply with ASTM D4632/D4632M

7.6.7 Elongation
- A. 50 percent, minimum average roll value
- B. Comply with ASTM D4632/D4632M

7.6.8 Trapezoidal Tear Strength
- A. 50 lbf minimum average roll value
- B. Comply with ASTM D4533/D4533M

7.6.9 Puncture Strength
- A. 310 lbf minimum average roll value
- B. Comply with ASTM D6241

7.6.10 UV Resistance at 500 Hours
- A. Strength Retention: 70 percent.
- B. Comply with ASTM D4355/D4355M.

8. WOVEN GEOTEXTILES FOR EROSION CONTROL

8.1 Provide woven geotextile that meets AASHTO M 288 Class 2 and 3 (less than 15 percent fines) for permanent erosion control and subsurface drainage. Provide woven mono-filament filtration geotextile made of 100 percent polypropylene yarns. Provide woven geotextile with opening area of 4 to 6 percent to provide excellent hydraulic properties and reduce clogging.

8.2 Furnish materials according to KDOT standards.

8.3 Non-biodegradable, UV-resistant, woven geotextile fabric

8.4 Edges: Selvaged or finished to prevent separation of outer material

8.5 Calendar such that yarns will retain relative positions

8.6 Performance and Design Criteria

8.6.1 Roll Dimension: 12.5 by 300 feet

8.6.2 Nominal Roll Weight: 176 lb.

8.6.3 Apparent Opening Size (AOS)
- A. No. 70 U.S. standard sieve size
- B. Comply with ASTM D4751

8.6.4 Water Permittivity: 0.28 Hz per second, minimum average roll value

8.6.5 Water Flow Rate
- A. 18 gpm/sq. ft., minimum average roll value
- B. Comply with ASTM D4491/D4491M

8.6.6 Grab Tensile Strength
- A. 370 by 250 lb., minimum average roll value
- B. Comply with ASTM D4632/D4632M

8.6.7 Elongation
- A. 15 percent, minimum average roll value
- B. Comply with ASTM D4632/D4632M

8.6.8 Trapezoidal Tear Strength
- A. 100 by 60 lb., minimum average roll value
- B. Comply with ASTM D4533/D4533M

8.6.9 Puncture Strength
- A. 950 lb., minimum average roll value
- B. Comply with ASTM D6241

8.6.10 UV Resistance at 500 Hours
- A. Strength Retention: 90 percent
- B. Comply with ASTM D4355/D4355M

8.6.11 Percent Open Area
- A 4 percent
- B Comply with Corps of Engineers (COE) - 02215

9. ACCESSORIES

9.1 Sewing Thread

9.1.1 Material: Polypropylene or Kevlar.

9.1.2 Durability: Equal to or greater than durability of geotextile.

9.2 Securing Pins

9.2.1 Material: Steel rods or bars

9.2.2 Diameter: 3/16-inch

9.2.3 Minimum Length: 12 inches

9.2.4 Washers
- A. Material: Steel
- B. Outside Diameter: Minimum 1-1/2 inches
- C. Inside Diameter: 1/4-Inch
- D. Thickness: 1/8-inch

9.3 Wire Staples
- 9.3.1 Material: Steel
- 9.3.2 Minimum Size: 10 gage
- 9.3.3 Minimum Length: 6 inches

PART 3 – EXECUTION

10. EXAMINATION
10.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

10.2 Verify that underlying surface is smooth and free of ruts or protrusions that could damage geotextile material.

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

11. PREPARATION
Subgrade Material and Compaction Requirements: As specified in Section 312323 "Fill".

12. INSTALLATION OF GEOTEXTILES
12.1 Geotextile Material
- 12.1.1 Lay and maintain smooth and free of tensile stresses, folds, wrinkles, or creases.
- 12.1.2 Ensure that material is in direct contact with subgrade.
- 12.1.3 Orientate with long dimension of each sheet parallel to direction of slope.
- 12.1.4 Minimum Unseamed Joints Overlap: 18 inches.

12.2 Securement Pins
- 12.2.1 Insert through geotextile midway between edges of overlaps and minimum 6 inches from free edges.
- 12.2.2 Minimum Spacing
  - A Slopes Steeper than 3 Horizontal on 1 Vertical: 24 inches o.c.
  - B. Slopes 3 Horizontal on 1 Vertical to 4 Horizontal on 1 Vertical: 3 feet o.c.
  - C. Slopes Flatter than 4 Horizontal on 1 Vertical: 5 feet o.c.

12.2.3 Ensure that washer bears against geotextile.

12.3 Seams

12.3.1 Minimum Seamed Joints Overlap: 12 inches at longitudinal and transverse joints.

12.3.2 Seams across Slope: Lap upper panel over lower panel.

12.3.3 Sewn Seams

A. Continuously sew seams on slopes steeper than 1 vertical on three (3) horizontal.

B. Stitch Type: As recommended by geotextile manufacturer.

C. Tie off thread at the end of each seam to prevent unraveling.

12.3.4 Thermal Seams

A. As recommended by geotextile manufacturer.

B. Comply with ASTM D4886.

12.4 Penetrations: As recommended by geotextile manufacturer.

12.5 Repair Damaged Geotextiles

12.5.1 Repair torn or damaged geotextile by placing patch of same type of geotextile over damaged area minimum of 12 inches beyond edge of damaged area and fasten as recommended by geotextile manufacturer.

12.5.2 Remove and replace geotextile rolls which cannot be repaired.

12.6 Fill and Cover

12.6.1 Place fill to prevent tensile stress or wrinkles in geotextile.

12.6.2 Place fill from bottom of side-slopes upward.

12.6.3 Do not drop fill from height greater than 3 feet.

13. PROTECTION

13.1 Ballast: Adequate to prevent uplift of material by wind

13.2 UV Exposure

Do not leave material uncovered for more than fourteen (14) days after installation.

13.3 Do not use staples or pins to hold geotextiles in place where located adjacent to other geosynthetic layers that could be damaged.

13.4 Do not operate equipment directly on top of geotextiles.

End of Section 021519

SECTION 021600

SITE CLEARING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Removing surface debris

1.1.2 Removing designated site elements

1.1.3 Removing designated trees, shrubs, and other plant life

1.1.4 Removing abandoned utilities

1.2 Related Sections: Section 022113 “Rough Grading”.

2. SUBMITTALS

Product Data

Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

3. QUALITY ASSURANCE

Conform to applicable code for environmental requirements, disposal of debris, burning debris on site, use of herbicides, etc.

PART 2 – PRODUCTS

4. MATERIALS

Herbicide: Approved by authority having jurisdiction.

PART 3 – EXECUTION

5. EXAMINATION

5.1 Verify existing conditions before starting work.

5.2 Verify existing plant life designated to remain is tagged or identified.

5.3 Coordinate waste and/or salvage area with Owner for placing removed materials.

6. PREPARATION

Call Local Utility Line Information service at 811 not less than 3 working days before performing Work.

6.1 Request underground utilities to be located and marked within and surrounding construction areas.

7. PROTECTION

7.1 Locate, identify, and protect from damage utilities indicated to remain.

7.2 Protect trees, plant growth, and features designated to remain, as final landscaping.

7.3 Protect benchmarks, survey control points, and existing structures from damage or displacement.

8. CLEARING

8.1 Clear areas required for access to site and execution of Work.

8.2 Remove trees and shrubs indicated. Remove stumps and main root ball.

8.3 Clear undergrowth and deadwood, without disturbing subsoil.

8.4 Apply herbicide to remaining stumps to inhibit growth.

9. REMOVAL

9.1 Remove debris, rock, and extracted plant life from site.

9.2 Remove designated site elements as indicated on Drawings. Neatly saw cut edges at right angle to surface.

9.3 Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

9.4 Continuously cleanup and remove waste materials from site. Do not allow materials to accumulate on site.

9.5 Do not burn or bury materials on site. Leave site in clean condition.

End of Section 021600

SECTION 021700

BUILDING DEMOLITION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

This Section includes the following:

2.1 Demolition and removal of the existing building structure, including footings, and all debris associated with demolition.

2.2 Demolition and removal of site improvements adjacent to a building or structure to be demolished.

2.3 Disconnecting, capping, or sealing, and removing site utilities.

2.4 Backfill, grading, and clean-up.

3. DEFINITIONS

3.1 Removal
Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or recycled.

3.2 Items to be Salvaged
Detach items from existing construction and deliver them to Owner, ready for reuse.

3.3 Existing to Remain
Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed, and salvaged, or recycled.

4. REGULATORY REQUIREMENTS

The Contractor shall comply with all applicable current Federal, State, and local building, safety and health regulations, including, but not limited to the following:

4.1 Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

4.2 Comply with ANSI A10.6 and NFPA 241.

4.3 Contractor must notify Kansas Department of Health and Environment (KDHE) in writing ten (10) business days prior to demolition to ensure compliance with air quality and asbestos regulations. Contractor must complete all required forms, and must obtain an Asbestos Control Business License from KDHE, as required.

4.4 Asbestos Certification
Contractors must be licensed by KDHE to perform asbestos-related projects, and on-site supervisors must hold active AHERA certifications.

4.5 Waste Disposal
Demolition debris must be disposed of in a KDHE-approved Construction and Demolition (C&D) or Municipal Solid Waste landfill.

4.6 Stormwater (If Applicable):
If the demolition project disturbs one or more acres, Contractor will acquire authorization for stormwater runoff under a construction general permit.

4.7 Contractor must comply with all local municipality and county requirements.
A. Contractor will apply for local Demolition Permit through the Metropolitan Area Building and Construction Department (MABCD).

B. Inspections & Disconnects: Before demolition, Contractor must provide proof that all utility services (water, sewer, gas, and electricity) have been properly disconnected.

4.8 Asbestos Inspection: Contractor must provide proof of a commercial asbestos survey or a KDHE Demolition Notification clearance, prior to receiving local permit.

4.9 For project-specific questions or to submit forms, Contractor will contact the KDHE Bureau of Air Quality / Asbestos Control directly.

4. DESCRIPTION OF WORK

Remove and properly dispose of all structures, trash, rubbish, basement walls, floors, foundations, sidewalks, steps, and driveways from the demolition site in compliance with Federal, State, and local regulations.

4.1 Submit a management plan to remove and legally dispose of any asbestos, if asbestos is discovered.

4.2 Special Testing
4.2.1 The Contractor is responsible for testing on all lifts, and backfill during placement. Testing shall be preformed by a licensed and certified geotechnical engineer to verify compliance.

4.2.2 The Contractor is responsible for all special testing, including, but not limited to air sampling / air quality testing and asbestos testing.

4.2 Remove any fuel tanks, outdoor toilets and septic tanks, cisterns, meter pits.

4.3 Plug or abandon wells.

4.4 Remove and legally dispose of mercury-containing materials including fluorescent, high-pressure sodium, mercury vapor, metal halide light bulbs, and thermostats containing a liquid filled capsule. PCB-containing materials include capacitors, ballasts, and transformers where the component is contained within a metal jacket and does not have a specific, legible label stating no PCBs are present

4.5 Perform site clearance, grading, and restoration.

4.6 Complete the demolition work in accordance with the plans and these technical specifications and any special provisions included in the Contract Documents.

4.7 Special Work not included:
The Owner reserves the right to have special work, not included in the Contract Documents, done during the course of the work herein included.

5. MATERIALS OWNERSHIP

Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during building demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner. Refer to Drawings.

6. SUBMITTALS

6.1 Schedule of Building Demolition Activities

6.1.1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity.

6.1.2 Interruption of utility services to the rest of the campus.

6.1.3 Coordination for shutoff, capping, and continuation of utility services.

6.2 Pre-Demolition
Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by building demolition operations. Submit before Work begins.

6.3 Landfill Records
Indicated receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

6.4 Statement of Refrigerant Recovery
Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

7. QUALITY ASSURANCE

7.1 Demolition Firm Qualifications
An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

7.2 Pre-Demolition Conference
Conduct conference at Project site to coordinate work reviewing methods and procedures related to building demolition including, but not limited to, the following:

7.2.1 Inspect and discuss condition of construction to be demolished.

7.2.2 Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.

7.2.3 Review and finalize protection requirements.

7.3 Upon completion of fill, an approved, qualified Geotechnical consultant shall confirm that fill was correctly installed. Geotechnical consultant services shall be provided by G.C.

8. PROJECT CONDITIONS

8.1 Buildings to be demolished will be vacated and their us discontinued before start of Work.

8.2 Owner occupies occupy other buildings immediately adjacent to demolition area. Conduct building demolition so Owner's operations will not be disrupted.

8.2.1 Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

8.2.2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from authorities having jurisdiction.

8.3 Owner assumes no responsibility for buildings and structures to be demolished. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

8.4 Hazardous Materials (Other than asbestos)
It is not expected that hazardous materials, other than asbestos, will be encountered in the Work.

8.4.1 Hazardous materials, other than asbestos, will be removed by the Owner before start of the Work.

8.4.2 If materials suspected of containing other hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Some hazardous materials may be removed by Owner under a separate contract.

8.5 Storage or sale of removed items or materials on-site is not permitted.

PART 2 – PRODUCTS

9. SOIL MATERIALS

Soil materials for infill must meet applicable standards for satisfactory soils.

PART 3 – EXECUTION

10. EXAMINATION

10.1 Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.

10.2 The Contractor shall accept the site in its present condition and shall inspect the site for its character and the type of structures to be demolished. The Owner assumes no responsibility for the condition of existing buildings, structures, and other property within the demolition area, or the condition of the property before or after the solicitation for proposals.

10.3 Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are the same as those indicated in the Project Record Documents.

10.4 Inventory and record the condition of items to be removed and salvaged.

10.5 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Architect.

11. PREPARATION

11.1 Permits and Fees
The Contractor shall obtain all the necessary permits and pay all permit fees that are required by the Jurisdiction in conjunction with the demolition work.

11.2 Utilities

11.2.1 Locate and identify which utilities will remain and which will be removed prior to demolition.

11.2.2 Existing Utilities to Remain
Maintain utility services indicated to remain and protect them against damage during demolition operations. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.

11.2.3 Utilities to be Disconnected or Removed
Disconnect all utility services before demolition. Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished. Do not begin demolition work until utility disconnecting and sealing have been completed and verified.

11.3 Removal of Refrigerants
Remove and recycle refrigerant from air-conditioning equipment before start of demolition. Remove and dispose of appliances and other items that may contain refrigerants in accordance with 40 CFR, Part 82. Appliances and other items that may contain refrigerants include, but

are not limited to, refrigerators, freezers, dehumidifiers and portable or central air conditioners. Refrigerant Recovery must be performed by a certified, EPA-approved technician.

12. PROTECTION

12.1 Existing Facilities

Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations.

12.2 Temporary Protection

12.2.1 The Contractor shall furnish and place a safety fence around the site of the work adequate to secure the demolition site, including any resulting debris or excavation, and to prevent pedestrian access. The fencing, including all materials, shall be considered incidental to the demolition. The safety fence shall remain in place until the demolished materials are removed from the site and all holes or excavated areas are backfilled.

12.2.2 Protect existing site improvements, appurtenances, and landscaping to remain.

12.2.3 Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

12.2.4 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

12.2.5 The Contractor shall not damage or cause to be damaged any public right-of-way, structures, parking lots, drives, streets, sidewalks, utilities, lawns, or any other property adjacent future demolition. The Contractor shall provide such sheeting and shoring as required to protect adjacent property during demolition. Care must also be taken to prevent the spread of dust and flying particles.

The Contractor shall restore existing agricultural drain tiles or roadway subdrains that are cut or removed to parcels released for demolition whether or not the property is scheduled for, including drainable backfill, to original condition. Repairs shall be subject to approval by the property owner where applicable, and by the Engineer.

13. DEMOLITION GENERAL

13.1 General

Demolish indicated existing building completely, as shown on Drawings. Use methods required to complete the Work within limitations of governing regulations as follows:

13.1.1 Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.

13.1.2 Maintain adequate ventilation when using cutting torches.

13.1.3 Located building demolition equipment and remove debris and materials, so as not to impose excessive loads on supporting walls, floors, or framing.

13.2 Site Access and Temporary Controls

Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

13.2.1 Do not close or obstruct streets, walks, walkways, or other adjacent or used facilities without permission from Owner.

13.2.2 Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

14. DEMOLITION

14.1 Structural Parts of Buildings

14.1.1 No wall or part thereof shall be permitted to fall outwardly from any building except through chutes or by other controlled means or methods, which will ensure safety and minimize dust, noise, and other nuisance.

14.1.2 Subject to site restrictions, outside chimneys or outside portions of chimneys shall be raised in advance of general demolition of each building. Any portion of a chimney inside a building shall be razed as soon as it becomes unsupported by reason of removal of other parts of the building.

14.1.3 Any part of a building, whether structural, collateral, or accessory, which has become unstable through removal of other parts, shall be removed as soon as practicable, and no such unstable part shall be left free-standing or inadequately braced against all reasonably possible causes of collapse at the end of any working day.

14.2 Basements and Foundation Walls

All basement floors, footings, and foundations shall be completely removed from the site. The basement area is to be inspected and approved by the Engineer before backfilling is started.

14.3 Concrete Slabs

The Contractor shall remove all concrete slabs, asphalt, surface obstructions, masonry slabs, and appurtenances.

14.4 Retaining Walls

Retaining walls or curbs near the perimeter of parcels shall be removed unless otherwise indicated in the Contract. The Contractor shall employ hand labor or other suitable tools and equipment necessary to complete the work without damage to adjacent public or private property. Where such retaining walls or curbs are removed, the embankment shall be graded to a slope of not greater than 3:1 horizontal: vertical or as directed by the Engineer. The cost of any tree or brush removal due to the removal and grading out of the retaining wall shall be considered incidental and shall be included in the lump sum bid for demolition.

14.5 Fences

Fences, guardrails, bumpers, signs, clotheslines, and similar facilities shall be completely removed from the site, except fences on the apparent boundary between a contract parcel and an improved non-contract parcel shall not be removed unless specifically stated in the special provisions. All posts for support shall be pulled out or dug up, so as to be entirely removed.

14.6 Partially Buried Objects

All piping, posts, reinforcing bars, anchor bolts, railings and all other partly buried objects protruding from the ground shall be removed. The remaining void shall be filled with soil and compacted in accordance with these specifications.

14.7 Vegetation

The Contractor shall remove all dead trees, trees identified for removal, stumps, all trees which are not an asset to the property, bushes, vegetation, brush, and weeds, whether standing or fallen, unless specifically stated otherwise by the Engineer. The Contractor shall protect all trees not removed from damage by the demolition operation. In the event that the Contractor damages a tree, it shall be repaired or removed by the Contractor as directed by the Engineer.

14.8 Fuel Tanks

Fuel tanks, above or below ground, shall be carefully removed and disposed of in a safe manner in accordance with the State Fire Marshal's regulations and any other applicable regulations.

14.8.1 Fuel tanks, above or below the ground, or tanks which have been used for storage of gasoline, kerosene, benzene, oils, or similar volatile materials shall be carefully removed and disposed of in a safe manner. The time, place and manner of disposal will be as set forth in the Contract documents.

14.8.2 All other tanks or receptacles shall be pumped out or emptied in a safe manner, and then shall be flushed out immediately with water, carbon dioxide or nitrogen gas until they are gas-free when checked with a “Explosimeter” or another equally efficient instrument, before the work of removal is begun. Checking with the “Explosimeter” shall be done in the presence of the Engineer by competent personnel.

14.9 Outdoor Toilets and Septic Tanks

Outdoor toilets and septic tanks shall be pumped out by a licensed company. The toilet building or septic tank shall be demolished and removed from the site. The excavation or pit shall be backfilled and compacted in accordance with these specifications. Septic tanks shall be broken up and removed from the site and the excavation filled in accordance with the requirements of the Jurisdiction.

14.10 Cisterns and Meter Pits

Cisterns and meter pits shall be demolished and removed. The excavations shall be backfilled and compacted in accordance with these specifications.

14.11 Well Plugging and Abandonment

All wells shall be plugged and abandoned in accordance with all applicable regulations. Required records shall be filed upon completion of the well abandonment.

15. EXPLOSIVE DEMOLITION

Use of explosives is not permitted.

16. DISPOSAL OF DEMOLITION DEBRIS AND SOLID WASTE

16.1 General

Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. All materials, rubbish, and trash shall be removed from the demolition area leaving the demolition area free of debris. Any cost incurred by the Owner in cleaning up such materials and debris left behind shall be deducted from funds due the Contractor under this contract.

16.1.1 Do not allow demolished materials to accumulate on-site.

16.1.2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

16.1.3 All debris and solid waste shall be delivered by the Contractor to an approved disposal facility licensed in accordance with state and/or local regulations, laws, and zoning.

The Contractor shall be responsible to pay all fees for waste disposal. The Contractor shall submit to the Owner/Architect copies of all disposal tickets for each structure demolished, where available, which identify the specific address of the origin of the debris associated with each ticket. The cost of all disposal fees shall be considered incidental to the demolition.

16.2 Tires

The Contractor shall visit the site to determine the number of tires that have been abandoned on site. If any additional tires are found on site prior to commencing demolition activity, the Contractor shall immediately notify the Engineer of the quantity of additional tires found on site so a change order can be prepared for additional removal.

16.3 PCB and Mercury Removal and Disposal

The handling of any fluorescent lighting fixtures and ballasts containing PCB or mercury is subject to all applicable state and federal mandates and regulations. The Contractor shall be responsible for the removal and disposal of the material in accordance with applicable regulations. All costs associated with said removal and disposal shall be considered incidental and shall be included in the lump sum bid for demolition.

16.4 Structures with Transite Siding

Privately owned properties containing transite siding shall be listed in the Contract Documents, and all demolition debris from these structures shall be disposed of at an approved landfill. The Contractor shall be responsible for notifying said landfill prior to commencing demolition on these structures to allow for authorization to dispose of material at the landfill. The Contractor shall assume responsibility for the landfill fees for disposing of the demolition debris. All structures with transite siding shall be thoroughly sprayed with water during the execution of the demolition to contain airborne particles. All debris shall be thoroughly wetted prior to transporting to the landfill.

16.5 Burning

Do not burn demolished materials

17. REPAIRS

Promptly repair damage to adjacent construction caused by building demolition operations.

17.1 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

17.2 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

18. SITE RESTORATION – BACKFILL, GRADING, AND CLEAN UP

18.1 Below-Grade Areas

18.1.1 Completely fill below-grade areas and voids resulting from building demolition operations with compacted satisfactory soil materials.

18.1.2 Once basement and footings have been removed, fill the basement hole in with maximum 6" lifts to 95% compaction. Fill can be sand or clay. Clay, if used, should have liquid limit less than 50. If clay is within 4 feet of the bottom of the floor slab or 18 inches below the bottom of the pavement, it should be placed at least 2% wet of optimum. Also, would need at least 18 inches of LVC below the floor slab if clay is used.

18.1.3 Tests should be performed on lifts during fill placement, by a licensed and certified geotechnical engineer, to verify compliance.

18.2 Backfill

When site conditions permit, as determined by the geotechnical engineer, on-site soil shall be used as backfill material. The top 9 to 12 inches of topsoil shall be stripped and stockpiled on site for use as final topsoil and grading material. If adequate topsoil, as defined by Section 2010, is not available on site, the Contractor shall bring in enough topsoil from off-site to place a minimum 8 inch cover on the entire site. Excess excavation materials shall be removed from the site. Topsoil material shall not be permitted as deep fill material.
Any borrow or fill material shall be approved by the geotechnical engineer before and during the placing of the material. All depressions on the property shall be filled, compacted, and graded to a uniform slope with adequate drainage.

18.3 Compaction

All excavations shall be backfilled with acceptable material and compacted as follows:

18.3.1 Standard Demolition Compaction: If required in the Contract Documents, all excavations associated with the demolition shall be backfilled and compacted in accordance with applicable regulations.

18.3.2 Special Demolition Compaction: If required, all excavations associated with the demolition shall be backfilled and compacted according to the requirements of applicable regulations. The Contractor shall notify the geotechnical engineer 24 hours in advance of placing any backfill or original backfill material so a soil sample can be obtained. It shall be the responsibility of the Contractor, to run a density test during and after the placement of the backfill material.

18.4 Additional Fill Material

All additional fill material shall be of equal quality to the soil adjacent to the excavation. Soil clumps shall be pea-sized or smaller, and free of rubble or organic matter. Additional fill material shall be acceptable fill material that meets the requirements of applicable regulations. The Contractor shall provide for a minimum depth of 8 inches of topsoil over the excavated area. There shall be no payment for additional fill material, which shall be considered a component of to the demolition bid price.

18.6 Grading

The site shall be graded to conform to all surrounding areas and shall be finished to have a uniform surface that shall not permit ponding of water. The Contractor shall grade and shape the site to drain, complete fine grading.

On demolition sites where seeding will be delayed because of the allowable seeding dates, the Contractor shall complete fine grading and shaping of the site to leave the site in a neat and presentable condition subject to the approval of the Owner/Architect.

18.7 Seeding

Unless seeding is not possible due to allowable seeding dates, the Contractor shall provide materials and labor for seeding. Seeding shall include preparation of the seedbed, furnishing and installing seed, fertilizer and mulch, maintenance, and guarantee for completed seeded areas, as specified in the Contract Documents.

18.8 Adjacent Areas

Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

18.9 Final Cleaning Up

Before acceptance of the demolition work, the Contractor shall remove all unused material and rubbish from the site of the work, remedy any objectionable conditions the Contractor may have created on private property, and leave the right-of-way in a neat and presentable condition. The Contractor shall not make agreements that allow salvaged or unused material to remain on private property. All ground occupied by the Contractor in connection with the work shall be restored.

End of Section 021700

SECTION 022100

EARTH MOVING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

- 2.1.1 Excavation for buildings, structures, walks, pavements, and utilities
- 2.1.2 Subgrade preparation
- 2.1.3 Backfill of utility trenches, buildings and structure
- 2.1.4 Preparation of building pad including low-volume change zone
- 2.1.5 Preparation of pavement stabilized subgrade
- 2.1.6 Field quality control

2.2 Related Sections

- 2.2.1 Division 01 Section "Construction Facilities and Temporary Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
- 2.2.2 Division 03 Section "Cast-in-Place Concrete" for concrete slab-on-grade.
- 2.2.3 Division 31 Section "Site Clearing" for removal of vegetation, topsoil stripping and removal of relocation of above and below-grade improvements.

3. DEFINITIONS

3.1 Backfill

Soil material or controlled low-strength material used to fill an excavation.

- 3.1.1 Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
- 3.1.2 Final Backfill: Backfill placed over initial backfill to fill a trench.

3.2 Bedding Course

Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

3.3 Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

3.4 Drainage Course

Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

3.5 Excavation
Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
3.5.1 Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

3.6 Low-Volume Change Zone
Chemically-stabilized material supporting the floor slab as acceptable to Geotechnical Engineer.

3.7 Engineered Structural Fill: Soil materials used to raise existing grades.

3.8 Structures
Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

3.9 Subgrade
Uppermost surface of an excavation or the top surface of a fill or backfill immediately below drainage fill, drainage course, or topsoil materials.

3.10 Utilities
On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

4. SUBMITTALS

4.1 Product Data
For each type of the following manufactured products required:
4.1.1 Controlled low-strength material, including design mixture

4.1.2 Warning tapes

4.2 Material Test Reports
For each on-site and borrow soil material proposed for fill and backfill as follows:
4.2.1 Classification according to ASTM D2487

4.2.2 Laboratory compaction curve according to ASTM D698

4.3 Field Quality Control Test Reports
Submit the following:
4.3.1 Verification of suitability of each footing subgrade material, in accordance with specified requirements

4.3.2 Field reports, in-place soil density tests

4.3.3 Report of actual unconfined compressive strength and/or results of bearing tests of each location and stratum tested as follows:
- A. Paved areas
- B. Building slabs-on-grade
- C. Foundation wall backfill
- D. Trench backfill

4.3.4 Vibrating wire settlement monitor reports and settlement plate reports at frequency indicated in Geotechnical Report.

5. QUALITY ASSURANCE

5.1 Codes and Standards
Perform earthwork and excavation work complying with requirements of authorities having jurisdiction.

5.2 Testing and Inspection Service
Contractor shall employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing and special inspections.
5.2.1 Testing Agency shall be GSI Engineering, LLC, Wichita, Kansas.

5.3 Pre-Excavation Conference: Conduct conference at Project site.

6. PROJECT CONDITIONS

6.1 Site Information
Data in subsurface investigation report was used for the basis of the design and is available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings.
It is expressly understood that neither Owner nor Architect will be responsible for interpretations or conclusions drawn from this data by Contractor.
6.1.1 Additional test borings and other exploratory operations may be performed by the Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

6.1.2 A copy of the Geotechnical Report prepared by GSI Engineering, LLC and dated September 15, 2022, is included at the end of Specification Section 020051 "Geotechnical Data"
- A. The Geotechnical Report, with its referenced attachments, is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the

depths of the borings or that of the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

C. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.

D. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

6.2 Existing Utilities
Do not interrupt existing utilities serving facilities occupied by the Owner, except when permitted in writing by the Architect and then only after acceptable temporary utility services have been provided.

6.2.1 Provide a minimum 72 hours' notice to the Architect and receive written notice to proceed before interrupting any utility.

6.3 Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.

6.4 Locate existing utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

6.4.1 Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

6.5 Protection of Persons and Property
Barricade open excavations occurring as part of this work and post with warning lights and other appropriate barriers.

6.5.1 Operate warning lights as recommended by authorities having jurisdiction.

6.5.2 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

6.6 Traffic
Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

6.6.1 Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

6.6.2 Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

6.7 Utility Locator Service
Notify utility locator service for area where Project is located before beginning earth moving operations.

6.8 Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Division 31 Section "Site Clearing," are in place.

PART 2 – PRODUCTS

7. SOIL MATERIALS

7.1 General
Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations. All borrow soil materials, imported fill, and select fill for low-volume change zone shall be approved by Testing Agency.

7.2 Satisfactory Soil Materials for Imported Fill: All imported fill shall consist of select fill.

7.3 Satisfactory Soil Materials for Select Fill
Select fill shall consist of approved low-volume change (LVC) materials, and shall be approved by the Testing Agency prior to placement.

7.3.1 Select fill used to construct LVC zone will be required beneath floor slabs, trenches, slabs-on-grade, and pavements.

7.3.2 LVC material as specified for use below floor slabs and pavements must consist of material with liquid limit (LL) less than 40 and a plasticity index (PI) between 10 and 20.

7.3.3 Silty gravel (KDOT Grading AB-3) and limestone screenings may also be used for LVC zone material as approved by Geotechnical Engineer.

7.4 Subbase Material
Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

7.5 Base Course
Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

7.6 Bedding Course
Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

7.7 Drainage Course
Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

7.8 Sand: ASTM C33; fine aggregate.

7.9 Impervious Fill
Clayey gravel and sand mixture capable of compacting to a dense state.

8. CONTROLLED LOW-STRENGTH MATERIAL

8.1 Controlled Low-Strength Material
Self-compacting, low-density, flowable concrete material produced from the following:

8.1.1 Portland Cement: ASTM C150, Type I

8.1.2 Fly Ash: ASTM C618, Class C

8.1.3 Normal-Weight Aggregate: ASTM C33

8.1.4 Water: ASTM C94/C94M

8.1.5 Air-Entraining Admixture: ASTM C260

8.2 Produce low-density, controlled low-strength material with the following physical properties:
Compressive Strength: 300 to 400 psi, when tested according to ASTM C495

9. ACCESSORIES

Warning Tape
Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

9.1 Red: Electric

9.2 Yellow: Gas, oil, steam, and dangerous materials

9.3 Orange: Telephone and other communications

9.4 Blue: Water systems

9.5 Green: Sewer systems

PART 3 – EXECUTION

10. PREPARATION

10.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

10.2 Protect and maintain erosion and sedimentation controls during earth moving operations.

10.3 Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

11. DEWATERING

11.1 Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

11.2 Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

11.2.1 Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

12. EXPLOSIVES

Do not use explosives.

13. CONSOLIDATION MONITORING

Provide consolidation monitoring system to measure structural fill settlement as indicated in Geotechnical Report.

14. EXCAVATION, GENERAL

Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

14.1 If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

15. EXCAVATION FOR STRUCTURES

Excavate to indicate elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

15.1 Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

15.2 Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

16. EXCAVATION FOR WALKS AND PAVEMENTS

Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

17. EXCAVATION FOR UTILITY TRENCHES

17.1 Excavate trenches to indicated gradients, lines, depths, and elevations.

17.1.1 Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

17.2 Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

17.2.1 Clearance: 12 inches each side of pipe or conduit.

17.3 Trench Bottoms
Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

17.3.1 For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

17.3.2 For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.

17.3.3 For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

17.3.4 Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

18. SUBGRADE INSPECTION

18.1 Notify Architect and Testing Agency when excavations have reached required subgrade.

18.2 If Architect and Testing Agency determine that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

18.3 Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded ten (10) wheel, tandem-axle dump truck weighing not less than fifteen (15) tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

18.3.1 Completely proof-roll subgrade in one (1) direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

18.3.2 Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect or Testing Agency, and replace with compacted backfill or fill as directed.

18.4 Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

18.5 Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

19. UNAUTHORIZED EXCAVATION

Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation.
Lean concrete fill, with 28-day compressive strength of 2,500 psi, may be used when approved by Architect and Testing Agency.

19.1 Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

20. STORAGE OF SOIL MATERIALS

Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

20.1 Stockpile soil materials away from edge of excavations.

21. BACKFILL

Place and compact backfill in excavations promptly, but not before completing the following:

21.1 Construction below finish grade including, where applicable, subdrainage, damp-proofing, waterproofing, and perimeter insulation

21.2 Recording locations of underground utilities for Record Documents

21.3 Testing and inspecting underground utilities

21.4 Removing concrete formwork

21.5 Removing trash and debris

21.6 Removing temporary shoring and bracing, and sheeting

21.7 Installing permanent or temporary horizontal bracing on horizontally supported walls

21.8 Place backfill on subgrades free of mud, frost, snow, or ice

22. UTILITY TRENCH BACKFILL

22.1 Place backfill on subgrades free of mud, frost, snow, or ice.

22.2 Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

22.3 Trenches under Footings
Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section “Cast-in-Place Concrete”.

22.4 Trenches under Roadways: Provide 4-inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways and pavements. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 03 Section “Cast-in-Place Concrete”.

22.5 Utilities trenches entering the structure from the exterior shall be plugged a minimum of 4 feet on each side of the exterior building foundation wall with compacted natural clay fill or low cement sand mix (2 sack) concrete as approved by Testing Agency.

22.6 Backfill voids with satisfactory soil while removing shoring and bracing.

22.7 Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

22.7.1 Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

22.8 Place and compact final backfill of satisfactory soil to final subgrade elevation.

22.9 Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

23. GENERAL SOIL FILL

23.1 Site preparation procedures shall be applied a minimum of 1 foot laterally beyond all edges of footing foundations or pavements for each foot of vertical fill required, or a minimum of 5 feet beyond the edge of building slabs-on-grade or pavements, whichever is greater.

23.2 Ground Surface Preparation
Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.

23.3 Plow, scarify, bench, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so fill material will bond with existing material.

23.4 Following completion of stripping and grading operations, and prior to any scarification, exposed subgrades shall be proof-rolled with several passes, in mutually perpendicular directions, using rubber-tired heavy construction equipment weighing a minimum of 25 tons. Suitable proof-rolling equipment would include such items as a fully loaded dump truck or scraper. Qualified geotechnical personnel shall observe proof-rolling operations. Any area which cannot be satisfactorily densified in-place shall be removed and replaced with approved, properly compacted fill material.

23.4.1 All unsuitable materials, including materials that become soft and yielding during proof-rolling operations, shall be removed and replaced with acceptable and properly compacted fill materials.

23.5 Following completion of proof-rolling activities and correction of all problem areas, exposed subgrades shall be scarified to a minimum depth of 8 inches then adjusted in moisture content and recompacted to required density, as approved by Testing Agency.

23.6 Place fill material in layers to required elevations for each location listed below:

23.6.1 Under building slabs and trenches, use imported fill material and select fill material for LVC zone. Clean sand is unacceptable as a select fill material.

23.6.2 Under pavements and walks, use satisfactory fill material and stabilized LVC zone.

23.6.3 Under grass and planted areas, use satisfactory soil materials.

23.7 All compacted fill shall be placed under controlled conditions and placed under observation of Testing Agency representative.

23.8 Place soil fill on subgrades free of mud, frost, snow, or ice.

24. LOW-VOLUME CHANGE ZONE UNDER SLABS-ON-GRADE

24.1 Scarified subgrade and fill material beneath floor slabs shall be adjusted in moisture content and compacted as specified and as indicated in Geotechnical Exploration Report.

24.1.1 The portions of fill beneath the LVC zone shall consist of general structural fill as defined in Geotechnical Exploration Report.

24.2 The approximately upper 18 inches below the floor slab shall consist of a low-volume change zone as specified and as approved by Geotechnical Engineer and Testing Agency. The exact depth of the low volume change zones shall be verified with the Soil Testing Lab.

24.3 General structural fill and the low-volume change zone shall extend a minimum of five (5) feet beyond the building slab.

25. PAVEMENT STABILIZED SUBGRADE

25.1 General

Stabilized subgrade consists of placing stabilized materials, in layers to specified thickness and compacting to specified density with proper moisture content, over subgrade surface supporting pavements.

25.2 Stabilized Subgrade

A low-volume change zone shall be constructed below pavements and gravel. LVC zone shall be a minimum thickness of 9 inches below pavements. Exact depth shall be verified with Soil Testing Lab.

25.3 LVC zone shall be constructed of materials acceptable to Testing Agency and Geotechnical Engineer.

25.4 LVC zone materials, including percentage of stabilization material, shall be approved by Testing Agency.

25.4.1 A stabilized LVC zone of 9 inches minimum depth shall be placed under all pavements and compacted to a minimum of 95 percent of the maximum dry unit weight determined by ASTM D698 as approved by Testing Agency.

25.4.2 The moisture content shall also be controlled to between optimum and 4 percent above the optimum moisture content as approved by Testing Agency.

25.5 The stabilized LVC zone under pavements shall extend a minimum distance of one (1) foot beyond the edge of driveways, pavements, and gravel.

26. SOIL MOISTURE CONTROL

26.1 Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction.

26.1.1 Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

26.1.2 Remove and replace, or scarify and air dry, otherwise satisfactory soil material that is too wet to compact to specified dry unit weight.

26.2 Moisture content shall be controlled during construction based on an acceptable range of moisture content as determined by Standard Proctor, ASTM D698.

26.3 Moisture content shall be as approved by Testing Agency and Geotechnical Engineer.

27. COMPACTION OF SOIL BACKFILLS AND FILLS

27.1 Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

27.2 Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

27.3 Compact soil materials to not less than the percentages of maximum dry unit weight according to ASTM D698 (Standard Proctor) as approved by Testing Agency and Geotechnical Engineer.

27.3.1 Compaction operations shall be as recommended by geotechnical engineer for various site conditions that may be encountered on site.

27.4 Care shall be taken to minimize wetting or drying of the exposed soil during construction. All loosened or disturbed material, or extremely wet or dry material, shall be removed from the excavation prior to placing reinforcing steel and concrete.

28. GRADING

28.1 General

Uniformly grade areas to a smooth surface, free of irregular surface changes.
Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

28.1.1 Provide a smooth transition between adjacent existing grades and new grades.

28.1.2 Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

28.2 Site Rough Grading

Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

28.2.1 Turf or Unpaved Areas: Plus or minus 1 inch

28.2.2 Walks: Plus or minus 1 inch

28.2.3 Pavements: Plus or minus 1/2-inch

28.3 Grading inside Building Lines
Finish subgrade to a tolerance of 1/2-inch when tested with a 10-foot straightedge.

28.4 Positive Slope
Topsoil and fill material shall be sloped at a minimum grade of 2 percent for a minimum distance of 10 feet to provide positive drainage away from building foundations and slabs-on-grade.

29. SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

29.1 Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

29.2 On prepared subgrade, place subbase course and base course under pavements and walks as follows:

29.2.1 Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

29.2.2 Place base course material over subbase course under hot-mix asphalt pavement.

29.2.3 Shape subbase course and base course to required crown elevations and cross-slope grades.

29.2.4 Place subbase course and base course 6 inches or less in compacted thickness in a single layer.

29.2.5 Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

29.2.6 Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698.

29.3 Pavement Shoulders
Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D698.

30. GRANULAR CUSHION COURSE UNDER CONCRETE SLABS-ON-GRADE

30.1 Place granular cushion course on subgrades free of mud, frost, snow, or ice.

30.2 On prepared subgrade, place and compact granular cushion course under cast-in-place concrete slabs-on-grade as indicated in Geotechnical Report.

31. FIELD QUALITY CONTROL

31.1 Special Inspections

Contractor shall engage a qualified special inspector or Testing Agency to perform the following special inspections:

31.1.1 Determine prior to placement of fill that site has been prepared in compliance with requirements.

31.1.2 Determine that fill material and maximum lift thickness comply with requirements.

31.1.3 Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

31.2 Testing Agency

Contractor shall engage GSI Engineering, LLC to perform tests and inspections unless otherwise specifically approved by the Architect.

31.3 Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

31.4 Footing Subgrade

At footing subgrades perform at least 1 test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect and Testing Agency.

31.5 Testing agency shall test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2922, and ASTM D2937, as applicable. Tests will be performed at the following locations and frequencies:

31.5.1 Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.

31.5.2 Foundation Wall Backfill: At each compacted backfill layer, at least one (1) test for every 100 feet or less of wall length, but no fewer than 2 tests.

31.5.3 Trench Backfill: At each compacted initial and final backfill layer, at least one (1) test for every 150 feet or less of trench length, but no fewer than 2 tests.

31.6 When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

32. PROTECTION

32.1 Protecting Graded Areas
Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

32.2 Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

32.2.1 Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

32.3 Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

32.3.1 Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

33. DISPOSAL OF SURPLUS AND WASTE MATERIALS

Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

End of Section 022100

SECTION 022113

ROUGH GRADING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Excavating topsoil

1.1.2 Excavating subsoil

1.1.3 Cutting, grading, filling, rough contouring, and compacting site

1.2 Related Sections

1.2.1 Section 020051 "Geotechnical Data"

1.2.2 Section 021513 "Soils for Earthwork" for soils for fill

1.2.3 Section 021516 "Aggregates for Earthwork" for aggregates for fill

1.2.4 Section 021600 "Site Clearing"

1.2.5 Section 022115 "Excavation" for building excavation

1.2.6 Section 022116 "Trenching" for trenching and backfilling for utilities

1.2.7 Section 022117 "Fill" for general building area backfilling

2. REFERENCES

2.1 American Association of State Highway and Transportation Officials (AASHTO)
AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a Ten (10) Pound Rammer and an 18-Inch Drop.

2.2 ASTM International

2.2.1 ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

2.2.2 ASTM D698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).

2.2.3 ASTM D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

2.2.4 ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).

2.2.5 ASTM D2167 – Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

2.2.6 ASTM D2419 – Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

2.2.7 ASTM D2434 – Standard Test Method for Permeability of Granular Soils (Constant Head).

2.2.8 ASTM D2922 – Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

2.2.9 ASTM D3017 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

3. SUBMITTALS

3.1 Samples
Submit, in air-tight containers, 10-pound sample of each type of fill to testing laboratory.

3.2 Materials Source: Submit name of imported materials suppliers.

3.3 Manufacturer's Certificate: Certify products meet or exceed specified requirements.

4. CLOSEOUT SUBMITTALS

Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

5. QUALITY ASSURANCE

Perform Work in accordance with Section 002132 "Geotechnical Data" and the City of Wichita Standard Specification Section 2201. The more stringent requirements shall apply herein.

PART 2 – PRODUCTS

6. MATERIALS

6.1 Topsoil: Type S5 as specified in Section 021513 "Soils for Earthwork"

6.2 Subsoil Fill: As specified in Section 021513 "Soils for Earthwork"

6.3 Structural Fill: As specified in Section 021513 "Soils for Earthwork"

6.4 Granular Fill: As specified in Section 021513 "Soils for Earthwork"

PART 3 – EXECUTION

7. EXAMINATION

7.1 Verify existing conditions before starting work.

7.2 Verify survey benchmark and intended elevations for the Work are as indicated on Drawings.

8. PREPARATION

8.1 Call Local Utility Line Information service at 811 not less than three (3) working days before performing Work.

8.1.1 Request underground utilities to be located and marked within and surrounding construction areas.

8.2 Identify required lines, levels, contours, and datum.

8.3 Notify utility company to remove and relocate utilities.

8.4 Protect utilities indicated to remain from damage.

8.5 Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.

8.6 Protect bench marks, survey control point, and existing site elements indicated to remain from excavating equipment and vehicular traffic.

9. TOPSOIL EXCAVATION

9.1 Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

9.2 Do not excavate wet topsoil.

9.3 Stockpile in area designated on site and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal. Contractor shall determine and not exceed the local requirements regarding stockpile height.

9.4 Remove excess topsoil not intended for reuse, from site.

10. SUBSOIL EXCAVATION

10.1 Excavate subsoil from areas to be further excavated, relandscaped, or regraded.

10.2 Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

10.3 When excavating through roots, perform Work by hand and cut roots with sharp axe.

10.4 Remove excess subsoil not intended for reuse, from site.

10.5 Benching Slopes: Horizontally bench existing slopes greater than 1 unit vertical in five (5) units horizontal (5V:1H) to key placed fill material to slope to provide firm bearing.

10.6 Stability: Replace damaged or displaced subsoil as specified for fill.

11. FILLING

11.1 Fill areas to contours and elevations with unfrozen materials.

11.2 Place fill material in continuous layers and compact in accordance with Section 020051 “Geotechnical Data”

11.3 Maintain optimum moisture content of fill materials to attain required compaction density.

11.4 Slope grade away from building minimum five (5) percent slope for minimum distance of ten (10) feet, unless otherwise on Drawings.

11.5 Make grade changes gradual. Blend slope into level areas.

11.6 Repair or replace items indicated to remain damaged by excavation or filling.

12. TOLERANCES

Top Surface of Subgrade: Plus or minus 1/10-foot from required elevation.

13. FIELD QUALITY CONTROL

13.1 Perform laboratory material tests, as required, in accordance with 020051 "Geotechnical Data"

13.2 Perform in place compaction tests in accordance with the following:

13.2.1 Density Tests: ASTM D2922

13.2.2 Moisture Tests: ASTM D3017

13.3 When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

13.4 Frequency of Tests

13.4.1 Roadbed: Two (2) tests minimum per lift, every 5,000 square feet.

13.4.2 Fills and Embankments: Two (2) tests minimum per lift, every 2,500 square feet.

13.4.3 See the following Sections for testing requirements related to fill around site structures and utilities:

A. Section 022117 "Fill"

B. Section 023306 "Site Water Utility Distribution Piping"

C. Section 023310 "Sanitary Sewerage Piping"

D. Section 023420 "Stormwater Conveyance"

End of Section 022113

SECTION 022115

EXCAVATION

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Excavating for building foundations

1.1.2 Excavating for sidewalks

1.1.3 Excavating for slabs-on-grade

1.1.4 Excavating for site structures

1.1.5 Excavating for landscaping

1.2 Related Requirements

1.2.1 Section 020051 “Geotechnical Data.”

1.2.2 Section 021513 “Soils for Earthwork”

1.2.3 Section 021516 “Aggregates for Earthwork”

1.2.4 Section 022113 “Rough Grading”

1.2.5 Section 022116 “Trenching”

1.2.6 Section 022117 “Fill”

2. SUBMITTALS

2.1 Shop Drawings

2.1.1 Excavation Protection Plan

A. Describe sheeting, shoring, and bracing materials and installation, as required, to protect excavations and adjacent structures and property.

B. Submit signed and sealed Shop Drawings with design calculations and assumptions to support plan.

2.2 Field Quality-Control Reports: For Contractor-furnished tests and inspections.

2.3 Qualifications Statement: For licensed professional.

3. QUALITY ASSURANCE

Licensed Professionals Qualifications: Professional Engineer experienced in design of specified Work and licensed in State of Kansas.

PART 2 – PRODUCTS

4. PERFORMANCE REQUIREMENTS

4.1 Perform Work according to:

4.1.1 The City of Wichita Standard Specifications and adopted building codes.

4.1.2 Occupational Safety and Health Administration (OSHA) 29 CFS, Part 1926, subpart P, “Excavations” and its appendices.

PART 3 – EXECUTION

5. PREPARATION

5.1 Call local utility line information service at 811 not less than three (3) working days before performing Work.

5.2 Request that underground utilities be located and marked within and immediately surrounding construction areas.

5.3 Identify required lines, levels, contours, and data.

5.4 Existing Utilities

5.4.1 Notify affected utility company to remove and relocate utilities.

5.4.2 Protect from damage utilities indicated to remain.

5.5 Protect plant life, lawns, rock outcroppings, and other features designated to remain as portion of final landscaping.

5.6 Protect benchmarks, survey control points, and existing site elements indicated to remain from excavating equipment and vehicular traffic.

5.7 Do not close or obstruct roadways, sidewalks, hydrants, etc., without permits.

5.8 Erect and maintain temporary barriers and security devices, including warning signs, warning lights, and similar measures, for protection of public, Owner, and existing improvements indicated to remain.

6. EXCAVATION

6.1 Underpin adjacent structures which may be damaged by excavation Work.

6.2 Excavate subsoil to accommodate building foundations, slabs-on-grade, paving, site structures, and construction operations.

6.3 Compact disturbed load-bearing soil in direct contact with foundations to original bearing capacity as specified in Section 212323 “Fill.”

6.4 Slope banks with machine to angle of repose or less until shored.

6.5 Do not interfere with 45-degree bearing splay of foundations.

6.6 Grade top perimeter of excavation to prevent surface water from draining into excavation.

6.7 Trim excavation and remove loose matter.

6.8 Removal of Deleterious Materials

6.8.1 Remove lumped subsoil, boulders, and rock up to 1/3-cubic yard, measured by volume.

6.8.2 Remove larger material as specified in Section 022117 "Fill."

6.8.3 Remove excess and unsuitable material from Site.

6.9 Notify Architect/Engineer of unexpected subsurface conditions.

6.10 Correct over-excavated areas as specified in Section 022117 "Fill."

6.10.1 Remove excavated material not intended for reuse from site.

6.11 Repair or replace items indicated to remain that have been damaged by excavation.

7. FIELD QUALITY CONTROL

7.1 Tests and Inspections
Request visual inspection of bearing surfaces by Architect/Engineer and/or inspection agency before installing subsequent Work.

7.2 Prepare test and inspection reports.

8. PROTECTION

8.1 Prevent displacement or loose soil from falling into excavation and maintain soil stability.

8.2 Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

8.3 Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that may be created by earth operations.

End of Section 022115

SECTION 022116

TRENCHING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Excavating trenches for utilities from 5 feet outside building to utility service.

1.1.2 Compacted fill from top of utility bedding to subgrade elevations.

1.1.3 Backfilling and compaction.

1.2 Related Sections

1.2.1 Section 020051 “Geotechnical Data.”

1.2.2 Section 033000 “Cast-In-Place Concrete” for concrete materials.

1.2.3 Section 021513 “Soils for Earthwork” for soils for fill.

1.2.4 Section 021516 “Aggregates for Earthwork” for aggregates for fill.

1.2.5 Section 022113 “Rough Grading” for topsoil and subsoil removal from site surface.

1.2.6 Section 022115 “Excavation” for general building excavation.

1.2.7 Section 022117 “Fill” for general backfilling.

1.2.8 Section 023306 “Site Water Utility Distribution Piping” for piping materials, fittings, and valves.

1.2.9 Section 023311 “Sanitary Utility Sewerage Piping” for sanitary sewer piping and bedding from building to utility service.

1.2.10 Section 023420 “Stormwater Conveyance” for drainage facilities to collect and provide for flow of stormwater.

2. REFERENCES

2.1 Note: Not all references listed below are referred to directly within this Section.

2.2 American Association of State Highway and Transportation Officials (AASHTO)
AASHTO T180 – Standard Specification for Moisture-Density Relations of Soils Using a 10 Pound Rammer and an 18-Inch Drop.

2.3 ASTM International

2.3.1 ASTM D698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3)

2.3.2 ASTM D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

2.3.3 ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3)

2.3.4 ASTM D2167 – Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

2.3.5 ASTM D2922 – Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

2.3.6 ASTM D3017 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

3. DEFINITIONS

Utility: Any buried pipe, duct, conduit, or cable.

4. SUBMITTALS

4.1 Excavation Protection Plan
Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

4.2 Product Data: Submit data for geotextile fabric indicating fabric and construction.

4.3 Samples
Submit, in air-tight containers, 10-pound sample of each type of fill to testing laboratory.

4.4 Materials Source: Submit name of imported fill materials suppliers.

4.5 Manufacturer's Certificate: Certify products meet or exceed specified requirements.

5. QUALITY ASSURANCE

Perform Work in accordance with Section 003132 "Geotechnical Data" and the City of Wichita Excavation and Trenching Standard Specifications. The stricter requirements shall apply herein.

6. QUALIFICATIONS

Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kansas.

7. FIELD MEASUREMENTS

Verify field measurements prior to fabrication.

8. COORDINATION

Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 – PRODUCTS

9. FILL MATERIALS

9.1 Subsoil Fill: As specified in Section 021513 "Soils for Earthwork"

9.2 Structural Fill: As specified in Section 021513 "Soils for Earthwork"

9.3 Granular Fill: As specified in Section 021516 "Aggregates for Earthwork"

9.4 Concrete: Lean concrete.

PART 3 – EXECUTION

10. LINES AND GRADES

10.1 Lay pipes to lines and grades indicated on Drawings.

10.1.1 Architect/Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

10.2 Use laser-beam instrument with qualified operator to establish lines and grades.

11. PREPARATION

11.1 Call Local Utility Line Information service at 811 not less than three (3) working days before performing Work.

11.1.1 Request underground utilities to be located and marked within and surrounding construction areas.

11.2 Identify required lines, levels, contours, and datum locations.

11.3 Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.

11.4 Protect bench marks, existing structures, and existing site elements indicated to remain from excavating equipment and vehicular traffic.

11.5 Maintain and protect above- and below-grade utilities indicated to remain.

11.6 Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

12. TRENCHING

12.1 Excavate subsoil required for utilities to utility service.

12.2 Remove lumped subsoil, boulders, and rock.

12.3 Perform excavation to within 24 inches of existing utility service, or in accordance with utility's requirements.

12.4 Do not advance open trench more than 200 feet ahead of installed pipe, or in accordance with utility's requirements.

12.5 Cut trenches to width indicated on Drawings, or in accordance with utility's requirements. Remove water or materials that interfere with Work.

12.6 Excavate bottom of trenches maximum two (2) feet wider than outside diameter of pipe, or in accordance with utility's requirements.

12.7 Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utilities.

12.8 Do not interfere with 45-degree bearing splay of foundations.

12.9 When Project conditions permit, slope side walls of excavation starting two (2) feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this Section.

12.10 When subsurface materials at bottom of trench are loose or soft, excavate to greater depth until suitable material is encountered.

12.11 Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type S1 and compact to density equal to or greater than requirements for subsequent backfill material.

12.12 Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

12.13 Correct over-excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

12.14 Remove excess subsoil not intended for reuse, from site.

12.15 Stockpile excavated material in area designated on site.

13. SHEETING AND SHORING

13.1 Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

13.2 Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

13.3 Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

13.4 Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing in accordance with the utility's requirements and/or the following Sections, as applicable:

13.4.1 Section 023306 "Site Water Utility Distribution Piping"

13.4.2 Section 023310 "Sanitary Sewerage Piping"

13.4.3 Section 023420 "Stormwater Conveyance"

14. BACKFILLING

14.1 Backfill trenches to contours and elevations.

14.2 Employ placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, etc.

14.3 Maintain optimum moisture content of fill materials to attain required compaction density.

14.4 Do not leave more than 50 feet of trench open at end of working day, or in accordance with utility's requirements.

14.5 Protect open trench to prevent danger to Owner and the public.

15. FIELD QUALITY CONTROL

15.1 Perform laboratory material tests in accordance with the utility's requirements and/or the following Sections, as applicable:

15.1.1 Section 023306 "Site Water Utility Distribution Piping"

15.1.2 Section 023310 "Sanitary Sewerage Piping"

15.1.3 Section 023420 "Stormwater Conveyance"

15.2 Perform in place compaction tests in accordance with the utility's requirements and/or the following Sections, as applicable:

15.2.1 Section 023306 "Site Water Utility Distribution Piping"

15.2.2 Section 023310 "Sanitary Sewerage Piping"

15.2.3 Section 023420 "Stormwater Conveyance"

16. PROTECTION OF FINISHED WORK

Reshape and re-compact fills subjected to vehicular traffic during construction.

End of Section 022116

SECTION 022117

FILL

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Backfilling building perimeter to subgrade elevations

1.1.2 Backfilling site structures to subgrade elevations

1.1.3 Fill under paving

1.1.4 Fill for over-excavation

1.2 Related Requirements

1.2.1 Section 020051 “Geotechnical Data”

1.2.2 Section 033000 “Cast-in-Place Concrete” for concrete materials.

1.2.3 Section 021513 “Soils for Earthwork” for soils for fill.

1.2.4 Section 021516 “Aggregates for Earthwork” for aggregates for fill.

1.2.5 Section 022113 “Rough Grading” for site filling.

1.2.6 Section 022115 “Excavation” for backfilling of building foundations and utilities within building perimeter.

1.2.7 Section 022116 “Trenching” for backfilling of utility trenches.

1.2.8 Section 023306 “Site Water Utility Distribution Piping” for pipe materials, fittings, and valves.

1.2.9 Section 023310 “Sanitary Sewerage Piping” for pipe materials and accessories normally encountered with gravity sanitary building piping.

1.2.10 Section 023420 “Stormwater Conveyance” for drainage facilities to collect and provide for flow of stormwater.

2. REFERENCE STANDARDS

2.1 Note: Not all references listed below are referred to directly within this Section.

2.2 American Association of State Highway and Transportation Officials (AASHTO): AASHTO T 180 – Standard Method of Test for Moisture-Density Relations of Soils Using a Ten (10) Pound Rammer and an 18-Inch Drop.

2.3 ASTM International

2.3.1 ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3)

2.3.2 ASTM D1556/D1556M – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method

2.3.3 ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3)

2.3.4 ASTM D2167 – Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

2.3.5 ASTM D6031/D6031M – Standard Test Method for Logging In Situ Moisture Content and Density of Soil and Rock by the Nuclear Method in Horizontal, Slanted, and Vertical Access Tubes

2.3.6 ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

3. SUBMITTALS

3.1 Product Data
Submit manufacturer information for geotextile fabric, indicating fabric and construction.

3.2 Samples
Submit, in airtight containers, one 10-pound sample of each type of fill to testing laboratory.

3.3 Materials Source: Submit name of imported materials suppliers.

3.4 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

3.5 Field Quality-Control Submittals
Indicate results of Contractor-furnished tests and inspections.

4. QUALITY ASSURANCE

Perform Work according to Section 002132 "Geotechnical Data" and the IBC 2018 standards. The more stringent requirements shall apply herein.

PART 2 – PRODUCTS

5. MATERIALS

5.1 Subsoil Fill: As specified in Section 021513 "Soils for Earthwork"

5.2 Structural Fill: As specified in Section 021513 "Soils for Earthwork"

5.3 Granular Fill: Type as specified in Section 021516 "Aggregates for Earthwork"

PART 3 – EXECUTION

6. EXAMINATION

6.1 Verify that subdrainage, damp-proofing, and waterproofing installations have been inspected.

6.2 Verify that underground tanks, as applicable, are anchored to their own foundations to avoid flotation after backfilling.

6.3 Verify structural integrity of unsupported walls to support loads imposed by fill.

7. PREPARATION

7.1 Compact subgrade to specified density requirements for subsequent backfill materials.

7.2 Soft Subgrade

7.2.1 Cut out soft areas of subgrade not capable of compaction in place.

7.2.2 Backfill with structural fill and compact to density equal to or greater than specified requirements for subsequent fill material.

7.3 Scarify subgrade surface per Section 002132 “Geotechnical Data”

8. BACKFILLING

8.1 Backfill areas to contours and elevations.

8.2 Systematically backfill to allow maximum time for natural settlement.

8.3 Do not backfill over porous, wet, frozen, or spongy subgrade surfaces, and do not backfill with frozen materials.

8.4 Geotextile
Place geotextile fabric prior to placing subsequent fill materials, as indicated on Drawings.

8.5 Place fill material in continuous layers and compact according to Section 002132 “Geotechnical Data”.

8.6 Use placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, etc.

8.7 Maintain optimum moisture content of fill materials to attain required compaction density.

8.8 Structures

8.8.1 Backfill against supported foundation walls.

8.8.2 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

8.8.3 Slope grade away from building minimum 5 percent slope for minimum distance of 10 feet, unless otherwise indicated on Drawings.

8.9 Make gradual grade changes and blend slope into level areas.

8.10 Remove surplus backfill materials from site.

8.11 Leave fill material stockpile areas free of excess fill materials.

9. FIELD QUALITY CONTROL

9.1 Inspecting
Request visual inspection of bearing surfaces by Architect/Engineer and/or inspection agency before installing subsequent Work.

9.2 Testing

9.2.1 Laboratory Material Testing: Comply with Section 002132 "Geotechnical Data"

9.2.2 In-Place Compaction Testing
Perform in accordance with Section 002132 "Geotechnical Data". Use the following schedule only in the event these items are unspecified in Section 002132 "Geotechnical Data"

A. Density Tests: Comply with ASTM D6938.

B. Moisture Tests: Comply with ASTM D6031/D6031M.

9.2.3 If tests indicate that Work does not meet specified requirements, remove Work, replace, compact, and retest.

9.2.4 Testing Frequency
Shall be in accordance with Section 002132 "Geotechnical Data".
Use the following schedule only in the event these items are unspecified in "Mechanical Data" Sections.

A. Structural Backfill: 2 tests minimum per lift, every 2,500 square feet, or as required.

B. See the following Sections for testing requirements related to rough grading and utilities:

1) Section 022113 "Rough Grading"
2) Section 023306 "Site Water Utility Distribution Piping"
3) Section 023310 "Sanitary Sewerage Piping"
4) Section 234200 "Stormwater Conveyance"

9.2.5 Proof-roll compacted fill surfaces per Section 002132 "Geotechnical Data".

10. PROTECTION

Reshape and recompact fills subjected to vehicular traffic during construction.

End of Section 022117

SECTION 022118

ASPHALT PAVING

PART 1 – GENERAL

1. ASPHALT PAVING

Asphalt paving shall be in accordance with Section 020051 "Geotechnical Data," the City of Wichita Bituminous Surfacing Standard Specification, and the Kansas Department of Transportation (KDOT) Standard Specifications, Division 600.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

End of Section 022118

SECTION 022713

PARKING BUMPERS

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Precast concrete parking bumpers

1.1.2 Parking bumper anchors

1.2 Related Requirements

1.2.1 Section 020051 “Geotechnical Report”

1.2.2 Section 022118 “Asphalt Paving”

2. REFERENCE STANDARDS

2.1 ASTM International

2.1.1 ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

2.1.2 ASTM C33 – Standard Specification for Concrete Aggregates.

2.1.3 ASTM C150 – Standard Specification for Portland Cement.

2.1.4 ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

2.1.5 ASTM C330 – Standard Specification for Lightweight Aggregates for Structural Concrete.

2.2 Forest Stewardship Council (FSC)
FSC Guidelines – Forest Stewardship Council Guidelines

3. COORDINATION

Coordinate the Work with pavement placement and parking striping.

4. SUBMITTALS

Product Data: Submit unit configuration, dimensions.

5. QUALITY ASSURANCE

5.1 Perform Work in accordance with Kansas Department of Transportation (KDOT) standards.

5.2 Maintain one (1) copy of each document on site.

PART 2 – PRODUCTS

6. CONCRETE BUMPERS

6.1 Cement: ANSI/ASTM C150, Portland Type I - Normal; gray color.

6.2 Concrete Materials: ASTM C33; water and sand.

6.3 Reinforcing Steel
ASTM A615, 60 ksi yield grade, deformed billet bars, uncoated finish, strength and size commensurate with precast unit design.

6.4 Air Entrainment Admixture: ANSI/ASTM C260.

6.5 Concrete Mix: Minimum 5,000 psi, 28-day strength, air entrained to 5 to 7 percent.

6.6 Use rigid molds, constructed to maintain precast units uniform in shape, size and finish. Maintain consistent quality during manufacture.

6.7 Embed reinforcing steel, and drill or sleeve for 2 dowels.

6.8 Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.

6.9 Minor patching in plant is acceptable, providing appearance of units is not impaired.

7. CONFIGURATION

Nominal Size: Suited to meet site conditions.

8. ACCESSORIES

Dowels: Steel, unfinished; 1/2-inch diameter, 12 inches long, pointed tip.

PART 3 – EXECUTION

9. INSTALLATION

9.1 Install units without damage to shape or finish. Replace or repair damaged units.

9.2 Install units in alignment with adjacent work.

9.3 Fasten units in place with two (2) dowels for each bumper.

End of Section 022713

SECTION 022921

SEEDING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes
- 1.1.1 Fertilizing
- 1.1.2 Seeding
- 1.1.3 Hydroseeding
- 1.1.4 Mulching
- 1.1.5 Maintenance

1.2 Related Sections
- 1.2.1 Section 022923 “Sodding”
- 1.2.2 Section 022930 “Plants”

2. REFERENCES

ASTM International: ASTM C602 – Standard Specification for Agricultural Liming Materials

3. DEFINITIONS

Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

4. SUBMITTALS

4.1 Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

4.2 Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

5. CLOSEOUT SUBMITTALS

Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

6. QUALITY ASSURANCE

6.1 Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

6.2 Perform Work according to State of Kansas Highways standards.

6.3 Maintain one (1) copy of each document on site.

7. QUALIFICATIONS

7.1 Seed Supplier
Company specializing in manufacturing products specified in this Section with minimum Three (3) years' documented experience.

7.2 Installer
Company specializing in performing work of this Section with minimum 3 years' documented experience.

8. DELIVERY, STORAGE, AND HANDLING

8.1 Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

8.2 Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

9. MAINTENANCE SERVICE

Maintain seeded areas for 3 months from date of Substantial Completion.

PART 2 – PRODUCTS

10. SEED MIXTURE

10.1 Suppliers: Star Seed Company, or approved equal.

10.2 Furnish materials according to State of Kansas Highways standards.

10.3 Description
10.3.1 As indicated in Plant Schedule on Drawings.
10.3.2 Mix percentage of each seed variety will vary by lot.

11. ACCESSORIES

11.1 Mulching Material
Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

11.2 Fertilizer
Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil, as indicated in analysis.

11.3 Lime
ASTM C602, Class T or Class O agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

11.4 Water
Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

11.5 Erosion Fabric: Jute matting, open weave.

11.6 Herbicide: As required to combat type of weeds encountered.

11.7 Stakes: Softwood lumber, chisel pointed.

11.8 String: Inorganic fiber.

12. SOURCE QUALITY CONTROL

12.1 Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

12.2 Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.

12.3 Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 3 – EXECUTION

13. EXAMINATION

13.1 Administrative Requirements: Verification of existing conditions before starting Work.

13.2 Verify prepared soil base is ready to receive the Work of this Section.

14. FERTILIZING

14.1 Apply lime at application rate recommended by soil analysis. Work lime into top 6 inches of soil.

14.2 Apply fertilizer at application rate recommended by soil analysis.

14.3 Apply after smooth raking of topsoil and prior to roller compaction.

14.4 Do not apply fertilizer at same time or with same machine used to apply seed.

14.5 Mix fertilizer thoroughly into upper 2 inches of topsoil.

14.6 Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

15. SEEDING

15.1 Apply seed at rate of 6 pounds per 1,000 square feet evenly in two (2) intersecting directions. Rake in lightly.

15.2 Do not seed areas in excess of that which can be mulched on same day.

15.3 Planting Season: Refer to Section 022930 “Plants”.

15.4 Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.

15.5 Roll seeded area with roller not exceeding 112 pounds per linear foot.

15.6 Immediately following seeding and compacting, apply mulch to thickness of 1/8-inch. Maintain clear of shrubs and trees.

15.7 Apply water with fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

16. HYDROSEEDING

16.1 Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate of six (6) pounds per 1,000 square feet evenly in one (1) pass.

16.2 After application, apply water with fine spray immediately after each area has been hydroseeded. Saturate to 4 inches of soil and maintain moisture levels 2 to 4 inches.

17. SEED PROTECTION

17.1 Identify seeded areas with stakes and string around area periphery. Set string height to twelve (12) inches. Space stakes at five (5) feet on center.

17.2 Cover seeded slopes where grade is four (4) inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

17.3 Lay fabric smoothly on surface, bury top end of each section in 6-inch-deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.

17.4 Secure outside edges and overlaps at 36-inch intervals with stakes.

17.5 Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

17.6 At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

18. MAINTENANCE

18.1 Mow grass at regular intervals to maintain at maximum height of 2-1/2 inches. Do not cut more than one-third of grass blade at each mowing. Perform first mowing when seedlings are 40 percent higher than desired height.

18.2 Neatly trim edges and hand clip where necessary.

18.3 Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.

18.4 Water to prevent grass and soil from drying out.

18.5 Roll surface to remove minor depressions or irregularities.

18.6 Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

18.7 Immediately reseed areas showing bare spots.

18.8 Repair washouts or gullies.

18.9 Protect seeded areas with warning signs during maintenance period.

19. SCHEDULE

Refer to Drawings for Schedule.

End of Section 022921

SECTION 022923

SODDING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Preparation of subsoil

1.1.2 Placement of topsoil

1.1.3 Fertilization

1.1.4 Sod installation

1.1.5 Maintenance

1.2 Related Requirements

1.2.1 Section 022117 “Fill” for rough grading of site

1.2.2 Section 021513 “Soils for Earthwork” for topsoil material

1.2.3 Section 022930 “Plants” for interior and exterior landscaping

2. DEFINITIONS

Weeds: Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

3. REFERENCE STANDARDS

3.1 ASTM International
ASTM C602 – Standard Specification for Agricultural Liming Materials

3.2 Turfgrass Producers International (TPI)
TPI – Guideline Specifications to Turfgrass Sodding

4. SUBMITTALS

4.1 Product Data

4.1.1 Submit sod producer’s information for sod grass species.

4.1.2 Submit manufacturer information for fertilizer, mulch, and other accessories.

4.2 Samples

4.2.1 Submit samples of topsoil proposed.

4.2.2 Forward samples to approved testing laboratory in sealed containers to prevent contamination.

4.3 Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

4.4 Sod Producer’s Certificate
Certify that sod grass meets or exceeds specified requirements.

4.5 Test and Evaluation Reports
Indicate topsoil nutrient and pH levels, with recommended soil supplements and application rates.

4.6 Source Quality-Control Submittals: Indicate results of factory tests and inspections.

4.7 Qualifications Statements
4.7.1 Submit qualifications for sod producer, manufacturer, and installer.

4.7.2 Submit sod producer's approval of installer.

5. CLOSEOUT SUBMITTALS

Operation and Maintenance Data

5.1 Submit maintenance instructions, cutting method, and maximum grass height.

5.2 Submit fertilizer types, application frequency, and recommended coverage.

6. QUALITY ASSURANCE

6.1 Sod
Ensure root development capable of supporting its own weight without tearing when suspended vertically by holding upper two (2) corners.

6.2 Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a minimum record of successful grass establishment of five (5) years.

6.3 Installer's Field Supervision
Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Delivery
Harvest, deliver, store, and handle sod according to requirements of the American Sod Producers Association's "Specifications for Turfgrass Sod Materials and Transplanting and Installation"

7.2 Inspection
Accept materials on site in manufacturer's original packaging and inspect for damage.

7.3 Store materials according to manufacturer instructions.

7.4 Protection
7.4.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

7.4.2 Protect exposed roots from dehydration.

7.4.3 Provide additional protection according to manufacturer instructions.

8. AMBIENT CONDITIONS

Minimum Conditions: Do not place sod when temperature is lower than 32 degrees F.

PART 2 – PRODUCTS

9. SOD

9.1 Description

9.1.1 Cultivated grass sod with strong fibrous root system, free of stones and burned or bare spots.

9.1.2 Grade: Field grown.

9.1.3 Type: As indicated in Plant Schedule on Drawings.

9.1.4 Weed Density: No more than 5 weeds per 1,000 square feet.

9.1.5 Percentage Grass Type: As indicated in Plant Schedule on Drawings.

9.2 Harvesting of Sod: Machine-cut sod and load on pallets according to TPI.

10. MATERIALS

Topsoil: Excavated from site and free of weeds.

11. ACCESSORIES

11.1 Fertilizer

11.1.1 Grade: Commercial.

11.1.2 Description

As recommended for grass, with 50 percent of elements derived from organic sources.

11.1.3 Proportions: As necessary to eliminate deficiencies of topsoil.

11.2 Water

Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of grass.

PART 3 – EXECUTION

12. EXAMINATION

Verify that prepared soil base is ready to receive Work of this Section.

13. INSTALLATION

13.1 Subsoil Preparation

13.1.1 Eliminate uneven areas and low spots.

13.1.2 Maintain indicated lines, levels, profiles, and contours.

13.1.3 Slopes
A. Make gradual changes in grade.

B. Blend slopes into level areas.

13.1.4 Foreign Materials
A. Remove foreign materials and undesirable plants and their roots.

B. Do not bury foreign materials beneath areas to be sodded.

13.1.5 Remove contaminated subsoil.

13.1.6 Scarify subsoil to depth of 4 inches where topsoil is to be placed.

13.1.7 Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

13.2 Placing of Topsoil
13.2.1 Spread topsoil to minimum depth of 6 inches over area to be sodded.

13.2.2 Place topsoil during dry weather and on dry, unfrozen subgrade.

13.2.3 Remove vegetable matter and foreign nonorganic material from topsoil while spreading.

13.2.4 Grade topsoil to eliminate rough, low, or soft areas, and to ensure positive drainage.

13.2.5 Install edging at periphery of sodded areas in straight lines to consistent depth.

13.3 Fertilizing
13.3.1 Apply fertilizer at application rate recommended by soil analysis.

13.3.2 Apply fertilizer after smooth raking of topsoil and prior to installation of sod.

13.3.3 Apply fertilizer no more than 48 hours before laying sod.

13.3.4 Mix fertilizer thoroughly into upper 4 inches of topsoil.

13.3.5 Lightly water soil to aid dissipation of fertilizer.

13.4 Laying of Sod
13.4.1 Moisten prepared surface immediately prior to laying sod.

13.4.2 Lay sod immediately after delivery to site to prevent deterioration.

13.4.3 Joints
A. Lay sod tightly with no open joints visible and no overlapping.

B. Stagger end joints minimum 12 inches.

C. Do not stretch or overlap sod pieces.

13.4.4 Lay smooth.

13.4.5 Place top elevation of sod 1/2-inch below adjoining paving.

13.4.6 Watering
A. Water sodded areas immediately after installation.

b. Saturate sod to one (1) inch of soil.

13.4.7 Rolling
A. After sod and soil have dried, roll sodded areas to bond sod to soil and to remove minor depressions and irregularities.

B. Roll before first watering.

14. MAINTENANCE

14.1 Provide service and maintenance of sodded areas for 3 months from date of Substantial Completion.

14.2 Water to prevent grass and soil from drying out.

14.3 Weed Control
14.3.1 Control growth of weeds by applying herbicides.

14.3.2 Remedy damage resulting from improper use of herbicides.

14.4 Immediately replace sod on areas showing deterioration or bare spots.

14.5 Protect sodded areas with warning signs during maintenance period.

End of Section 022923

SECTION 022930

PLANTS

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Preparation of subsoil and topsoil

1.1.2 Topsoil bedding

1.1.3 Trees, plants, and ground cover

1.1.4 Mulch

1.1.5 Fertilizer

1.1.6 Pruning

1.1.7 Maintenance

1.2 Related Sections

1.2.1 Section 022117 “Fill” for rough grading of site

1.2.2 Section 022921 “Seeding”

1.2.3 Section 022923 “Sodding”

2. REFERENCES

2.1 American National Standards Institute (ANSI)

2.1.1 ANSI A300 – Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance – Standard Practices

2.1.2 ANSI Z60.1 – Nursery Stock

2.2 Forest Stewardship Council (FSC)
FSC Guidelines - Forest Stewardship Council Guidelines

3. DEFINITIONS

3.1 Weeds
Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

3.2 Plants
Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

4. SUBMITTALS

4.1 Product Data
Submit list of plant material sources, data for fertilizer, and other accessories.

4.2 Submit minimum 10-ounce sample of topsoil proposed. Forward sample to testing laboratory in sealed container to prevent contamination.

4.3 Installation instructions

4.4 Warranty

4.5 Samples

4.5.1 Organic and Compost Mulch
1-quart sealed plastic bag of each required mulch, including label with percentage weight of each material and source representing material to be provided. Samples to match color, texture, and composition of installed material.

4.5.2 Mineral Mulch
2-pound sealed plastic bag of mulch, including label with source. Samples to match color, texture, and composition of installed material.

4.5.3 Filter Fabric: 12 by 12 inches

4.5.4 Edging Materials and Accessories: Manufacturer's standard sizes

4.5.5 Tree Wrap: Width of panel by 12 inches

4.6 Test reports: Certify products comply with Specifications

4.7 Certificates: Certify products comply with Specifications.

4.7.1 Plant Materials: Department of Agriculture nursery certification by State Nursery Inspector declaring material to be free from insects and disease.

4.7.2 Seed and Turf Materials: Notarized certificate of product analysis.

5. CLOSEOUT SUBMITTALS

Operation and Maintenance Data: Include pruning objectives, types and methods; types, application frequency, and recommended coverage of fertilizer.

6. QUALITY ASSURANCE

6.1 Tree Pruning: ANSI A300 – Pruning Standards for Woody Plants.

6.2 Perform Work according to industry standards.

6.3 Maintain one (1) copy of each document on Project site.

7. QUALIFICATIONS

7.1 Nursery
Company specializing in growing and cultivating plants with three (3) years' documented experience.

7.2 Installer
Company specializing in installing and planting plants with five (5) years' documented experience, and approved by nursery.

7.3 Tree Pruner
Company specializing in performing Work of this Section with minimum five (5) years' documented experience, and approved by manufacturer.

7.4 Maintenance Services: Performed by Installer.

7.5 Certified Arborist (ISA). Licensed Arborist required to submit one (1) copy of license.

8. DELIVERY, STORAGE, AND HANDLING

8.1 Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

8.2 Deliver packaged products in manufacturer's original sealed packaging.

8.3 Bulk Products

8.3.1 Deliver bulk products away from buildings, utilities, pavement, and existing turf and planted areas. Maintain dry bulk product storage away from contaminants.

8.3.2 Install erosion control materials to prevent erosion or displacement of bulk products.

8.4 Apply antidesiccant to trees and shrubs according to manufacturer's instructions to protect during digging, handling, and transportation.

8.4.1 For deciduous trees or shrubs in full leaf, spray with antidesiccant at nursery before transporting and again two (2) weeks after planting.

8.5 Wrap trees and shrubs with tree wrap according to manufacturer's instructions to protect from wind and other damage during digging, handling, and transportation.

8.6 Deliver branched plants with branches tied and exposed branches covered with material that allows air circulation. Prevent damage to branches, trunks, root systems, root balls and desiccation of leaves.

8.7 Use of equipment such as "tree spades" is permitted provided plant balls are sized according to ANSI Z60.1 and tops are protected from damage.

8.8 Protect and maintain plant life until planted.

8.9 Deliver plant life materials immediately prior to placement. Keep plants moist.

8.10 Plant material damaged as a result of delivery, storage or handling will be rejected.

8.11 Plant Storage and Protection
Store and protect plants not planted on day of arrival at project site as follows:

8.11.1 Shade and protect plants in outdoor storage areas from wind and direct sunlight until planted.

8.11.2 Protect balled and burlapped plants from freezing or drying out by covering balls or roots with moist burlap, sawdust, wood chips, shredded bark, peat moss, or other approved material. Provide covering that allows air circulation.

8.11.3 Keep plants in moist condition until planted by watering with fine mist spray.

8.11.4 Do not store plant materials directly on concrete or bituminous surfaces.

8.12 Root Control Barrier and Weed Control Fabric
Store materials on site in enclosures or under protective covering in dry location out of direct sunlight. Do not store materials directly on ground.

8.13 Handling
Do not drop or dump plants from vehicles. Avoid damaging plants being moved from nursery or storage area to planting site. Handle balled and burlapped, balled and potted, container plants carefully to avoid damaging or breaking earth ball or root structure. Do not handle plants by trunk or stem. Remove damaged plants from Project site.

9. ENVIRONMENTAL REQUIREMENTS

9.1 Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

9.2 Do not install plant life when wind velocity exceeds 30 mph.

9.3 Coordinate installation of planting materials during optimal planting seasons for each type of plant material required.

9.4 Planting Dates

9.4.1 Deciduous Material: From February 1 to May 15 for spring planting, and from September 1 to November 15 for fall.

9.4.2 Evergreen Material: March 15 to May 15 for spring planting, and from September 1 to November 15 for fall.

9.4.3 Turfgrass Sod: From March 1 to September 15 (not before irrigation system installed, tested and approved).

9.4.4 Turfgrass Seed: September 1 to October 15 for fall planting, and April 15 to July 1 for spring planting (not before irrigation system installed, tested and approved).

10. WARRANTY

10.1 Furnish 1-year manufacturer warranty for trees, plants, and ground cover.

10.1.1 Replace any plants more than 25 percent dead, missing or defective plant material before final inspection.

10.1.2 Only one (1) replacement of each plant will be required except when losses or replacements are due to failure to comply with these requirements.

10.1.3 Repair damage caused while making plant replacements.

10.2 Remove stakes, guy wires/straps at the end of 1-year warranty.

11. MAINTENANCE SERVICE

11.1 Maintain plant life for 3 months after date of Substantial Completion.

11.2 Maintain plant life immediately after placement until plants are well established and exhibit vigorous growing condition. Continue maintenance until termination of warranty period.

11.3 Maintenance Includes

11.3.1 Cultivation and weeding plant beds and tree pits

11.3.2 Applying herbicides for weed control. Remedy damage resulting from use of herbicides

11.3.3 Remedy damage from use of insecticides

11.3.4 Irrigating sufficient to saturate root system

11.3.5 Pruning, including removal of dead or broken branches

11.3.6 Disease control

11.3.7 Maintaining wrapping, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

11.3.8 Replacement of mulch

PART 2 – PRODUCTS

12. TREES, PLANTS, AND GROUND COVER

12.1 Planting Stock

12.1.1 Species: According to Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.

12.1.2 Identification: Label individual plants or each bundle of plants when tied in bundles.

12.1.3 Plants: No. 1 Grade conforming to "American Standard for Nursery Stock" of American Association of Nurserymen (AAN); well-branched, vigorous and balanced root and top growth; free from disease, injurious insects, mechanical wounds, broken branches, decay, and other defects.

12.1.4 Trees: Furnish with reasonably straight trunks, well balanced tops, and single leader.

12.1.5 Deciduous Plants: Furnish in dormant state, except those specified as container grown.

12.2 Trees Plants and Ground Cover
Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

13. SOIL MATERIALS

Topsoil: Excavated from site.

14. SOIL AMENDMENT MATERIALS

14.1 When soil tests indicate soil amendment, apply soil conditioners or fertilizers to amend soil to specified conditions.

14.1.1 Plant Fertilizer

A. Soil Test: Evaluate existing soil conditions and requirements before fertilizer selection and application to minimize use of all fertilizers and chemical products. Obtain approval for allowable products, product alternatives, scheduling and application procedures. Evaluate existing weather and site conditions before application. Apply products during favorable weather and site conditions according to manufacturer's instructions and warranty requirements. Fertilizers shall be registered and approved by the Environmental Protection Agency (EPA), acceptable to authorities having jurisdiction, and of type recommended by manufacturer applicable to specific areas as required for Project conditions and application. Provide commercial-grade plant and turf fertilizers, free flowing, uniform in composition and conforms to applicable State and Federal regulations.

B. Fertilizer for groundcover, wildflowers, and grasses is not acceptable. Provide fertilizer for trees, plants, and shrubs as recommended by plant supplier, except synthetic chemical fertilizers are not acceptable. Fertilizers containing petrochemical additives or that have been treated with pesticides or herbicides are not acceptable.

C. Granular Fertilizer: Organic, granular controlled release fertilizer containing minimum percentages, by weight, of plant food nutrients.

1) Composition: Nitrogen, phosphorous, potassium, sulfur, and iron in amounts recommended in soil reports from qualified soil testing laboratory.

14.2 Peat Moss
Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.

14.3 Lime
Commercial grade limestone containing calcium carbonate equivalent (CCE) specified in ASTM C602, of minimum 80 percent.

14.4 Water
Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of plants.

14.5 Herbicide: As required to combat type of weeds encountered.

15. MULCH MATERIALS

Mulching Material: Composted, shredded hardwood bark, dark brown in color.

16. ACCESSORIES

16.1 Wrapping Materials: Burlap

16.2 Stakes: Softwood lumber, pointed end

16.3 Cable, Wire, Eye Bolts
Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

16.4 Plant Protectors: Tree straps.

17. SOURCE QUALITY CONTROL

17.1 Test and analyze existing topsoil.

17.2 Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter, pH value.

17.3 Provide recommendation for fertilizer and soil amendment application rates for specified planting as result of testing.

17.4 Testing is not required when recent tests are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 3 – EXECUTION

18. EXAMINATION

18.1 Verify prepared subsoil is ready to receive Work.

18.2 Saturate soil with water to test drainage.

18.3 Verify required underground utilities are available, in proper location, and ready for use.

19. PREPARATION OF SUBSOIL

19.1 Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

19.2 Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

19.3 Scarify subsoil to depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

19.4 Dig pits and beds 3 times wider than plant root system.

20. PLACING TOPSOIL

20.1 Spread topsoil to minimum depth of 6 inches over area to be planted. Rake smooth.

20.2 Place topsoil during dry weather and on dry unfrozen subgrade.

20.3 Remove vegetable matter and foreign non-organic material from topsoil while spreading.

20.4 Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

20.5 Install topsoil into pits and beds intended for plant root balls, to minimum thickness of 6 inches.

21. FERTILIZING

21.1 Apply starter fertilizer.

21.2 Apply after initial raking of topsoil.

21.3 Mix thoroughly into upper 2 inches of topsoil.

21.4 Lightly water soil to aid dissipation of fertilizer.

22. PLANTING

22.1 Place plants for best appearance.

22.2 Set plants vertical.

22.3 Remove non-biodegradable root containers.

22.4 Set plants in pits or beds, partly filled with prepared plant mix, at minimum depth as indicated on Drawings under each plant. Remove burlap, ropes, and wires, from top half of root ball.

22.5 Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6-inch layers. Maintain plant life in vertical position.

22.6 Saturate soil with water when pit or bed is half full of topsoil and again when full.

23. INSTALLATION OF ACCESSORIES

Wrap deciduous shade and flowering tree trunks and place tree protectors.

24. PLANT SUPPORT

24.1 Brace plants vertically with plant protector wrapped guy wires and stakes.

24.2 Tree Support Method: as indicated on Drawings.

25. TREE PRUNING

When pruning trees is required, lightly prune trees according to ANSI A300 Maintenance Pruning Type: Crown Cleaning.

26. MULCH INSTALLATION

Provide specified mulch over entire planting bed surfaces and individual plant surfaces, including earth mount watering basin around plants, to 3 inches depth after plant installation and before watering. Do not place mulch in crowns of shrubs. Place mulch minimum 2 to 3 inches away from tree or shrub trunks. Place mulch on all weed control fabric.

27. EDGING INSTALLATION

27.1 Uniformly edge beds of plants to provide clear-cut division line between planted area and adjacent lawn. Construct bed shapes as indicated on Drawings.

27.2 Cultivated Edging
Provide uniform 'V' cut with 1 vertical side adjacent to turf areas five (5) inches deep and second side angled 10 inches toward center of plant bed for clear-cut division line between plant bed and adjacent lawn.

27.3 Steel Edging: Install per manufacturer's written instructions.

28. FIELD QUALITY CONTROL

Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

29. PLANT MAINTENANCE

29.1 Frequency
Begin maintenance immediately after plants have been installed. Inspect plants at least once a week and perform required maintenance promptly.

29.2 Promotion of Plant Growth and Vigor
Water, prune, fertilize, mulch, eradicate weeds, and perform other operations necessary to promote plant growth and vigor.

29.3 Planter Beds
Weed, fertilize, and irrigate planter beds and keep pest free, pruned, and mulch levels maintained. Do not permit planter beds to encroach into turf areas. Maintain edging breaks between turf areas and planter beds. Fertilize plant materials to promote healthy growth without encouraging excessive top foliar growth. Remove noxious weeds common to area from planter beds by mechanical means.

29.4 Shrubs

In addition to planter bed maintenance requirements, selectively prune and shape shrubs for health and safety when following conditions exist:

29.4.1 Remove growth in front of windows, over entrance ways or walks, and any growth which will obstruct vision at street intersections or of security personnel.

29.4.2 Remove dead, damaged, or diseased branches or limbs where shrub growth obstructs pedestrian walkways, where shrub growth is growing against or over structures, and where shrub growth permits concealment of unauthorized persons.

29.4.3 Properly dispose of all pruning debris.

29.4.4 Trees

Adjust stakes, ties, guy supports and turnbuckles and water, fertilize, control pests, mulch, and prune for health and safety.

29.4.5 Fertilize trees to promote healthy plant growth without encouraging excessive top foliar growth. Inspect and adjust stakes, ties, guy supports and turnbuckles to avoid girdling and promote natural development.

29.4.6 Selectively prune all trees within Project boundaries, regardless of caliper, for safety and health reasons, including, but not limited to, removal of dead and broken branches and correction of structural defects. Prune trees according to their natural growth characteristics leaving trees well shaped and balanced.

29.4.7 All pruning, including palm tree pruning, must be by or in presence of certified member of International Society of Arboriculture and according to TCIA Z133.1.

29.4.8 Properly dispose of all pruning debris.

30. REMOVAL OF DYING OR DEAD PLANTS

Remove dead and dying plants immediately and provide new plants upon commencement of specified planting season and replace stakes, guys, mulch, and eroded earth mound water basins. No additional correction period will be required for replacement plants beyond original warranty period. Plants will be considered dead or dying as follows:

30.1 Tree: Main leader die-back or minimum 20 percent of crown died.

30.2 Shrub and Ground Cover: Minimum 20 percent of plant died.

30.3 Determination: Scrape on maximum 1/16-inch-square branch area to determine dying plant material cause and provide recommendations for replacement.

31. LANDSCAPE PLANT ACCEPTANCE

31.1 Landscape plant and turfgrass acceptance will occur after completion of Landscape Plant Establishment Period. Contractor shall have completed, located, and installed all plants and turfgrass according to Drawings and Specifications. All plants and turfgrass are expected to be living and in healthy condition at time of inspection and acceptance. Make written request 2 weeks before final inspection of landscape plants and turfgrass. Upon inspection, when work is found to not meet Specifications, Establishment Period will be extended at no additional cost until work has been satisfactorily completed, inspected and accepted.

31.2 Criteria for Acceptance of Landscape Plants

31.2.1 Tree support stakes, guys, and turnbuckles are in good condition.

31.2.2 Total plants on site as required by Specifications and required replacements have been installed.

32. CLEANING

Remove and legally dispose of all excess soil and planting debris.

33. PROTECTION

33.1 Protect plants from traffic and construction operations.

33.2 Provide temporary fences or enclosures and signage, at planted areas. Maintain fences and enclosures during maintenance period.

33.3 Remove protective materials immediately before acceptance.

33.4 Repair damage.

End of Section 022930

SECTION 023011

DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes: Disinfection chemicals.

1.2 Related Requirements

1.2.1 "Plumbing Fixtures" Sections for disinfection of building domestic water piping systems.

1.2.2 Section 023306 "Site Water Utility Distribution Piping" for product and execution requirements for installation and testing of site domestic water distribution piping.

2. SUBMITTALS

2.1 Disinfection Procedure
Submit description of procedure, including type of disinfectant and calculations indicating quantities of disinfectants required to produce specified chlorine concentration.

2.2 Product Data
Submit manufacturer information for proposed chemicals and treatment doses.

2.3 Certify that final water complies with disinfectant quality standards of the City of Wichita.

2.4 Material Test Reports: For each disinfectant, by a qualified testing agency.

2.5 Field Quality-Control Reports: For disinfection chemicals.

2.6 Qualifications Statements: For manufacturer and applicator.

3. CLOSEOUT SUBMITTALS

Disinfection Report

3.1 Type and form of disinfectant used

3.2 Date and time of disinfectant injection start and completion

3.3 Test locations.

3.4 Name of person collecting samples.

3.5 Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.

3.6 Date and time of flushing start and completion.

3.7 Disinfectant residual after flushing in ppm for each outlet tested

4. QUALITY ASSURANCE

4.1 Manufacturers Qualifications
Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

4.2 Applicators Qualifications: Company specializing in performing Work of this Section with minimum three (3) years' documented experience.

PART 2 – PRODUCTS

5. PERFORMANCE REQUIREMENTS

Perform Work according to Kansas Department of Health and Environment (KDHE) standards.

6. DISINFECTION CHEMICALS

Chemicals

6.1 Hypochlorite: Comply with AWWA B300

6.2 Ammonium Sulfate: Comply with AWWA B302

6.3 Sodium Chlorite: Comply with AWWA B303

PART 3 – EXECUTION

7. EXAMINATION

7.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

7.2 Verify that piping system has been cleaned, inspected, and pressure tested.

7.3 Verify that access fittings have been installed under Section 023306 "Site Water Utility Distribution Piping".

7.4 Perform scheduling and disinfecting activity with startup, water pressure testing, adjusting and balancing, and demonstration procedures, including coordination with related systems.

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

8. INSTALLATION OF DISINFECTION CHEMICALS

Perform in accordance with Kansas Department of Health and Environment (KDHE) standards.

9. FIELD QUALITY CONTROL

Perform in accordance with KDHE standards.

End of Section 023011

SECTION 023119

THRUST RESTRAINT FOR UTILITY PIPING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes: Tied joint restraint systems.

1.2 Related Requirements:

1.2.1 Section 022116 “Trenching” for trenching and backfilling requirements for site utilities.

1.2.2 Section 023306 “Site Water Utility Distribution Piping” for requirements for piping Work as required by this Section.

1.2.3 Section 023311 “Public Sanitary Sewerage Gravity Piping” for requirements for piping Work as required by this Section.

2. COORDINATION

Coordinate Work of this Section with installation of fittings and joints that require restraint.

3. SUBMITTALS

3.1 Product Data: Tied joint restraint systems.

3.2 Shop Drawings

3.2.1 Indicate restrained joint details and materials being used.

3.2.2 Submit layout drawings showing piece numbers and locations.

3.2.3 Indicate restrained joint locations.

3.2.4 Signed and sealed by the qualified professional engineer responsible for their preparation.

3.3 Delegated Design Submittals

3.3.1 Submit signed and sealed Shop Drawings with design calculations and assumptions for restrained lengths.

3.3.2 Submit joint restraint details.

3.3.3 Use joint restraint devices specifically designed for applications described in manufacturer information.

3.4 Qualification Statements

Submit qualifications for manufacturer, fabricator, and licensed professionals.

4. CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of joint restraints.

5. QUALITY ASSURANCE

5.1 Manufacturer's Qualifications

Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

5.2 Fabricators Qualifications

Company specializing in fabricating products specified in this Section with minimum three (3) years' documented experience.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Inspection

Accept materials on site in manufacturer's original packaging and inspects for damage.

6.2 Store materials according to manufacturer instructions.

6.3 Protection

6.3.1 Protect materials from moisture and dust by storing in clean, dry location; remove from construction operations areas.

6.3.2 Provide additional protection according to manufacturer instructions.

PART 2 – PRODUCTS

7. PERFORMANCE REQUIREMENTS

7.1 Perform Work according to the State of Kansas Department of Transportation (KDOT) standards.

7.2 Provide pressure pipeline with restrained joints at each bend, tee, and change in direction.

8. TIED JOINT RESTRAINT SYSTEMS

8.1 Manufacturers

8.1.1 Baker Hughes Company

8.1.2 Bulldog Restraint System: S&B Technical Products

8.2 Tie Bolts

8.2.1 Mechanical Joints on 2- and 3-inch Pipe

A. Size: 5/8-inch

B. Comply with ASTM A588/A588M, Grade B

C. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 lbs., minimum for 5/8-inch and 60,000-lb. minimum for 3/4-inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

8.2.2 Mechanical and Flanged Joints on 4- to 12-inch Pipe
A. Size: 3/4-inch.

B. Comply with ASTM A588/A588M, Grade B.

C. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 lbs., minimum for 5/8-inch and 60,000-lb. minimum for 3/4-inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

8.2.3 Mechanical Joints on 14- to 24-inch Pipe
A. Size: 3/4-inch

B. Comply with ASTM A588/A588M, Grade B and ASTM A325, Type 3

8.2.4 Mechanical and Flanged Joints on 30-inch and Larger Pipe
A. Size: 1-inch

B. Comply with ASTM A588/A588M, Grade B

C. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 100,000 lb. minimum by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

8.3 Tie Nut
8.3.1 Description: Hex nut for each tie bolt and tie rods
8.3.2 Comply with ASTM A563, Grade C3
8.3.3 Finish: Galvanized

8.4 Tiepin
8.4.1 Bend and Hydrants: 3/4-inch round bar stock
8.4.2 Size and Shape: 6-inch hairpin
8.4.3 Comply with ASME B1.1 and ASTM A588/A588M
8.4.4 Finish: Galvanized

8.5 Tie Coupling
8.5.1 Description: Extension of continuous-threaded rods

8.5.2 Provide with center stop to aid installation

8.5.3 Comply with ASTM A36/A36M, ASTM A307, Grade A, and ASTM A563, Grade A

8.5.4 Finish: Galvanized

8.6 Tie Clamp
- 8.6.1 Description: Retainer clamp for ductile iron, asbestos-cement, and PVC push-on pipe
- 8.6.2 Location: In front of bell
- 8.6.3 Comply with ASTM A36/A36M, ASTM A307, Grade A, and ASTM A563, Grade A
- 8.6.4 Finish: Galvanized

8.7 Tie Rod
- 8.7.1 Description: Continuous-threaded rod for cutting to desired lengths
- 8.7.2 Comply with ASTM A588/A588M, Grade B, ASTM A325. Type 3, and ASME B1.1
- 8.7.3 Finish: Galvanized

8.8 Tie Bar
- 8.8.1 Description: Steel bar used to restrain push-in plugs
- 8.2.2 Comply with ASTM A36/A36M
- 8.8.3 Finish: Galvanized

8.9 Tie Washer
- 8.9.1 Description: Round flat washers
- 8.9.2 Comply with ASTM A588/A588M, ASTM F436. Type 1
- 8.9.3 Finish: Galvanized

9. MATERIALS

Steel

9.1 High-Strength Low-Alloy Steel: Comply with ASTM A588/A588M, heat treated

9.2 Carbon Steel: Comply with ASTM A36/A36M

10. FINISHES

10.1 Zinc Plating
- 10.1.1 Factory applied
- 10.1.2 Comply with ASTM B633

10.2 Galvanizing:
- 10.2.1 Factory applied
- 10.2.2 Comply with ASTM A153/A153M

PART 3 – EXECUTION

11. EXAMINATION

11.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

11.2 Examine roughing-in for thrust restraint for utility piping to verify actual locations or piping connections before equipment installation.

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

12. PREPARATION

Clean surfaces of pipe and fittings that are to receive tied joint restraint systems.

13. INSTALLATION OF THRUST RESTRAINT FOR UTILITY PIPING

13.1 According to AWWA C600.

13.2 Install joint restraint system such that joints are mechanically locked together to prevent joint separation.

14. TOLERANCES

14.1 Torque 5/8-inch nuts on mating threaded fasteners from 45 to 60 ft.-lbf.

14.2 Torque 3/4-inch nuts on mating threaded fasteners from 75 to 90 ft.-lbf.

14.3 Torque 1-inch nuts from 100 to 120 ft.-lbf.

End of Section 023119

SECTION 023156

CONCRETE MANHOLES

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Concrete and masonry manholes

1.1.2 Frames and covers

1.1.3 Riser rings

1.1.4 Pile support systems

1.2 Related Requirements

1.2.1 Section 033000 “Cast-in-Place Concrete” for concrete type for manhole and structure foundation slab construction.

1.2.2 Section 021513 “Soils for Earthwork” for soils for backfill in trenches.

1.2.3 Section 021516 “Aggregates for Earthwork” for aggregate for backfill in trenches.

1.2.4 Section 021519 “Geotextiles for Earthwork” for filter fabric for subsurface drainage.

1.2.5 Section 022115 “Excavation” for excavating for manholes, structures, and foundation slabs.

1.2.6 Section 022117 “Fill” for backfilling after manhole and structure installation.

1.2.7 Section 023310 “Sanitary Sewerage Piping” for piping connections to manholes.

1.2.8 Section 023311 “Public Sanitary Sewerage Gravity Piping” for piping connections to manholes.

1.2.9 Section 023420 “Stormwater Conveyance” for piping connections to manholes and structures.

2. DEFINITIONS

2.1 Bedding: A type of specialized material placed under manhole prior to installation and subsequent backfill operations.

3. COORDINATION

Coordinate Work of this Section with connection to City of Wichita Utilities Department.

4. SUBMITTALS

4.1 Product Data

4.1.1 Concrete and masonry manholes

4.1.2 Frames and covers

4.1.3 Riser rings

4.1.4 Pile support systems

4.2 Shop Drawings

4.2.1 Indicate structure locations and elevations.

4.2.2 Indicate sizes and elevations of piping, conduit, and penetrations.

4.2.3 Signed and sealed by the qualified professional engineer responsible for their preparation.

4.3 Source Quality-Control Reports: For manholes and covers.

4.4 Field Quality-Control Reports: For manholes and covers.

4.5 Qualifications Statement: For manufacturer.

5. CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of manholes and connections, and record invert elevations.

6. QUALITY ASSURANCE

Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Inspection

Accept materials on site in manufacturer's original packaging and inspect for damage.

7.2 Handling

Comply with precast concrete manufacturer instructions and ASTM C913 for unloading and moving precast manholes and drainage structures.

7.3 Storage

7.3.1 Store materials according to manufacturer instructions.

7.3.2 Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.

7.3.3 Repair property damaged from materials storage.

7.4 Protection

7.4.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

7.4.2 Provide additional protection according to manufacturer instructions.

8. FIELD CONDITIONS

8.1 Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry Work.

8.2 Cold Weather Requirements: Comply with ACI 530/530.1.

9. WARRANTY

Furnish 5-year manufacturer's warranty for concrete manholes.

PART 2 – PRODUCTS

10. PERFORMANCE REQUIREMENTS

Perform Work according to the State of Kansas Department of Transportation (KDOT) standards.

11. CONCRETE AND MASONRY MANHOLES

11.1 Reinforced Precast Concrete Manhole Sections

11.1.1 Comply with ASTM C478

11.1.2 Gaskets: Comply with ASTM C923

11.1.3 Joints

A. Comply with ASTM C913

B. Maximum Leakage: 0.025-gallon per hour per foot of joint at three (3) feet of head.

11.2 Mortar and Grout: Mortar: Type S.

11.3 Reinforcement

11.3.1 Formed steel reinforcing rods

11.3.2 Thickness: As required for design loading

11.3.3 Finish: Galvanized

11.4 Shaft and Eccentric Cone Top Sections

11.4.1 Pipe Sections: Reinforced precast concrete

11.4.2 Joints

A. Lipped male/female

B. Dry

11.4.3 Sleeved to receive pipe sections

11.5 Shape: As indicated on Drawings

11.6 Clear Inside Dimensions: As indicated on Drawings

11.7 Design Depth: As indicated on Drawings

11.8 Clear Cover Opening: As indicated on Drawings

11.9 Pipe Entry: Furnish openings as indicated on Drawing

11.10 Structure Joint Gaskets
11.10.1 Comply with ASTM C361
11.10.2 Material: Rubber

12. FRAMES AND COVERS

12.1 Manufacturers
12.1.1 EJ
12.1.2 Neenah Foundry Company

12.2 Cast iron

12.3 Comply with ASTM A48/A48M, Class 30B

12.4 Lid
12.4.1 Bearing Surface: Machined flat
12.4.2 Configuration: Removable
12.4.3 Security: None

12.5 Cover Design: Closed

12.6 Live-Load Rating
American Association of State Highway and Transportation Officials (AASHTO) Highway Loading Class H-20.

12.7 Furnish sealing gasket

12.8 Cover: Molded with identifying name and logo

12.9 Grate: Bicycle safe

12.10 Nominal Lid or Grate Size: As indicated on Drawings

13. RISER RINGS

13.1 Manufacturers
13.1.1 EJ
13.1.2 Neenah Foundry Company

13.2 Riser Rings:
13.2.1 Thickness of 4 to 6 inches
A. Precast concrete
B. Comply with ASTM C478

13.2.2 Thickness Less Than 4 inches
A. Cast iron
B. Comply with AASHTO M306

13.2.3 Rubber Seal Wraps
- A. Wraps and Band Widths: Comply with ASTM C877, Type III
- B. Cone/Riser Ring Joint: Minimum 3-inch overlap
- C. Frame/Riser Ring Joint: 2-inch overlap
- D. Additional Bands: Overlap upper band by 2 inches

14. PILE SUPPORT SYSTEMS

Concrete Cradle

14.1.1 As specified in Section 033000 “Cast-in-Place Concrete”

14.1.2 Description
- A. Type: Reinforced
- B. Strength: 4,000 psi at 28 days
- C. Finish: Rough troweled

15. MATERIALS

Cover and Bedding

15.1 Bedding: Fill type as specified in Section 021516 “Aggregates for Earthwork”

15.2 Cover: Fill type as specified in Section 021516 “Aggregates for Earthwork”

16. ACCESSORIES

16.1 Steps
- 16.1.1 As required by applicable code
- 16.1.2 Rungs: Formed PP
- 16.1.3 Fabrication: Formed integral with manhole sections
- 16.1.4 Diameter: 3/4-inch
- 16.1.5 Width: As indicated on Drawing.
- 16.1.6 Spacing: As indicated on Drawings

16.2 Foundation Slab
- 16.2.1 Cast-in-place concrete as specified in Section 033000 “Cast-in-Place Concrete”
- 16.2.2 Top Surface: Level

16.3 Strap Anchors
- 16.3.1 Shape: Bent steel
- 16.3.2 Finish: Galvanized

16.4 Joint Sealant: Comply with ASTM C990

16.5 Fasteners: Stainless steel; ASTM F593

16.6 Geotextile Filter Fabric: As specified in Section 021519 “Geotextiles for Earthwork”

16.7 Concrete: As specified in Section 033000 “Cast-in-Place Concrete”

16.8 Grout: As specified in Section 033000 “Cast-in-Place Concrete”

16.9 Soil Backfill from Above Pipe to Finish Grade:
16.9.1 Soil type as specified in Section 021513 "Soils for Earthwork"

16.9.2 Subsoil: No frozen earth, or foreign matter, or rocks more than 6 inches in diameter.

17. FINISHES

Steel Galvanizing

17.1 Hot-dip galvanize after fabrication

17.2 Comply with ASTM A123/A123M

18. SOURCE QUALITY CONTROL

18.1 Provide shop inspection and testing of completed assembly.

18.2 Certificate of Compliance

18.2.1 If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

18.2.2 Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 – EXECUTION

19. EXAMINATION

19.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

19.2 Examine ground areas for suitable conditions where concrete manholes will be installed.

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

20. PREPARATION

20.1 Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.

20.2 Coordinate placement of inlet and outlet pipe or duct sleeves as required by other Sections.

20.3 Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.

20.4 Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

21. INSTALLATION OF CONCRETE MANHOLES

21.1 Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas.

21.2 Correct over-excavation with coarse aggregate.

21.3 Remove large stones or other hard matter impeding consistent backfilling or compaction.

21.4 Protect manhole from damage or displacement while backfilling operation is in progress.

21.5 Excavating

21.5.1 As specified in Section 022115 “Excavation” and in indicated locations and depths.

21.5.2 Provide clearance around sidewalls of manhole or structure for construction operations.

21.5.3 If ground water is encountered, prevent accumulation of water in excavations; place manhole or structure in dry trench.

21.5.4 Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation as approved by Architect/Engineer.

21.6 Base and Alignment

21.6.1 Place foundation slab and trowel top surface level.

21.6.2 Grout base of shaft sections to achieve slope to exit piping, trowel smooth, and contour to form continuous drainage channel.

21.6.3 Place manhole sections plumb and level, trim to correct elevations, and anchor to foundation slab.

21.7 Backfilling: As specified in Section 022117 “Fill”

21.8 Coating: Paint interior with 2 coats of bituminous interior coating at rate of 120 sq. ft./gal. for each coat.

21.9 Precast Concrete Manholes

21.9.1 Lift precast components at lifting points designated by manufacturer.

21.9.2 When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.

21.9.3 Assembly

A. Assemble multi-section manholes and structures by lowering each section into excavation.

B. Install rubber gasket joints between precast sections according to manufacturer recommendations.

C. Lower, set level, and firmly position base section before placing additional sections.

21.9.4 Remove foreign materials from joint surfaces and verify that sealing materials are placed properly.

21.9.5 Maintain alignment between sections by using guide devices affixed to lower section.

21.9.6 Joint sealing materials may be installed on site or at manufacturer's plant.

21.9.7 Verify that installed manholes and structures meet required alignment and grade.

21.9.8 Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.

21.9.9 Cut pipe flush with interior of structure.

21.9.10 Shape inverts through manhole and structures as indicated on Drawings.

21.9.11 Sanitary Manhole Drop Connections: As indicated on Drawings.

22. FIELD QUALITY CONTROL

22.1 Tests and Inspections:

22.1.1 Cast-in-Place Concrete
As specified in Section 033000 “Cast-in-Place Concrete”

22.1.2 Concrete Manhole Sections: Comply with ASTM C497.

22.2 Prepare test and inspection reports.

23. ADJUSTING

Vertical Adjustment of Existing Manholes and Structures

23.1 If required, adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.

23.2 Frames, Grates, and Covers

A. Remove frames, grates, and covers cleaned of mortar fragments.

B. Reset to required elevation according to requirements specified for installation of castings.

23.3 Reinforcing Bars

A. Remove concrete without damaging existing vertical reinforcing bars if removal of existing concrete wall is required.

B. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement as indicated on Drawings.

23.4 Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete as specified in Section 033000 “Cast-in-Place Concrete”

End of Section 023156

SECTION 023197

IDENTIFICATION AND SIGNAGE FOR UTILITIES

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Pipeline marker posts

1.1.2 Utility markers

1.1.3 Marking flags

1.1.4 Ribbon tape

1.1.5 Trace wire

1.2 Related Requirements

1.2.1 Section 022116 “Trenching” for backfilling considerations for installation of underground pipe markers.

1.2.2 Section 022117 “Fill” for backfilling considerations for installation of underground pipe markers.

1.2.3 Section 023306 “Site Water Utility Distribution Piping” for piping, valves, and appurtenances requiring identification marking.

1.2.4 Section 023310 “Sanitary Sewerage Piping” for piping, valves, and appurtenances requiring identification marking.

1.2.5 Section 023311 “Public Sanitary Sewerage Gravity Piping” for piping, valves, and appurtenances requiring identification marking.

1.2.6 Section 023420 “Stormwater Conveyance” for piping, valves, and appurtenances requiring identification marking.

2. SUBMITTALS

2.1 Product Data

2.1.1 Marking flags

2.2.2 Ribbon tape

2.2.3 Trace wire

2.2 Qualifications Statement: For manufacturer

3. CLOSEOUT SUBMITTALS

Project Record Documents: Record actual locations of tagged valves.

4. QUALITY ASSURANCE

Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

PART 2 - PRODUCTS

5. MARKING FLAGS

5.1 Manufacturer: Bernsten International Inc.

5.2 Description

5.2.1 Material: PE

5.2.2 Minimum Size: 2-1/2 by 3-1/2 inches

5.2.3 Wire Stem: 21 inches

6. RIBBON TAPE

6.1 Manufacturers

6.1.1 Berntsen International Inc.

6.1.2 Pipemarker.com; Brimar Industries, Inc.

6.2 Description

6.2.1 Material: PE

6.2.2 Brightly colored, continuously printed

6.2.3 Minimum Size: 6 inches wide by 4 mils thick

6.2.4 Manufactured for direct burial service

6.2.5 Imprint: In large letters

7. TRACE WIRE

7.1 Manufacturers

7.1.1 Northtown Company

7.1.2 Priority Wire and Cable, Inc.

7.1.3 TracerWire

7.2 Conductor: Magnetically detectable

7.3 Covering: Plastic, imprinted in large letters

7.4 Wire: Unshielded 10-AWG Type THWN insulated copper

PART 3 – EXECUTION

7. INSTALLATION OF IDENTIFICATION AND SIGNAGE FOR UTILITIES

7.1 Marking Flags: According to manufacturer instructions.

7.2 Ribbon Tape or Trace Wire

7.2.1 Continuous over top of pipe

7.2.2 If multiple pipes occur in common trench, locate tape or wire above centerline of trench

7.2.3 Coordinate with trench Work as specified in Section 021116 “Trenching”

End of Section 023197

SECTION 023306

SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Piping

1.1.2 Tapping sleeves and valves

1.1.3 Valves and hydrants

1.1.4 Reduced-pressure backflow preventers

1.1.5 Concrete encasement and cradles

1.2 Related Requirements

1.2.1 Section 033000 “Cast-in-Place Concrete” for concrete for cradles and encasements.

1.2.2 Section 021513 “Soils for Earthwork” for soils for backfill in trenches.

1.2.3 Section 021516 “Aggregates for Earthwork” for aggregate for backfill in trenches.

1.2.4 Section 022115 “Excavation” for product and execution requirements for excavation and backfill.

1.2.5 Section 022116 "Trenching” for execution requirements for trenching.

1.2.6 Section 022117 “Fill” for requirements for backfill to be placed by this Section.

1.2.7 Section 023011 “Disinfection of Water Utility Piping Systems” for disinfection of water mains and appurtenances.

1.2.8 Section 023197 “Identification and Signage for Utilities” for pipe markers.

1.2.9 Section on “Valves and Hydrants for Water Utility Service” for fire hydrants, valves, and valve boxes for fire hydrant and water main installations.

2. SUBMITTALS

2.1 Product Data

2.1.1 Piping

2.2.2 Tapping sleeves and valves

2.2.3 Valves and hydrants

2.2.4 Reduced-pressure backflow preventers

2.2 Field Quality-Control Reports: For piping and related equipment

2.3 Qualifications Statements: For manufacturer and installer

3. CLOSEOUT SUBMITTALS

3.1 Project Record Documents
Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.

3.2 Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

4. QUALITY ASSURANCE

4.1 Manufacturers Qualifications
Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

4.2 Installers Qualifications
Company specializing in performing Work of this Section with minimum three (3) years' documented experience in installation of Work of this Section.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Inspection
Accept materials on site in manufacturer's original packaging and inspect for damage.

5.2 Storage

5.2.1 Store materials according to manufacturer instructions.

5.2.2 Block individual and stockpiled pipe lengths to prevent moving.

5.2.3 Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

5.2.4 Store PE and PVC materials out of sunlight.

5.3 Protection

5.3.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

5.3.2 Provide additional protection according to manufacturer instructions.

6. WARRANTY

Furnish 5-year manufacturer's warranty for valves.

PART 2 – PRODUCTS

7. PERFORMANCE REQUIREMENTS

Perform Work according to the City of Wichita Department of Public Works standards.

8. PIPING

PVC Pipe with Cast Iron Fittings

8.1 Comply with AWWA C900, Class 235

8.2 Cast Iron Fittings: Comply with AWWA C111

8.3 Joints

8.3.1 Comply with ASTM D3139

8.3.2 Furnish compression gasket ring

9. TAPPING SLEEVES AND VALVES

9.1 Tapping Sleeves

Manufacturer: Smith-Blair, Inc.

9.2 Description

9.2.1 Material: Ductile or cast iron

9.2.2 Type: Dual compression

9.2.3 Outlet Flange Dimensions and Drilling: Comply with ASME B16.1, Class 125, and MSS SP-60.

10. VALVES AND HYDRANTS

Valves, Valve Boxes, and Fire Hydrants: As specified in Mechanical Section on "Valves and Hydrants for Water Utility Service"

11. REDUCED-PRESSURE BACKFLOW PREVENTERS

11.1 Manufacturer: WATTS

11.2 Description

11.2.1 Comply with ASSE 1013

11.2.2 Materials

A. Body: Bronze

B. Internal Parts: Bronze

C. Springs: Stainless steel

11.2.3 Check Valves
A. Quantity: 2

B. Description: Independently operating, spring loaded

C. Type: Diaphragm type, differential pressure relief, located between check valves

D. Provide third check valve opening under back pressure in case of diaphragm failure

E. Vent Outlet: Non-threaded

11.2.4 Furnish two (2) gate valves, one (1) strainer, and four (4) test cocks

11.3 Double-Check Valve Assemblies
11.3.1 Comply with ASSE 1012

11.3.2 Description
Two (2) independently operating check valves, with intermediate atmospheric vent

11.3.3 Materials
A. Body: Bronze
B. Internal Parts: Corrosion resistant
C. Springs: Stainless steel

12. CONCRETE ENCASEMENT AND CRADLES

Concrete
12.1 As specified in Section 033000 “Cast-in-Place Concrete”.
12.2 Type: Reinforced, air entrained
12.3 Compressive Strength: 4,000 psi at 28 days
12.4 Finish: Rough troweled

13. MATERIALS

Bedding and Cover
13.1 Bedding: Fill type as specified in Section 021516 “Aggregates for Earthwork”.

13.2 Cover: Fill type as specified in Section 021516 “Aggregates for Earthwork”.

13.3 Soil Backfill from Above Pipe to Finish Grade
13.3.1 Soil type as specified in Section 021513 “Soils for Earthwork”.

13.3.2 Subsoil with no rocks greater than 6 inches in diameter, frozen earth, or foreign matter.

14. ACCESSORIES

14.1 Thrust Restraints: As specified in Section 023119 "Thrust Restraint for Utility Piping".

14.2 Steel Rods, Bolt, Lugs, and Brackets

14.2.1 Comply with ASTM A36/A36M

14.2.2 Grade A carbon steel

PART 3 – EXECUTION

15. EXAMINATION

15.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

15.2 Examine roughing-in for site water utility distribution piping to verify actual locations of piping connections before equipment installation.

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

16. PREPARATION

16.1 Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.

16.2 Remove scale and dirt on inside and outside before assembly.

16.3 Prepare pipe connections to equipment with flanges or unions.

16.4 Protect and support existing distribution piping and appurtenances as Work progresses.

17. INSTALLATION OF SITE WATER UTILITY DISTRIBUTION PIPING

17.1 Bedding

17.1.1 Excavate pipe trench as specified in Section 022116 "Trenching".

17.1.2 Placement

A. Place bedding material per City of Wichita standards and Kansas Technical Provision and Pipe Material requirements.

B. Level fill materials in one (1) continuous layer not exceeding 6 inches of compacted depth.

C. Compact to 95 percent maximum density.

17.1.3 Backfill around sides and to top of pipe as specified in Section 022117 "Fill".

17.1.4 Place fill materials as specified in Section 022117 "Fill".

17.2 Pipe and Fittings

17.2.1 Maintain separation of water main from sewer according to Kansas Department of Health and Environment (KDHE) and City of Wichita requirements.

17.2.2 Group piping with other site piping work whenever practical.

17.2.3 Install pipe to elevations indicated on Drawings.

17.2.4 Install ductile-iron piping and fittings according to AWWA C600.

17.2.5 Install grooved and shouldered pipe joints according to AWWA C606.

17.2.6 Route pipe in straight line.

17.2.7 Install access fittings to permit disinfection of water system performed under Section 023011 "Disinfection of Water Utility Piping Systems".

17.2.8 Thrust Restraints

A. Form and place concrete for pipe thrust restraints at each elbow or change of pipe direction.

B. Place concrete to permit full access to pipe and pipe accessories.

C. Provide bearing area as indicated on Drawings.

17.2.9 Establish elevations of buried piping with not less than 3'-6" of cover.

17.2.10 Valves, Valve Boxes, and Fire Hydrants: As specified in Mechanical Section, "Valves and Hydrants for Water Utility Service"

17.3 Disinfection

As specified in Section 023011 "Disinfection of Water Utility Piping Systems".

18. TOLERANCES

Install pipe within tolerance of 5/8-inch.

19. FIELD QUALITY CONTROL

Tests and Inspections:

19.1 Pressure test piping system according to AWWA C600

19.2 Compaction Testing:

A. Comply with ASTM D698

B. Frequency of Compaction Tests: Every 250 linear feet

C. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

End of Section 023306

SECTION 023310

SANITARY SEWERAGE PIPING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Sanitary sewerage piping

1.1.2 Manholes

1.1.3 Flexible couplings

1.1.4 Flexible pipe boots for manhole pipe entrances

1.2 Related Requirements

1.2.1 Section 021513 “Soils for Earthwork” for soil for backfill in trenches.

1.2.2 Section 021516 “Aggregates for Earthwork” for aggregate for backfill in trenches.

1.2.3 Section 022116 “Excavation” for requirements for excavation and backfill as required by this Section.

1.2.4 Section 022116 “Trenching” for requirements for trenching as required by this Section.

1.2.5 Section 022117 “Fill” for requirements for backfilling as required by this Section.

1.2.6 Section on “Infiltration and Exfiltration Testing” for infiltration testing of gravity-flow sewerage piping.

1.2.7 Section on “Mandrel Testing” for deflection testing of plastic sewerage piping.

1.2.8 Section 023156 “Concrete Manholes” for manholes for sanitary sewerage piping.

1.2.9 Section 023197 “Identification and Signage for Utilities” for pipe markers.

2. DEFINITIONS

Bedding: Fill placed under, beside, and directly over pipe, prior to subsequent backfill operations.

3. COORDINATION

Coordinate Work of this Section with termination of sanitary sewer connection outside building, connection to City of Wichita utility service, and trenching.

4. SUBMITTALS

4.1 Product Data

4.1.1 Sanitary sewerage piping

4.1.2 Manholes

4.1.3 Flexible couplings

4.1.4 Flexible pipe boots for manhole pipe entrances.

4.2 Source Quality-Control Reports: For piping and accessories

4.3 Field Quality-Control Reports: For piping and accessories

4.4 Qualifications Statements: For manufacturer and installer

5. CLOSEOUT SUBMITTALS

Project Record Documents: Record finished locations of pipe runs, connections, manholes, cleanouts, and invert elevations.

6. QUALITY ASSURANCE

6.1 Manufacturers Qualifications

Company specializing in manufacturing products specified in this Section with minimum 3 years' documented experience.

6.2 Installers Qualifications

Company specializing in performing Work of this Section with minimum 3 years' documented experience.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Inspection

Accept materials on site in manufacturer's original packaging and inspect for damage.

7.2 Storage

7.2.1 Store materials according to manufacturer instructions.

7.2.2 Store valves in shipping containers with labeling in place.

7.3 Protection

7.3.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

7.3.2 Block individual and stockpiled pipe lengths to prevent moving.

7.3.3 Provide additional protection according to manufacturer instructions.

PART 2 – PRODUCTS

8. PERFORMANCE REQUIREMENTS

Perform Work according to City of Wichita standards and Specifications.

9. SANITARY SEWERAGE PIPING

9.1 Plastic Pipe with Bell and Spigot End Connections with Rubber-Ring-Sealed Gasket Joint

9.1.1 Material: PVC

9.1.2 Comply with ASTM D3034, SDR-35

9.1.3 Inside Nominal Diameter: According to Drawings

9.1.4 Fittings: PVC

9.1.5 Joints

A. Elastomeric gaskets

B. Comply with ASTM F477

9.2 As specified in Section 023156 "Concrete Manholes"

10. FLEXIBLE COUPLINGS

10.1 Manufacturers

A. Fernco Inc.

B. Romac Industries, Inc.

10.2 Material: Resilient, chemical-resistant, elastomeric PVC

10.3 Attachment: Two Series-300 stainless-steel clamps, screws, and housings

11. FLEXIBLE PIPE BOOTS FOR MANHOLE PIPE ENTRANCES

11.1 Manufacturers

A. A-Lok

B. Press-Seal Corporation

11.2 Material: EPDM

11.3 Comply with ASTM C923

11.4 Attachment: Series-300 stainless-steel clamp and hardware

12. MATERIALS

Bedding and Cover

12.1 Bedding: As specified in Section 021516 "Aggregates for Earthwork"

12.2 Cover: As specified in Section 021516 "Aggregates for Earthwork"

12.3 Soil Backfill from Above Pipe to Finish Grade

A. As specified in Section 021513 "Soils for Earthwork"

B. Subsoil with no rocks more than 6 inches in diameter, frozen earth, or foreign matter.

13. SOURCE QUALITY CONTROL

13.1 Provide shop inspection and testing of pipe.

13.2 Certificate of Compliance

13.2.1 If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

13.2.2 Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 – EXECUTION

14. EXAMINATION

14.1 Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

14.2 Verify that trench cut is ready to receive Work of this Section.

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

15. PREPARATION

15.1 Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

15.2 Correct over-excavation with coarse aggregate.

15.3 Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.

15.4 Protect and support existing sewer lines, utilities, and appurtenances.

15.5 Utilities

15.5.1 Maintain profiles of utilities

15.5.2 Coordinate with other utilities to eliminate interference

15.5.3 Notify Architect/Engineer if crossing conflicts occur

16. INSTALLATION OF PIPING AND MANHOLES

16.1 Bedding

16.1.1 Excavate pipe trench as specified in Section 212316 “Trenching”

16.1.2 Place bedding material at trench bottom.

16.1.3 Level materials in continuous layer not exceeding 6 inches.

16.1.4 Maintain optimum moisture content of bedding material to attain required compaction density.

16.2 Piping

16.2.1 Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.

16.2.2 Lay pipe to slope gradients as indicated on Drawings.

16.2.3 Begin at downstream end of system and progress upstream.

16.2.4 Bedding: Install at sides and over top of pipe, to minimum compacted thickness of 12 inches.

16.2.5 Lay bell-and-spigot pipe with bells upstream.

16.2.6 Backfill and compact as specified in Section 212316 "Trenching"

16.2.7 Do not displace or damage pipe when compacting.

16.2.8 Connect to building sanitary sewer outlet and municipal sewer system.

16.2.9 Install site sanitary sewage system piping to within 5 feet of building, and connect to building sanitary waste system.

16.3 Manholes: As specified in Section 230561 "Concrete Manholes"

16.4 Backfilling

16.4.1 Backfill around sides and to top of pipe with cover fill in minimum lifts of 6 inches.

16.4.2 Tamp fill in place, and compact to 95 percent of maximum density.

16.4.3 Place and compact material immediately adjacent to pipes to avoid damage to pipe and prevent pipe misalignment.

16.4.4 Maintain optimum moisture content of bedding material as required to attain specified compaction density.

17. TOLERANCES

Maximum Variation from Indicated Slope: 1/8-inch in 10 feet.

18. FIELD QUALITY CONTROL

18.1 Request inspection by inspector prior to and immediately after placing bedding.

18.2 Testing

18.2.1 If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.

18.2.2 Perform testing on site sanitary sewage system according to the requirements of local jurisdictions.

18.2.3 Compaction Testing:
- A. Comply with ASTM D698
- B. Testing Frequency: 200 linear feet

18.3 Prepare test and inspection reports.

19. PROTECTION

19.1 Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

19.2 Cap open ends of piping during periods of Work stoppage.

End of Section 023310

SECTION 023311

PUBLIC SANITARY SEWERAGE GRAVITY PIPING

PART 1 – GENERAL

1.1 PUBLIC SANITARY SEWERAGE GRAVITY PIPING

Public sanitary sewerage shall be in accordance with the City of Wichita Specification Sections on "Sanitary Sewer Construction" and Section on "Existing Sanitary Sewer Manhole Rehabilitation"

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 023311

SECTION 023420

STORMWATER CONVEYANCE

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Storm drainage piping

1.1.2 Manholes

1.1.3 Catch basins

1.1.4 Cleanouts

1.1.5 Concrete encasement and cradles

1.2 Related Requirements

1.2.1 Section 033000 “Cast-in-Place Concrete” for concrete type for catch basin base pad construction.

1.2.2 Section 021513 “Soils for Earthwork” for soils for backfill in trenches.

1.2.3 Section 021516 “Aggregates for Earthwork” for aggregate for backfill in trenches.

1.2.4 Section 021519 “Geotextiles for Earthwork” for geotextile filter fabric.

1.2.5 Section 022115 “Excavation” for product and execution requirements for excavation and backfill as required by this Section.

1.2.6 Section 022116 “Trenching” for execution requirements for trenching as required by this Section.

1.2.7 Section 022117 “Fill” for requirements for backfill to be placed under this Section.

1.2.8 Section on “Infiltration and Exfiltration Testing."

1.2.9 Section on “Mandrel Testing."

1.2.10 Section 023156 “Concrete Manholes” for manholes and accessories as required by this Section.

2. DEFINITIONS

ABS: Acrylonitrile butadiene styrene.

3. COORDINATION

Coordinate Work of this Section with termination of storm sewer connection outside building, and connection to municipal sewer utility service.

4. SUBMITTALS

4.1 Product Data

4.1.1 Storm drainage piping

4.1.2 Manholes

4.1.3 Catch basins

4.1.4 Cleanouts

4.1.5 Concrete encasement and cradles

4.2 Field Quality-Control Reports

For storm drainage piping, manholes, catch basins, cleanouts, pile support systems, and concrete encasement and cradles.

4.3 Qualifications Statement: For manufacturer

5. QUALITY ASSURANCE

Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Inspection

Accept materials on site in manufacturer's original packaging and inspect for damage.

6.2 Store materials according to manufacturer instructions.

6.3 Protection

6.3.1 Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

6.3.2 Provide additional protection according to manufacturer instructions.

PART 2 – PRODUCTS

7. PERFORMANCE REQUIREMENTS

Perform Work according to City of Wichita Department of Public Works standards.

8. STORM DRAINAGE PIPING

8.1 Corrugated PE Piping for 3- to 6-Inch or 3- to 10-Inch Diameters

8.1.1 Pipe

A. Comply with AASHTO M252

B. Type: Smooth interior

C. Inside Nominal Diameter: As indicated on Drawings

8.2 Fittings: PE

8.3 Joints: Comply with AASHTO M252

8.4 Corrugated PE Piping for 8- to 24-Inch or 12- to 60-Inch Diameters
8.4.1 Pipe
A. Comply with AASHTO M294
B. Type: Smooth interior
C. Inside Nominal Diameter: As indicated on Drawings

8.4.2 Fittings: PE

8.4.3 Joints: Comply with AASHTO M294

9. MANHOLES
As specified in Section 023156 "Concrete Manholes"

10. CATCH BASINS
10.1 Shaft and Top Section
10.1.1 Material: Reinforced precast concrete pipe sections
10.1.2 Joints: Lipped male/female
10.1.3 Nominal Shaft Diameter: As indicated on Drawings
10.1.4 Top Section: Concentric cone

10.2 Lids and Frames
10.2.1 Materials: Cast iron
10.2.2 Lid: Hinged
10.2.3 Nominal Lid and Frame Size: As indicated on Drawings

10.3 Base Pad Material: Cast-in-place concrete, as specified in Section 033000 "Cast-in-Place Concrete"

11. CLEANOUTS
11.1 Cleanout Lids and Frames
11.1.1 Materials: Cast iron
11.1.2 Lid: Hinged
11.1.3 Nominal Lid and Frame Size: As indicated on Drawings

11.2 Base Pad Material
Cast-in-place concrete, as specified in Section 033000 "Cast-in-Place Concrete"

12. CONCRETE ENCASEMENT AND CRADLES
Concrete
12.1 Description
Reinforced concrete, as specified in Section 033000 "Cast-in-Place Concrete"

12.2 Compressive Strength
4,000 psi at 28 days, reinforced concrete, air-entrained rough troweled finish.

13. MATERIALS

Bedding and Cover

13.1 Bedding: Fill type as specified in Section 021516 "Aggregates for Earthwork"

13.2 Cover: Fill type as specified in Section 021516 "Aggregates for Earthwork"

13.3 Soil Backfill from above Pipe to Finish Grade: As specified in Section 021513 "Soils for Earthwork"

13.4 Subsoil: No rocks more than 6 inches in diameter, frozen earth, or foreign matter.

14. ACCESSORIES

Geotextile Filter Fabric: As specified in Section 021519 "Geotextiles for Earthwork"

PART 3 – EXECUTION

15. EXAMINATION

15.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

15.2 Verify that excavation base is ready to receive Work of this Section.

15.3 Verify that excavations, dimensions, and elevations are as indicated.

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

16. PREPARATION

16.1 Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

16.2 Correct over-excavation with coarse aggregate.

16.3 Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

17. INSTALLATION OF STORM DRAINAGE PIPING, CATCH BASINS, AND CLEANOUTS

17.1 Excavation and Bedding

17.1.1 Excavate trench as specified in Section 212316 "Trenching"

17.1.2 Hand trim excavation for accurate placement of piping to indicated elevations.

17.1.3 Place bedding material at trench bottom.

17.1.4 Level materials in continuous layers not exceeding 6-inch compacted depth.

17.1.5 Maintain optimum moisture content of bedding material to attain required compaction density.

17.1.6 Level fill materials in continuous layers not exceeding 6 inches in depth, and compact to 95 percent maximum density.

17.1.7 Place geotextile fabric over compacted bedding.

17.1.8 Install pipe supports and anchors.

17.2 Piping

17.1.1 Pipe, Fittings, and Accessories: Comply with ASTM D2321.

17.1.2 Seal joints watertight.

17.1.3 Cradle bottom 20 percent of pipe diameter to avoid point load.

17.1.4 Install aggregate at sides and over top of pipe.

17.1.5 Install top cover to minimum compacted thickness of 12 inches, and compact to 95 percent maximum density.

17.1.6 Backfilling and Compaction

A. As specified in Section 022117 "Fill"

B. Do not displace or damage pipe while compacting.

17.1.7 Manholes: As specified in Section 023156 "Concrete Manholes"

17.1.8 Connect to municipal storm sewer system.

17.1.9 Install site storm drainage system piping to within 5 feet of building.

17.3 Catch Basins and Cleanouts

17.3.1 Form bottom of excavation clean and smooth, and to indicated elevation.

17.3.2 Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.

17.3.3 Level top surface of base pad.

17.3.4 Sleeve concrete shaft sections to receive storm sewer pipe sections.

17.3.5 Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.

17.3.6 Mount lid and frame level in grout, secured to top section to indicated elevation.

18. TOLERANCES

Maximum Variation from Indicated Pipe Slope: 1/8-inch in 10 feet.

19. FIELD QUALITY CONTROL

19.1 Request inspection by Engineer prior to and immediately after placing aggregate cover over pipe.

19.2 Testing

19.2.1 Compaction Test

A. Comply with ASTM D698

B. Testing Frequency: Every 250 linear feet

19.2.2 Manholes: As specified in Section 230561 "Concrete Manholes"

19.2.3 Piping

A. Infiltration and Exfiltration: As specified in Section on "Infiltration and Exfiltration Testing"

B. Deflection Testing: As specified in Section on "Mandrel Testing"

19.2.4 If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.

19.3 Prepare test and inspection reports.

20. PROTECTION

Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

End of Section 023420

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

3. CODES AND STANDARDS

Perform all work in accordance with rules and regulations of authorities having jurisdiction. In the absence of other authorities comply with any State of Kansas regulations and their Adopted Building Code.

4. SUBMITTALS

4.1 Product Data: For standard factory manufactured materials.

4.2 Design Mixes

For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

4.3 Steel Reinforcement Shop Drawings

4.3.1 Include setting plans, bending diagrams, cutting lists, and other information so as to completely and unambiguously define and establish the location, spacing, size, length, bending, shape, splicing, keying at construction joints and all other pertinent information, as required. Drawings shall show bar material and grade, bar schedules, stirrup spacing, bar arrangement, tie spacing, and hoop spacing. Opposite hand reinforcing shall be detailed separately. Each shop drawing shall show splice length for every size and type of bar used, and/or mechanical connections.

4.3.2 Type, size and location of all accessories required for the proper assembling, placing and support of the reinforcement.

4.3.3 All openings, depressions, construction and control joints, trenches, sleeves, inserts and all other Project requirements affecting reinforcing details and placing.

4.3.4 Placement drawings indicating joint layout, types, location, and dimensions for all footings and foundations, walls, and slabs on grade.

4.4 Material Test Reports
From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials.

4.5 Material Certificates
Signed by manufacturers certifying that each of the following items complies with requirements:
- 4.5.1 Cementitious materials and aggregates
- 4.5.2 Form materials and form-release agents
- 4.5.3 Steel reinforcement and reinforcement accessories
- 4.5.4 Admixtures
- 4.5.5 Waterstops
- 4.5.6 Curing materials
- 4.5.7 Floor and slab treatments
- 4.5.8 Bonding agents
- 4.5.9 Adhesives
- 4.5.10 Vapor retarders
- 4.5.11 Epoxy joint filler
- 4.5.12 Joint-filler strips
- 4.5.13 Repair materials

4.6 Minutes of preinstallation conference

4.7 Floor surface flatness and levelness measurements to determine compliance with specified tolerances indicated on the Structural Drawings.

5. QUALITY ASSURANCE

5.1 Installer Qualifications
A qualified installer who employs Project personnel qualified as Flatwork Technician and Finisher and a supervisor who is a Concrete Flatwork Technician.

5.2 Responsibility
The Contractor alone shall be fully responsible for the design, strength, safety and adequacy of all formwork, shoring, bracing and all methods of construction.

5.3 Manufacturer Qualifications
A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.

5.4 Source Limitations
Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

5.5 ACI Publications
Comply with the following unless modified by requirements in the Contract Documents, current additions of ACI publications below:
5.5.1 ACI 301, "Specification for Structural Concrete."

5.5.2 ACI 318, "Building Code Requirements for Structural Concrete."

5.5.3 ACI 347, "Guide to Formwork for Concrete."

5.6 Manufacturer Qualifications
A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.

5.7 Retain paragraph below if Contractor or manufacturer selects testing agency for mix design, material test reports, or field quality control.

5.8 Testing Agency Qualifications
An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
5.8.1 Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

5.8.2 Demolish and remove mockups when directed.

5.8.3 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

5.9 Preinstallation Conference: Conduct conference at Project site.

6. DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle steel reinforcement to prevent bending and damage.
6.1 Avoid damaging coatings on steel reinforcement.

6.2 Repair any damaged epoxy coatings on steel reinforcement according to ASTM D3963.

PART 2 – PRODUCTS

7. FORM-FACING MATERIALS

7.1 Smooth-Formed Finished Concrete
Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
7.1.1 Plywood, metal, or other approved panel materials.

7.1.2 Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
A. High-density overlay, Class 1, or better.
B. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.

C. Structural 1, B-B, or better, mill oiled and edge sealed.

D. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

7.2 Rough-Formed Finished Concrete
Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

7.3 Forms for Cylindrical Columns, Pedestals, and Supports
Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

7.4 Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4- by 3/4-inch, minimum.

7.5 Form-Release Agent
Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
7.5.1 Formulate form-release agent with rust inhibitor for steel form-facing materials.

7.6 Form Ties
Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
7.6.1 Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.

7.6.2 Furnish ties with integral water-barrier plates to walls indicated to receive damp-proofing or waterproofing.

8. STEEL REINFORCEMENT

8.1 Reinforcing Bars: ASTM A615, Grade 60 (Grade 420), deformed.

8.2 Galvanized Plain-Steel Welded Wire Fabric
ASTM A185, fabricated from galvanized steel wire into flat sheets.

9. REINFORCEMENT ACCESSORIES

9.1 Bar Supports
Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber reinforced concrete of greater compressive strength than concrete, and as follows:
9.1.1 For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

9.2 Joint Dowel Bars
Plain-steel bars, ASTM A615, Grade 60 (Grade 420). Cut bars true-to-length with ends square and free of burrs.

10. CONCRETE MATERIALS

10.1 Portland Cement: ASTM C150, Type I or Type II.

10.2 Normal-Weight Aggregate
ASTM C33, uniformly graded, and as follows:
10.1.1 Nominal Maximum Aggregate Size: 3/4-inch.
10.1.2 Fine Aggregate: Washed, inert, natural sand.

10.3 Water: Potable and complying with ASTM C94.

11. CHEMICAL ADMIXTURES

11.1 General
Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

11.2 Air-Entraining Admixture: ASTM C260 (used in exterior concrete).

11.3 Water-Reducing Admixture: ASTM C494, Type A.

12. WATERSTOPS

12.1 Chemically-Resistant Flexible Waterstops
Thermoplastic elastomer rubber waterstops, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.
12.1.1 Available Products
A. JP Specialties, Inc.; Earth Shield TPE-Rubber
B. Vinylex Corp.; PetroStop
C. WESTEC Barrier Technologies, Inc.; 600 Series TPE-R

12.1.2 Profile: Ribbed with center bulb.

12.1.3 Dimensions: 4 inches by 3/16-inch thick: non-tapered.

12.2 Self-Expanding Strip Waterstops
Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
12.2.1 Products: Subject to compliance with requirements, provide one of the following:
A. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
B. Conseal CS-231; Concrete Sealants, Inc.
C. Swellseal Joint; De Neef Construction Chemicals (U.S.), Inc.
D. Hydrotite; Greenstreak.
E. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
F. Adeka Ultra Seal; Mitsubishi International Corporation.
G. Superstop; Progress Unlimited Inc.

13. VAPOR RETARDERS

13.1 Provide Vapor Retarder, seam tape, mastic, pipe boots, detail strip for installation under concrete slabs.

13.2 Plastic Vapor Retarder: ASTM E1745, Class A.

13.2.1 Product: Stego Industries, LLC; Stego Wrap, 15 mils (minimum).

13.2.2 WVTR of 0.008 gr./ft./hr. or lower as tested by ASTM E96.

13.2.3 Permeance rating of 0.01 perms or lower as tested by ASTM E96.

13.2.4 Puncture resistance of 2,200 grams minimum as tested by ASTM D1709.

13.2.5 Tensile strength of 45.6 lbf./in. minimum as tested by ASTM D882.

13.2.6 Chemical resistant with an indefinite life expectancy as tested by ASTM E154.

13.3 Accessories

13.3.1 Manufacturer's seam tape with water vapor transmission rate per ASTM E96 of 0.03 perms or lower.

13.3.2 Manufacturer's vapor proofing mastic with water vapor transmission rate per ASTM E96 of 0.08 perms or lower.

13.3.3 Pipe Boots: Construct pipe boots from vapor barrier material, pressure-sensitive tape and/or mastic per manufacturer's instructions.

13.3.4 Slab Perimeter: Stego Crete claw tape, 26 mil minimum, 6 inches wide.

13.4 Granular/Drainage Fill

Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

13.5 Fine-Graded Granular Material

Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C33 for fine aggregates.

14. FLOOR SEALER

14.1 Penetrating Sealer

Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; colorless; odorless/VOC compliant; that penetrates, hardens, and densifies concrete surfaces.

14.1.1 Available Products

A. Euclid Chemical Company (The); Euco Diamond Hard

B. L&M Construction Chemicals, Inc.; Cure Hard. (This product serves as curing compound also)

C. Sonneborn, Div. of ChemRex; Kure-N-Harden. (The manufacturer recommended this product in that the requested product, Mastertop CST, has been discontinued. Like Cure Hard, this product serves as curing compound also.)

14.1.2 Cure concrete as recommended by floor treatment manufacturer.

15. CURING MATERIALS

15.1 Evaporation Retarder
Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

15.2 Absorptive Cover
AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

15.3 Moisture-Retaining Cover
ASTM C171, polyethylene film or white burlap-polyethylene sheet.

15.4 Water: Potable

15.5 Clear, Waterborne, Membrane-Forming Curing Compound
ASTM C 309, Type 1, Class A, VOC compliant

15.5.1 Products

A. MBT Protection and Repair, Div. of ChemRex; MasterKure

B. Sonneborn, Div. of ChemRex; Kure-N-Seal

C. Euclid Chemical Company (The); Super Diamond Clear VOX

16. RELATED MATERIALS

16.1 Reglets
Fabricate reglets of not less than 0.0217-inch-thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

16.2 Dovetail Anchor Slots
Hot-dip galvanized steel sheet, not less than 0.0336-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

16.3 Expansion- and Isolation-Joint-Filler Strips
ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, Type H, granulated cork between saturated felt or glass fiber felt.

16.3.1 Provide at slab expansion and control joints, joints between floor slabs and walls, and other isolation joints.

16.4 Non shrink grout shall be a mixture of water and a specially formulated packaged mixture approved by the Architect/Engineer, such as Masterflow 713 Plus by Master Builders, EUCO N S by Euclid Chemical Co., Crystex by L and M Construction Chemicals, or Sonogrout 14K Hy Flow by Sonneborn Contech.

16.5 Semirigid Joint Filler
Two-component, semirigid, 100 percent solids, per ASTM D2240.

16.6. Bonding Agent
ASTM C1059, standard specifications for latex agents for bonding fresh to hardened concrete, Type I.
16.6.1 Product: Euclid Chemical Company (The); Euco Weld

17. CONCRETE MIXES, GENERAL

17.1 It is the intent of this Specification to secure, for every part of the work, concrete of homogeneous structure which, when hardened, will have the required strength, appearance and resistance to weathering.

17.2 Specific concrete mix design performance criteria are shown in the structural notes on the Drawings.

17.3 Basic mix proportions shall be established by the Contractor by means of current laboratory tests made with the constituents to be used in the work. If suitable data are not available, Contractor shall engage a testing laboratory to provide them.
17.3.1 Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

17.4 Admixtures: Use admixtures according to manufacturer's written instructions.

17.5 Concrete in pavements and where flat surfaces are exposed to the weather shall have an entrained air content of 5 percent ± 1 percent. All other concrete shall have an entrained air content as desired by Contractor. (Verify with Structural Engineer.)

17.6 No concrete may be placed in the work until the appropriate design mix has been reviewed and accepted by the Architect/Engineer.

17.7 If, during the progress of the work, any difficulty should occur in securing concrete of the required workability and strength, the Architect may order such changes in the proportions or materials, or both, as may be necessary. Any changes so ordered shall be made at the Contractor's expense.

18. FABRICATING REINFORCEMENT

Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

19. CONCRETE MIXING

19.1 Ready-Mixed Concrete
Measure, batch, mix, and deliver concrete according to ASTM C94 and ASTM C1116, and furnish batch ticket information.
19.1.1 When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1 1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

19.1.2 All concrete shall be ready mixed produced by a plant acceptable to the Architect. All constituents, including admixtures, shall be batched at the central batch plant.

19.2 Cold Weather Requirements
When the air temperature is at or below 45 degrees F, or when weather reports indicate that the air temperature may fall below 45 degrees F within 24 hours immediately following the completion of concrete placement, the mixing water and, if necessary, the aggregates shall be heated so that the concrete shall have a temperature of 55 degrees to 80 degrees when placed. If the mixing water is heated, it shall not have a temperature in excess of 140 degrees F at the time it is added to the cement and aggregates.

19.3 Hot Weather Requirements
During hot weather, the concrete shall, at the time it is placed, have a temperature from 55 to 80 degrees F but never above 90 degrees F. Provide crushed ice in lieu of equal weight of mixing water if necessary. Ice must be completely dissolved before placing.

PART 3 – EXECUTION

20. FORMWORK

20.1 Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

20.2 Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

20.3 Construct forms tight enough to prevent loss of concrete mortar.

20.4 Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
20.4.1 Do not use rust-stained steel form-facing material.

20.5 Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

20.6 Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

20.7 Chamfer exterior corners and edges of permanently exposed concrete.

20.8 Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

20.9 Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

20.10 Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

20.11 Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

21. EMBEDDED ITEMS

Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

21.1 Install anchor bolts, accurately located, to elevations required.

21.2 Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

21.3 Install dovetail anchor slots in concrete structures as indicated.

22. REMOVING AND REUSING FORMS

Leave formwork for walls and other structural elements, that supports weight of concrete in place until concrete has achieved the following:

22.1 At least 75 percent of 28-day design compressive strength.

22.2 Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

22.3 When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

23. SHORES

Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring.

24. VAPOR RETARDERS

24.1 Ensure that subsoil is approved by geotechnical firm.

24.1.1 Level and tamp or roll granular fill per requirements in the geotechnical report.

24.2 Installation of Vapor Retarders

Place, protect, and repair vapor retarders according to ASTM E1643 and manufacturer’s written instructions.

24.2.1 Unroll vapor retarder with the longest dimension parallel with the direction of the pour.

24.2.2 Lap vapor retarder over footings or seal to foundation walls.

24.2.3 Lap joints 6 inches and seal with manufacturer’s recommended tape.

24.2.4 Seal all penetrations (including pipes) per manufacturer’s instructions.

24.2.5 No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.

24.2.6 Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all 4 sides with tape.

25. STEEL REINFORCEMENT

25.1 General

Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

25.1.1 Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

25.2 Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

25.3 Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

25.4 Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

25.5 Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

25.6 Bending, tack welding, cutting or substituting reinforcement in the field, other than shown on the Contract Drawings, in any manner is prohibited, unless specific approval for each case is given by the Architect or his designate.

25.7 Before concrete is cast, check all reinforcement after it is placed to ensure that reinforcement conforms to Contract Drawings and approved shop detail drawings and Specification requirements. Such checking shall be done only by qualified, experienced personnel. In addition, the Architect's representative shall be notified at least 36 hours prior to concrete placement and given the opportunity to inspect the completed reinforcement and formwork before concrete placement.

26. JOINTS

26.1 General

Construct joints true to line with faces perpendicular to surface plane of concrete.

26.2 Construction Joints

Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

26.2.1 Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

26.2.2 Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

26.2.3 Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

26.2.4 Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

26.3 Contraction Joints in Slabs-on-Grade

Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one fourth of concrete thickness, as follows:

26.3.1 Sawed Joints

Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

26.4 Isolation Joints in Slabs-on-Grade

After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

26.4.1 Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

26.4.2 Terminate full-width joint-filler strips not less than 1/2-inch or more than 1 inch below finished concrete surface where joint sealants are indicated.

26.4.3 Install joint-filler strips in lengths as long as practicable. Where more than one (1) length is required, lace or clip sections together.

26.5 Dowel Joints

Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

26.5.1 Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

27. WATERSTOPS

27.1 Flexible Waterstops

Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

27.2 Self-Expanding Strip Waterstops

Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

28. CONCRETE PLACEMENT

28.1 Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

28.2 Remove water and all foreign matter from place of deposit.

28.3 Transport concrete mixes to place of final deposit as rapidly as practical by methods, which prevent segregation.

28.4 Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect/engineer.

28.4.1 Water may be added at site for waterproof concrete only, when and as required by the Integral Waterproofing Admix manufacturer.

28.5 Concrete shall be placed in such a manner as will prevent segregation.

28.6 Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

28.6.1 Deposit concrete in horizontal layers of depth to not exceed 18 inches, formwork design pressures, and in a manner to avoid inclined construction joints.

28.6.2 Consolidate placed concrete, during and immediately after depositing, with mechanical vibrating equipment according to ACI 301.

28.6.3 Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least six (6) inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

28.7 Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

28.7.1 Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

28.7.2 Maintain reinforcement in position on chairs during concrete placement.

28.7.3 Screed slab surfaces with a straightedge and strike off to provide finished surface at exact elevations shown on Drawings. The slab thickness shall be increased where necessary to compensate for all settlements and deflection due to the weight of the wet concrete.

28.7.4 Slope surfaces uniformly to drains where required.

28.7.5 Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

28.8 Calcium chloride shall not be used anywhere on the site for any purpose.

28.9 Cold-Weather Placement

Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

28.9.1 When average high and low temperature is expected to fall below 40 degrees F for three (3) successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

28.9.2 Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

28.9.3 Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

28.10 Hot-Weather Placement

Comply with ACI 301 and as follows:

28.10.1 Maintain concrete temperature from 55 to 80 degrees F but never above 90 degrees F at time of placement.

28.10.2 Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

28.11 Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each placement.

29. FINISHING FORMED SURFACES

29.1 Smooth-Formed Finish

As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8-inch in height.

29.1.1 Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, or painting.

29.1.2 Do not apply rubbed finish to smooth-formed finish.

29.2 Related Unformed Surfaces

At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

30. FINISHING FLOORS AND SLABS

30.1 General

Comply with recommendations in ACI 302.1R for screeding, re-straightening, and Finishing operations for concrete surfaces. Do not wet concrete surfaces.

30.2 Scratch Finish

While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.

30.2.1 Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes (verify finish with flooring suppliers).

30.3 Float Finish

Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

30.3.1 Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing.

30.4 Trowel Finish

After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

30.4.1 Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system

30.4.2 Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E1155 for a randomly-trafficked floor surface:

A. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade

30.4.3 Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot-long straightedge, resting on 2 high spots and placed anywhere on the surface, does not exceed the following:

A. 1/4-inch

30.5 Trowel and Fine-Broom Finish

Apply a first trowel finish to surfaces where ceramic or quarry tile, or terrazzo (verify final finish required for terrazzo with installer) is to be installed by thin set method. While concrete is still plastic, slightly scarify surface with a fine broom.

30.5.1 Comply with flatness and levelness tolerances for trowel finished floor surfaces.

30.6 Broom Finish

Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

30.6.1 Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

31. MISCELLANEOUS CONCRETE ITEMS

31.1 Filling In

Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

31.2 Curbs

Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.1.3 Equipment Bases and Foundations

Provide machine and equipment bases and foundations as shown on Mechanical Drawings and as directed by equipment suppliers. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

32. CONCRETE PROTECTION AND CURING

32.1 General

Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 301 for hot-weather protection during curing.

32.2 Evaporation Retarder

Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

32.3 Formed Surfaces

Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

32.4 Unformed Surfaces

Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

32.4.1 Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days with the following materials:

A. Water

B. Continuous water-fog spray

C. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

32.4.2 Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

A. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

B. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

C. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

32.4.3 Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

32.4.4 Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

33. FLOOR SEALER

33.1 Penetrating Liquid Floor Treatment

Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

33.2 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.

34. JOINT FILLING

34.1 Prepare, clean, and install joint filler according to manufacturer's written instructions.

34.1.1 Defer joint filling until concrete has aged at least three (3) months. Do not fill joints until construction traffic has permanently ceased.

34.2 Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

34.3 Install semi-rigid joint filler full depth in saw-cut joints and at least two (2) inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

35. CONCRETE SURFACE REPAIRS

35.1 Defective Concrete

Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

35.2 Concrete surfaces shall be repaired by using either the same material as originally cast or by use of a dry pack material. Areas affected shall be chipped back square and to a depth of 1 inch minimum. Holes shall then be moistened with water for minimum of two (2) hours. Then followed by a brush coat of EUCO WELD as manufactured by Euclid Chemical Co. As soon as EUCO WELD becomes tacky, immediately plug the hole with a dry pack material consisting of 1:1 1/2 mixture of cement and concrete sand mixed slightly damp to the touch. Hammer the dry pack into the hole until dense and excess of paste appears on the surface. Finish the patch to the same texture as surrounding concrete. Color of patch after curing shall match adjacent concrete exactly. Adjust color if necessary using white cement or limestone aggregate.

35.2.1 Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

35.3 Perform structural repairs of concrete, subject to Architect’s approval, using epoxy adhesive and patching mortar.

35.4 Repair materials and installation not specified above may be used, subject to Architect’s approval.

36. FIELD QUALITY CONTROL

36.1 Testing Agency

General Contractor shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, submit test reports during concrete placement, and prepare Special Inspection test reports.

36.2 Testing Services

Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:

36.2.1 Testing Frequency: Obtain one composite sample, consisting of a set of three (3) cylinders, for each days casting or every 50 cu. yd., but not less than ACI 318-02 or local building code requirements.

36.2.2 Slump: ASTM C143; one (1) test at point of placement for each composite sample, but not less than 1 test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

36.2.3 Air Content: ASTM C231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one (1) test for each day's pour of each concrete mix.

36.2.4 Concrete Temperature: ASTM C1064; 1 test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test for each composite sample.

36.2.5 Those portions of the structure that do not meet the Contract requirements shall be corrected or removed and replaced as directed by the Architect, and all cost of correction, removal and replacement shall be at the Contractor's expense.

36.2.6 The Contractor shall notify the Architect and testing agency not less than 24 hours in advance of the starting of any Project concrete operations.

36.2.7 The Contractor shall cooperate by allowing clear and safe access to the work for sampling, inspection and storage of specimens and equipment. He shall construct a storage box on the site of sufficient size to store 24 cylinders and which will afford the protection required by ASTM C31.

36.3. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

36.4 Nondestructive Testing
Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

36.5 Additional Tests
Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by Architect.

36.6 Vapor retarder shall be inspected and approved by manufacturer's representative and photographed for documentation before beginning of any concrete installation.

End of Section 033000

SECTION 03314

PRESTRESSED CONCRETE

1. GENERAL

1.1 All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

1.2 This contractor is to coordinate with the supplier on production, delivery and erection. The precast cost includes material, grouting and erection.

1.3 No hand or explosive driven inserts, anchors, or drive-ins of any kind shall be used in the area of the prestressing strand without prior written consent of the Architect and/or Engineer.

1.4 The fabricator shall provide for all openings shown on structural drawings in the precast slab 12 inches or greater in diameter. Holes not provided by the fabricator shall be cut with a power drill on the job by the trade involved. Inserts for lighting fixtures, ducts, plumbing, etc., shall be as designated by the plans and specifications. The General Contractor shall be responsible for coordinating and furnishing all necessary information concerning location and size of openings 12 inches, or greater, and inserts to the fabricator. Location of all block-outs and inserts shall be shown on the shop drawings for approval of the Architect.

2. WORK INCLUDED

2.1 The Contractor shall furnish all labor and materials to complete all Prestress Concrete work required by the drawings and/or herein specified as follows:

2.2 Fabrication of all Prestress twin tees, beams, floor slabs, architectural panels and columns herein specified or shown on the drawings, and that may be required for a complete job.

2.3 Transporting and erection of prestress structural system.

2.4 Cast in openings for other trades.

2.5 Furnish all shop drawings, plant, labor, equipment and materials and perform all operations, in connection with the manufacture and installation of all prestressed precast concrete, complete, in strict accordance with these specifications and subject to the terms and conditions of the contract.

3. WORK NOT INCLUDED

3.1 Concrete topping is specified under Section “C”, Concrete Poured in Place, of these specifications.

4. MATERIALS

4.1 Design and proportioning of concrete mixes shall be the responsibility of the manufacturer and shall provide ultimate compressive strength as required by structural design.

4.2 Suitable admixtures may be used to increase the workability and durability of the concrete provided that they contain no calcium chloride.

All materials shall be in accordance with current ASTM Specifications.

4.2.1	Prestressing Strands	ASTM A416
4.2.2	Prestressing Wire	ASTM A421
4.2.3	Reinforcing Bars	ASTM A615
4.2.4	Welded Wire Mesh	ASTM A185
4.2.5	Structural steel	ASTM A36
4.2.6	Aggregates:	
	(1) Sand and gravel	ASTM C33
	(2) Lightweight	ASTM C330
4.2.7	Portland Cement	ASTM C150

4.2.8 Water used in mixing concrete shall be clean and free of injurious amount of oils, acids, alkalis, organic materials, or other deleterious substances.

5. DESIGN

All design of prestressed/precast members shall be done in strict accordance with procedures set forth in ACI 318 "Building Code Requirements for Reinforced Concrete" and "PCI Design Handbook", most recent edition. Architectural wall panels shall be reinforced to qualify for reinforced concrete per Chapter 26 for Seismic Zone 2 as minimum. Supporting and supplementary calculations of prestressed/precast concrete members and connections to be by a registered engineer experienced in prestress/precast concrete design and submitted for approval by the responsible design engineer prior to fabrication. Refer to plans for design loading criteria of Prestress/precast members and connections.

6. FABRICATION

6.1 The manufacturing plant and methods shall conform to the "Prestressed Concrete Institute Manual for Quality Control" MNL-116.

6.2 At least three (3) standard concrete test specimens shall be prepared for each production line at the time the concrete is deposited to determine the concrete strengths prior to detensioning or other designated age. Other methods of determining concrete strength shall be approved by the Architect prior to fabrication.

6.3 The dimensions of the members shall be as shown on the plans with a cross-section dimension tolerance of 3/16-inch and a length dimension tolerance of 1/2-inch. Ends shall be square and plumb with a tolerance of 1/4-inch vertically and horizontally. Straightness variation: 1/4-inch up to 40 feet, 3/8-inch up to 60 feet and 1/2-inch over 60 feet. Camber variation in members of the same length shall not exceed 1/8-inch x length in ft. or 3/4-inch.

7. CONCRETE FINISHES

Unless otherwise noted on the plans all prestressed members (excluding architectural panels) shall have a "standard finish".

7.1 Standard Finish: Form finish as obtained with a well-designed mix and proper vibration with no special finishing required.

7.2 Architectural Panels: The exterior face is to be "beige" concrete (per architect's approved color) with a light sand blast. **Refer to plans for details**. These panels have a brick finish to 17 ft.-4 in. The upper portion of the wall has rustication joints dividing the panel into 2 x 4 ft. sections. Vertical dovetail joints cast into the panel at 24 inches O.C.

7.3 Concrete Columns: Shall be 24-inch diameter cast in place, light sand blast, height varies, refer to plans.

8. ERECTION

8.1 Extreme care shall be used in transporting the prestressed units to the jobsite. Members shall be handled in such a manner as to prevent excessive stresses and damage due to chipping, spalling and undesirable cracking.

8.2 The prestressed members shall be lifted by means of suitable lift rings or lifting devices at points provided by fabricator or as shown by shop drawings. Members shall be stored in a manner to prevent the occurrence of excessive stresses and undesirable cracking. If jobsite stockpiling is necessary, the General Contractor shall provide areas well graded for drainage and satisfactory to the fabricator.

8.3 Precast-prestressed members shall be erected at the jobsite by a qualified erector.

8.4 Field welding of bearing plates, connections and weld tabs shall be accomplished with a qualified welder.

8.5 Grouting of keyed joints and connections shall be accomplished using an approved mix of consistency suitable to fill the voids and provide required strength.

8.6 Any excessive variation in camber between adjacent members shall be reasonable leveled out by jacking or loading adjacent members as recommended by the fabricator prior to welding or grouting the edges together.

8.7 Prestressed and precast products damaged in shipment or placement may be accepted provided the damage does not impair the structural qualities of the member and such damage can be repaired in a neat, slightly manner at the site.

8.8 Baring pads on double tee shall be a minimum of 1/4 inch neoprene.

9. FILLER BLOCKS

9.1 Precast filler blocks to close spaces between joists where shown on the plans shall be provided under this section of the specifications.

End of Section 033140

SECTION 033536

POLISHED AND DYED CONCRETE FLOOR SYSTEM

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Polished concrete floor systems are included as an Alternate.

2.2 Related Requirements
Section 033000 "Cast-in-Place Concrete" for concrete not designated as polished concrete.

3. SYSTEM DESCRIPTION

3.1 Installation of polished concrete floor system for new interior concrete floors by dry grinding and polishing with various size grit metal-bonded and resin-bonded diamonds and application of concrete densifier.

3.2 Performance Requirements
Improve performance of floor by installation of polished concrete floor system as measured by the following criteria:

3.2.1 Static Coefficient of Friction: Comply with applicable requirements of 2010 ASA for walkway surfaces.

3.2.2 Specular Gloss/Reflectance: Comply with ASTM D 523.

4. SUBMITTALS

4.1 Product Data
Manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.

4.2 Samples
Submit installer's samples of penetrating dye colors.

4.3 Installer's Certification
Submit IPCI certification of installer and installer's employees.

4.4 Installer's Project References
Submit installer's list of successfully completed polished concrete floor system projects, including project name and location, name of architect, and type of quantity of polished concrete floor system installed.

4.5 Maintenance Manual
Submit installer's maintenance manual, including maintenance and cleaning instructions for polished concrete floor system.

5. QUALITY ASSURANCE

5.1 Installer's Qualifications

5.1.1 Certified IPCI Installer

5.1.2 Employ IPCI Certified Craftsmen for installation of polished concrete floor system.

5.2 Source Limitations

Obtain each type or class of dyes and sealers through one (1) source, from a single manufacturer.

5.3 Mockups

Before application of chemical dyes to concrete, build mockups to verify selections made under sample submittals and to demonstrate typical finishes, textures, tolerances, and standards of workmanship.

5.3.1 Build mockups in the location and of the size as directed by Architect.

5.3.2 Obtain approval of the mockups prior to proceeding with the Work included in the scope of this project.

5.4 Pre-installation Meeting

5.4.1 Convene pre-installation meeting before start of installation of polished concrete floor system.

5.4.2 Require attendance of parties directly affecting work of this Section, including Owner, Contractor, Architect, and installer.

5.4.3 Review examination, surface preparation, installation, field quality control, protection, and coordination with other work.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Delivery

Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

6.2 Storage

6.2.1 Store materials in clean, dry area indoors, in accordance with manufacturer instructions.

6.2.2 Keep materials from freezing.

6.3 Handling

Protect materials during handling and application to prevent contamination or damage.

PART 2 – PRODUCTS

7. INSTALLER

Consult IPCI to find certified IPCI installers.
International Polished Concrete Institute, P.O. Box 1174, Norris, Tennessee, 37828.

Toll Free: (866) 421-9550. Phone (865) 494-7881. Web: www.ipcionline.org.
email: info@ipcionline.org.

8. EQUIPMENT TO BE USED FOR INSTALLATION

8.1 Floor Grinder

- 8.1.1 Model: Concrete Polishing Solutions “G-320” or equivalent.
- 8.1.2 Type: Multi-orbital, planetary-action, opposing-rotational, diamond-headed floor grinder
- 8.1.3 Weight: 850 lbs.
- 8.1.4 Grinding pressure: 675 lbs.
- 8.1.5 Grinding width: 32 inches
- 8.1.6 Motor: 15 HP
- 8.1.7 Maximum RPM: 1750
- 8.1.8 Head: 3-head system contours to floor surface

8.2 Floor Grinder

Concrete Polishing Solutions (or equivalent) model as determined by installer to perform required grinding and polishing of concrete floor.

8.3 Vacuum System

- 8.3.1 Model: Concrete Polishing Solutions “CAT 5 Dust Extractor”, or equivalent.
- 8.3.2 Filtration: Direct-connect, HEPA filtration system.

8.4 Vacuum System

Concrete Polishing Solutions (or equivalent) model as determined by installer to perform required dust extraction during grinding and polishing of concrete floor.

8.5 Diamond Tooling for Coating Removal, Initial Grinding, and Preparing Floor for Polishing:

- 8.5.1 Concrete Polishing Solutions “MFL” 80-grit metal-bonded diamonds (or equivalent).
- 8.5.2 Concrete Polishing Solutions “MFL” 150-grit metal-bonded diamonds (or equivalent).

8.6 Diamond Tooling for Polishing Concrete
8.6.1 Concrete Polishing Solutions "GST" 100-grit resin-bonded diamonds (or equivalent).

8.6.2 Concrete Polishing Solutions "GST" 200-grit resin-bonded diamonds (or equivalent).
8.6.3 Concrete Polishing Solutions "GST" 400-grit resin-bonded diamonds (or equivalent).

8.6.4 Concrete Polishing Solutions "GST" 800-grit resin-bonded diamonds (or equivalent).

9. MATERIALS

9.1 Concrete Densifier
Concrete Polishing Solutions "Armor Densifier MFL" (or equivalent).
9.1.1 Permanent sealing, densifying, and hardening compound for concrete.

9.1.2 Odorless

9.2 Concrete Sealer
Concrete Polishing Solutions "Armor Surface Sheild MFL" (or equivalent penetrating sealer).

PART 3 – EXECUTION

10. EXAMINATION

10.1 Examine floor to receive polished and dyed concrete floor system.

10.2 Notify Architect of conditions that would adversely affect installation or subsequent use.

10.3 Do not begin surface preparation or installation until unacceptable conditions are corrected.

10.4 Verify the Following for New Concrete Floors
10.4.1 Floor Finish
A. Slabs and flatwork shall be placed and finished monolithically
B. Strike off and laser screed slabs to true, plane surfaces at required elevations
C. Thoroughly compact concrete with vibrators, floats, and tampers to force coarse aggregate below the surface
D. Power trowel with no hard finishing
E. Pan float
F. Steel finish
G. Surface should not be burned due to excessive troweling
H. Imprints are not acceptable (ie., boots, foreign objects dropped onto concrete)

10.4.2 Floor and Joints
- A. Free of debris and excessive dirt, dust, clay, and mud
- B. Dry

10.4.3 Floor Surface Profile
- A. Floor Flatness Number (FF): 50 (preferred), 45 (minimum)
- B. Floor Levelness Number (FL): 35 (preferred), 30 (minimum)

10.4.4 Concrete Compressive Strength: 3,500 psi to 5,000 psi.

10.4.5 Concrete Curing: Minimum eight (8) days' water-cured or dissipating curing compound applied.

10.4.6 Concrete Adjacent to Floor Penetrations: Troweled flat and level with surrounding concrete.

11. SURFACE REPARATION

11.1 Protection

Protect surrounding areas and adjacent surfaces from the following:

11.1.1 Accumulation of dust from grinding and polishing

11.1.2 Contact with overspray of concrete densifier

11.1.3 Contact with overspray of concrete sealer

11.2 Surface Preparation

Prepare surfaces in accordance with installer's instructions.

11.3 Clean Surfaces

Remove dirt, debris, oil, grease, curing agents, bond breakers, paint, coatings, and other surface contaminants which could adversely affect installation of polished concrete floor system.

12. INSTALLATION

12.1 Install polished concrete floor system in accordance with installer's instructions at locations indicated on the Drawings.

12.2 Aggregate Exposure

Cream Aggregate: Minimal to no course aggregate exposure.

12.3 Polished Concrete Floor System

IPCI Sheen Level 3 – High Sheen

12.3.1 Preparation Step: Remove floor coatings and level floor by grinding with 80-grit metal-bonded diamonds.

12.3.2 Apply concrete densifier to deeply saturate floor.

12.3.3 Remove residue of concrete densifier dried on floor surface by grinding with 150-grit metal-bonded diamonds.

12.3.4 Floor Closure Polishing

A. Remove 150-grit metal-bonded diamond scratches by grinding with a 100-grit resin-bonded diamonds.

B. Remove 150-grit metal-bonded diamond scratches and 100-grit resin-bonded diamond scratches by grinding with a 200-grit resin-bonded diamonds.

C. Prepare floor for polishing by grinding with 400-grit resin-bonded diamonds.

D. Grind with 800-grit resin-bonded diamonds.

12.3.5 Apply concrete sealer.

13. FIELD QUALITY CONTROL

13.1 Inspect completed polished concrete floor system with Owner, Contractor, Architect, and Installer.

13.2 Review procedures with Architect to correct unacceptable areas of completed polished concrete floor system.

13.3 Testing

Test the following from completed polished concrete floor system:

13.3.1 Static Coefficient of Friction, ASTM C1028:

A. Dry surface

B. West surface

13.3.2 Specular Gloss/Reflectance, ASTM D523:

A. 20 degrees

B. 60 degrees

C. 85 degrees

13.3.3 Floor Surface Profiles, ASTM E1155:

A. Floor Flatness Number (FF)

B. Floor Levelness Number (FL)

13.4 Test Results

13.4.1 Report test results in writing to Owner, Contractor, and Architect within 24 hours after tests.

13.4.2 Compare test results performed before and after installation of polished concrete floor system.

14. PROTECTION

14.1 Protect completed polished and dyed concrete floor system from damage until Substantial Completion.

14.1.1 Do not allow vehicle and pedestrian traffic on unprotected floor.

14.1.2 Do not allow construction materials, equipment, and tools on unprotected floor.

14.1.3 Utilize non-marking tires and diapers for lifts and other equipment working over concrete polished floor surfaces.

14.2 Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed polished concrete floor system.

14.3 Repair damaged areas of completed polished concrete floor system to satisfaction of Architect.

14.3.1 Concrete slabs scheduled to receive chemical dye and polishing that become soiled or discolored by construction employees or construction equipment shall be replaced or shall receive abrasive blast ad directed by the Architect, and chemical dye and polishing system shall be reapplied.

End of Section 033536

SECTION 034000

PRECAST STRUCTURAL CONCRETE COMPONENTS

PART 1 – GENERAL

1. DESCRIPTION

1.1 Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 This section covers the provision and installation of precast concrete components, as shown on the Drawings as applicable, and specified herein, including but not limited to: the steel reinforcement, steel embedment plates, required sleeves, finished exposed surfaces, anti-graffiti system, preparation of setting surface, adhesive, fasteners, and anchor clip assemblies.

1.3 Acceptable designs of the precast concrete components are provided as shown on the Drawings. The Contractor may use this design for this Work or may propose alternate designs of the corresponding components as follows:

A. All provisions of this Specification shall apply to the Contractor proposed design.

B. Alternate designs shall be approved by Architect, prior to order.

1.4 This section includes finishing and staining/coating of exposed faces of the precast concrete components as indicated on Drawings or described herein.

1.5 This section covers furnishing and installing an anti-graffiti coating system applied to exterior exposed surfaces, precast units, cast-in-place concrete and stone piers (all exposed surfaces).

2. RELATED WORK

2.1 Section 03300 – “Concrete”

2.2 Section 04200 – “Masonry”

3. QUALITY ASSURANCE

3.1 Manufacturer’s Qualifications: Prior to commencement of work, Contractor shall submit documentation regarding the experience of his precast concrete supplier in the design and manufacture of Precast Concrete structures and custom units. Design, fabrication, delivery, and erection shall conform to ACI 318-02. Perform all welding in accordance with AWS D1.1.

3.2 Precast concrete manufacturer’s qualified Registered Professional Structural Engineer to certify that precast reinforced concrete conforms to specified requirements and loads.

3.3 Codes and regulations of the Federal, State, and County authorities shall apply.

3.4 Fabricate to dimensions shown or approved. Replace or correct precast concrete components which do not comply with the individual dimensions and tolerances.

3.5 Before starting production of precast concrete components, furnish at the site, two complete precast concrete components to demonstrate quality of construction. Commence production of precast concrete components only after written approval.

3.6 Design Criteria

3.6.1 The precast concrete components shall be of the following type, style, and size:

A. Type: Precast concrete, reinforced.

B. Size: Exterior dimensions as indicated on plans.

3.6.2 The precast components shall be capable of structurally supporting imposed service live loads based on cast stone thickness, dimensions, and heights, including material composition and element sectional properties, mortar and grout, reinforcement and load bearing locations. Verify and coordinate with cast stone manufacturer prior to manufacturing precast concrete component units.

3.6.3 The Contractor shall submit in accordance with Section 01300 – "Submittals" for review and approval, 5 sets of design documentation showing structural design of the precast components. This documentation shall include dimensions, methods of construction, and calculations. All design calculations and drawings shall be signed and sealed by qualified Professional Structural Engineer, registered in the State of Kansas.

3.7 Functional Load Tests

Construction shall pass all required Load Tests. Contractor shall cover cost of required testing.

4. MANUFACTURER / INSTALLER QUALIFICATIONS

4.1 Precast concrete components shall be product of manufacturer / installer who has a minimum of 3 years' experience in fabrication and erection of the precast concrete units similar in material design and extent to that indicated on the drawings and specified herein.

4.2 Supply and Installation of fastener system shall be a product of manufacturer and installer both who have had a minimum of 3 years' experience of installation of similar design as indicated on the drawing.

4.3 Precast manufacturer plant(s) used to be National Precast Concrete Association (NPCA) certified.

5. SUBMITTALS

5.1 Submit in accordance with Section 01300 – "Submittals"

5.1.1 Samples: all fastening systems; mounting hardware and exposed surface finishes including, but not limited to, the following:

A. Stainless Steel Bolts, Nuts and Washers

B. Tamper Proof Stainless Steel Bolts

C. Stainless Steel Expansion Anchors, bolts and pins

D. Shims

E. Exposed back of precast concrete units with specified finish and anti-graffiti system installed before shipment.

F. Exposed front of precast concrete units/components with coating applied.

G. Adhesives and grouts.

5.2 Shop Drawings

Complete shop and erection drawings of all precast concrete units, showing all dimensions and details of construction, installation and relation to adjoining work, reinforcements, anchorage, attachments, inserts, location of all predrilled sleeves and other items to be

installed in the work of other trades, joint treatment, joint alignment coordinated with cap stone joints, cap stone load bearing locations, if applicable, and other work required for a complete installation. Provide evidence that the Contractor to be installing the cast in place concrete foundations for the precast concrete components and units has been contacted prior to any work relating to the footings for the concrete component construction and that the construction of the concrete support work has been coordinated with the precast concrete unit manufacturer and installer.

5.3 Manufacturer's Literature and Data

A. Each type of Concrete Fastener, including adhesive and anchor devices

B. Instructions for final cleaning

C. Concrete stain/coating, including color charts of manufacturers standard color palette

5.4 Certificates

Manufacturers qualifications specifying precast concrete units meet the requirements of ACI 533.3R and as specified.

6. DELIVERY, STORAGE

Ship precast concrete units to site with adequate protection to prevent chipping, breaking and other damage. Materials shall be marked giving proper identifications and location. Store materials in protected areas to prevent damage, injurious effects of weather and inclusion of foreign matter.

7. COORDINATION

Coordinate the manufacture and erection of precast concrete units with related work of other sections of the Specifications. Provide templates for inserts and other devices for anchoring precast concrete units to the work of other trades, in sufficient time to be built into adjoining construction. Perform cutting, fitting, and other related work in connection with erection of precast concrete unit work. See Shop Drawing section for details regarding the coordination of work.

8. GUARANTEE

Guarantee precast concrete unit work, including anchorage, joint treatment and related components to be free from all defects in materials and workmanship, including cracking and spalling, and after erection, completed work will be subject to terms of "Guaranty" article in Division 1 Specification Sections except that guarantee period is one year.

9. APPLICABLE PUBLICATIONS

9.1 The publications listed below from a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

9.2 Federal Specifications (Fed. Spec.):

QQ-S-766C (5)	Steel Plates, Sheets, and Strip-Corrosion Resisting
QQ-W-423B	Wire, Steel, Corrosive-Resisting
TT-S-00227E (3)	Sealing Compound: Elastomeric Type, Multi-Component (For Caulking, Sealing, and Glazing in Building and Other Structures)
TT-S-00230C (2)	Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Building and Other Structures)

9.3 American Concrete Institute (ACI) Publications:

ACI 533.3R-70	Fabrication, Handling and Erection of Precast Concrete
ACI 318	Building Code Requirements for Reinforced Concrete

9.4 American Society for Testing Materials (ASTM) Standards:

A36	Standard Specification for Carbon Structural Steel
A185	Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement Welded
A615-87	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C33-86	Concrete Aggregates
C150-86	Portland Cement
C260	Air Entraining Admixture
C494	Water Reducing Admixture

9.5 American Welding Society (AWS) Publications:

AWS D1.1-90	Structural Welding Code
AWS D1.4-80	Welding Reinforcing Steel

PART 2 – PRODUCTS

10. ACCEPTABLE MANUFACTURER/DESIGN

10.1 Acceptable Manufacturers

The following are approved manufacturers:

A. Concrete Industries, Inc., 6300 Cornhusker Highway, Lincoln, NE 68507
Phone: 402-434-1800

B. Coreslab OKC, 817 SE 55th Street, Oklahoma City, OK 73129
Phone: 405-409-5265; Contact: Chad Devarenne, email: CDevarenne@coreslab.com

C. Enterprise Precast Concrete, 6731 West 121st Street, Suite 203,
Overland Park, KS 66209
Phone: 913-312-5616; Contact: Dirk McClure,
email: DMcClure@enterpriseprecast.com

D. Omega Concrete Systems, Inc., 5525 Kaw Drive, Kansas City, KS 66102
Phone: 913- 777-5833; Contact: Keith Jensen, email: K.Jensen@omegacon.net

E. Prestressed Concrete Construction, 2800 Old Hwy 81, Newton, KS 67114
Phone: 316-283-2277; Contact: Mike Smith, PE, email: MSmith@preconc.com

F. Tulsa Dynaspan (Arrowhead Precast), 1701 E. Houston St.,
Broken Arrow, OK 74012
Phone: 918-557-3830; Contact: Mark Carr, email: MCarr@arrowheadprecast.com

G. An approved equal manufacturer.

10.2 Coarse Aggregate

Hard durable aggregate carefully graded from coarse to fine in proportions required to match approved samples.

10.3 Portland Cement

ASTM C150, Type I and Type II; Color as required.

10.4 Steel Wire Reinforcement

ASTM A82, cold drawn.

10.5 Reinforcing Steel

ASTM A615, deformed, Grade 60.

10.6 Miscellaneous Galvanized Steel Items
Bolts, nuts, washers, anchors, inserts, and the like for handling, erection, or use by other trades.

10.7 Back-up Material
Closed sell neoprene, butyl, polyurethane, vinyl or polyethylene foam rod, diameter approximately 1-1/3 times the joint width.

10.8 Bond Breakers if Used
Type and material recommended by sealant manufacturer.

10.9 Sealing Compound if Used
Fed. Spec. TT-S-00230 C, Type II, Class A, or ASTM C 920-87, Type S, Grade NS, Class 25.

11. FABRICATION

Precast concrete units shall NOT be: fabricated, delivered or incorporated in the work until samples and mock-up have been approved. Precast concrete shall comply with ACI 533.3R, expect as modified herein.

11.1 Concrete for precast concrete units shall have minimum compressive strength of 4,000 psi at 28 days.

11.2 Provide additional steel reinforcing as required for casting, handling, and erection loads.

11.3 Back-up Mix
Porosity, strength, weight, and gradation of coarse aggregate shall be as required to produce specified characteristics.

11.4 Precast concrete units/components shall be cast in steel forms designed to suit shape and finish required and to withstand high frequency vibration. Concrete shall be deposited in plastic lined or metal forms that are true to line and plane. Vibrations, where required, shall be continuous during process of casting to attain through compaction, complete embedment of reinforcement and to assure concrete of uniform and maximum density without segregation of mix and full thickness of precast element is attained.

11.4.1 Anchors, lifting devices, provisions for cutouts and openings, dovetail slots, notches, reglets, inserts and similar items required for the work of other trades shall be accurately positioned in forms before casting elements.

11.4.2 All fastener location holes, including those for anchoring of units shall be cast into units. Drilling to precast concrete units, after fabrication, shall only be acceptable for bottom attachment to concrete base and for anchoring the capstones set on top of the units.

11.4.3 Identification
Provide permanent markings to identify pick-up points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface, which will not show in finished structure.

11.5 Cement, aggregate and water shall be obtained from single sources for facing mix of precast concrete work in order to assure regularity of appearance and uniformity of color.

11.6 Finish
Exposed faces shall have smooth finish, unless otherwise noted. Back side of single units, with back exposed to view shall have surface finish as indicated on the drawings. Specified surface finish for the exposed back of the precast concrete units shall be applied during the appropriate time of fabrication and curing. Seal coating of exposed back of units shall be applied as per manufacturer's recommendations.

11.7 Curing
Precast concrete shall be cured as required to develop specified structural characteristics and shall be stored in a manner that will permit all surfaces to cure equally and minimize warping, without staining the exposed faces.

12. STAIN AND FINISH EXPOSED EDGES

12.1 Finish for all exposed faces and edges of precast concrete units shall be coated with a color coat suitable for cured concrete, such as Sonocoat® Super Colorcoat™ VOC manufactured by Sonneborn®, or the approved equal. Color and texture to be approved by architect prior to application of coating. Manufacturer's literature and color charts shall be submitted as part of the submittal process.

12.2 Anti-graffiti coating system. Furnish and install a permanent two coat anti-graffiti coating system, matte type finish (non-gloss), designed to be applied on concrete and brick surfaces and to provide a minimum life, as indicated in the manufacturer's literature, of 10 years. The coating system shall be clear.

PART 3 – EXECUTION

13. ALLOWABLE TOLERANCES

13.1 Erect precast structural concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

13.2 Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator, and approved by Architect.

14. HANDLING AND INSTALLATION

14.1 All work performed under this section shall be in accordance with the Specifications, Drawings, and Manufacturer's instructions and recommendations. In the event of a conflict, the stricter requirement shall prevail.

14.2 Before beginning installation, inspect work of other trades in-so-far as it affects the work of this Section. Commencing installation of precast concrete units will be construed as acceptance, as suitable, of such work of other trades. Concrete base for the precast concrete units shall be inspected and modified as required, grinding off high spots, to become an acceptable base upon which to install the units. Precast concrete units shall be handled in a nearly vertical plane, at all times, and stacked vertically on wood supports of adequate strength, until erected. Cover and protect precast concrete units against staining and other damage. Reinstall, realign and otherwise correct improper installed units.

14.2.1 Accurately place and securely anchor precast concrete units to adjoining construction in accordance with manufacturer's specifications. Provide shop and erection drawings as per manufacturer recommendations and specifications.

15. SETTING

15.1 Where shown, joints shall be filled with sealant, surfaces and other joints for precast concrete units shall be cleaned of all dust, dirt, and other foreign matter. Exposed surfaces of units shall be protected by anti-graffiti coating at the manufacturer, or shall be protected until accepted by the architect/owner following installation. Units that have been damaged on exposed surfaces by graffiti, when not coated in advance shall be rejected and removed from the site. Each precast element shall be set level and true to line with uniform joints.

15.2 Erect precast concrete members to conform to PCI Design handbook tolerances, except as follows:

15.2.1 Variation in joint width ±1/4 inch.

15.2.2 Maximum difference between bottom surfaces of adjacent plank 1/4 inch.

15.3 Joints required to have sealants shall be kept free of dirt and other contaminants for their full depth. Precautions shall be taken to protect precast concrete work from being damaged and soiled during and after installation. Wedges, spacers, or other appliances which are likely to cause staining shall be removed from joints.

16. SEALING OF JOINTS

Where shown and where required to make work watertight, joints between precast concrete units, and between other precast elements and adjoining masonry, concrete and other materials shall be filled with back-up material for depth extending as required to form joint of depth as shown or recommended by sealant manufacturer. Provide bond breakers, at base of sealant where space for back-up does not exist and to prevent sealant from bonding to material at base of joint. Workmanship shall be in accordance with Division 1 Specification Sections.

17. CLEANING

After erection is complete, clean precast concrete units using the materials, equipment, and methods recommended by manufacturer.

18. REPLACEMENT AND REPAIR

Precast concrete units which are damaged, cracks, stained, improperly fabricated or otherwise defective shall be removed and be replaced. Precast units having minor defects not affecting serviceability or appearance may be repaired when approved by the architect/owner. Repaired work shall be sound, permanent, flush with adjacent surfaces and of color and texture matching similar adjoining surfaces, and shall show no line of demarcation between original and patched surfaces. Replacement and repairs shall be done at no additional cost to the School District.

19. FINISHING OF EXPOSED EDGES AND FACES

Apply coating to complete, clean exposed concrete edges as per manufacturer's standard specifications and recommendations.

End of Section 034000

SECTION 042000

UNIT MASONRY

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

- 1.1.1 Concrete masonry units
- 1.1.2 Lintels
- 1.1.3 Mortar and grout materials
- 1.1.4 Reinforcement
- 1.1.5 Ties and anchors
- 1.1.6 Embedded flashing
- 1.1.7 Accessories
- 1.1.8 Mortar and grout mixes

1.2 Related Requirements
Section 042613 “Masonry Veneer” for face brick.

2. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3. ACTION SUBMITTALS

3.1 Product Data
For each type of product.

3.2 Shop Drawings
For reinforcing steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.

3.3 Samples: For each type and color of exposed masonry unit.

4. INFORMATIONAL SUBMITTALS

4.1 Material Certificates
For each type and size of product and for masonry units, include material test reports substantiating compliance with requirements.

4.2 Mix Designs
For each type of mortar and grout. Include description of type and proportions of ingredients.

- 4.2.1 Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.

- 4.2.2 Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

5. FIELD CONDITIONS

5.1 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 TMS 602.

5.2 Hot-Weather Requirements

Comply with hot-weather construction requirements contained in TMS 602.

PART 2 – PRODUCTS

6. UNIT MASONRY, GENERAL

6.1 Masonry Standard

Comply with TMS 602, except as modified by requirements in the Contract Documents.

6.2 Defective Units

Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

6.3 Fire-Resistance Ratings

Comply with requirements for fire-resistance-rated assembly designs indicated.

6.3.1 Where fire-resistance-rated construction is indicated, use the equivalent thickness method for masonry units in accordance with ACI 216.1.

7. CONCRETE MASONRY UNITS

7.1 Shapes

Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

7.1.1 Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

7.2 Integral Water Repellent

Provide units made with integral water repellent for exposed units and with face of CMU in air space with masonry veneer.

7.2.1 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. ACM Chemistries
B. Euclid Chemical Company (The); an RPM company
C. GCP Applied Technologies, Inc.
D. Master Builders Solutions
E. Moxie International

7.3 CMUs
ASTM C90, weight as indicated on Structural Drawings.
7.3.1 Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2,150 psi unless otherwise indicated on Structural Drawings.

8. LINTELS

8.1 Masonry Lintels
Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

8.2 Offset Angle Supports
Steel plate brackets anchored to structure, allowing continuous insulation behind shelf angle supporting veneer. Component and anchor size and spacing engineered by manufacturer.

9. BRICK

General: Refer to Section 042613 “Masonry Veneer.”

10. MORTAR AND GROUT MATERIALS

10.1 Portland Cement
ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
10.1.1 Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

10.2 Hydrated Lime: ASTM C207, Type S.

10.3 Portland Cement-Lime Mix
Packaged blend of Portland Cement and hydrated lime containing no other ingredients.

10.4 Preblended Dry Mortar Mix
Packaged blend made from Portland Cement and hydrated lime, sand, mortar pigments, water repellents, and admixtures and complying with ASTM C1714/C1714M.
10.4.1 Preblended Dry Portland Cement Mortar Mix:
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) Amerimix
2) QUIKRETE
3) SAKRETE of North America LLC
4) SPEC MIX, LLC

10.5 Aggregate for Mortar: ASTM C144.
10.5.1 For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

10.5.2 For joints less than 1/4-inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

10.5.3 White-Mortar Aggregates: Natural white sand or crushed white stone.

10.6 Aggregate for Grout: ASTM C404.

10.7 Retain first option in "Cold-Weather Admixture" Paragraph below for products complying with ASTM C494/C494M, intended for concrete admixtures; however, many available products comply with this standard. Retain second option for products complying with ASTM C1384. Appendix X1 in ASTM C270 and BIA Technical Notes 8 generally recommend not using admixtures unless they are known to have no adverse effects. Before approving the use of cold-weather admixtures, verify their acceptability by laboratory testing with mortar mix used.

10.8 Cold-Weather Admixture
Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C or ASTM C1384, and recommended by manufacturer for use in masonry mortar of composition indicated.

10.8.1 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. Euclid Chemical Company (The); an RPM company
B. GCP Applied Technologies, Inc.

10.9 Water-Repellent Admixture
Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

10.9.1 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. ACM Chemistries
B. Euclid Chemical Company (The); an RPM company
C. GCP Applied Technologies, Inc.
D. Master Builders Solutions

10.10 Water: Potable

11. REINFORCEMENT

11.1 Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

11.2 Masonry-Joint Reinforcement, General: ASTM A951/A951M.

11.2.1 Interior Walls: Mill-galvanized carbon steel

11.2.2 Exterior Walls: Hot-dip galvanized carbon steel

11.2.3 Wire Size for Side Rods: 0.148-inch diameter

11.2.4 Wire Size for Cross Rods: 0.148-inch diameter

11.2.5 Wire Size for Veneer Ties: 0.148-inch diameter

11.2.6 Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

11.2.7 Provide in lengths of not less than 10 feet, with prefabricated corner and tee units

11.3 Masonry-Joint Reinforcement for Single-Wythe Masonry
Ladder or truss type with single pair of side rods.

11.3.1 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. Hohmann & Barnard, Inc.

B. Wire-Bond

11.4 Masonry-Joint Reinforcement for Multi-wythe Masonry

11.4.1 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. Heckmann Building Products, Inc.

B. Hohmann & Barnard, Inc.

C. Wire-Bond

11.4.2 Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches wide, plus 1 side rod at each wythe of masonry 4 inches wide or less.

11.4.3 Tab type, either ladder or truss design, with 1 side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.

11.4.4 Adjustable (2-piece) type, either ladder or truss design, with one (1) side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16-inch and maximum vertical adjustment of 1 1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

11.4.5 Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch-diameter, hot-dip galvanized carbon steel continuous wire.

12. TIES AND ANCHORS

12.1 General
Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

12.2 Materials
Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

12.2.1 Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/ A153M, Class B-2 coating.

12.2.2 Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.

12.2.3 Steel Plates, Shapes, and Bars: ASTM A36/A36M.

12.3 Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
12.3.1 Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire.

12.4 Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
12.4.1 Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.

12.4.2 Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized steel wire.

12.5 Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
12.5.1 Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch-thick steel sheet, galvanized after fabrication.

12.5.2 Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized steel wire.

12.6 Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod six (6) inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

12.7 Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4-inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
12.7.1 Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

13. EMBEDDED FLASHING

13.1 Metal Flashing
Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual".

13.2 Flexible Flashing
Use the following unless otherwise indicated:
13.2.1 Copper-Fabric Flashing: 3 oz./sq. ft. self-adhesive copper sheet bonded between 2 layers of glass-fiber cloth.
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) Advanced Building Products Inc.
2) Hohmann & Barnard, Inc.

3) STS Coatings, Inc.

4) Wire-Bond

5) York Manufacturing, Inc.

13.3 Drainage Plane Flashing
Fabricate from elastomeric membrane and drainage membrane to shapes indicated, including weep tabs, termination bar, and drip edge. Provide flashing materials as follows:

13.3.1 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. Mortar Net Solutions

B. STS Coatings, Inc.

C. York Manufacturing, Inc.

13.3.2 Fabricate continuous flashings in sections 60 inches long, minimum.

13.4 Single-Wythe CMU Flashing System
System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

13.4.1 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. Mortar Net Solutions

13.5 Solder and Sealants for Sheet Metal Flashings
As specified in Section 076200 “Sheet Metal Flashing and Trim.”

13.6 Adhesives, Primers, and Seam Tapes for Flashings
Flashing manufacturer’s standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

13.7 Termination Bars for Flexible Flashing: Stainless steel bars 0.075-inch by 1 inch.

13.8 Termination Bars for Flexible Flashing, Flanged
Stainless steel sheet 0.019-inch by 1 1/2 inches with a 3/8-inch flange at top and bottom.

14. ACCESSORIES

14.1 Compressible Filler
Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

14.2 Preformed Control-Joint Gaskets
Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

14.3 Bond-Breaker Strips
Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

15. MORTAR AND GROUT MIXES

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

15.1.1 Do not use calcium chloride in mortar or grout.

15.1.2 Use Portland cement-lime or masonry cement mortar unless otherwise indicated.

15.1.3 Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

15.2 Preblended, Dry Mortar Mix
Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

15.3 Mortar for Unit Masonry
Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

15.3.1 For masonry below grade or in contact with earth, use Type M.

15.3.2 For reinforced masonry, use Type S.

15.3.3 For exterior, above-grade, load-bearing, non-load-bearing walls, and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

15.3.4 For interior non-load-bearing partitions, Type O may be used instead of Type N.

15.4 Grout for Unit Masonry: Comply with ASTM C476.

15.4.1 Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.

15.4.2 Proportion grout in accordance with ASTM C476, Table 1.

15.4.3 Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

PART 3 – EXECUTION

16. INSTALLATION, GENERAL

16.1 Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

16.2 Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

17. TOLERANCES

17.1 Dimensions and Locations of Elements

17.1.1 For dimensions in cross section or elevation, do not vary by more than plus 1/2-inch or minus 1/4-inch.

17.1.2 For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2-inch.

17.1.3 For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4-inch in a story height or 1/2-inch total.

17.2 Lines and Levels

17.2.1 For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

17.2.2 For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8-inch in 10 feet, 1/4-inch in 20 feet, or 1/2-inch maximum.

17.2.3 For vertical lines and surfaces, do not vary from plumb by more than 1/4-inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

17.2.4 For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8-inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

17.2.5 For lines and surfaces, do not vary from straight by more than 1/4-inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

17.2.6 For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

17.3 Joints

17.3.1 For bed joints, do not vary from thickness indicated by more than plus or minus 1/8-inch, with a maximum thickness limited to 1/2-inch.

17.3.2 For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4-inch.

17.3.3 For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8-inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8-inch.

18. LAYING MASONRY WALLS

18.1 Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

18.2 Bond Pattern for Exposed Masonry
Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

18.3 Built-in Work
As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

18.4 Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

18.5 Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

19. MORTAR BEDDING AND JOINTING

19.1 Lay CMUs as follows:

19.1.1 Bed face shells in mortar and make head joints of depth equal to bed joints.

19.1.2 Bed webs in mortar in all courses of piers, columns, and pilasters.

19.1.3 Bed webs in mortar in grouted masonry, including starting course on footings.

19.1.4 Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

19.1.5 Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

19.2 Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

19.3 Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

19.4 Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

20. MASONRY-JOINT REINFORCEMENT

20.1 General

Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2-inch elsewhere. Lap reinforcement a minimum of 6 inches.

20.1.1 Space reinforcement not more than 16 inches o.c.

20.1.2 Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

20.1.3 Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

20.2 Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

20.3 Provide continuity at wall intersections by using prefabricated T-shaped units.

20.4 Provide continuity at corners by using prefabricated L-shaped units.

21. ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

21.1 Provide an open space not less than 1/2-inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

21.2 Anchor masonry with anchors embedded in masonry joints and attached to structure.

21.3 Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

22. FLASHING, WEEP HOLES, AND CAVITY VENTS

22.1 General

Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

22.2 Install flashing as follows unless otherwise indicated:

22.2.1 Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

22.2.2 At multi-wythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2-inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.

22.2.3 At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.

22.2.4 Install metal drip edges and sealant stops with sawtooth sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

22.2.5 Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2-inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

23.1 Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

23.2 Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

23.2.1 Use specified weep/cavity vent products or open-head joints to form weep holes.

23.2.2 Space weep holes 24 inches o.c. unless otherwise indicated.

23.2.3 Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

23.3 Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Accessories" Article.

23.4 Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products or open-head joints to form cavity vents.

23.4.1 Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

24. REINFORCED UNIT MASONRY

24.1 Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

24.1.1 Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

24.1.2 Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

24.2 Placing Reinforcement: Comply with requirements in TMS 602.

24.3 Grouting
Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
24.3.1 Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

24.3.2 Limit height of vertical grout pours to not more than 60 inches.

25. FIELD QUALITY CONTROL

25.1 Testing Agency
Engage a qualified testing agency to perform tests and inspections.
Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense.

25.2 Inspections
Special inspections in accordance Building Code and Drawings.
25.2.1 Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

25.2.2 Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

25.2.3 Place grout only after inspectors have verified proportions of site-prepared grout.

25.3 Testing Prior to Construction: One set of tests.

25.4 Testing Frequency
One set of tests for each 5,000 square feet of wall area or portion thereof.

25.5 Retain “Clay Masonry Unit Test” and “Concrete Masonry Unit Test” paragraphs below, as applicable, if unit-strength method is used. Delete both paragraphs if retaining prism-test method.

25.6 Concrete Masonry Unit Test
For each type of unit provided, in accordance with ASTM C140/C140M for compressive strength.

25.7 Mortar Aggregate Ratio Test (Proportion Specification)
For each mix provided, in accordance with ASTM C780.

25.8 Mortar Test (Property Specification)
For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content and compressive strength.

25.9 Grout Test (Compressive Strength)
For each mix provided, in accordance with ASTM C1019.

26. CLEANING

26.1 In-Progress Cleaning

Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

26.2 Final Cleaning

After mortar is thoroughly set and cured, clean exposed masonry as follows:

26.2.1 Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

26.2.2 Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

26.2.3 Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

27. MASONRY WASTE DISPOSAL

Excess Masonry Waste

Remove excess masonry waste and legally dispose of off Owner’s property.

End of Section 042000

SECTION 042550

BRICK MASONRY

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes:

A. Face brick

B. Mortar and grout

C. Ties and anchors

D. Embedded flashing

E. Miscellaneous masonry accessories

2.2 Related Sections:

A. Division 03 Section "Cast-in-Place Concrete"

B. Division 05 Section "Metal Fabrication" for furnishing steel lintels and shelf angles for brick masonry.

C. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

3. SUBMITTALS

3.1 Product Data: For each type of product indicated.

3.2 Samples for Selection and Verification:

3.2.1 Unit masonry samples showing the full range of colors for each masonry unit specified.

3.2.2 Submittal is for information only. Neither receipt of list nor approval of mock-up constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of the Architect and approved in writing.

3.3 Material Certificates: For each type and size of the following:

3.3.1 Masonry Units

A. Include data on material properties.

B. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.

C. For exposed brick, include test report for efflorescence according to ASTM C 67.

3.3.2 Cementitious materials. Include brand, type, and name and manufacturer. Pre-blended, dry mortar mixes. Include description of type and proportions of ingredients. Grout mixes. Include description of type and proportions of ingredients. Anchors, ties, and metal accessories.

3.4 Cold-Weather and Hot-Weather Procedures: Details description of methods, materials, and equipment to be used to comply with requirements.

4. QUALITY ASSURANCE

4.1 Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges acceptable for these characteristics, from single source from single manufacturer for each product required.

4.2 Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

4.3 Masonry Standard: Comply with ACI 530.1 / ASCE 6 / TMS 602 unless modified by requirements in the Contract Documents.

4.4 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

4.4.1 Build mock-up of typical wall area as shown on Drawings.

4.4.2 Build mock-ups for each type of exposed until masonry construction in sizes approximately 48 inches high by 60 inches long by full thickness, including accessories.

A. Provide a sealant-filled joint at least 16 inches long for approval.

B. Include through-wall flashing installed with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

C. Include metal studs, sheathing, building wrap, building paper, sheathing joint-and-penetration treatment, veneer anchors, flashing, cavity drainage material, and weep holes in mock-up.

4.4.3 Where masonry is to match existing, erect mock-ups adjacent and parallel to existing surface.

4.4.4 Clean exposed faces of mock-ups with masonry cleaner as indicated.
Protect accepted mock-ups from the elements with weather-resistant membrane.
Approval of mock-ups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetics qualities of workmanship.

A. Approval of mock-ups is also for other material and construction qualities specifically approved by Architect in writing.

B. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically approved by Architect in writing.

4.4.5 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

5.2 Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

5.3 Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

5.4 Deliver pre-blended, dry mortar mix in moisture-resistant containers designed to use with dispensing silos, Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

5.5 Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

6. PROJECT CONDITIONS

6.1 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.

6.1.1 Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

6.2 Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come into contact with such masonry.

6.2.1 Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

6.2.2 Protect sills, ledges, and projections from mortar droppings.

6.2.3 Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

6.2.4 Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

6.3 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.

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

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

PART 2 – PRODUCTS

7. MASONRY UNITS, GENERAL

7.1 Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

7.2 Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

8. BRICK

8.1 General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

8.1.1 For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

8.1.2 Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes and lintels.

8.1.3 Provide special shapes for application requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

8.1.4 Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

8.2 Face Brick

Products shall be standard face brick complying with ASTM C 216; Grade: ASTM C216 Grade SW (Severe Weather resistance) and all grades of ASTM C 62.

Distributor: Lusco Brick and Stone Company, Wichita, Kansas; phone: (316) 262-0406, or approved equal.

Products shall be equal to:

A. Brick Type 1:
Glen-Gery Velour, Modular, Color: Dune Gray, as manufactured by Glen-Gery, a brand of Brickworks Building Products, Sergeant Bluff Plant, Sergeant Bluff, Iowa.; (712) 943-5581.

B. Brick Type 2:
Cherokee Brick, M/S Modular, Color: Cherokee Flash, Macon Plant, as manufactured by Cherokee Brick Company, Macon, Georgia.; phone: 1-800-277-2745, www.cherokeebrick.com.

C. Brick Type 3:
Endicott Clay, Velour Modular, Color: Sienna Ironspot, as manufactured by Endicott Clay Products, Endicott Nebraska; (402) 729-3315; www.endicott.com.

9. MORTAR MATERIALS

9.1 Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

9.2 Hydrated Lime: ASTM C 207, Type N above grade and Type S below grade.

9.3 Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

9.4 Aggregate for Mortar: ASTM C 144
For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

9.5 Cold-Weather Admixture: Non-chloride, non-corrosive, accelerating admixture complying with ASTM C 494 / C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

9.5.1 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

A. Euclid Chemical Company (The); Accelguard 80

B. Grace Construction Products, W. R. Grace & Co. – Conn.; Morset

C. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA

9.6 Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

9.6.1 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

A. ACM Chemistries, Inc.; RainBloc for Mortar

B. BASF Aktiengesellschaft; Rheopel Mortar Admixture

C. Grace Construction Products, W. R. Grace & Co. – Conn.; Morset

10. REINFORCEMENT

10.1 Masonry Joint Reinforcement, General: ASTM A 951 / A 951M

10.2 Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- diameter, hot-dip galvanized, carbon steel continuous wire.

11. TIES AND ANCHORS

11.1 Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

11.1.1 Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 1008 / A82M, Commercial Steel, with ASTM A 153 / A 153M, Class B coating.

11.1.2 Steel Sheet, Galvanized after Fabrication: ASTM A 1008 / A 1008M, Commercial Steel, with ASTM A 153 / A 153M, Class B coating.

11.2 Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through the veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend two (2) inches parallel to face of veneer.

11.3 Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

11.4 Adjustable Masonry-Veneer Anchors:

11.4.1 General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over concrete or concrete block, and as follows:

A. Structural Performance Characteristics: Capable of withstanding a 100 lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch.

11.4.2 Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:

11.4.3 Masonry-Veneer Anchors: Units consisting of a wire tie and metal anchor section.

A. Products: Subject to compliance with requirements, provide one of the following:

1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 210 / A 700
2) Heckman Building Products, Inc.; 132/316
3) Hohman & Bernard, Inc.; DW 10-HS

B. Fabricate sheet metal anchor sections and other sheet metal parts from 0.078-inch thick, steel sheet, galvanized after fabrication.

C. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.25-inch diameter, hot-dip galvanized steel wire.

12. EMBEDDED FLASHING MATERIALS

12.1 Metal Flashing: Provide metal complying with Division 07 Section "Sheet Metal Flashing and Trim", and as follows:

12.1.1 Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.

12.1.2 Fabricate through-wall metal flashing embedded in masonry with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.

A. Products: Subject to compliance with requirements, availability products that may be incorporated into the Work include, but are not limited to, the following:

1) Cheney Flashing Company; Cheney Flashing or Cheney 3-Way Flashing (Sawtooth)
2) Keystone Flashing Company, Inc.; Keystone 3-Way interlocking Thruwall Flashing
3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing

12.1.3 Fabricate through-wall flashing with snap-lock receiver on exterior face where indicated to receive counter flashing.

12.1.4 Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

12.1.5 Fabricate through-wall flashing with sealant stop where indicated. Fabricate by bending metal back on itself 34 inch at exterior face of wall and down into joint 14 inch to form a stop for retaining sealant backer rod.

12.1.6 Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending.

12.2 Flexible Flashing: Use one of the following unless otherwise indicated:

12.2.1 Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch.

A. Products: Subject to compliance with requirements, provide one of the following:

1) Advanced Building Products, Inc.; Peel-N-Seal

2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing

3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing

4) Fiberweb; Clark Hammerbeam Corp.; Aquaflash 500

5) Grace Construction Products, WR Grace & Co. –

Conn.; Perm-A-Barrier Wall Flashing

6) Heckmann Building Products, Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing

7) Hohmann & Barnard, Inc.; Textroflash

8) W. R. Meadows, Inc.; Air-Sheild Thru-Wall Flashing

9) Polyguard Products, Inc.; Polyguard 300

10) Sandell Manufacturing Co., Inc.; Sando-Seal

11) Williams Products, Inc.; Everlastic MF-40

B. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

13. MISCELLANEOUS MASONRY ACCESSORIES

13.1 Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; Compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC,

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

13.3 Weep / Vent Products: Use the following unless otherwise indicated:

13.3.1 Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 14 to 38 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.

13.4 Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

13.4.1 Products: Subject to compliance with requirements, provide one of the following:

A. Dayton Superior Corporation, Dur-O-Wal Division; Mortar Net

B. Mortar Net USA, Ltd.; Mortar Net

13.4.2 Provide one of the following configurations:
A. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.

14. MASONRY CLEANERS

14.4 Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar / grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

14.4.1 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. Diedrich Technologies, Inc.
B. EaCo Chem, Inc.
C. ProSoCo, Inc.

15. MORTAR MIXES

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

15.4.1 Do not use calcium chloride in mortar.

15.4.2 Use Portland cement-lime mortar unless otherwise indicated.

15.4.3 Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

PART 3 – EXECUTION

16. EXAMINATION

16.4 Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

17. INSTALLATION, GENERAL

17.1 Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

17.2 Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces, and where possible, cut edges concealed.

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

17.6.1 Mix units from several pallets or cubes as they are packed.

17.4 Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

17.5 Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g / 30 sq. in. Per minute when tested per ASTM C 67. Allow units to absorb water so that they are damp but not wet at time of laying.

18. TOLERANCES

18.1 Dimensions and Locations of Elements

18.1.1 For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.

18.1.2 For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.

18.1.3 For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height, or 1/2 inch total.

18.2 Lines and Levels

18.2.1 For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

18.2.2 For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

18.2.3 For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

18.2.4 For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

18.2.5 For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

18.2.6 For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

18.2.7 For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

18.3 Joints

18.3.1 For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch; do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

18.3.2 For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

18.3.3 For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

19. LAYING MASONRY WALLS

19.1 Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thickness and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

19.2 Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond pattern and as indicated on Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

19.3 Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

19.4 Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

19.5 Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

20. MORTAR BEDDING AND JOINTING

20.1 Lay hollow brick as follows:

20.1.1 With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

20.1.2 With entire units, including areas under cells, fully bedded in mortar at starting course on footings.

20.2 Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

20.3 Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

21. ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

21.1 Provide a space not less than 3 inch wide between masonry and concrete or block unless otherwise indicated. Keep open space free of mortar.

21.2 Anchor masonry with anchors embedded in masonry joints and attached to structure.

22. ANCHORING MASONRY VENEERS

Anchor masonry veneers to concrete back-up with masonry-veneer anchors to comply with the following requirements:

22.1 Fasten anchors to concrete back-up with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

22.2 Embed tie sections in masonry joints. Provide not less than 1 inches of air space between back of masonry veneer and face of rigid insulation.

22.3 Locate anchor sections to allow maximum vertical differential movement ties up and down.

22.4 Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors with 12 inches of openings and at intervals, not exceeding 8 inches, around perimeters.

23. EXPANSION JOINTS

23.1 General: Install expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

23.2 Form expansion joints in brick as follows:

23.2.1 Build flanges of metal expansion strips into masonry. Lap each joint 4 inches direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.

23.2.2 Build flanges of factory-fabricated, expansion-joint units into masonry.

23.2.3 Build in compressible joint fillers where indicated.

23.2.4 Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants".

23.3 Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants".

23.3.1 Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

24. LINTELS

24.1 Install galvanized steel lintels where indicated.

24.2 Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

25. FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

25.1 General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

25.2 Install flashing as follows unless otherwise indicated:

25.2.1 Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed or mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

25.2.2 At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.

25.2.3 At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

25.2.4 Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.

25.2.5 Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.

25.2.6 Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.

25.2.7 Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

25.2.8 Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

25.3 Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

25.4 Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

25.4.1 Use specified weep to form weep holes.

25.4.2 Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

25.4.3 Space weep holes 24 inches o.c. unless otherwise indicated.

25.4.4 Trim wicking material flush with outside face of wall after mortar has set.

25.5 Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

25.5.1 Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

26. FIELD QUALITY CONTROL

26.1 Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspection. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

26.2 Inspections: Level 1 special inspections according to the "International Building Code".

26.2.1 Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

26.3 Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

27. REPAIRING, POINTING, AND CLEANING

27.1 Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

27.2 Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

27.3 In-Progress Cleaning: Cleaning unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

27.4 Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

27.4.1 Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

27.4.2 Test cleaning methods on sample wall panel; leave one-half of panel un-cleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

27.4.3 Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

27.4.4 Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

27.4.5 Clean brick by bucket-and-brush hand-cleaning method described in "BIA Technical Notes 20".

27.4.6 Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

27.4.7 Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

27.4.8 Clean stone trim to comply with stone supplier's written instructions.

27.4.9 Clean limestone units to comply with supplier's written recommendations.

27.5 Brick Sealant: Specified in Painting Section 099123.

28. MASONRY WASTE DISPOSAL

28.1 Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

28.2 Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

End of Section 042550

SECTION 042613

MASONRY VENEER

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes
- 1.1.1 Brick
- 1.1.2 Mortar materials
- 1.1.3 Ties and anchors
- 1.1.4 Embedded flashing
- 1.1.5 Accessories
- 1.1.6 Mortar mixes

1.2 Products Installed but not Furnished under This Section
- 1.2.1 Steel lintels in masonry veneer
- 1.2.2 Steel shelf angles for supporting masonry veneer

1.3 Related Requirements
- 1.3.1 Section 071900 “Water Repellents” for water repellents applied to unit masonry assemblies as recommended by brick manufacturer.
- 1.3.2 Section 076200 “Sheet Metal Flashing and Trim” for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

2. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3. ACTION SUBMITTALS

3.1 Product Data: For each type of product.

3.2 Shop Drawings
For the following:
- 3.2.1 Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
- 3.2.2 Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

3.3 Samples for Initial Selection
- 3.3.1 Clay face brick, in the form of straps of five (5) or more bricks
- 3.3.2 Weep/cavity vents

3.4 Samples for Verification
For each type and color of the following:
- 3.4.1 Clay face brick, in the form of straps of five (5) or more bricks

3.4.2 Special brick shapes

3.4.3 Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

3.4.4 Weep/cavity vents

3.4.5 Cavity drainage material

3.4.6 Accessories embedded in masonry

4. INFORMATIONAL SUBMITTALS

4.1 List of Materials Used in Constructing Mockups

List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

4.1.1 Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

4.2 Material Certificates

For each type and size of the following:

4.2.1 Masonry units

A. Include data on material properties and material test reports substantiating compliance with requirements

B. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances

C. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M

4.2.2 Cementitious materials. Include name of manufacturer, brand name, and type

4.2.3 Mortar admixtures

4.2.4 Preblended, dry mortar mixes. Include description of type and proportions of ingredients

4.2.5 Anchors, ties, and metal accessories

4.3 Mix Designs

For each type of mortar. Include description of type and proportions of ingredients.

4.3.1 Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.

4.4 Cold-Weather and Hot-Weather Procedures
Detailed description of methods, materials, and equipment to be used to comply with requirements.

5. QUALITY ASSURANCE

Qualifications

5.1 Include "Installers" Paragraph below if requiring IMI training for masonry flashing installers.

5.2 Testing Agency: Qualified in accordance with ASTM C1093 for testing indicated.

6. MOCKUPS

Wall Mockups

Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for installation.

6.1 Build mockups for typical exterior wall with CMU backup and also brick veneer with cold-formed metal back-up, in sizes approximately 96 inches long by 60 inches high by full thickness, including face and backup wythes and accessories.

6.1.1 Include a sealant-filled joint at least 16 inches long in mockup.

6.1.2 Include through-wall flashing installed for full length of mockup, with a minimum 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

6.1.3 Include CMU, metal studs, sheathing, water-resistive barrier, air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.

6.2 Clean one-half of exposed faces of mockups with masonry cleaner as indicated.

6.3 Protect accepted mockups from the elements with weather-resistant membrane.

6.4 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

6.5 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

7.2 Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

7.3 Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

7.4 Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

7.5 Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

8. FIELD CONDITIONS

8.1 Protection of Masonry

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

8.1.1 Extend cover a minimum of 24 inches down face of veneer, and hold cover securely in place.

8.2 Stain Prevention

Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with masonry.

8.2.1 Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

8.2.2 Protect sills, ledges, and projections from mortar droppings.

8.2.3 Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

8.2.4 Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

8.3 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 TMS 602.

8.3.1 Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 degrees F and higher and will remain so until masonry has dried, but not less than seven (7) days after completing cleaning.

8.4 Hot-Weather Requirements

Comply with hot-weather construction requirements contained in TMS 602.

PART 2 – PRODUCTS

9. SOURCE LIMITATIONS

9.1 Obtain exposed masonry units and mortar from single source.

9.2 For exposed masonry units and cementitious mortar components, obtain each color and grade from single source with resources to provide materials of consistent quality in appearance and physical properties.

10. UNIT MASONRY, GENERAL

10.1 Masonry Standard

Comply with TMS 602, except as modified by requirements in the Contract Documents.

10.2 Defective Units

Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

11. BRICK

11.1 General

Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

11.1.1 For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

11.1.2 Provide special shapes for applications where stretcher units cannot accommodate special conditions, including corners and movement joints, requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing, or where shapes produced by sawing would result in sawed surfaces being exposed to view.

11.2 Clay Face Brick

Facing brick complying with ASTM C216.

11.2.1 Manufacturers: Subject to compliance with requirements, provide products by the following:

A. As selected by the Architect.

11.2.2 Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M.

11.2.3 Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated “not effloresced.”

11.2.4 Surface Coating: Brick with colors or textures produced by application of coatings withstand 50 cycles of freezing and thawing in accordance with ASTM C67/C67M with no observable difference in the applied finish when viewed from 10 feet or have a history of successful use in Project's area.

11.2.5 Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

11.2.6 Application: Use where brick is exposed unless otherwise indicated.

11.2.7 Color and Texture: As indicated on Drawings.

12. CONCRETE MASONRY UNITS

12.1 Shapes
Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

12.1.1 Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

13. MORTAR MATERIALS

13.1 Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce mortar color indicated.

13.1.1 Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

13.2 Hydrated Lime: ASTM C207, Type S.

13.3 Portland Cement-Lime Mix
Packaged blend of Portland cement and hydrated lime containing no other ingredients.

13.4 ASTM C91/C91M does not require masonry cement to comply with any performance tests for flexural bond strength; confirm Project requirements. See the Evaluations.

13.5 Retain "Mortar Pigments" Paragraph below for colored cement or for pigments added at Project site.

13.6 Preblended Dry Mortar Mix
Packaged blend made from Portland cement and hydrated lime, sand, and admixtures and complying with ASTM C1714/C1714M.

13.6.1 Preblended Dry Portland Cement Mortar Mix:

A. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:

1) Amerimix is a trademark of Bonsal American, an Oldcastle company
2) Quikrete; The QUIKRETE Companies, LLC.
3) Sakrete; CRH Americas, Oldcastle APG
4) SPEC MIX, LLC.

13.7 Masonry cement is not acceptable and shall not be used.

13.8 Aggregate for Mortar: ASTM C144.

13.8.1 For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone to match existing mortar.

13.9 Cold-Weather Admixture
Shall be specifically approved by Architect before use.

13.10 Water: Potable

14. TIES AND ANCHORS

14.1 General

Ties and anchors extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

14.2 Materials

Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

14.2.1 Stainless-Steel Wire: ASTM A580/A580M

14.2.2 Stainless Steel Sheet: ASTM A240/A240M or ASTM A666

14.3 Corrugated-Metal Ties

Metal strips not less than 7/8-inch wide with corrugations having a wavelength of 0.3- to 0.5-inch and an amplitude of 0.06- to 0.10-inch made from 22 gauge thick, stainless-steel sheet.

14.4 Masonry-Veneer Anchors; Single-Barrel Screw with Double-Pintle Wingnut

Self-drilling, single-barrel screw with wingnut head designed to receive double-pintle wire tie. Screw has a smooth barrel the same thickness as insulation with factory-installed gasketed washer to seal at face of insulation and sheathing and a coating to reduce thermal conductivity. Provide with seismic tie, clip, and continuous wire in veneer.

14.1.1 Manufacturers: Subject to compliance with requirements, provide products by Hohmann & Barnard, Inc.

15. EMBEDDED FLASHING

15.1 Metal Flashing

Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

15.1.1 Fabricate through-wall flashing with snap lock receiver on exterior face where indicated to receive counterflashing.

15.1.2 Fabricate by extending flashing 1/2-inch out from wall, with outer edge bent down 30 degrees and hemmed.

15.1.3 Fabricate through-wall flashing with sealant stop where required.

15.2 Flexible Flashing

Use 1 of the following unless otherwise indicated:

15.2.1 Copper Fabric Flashing: 3-oz./sq. ft., self-adhesive copper sheet bonded between two (2) layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

15.2.2 Copper Corners and End Dams: Provide at inside and outside corners.

A. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:

1) Hohmann & Barnard, Inc.
2) York Manufacturing, Inc.

15.3 Sealants for Sheet Metal Flashings
As specified in Section 076200 "Sheet Metal Flashing and Trim."
15.3.1 Elastomeric Sealant: ASTM C920, chemically curing urethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

15.4 Adhesives, Primers, and Seam Tapes for Flashings
Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

15.5 Termination Bars for Flexible Flashing: Stainless-steel bars 1/8-inch by 1 inch.

15.6 Termination Bars for Flexible Flashing, Flanged
Stainless-steel sheet 0.019-inch by 1 1/2 inches with a 3/8-inch flange at top and bottom.

16. ACCESSORIES

16.1 Compressible Filler
Pre-molded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
16.1.1 Mesh Weep/Vent: Free-draining mesh; polyester plastic non-woven mesh, UV inhibitor, flame retardant, full height and width of head joint and depth 1/8-inch less than depth of outer wythe; in color selected from manufacturer's standard. Fabricated to prevent insects from entering vent. Install at 24 inches o.c. at both top and bottom of wall for air pressure equalization.
A. Manufacturers: Subject to compliance with requirements, provide products by Hohmann & Barnard, Inc.

16.2 Cavity Drainage Material
Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Install to prohibit mortar from preventing free flow of moisture to weep holes.
16.2.1 Mortar Trap: 90% open mesh, high comprehensive, will not degrade; designed for life of building.
A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1) Hohmann & Barnard, Inc.; Mortar Trap

16.2.2 Rainscreen Drainage Mat: Sheets or strips not less than 1-1/2 inches thick and installed to full height of cavity, with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity to prevent weep holes from clogging with mortar.
A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1) Mortar Net Solutions
2) Wire-Bond

17. MORTAR MIXES

17.1 General

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

17.1.1 Do not use calcium chloride in mortar or grout.

17.1.2 Use Portland Cement-lime mortar unless otherwise indicated.

17.1.3 For exterior masonry, use Portland Cement-lime mortar.

17.1.4 For reinforced masonry, use Portland Cement-lime mortar.

17.1.5 Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

17.2 Preblended, Dry Mortar Mix

Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site. Masonry cement is not acceptable.

17.3 Mortar for Unit Masonry

Comply with ASTM C270, Property Specification. Use Type N unless another type is indicated.

17.3.1 For masonry below grade or in contact with earth, use Type M.

PART 3 – EXECUTION

18. EXAMINATION

18.1 Examine conditions, with Installer and Architect present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

18.1.1 For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

18.2 Proceed with installation only after on-site review, by Architect, of wall construction and flashing installation, and only after unsatisfactory conditions have been corrected.

19. INSTALLATION, GENERAL

19.1 Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

19.2 Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

19.3 Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

19.4 Retain "Wetting of Brick" Paragraph below for high-suction brick. A simple test to determine if wetting is required consists of drawing a circle the size of a quarter on a brick and placing 20 drops of water in the circle; if water is absorbed within 1-1/2 minutes, the brick requires wetting.

19.5 Wetting of Brick
Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.

20. TOLERANCES

20.1 Dimensions and Locations of Elements

20.1.1 For dimensions in cross section or elevation, do not vary by more than plus 1/2-inch or minus 1/4-inch.

20.1.2 For location of elements in Plan, do not vary from that indicated by more than plus or minus 1/2-inch.

20.1.3 For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4-inch in a story height or 1/2-inch total.

20.2 Lines and Levels

20.2.1 For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

20.2.2 For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8-inch in 10 feet, 1/4-inch in 20 feet, or 1/2-inch maximum.

20.2.3 For vertical lines and surfaces, do not vary from plumb by more than 1/4-inch in 10 feet, 3/8-inch in 20 feet, or 1/2-inch maximum.

20.2.4 For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8-inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

20.2.5 For lines and surfaces, do not vary from straight by more than 1/4-inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

20.2.6 For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

20.2.7 For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16-inch except due to warpage of masonry units within tolerances specified for warpage of units.

20.3 Joints

20.3.1 For bed joints, do not vary from thickness indicated by more than plus or minus 1/8-inch, with a maximum thickness limited to 1/2-inch.

20.3.2 For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8-inch.

20.3.3 For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4-inch.

20.3.4 Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8-inch.

20.3.5 For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16-inch from one masonry unit to the next.

21. LAYING MASONRY WALLS

21.1 Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

21.2 Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

21.3 Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

21.4 Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

21.5 Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

22. MORTAR BEDDING AND JOINTING

22.1 Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

22.2 Lay CMUs with face shells fully bedded in mortar and with head joints of depth equal to bed joints. At starting course, fully bed entire units, including area under cells.

22.2.1 At anchors and ties, fully bed units and fill cells with mortar as needed to fully embed anchors and ties in mortar.

22.3 Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

23. ANCHORED MASONRY VENEERS

23.1 Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:

23.1.1 Fasten screw-attached anchors through continuous insulation and sheathing to wall framing with metal fasteners of type indicated. Use 2 fasteners unless anchor design only uses 1 fastener.

23.1.2 Embed connector sections and continuous wire in masonry joints.

23.1.3 Locate anchor sections to allow maximum vertical differential movement of ties up and down.

23.1.4 Space anchors as indicated, but not more than 18 inches on center vertically and 24 inches on center horizontally, with not less than 1 anchor for each 2 square feet of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

23.1.5 Anchors shall be attached through continuous insulation and sheathing and into cold formed metal framing members.

23.2 Provide not less than 2 inches of airspace between back of masonry veneer and face of insulation.

23.2.1 Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

24. ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:

24.1 Provide an open space not less than one (1) inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

24.2 Anchor masonry with anchors embedded in masonry joints and attached to structure.

24.3 Space anchors as indicated, but not more than 24 inches on center vertically and 36 inches on-center horizontally.

25. EXPANSION JOINTS

25.1 General

Install expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

25.2 Form expansion joints as follows:

25.2.1 Build flanges of metal expansion strips into masonry. Lap each joint four (4) inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.

25.2.2 Build flanges of factory-fabricated, expansion-joint units into masonry.

25.2.3 Build in compressible joint fillers where indicated.

25.2.4 Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 “Joint Sealants.”

25.3 Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 “Joint Sealants,” but not less than 3/8-inch.

25.3.1 Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

26. LINTELS

26.1 Install steel lintels where indicated.

26.2 Provide offset angle supports where indicate and where openings of more than twelve (12) inches for brick-size units and 24 inches for block-size units are indicated without structural steel or other supporting lintels.

26.3 Provide minimum bearing of eight (8) inches at each jamb unless otherwise indicated.

27. FLASHING, WEEP HOLES, AND VENTS

27.1 General

Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

27.2 Install flashing as follows unless otherwise indicated:

27.1.1 Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

27.1.2 Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier and air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.

27.1.3 At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.

27.1.4 Interlock end joints of sawtooth sheet metal flashing by overlapping ribs not less than 1 1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

27.1.5 Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2-inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

27.1.6 Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2-inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

27.1.7 Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

27.3 Install reglets and nailers for flashing and other related construction where they are indicated to be built into masonry.

27.4 Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

27.4.1 Use specified weep/cavity vent products to form weep holes.

27.4.2 Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

27.4.3 Space weep holes 24 inches on center unless otherwise indicated.

27.4.4 Space weep holes formed from material as specified 16 inches on center.

27.4.5 Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

27.4.6 Trim wicking material flush with outside face of wall after mortar has set.

27.5 Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Accessories" Article.

27.6 Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form vents.

27.6.1 Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

28. REPAIRING, POINTING, AND CLEANING

28.1 Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

28.2 Pointing

During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

28.3 In-Progress Cleaning
Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

28.4 Final Cleaning
After mortar is thoroughly set and cured, clean exposed masonry as follows:

28.4.1 Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

28.4.2 Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

28.4.3 Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid-strippable masking agent or polyethylene film and waterproof masking tape.

28.4.4 Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

28.4.5 Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

28.4.6 Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

29. MASONRY WASTE DISPOSAL

29.1 Salvageable Materials
Unless otherwise indicated, excess masonry materials are Contractor’s property.
At completion of unit masonry work, remove from Project site.

29.2 Excess Masonry Waste
Remove excess masonry waste, as described above or recycled, and other masonry waste, and legally dispose of off Owner’s property.

End of Section 042613

SECTION 051200

STRUCTURAL STEEL

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Furnish all labor, material, and equipment necessary to complete all structural steel work as shown and/or specified, including, but not necessarily limited to, the following:

2.1.1 Structural steel

2.1.2 Leveling plates

2.1.3 Anchor bolts

2.2 Related Sections include the following:

2.2.1 Division 01 Section for testing and inspections required for Structural Steel.

2.2.2 Division 03 Section "Cast-In-Place Concrete" for grouting of bearing and base plates.

2.2.3 Division 05 Section "Steel Joists" for structural joist bearing plates, including anchorage.

2.2.4 Division 05 Section "Steel Deck" for field installation of shear connectors and for bearing plates for metal deck bearing, including anchorage.

2.2.5 Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.

2.3 Products furnished, but not installed, under this Section include the following:
Anchor bolts and leveling plates, installed under Division 03 Section "Cast-In-Place Concrete."

3. DEFINITIONS

3.1 Structural Steel
Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

4. PERFORMANCE REQUIREMENTS

4.1 Connections

Design and detail all connections to resist the loads and reactions indicated on the Drawings or specified herein. Details shall supplement and be consistent with details shown on the Drawings. Proper account of eccentricity shall be taken in the design of connections so that there is no over-stressing of any material either in the connections themselves or in the connected members. The design of all connections shall be subject to the approval of the Architect/Engineer.

4.1.1 Shop and field connections shall be made using minimum 3/4-inch-diameter high-strength bolts or by welding, unless otherwise indicated.

4.1.2 Beam to column connections shall be such as to minimize eccentric loading on the column. Unrestrained simple beam end connections shall be detailed and fabricated so as to minimize end restraint of the beam. All parts of such connections (such as welds, bolts and material) shall be designed taking eccentricity into account.

4.2 Connection Design Information

Design connections in accordance with applicable codes and ANSI Standards by fabricator's qualified professional engineer.

4.3 Temporary Bracing

The Contractor shall be fully responsible for the design, strength, safety and adequacy of all temporary bracing and all methods of construction. The specifying herein of requirements for bracing or construction methods, preliminary approvals by the Architect, or any other requirements of the Specifications shall be construed as the minimum acceptable, and shall not eliminate, lessen or restrict in any manner the responsibility of the Contractor for all construction methods and for the safety and stability of the structural steel work at all stages of erection, until such time as the permanent bracing system becomes effective.

5. SUBMITTALS

5.1 Product Data

For each type of product indicated, including paints and primers.

5.2 Shop Drawings

Show fabrication of structural-steel components.

5.2.1 Standard details of proposed beam end connections with load capacities, and other job standards for appropriate parts of the work. Submit for approval before preparation of Detail Drawings. Consistently use standard details on Detail Drawings where appropriate.

5.2.2 Include complete details of all members including identification marks, dimensions, sizes, grades of steel, cuts, connections, splices, camber, holes, cleaning requirements prior to painting, type of paint/primer, and other pertinent data.

5.2.3 Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

5.2.4 Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

5.2.5 Anchor Bolt, Leveling Plate and Bearing Plate: Plans showing the location, size, and identification marks of all base plates, screws, bolts, grade of steel, and setting elevations.

5.2.6 Include embedment drawings.

5.2.7 Include on Drawings all temporary members required for erection.

5.2.8 Erection plans, showing type, size, weight, location identification marks of all members and all information regarding field welds and bolts.

5.3 Welding certificates, prior to fabrication and erection.

5.3.1 Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months.

5.3.2 General Contractor to keep on file with copies to Owner.

5.4 Mill Test Reports
Prior to delivery of steel to the Project site, submit certified copies of mill test reports including name and location of mill and analysis of chemical and physical properties of steel to be used on this Project.

5.5 Source quality-control test reports.

5.6 Delegated Design Submittals
For structural steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified and licensed professional engineer responsible for their preparation.

6. QUALITY ASSURANCE

6.1 Erector's Qualifications: Satisfactorily completed projects of similar magnitude.

6.2 Fabricator Qualifications

6.2.1 Satisfactorily completed projects of similar magnitude.

6.2.2 Facilities and capacity to provide fabricated steel to facilitate timely completion of Project.

6.2.3 Fabricator shall be certified by AISC for standard building structures.

6.3 Welding

6.3.1 All shop and field welding shall be performed by operators who have passed the test as prescribed in AWS D1.1 Chapter 5 "Qualifications," and qualified to perform the type of welding required.

6.3.2 Each welder working on the Project shall be assigned an identification symbol or mark and shall mark or stamp his identification at each completed weldment, both in the shop and field.

6.4 Comply with Applicable Provisions of the Following Specifications and Documents (Current Editions):

6.4.1 AISC's "Code of Standard Practice for Steel Buildings and Bridges."

6.4.2 AISC's "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."

6.4.3 AISC "Manual of Steel Construction," fourteenth edition.

6.4.4 AISC's "Specification for Structural Steel Buildings—Load and Resistance Factor Design."

6.4.5 AISC's "Specification for the Design of Steel Hollow Structural Sections."

6.4.6 AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Council.

6.4.7 AISC's "Specification for Allowable Stress Design of Single-Angle Members."

6.4.8 AWS D1.7 "Code for Welding in Building Construction."

6.4.9 SSPC "Structural Steel Painting Manual."

6.4.10 Painting Manual, Vol. 1, "Good Painting Practice" and Painting Manual, Vol. 2, "Systems and Specifications," Steel Structures Painting Council.

6.4.11 All pertinent Federal, State, and Local Codes.

6.4.12 In case of conflict between specified codes and standards, the most stringent requirements govern. In case of conflict between codes and standards and Project Specifications, Project Specifications shall govern.

6.5 Inspection and Quality Control

6.5.1 The Fabricator shall provide effective quality control over all fabrication activities. This shall include ultra sonic, magnetic particle, dye penetrant, x ray, or other effective means of ensuring that all welds fully conform to AWS Standards. The Owner's representative may visit the plant to verify that a quality control program is being maintained and to spot check weldments and welding procedures. All fabricated items may also be subject to inspection in the field including ultra sonic testing. Inspection by the testing agency is not intended to be comprehensive or complete, and full responsibility for quality control shall remain with the Fabricator.

6.5.2 The Owner or his representative shall have the right to reject any item not fully conforming to all requirements of the Contract Documents.

7. DELIVERY, STORAGE, AND HANDLING

Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

7.1 Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

7.2 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.

8. COORDINATION

Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 – PRODUCTS

9. STRUCTURAL-STEEL MATERIALS

9.1 W-Shapes and WT-Shapes: ASTM A992.

9.2 Rolled Steel Plates, Bars, and Non-Wide-Flange Shapes: ASTM A 36 unless otherwise indicated.

9.3 Cold-Formed Hollow Structural Sections: ASTM A500, Grade B, structural tubing.

9.4 Steel Pipe: ASTM A-501 or A53/A53M, Grade B.

9.5 Shear Connectors: ASTM A108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.

9.6 Welding Electrodes: AWS E70 Series.

10. BOLTS, CONNECTORS, AND ANCHORS

10.1 High-Strength Bolts, Nuts, and Washers
ASTM A325 or ASTM A490, Type 1, heavy-hex steel structural bolts; ASTM A563 heavy-hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

10.1.1 Finish, Interior Locations: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50], unless otherwise indicated.

10.1.2 Finish, Exterior Locations
[Plain] [Hot-dip zinc coating, ASTM A153/A153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50], unless otherwise indicated.

10.2 Standard Anchor Bolts: ASTM F1544-36, unless noted otherwise on the drawings.

11. PAINT – SHOP PRIMERS

11.1 Acceptable Products

11.1.1 Interior: Manufacturer's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer, compatible with finishes listed in Division 09 painting Sections, Color Gray.

11.1.2 Exterior: Zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat finishes listed in Division 09 painting Sections.

11.2 Preparation for Painting

Clean all surfaces to be painted in accordance with SSPC-SP3, except architecturally exposed structural steel shall be cleaned in accordance with SSPC-SP6.

12. GROUT

Nonmetallic, Shrinkage-Resistant Grout

Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland Cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with ASTM C1107, of consistency suitable for application, and a 30 minute working time.

13. FABRICATION

13.1 Structural Steel

Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design.

13.1.1 Camber structural-steel members where indicated.

13.1.2 Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.

13.1.3 Mark and match-mark materials for field assembly.

13.1.4 Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

13.2 Installation of High-Strength Bolts: Shop-installed high-strength bolts shall be installed as specified below under "Execution."

13.3 Welding

13.3.1 Shop welding shall be done by either shielded metal arc welding, submerged arc welding or flux core arc welding (SMAW, SAW, FCAW). Gas metal arc welding (GMAW) is not permitted.

13.3.2 Prepare joint welding procedures and program of welding sequence (for each component and for welding joining components to each other) and submit to Architect for approval before any welding is done. After approval, welding procedures and sequences shall be followed without deviation unless specific approval for change is obtained from Architect. Architect may require requalifications of operators for such changes in welding procedures by test prescribed in AWS "Standard Qualification Procedures."

13.4 Cutting

13.4.1 Manual oxygen cutting shall be done only with a mechanically guided torch, except as permitted below:

A. Gas cut edges, which are not to be welded, and which will be free of substantial stresses (as determined by the Architect/Engineer) may be cut manually with an unguided torch provided that specified AISC edge distances to holes are maintained.

B. Gas cut edges which will be subjected to substantial stress (over 1/2 the allowable stress, as determined by the Architect/Engineer), or which are to be welded may be cut manually with an unguided torch to a line not within 1/8-inch of the finished dimension, with final removal of material completed by chipping or grinding to produce a surface quality equal to that of the base metal edges.

13.4.2 Punch and drill steel for attachment of other materials indicated on the Drawings or noted in the Specifications to be attached to the steel.

13.4.3 Holes for bolted connections shall not be oxygen cut. Components prepared in this manner will be rejected.

13.4.4 All reentrant corners shall be shaped notch free to a radius of at least 1/2-inch.

13.4.5 Cut no openings without the written approval of the Architect/Engineer.

13.5 Milled Ends

13.5.1 Milling of ends is not required unless specifically called for on Drawings.

13.5.2 Accurately mill ends of columns and other members transmitting loads in bearing.

13.6 Identification

Each structural steel member shall have its assigned position and identification mark or symbol plainly indicated thereon near 1 end. Marks shall agree with those shown on the Shop Drawings and Erection Drawings.

13.7 Shear Connectors

Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's printed instructions.

13.8 Holes

Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.

13.8.1 Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

13.8.2 Weld threaded nuts to framing and other specialty items as indicated to receive other work.

14. SHOP PRIMING/PAINTING

14.1 Shop prime steel surfaces except the following:

14.1.1 Surfaces embedded in concrete or mortar.

14.1.2 Surfaces within two (2) inches of field welds.

14.1.3 Surfaces to be high-strength bolted.

14.1.4 Machine finished surfaces (e.g., bearing surfaces of columns and column base plates).

14.2 Surface Preparation

Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
Painted Steel

14.2.1 Non exposed steel specified to be painted shall be cleaned in accordance with SSPC SP 3, "Power Tool Cleaning."

A. Non exposed steel is defined as steel not exposed to the elements. Usually contained within building envelope.

14.3 Method and Rate of Paint Application

Non exposed Steel

14.3.1 Apply 1 prime coat of gray paint to dry, clean surfaces by brush, spray or roller with no running or sagging.

14.3.2 The coverage rate shall provide a minimum dry film thickness of 2 mils.

14.3.3 If for any reason any surface to be field welded or bolted is painted, remove such paint completely to within stated limits before field welding or bolting. If any machine finished surface is painted, remove such paint completely, and touch up specified finish if required, before shipping or erection.

15. GALVANIZING

Hot-Dip Galvanized Finish

Apply zinc coating by the hot-dip process to structural steel indicated for galvanizing or any steel exposed to the outside according to ASTM A123. Steel to be galvanized shall be cleaned in accordance with SSPC-SP 8. Examine Drawings for steel to be galvanized.

16. SOURCE QUALITY CONTROL

16.1 Contractor shall engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports, as outlined in Division 01, as indicated on Structural Drawings, and as required by authorities having jurisdiction.

16.2 In addition to visual inspection, shop-welded full penetration connections will be inspect-ed and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

16.2.1 Liquid Penetrant Inspection: ASTM E165.

16.2.2 Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

16.2.3 Radiographic Inspection: ASTM E94 and ASTM E142; minimum quality level "2-2T."

16.2.4 Ultrasonic Inspection: ASTM E164.

PART 3 – EXECUTION

17. EXAMINATION

17.1 Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector and concrete precaster present, for compliance with requirements.

17.2 Verify that anchor bolts and bearing plates are of the size required and accurately located, prior to erection of the steel.

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

18. PREPARATION

18.1 Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads.

18.2 All temporary supports, flooring, planking, and scaffolding necessary in connection with the erection of the structural steel, or the support of erection equipment, shall be provided as a part of the erection work. The temporary floors shall be as required by Federal, State and Municipal laws and governing safety regulations.

18.3 Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated or required.

19. ERECTION

19.1 Verify that anchor bolts and bearing plates are of the size required and accurately located, prior to erection of the steel.

19.2 Set base plates and bearing plates level to correct elevations and support temporarily on steel wedges, shims, leveling devices, or as shown on Drawings, until corresponding supported member has been positioned, plumbed and anchor bolted. Leave protruding leveling devices in place until after grout has been placed and has attained required strength, and then cut off flush with top or edges of base plate, or both, except as otherwise noted.

19.3 Align, level, and adjust all members accurately prior to final fastening. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned prior to final assembly of members. Drift pins shall be used only to bring together the several parts. They shall not be used in such manner as to distort or damage the metal.

19.4 As erection progresses, the work shall be securely connected to safely resist all dead load, wind and erection forces. Temporary bracing shall be introduced wherever necessary to safely resist all loads to which the structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety.

19.5 Oxygen cutting in the field shall not be done except with written permission of the Architect. When permitted, it shall be executed in accordance with the requirements herein specified.

19.6 Protect expansion joints during all construction phases such to prevent any accumulation of debris or other deleterious materials in the sliding plane.

19.7 Splice members only where indicated.

19.8 Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

19.9 Do not use thermal cutting during erection.

19.10 Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

20. FIELD WELDING

Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

20.1 Field welding shall be done with shielded metal arc welding (SMAW) or flux core arc welding (FCAW) only.

20.2 The Contractor shall provide safe and substantial work platforms at proper height to permit best possible field welding technique. Temporary enclosure, shielding, etc., shall be provided to protect welding operators and joints to be welded against the elements during welding operations.

20.3 Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

20.4 Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show through on exposed steel surfaces.

20.4.1 Grind butt welds flush.

20.4.2 Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

20.5 Grind all welds smooth for steel indicated to be Architecturally Exposed Structural Steel (AESS) on the Drawings.

20. INSTALLATION OF HIGH-STRENGTH BOLTS, GENERAL

21.1 Provide safe and substantial work platform for bolting crews.

21.2 Each bolting crew working on the Project shall be assigned an identification symbol or mark. Each bolting crew shall mark this identification on each joint completed.

21.3 Joints shall be made without the use of erection bolts, the high-strength bolts required for the joint serving that purpose themselves. Where proper fix up cannot be obtained, corrective work or additional plumbing, leveling, etc., may be required. Use not more than 2 washers per bolt.

21.4 Correct poor matching of holes by drilling to next larger size and use of larger size bolt, if approved by Architect/Engineer. Welding for redrilling shall not be done.

21.5 High-strength bolts shall be installed by the "modified turn of the nut method" (see below).

22. INSTALLATION OF HIGH-STRENGTH BOLTS BY "MODIFIED TURN-OF-THE-NUT METHOD"

Install high-strength steel bolts in accordance with the turn of the nut method in the AISC approved "Specification for Structural Joints using ASTM A325 or A490 Bolts," with the following additional requirements:

22.1 Use hardened washer under bolt head or nut, whichever is turned in tightening (unless oversize holes have been approved, in which case washers are required under head and nut).

22.2 At the start of each day, each operator shall field test his power impact wrench as directed by the testing agency or Architect and as described below using bolts representative of those to be used in the work.

22.3 Field testing of each impact wrench shall consist of tightening, in a hydraulic tension measuring device such as a Skidmore Wilhelm Calibrator furnished by the Contractor, three (3) bolts of each size to be used, with a hardened washer under either bolt head or nut, whichever is turned in tightening. Bolt tension readings shall be taken at "snug tight plus fraction of turn" (tabulated in Table 4) conditions to confirm that bolts and equipment have the capacity to develop the minimum tension tabulated in Table 3.

22.4 While power impact wrenches are being field tested, the testing agency shall be given the opportunity to determine the torque tension relationship for its manual torque indicator wrench for every combination of impact wrench and bolt size to be used in the work for the day. These torque values shall be used as the inspection standard in testing the actual installations.

22.5 Install bolts using powered impact wrenches with sufficient capacity and an adequate supply of compressed air.

23. FIELD QUALITY CONTROL

23.1 Testing Agency
Contractor shall engage a qualified independent testing and inspecting agency to perform special inspections as indicated on Structural Drawings and to inspect field welds and high-strength bolted connections as outlined in Division 01, and prepare test reports.

23.1.1 Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

23.2 In addition to visual inspection, field-welded shear connectors will be inspected and tested according to requirements of AWS D1.1 for stud welding and as follows:

23.2.1 Bend tests will be performed when visual inspections reveal either less than a continuous 360 degree flash or welding repairs to any shear connector.

23.2.2 Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.

24. CORRECTIVE WORK

24.1 Structural steel members or assemblages having fabrication errors, or which have deformations preventing proper assembly and fitting of parts, shall be reported immediately to the Architect. They shall not be incorporated in the finished work. Such members or assemblages may be corrected if permitted by the Architect, such corrective work shall be in accordance with the Contract Documents.

24.2 Submit to the Architect for approval, Drawings showing reasons for and details of proposed corrective work, and receive approved Drawings prior to performing the corrective work.

25. FIELD TOUCH-UP PAINTING

25.1 After erection, all exposed metal surfaces where shop coat is missing or has been damaged shall be touched up using the same type of paint as approved for the shop coat.

25.2 Prior to touch up, all areas to be painted shall be thoroughly cleaned of rust, dirt and weld slag.

25.3 Touch-up paint shall extend a minimum of 2 inches onto undamaged finish.

25.4 Paint shall be uniformly applied to dry surfaces to a dry film thickness of no less than 2 mils, 4 mils for exposed steel.

25.5 Galvanized Surfaces
Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint according to ASTM A780.

End of Section 051200

SECTION 052100

STEEL JOISTS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

2.1.1 Open web steel joists

2.1.2 Joist accessories

2.2 Related Sections include the following:

2.2.1 Division 01 Sections for testing and inspections required for Steel Joists

2.2.2 Division 05 Section "Metal Fabrications" for supplementary framing at openings

3. DEFINITIONS

3.1 SJI "Specifications"

Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

3.2 Special Joists

Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

4. PERFORMANCE REQUIREMENTS

4.1 Structural Performance

Provide special joists and connections capable of withstanding design loads indicated on the structural drawings.

4.2 Anchorage

Design joist and joist anchorage to resist a minimum net uplift force as indicated on the structural drawings.

5. SUBMITTALS

5.1 Product Data: For each type of joist, accessory and product.

5.2 Shop Drawings

5.2.1 Indicate details of fabrications and erection.

5.2.2 Include plan, bearing details, bracing, connections, anchoring, quantity, joist sizes, size of welds and type of paint.

5.2.3 Submit calculations, designed and sealed by a Professional Engineer registered in the State of Kansas, for all SJI products covered in this section. Use load criteria as shown on Plans and in the general notes. Submit calculations prior to preparation of shop drawings.

5.3 Welding Certificates: Provide evidence of welder's qualifications.

5.4 Manufacturer Certificates
Signed by manufacturers certifying that joists comply with requirements.

5.5 Mill Certificates
Signed by bolt manufacturers certifying that bolts comply with requirements.

6. QUALITY ASSURANCE

6.1 Manufacturer Qualifications
An SJI member firm, experienced in manufacturing joints similar to those indicated for this Project and with a record of successful in-service performance.

6.1.1 Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.

6.1.2 Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code—Steel"; and AWS D1.3 "Structural Welding Code—Sheet Steel."

6.2 Welder's Qualifications
Qualifications of welders shall be as prescribed in the "Standard Qualification Procedures" by the American Welding Society. Welding operators shall have been previously qualified to perform the type of work required for this Project.

6.3 Unless otherwise indicated herein, perform work in accordance with the following standards:

6.3.1 AWS: "Code for Welding in Building Construction."

6.3.2 SJI: "Standard Specifications for Open Web Steel Joists," current edition.

6.3.3 Execute field welding in accordance with AWS "Code for Arc and Gas Welding in Building Construction."

7. DELIVERY, STORAGE, AND HANDLING

7.1 Deliver, store, and handle joists as recommended in SJI's "Specifications."

7.2 Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 – PRODUCTS

8. MATERIALS

8.1 Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.

8.2 Steel Bearing Plates: ASTM A36/A36M.

8.3 High-Strength Bolts, Nuts, and Washers
ASTM A325, Type 1, heavy-hex steel structural bolts; heavy hex carbon-steel nuts; and hardened carbon-steel washers.

8.4 Welding Electrodes: Comply with AWS standards.

9. PAINT – SHOP PRIMERS

9.1 Acceptable Products
Lead and chromate free, non-asphaltic, rust inhibiting primer. Compatible with finishes specified in Division 09 painting Sections where exposed.

9.2 Preparation for Painting: Clean all surfaces to be painted in accordance with SSPC SP3.

9.3 Surfaces to be Painted: All joists, bridging and related accessories.

9.4 Rate of Application: Minimum dry film thickness of 1.5 mils.

10. OPEN WEB STEEL JOISTS AND JOIST GIRDERS

10.1 Manufacture steel joists according to "Standard Specifications for Open Web Steel Joists, Joist Girder, LH-Series, K-Series and/or special joists," in SJI's "Specifications," with steel-angle top and bottom-chord members, underslung ends, and parallel top and bottom chords unless shown differently on Drawings; of joist type indicated.
10.1.1 Joist Type: As shown on Drawings.

10.2 Top-Chord Extensions
Extend top chords of joists where indicated, complying with SJI's "Specifications."

10.3 Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

10.4 Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4-inch per 12 inches (1:48).

10.5 All joists connected to a column shall have the bottom chord extended and connected to the column as shown on Contract Documents.

11. JOIST ACCESSORIES

11.1 Bridging
Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.

11.2 Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated. Shop prime paint.

11.3 Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

PART 3 – EXECUTION

11. EXAMINATION

Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

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

12. INSTALLATION

12.1 Do not install joists until supporting construction is in place and secured.

12.2 Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommend-dations, and requirements in this Section.

12.2.1 Before installation, splice joists delivered to Project site in more than one (1) piece.

12.2.2 Space, adjust, and align joists accurately in location before permanently fastening.

12.2.3 Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

12.3 Field weld joists to supporting steel or steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

12.4 Bolt joists to supporting steel framework using high strength-steel bolts, unless otherwise indicated.

12.5 Install and connect bridging concurrently with joist erection before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

13. FIELD QUALITY CONTROL

Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections, perform field tests and inspections as outlined in Division 01 Sections, perform special inspections as indicated on structural drawings, and to prepare test reports.

14. FIELD TOUCH UP PAINTING

After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories (bearing plates and abutting structural steel).

14.1 Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC SP 3.

14.2 Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.

End of Section 052100

SECTION 053100

STEEL DECK

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following: Non-composite roof deck.

2.2 Related Sections include the following:

2.2.1 Division 03 Section "Cast-in-Place Concrete" for concrete fill and reinforcing steel.

2.2.2 Division 05 Section "Structural Steel" for shop and field-welded shear connectors.

2.2.3 Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

3. PERFORMANCE REQUIREMENTS

3.1 Span each deck unit over three (3) or more spans, minimum load capacity equivalent to SDI Standard Loading Tables.

3.2 Where deck spans less than three (3) spans, increase the gauge of the deck to provide the same load capacity as shown in SDI Standard Load Tables for 3 or more spans.

4. SUBMITTALS

4.1 Product Data: For each type of deck, accessory, and product indicated.

4.2 Shop Drawings

4.2.1 Indicate all details of fabrication and installation.

4.2.2 Deck: Include type, gauge, finish, location, openings, dimensions, anchorage details, lap details, accessories and shoring requirements (if any).

4.3 Product Certificates

4.3.1 For each type of steel deck, signed by product manufacturer.

4.3.2 Certificates from an approved independent Testing Laboratory indicating compliance with specified fire resistance requirements.

4.4 Welding Certificates: Copies of certificates for welding procedures and personnel.

5. QUALITY ASSURANCE

5.1 Installer Qualifications
An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

5.2 Testing Agency Qualifications
An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

5.3 Welding
Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code – Steel," and AWS D1.3, "Structural Welding Code – Sheet Steel." Qualifications of welders shall be as described in the "Standard Qualification Procedures" by the American Welding Society. Welding operators shall have been previously qualified to perform the type of work required for this Project.

5.4 AISI Specifications
Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

5.5 Unless otherwise indicated herein, perform work in accordance with the following reference standards:

5.5.1 Steel Deck Institute: "Code of Recommended Standard Practice."

5.5.2 American Welding Society: "Code for Welding in Building Construction."

5.5.3 American Iron and Steel Institute: "Specifications for the Design of Light Gauge Cold Formed Steel Structural Members."

6. DELIVERY, STORAGE, AND HANDLING

6.1 Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

6.2 Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

6.3 If mud, dirt, or other foreign matter does accumulate on the deck, completely remove such accumulation prior to erection.

PART 2 – PRODUCTS

7. MANUFACTURERS

Subject to compliance with requirements, provide products by one (1) of the following:

7.1 Steel Deck

- 7.1.1 Bowman Construction Products.
- 7.1.2 Epic Metals Corp.
- 7.1.3 Nucor Corp.; Vulcraft Div.
- 7.1.4 Rollform Products, Inc.
- 7.1.5 United Steel Deck, Inc.
- 7.1.6 Verco Manufacturing Co.
- 7.1.7 Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

8. ROOF DECK

8.1 Steel Roof Deck

Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29, and the following:

- 8.1.1 Steel Sheet, ASTM A1008 for painted deck and ASTM A653 for painted galvanized deck with minimum yield strength of 33,000 psi
- 8.1.2 Deck Profile: Type WR, wide rib
- 8.1.3 Profile Depth: 1-1/2 inches, except 3 inches at FEMA Shelter
- 8.1.4 Gauge as noted on the Drawings
- 8.1.5 Span Condition: Triple span or more
- 8.1.6 Side Laps: Interlocking seam
- 8.1.7 Fastening as indicated on the Drawings

9. PAINT – SHOP PRIMERS

9.1 Acceptable Products

Manufacturer's Standard: Gray paint color, lead- and chromate-free, non-asphaltic, rust inhibiting primer, and compatible with finishes listed in Division 09 painting Sections.

9.2 Preparation of Painting

Clean surfaces to be painted in accordance with SSPC-SP2 (interior) or SSPC SP6 (exterior).

9.3 Rate of Application: Minimum dry film thickness of 1.0 mils.

10. ACCESSORIES

10.1 General
Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

10.2 Mechanical Fasteners
Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

10.3 Side-Lap Fasteners
Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, size as shown on the structural drawings.

10.4 Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

10.5 Steel Sheet Accessories
Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

10.6 Pour Stops and Girder Fillers
Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck.

10.7 Column Closures, End Closures, Z-Closures, and Cover Plates
Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

10.8 Shear Connectors
ASTM A108, Grades 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B, with arc shields.

10.9 Repair Paint
Lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

PART 3 – EXECUTION

11. PREPARATION

11.1 Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

11.2 Steel framework shall be plumbed, aligned, and completed.

11.3 Ice, oil, dirt, rust, and other materials, which may adversely affect welding shall have been removed.

12. INSTALLATION, GENERAL

12.1 Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

12.2 Locate decking bundles to prevent overloading of supporting members.

12.3 Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

12.3.1 Align cellular deck panels for entire length of cell runs and align cells at ends of abutting panels.

12.4 Place deck panels flat and square and fasten to supporting frame without warp or deflection.

12.5 Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

12.6 Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

12.7 Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

12.8 Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer’s written instructions. Submit alternate design from mechanical fastener supplier for approval.

13. ROOF DECK INSTALLATION

13.1 Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated:

13.1.1 Weld Diameter: 5/8-inch, nominal.

13.1.2 Weld Spacing: Space and locate welds as indicated on the structural drawings.

13.2 Side-Lap and Perimeter Edge Fastening

Fasten side laps and perimeter edges of panels between supports, at intervals as indicated on the structural drawings:

13.2.1 Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.

13.3 End Bearing

Install deck ends over supporting frame with a minimum end bearing of two (2) inches with end joints as follows:

13.3.1 End Joints: Lapped two (2) inches minimum.

13.4 Roof Sump Pans and Sump Plates
Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one (1) weld at each corner. Coordinate location and requirements for sump pans and plates and any supporting angle frames with the Drawings based on roof drain supplier and plumbing contractor requirements.

13.5 Miscellaneous Roof Deck Accessories
Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

13.6 Flexible Closure Strips
Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

13.7 Placing Deck Units

13.7.1 Position metal deck units on supporting steel and accurately align to final position with units resting tightly on top of all supporting members. Do not stretch or contract the side lap interlocks.

13.7.2 Center ends of deck of center of each support.

13.8 Cutting and Fitting

13.8.1 Shop Cutting: Cut to proper length before shipping to the field.

13.8.2 Field Cutting by Metal Deck Erector

A. Notch to fit around columns and other similar fabrication.

B. All holes and openings which are located and dimensioned on the structural drawings.

C. Holes in deck larger than 6 inches and up to 12 inches in diameter:

1) Deck erector shall furnish and install 1 1/2 inch by 1 1/2 inch by 3/16 inch galvanized steel angle 5 feet-0 inches long on one (1) or both sides of each hole, perpendicular to flutes, as required. (Both sides if any portion of hole occurs in middle 1/3 of deck span, otherwise one (1) side.)

2) Attach angle to underside of deck by bolting or puddle welding at each bottom flute.

3) Do not space holes closer than 5 feet- 0 inches on center in any span.

13.8.3 Field Cutting by Other Trades

A. Holes and openings required for work under other Sections of the Specifications, which are not located and dimensions on the structural drawings and are 6 inches in diameter or less shall be cut by the respective trade. Not more than 1 rib shall be cut per panel per span.

B. Method and Quality of Cutting: All cuts shall be neat and trim in appearance, cut deck with metal saw, drills or cutting torch.

14. FIELD QUALITY CONTROL

14.1 Testing
Contractor shall engage a qualified independent testing agency to perform field quality-control testing.

14.2 Field welds will be subject to inspection.

14.3 Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding and as follows:

14.3.1 Shear connector stud welds will be visually inspected.

14.3.2 Bend tests will be performed if visual inspections reveal less than a full 360-degree flash or welding repairs to any shear connector stud.

14.3.3 Tests will be conducted on additional shear connector studs if weld fracture occurs on shear connector studs already tested according to AWS D1.1.

14.4 Testing agency shall report test results promptly and in writing to Contractor and Architect.

14.5 Remove and replace work that does not comply with specified requirements.

14.6 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

15. REPAIRS AND PROTECTION

15.1 Galvanizing Repairs
Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer’s written instructions.

15.2 Field Touch-Up Painting Preparation

15.2.1 Thoroughly clean areas to receive touch-up paint of all rust, dirt, oil, and weld slag.

15.2.2 Accomplish touch-up soon after deck is erected.

15.2.3 Touch-up shall include but not be limited to abrasions, scars, cut edges, and welds.

15.2.4 Extend paint minimum of two (2) inches into damaged finish.

15.2.5 Minimum Dry Film Thickness: 1 mil.

15.3 Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

End of Section 053100

SECTION 054000

COLD-FORMED METAL FRAMING

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes: Exterior non-load-bearing wall framing and soffit framing.

1.2 Related Requirements

1.2.1 Section 055000 “Metal Fabrications” for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

1.2.2 Section 092216 “Non-Structural Metal Framing” for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

2. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3. ACTION SUBMITTALS

3.1 Product Data

For the following:

3.1.1 Cold-formed steel framing materials

3.1.2 Exterior non-load-bearing wall framing

3.1.3 Vertical deflection clips

3.1.4 Single deflection track

3.1.5 Double deflection track

3.1.6 Soffit framing

3.1.7 Post-installed anchors

3.1.8 Power-actuated anchors

3.1.9 Sill sealer gasket

3.2 Shop Drawings

3.2.1 Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

3.2.2 Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

3.3 Delegated Design Submittal: For cold-formed steel framing.

4. INFORMATIONAL SUBMITTALS

4.1 Qualification Data: For testing agency

4.2 Welding certificates

4.3 Product Certificates: For each type of code-compliance certification for studs and tracks.

4.4 Product Test Reports
For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

- 4.4.1 Steel sheet
- 4.4.2 Expansion anchors
- 4.4.3 Power-actuated anchors
- 4.4.4 Mechanical fasteners
- 4.4.5 Vertical deflection clips
- 4.4.6 Horizontal drift deflection clips
- 4.4.7 Miscellaneous structural clips and accessories

4.5 Research Reports
For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

5. QUALITY ASSURANCE

5.1 Testing Agency Qualifications
Qualified according to ASTM E329 for testing indicated.

5.2 Product Tests
Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

5.3 Code-Compliance Certification of Studs and Tracks
Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association.

5.4 Welding Qualifications: Qualify procedures and personnel according to the following:

- 5.4.1 AWS D1.1/D1.1M, “Structural Welding Code - Steel.”
- 5.4.2 AWS D1.3/D1.3M, “Structural Welding Code - Sheet Steel.”

6. DELIVERY, STORAGE, AND HANDLING

Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

PART 2 – PRODUCTS

7. MANUFACTURERS

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:

7.1 Clark-Dietrich

7.2 Consolidated Fabricators Corp.; Building Products Division

7.3 Marino\WARE

7.4 SCAFCO Steel Stud Company; Stone Group of Companies

8. PERFORMANCE REQUIREMENTS

8.1 Delegated Design

Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

8.2 Structural Performance

Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.

8.2.1 Design Loads: As indicated on Drawings.

8.2.2 Deflection Limits

Design framing systems to withstand design loads without deflections greater than the following:

A. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height.

8.2.3 Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 degrees F.

8.2.4 Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.

8.2.5 Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

8.3 Cold-Formed Steel Framing Standards

Unless more stringent requirements are indicated, framing complies with AISI S100 and AISI S200.

8.4 Fire-Resistance Ratings

Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

8.4.1 Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

9. COLD-FORMED STEEL FRAMING MATERIALS

9.1 Framing Members, General: Comply with applicable standards for conditions indicated.

9.2 Steel Sheet
ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
9.2.1 Grade: As required by structural performance.

9.2.2 Coating: G60, A60, AZ50, or GF30.

9.3 Steel Sheet for Vertical Deflection and Drift Clips
ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
9.3.1 Grade: As required by structural performance.

9.3.2 Coating: G60.

10. EXTERIOR NON-LOAD-BEARING WALL FRAMING

10.1 Steel Studs
Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
10.1.1 Minimum Base-Metal Thickness: As indicated on Structural Drawings and as required by Delegated Design.

10.1.2 Section Properties: As indicated on Drawings and as required by Delegated Design.

10.2 Steel Track
Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching base-metal thickness of steel studs.

10.3 Vertical Deflection Clips, Exterior
Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

10.4 Single Deflection Track
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 loads and transfer them to the primary structure.

10.5 Double Deflection Tracks
Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

11. SOFFIT FRAMING

Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, to match exterior non-load-bearing wall framing.

12. FRAMING ACCESSORIES

12.1 Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic-coated steel sheet, of same grade and coating designation used for framing members.

12.2 Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

- 12.2.1 Supplementary framing
- 12.2.2 Bracing, bridging, and solid blocking
- 12.2.3 Web stiffeners
- 12.2.4 Anchor clips
- 12.2.5 End clips
- 12.2.6 Foundation clips
- 12.2.7 Gusset plates
- 12.2.8 Stud kickers and knee braces
- 12.2.9 Joist hangers and end closures
- 12.2.10 Hole-reinforcing plates
- 12.2.11 Backer plates

13. ANCHORS, CLIPS, AND FASTENERS

13.1 Steel Shapes and Clips
ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

13.2 Anchor Bolts
ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc-coated by hot-dip process according to ASTM A153/A153M, Class C.

13.3 Post-Installed Anchors
Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.

- 13.3.1 Uses: Securing cold-formed steel framing to structure.
- 13.3.2 Type: Torque-controlled expansion anchor, torque-controlled adhesive anchor, or adhesive anchor.
- 13.3.3 Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
- 13.3.4 Material for Exterior or Interior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

13.4 Power-Actuated Anchors
Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

13.5 Mechanical Fasteners
ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
13.5.1 Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

13.6 Welding Electrodes: Comply with AWS standards.

14. MISCELLANEOUS MATERIALS

14.1 Galvanizing Repair Paint: ASTM A780/A780M.

14.2 Cement Grout
Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

14.3 Nonmetallic, Non-shrink Grout
Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

14.4 Shims
Load-bearing, high-density, multi-monomer, non-leaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

14.5 Sill Sealer Gasket
Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer’s standard widths to match width of bottom track or rim track members as required.

15. FABRICATION

15.1 Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI’s specifications and standards, manufacturer’s written instructions, and requirements in this Section.
15.1.1 Fabricate framing assemblies using jigs or templates.

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

15.1.3 Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
A. Comply with AWS D1.3/D1.3M 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 screws penetrating joined members by no fewer than 3 exposed screw threads.

15.1.4 Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to shop drawings.

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

15.3 Tolerances
Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8-inch in 10 feet and as follows:

15.3.1 Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative errors are not to exceed minimum fastening requirements of sheathing or other finishing materials.

15.3.2 Squareness: Fabricate each cold-formed steel framing assembly to a maximum out of square tolerance of 1/8 inch.

PART 3 – EXECUTION

16. EXAMINATION

16.1 Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

17. PREPARATION

17.1 Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4-inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

17.2 Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

18. INSTALLATION, GENERAL

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

18.2 Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

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

18.3.1 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.

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

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

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

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

B. Locate mechanical fasteners, install according to shop drawings, and comply with requirements for spacing, edge distances, and screw penetration.

18.5 Install framing members in 1-piece lengths unless splice connections are indicated for track or tension members.

18.6 Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

18.7 Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

18.8 Install insulation, specified in Section 072100 “Thermal Insulation,” in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

18.9 Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer’s approved or standard punched openings.

19. INSTALLATION OF EXTERIOR NON-LOAD-BEARING WALL FRAMING

19.1 Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

19.2 Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

19.2.1 Stud Spacing: As indicated on Drawings.

19.3 Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

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

19.4.1 Install single deep-leg deflection tracks and anchor to building structure.

19.4.2 Install double deep-leg deflection tracks and anchor outer track to building structure.

19.4.3 Connect vertical deflection clips to bypassing studs and anchor to building structure.

19.4.4 Connect drift clips to cold-formed steel framing and anchor to building structure.

19.5 Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

19.5.1 Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.

19.5.2 Strap Bridging: 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.

19.5.3 Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

19.6 Top Bridging for Single Deflection Track
Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

19.6.1 Install solid blocking at 96-inch centers and centers indicated on shop drawings.

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

20. INSTALLATION OF INTERIOR NON-LOAD-BEARING WALL FRAMING

20.1 Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

20.2 Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

20.2.1 Stud Spacing: As indicated on Drawings.

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

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

20.4.1 Install single deep-leg deflection tracks and anchor to building structure.

20.4.2 Install double deep-leg deflection tracks and anchor outer track to building structure.

20.4.3 Connect vertical deflection clips to studs and anchor to building structure.

20.4.4 Connect drift clips to cold-formed steel metal framing and anchor to building structure.

20.5 Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

20.5.1 Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.

20.5.2 Strap Bridging: 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.

20.5.3 Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

20.6 Top Bridging for Single Deflection Track
Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

20.6.1 Install solid blocking at 96-inch center and centers indicated on shop drawings.

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

21. INSTALLATION TOLERANCES

Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8-inch in 10 feet and as follows:

21.1 Space individual framing members no more than plus or minus 1/8-inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

22. REPAIR

Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

23. FIELD QUALITY CONTROL

23.1 Testing
Contractor shall engage a qualified independent testing and inspecting agency to perform field tests, special inspections, and to prepare test reports.

23.2 Field and shop welds will be subject to testing and inspecting.

23.3 Testing agency shall report test results promptly and in writing to Owner and Architect.

23.4 Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

23.5 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

24. PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

End of Section 054000

SECTION 055000

METAL FABRICATIONS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Steel framing and supports for mechanical and electrical equipment

2.1.2 Steel framing and supports for applications where framing and supports are not specified in other Sections

2.1.3 Shelf angles

2.1.4 Miscellaneous steel trim including steel angle corner guards and steel edgings

2.1.5 Loose bearing and leveling plates for applications where they are not specified in other Sections

2.2 Products furnished, but not installed, under this Section:

2.2.1 Loose steel lintels

2.2.2 Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry

2.2.3 Steel weld plates and angles for applications where they are not specified in other Sections

2.3 Related Sections

2.3.1 Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete

2.3.2 Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry

3. PERFORMANCE REQUIREMENTS

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

3.1 Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

4. SUBMITTALS

4.1 Product Data
For the following:
4.1.1 Paint products
4.2.2 Grout

4.2 Shop Drawings
Show fabrication and installation details for metal fabrications.
4.2.1 Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

5. QUALITY ASSURANCE

5.1 Welding Qualifications
Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

5.2 Welding Qualifications:
Qualify procedures and personnel according to the following:
5.2.1 AWS D1.1/D1.1M, "Structural Welding Code – Steel."

6. PROJECT CONDITIONS

6.1 Field Measurements
Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

6.2 All metal fabrications either at exterior locations or exposed to weather conditions shall be hot-dipped galvanized.

7. COORDINATION

7.1 Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

7.2 Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

8. METALS, GENERAL

Metal Surfaces, General
Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

9. FERROUS METALS

9.1 Steel Plates, Shapes, and Bars: ASTM A36/A36M.

9.2 Rolled-Steel Floor Plate
ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.

9.3 Steel Tubing: ASTM A500, cold-formed steel tubing.

9.4 Steel Pipe
ASTM A53/A53M, standard weight (Schedule 40) unless otherwise indicated.

10. FASTENERS

10.1 General
Unless otherwise indicated, provide zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

10.2 Steel Bolts and Nuts
Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and flat washers.

10.3 Anchor Bolts
ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

10.3.1 Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

10.4 Machine Screws: ASME B18.6.3

10.5 Lag Screws: ASME B18.2.1

10.6 Wood Screws: Flat head, ASME B18.6.1

10.7 Plain Washers: Round, ASME B18.22.1

10.8 Lock Washers: Helical, spring type, ASME B18.21.1

10.9 Anchors, General
Anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.

10.10 Cast-in-Place Anchors in Concrete
Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329.

10.11 Post-Installed Anchors
As indicated on structural drawings.
10.1.11 Material for Exterior and Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.

11. MISCELLANEOUS MATERIALS

11.1 Welding Rods and Bare Electrodes
Select according to AWS specifications for metal alloy welded.

11.2 Shop Primers: Provide primers that comply with Division 09 painting Sections.

11.3 Universal Shop Primer
Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
11.3.1 Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

11.4 Galvanizing Repair Paint
High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

11.5 Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

11.6 Non-shrink, Nonmetallic Grout
Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

11.7 Concrete
Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3,000 psi.

12. FABRICATION, GENERAL

12.1 Shop Assembly
Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

12.2 Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

12.3 Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

12.4 Form exposed work with accurate angles and surfaces and straight edges.

12.5 Weld corners and seams continuously to comply with the following:

12.5.1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

12.5.2 Obtain fusion without undercut or overlap.

12.5.3 Remove welding flux immediately.

12.5.4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

12.6 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

12.7 Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

12.8 Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

12.9 Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

12.9.1 Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8- by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches on center, unless otherwise indicated.

13. MISCELLANEOUS FRAMING AND SUPPORTS

13.1 General

Provide steel framing and supports not specified in other Sections as needed to complete the Work.

13.2 Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

13.2.1 Fabricate units from slotted channel framing where indicated.

13.2.2 Furnish inserts for units installed after concrete is placed.

13.3 Galvanize miscellaneous framing and supports where indicated.

13.4 Prime miscellaneous framing and supports with zinc-rich primer where indicated.

14. SHELF ANGLES

14.1 Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches on center, unless otherwise indicated.

14.1.1 Provide mitered and welded units at corners.

14.1.2 Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

14.2 For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

14.3 Galvanize shelf angles located in exterior walls.

14.4 Prime shelf angles located in exterior walls with zinc-rich primer.

15. METAL LADDERS

15.1 General

Comply with ANSI A14.3 unless otherwise indicated.

15.2 Steel Ladders

15.2.1 Space siderails 18 inches apart unless otherwise indicated.

15.2.2 Space siderails of elevator pit ladders 12 inches apart.

15.2.3 Siderails: Continuous, 1/2- by 2-1/2-inch steel flat bars, with eased edges.

15.2.4 Rungs: 1-inch-diameter steel bars.

15.2.5 Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

15.2.6 Provide nonslip surfaces on top of each rung, either by coating rung with aluminum oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

15.2.7 Support each ladder at top and bottom and not more than 60 inches on center with welded or bolted steel brackets.

15.2.8 Prime exterior ladders, including brackets and fasteners, with zinc-rich primer.

16. METAL FLOOR PLATE

16.1 Fabricate from rolled-steel floor plate of thickness indicated below:

Thickness: 1/4-inch

16.2 Provide grating sections where indicated fabricated from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 1/2-inch in least dimension.

16.3 Provide steel angle supports as indicated.

16.4 Include steel angle stiffeners, and fixed and removable sections as indicated.

17. MISCELLANEOUS STEEL TRIM

17.1 Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

17.2 Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

17.2.1 Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

17.3 Prime exterior miscellaneous steel trim with zinc-rich primer.

18. METAL BOLLARDS

18.1 Fabricate metal bollards from Schedule 80 steel pipe.

18.1.1 Cap bollards with 1/4-inch-thick steel plate.

18.1.2 Where bollards are indicated to receive controls for door operators, provide necessary cutouts for controls and holes for wire.

18.2 Fabricate bollards with 3/8-inch-thick steel baseplates for bolting to concrete slab. Drill baseplates at all 4 corners for 3/4-inch anchor bolts.

18.2.1 Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

18.3 Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch-thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4-inch larger than OD of bollard.

18.4 Prime bollards with zinc-rich primer.

19. LOOSE BEARING AND LEVELING PLATES

Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

20. LOOSE STEEL LINTELS

20.1 Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

20.2 Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.

21. STEEL WELD PLATES AND ANGLES

Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two (2) integrally welded steel strap anchors for embedding in concrete.

22. FINISHES, GENERAL

22.1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

22.2 Finish metal fabrications after assembly.

22.3 Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

23. STEEL AND IRON FINISHES

23.1 Galvanizing
Hot-dip galvanize all items located at exterior of building or exposed to weather to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
23.1.1 Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

23.2 Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
23.2.1 Shop prime with universal shop primer unless zinc-rich primer is indicated.

23.3 Preparation for Shop Priming
Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning" and SSPC-SP 3, "Power Tool Cleaning" as indicated:
23.3.1 Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

23.3.2 Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

23.3.3 Other Items: SSPC-SP 3, "Power Tool Cleaning."

23.4 Shop Priming
Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
23.4.1 Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 – EXECUTION

24. INSTALLATION, GENERAL

24.1 Cutting, Fitting, and Placement
Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

24.2 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

24.3 Field Welding
Comply with the following requirements:
24.3.1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

24.3.2 Obtain fusion without undercut or overlap.

24.3.3 Remove welding flux immediately.

24.3.4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

24.4 Fastening to In-Place Construction
Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

24.5 Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

24.6 Corrosion Protection
Coat concealed surfaces of metal that will come into contact with grout, concrete, masonry, wood, or dissimilar metals.

25. INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

25.1 General
Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on shop drawings.

25.2 Install columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

26. INSTALLING METAL BOLLARDS

26.1 Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.
26.1.1 Embed anchor bolts at least 4 inches in concrete.

26.2 Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

26.3 Fill bollards solidly with concrete, and cap with steel plate to match bollard circumference, as specified.

27. INSTALLING BEARING AND LEVELING PLATES

27.1 Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

27.2 Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

27.2.1 Use non-shrink, non-metallic grout.

27.2.2 Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

28. ADJUSTING AND CLEANING

28.1 Touchup Painting

Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

28.1.1 Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

28.2 Galvanized Surfaces

Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

End of Section 055000

SECTION 059900

MISCELLANEOUS METALS & METAL SPECIALTIES

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

2. WORK INCLUDED

Furnish all labor and materials to complete all miscellaneous metals and metal specialty work shown on the drawings and/or herein specified, as follows:

2.1 Plaque
2.2 Flags and Flag Poles
2.3 Trash Enclosure Gates

3. PLAQUE

Furnish and install one photo etched bronze tablet, 16" x 16" in location as directed by architect, to contain the following: (Architect will submit design drawing)

SEDGWICK COUNTY, KANSAS
Juvenile Services Building
881 S. Minnesota, Wichita, Kansas

County Project Manager: Sandy Anguelov

Board of County Commissioners:
(insert names of five current Commissioners by name)

Architect:	General Contractor:
Hanney & Associates	(insert name)
A R C H I T E C T S	

DEDICATION DATE AND YEAR

4. FLAGS AND FLAG POLES

Provide and install two (2) ESR45D82, 45-foot flag poles, clear finished aluminum, external halyard, ground with sleeve. Provide with (2) 5’ x 8’ nylon flags – (1) State of Kansas, (1) USA, as manufactured by American Flagpole & Flag Co., 3546 Lake Elmo Ave, Suite #3. Lake Elmo, Minnesota 55042 (800) 426-6235, www.aflag.com, or the approved equal.

5. TRASH ENCLOSURE GATES

Provide and install trash gates as manufactured by CityScapes, Inc, or approved equal.
Manufacturer Contact: Tyler Fleming, email: tfleming@cityscapesinc.com;
1-380-210-2233 direct phone, or 1-877-727-3367.

End of Section 059900

SECTION 061000

ROUGH CARPENTRY

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

2.1.1 Rooftop equipment bases and support curbs

2.2.2 Wood blocking, cants, and nailers

2.2.3 Wood furring and grounds

2.2.4 Fire-retardant-treated wood products

2.2.5 Plywood backing panels

2.2 Related Sections Include: Division 06 Section “Sheathing.”

3. DEFINITIONS

3.1 Exposed Framing: Framing not concealed by other construction.

3.2 Dimension Lumber
Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

3.3 Timber: Lumber of 5 inches nominal or greater in least dimension.

3.4 Lumber grading agencies, and the abbreviations used to reference them, include the following:

3.4.1 NeLMA: Northeastern Lumber Manufacturers’ Association

3.4.2 NLGA: National Lumber Grades Authority

3.4.3 RIS: Redwood Inspection Service

3.4.4 SPIB: The Southern Pine Inspection Bureau

3.4.5 WCLIB: West Coast Lumber Inspection Bureau

3.4.6 WWPA: Western Wood Products Association

4. SUBMITTALS

4.1 Product Data
For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

4.1.1 Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

4.1.2 Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

4.1.3 For fire-retardant treatments specified to be high-temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

4.1.4 For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

4.1.5 Include copies of warranties from chemical treatment manufacturers for each type of treatment.

4.2 Fastener Patterns: Full-size templates for fasteners in exposed framing.

4.3 Material Certificates
For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

4.4 Research/Evaluation Reports
For the following, showing compliance with building code in effect for Project:

4.4.1 Wood-preservative-treated wood

4.4.2 Fire-retardant-treated wood

4.4.3 Engineered wood products

4.4.4 Power-driven fasteners

4.4.5 Powder-actuated fasteners

4.4.6 Expansion anchors

4.4.7 Metal framing anchors

5. QUALITY ASSURANCE

Source Limitations for Engineered Wood Products
Obtain each type of wood product through one (1) source from a single manufacturer.

6. DELIVERY, STORAGE, AND HANDLING

Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

7. WOOD PRODUCTS, GENERAL

7.1 Lumber

DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

7.1.1 Factory mark each piece of lumber with grade stamp of grading agency.

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

7.1.3 Provide dressed lumber, S4S, unless otherwise indicated.

8. WOOD-PRESERVATIVE-TREATED LUMBER

8.1 Preservative Treatment by Pressure Process

WPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

8.1.1 Preservative Chemicals

Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

8.1.2 For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

8.2 Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

8.3 Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

8.3.1 For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

8.4 Application

Treat items indicated on Drawings, and the following:

8.4.1 Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

8.4.2 Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

9. FIRE-RETARDANT-TREATED MATERIALS

9.1 General
Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).

9.1.1 Use Exterior type for exterior locations and where indicated.

9.1.2 Use Interior Type A, high temperature (HT) for all interior lumber, blocking, and nailers inside of building.

9.1.3 Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D5664, for lumber and ASTM D5516, for plywood.

9.1.4 Use treatment that does not promote corrosion of metal fasteners.

9.2 Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

10. MISCELLANEOUS LUMBER

10.1 General
Provide lumber for support or attachment of other construction including curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

10.2 Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

10.3 Moisture Content
19 percent maximum for lumber items not specified to receive wood preservative treatment.

10.4 Grade and Species: Same as dimension lumber.

10.5 For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

10.6 For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

11. PLYWOOD BACKING PANELS

11.1 Construction Panel Standards
Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural Use Panels," Form No. E445.

11.2 Trademark
Factory mark each construction panel with APA trademark evidencing compliance with grade requirements.

11.3 Miscellaneous Exposed Plywood
A-C, Group 1, Exterior, not less than 3/4-inch nominal.

11.4 Miscellaneous Concealed Plywood
C-C Plugged Exterior, not less than 3/4-inch nominal.

11.5 Provide preservative-treated plywood at roof parapet walls and caps.

12. FASTENERS

General
Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

12.1 Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high-relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

12.2 Nails, Brads, and Staples: ASTM F1667

12.3 Power-Driven Fasteners: NES NER-272

12.4 Wood Screws: ASME B18.6.1

12.5 Lag Bolts: ASME B18.2.1

12.6 Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers

12.7 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing and inspecting agency.

12.7.1 Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

12.7.2 Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

13. MISCELLANEOUS MATERIALS

13.1 Sill-Sealer Gaskets
Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

13.2 Water-Repellent Preservative
NWWDA-tested and -accepted formulation containing three iodo two propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 – EXECUTION

14. INSTALLATION, GENERAL

14.1 Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

14.2 Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

14.2.1 Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center.

14.3 Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

14.4 Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

14.5 Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

14.6 For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

14.6.1 Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.

14.6.2 Use finishing nails, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

15. WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

15.1 Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

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

15.3 Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

16. WOOD FURRING INSTALLATION

16.1 Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

16.1.1 Firestop spaces on walls at and at ceiling with wood blocking or noncombustible materials, accurately fitted to close spaces.

16.2 Furring to Receive Plywood or Hardboard Paneling
Install 1- by 3-inch nominal-size furring vertically at 24 inches on center.

16.3 Furring to Receive Gypsum Board
Install 1- by 2-inch nominal-size furring vertically at 16 inches on center.

17. PROTECTION

17.1 Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

17.2 Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA registered label.

End of Section 061000

SECTION 061600

SHEATHING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

2.1.1 Plywood wall sheathing

2.1.2 Glass-mat gypsum wall sheathing

2.1.3 Sheathing joint-and-penetration treatment

2.1.4 Flexible flashing at openings in sheathing

2.2 Related Sections include the following:

2.2.1 Division 06 Section “Rough Carpentry” for treated wood blocking.

2.2.2 Division 07 Section “Fluid-Applied Membrane Air Barriers” for applications of membrane air barriers over sheathing.

2.2.3 Division 07 Section “Metal Plate Wall Panels” for composite metal wall panel applications.

2.2.4 Division 07 Section “Sheet Metal Flashing and Trim” for metal flashing and trim applications.

3. SUBMITTALS

3.1 Product Data

For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

3.1.1 Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.

3.1.2 Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.

3.1.3 For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.

3.1.4 For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

3.2 Research/Evaluation Reports
For the following, showing compliance with building code in effect for Project:
3.2.1 Preservative-treated plywood

3.2.2 Fire-retardant-treated plywood

4. DELIVERY, STORAGE, AND HANDLING

Stack panels flat with spacers between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

5. PERFORMANCE REQUIREMENTS

Fire-Resistance Ratings
As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

5.1 Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

6. WOOD PANEL PRODUCTS

6.1 Thickness
As needed to comply with requirements specified, but not less than 5/8-inch thick.

6.2 Factory mark panels to indicate compliance with applicable standards.

7. PRESERVATIVE-TREATED PLYWOOD

7.1 Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

7.2 Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

7.3 Application: Treat all exterior plywood, unless otherwise indicated.

8. WALL AND PARAPET SHEATHING

Plywood Wall Sheathing: Exterior, Structural I sheathing.

8.1 Span Rating: Not less than 24/0 and as indicated on Structural Drawings.

8.2 Nominal Thickness
Not less than 5/8-inch, unless otherwise indicated on Structural Drawings.

8.3 Applications
For use as back-up for metal wall panel systems, parapet locations for adhering of membrane roofing and other locations as indicated on Drawings.

9. WALL SHEATHING

Glass-Mat Gypsum Wall Sheathing: ASTM C1177/1177M.

9.1 Product
Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corporation.

9.2 Type and Thickness: Type X, 5/8-inch thick.

9.3 Applications: At locations indicated on Drawings.

10. FASTENERS

10.1 General
Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

10.1.1 For wall and parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M; or with organic polymer corrosion-protective coating complying with ASTM B117.

10.2 Power-Driven Fasteners
Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

10.3 Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing
Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.

10.3.1 For steel framing less than 0.0329-inch thick, attach sheathing to comply with ASTM C1002.

10.3.2 For steel framing from 0.033- to 0.112-inch thick, attach sheathing to comply with ASTM C954.

11. SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

11.1 Sealant for Glass-Mat Gypsum Sheathing Board
Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing, and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

11.2 Sheathing Tape for Glass-Mat Gypsum Sheathing Board
Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

12. MISCELLANEOUS MATERIALS

12.1 Flexible Flashing
Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film.

12.1.1 Products: Subject to compliance with requirements, provide 1 of the following:

A. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.

B. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Plus Self-Adhered Flashing.

12.2 Primer for Flexible Flashing
Product recommended by manufacturer of flexible flashing for substrate.

PART 3 – EXECUTION

13. INSTALLATION – GENERAL

13.1 Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

13.2 Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

13.3 Securely attach to substrate by fastening as indicated, complying with the following:

13.3.1 Table 2304.9.1, “Fastening Schedule,” in ICC’s “International Building Code.”

13.3.2 ICC-ES evaluation report for fasteners.

13.4 Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

13.5 Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

13.6 Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

14. WOOD STRUCTURAL PANEL INSTALLATION

14.1 General
Comply with applicable recommendations in APA Form No. E30S, “Engineered Wood Construction Guide,” for types of structural-use panels and applications indicated.

14.2 Fastening Methods
Fasten panels as indicated below:

14.2.1 Screw to cold-formed metal framing

14.2.2 Space panels 1/8-inch apart at edges and ends

15. GYPSUM SHEATHING INSTALLATION

15.1 Comply with GA-253 and with manufacturer's written instructions

15.1.1 Fasten gypsum sheathing to cold-formed metal framing with screws

15.1.2 Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements

15.1.3 Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

15.2 Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.

15.3 Horizontal Installation

Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than 1 stud spacing. Attach boards at perimeter and within field of board to each steel stud.

15.3.1 Space fasteners approximately 8 inches on center and set back a minimum of 3/8-inch from edges and ends of boards.

15.4 Vertical Installation

Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

15.4.1 Space fasteners approximately 8 inches on center and set back a minimum of 3/8-inch from edges and ends of boards.

16. SHEATHING JOINT-AND-PENETRATION TREATMENT

Seal sheathing joints according to sheathing manufacturer’s written instructions.

16.1 Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient quantity of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.

16.2 Apply glass-fiber sheathing tape to glass-mat gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

16.3 Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

17. FLEXIBLE FLASHING INSTALLATION

Apply flexible flashing where indicated to comply with manufacturers written instructions.

17.1 Prime substrates as recommended by flashing manufacturer.

17.2 Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.

17.3 After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

End of Section 061600

SECTION 064023

INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

Adjust list below to suit Project and to distinguish interior architectural woodwork from items made from wood but specified as finish carpentry, stock cabinets, etc., in other Sections. AWI's definition of standing and running trim includes "rails used on corridor walls of hospitals or nursing homes, etc., and guard rails at glass openings."

2.1.1 Cabinetry: Refer to Drawings, especially, but not limited to Sheet 7.8.

2.1.2 Plastic-laminate finish cabinets

2.1.3 Countertops
All countertops will be solid surface with built-up edge, unless noted otherwise.

2.1.4 Solid surfacing material for countertops and window sills, unless noted otherwise. Refer to Section 06610 – “Solid Surfacing Materials”, this specification, and refer to Drawings, especially, but not limited to Sheet 7.8.

2.1.5 Sliding Door Hardware – Serving Kitchen R101

2.1.6 Wall Mounted Shelving: Refer to Sheets 7.1 and 7.2.

2.1.7 Racks Refer to Sheets 7.1 and 7.2.

2.1.8 Tall Wardrobe (TW): Refer to Sheet A7.7.

2.1.9 Tall Storage (TS): Refer to Sheet A7.7.

2.1.10 Wall-Hung Cabinet – Double: Refer to Sheet A7.7.

2.1.11 Wall Hung Cabinet – Microwave: Refer to Sheet A7.7.

2.1.12 Wall Hung Cabinet – Refrigerator: Refer to Sheet A7.7.

2.1.13 Wall Hung Cubbie: Refer to Sheet A7.7.

2.1.14 Wall Hung Cabinet, Glass Door: Refer to Sheet A7.7.

2.1.5 Wood Trim at Tectum Panels

2.2 Related Sections include Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

3. COUNTERTOPS AND TOPS – SPECIAL INSTRUCTIONS

All tops require built-up edge, full coverage backer sheet. Backer sheet will be 3/4 inch thick when top is cantilevered. Refer to drawings for back/side splash and apron locations.

3.1 Countertops with Undermount Sinks: Radius route corners. Refer to the appropriate plumbing fixture specification section, this specification.

3.2 Workstation Countertops

3.2.1 Supports: Metal Countertop Supports shall occur on spans greater than 32-inch length of top, unsupported. See detailed info in complete set of drawings. Manufacturer: A&M Hardware, Steel Workstation and counter support brackets. Size and spacing to accommodate a fully loaded workstation and counter.

3.2.2 Grommets, and wire management components below the workstation top are required. When applicable, provide workstation electrical and communications, with wire management as specified. Refer to Section 12500 – "Furniture". Grommet colors must be compatible and coordinated with workstation finish colors.

3.3 Transaction Counters require coordination of recessed deal tray, which is a part of the window system). Fabrication will maintain the integrity of the ballistic window system. Refer to Sheets A3.0 and A3.1.

3.4 Serving Kitchen Countertop – Stainless Steel: Food Grade Stainless Steel with square edge. Coordination required for recessed warming trough will be by others. Refer to Section 123616.

3.5 Serving Kitchen Countertop: Refer to paragraph 10.9 this section, this specification. Refer also to Section 06610 – "Solid Surfacing Materials", this specification, and Drawings.

3.6 Non-countertop Solid Surface Items: Refer to Section 06610 – "Solid Surfacing Materials", this specification.

3.7 Countertops on specific furniture items: Refer to Sheets A9.1 and A9.2.

4. DEFINITIONS

Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

5. SUBMITTALS

5.1 Product Data

For panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, and cabinet hardware and accessories.

5.2 Shop Drawings

Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

5.2.1 Show details full size.

5.2.2 Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

5.2.3 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, and other items installed in architectural woodwork.

6. QUALITY ASSURANCE

6.1 Fabricator Qualifications

Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

6.2 Source Limitations

Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork.

6.3 Quality Standard

Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

7. DELIVERY, STORAGE, AND HANDLING

Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

8. PROJECT CONDITIONS

8.1 Environmental Limitations

Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

8.2 Field Measurements

Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

8.3 Established Dimensions
Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

9. COORDINATION

Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

9.1 Hardware Coordination
Distribute copies of approved Hardware Schedule specified in Division 08 Section "Door Hardware" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 – PRODUCTS

10. MATERIALS

10.1 Wood Products: Comply with the following:
Recycled content of medium-density fiberboard and particleboard varies greatly; consult manufacturers before inserting requirement.
Hardboard: AHA A135.4.
Softwood Plywood: DOC PS 1, Medium Density Overlay.

10.2 Thermoset Decorative Panels
Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

10.3 High-Pressure Decorative Laminate
NEMA LD 3, grades as indicated on Drawings or, if not indicated, as required by woodwork quality standard.

10.4 Manufacturer
Subject to compliance with requirements, provide high-pressure decorative laminates equal to the following:
Wilsonart, or other as specified. Refer to Drawings.

10.5 Colors and Finishes
As indicated on Drawings for various applications, including metallic and quartz finishes.

10.6 Solid-Surfacing Material
Homogeneous solid sheets of filled plastic resin complying with ISSF A-2.
As indicated on Drawings for various applications. Refer to Section 06610 – "Solid Surfacing Materials", this specification. Refer to Drawings.

10.8 Stainless Steel Counters, Wall Caps, and Wall Panels – Fabrication
Refer to Drawings. See built-up edge details, millwork sheets. Wall Panel coverage / extent will comply with current building and mechanical codes for the applicable jurisdiction. Manufacturer / Supplier: Local fabricator.

10.8.1 At Serving Counter, Wall Cap, and Wall Panel at Cooking Unit:
Food Grade Stainless Steel Counter, Wall Cap, and Wall Panel.
Wall Panel to include Stainless Steel accessory trims.
Manufacturer / Supplier: Local fabricator.

10.9 Serving Kitchen Countertop:
Wilsonart® Engineered Surfaces, Thinscape Ultrathin Composite, self-supporting tops, 1/2 inch. Submit Granite sample for architect to review, prior to bid letting.

The counters will require drain board grooves at the sink nearest the dishwasher.

Wilsonart® Engineered Surfaces
Contact: Bailey Shoemaker, phone 405-618-0393,
email: bailey.shoemaker@wilsonart.com.

Alternative Product: Ultrathin Solid Surface from Wilsonart®:
Contractor has the option to use the specified porcelain tile:
Concept Surfaces, Allspice Brilhoazul Living3, Finish: Honed, Polished, Silky, 12 mm Thick, Edge: Non-Rectified, Application; Countertop,
https://new.conceptsurfaces.com/product/allspice/
(please confirm selection)

Contact: Tamra Smith, Concept Surfaces, phone: 913-484-2383,
email: tamras@conceptsurfaces.com

11. CABINET HARDWARE AND ACCESSORIES

Where close matching of cabinet hardware and door hardware is required, it may be preferable to specify cabinet hardware in Division 08.

11.1 General
Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section “Door Hardware.”

11.2 Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.

11.3 Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16-inch in diameter.

11.4 Shelf rests in first paragraph below are installed in holes drilled in cabinet sides and partitions.
Shelf Rests: BHMA A156.9, B04013; metal, 2-pin type with shelf hold-down clip.

11.5 Drawer Slides: BHMA A156.9, B05091.
Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension \ zinc-plated steel ball-bearing slides.

11.6 Box Drawer Slides
Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.

11.7 Exposed Hardware Finishes
For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

11.8 Satin Chromium Plated
BHMA 626 for brass or bronze base; BHMA 652 for steel base.
For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

12. MISCELLANEOUS MATERIALS

12.1 Furring, Blocking, Shims, and Hanging Strips
Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

12.2 Anchors
Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

12.3 Adhesives, General: Do not use adhesives that contain urea formaldehyde.

12.4 VOC Limits for Installation Adhesives and Glues
Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24)

12.5 Adhesive for Bonding Plastic Laminate
Unpigmented contact cement or contact cement.

13. FABRICATION, GENERAL

If all woodwork is same grade, retain first paragraph below and delete separate grades in other articles; otherwise, delete paragraph or retain as default and indicate exceptions in other articles.
Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard.

13.1 Wood Moisture Content
Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
Fabricate woodwork to dimensions, profiles, and details indicated.

13.2 Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

13.3 Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

13.4 Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
Seal edges of openings in countertops with a coat of varnish.

14. PLASTIC-LAMINATE CABINETS

Subject to compliance with requirements, provide high-pressure decorative laminates equal to the following:
Wilsonart®, or other as specified, or approved equal. Refer to Drawings.

14.1 Grade: Custom.
AWI Type of Cabinet Construction: Flush overlay on face frame.

14.2 Laminate Cladding for Exposed Surfaces
High-pressure decorative laminate complying with the following requirements.

A. Horizontal Surfaces Other Than Tops: Grade HGL.

B. Post-formed Surfaces: Grade HGP.

C. Vertical Surfaces: Grade VGS.

D. Retain one edge construction from subparagraph below. Coordinate with standards and grade selection.

E. Edges: Grade VGS.

14.3 Materials for Semi-Exposed Surfaces

14.3.1 Exposed and Semi-Exposed Door Surfaces

High-pressure decorative laminate, Grade VGS.

Other Surfaces: Thermoset decorative panels.

Drawer Sides and Backs: Thermoset decorative panels.

Drawer Bottoms: Thermoset decorative panels.

14.3.2 As selected by Architect from laminate manufacturer's full range in the following categories:
Solid colors, gloss, or matte finish.

Patterns, gloss, or matte finish.

14.4 Colors and Finishes
As indicated on Drawings for various applications, including metallic and quartz finishes.

14.5 Cabinet Laminate Finishes
As indicated on Drawings for various applications. Refer to Drawings.

14.5.1 General Laminate
Plastic Laminate HPL, Color: (3) for project scope, Finish: Velvet or equal pattern, varies at linear patterns. Position lines vertically.

14.5.2 General Adjustable Height Shelving Locations:
Plastic Laminate Finish – HPL, Shelf: Wilsonart, Dove Grey D92.

Edge-banding applies to all sides of each shelf.

Wilsonart® Laminate, or approved equal.

15. PLASTIC-LAMINATE COUNTERTOPS

15.1 Grade: Custom.
High-Pressure Decorative Laminate Grade: HGS.

15.2 Colors, Patterns, and Finishes
Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
As selected by Architect from manufacturer's full range of colors, finishes and patterns.
Edge Treatment: Same as laminate cladding on horizontal surfaces.
Core Material: 3/4-inch marine grade plywood.

16. SOLID-SURFACING-MATERIAL

Refer to Section 066100 – "Solid Surfacing Materials", this Specification.

16.1 Grade: Custom

16.2 Solid-Surfacing-Material Thickness: 1/2-inch

16.3 Color, Patterns, and Finishes
Provide materials and products that result in colors of solid-surfacing material complying with the following requirements: As indicated.

16.4 Fabricate in one (1) piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
16.4.1 Fabricate top shop-applied edges of materials and configuration indicated.

17. SLIDING DOOR HARDWARE – Serving Kitchen R101

Provide and install sliding door hardware as indicated on the drawings. Hardware to support four (4) sets of double sliding doors. At Serving Counter Base Cabinet utilize shelf hardware, recessed, built-in steel pilaster with metal shelf supports. Keep pin.

17.1 Approved Manufacturer / Product:
Sliding and Roller Shutter Systems – Sliding door hardware as manufactured by Hafele, 3901 Cheyenne Drive, Archdale, NC 27263; phone 1-800-423-3531; www.hafele.com, or approved equal.

17.2 Sliding wood door fittings, Model S80, or approved equal.
Model S80 hardware items to include:
17.1.1 Matte anodized finish: Item # 793.00.302, Item # 793.00.310, Item # 793.00.311, Item # 793.00.319

PART 3 – EXECUTION

18. PREPARATION

Before installation, condition woodwork to average prevailing humidity conditions in installation Areas. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming.

19. INSTALLATION

19.1 Grade
Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

19.2 Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

19.3 Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8-inch in 96 inches.

19.4 Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

19.5 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

19.6 Cabinets
Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

19.7 Install cabinets with no more than 1/8-inch in 96-inch sag, bow, or other variation from a straight line.

19.8 Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches on center with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

19.9 Countertops
Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

19.10 Install countertops with no more than 1/8-inch in 96-inch sag, bow, or other variation from a straight line.

19.11 Secure backsplashes to tops with concealed metal brackets at 16 inches on center and to walls with adhesive.

19.12 Caulk space between backsplash and wall with sealant specified in Division 07 Section "Sealants."

20. ADJUSTING AND CLEANING

20.1 Repair damaged and defective woodwork, where possible, to eliminate functional and Visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

20.2 Clean, lubricate, and adjust hardware.

20.3 Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

End of Section 064023

SECTION 066100

SOLID SURFACING MATERIALS

PART 1 – GENERAL

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. This Contractor is required to refer especially thereto.

2. SUMMARY

2.1 Section Includes

Provide solid surfacing fabrications including but not limited to following:

2.1.1 Countertops (which may include with sinks and backsplashes)
Refer also to the applicable plumbing fixture specification section.
Radius route corners.

2.1.2 Countertops with undermount sinks (Restrooms)
Refer also to the applicable plumbing fixture specification section.
Radius route corners.

2.1.3 Non-Countertop Solid Surface Items:

A. Windowsills where noted on Sheets A7.1 and A7.2

B. Cased openings in Hall B115 and Hall H236

C. Wall cap at Feature Stair 1

D. Phone shelf in Room H254

E. Tray shelf at rolling counter doors in serving kitchens

Note: All tops listed require built-up edge, full coverage backer sheet. Backer sheet shall be 3/4 inch thick when top is cantilevered. Refer to drawings for back/side splash and apron locations.

2.1.4 Solid Surface with Hot Wells for food service

A. Countertops for drop-in Hot Food Wells

B. Countertops for drop-in Cold Food Wells

3. RELATED SECTIONS

3.1 Division 5, Section 05990 – Miscellaneous Metals & Metal Specialties

3.2 Division 6, Section 06100 – Rough Carpentry. Framing, furring, wood blocking and grounds within finished walls, anchored to block walls and above finished ceiling

3.3 Division 6, Section 06610 – Solid Surface

3.4 Division 8, Section 08800 – Glass and Glazing

3.5 Division 9, Section 09900 – Painting

3.6 Division 10, Section 10000 – Specialty Equipment

3.7 Division 10, Section 10010 – Window Treatments

3.8 Division and Sections associated with Electrical, Plumbing and Mechanical Specifications are found on drawings. Coordination with Electrical, Plumbing and Mechanical systems where affected by Millwork and Casework.

4. APPLICABLE PUBLICATIONS

Comply with references to extent specified in this section, most current edition.

4.1 ASTM International: A36/A36M, A53/A53M, A240/A240M, B26/B26M, B2221, E84

4.2 American Hardboard Association (AHA): A135.4 Basic Hardboard

4.3 Architectural Woodwork Institute (AWI): Architectural Woodwork Standards, Premium Grade and/or Duty Level 3, unless otherwise noted

4.4. ANSI/NSF 51 "food zone" and FDA "direct-food contact" compliant

4.5 UL GREENGUARD® Gold Certified product for low-chemical emissions

4.6 Hardwood Plywood and Veneer Association (HPVA): HP1 Hardwood and decorative plywood

4.7 National Particleboard Association (NPA): A208.1 Wood Particleboard

4.8 UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials

4.9 SCAQMD Rule 1168 - Adhesive and Sealant Applications (amended January 2005)

4.10 Compliance with the ICPA/ANSI SS-1 Standard

4.11 Food and Drug Adminstration (FDA) compliance for food contact materials described in 21 CFR 174 to 21 CFR 190

4.11 Definitions
Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

5. SUBMITTALS

5.1 Product Data: For countertop, wall, and sill materials and sinks including manufacturer's technical data sheets, and published written instructions.

5.2 Sustainable Design Submittal Product Data

A. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, terminations, and cutouts.

C. Show locations and details of joints.

D. Show direction of directional pattern, if any.

5.3 Samples for Initial Selection: For each type of material exposed to view.

5.4 Samples for Verification : For the following products:
A. 6 inches square.

5.5 Qualification Data: For manufacturer and fabricator.

6. CLOSEOUT SUBMITTALS

Operational and Maintenance Data

6.1 Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.

6.2 Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

7. QUALITY ASSURANCE

7.1 Qualifications
Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

7.2 Mock-Ups

7.2.1 Prior to final approval of Shop Drawings, erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for Architect review.

7.2.2 Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.

7.2.3 Approved mock-up will be used as standard for acceptance of subsequent work.

7.2.4 Approved mock-ups may remain as part of finished work.

8. FIELD CONDITIONS

8.1 Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

9. DELIVERY, STORAGE, AND HANDLING

9.1 Delivery and Acceptance Requirements
Deliver no components to Project site until areas are ready for installation.

9.2 Storage and Handling Requirements

9.2.1 Store components indoors prior to installation.

9.2.2 Handle materials to prevent damage to finished surfaces.

9. WARRANTY

Manufacturer Warranty
Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 – PRODUCTS

10. APPROVED MANUFACTURERS

Countertops, Backspashes, Lavatory Shrouds, and Windowsills
Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
Wilsonart® or Corian® products as specified, or other as specified, or the approved equal.
Refer to Drawings.

Confirm all product selections with drawings and architect, prior to placing order.

11. MATERIALS

11.1 Approved Material
Solid Surface Material: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:

11.1.1 Solid Surface countertops, backsplashes, lavatory shrouds, and windowills are to be 1/2-inch thick material. Solid Surface chair rail is to be 1" thick material.

11.1.2 Flammability: Class 1 and A when tested to UL 723.

11.2 Colors and Finishes
As indicated on Drawings for various applications, including metallic and quartz finishes.

11.3 Components
Wilsonart® or Corian® products as specified, or the approved equal.

11.3.1 Solid-Surfacing Material
Homogeneous solid sheets of filled plastic resin complying with ISSF A-2.
As indicated on Drawings for various applications. Refer to Drawings.

Wilsonart® Engineered Surfaces
Contact: Bailey Shoemaker, phone 405-618-0393,
email: bailey.shoemaker@wilsonart.com.

A. Check-in Countertop at Standing Height Top:
Wilsonart Engineered Surfaces, Thinscape Ultrathin Composite,
Self-supporting tops, 1/2 inch. Submit Granite sample for architect to review, prior to bid letting.

B. Serving Kitchen Countertop:
Wilsonart® Engineered Surfaces, Thinscape Ultrathin Composite,
Self-supporting tops, 1/2 inch. Submit Granite sample for architect to review, prior to bid letting.

The counters will require drain board grooves at the sink nearest the dishwasher.

Alternative Product: Ultrathin Solid Surface from Wilsonart®,

Contractor has the option to use the specified porcelain tile:
Concept Surfaces, Allspice Brilhoazul Living3, Finish: Honed, Polished, Silky, 12 mm Thick, Edge: Non-Rectified, Application; Countertop,
https://new.conceptsurfaces.com/product/allspice/

Confirm selections with drawings and architect, prior to placing order.

Contact: Tamra Smith, Concept Surfaces, phone: 913-484-2383,
email: tamras@conceptsurfaces.com

11.3.2 Engineered Stone
As indicated on Drawings for various applications. Refer to Drawings.

Contact: Hallmark Supplies, Kristy Rinne, phone 314-254-6634,
email: krinne@hllmark.com.

A. Serving Kitchen, Med, Exam and Lab, and Control Desk

B. Computer Station Counter:
Corian Solid Surface: Color: Linen, Thickness: 1/2 inch.

Note: For Corian® products, refer also to Corian® Technical Bulletin K-25291 – Structural Support.

11.3.3 ALL Solid Surface Countertops are to be 1/2" thick quartz solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings.

11.3.4 Window Sills
1/2" thick solid surfacing material, edge details as indicated on Drawings.
Color: To match the window frame – to be selected by the architect from the Corian® Solid Surface Collection, or approved equal.

11.3.5 Lavatory Shroud (for bathroom lavatory)
1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings.

11.3.6 Solid Surface End Guard
Refer to Section 10260 – Corner Guards and End Guards.

11.3.7 Sinks and Lavatories
For sinks and lavatories, refer to Corian® Technical Bulletins K25296 – Sinks and Lavatories and K-27499 – Dupont™ Corian® Lavatory Positioning for ADA Compliance.

11.4 Components – Other

11.4.1 Counter Perimeter Frame
Ensure 1/2" thick, moisture resistant cores for counter tops in wet areas having sinks or lavatories are 3/4" thick exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only; or MDF core conforming to ANSI/NPA A208.2 balanced design, manufactured from recycled materials, meeting ANSI

Standards for emissions, of minimum density of 48 lb/cu. ft. and surface character to match sample approved by Architect. Ensure that fire retardant product, if required, contains fire-retardant chemicals injected with raw materials during manufacturing and achieves a maximum flame-spread rating of 25 with a maximum smoke development of 200 when tested to ASTM E84.

11.5 Drop-in Hot Wells for food service – Where cut-outs are near a heat source
Fabricate solid surfaces in strict accordance with drop-in Hot Well manufacturer's instructions for Hot Wells for food service; and in strict accordance with solid surface manufacturer's specifications and standards. Refer to Drawings A7.1 and A7.2 for additional information and details.

11.5.1 If using solid surface material like Corian, rigorous heat shielding is mandatory.

A. Thermal Breaks: Hot wells expand when heated. Provide a slight clearance (usually 1/8 to 1/4 inch) between the edge of the drop-in well and the countertop cutout. Seal this gap with a high-temperature NSF-approved silicone.

B. Insulation Barriers: Shield the supporting cabinetry and adjacent surfaces. For example, solid surfaces require protective heat shields and layers of Nomex® fabric insulation to prevent cracking or discoloration.

Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source. Use insulating Nomex® Fabric, or the approved equal.

C. Heat Reflecting Tape
Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources, or the approved equal.

D. Electrical Clearance: Ensure adequate ventilation beneath the counter so the thermostatic controls and wiring do not overheat.

11.5.4 Support Drop-in Hot Well with construction, in accordance with manufacturer recommendations. Never use raw particle board or MDF directly under a hot well, as heat and moisture will cause it to warp and degrade. Use marine-grade plywood or a reinforced metal framework to bear the weight.

11.5.5 Drainage and Plumbing

A. Wet vs. Dry Wells: If building for wet wells (which require water for steaming), every well must have an individual brass drain valve.

B. Manifolding: Plumb the drains together into a single manifold with a shut-off valve before routing it to an approved floor sink or grease trap.

E. Sloping: Construct the counter and plumbing to allow complete gravity drainage.

11.6 Drop-in Cold Wells for food service
Fabricate solid surfaces in strict accordance with drop-in well manufacturer's instructions for Cold Wells for food service; and in strict accordance with solid surface manufacturer's specifications and standards. Refer to Drawings A7.1 and A7.2 for additional information and details.

Countertop cold well requires durable, food-safe materials, proper insulation, and a seamless cutout. The counter must support the weight of the well, ice, and food pans. Installer must seal all joints against liquid spills and provide adequate ventilation for refrigeration systems.

11.6.1 Countertop Surface: Non-porous, sanitary, and NSF-approved materials are strictly required.

11.6.2 Cold Well Liner: The drop-in well must be constructed of corrosion-resistant stainless steel (typically 18 or 20 gauge, series 300) to withstand constant exposure to ice melt and food acids.

11.6.3 Structural Support & Cutouts Reinforced Framework:
Support Drop-in Cold Well with construction in accordance with manufacturer recommendations.

A. Countertops must have additional structural support (e.g., steel framing or plywood reinforcement) placed within 2 inches of the cutout perimeter to bear the load of the heavy chilled unit.

B. Inside Radius: All inside corners of the countertop cutout must have a minimum radius (usually 1/2 inch) to prevent stress cracking in solid surface materials.

C. Clearance Gaps: Ensure a minimum clearance of 1/8 inch to 1/4 inch between the food well and the countertop support edge to allow for expansion and contraction.

11.6.4 Insulation & Condensation Prevention

A. Thermal Barrier: To prevent the surrounding countertop from warping or accumulating condensation, the well requires a dense thermal breaker (such as black polyethylene) and heavy-duty fiberglass or polyurethane insulation.

C. Heat & Cold Protection: If near hot food wells, the hot and cold well cutouts must be separated by at least twelve inches (12"), and insulated using Nomex® material, or approved equal, to protect the countertop material from extreme temperature fluctuations.

Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source. Insulating Nomex® Fabric, or the approved equal.

Heat Reflecting Tape
Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources, or the approved equal.

11.6.5 Drainage and Utilities Plumbing

A. Ice-chilled or refrigerated wells must have a 1-inch diameter drain. The drain must be connected using approved commercial drainage materials to quickly evacuate melt-water and spills.

B. Refrigeration Ventilation: If installing a self-contained, mechanically refrigerated cold well rather than an ice well, the counter base cabinetry must have adequate ventilation grilles to prevent the compressor from overheating.

11.6.6 Assembly & Installation Steps

A. Draw the exact cutout on your countertop based on the manufacturer's specification sheet. Cut carefully along the lines.

B. Apply a 1/4 inch bead of 100% heat / water-resistant, food-grade silicone sealant or butyl tape around the underside of the well's outer flange.

C. Lower the cold well into the cutout and press down firmly so the flange sits flush against the counter.

D. Allow the silicone to fully cure according to the manufacturer's instructions before connecting the below-counter drains and power supply.

12. FABRICATION

Comply with NSF/ANSI Standard 51 Certification and UL 2828, ASTM D790, NEMA LD-3, ASTM C 501, ASTM C 97, ASTM C 170 and Class I Class A per ASTM E 84. Basis of Design Manufacturer: Corian or the approved equal. Thickness and Built up edges, reference drawing details. Patterns contain direction and/or movement.

12.1 Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.

12.2 Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.

12.3 Ensure no blistering, whitening, and cracking of components during forming.

12.4 Fabricate backsplashes from solid surfacing material with optional radius cove where counter and backsplashes meet as indicated on Drawings. Backsplashes for most colors may be fabricated by traditional means discussed in K-25294 Backsplashes. Colors with metallic/mica particle or veined colors creating directional aesthetics (K-26833 Directional Aesthetics) may require the techniques in Technical Bulletin K-28235 Thermoformed Backsplash.

12.5 Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.

12.6 Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.

12.7 Route and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.

12.8 Finish
Ensure surfaces have uniform finish. Architect to specify finish.
Finish options are: Matte, with a 60° gloss rating of 5 – 20; Semi-gloss, with a 60° gloss rating of 25 – 50; or Polished, with a 60° gloss rating of 55 – 80.

12.9 Fabrication Tolerances
12.9.1 Variation in Component Size: +/-1/8".

12.9.2 Location of Openings: +/-1/8" from indicated location.

12.10 Solid Surface Counters, Casing, Windowsills
3cm thickness, unless otherwise noted.
12.10.1 Casing, Sills, and Splashes: 2 cm thickness

12.10.2 Backer board where required by manufacturer and/or AWI premium fabrication.

12.10.3 Exposed Edges: 3/16-inch radius, unless otherwise noted.

12.10.4 Adhesive: Manufacturer's Standard One-or Two-part adhesive kit.

PART 3 – EXECUTION

13. EXAMINATION

13.1 Verification of Conditions
13.1.1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

13.1.2 Verify actual site dimensions and location of adjacent materials prior to commencing work.

13.1.3 Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0".

13.1.4 Notify Architect in writing of any conditions which would be detrimental to installation.

13.2 Evaluation and Assessment
Commencement of work implies acceptance of previously completed work.

14. INSTALLATION

14.1 Solid Surface fabrications
14.1.1 Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.

14.1.2 Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.

14.1.3 Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.

14.1.4 Install countertops with no more than 1/8" sag, bow or other variation from a straight line.

14.1.5 Adhere undermount/submount/bevel mount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.

14.1.6 Adhere top-mount sinks/bowls to countertops using manufacturer recommended adhesives and color-coordinated silicone sealant. [Secure seam mount bowls and sinks to counter tops using color matched joint adhesive.]

14.1.7 Seal between wall and components with joint sealant as specified herein and in Section 07950, as applicable.

14.1.8 Provide backsplashes and end-splashes as indicated on Drawings. Adhere to countertops using a standard color-coordinated silicone sealant. Adhere applied side-splashes to countertops using a standard color-matched silicone sealant. Provide coved backsplashes and side-splashes at walls and adjacent millwork. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard color-coordinated joint adhesive.

14.1.9 Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.

14.1.10 Coordinate connections of plumbing fixtures with Division 22 Plumbing Sections. Make plumbing connections to sinks in accordance with Division 22 Plumbing Sections.

15. SITE QUALITY CONTROL

Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

16. CLEANING

16.1 Remove excess adhesive and sealant from visible surfaces.

16.2 Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

17. PROTECTION

17.1 Provide protective coverings to prevent physical damage or staining following installation for duration of Project.

17.2 Protect surfaces from damage until date of Substantial Completion of the Work.

End of Section 06610

SECTION 071326

SELF-ADHERING SHEET WATERPROOFING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

2.1.1 Rubberized-asphalt sheet waterproofing with protection course on vertical walls at elevator pits and other earth-retaining structures as indicated on Drawings.

2.1.2 Protection course applied over sheet waterproofing.

2.2 Related Sections include Division 03 Section “Cast-in-Place Concrete” for concrete walls and floor slabs.

3. SYSTEM PERFORMANCE

General: Provide sheet waterproofing products that have been produced and installed to establish and maintain continuous watertight seals.

4. SUBMITTALS

4.1 Product Data

Include manufacturer’s written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

4.2 Shop Drawings

Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

4.3 Samples: For the following products:

4.3.1 12- by 12-inch square of waterproofing and flashing sheet.

4.3.2 12- by 12-inch square of protection board.

4.4 Installer Certificates

Signed by manufacturers certifying that installers comply with requirements.

4.5 Qualification Data: For Installer.

4.6 Product Test Reports

Based on evaluation of comprehensive tests performed by a qualified testing agency, for waterproofing.

4.7 Warranties: Special warranties specified in this Section.

5. QUALITY ASSURANCE

5.1 Installer Qualifications
A qualified installer who is certified in writing by waterproofing manufacturer as qualified to install manufacturer's waterproofing.

5.2 Source Limitations
Obtain waterproofing materials, protection course, through one (1) source from a single manufacturer.

5.3 Preinstallation Conference
Conduct conference at Project site. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

6.2 Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

6.3 Remove and replace liquid materials that cannot be applied within their stated shelf life.

6.4 Store rolls according to manufacturer's written instructions.

6.5 Protect stored materials from direct sunlight.

7. PROJECT CONDITIONS

7.1 Environmental Limitations
Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

7.1.1 Do not apply waterproofing in snow, rain, fog, or mist.

7.2 Maintain adequate ventilation during preparation and application of waterproofing materials.

8. WARRANTY

8.1 Special Manufacturer's Warranty
Manufacturer's standard form in which manufacturer agrees to replace waterproofing material that does not comply with requirements or that fails to remain watertight within specified warranty period.

8.1.1 Failure includes, but is not limited to, failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16-inch in width.

8.1.2 Warranty Period: Five (5) years from date of Substantial Completion.

8.2 Special Installer's Warranty
Signed by Installer, covering Work of this Section, for warranty period of 5 years.
8.2.1 Warranty includes removing and reinstalling protection board.

8.3 The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 – PRODUCTS

9. RUBBERIZED-ASPHALT SHEET WATERPROOFING

9.1 Rubberized-asphalt self-adhering membrane integrally bonded to polyethylene sheeting, formed into uniform flexible sheets of not less than 56-mils thick, complying with the following:
9.1.1 Tensile Strength: 250 psi minimum; ASTM D412-982

9.1.2 Ultimate Elongation: 300 percent minimum; ASTM D412-982

9.1.3 Brittleness Temperature: Minus 25 degrees F; ASTM D146-97

9.1.4 Hydrostatic Head Resistance: 150 feet minimum

9.1.5 Water Absorption: Not more than 0.5 percent weight gain after 48 hours' immersion at 70 degrees F; ASTM D570-98

9.2 Products
Subject to compliance with requirements, provide 1 of the following products:
9.2.1 Carlisle: CCW-701

9.2.2 W. R. Grace & Co.; Bituthene 3000

9.2.3 W. R. Meadows, Inc.; Mel-Rol

10. AUXILIARY MATERIALS

10.1 General
Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
10.1.1 Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

10.2 Primer
Liquid primer recommended for substrate by manufacturer of sheet waterproofing material.

10.3 Surface Conditioner
Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

10.4 Substrate Patching Membrane
Low-viscosity, 2-component, asphalt-modified coating.

10.5 Sheet Strips
Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.

10.6 Mastic, Adhesives, and Tape
Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
10.6.1 Detail Tape: 2-sided, pressure-sensitive, self-adhering reinforced tape, 4-1/2 inches wide, with a tack-free protective adhesive coating on one (1) side and release film on self-adhering side.

10.6.2 Detail Strips: 62.5-mil-thick, felt-reinforced self-adhesive strip, 9 inches wide, with release film on adhesive side.

10.7 Metal Termination Bars
Continuous metal termination bar as recommended by manufacturer.
10.7.1 Fasten to wall per manufacturer's recommendations.

10.8 Protection Course
ASTM D6506, semi-rigid sheets of fiberglass or mineral-reinforced asphaltic core, pressure laminated between 2 asphalt-saturated fibrous liners and as follows:
10.8.1 Thickness: 1/8-inch, nominal, for vertical applications; 1/4-inch, nominal, elsewhere.

10.8.2 Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection course.

10.9 Protection Course
Extruded-polystyrene board insulation unfaced, ASTM C578, Type X, 1/2 inch thick.

10.10 At Contractor's option, provide either type of protection course specified.

PART 3 – EXECUTION

11. EXAMINATION
Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
11.1 Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.

11.2 Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.

11.3 Notify Architect in writing of anticipated problems using waterproofing over substrate.

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

12. SURFACE PREPARATION

12.1 Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

12.2 Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

12.3 Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

12.4 Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

12.5 Cast-In-Place Concentrate Substrates

12.5.1 Do not proceed with installation until concrete has properly cured and dried (minimum 7 days for normal structural concrete).

12.5.2 Fill form tie rod holes with concrete and finish flush with surrounding surface.

12.5.3 Repair bug holes over 0.5-inch in length and 0.25-inch deep and finish flush with surrounding surface.

12.5.4 Remove scaling to sound, unaffected concrete and repair exposed area.

12.2.5 Grind irregular construction joints to suitable flush surface.

12.6 Related Materials

Treat joints and install flashing as recommended by waterproofing manufacturer.

13. RUBBERIZED-ASPHALT SHEET APPLICATION

13.1 Install self-adhering sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D6135.

13.2 Coordinate installing waterproofing materials with associated work to provide complete system complying with combined recommendations by manufacturers and installers involved in Work. Schedule installation to minimize exposure of sheet waterproofing materials.

13.3 Extend waterproofing sheet and flashings to provide a complete membrane over area indicated to be waterproofed.

13.4 Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

13.5 Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.

13.5.1 When ambient and substrate temperatures exceed 40 degrees F, install manufacturer's standard rubberized-asphalt composite sheet.

13.6 Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints.

13.7 Seal exposed edges of sheets at terminations not concealed by metal counter-flashings, or ending in reglets with mastic or sealant.

13.8 Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fish-mouths and blisters. Patch with sheets extending 6 inches beyond repaired areas in all directions.

13.9 Correct deficiencies in or remove sheet waterproofing that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.

14. PROTECTION COURSE INSTALLATION

Install protection course over waterproofing membrane using tape or adhesive according to manufacturer's written instructions and before commencing subsequent construction operations. Minimize exposure of membrane.

15. PROTECTION AND CLEANING

15.1 Protect waterproofing from damage and wear during remainder of construction period, according to manufacturer's written instructions.

15.2 Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

End of Section 071326

SECTION 072100

THERMAL INSULATION

PART 1 – GENERAL

1. SUMMARY

1.1 Section Includes

1.1.1 Extruded polystyrene foam-plastic board insulation

1.1.2 Polyisocyanurate foam-plastic board insulation

1.1.3 Glass-fiber blanket insulation

1.1.4 Mineral-wool blanket insulation

2. DEFINITIONS

2.1 Mineral-Fiber Insulation

Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

2.2 Thermal Resistivity

Where the thermal resistivity of insulation products are designated by "R values," they represent the reciprocal of thermal conductivity (K-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two (2) exposed faces required to cause 1 Btu to flow through 1 square foot per hour at mean temperatures indicated.

3. PERFORMANCE REQUIREMENTS

Plenum Rating

Provide glass-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.

3.1 Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for four (4) hours at 2,500 fpm air velocity.

3.2 Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosium on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

4. ACTION SUBMITTALS

Product Data

For the following:

4.1 Extruded polystyrene foam-plastic board insulation

4.2 Polyisocyanurate foam-plastic board insulation

4.3 Glass-fiber blanket insulation

4.4 Mineral-wool blanket insulation

5. INFORMATIONAL SUBMITTALS

5.1 Installer's Certification
Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
5.1.1 Sign, date, and post the certification in a conspicuous location on Project site.

5.2 Product test reports

5.3 Research reports

6. QUALITY ASSURANCE

6.1 Source Limitations
Obtain each type of building insulation through 1 source from a single manufacturer.

6.2 Fire-Test-Response Characteristics
Provide insulation and related materials with the fire test response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
6.2.1 Surface-Burning Characteristics: ASTM E84
6.2.2 Fire-Resistance Ratings: ASTM E119
6.2.3 Combustion Characteristics: ASTM E136

7. DELIVERY, STORAGE, AND HANDLING

Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturers' written instructions for handling, storing, and protecting during installation.

PART 2 – PRODUCTS

8. EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

Extruded Polystyrene Board Insulation, Type IV (Perimeter Foundation Insulation)
ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.

8.1 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. DiversiFoam Products
B. Dow Chemical Company (The)
C. Owens Corning

8.2 Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

8.3 Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.

8.4 Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

8.5 Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

9. POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

Polyisocyanurate Board Insulation, Foil Faced (at Exterior Walls)
ASTM C1289, foil faced, Type I, Class 1 or 2.

9.1 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. Atlas Molded Products; a Division of Atlas Roofing Corporation
B. Atlas Roofing Corporation - Polyiso
C. Carlisle Coatings & Waterproofing Inc; Carlisle Construction Materials
D. Dow Chemical Company (The)
E. Firestone Building Products
F. Hunter Panels; Carlisle Construction Materials
G. Johns Manville; a Berkshire Hathaway company
H. Rmax, Inc.

9.2 Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

9.3 Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

10. GLASS-FIBER BLANKET INSULATION

10.1 Glass-Fiber Blanket Insulation, Unfaced
(Wall and/or Ceiling Cavities Where Indicated on Drawings)
ASTM C665, Type I; passing ASTM E136 for combustion characteristics.

10.1.1 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. CertainTeed; Saint-Gobain
B. Johns Manville; a Berkshire Hathaway company
C. Knauf Insulation
D. Owens Corning

10.1.2 Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

10.1.3 Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

10.1.4 Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

10.2 Glass-Fiber Blanket Insulation, Unfaced

10.2.1 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. CertainTeed; Saint-Gobain

B. Johns Manville; a Berkshire Hathaway company

C. Knauf Insulation

D. Owens Corning

10.2.2 Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

10.2.3 Glass-Fiber Blanket Insulation, Foil Faced
ASTM C665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

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) CertainTeed; Saint-Gobain

2) Johns Manville; a Berkshire Hathaway company

3) Knauf Insulation

4) Owens Corning

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

11. MINERAL-WOOL BLANKET INSULATION

Mineral-Wool Blanket Insulation, Unfaced (Sound Batts for Wall/Ceiling Application)
ASTM C665, Type I (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

11.1 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. Johns Manville; a Berkshire Hathaway company

B. Owens Corning

C. Rockwool

11.2 Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

11.3 Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

11.4 Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

12. ACCESSORIES

12.1 Insulation for Miscellaneous Voids

12.1.1 Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

12.1.2 Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

12.2 Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

12.3 Vapor-Retarder Tape
Pressure-sensitive tape of type recommended by insulation manufacturer for sealing joints and penetrations in vapor-retarder facings.

12.4 Adhesive for Bonding Insulation
Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

12.5 Mechanical Anchors: Type and size as recommended by manufacturer.

PART 3 – EXECUTION

13. EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.

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

14. PREPARATION

Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

15. INSTALLATION, GENERAL

15.1 Comply with insulation manufacturer's written instructions applicable to products and application indicated.

15.2 Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

15.3 Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

15.4 Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

15.5 For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

16. INSTALLATION OF GENERAL BUILDING INSULATION

16.1 Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

16.2 Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

16.3 Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated.

16.3.1 Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

16.4 Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

16.4.1 Use insulation widths and lengths that fill the cavities formed by framing members. If more than 1 length is required to fill cavity, provide lengths that will produce a snug fit between ends.

16.4.2 Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

16.4.3 Maintain 3-inch clearance of insulation around recessed lighting fixtures.

16.4.4 For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

16.5 Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lbs./cu. ft.

17. INSTALLATION OF VAPOR RETARDERS

17.1 General

Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

17.2 Seal vertical joints in vapor retarders over framing by lapping not less than two (2) wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches on center.

17.3 Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

17.4 Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

17.5 Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

17.6 Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

18. INSTALLATION OF SLAB INSULATION

18.1 On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

18.1.1 If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

18.2 On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

18.2.1 If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

19. INSTALLATION OF FOUNDATION WALL INSULATION

19.1 Butt panels together for tight fit.

19.2 Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.

19.3 Adhesive Installation: Install with adhesive or press into tacky waterproofing or damp-proofing according to manufacturer's written instructions.

20. INSTALLATION OF CAVITY-WALL INSULATION

Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.

20.1 Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.

20.2 Press units firmly against inside substrates.

20.3 Supplement adhesive attachment of insulation by securing boards with 2-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

21. INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

21.1 Blanket Insulation

Install in cavities formed by framing members according to the following requirements:

21.1.1 Use insulation widths and lengths that fill the cavities formed by framing members. If more than 1 length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

21.1.2 Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

21.1.3 Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

21.1.4 Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

21.1.5 For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

21.1.6 Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

A. Exterior Walls: Set units with facing placed toward interior of construction.

21.2 Miscellaneous Voids

Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

21.2.1 Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lbs./cu. ft.

21.2.2 Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

22. PROTECTION

Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

End of Section 072100

SECTION 072726

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes fluid-applied membrane air barrier, vapor permeable.

2.2 Related Sections include the following:

2.2.1 Division 06 Section "Sheathing" for wall sheathings, wall sheathing joint-and-penetration treatments, building paper, and building wraps.

2.2.2 Division 07 Section "Thermal Insulation" for foam-plastic board insulation.

2.2.3 Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashings.

2.2.4 Division 07 Section "Joint Sealants" for joint-sealant materials and installation.

3. DEFINITIONS

3.1 ABAA: Air Barrier Association of America.

3.2 Air-Barrier Material
A primary element that provides a continuous barrier to the movement of air.

3.3 Air-Barrier Accessory
A transitional component of the air barrier that provides continuity.

3.4 Air Barrier Assembly
The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

4. PERFORMANCE REQUIREMENTS

4.1 General
Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

4.2 Air Barrier Assembly Air Leakage: 0.04-cfm x sq. ft. of surface area at 1.57 lbf/sq. ft.

5. SUBMITTALS

5.1 Product Data
Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

5.2 Product Certificates
For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

6. QUALITY ASSURANCE

6.1 Applicator Qualifications
A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance and is approved by the manufacturer for such installation.

6.2 Source Limitations
Obtain primary air-barrier materials and air-barrier accessories from single source and from single manufacturer.

6.3 Mockups
Before beginning installation of air barrier, build mockups of exterior wall assembly, 150 square feet, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

6.3.1 If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

6.3.2 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

6.4 Preinstallation Conference: Conduct conference at Project site.

6.4.1 Include installers of other construction connecting to air barrier, including roofing, waterproofing, sealants, windows, glazed curtain walls, and door frames.

6.4.2 Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.

7.2 Remove and replace liquid materials that cannot be applied within their stated shelf life.

7.3 Store rolls according to manufacturer's written instructions.

7.4 Protect stored materials from direct sunlight.

8. PROJECT CONDITIONS

Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 – PRODUCTS

9. FLUID-APPLIED MEMBRANE AIR BARRIER

Fluid-Applied, Vapor-Permeable Membrane Air Barrier
Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils or thicker over smooth void-free substrates.

9.1 Products: Subject to compliance with requirements, provide 1 of the following:

9.1.1 Synthetic Polymer Membrane

A. Grace Construction Products; W. R. Grace & Co.; Perm-A-Barrier VP

B. Henry Company; Air-Bloc 31 MR

9.2 Physical and Performance Properties

9.2.1 Membrane Air Permeance
Not to exceed 0.004-cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. pressure difference; ASTM E 2178.

9.2.2 Membrane Vapor Permeance: Not less than 10 perms; ASTM E96, Procedure B

9.2.3 Ultimate Elongation: Minimum 300 percent; ASTM D412, Die C.

9.2.4 Adhesion to Substrate: Minimum 30 lb/sq. in. when tested according to ASTM D4541

9.2.5 UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions; ASTM D412

10. ACCESSORY MATERIALS

Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing strips and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants and other auxiliary materials that are recommended by air-barrier manufacturer in writing, to produce a complete air-barrier assembly. The installation shall be compatible with primary air-barrier material and adjacent construction to which they may seal.

PART 3 – EXECUTION

11. EXAMINATION

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

11.1 Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

11.2 Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.

11.3 Verify that substrates are visibly dry and free of moisture.

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

12. SURFACE PREPARATION

12.1 Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

12.2 Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

12.3 Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

12.4 Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

12.5 At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

12.6 Cover gaps in substrate plane and form a smooth transition from 1 substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

12.7 Bridge isolation joints and discontinuous wall-to-wall, deck-to-wall and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

13. JOINT TREATMENT

Gypsum Sheathing: Fill joints greater than 1/4-inch with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

14. ACCESSORY MATERIALS AND TRANSITION STRIP INSTALLATION

14.1 Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

14.1.1 Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

14.1.2 Install transition strip on roofing membrane or base flashing such that a minimum of 3 inches of coverage is achieved over each substrate.

14.1.3 Unless manufacturer recommends in writing against priming, apply primer to substrates at required rates and allow to dry.

14.1.4 Apply primer to substrates at required rates and allow to dry. Limit priming to areas that will be covered by air-barrier material on same day. Re-prime areas exposed for more than 24 hours.

14.2 Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, glazed curtainwall systems, storefront systems, exterior louvers, exterior door frames and other construction used in exterior wall openings, using accessory materials.

14.3 At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

14.4 Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

14.5 Wall Openings: Prime concealed perimeter frame surfaces and rough opening surfaces of windows, curtainwalls, storefronts, and doors. Apply membrane barrier so that the entire surface of the rough opening is covered. Maintain 3 inches of full contact over firm bearing to perimeter frames.

14.6 Fill gaps in perimeter frame surfaces of windows, curtainwalls, storefronts and doors along with miscellaneous penetrations of air-barrier material with foam sealant.

14.7 Seal top of through-wall flashings to air barrier with an additional 6-inch-wide transition strip.

14.8 Seal exposed edges of strips of seams, cuts, penetrations and terminations not concealed by metal counter-flashings or ending in reglets with termination mastic.

14.9 Repair punctures, voids and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

15. AIR BARRIER MEMBRANE INSTALLATION

15.1 Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

15.2 Apply air barrier membrane within manufacturer's recommended application temperature ranges.

15.3 Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

16.3.1 Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

15.4 Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.

16.4.1 Vapor-Permeable Membrane Air Barrier: 47-mil minimum dry film thickness.

15.5 Apply strip and transition strip a minimum of 1 inch onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches onto each surface according to air barrier manufacturer's written instructions.

15.6 Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

16. CLEANING AND PROTECTION

16.1 Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

16.1.1 Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 30 days.

16.1.2 Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.

16.2 Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

16.3 Remove masking materials after installation.

End of Section 072726

SECTION 074000

COMPOSITE WALL PANELS: FIBER CEMENT ARCHITECTURAL BLOCK

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. The Contractor for this portion of the work is required to refer especially thereto.

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

1.3 All requirements under Division One (1) of these specifications shall be a part of this section. Each Contractor is responsible to thoroughly familiarize himself with all its contents as to requirements, which affect this division or section.

2. SECTION INCLUDES

2.1 Exterior, panelized fiber cement cladding system and accessories to complete a drained and back-ventilated rainscreen.

2.2 Interior fiber cement panelized cladding system and accessories.

3. RELATED SECTIONS

3.1 Section 05100 – Structural Steel

3.2 Section 06100 – Rough Carpentry

3.3 Section 07200 – Insulation

3.4 Section 09200 – Metal Studs, Partitions, and Gypsum Wallboard

4. REFERENCES

4.1 American Architectural Manufacturers Association (AAMA):
AAMA 509-14 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems

4.2 ASTM International (ASTM):

4.2.1 ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

4.2.2 ASTM C 1185 – Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement

4.2.3 ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets

4.2.4 ASTM E-84 – Standard Test for Surface Burning Characteristics of Building Materials

4.2.5 ASTM E 119 – Standard Test Methods for Fire Tests of Building Construction and Materials

4.2.6 ASTM E 228 – Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer

4.2.7 ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

4.2.8 ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

4.3 National Fire Protection Association (NFPA)

4.3.1 NFPA 285 – Fire Test Method for Exterior Wall Assemblies Containing Combustible Material

4.3.2 NFPA 268 – Ignition Resistance of Exterior Wall Assemblies

5. SUBMITTALS

5.1 Submit under provisions of Section 01300.

5.2 Product Data
Submit manufacturer's product description, storage and handling requirements, and installation instructions.

5.3 Product Test Reports and Code Compliance
Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies.

5.4 LEED Credits: Not applicable.

5.5 Manufacturer's Details
Submit drawings (.dwg, .rvt, and/or .pdf formats), including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/ treatments, compression and control joints, corners, openings, and penetrations.

5.6 Samples
Submit samples of each product type proposed for use.

6. QUALITY ASSURANCE

6.1 Manufacturer Qualifications
All fiber cement panels specified in this section must be supplied by a manufacturer with a minimum of ten (10) years of experience in fabricating and supplying fiber cement cladding systems.

6.1.1 Products covered under this section are to be manufactured in an ISO 9001 certified facility.

6.1.2 Provide technical and design support as needed regarding installation requirements and warranty compliance provisions.

6.2 Installer Qualifications
All products listed in this section are to be installed by a single installer trained by manufacturer or representative.

6.3 Mock-Up Wall
Provide a mock-up wall as evaluation tool for product and installation workmanship.

6.4 Pre-Installation Meetings
Prior to beginning installation, conduct conference to verify and discuss substrate conditions, manufacturer's installation instructions and warranty requirements, and project requirements.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation. Do not stack pallets more than two high. Refer to the information included on each pallet.

7.2 If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing. Failure to do so may result in panel shrinkage at ship lap joints, and such action may void warranty.

7.3 Panels MUST be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.

7.4 Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

8. WARRANTY

8.1 Provide manufacturer's 15-year warranty against manufactured defects in fiber cement panels. Additional 5-year extension available when refinished in year 14-15.

8.2 Provide manufacturer's 15-year warranty against manufactured defects in panel finish.

8.3 Warranty provides for the original purchaser. See warranty for detailed information on terms, conditions and limitations.

PART 2 – PRODUCTS

9. MANUFACTURERS

9.1 Acceptable Manufacturer
Nichiha Corporation, 18-19 Nishiki 2-chome Naka-ku, Nagoya,
Aichi 460-8610, Japan.

9.2 Acceptable Manufacturer's Representative
Nichiha USA, Inc.,
6465 E. Johns Crossing, Suite 250,
Johns Creek, GA 30097

Toll free: 1-866-424-4421, Office: 770-805-9466, Fax: 770-805-9467, www.nichiha.com.
Local Rep Contact: Shawn Hulsey, Phone: 816-918-0146, email: shulsey@nichiha.com

9.3 Approved Product
Nichiha Series, Style, Finish, and Color to be determined by architect.
9.3.1 Size / Profiles: Refer to architectural drawings.

9.3.2 Accessory/Component Options:
A. Manufactured Corners with 3-1/2" returns for each profile color

B. Aluminum trim options: Corner Key, Open Outside Corner, H-Mold, J-Mold, Compression Joint, Inside Corner
(1) Finish: Clear Anodized, or Primed

C. Essential Flashing System: Starter, Overhang
(1) Finish: Matte black

9.3.3 Dimensions: AWP-1818: 455mm (17-7/8") (h) x 1,818 mm (71-9/16") (l)

9.3.4 Panel Thickness: 16 mm (5/8")

9.3.5 Finish: To be determined by architect.

9.3.6 Weight: 34.8 lbs. per panel

9.3.7 Coverage: 8.88 sq. ft. per panel

9.3.8 Factory sealed on six [6] sides

9.4 Substitutions: Not permitted without approval.

10. MATERIALS

10.1 Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.

10.2 Panel surface pre-finished and machine applied.

10.3 Panels profiled along all four edges, such that both horizontal and vertical joints between the installed panels are ship-lapped.

10.4 Factory-applied sealant gasket added to top and right panel edges; all joints contain a factory sealant.

11. PERFORMANCE REQUIREMENTS

11.1 Fiber Cement Cladding
Must comply with ASTM C-1186, Type A, Grade II requirements:
11.1.1 Wet Flexural Strength: Result: 1418 psi; Lower Limit: 1015 psi

11.1.2 Water Tightness: No water droplets observed on any specimen

11.1.3 Freeze-thaw: No damage or defects observed

11.1.4 Warm Water: No evidence of cracking, delamination, swelling, or other defects observed

11.1.5 Heat-Rain: No crazing, cracking, or other deleterious effects, surface or joint changes observed in any specimen

11.2 Mean Coefficient of Linear Thermal Expansion (ASTM E-228): Max 1.0*10^-5 in./in. F

11.3 Surface Burning (CAN-ULC S102/ASTM E-84)
Flame Spread: 0, Smoke Developed: 0

11.4 Wind Load (ASTM E-330)
Contact manufacturer for ultimate test pressure data corresponding to framing type, dimensions, fastener type, and attachment clips. Project engineer(s) must determine Zone 4 and 5 design pressures based on project specifics. Minimum lateral deflection: L/120.

11.5 Water Penetration (ASTM E-331)
No water leakage observed into wall cavity

11.6 Steady-State Heat Flux and Thermal Transmission Properties
Test (ASTM C-518)
16mm thick panel thermal resistance R Value of 0.47

11.7 Fire Resistant (ASTM E-119)
The wall assembly must successfully endure 60-minute fire exposure without developing excessive unexposed surface temperature or allowing flaming on the unexposed side of the assembly.

11.8 Ignition Resistance (NFPA 268)
No sustained flaming of panels, assembly when subjected to a minimum radiant heat flux of 12.5 kW/m2 ± 5% in the presence of a pilot ignition source for a 20-minute period

11.9 Fire Propagation (NFPA 285)
Wall assembly of Nichiha AWP, Ultimate Clips and Starter
Track, Tyvek Commercial Wrap, ½" Densglass Gold Sheathing, 16" o.c. 18 gauge steel studs, mineral wool in-cavity insulation, and interior 5/8” Type X gypsum met the acceptance criteria of NFPA 285

11.10 Fire Propagation (CAN/ULC S-134)
Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Housewrap, 5/8" FRT plywood, 16" o.c. 2x wood studs, fiberglass in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of CAN/ULC S-134.

11.11 Drained and Back Ventilated Rainscreen (AAMA 509-14)
System classifications: W1, V1

12. INSTALLATION COMPONENTS

12.1 Ultimate Clip System

12.1.1 Starter Track
FA 700 (10mm rainscreen) – 10' (3030mm) (l) galvalume coated steel

12.1.2 Panel Clips
JEL 777 "Ultimate Clip" (10mm rainscreen for 5/8" AWP) – Zinc-Aluminum-Magnesium alloy coated steel

1) Joint Tab Attachments (included) –
used at all AWP-1818 panel to panel vertical joints

12.1.3 Single Flange Sealant Backer – FHK 1017 (10mm) – 6.5' (l) fluorine coated galvalume

12.1.4 Double Flange Sealant Backer – FH 1020 (10mm) – 10' (l) fluorine coated galvalume

12.1.5 Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4' (l)

12.1.6 Finish Clip (optional) – JE310 (5mm)

12.2 Alluminum Trim (optional)
Paint as specified in finish schedule

12.3 Essential Flashing System (optional)

A. Starter – main segments (3030mm), inside corners, outside corners

B. Compression Joint – main segments (3030mm)

C. Overhang – main segments (3030mm), inside corners, outside corners, joint clips

12.4 Fasteners
Corrosion resistant fasteners, such as hot-dipped galvanized screws appropriate to local building codes and practices must be used. Use Stainless Steel fasteners in high humidity and high-moisture regions. Panel manufacturer is not liable for corrosion resistance of fasteners. Do not use aluminum fasteners, staples or fasteners that are not rated or designed for intended use. See manufacturer's instructions for appropriate fasteners for construction method used.

12.5 Flashing
Flash all areas specified in manufacturer's instructions. Do not use raw aluminum flashing. Flashing must be galvanized, anodized, or PVC coated.

12.6 Sealant
Sealant shall comply with ASTM C920, Class 35.

PART 3 – EXECUTION

13. EXAMINATION

13.1 Verification of Conditions

13.1.1 Fiber cement panels can be installed over braced wood, steel studs and sheathing including plywood, OSB, plastic foam or fiberboard sheathing. Fiber cement panels can also be installed over Structural Insulated Panels (SIP's), Concrete Masonry Units (CMU's) and Concrete Block Structures (CBS's) with furring strips, and Pre-Engineered Metal Construction. Insulated Concrete Forms (ICFs) are NOT an approved substrate under any condition.

13.1.2 Allowable stud spacing: 16" o.c. maximum

13.1.3 A weather resistive barrier is required when installing fiber cement panels. Use an approved weather resistive barrier (WRB) as defined by the 2015 IBC or IRC. Refer to local building codes.

13.1.4 Appropriate metal flashing should be used to prevent moisture penetration around all doors, windows, wall bottoms, material transitions and penetrations. Refer to local building codes for best practices.

13.2 Examine site to ensure substrate conditions are within alignment tolerances for proper installation.

13.3 Do not begin installation until unacceptable conditions have been corrected.

13.4 Do not install panels or components that appear to be damaged or defective. Do not install wet panels.

14. TOLERANCE

Wall surface plane must be plumb and level within +/- 1/4 inch in 20 feet in any direction.
One layer of Nichiha 5mm (~3/16") Spacer may be used as shim.

15. INSTALLATION

15.1 General

Install products in accordance with the latest installation guidelines of the manufacturer and all applicable building codes and other laws, rules, regulations, and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.

15.1.1 Consult with your local dealer or Nichiha Technical Department before installing any Nichiha fiber cement product on a building higher than 45 feet or three stories or for conditions not matching prescribed standard installation guide requirements and methods. A Technical Design Review (TDR) process is available to evaluate project feasibility.

15.1.2 ***Vertical Control/Expansion Joints*** are required within 2-10 feet of outside corners finished with metal trim and approximately every 30 feet thereafter.

15.1.3 ***Horizontal/Compression Joints*** are required for multi-story installations of AWP. Locate joints at floor lines. Joints are flashed minimum ½" breaks. Do not caulk.
Refer to installation guide(s).

A. Wood framed buildings of three or more floors require a compression joint at each floor.

B. Steel framed buildings (including reinforced concrete core with LGMF exterior walls) of more than three floors (or 45 feet) require a compression joint every 25 feet at a floor line.

15.2 Panel Cutting

15.2.1 Always cut fiber cement panels outside or in a well-ventilated area. Do not cut the products in an enclosed area.

15.2.2 Always wear safety glasses and NIOSH/OSHA approved respirator whenever cutting, drilling, sawing, sanding or abrading the products. Refer to manufacturer SDS for more information.

15.2.3 Use a dust-reducing circular saw with a diamond-tipped or carbide-tipped blade.

A. Recommended circular saw: Makita 7-1/4-inch Circular Saw with Dust Collector (#5057KB).

B. Recommended blade
Tenryu Board-Pro Plus PCD Blade (#BP-18505)

C. Shears (electric or pneumatic) or jig saw can be used for complicated cuttings, such as service openings, curves, radii and scrollwork.

15.2.4 Silica Dust Warning
Fiber cement products may contain some amounts of crystalline silica, a naturally occurring, potentially hazardous mineral when airborne in dust form. Consult product SDS or visit: https://www.osha.gov/dsg/topics/silicacrystalline/.

16. CLEANING AND MAINTENANCE

Review manufacturer guidelines for detailed care instructions.

End of Section 074000

SECTION 074200

PHENOLIC WALL PANELS (TRESPA®)

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. This Contractor is required to refer especially thereto.

2. SECTION INCLUDES

Solid phenolic wall panels will be installed for both exterior and interior applications.

2.1 Exterior solid phenolic cladding panel system and accessories as required for a complete drained and back-ventilated rainscreen system.

- 2.1.1 Wall panels
- 2.1.2 Fascia
- 2.1.3 Horizontal soffits
- 2.1.4 Storefront panels

2.2 Interior solid phenolic cladding panel system and accessories.

3. RELATED SECTIONS

3.1 Sections on Metal Fabrications; additional sub framing, Z girts to accommodate exterior insulation is not in the scope of this section.

3.2 Section 07200 – Insulation; exterior insulation, if required for NFPA 285 compliance, is not included in the scope of this section.

3.3 Section 08400 – Storefronts

3.4 Section 08500 – Windows (Metal Framed Curtain Walls)

3.5 Section 09200 – Metal Studs, Partitions & Gypsum Wallboard

4. REFERENCES

4.1 ASTM International (ASTM)

- 4.1.1 ASTM B 117 – Standard Practice for Operating Salt Spray (Fog) Apparatus
- 4.1.2 ASTM D 635 – Standard Test Method for Small Scale Burning
- 4.1.3 ASTM D 1929 – Standard Test Method for Ignition Temperature
- 4.1.4 ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
- 4.1.5 ASTM D 2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
- 4.1.6 ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials

4.1.7 ASTM E 119 – Standard Test Method for Fire Rated or Fire Resistive Construction

4.1.8 ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads

4.2 International Organization for Standardization (ISO)

4.2.1 ISO 105 A02-93 – Tests for Color Fastness – Part A02: Grey scale for assessing change in color

4.2.2 ISO 178 – Determination of Flexural Properties

4.2.3 ISO 527-3 – Determination of Tensile Properties

4.2.4 ISO 846 – Evaluation of the Action of Organisms

4.3 National Fire Protection Association (NFPA)

4.3.1 ISO 105 A02-93 – Tests for Color Fastness – Part A02: Grey scale for assessing change in color

4.3.2 ISO 178 – Determination of Flexural Properties

4.3.3 ISO 527-3 – Determination of Tensile Properties

4.3.4 ISO 846 – Evaluation of the Action of Organisms

5. SUBMITTALS

5.1 Submit under provisions of Section 01300.

5.2 Product Data

Manufacturer's data sheets on each product to be used, including:

5.2.1 Preparation instructions and recommendations

5.2.2 Storage and handling requirements and recommendations

5.2.3 Installation methods

5.3 Shop Drawings

Submit plan, section, elevation and perspective drawings necessary to describe and convey the layout, profiles and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colors, patterns, and textures.

5.4 Code Compliance

Documents showing product compliance with local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product. Alternate materials must be approved by the architect of record prior to the bid date.

5.5 Engineering Calculations

Submit engineering calculations as required by the local building code, showing that the installed panels and attachments system meets the wind load requirements for the project.

5.6 Selection Samples
For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Please note that samples are only representative for color and pattern and not for thickness or edge finish. Metallic colors may also show a slight fluctuation in appearance do to the metal flake orientation from batch to batch.

5.7 Verification Samples
For each finish product specified, two samples a minimum of 3.5 inches x 3.5 inches representing actual product, color, and patterns. Sample edges may vary from field panel edges.

5.8 Operation and Maintenance Data
Submit operation, maintenance, and cleaning information for products covered under this section.

6. QUALITY ASSURANCE

6.1 Manufacturer Qualifications
All primary panel products specified in this section will be supplied by a single manufacturer with a minimum of ten years' experience.

6.1.1 Products covered under the Work listed in this section are to be manufactured in an ISO 9001 certified facility.

6.2 Installer Qualifications
All products listed in this section are to be installed by a single installer trained and approved by the manufacture or representative.

6.3 Manufacturer's Field Services
Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

6.4 Mock-Up
Provide a mock-up for evaluation of the product and application workmanship.

6.4.1 Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

6.5 Pre-installation Meetings
Conduct pre-installation conference to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Delivery

7.1.1 During transportation, use stable, flat pallets that are at least the same dimension as the sheets.

7.1.2 Materials shall be packaged to minimize or eliminate the possibility of damage during shipping. Items such as wooden side boards, wooden lid, and spacers or protective sheeting between panels shall be used to protect the panels from surface and/or edge damage

7.2 Storage

7.2.1 Store products in an enclosed area protected from direct sunlight, moisture, and heat. Maintain a consistent temperature and humidity.

7.2.2 Store products in manufacturer's unopened packaging until ready for installation.

7.2.3 Stack panels using protective dividers to avoid damage to decorative surface.

7.2.4 For horizontal storage, store sheets on pallets of equal or greater size as the sheets with a protective layer between the pallet and sheet and on top of the uppermost sheet.

7.2.5 Do not store sheets, or fabricated panels vertically.

7.3 Handling

7.3.1 Remove protective film within 24 hours of the panels being removed from the pallet.

7.3.2 When moving sheets, lift evenly to avoid dragging panels across each other and scratching the decorative surface.

7.3.3 Remove all labels and stickers immediately after installation.

8. PROJECT CONDITIONS

8.1 Solid phenolic wall panels will be installed for both exterior and interior applications. Ensure that installation meets manufacturer's written standards for the specified location / application. Refer to drawings.

8.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

8.2 Field Measurements

Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. Recorded measurements to be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

9. WARRANTY

At project closeout, provide manufacturer's limited ten year warranty covering defects in materials. Warranty only available when material installed by an installation contractor trained and approved by the manufacturer's representative.

PART 2 – PRODUCTS

10. MANUFACTURERS

10.1 Acceptable Manufacturer

Trespa International B.V.; P.O. Box 110, 6000 AC Weert Wetering 20, 6002 SM Weert The Netherlands; www.trespa.com.

10.2 Acceptable Manufacturer's Representative

Local Trespa® representative is R-S Products, Inc.
P.O. Box 274, Cottleville, MO 63338

www.rsstl.com
10.2.1 Contact: Allison Boss
636-448-5440
email: aboss@rsstl.com

10.3 Substitutions
Not permitted without prior written approval by architect.

11. WALL PANELS

Solid Phenolic Wall Panels
Trespa® Meteon and / or Trespa® Pura by Trespa International as represented by Trespa North America, LTD, or the approved equal.

11.1 Material
Solid panel manufactured using a combination of high pressure and temperature to create a flat panel created from thermosetting resins, homogenously reinforced with wood-based fibers and an integrated decorative surface or printed décor.

11.1.1 Color: As selected by the Architect from manufacturer's standard color palette.

11.1.2 Finish: As selected by the Architect. Standard finishes are Satin sheen, Gloss, and Rock.

11.1.3 Panel Core: Fire retardant (FR) black core.

11.1.4 Panel Thickness: As indicated on the Drawings.

11.2 Physical Properties

11.2.1 Modulus of Elasticity: 1,300,000 psi minimum, ISO 178.

11.2.2 Tensile Strength: 10,100 psi minimum, ISO 527-2.

11.2.3 Flexural Strength: 14,500psi minimum, ISO 178.

11.2.4 Thermal Conductivity: 2.1 BTU/inch/ft 2.hr. degrees F, EN 12524.

11.2.5 Structural Performance (ASTM E330)

A. Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 15 pounds per square foot (psf). Wind load testing shall be done in accordance with this standard to obtain the following results:

B. Normal to the plane of the wall, the maximum panel deflection shall not exceed L/175

C. Normal to the plane of the wall between supports, deflection of the aluminum sub-framing members shall not exceed L/175 or 3/4 inch, whichever is less

1) At 1-1/2 times design pressure, permanent deflection of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion.

2) If system tests are not available, mock ups shall be constructed and tests performed under the direction of an independent third party laboratory which show compliance to the minimum standards listed above.

11.3 Fire Performance

11.3.1 Flame Spread: Class A, ASTM E 84.

11.3.2 Smoke Development: Less than 450, ASTM E 84.

11.3.3 Ignition Temperature: Greater than 650 degrees F (350 degree C) above ambient, ASTM D1929.

11.3.4 Burning Classification: CC1 or CC2, ASTM D635.

11.3.5 When required for compliance with local building codes, the wall cladding assembly shall show no degradation of the rating of Fire Resistant Assemblies, ASTM E119.

11.3.6 When required for compliance with local building codes, the wall cladding assembly including cladding and non-cladding elements such as, but not limited to, specific weather resistive barriers and/or exterior insulation materials, shall meet the performance requirements of NFPA 285. Performance shall be determined by actual testing in accordance with NFPA 285or through an equivalency analysis provided by a recognized fire protection expert.

11.3.7 When required for compliance with local building codes, the wall cladding assembly shall not ignite when exposed to a radiant heat energy source, NFPA 268.

11.4 Finish Performance

11.4.1 Color: As selected by the architect/engineer from manufacturer's standard colors or a custom color to be matched by the panel supplier.

11.4.2 Humidity Resistance: No formation of blisters when subjected to condensing water fog at 100% relative humidity and 100 degree F (38 degree C) for 3000 hours, ASTM D 2247.

11.4.3 Salt Spray Resistance: Corrosion creepage from scribe line (1/16 inch max.) and minimum blister rating of 8 within the test specimen field, ASTM B117.

11.4.4 Weather Exposure: Accelerated – 3000 hours in Atlas Type Weatherometer using cycle of 90 minutes light and 30 minutes diminished light and demineralized water with a maximum color change of 5 Delta E units from the original color according to ASTM D-2244, with the exception of Uni-Colors A12.3.7 / A18.3.5 / A04.1.7, which will not deviate more than 10 Delta E units from original color according ASTM D-2244.

11.4.5 Color Stability: The decorative surface comply with, classification, 4 - 5 measured with the grey scale according to ISO 105 A02-93 according to test method EN 438-2:29.

11.4.6 Microbial Characteristics: Will not support micro-organic growth (ISO 846).

11.5 Mounting System

11.5.1 TS110-285 – Exposed fastening on fixed depth aluminum sub-framing tested and meeting the performance requirements of NFPA 285.

11.5.2 Other installation systems – Include test documentation showing compliance with the performance criteria set forth in the specification and in accordance with the local building code.

11.6 Aluminum Sub-Structure

Aluminum sub-structure designed to withstand structural loading due to wind load and the dead load of the panel, painted as required to conceal behind the open joinery of the attachment system.

11.6.1 Extrusions, including corner closures, joint closures, and vent screens, formed members, sheet, and plate shall conform with the recommendations of the manufacturer.

11.7 Extruded Aluminum Trim

Color as specified in the finish schedule.

11.8 Fasteners (Concealed/Exposed)

Fasteners shall be non-corrosive and as recommended by panel manufacturer.
Exposed fasteners shall be colored to match panels where required by the architect.

11.9 Panel Corner Profile

11.9.1 Dimensions: 143.70 inches x 11.81 x 11.81 inches with a 5/16-inch thick x 3/4-inch radius.

11.9.2 Dimensions: 143.70 inches x 11.81 x 11.81 inches with a 3/8-inch thick x 3/4-inch radius.

12. FABRICATION

12.1 Panels

Solid phenolic impregnated kraft paper wall panels with no voids, air spaces or foamed insulation in the core material. Accessory items in accordance with manufacturer's recommendations and approved submittals.

12.2 Panel Weight

8 mm (2.4 lb./ft2), 10 mm (3 lb./ ft2), 13 mm (3.8 lb./ ft2).

12.3 Panel Bow

2 mm / m (= 0.079 inch/39.38 inches).

12.4 Panel Dimensions

Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.

12.5 Appearance

Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.

13. EXAMINATION

13.1 Do not begin installation until substrates have been properly prepared.

13.2 Surfaces to receive panels shall be even, smooth, dry, and free from defects detrimental to the installation of the panel system. Notify Contractor in writing of conditions detrimental to proper and timely completion of the work.

13.3 Confirm exterior sheathing is plumb and level, with no deflection greater than 1/4 inch in 20 feet.

13.4 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected.

14. PREPARATION

14.1 Clean surfaces thoroughly prior to installation.

14.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

15. INSTALLATION

15.1 Install solid phenolic wall panels and sub-frame system in accordance with manufacturer's instructions.

15.2 Install solid phenolic wall panels plumb and level and accurately spaced in accordance with manufacturer's recommendations and approved submittals and drawings.

15.3 Anchor panels and sub-framing securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary movement and structural support.

15.4 Fasten solid phenolic wall panels with fasteners approved for use with supporting substrate.

15.5 Do not install panels or component parts which are observed to be defective or damaged including, but not limited to: warped, bowed, abraded, scratched, and broken members.

15.6 Do not cut or trim component parts during installation in a manner that would damage the finish, decrease the strength, or result in visual imperfection or a failure in performance. Return component parts with require alteration to the shop for re-fabrication or replacement.

15.7 Install corner profiles and trim with fasteners appropriate for use with adjoining construction as indicated on the Contract Drawings and as recommended by manufacturer.

16. ADJUSTING AND CLEANING

16.1 Remove masking or panel protection as soon as possible after installation. Any masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor to remove.

16.2 Adjust final panel installation so that all joints are true and even throughout the installation. Panels out of plane shall be adjusted with the surrounding panels to minimize any imperfection.

16.3 Repair panels with minor damage. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.

16.4 Clean finished surfaces as recommended by panel manufacturer. After installation cleaning, cleaning during construction shall become the responsibility of the General Contractor.

End of Section 074200

SECTION 074213

METAL COMPOSITE MATERIAL WALL PANELS

PART 1 – GENERAL

1. SUMMARY

Section Includes: Metal composite material (MCM) system.

2. DEFINITIONS

2.1 DBVC

Drained and back-ventilated cavity rainscreen system designed to drain and dry water entering cavity through drainage channels, weeps, and air ventilation.

2.2 MCM

Metal composite material; cladding material formed by joining two (2) thin metal skins to polyethylene or fire-retardant core and bonded under precise temperature, pressure, and tension.

2.3 PER

Pressure-equalized rainscreen system designed for no water intrusion, with equal pressure within air cavity and outside cladding barrier.

3. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3.1 Meet with Owner, Architect, Owner's insurer if applicable, MCM system Installer, MCM system manufacturer's representative, and installers whose work interfaces with or affects MCM panels, including installers of doors, windows, and louvers.

3.2 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3.3 Review methods and procedures related to MCM system installation, including manufacturer's written instructions.

3.4 Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.

3.5 Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect MCM system.

3.6 Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.

3.7 Review temporary protection requirements for system assembly during and after installation.

3.8 Review procedures for repair of panels damaged after installation.

3.9 Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

4. ACTION SUBMITTALS

4.1 Product Data
Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel, system, and accessory.

4.1.1 Metal composite material (MCM) panels

4.1.2 Metal composite material (MCM) system

4.2 Shop Drawings

4.2.1 Include fabrication and installation layouts of MCM system; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, accessories, and special details.

4.2.2 Accessories: Include details of flashing, trim, and anchorage, at a scale of not less than 1 1/2 inches per 12 inches.

4.2.3 Provide signed and sealed drawings, by a qualified design professional in Project jurisdiction, of MCM system showing compliance with performance requirements and design criteria identified for this Project.

4.3 Samples for Initial Selection
For each type of MCM panel indicated, with factory-applied color finishes.

4.3.1 Size: Manufacturers' standard size.

4.3.2 Include Samples of trim and accessories involving color selection.

4.4 Samples for Verification
For each type of MCM panel and MCM system required, with factory-applied color finishes.

4.4.1 MCM Panel: Two samples, 4 by 6 inches.

4.4.2 MCM System: 12 inches long by actual panel width, fabricated into panel systems indicated. Include fasteners, closures, and other MCM panel accessories. Panel sample need not be provided in the specified color.

4.5 Delegated Design Submittals
For MCM system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

5. INFORMATIONAL SUBMITTALS

Test and Evaluation Reports

5.1 Product Test Reports: For each MCM system, for tests performed by manufacturer and witnessed by a qualified testing agency.

5.1.1 MCM Panel Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.

5.1.2 Fabricator's MCM System Test Reports: Certified test reports showing system compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.

A. Dry or Wet Seal System: Tested to AAMA 501.1

B. DBVC System: Tested to AAMA 509

C. PER System: Tested to AAMA 508

5.2 Research Reports: For MCM systems, from ICC-ES showing compliance.

5.3 Preconstruction Test Reports
For MCM system.

5.3.1 Field Quality-Control Submittals: Field quality-control reports

5.3.2 Qualification Statements: For manufacturer, fabricator and Installer

5.3.3 Delegated design engineer qualifications

5.3.4 Sample warranties

6. CLOSEOUT SUBMITTALS

6.1 Maintenance Data: For MCM panels

6.2 Warranty Documentation

6.2.1 Manufacturers' special warranties

6.2.2 Installer's special warranties

7. QUALITY ASSURANCE

7.1 Manufacturer Qualifications: Minimum Five (5) years' experience.

7.2 Fabricator Qualifications: Approved by MCM panel manufacturer.

7.3 Installer Qualifications
Entity that employs installers and supervisors who are trained and approved by MCM system manufacturer.

7.4 Delegated Design Engineer Qualifications
A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.

7.5 Testing Agency Qualifications: An agency acceptable to authorities having jurisdiction.

8. MOCKUPS

Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

8.1 Build mockup, including corner, soffits, supports, attachments, and accessories. Panel sample need not be provided in the specified color.

8.2 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.

8.3 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

9. PRECONSTRUCTION TESTING

9.1 Preconstruction Testing Service

Engage a qualified testing agency to perform preconstruction testing on field mockups.

9.1.1 Provide test specimens and assemblies representative of proposed materials and construction.

9.1.2 Build laboratory mockups at testing agency facility; use personnel, materials, and methods of construction that will be used at Project site.

9.1.3 Notify Architect seven (7) days in advance of dates and times when laboratory mockups will be tested.

9.2 Preconstruction Testing

Performed by a qualified testing agency on manufacturer's standard assemblies.

9.2.1 Water-Spray Test: Conduct water-spray test of mockup of MCM system, testing for water penetration in accordance with AAMA 501.2.

9.2.2 PER System: Conduct all tests to determine wall performance and pressure equalization in accordance with AAMA 508.

9.2.3 DBVC System: Conduct all tests to determine wall performance and provide a V/W classification in accordance with AAMA 509.

10. DELIVERY, STORAGE, AND HANDLING

10.1 Deliver components, MCM panels, and other manufactured items so as not to be damaged or deformed. Package MCM panels for protection during transportation and handling.

10.2 Unload, store, and erect MCM panels in a manner to prevent bending, warping, twisting, and surface damage.

10.3 Stack MCM panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering. Store MCM panels to ensure dryness, with positive slope for drainage of water. Do not store MCM panels in contact with other materials that might cause staining, denting, or other surface damage.

10.4 Retain strippable protective covering on MCM panels during installation.

11. FIELD CONDITIONS

Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of MCM panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

12. COORDINATION

Coordinate MCM panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

13. WARRANTY

13.1 Panel Integrity Warranty

Manufacturer agrees to repair or replace components of MCM panels that fail in materials or workmanship within specified warranty period.

13.1.1 Failures include, but are not limited to, the following:

A. Structural failures including rupturing, cracking, or puncturing.

B. Deterioration of metals and other materials beyond normal weathering.

13.1.2 Warranty Period: Ten years from date of Substantial Completion.

13.2 Panel Finish Warranty

Manufacturer agrees to repair finish or replace MCM panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

13.2.1 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

A. Color fading more than five (5) Hunter units when tested in accordance with ASTM D2244.

B. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

C. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

13.2.2 Finish Warranty Period

Twenty (20) years from date of Substantial Completion.

13.3 MCM System Warranty

System manufacturer's standard form in which manufacturer agrees to repair or replace components of MCM systems that fail in materials or workmanship within specified warranty period.

13.3.1 Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 – PRODUCTS

14. PERFORMANCE REQUIREMENTS

14.1 Delegated Design
Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design MCM system.

14.2 Seismic Performance
No failure or deterioration of the system when laterally racked to 3/4 inch in both directions and repeated for three (3) cycles in accordance with AAMA 501.4. System must pass the static water test as described in ASTM E331 following the seismic racking.

14.3 Structural Performance
MCM systems to withstand the effects of the following loads, based on testing in accordance with ASTM E330/E330M:
14.3.1 Wind Loads: As indicated on Drawings

14.3.2 Other Design Loads: As indicated on Drawings

14.3.3 Deflection Limits: For wind loads, no greater than 1/240 of the span

14.4 Air Infiltration
Air leakage of not more than 0.06-cfm/sq. ft. when tested in accordance with ASTM E283/E283M at the following test-pressure difference:
14.1.1 Test-Pressure Difference: 6.24 lbf/sq. ft.

14.5 Water Penetration under Static Pressure
No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:
14.5.1 Test-Pressure Difference: 6.24 lbf/sq. ft.

14.6 Water Penetration under Dynamic Pressure
No water penetration when tested in accordance with AAMA 501.1 at the following test pressure:
14.6.1 Test Pressure: 6.24 psf.

14.7 Pressure Cycling
Provide PER system with a pass rating in accordance with AAMA 508.
14.7.1 Lag between the cavity and the cyclic wind pressure to not exceed 0.08 seconds.

14.7.2 Maximum differential between the cavity and the cyclic wind pressure to not exceed 50 percent of the maximum test pressure.

14.8 Provide DBVC system with V-axis classification number greater than or equal to W-axis classification number in accordance with AAMA 509.

14.9 Thermal Movements
Allow for thermal movements from ambient and surface temperature changes.
14.9.1 Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

14.10 Fire-Resistance Ratings
Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
14.10.1 Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.

14.11 Fire Propagation Characteristics: MCM system passes NFPA 285 testing.

15. METAL COMPOSITE MATERIAL (MCM) WALL PANELS

15.1 Metal Composite Material (MCM) Wall Panels
Provide MCM panels fabricated from 2 metal facings bonded to a solid, extruded thermoplastic core.

15.1.1 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. ALPOLIC Materials; Mitsubishi Chemical Composites
B. ALUCOBOND; 3A Composites USA, Inc.
C. Core: FR
D. Panel Thickness: 0.157-inch
E. Bond Strength: 22.5 in-lbs./in. when tested for bond integrity in accordance with ASTM D1781
F. Fire Performance: Flame-spread index Class A and smoke-developed index less than 450, in accordance with ASTM E84 or UL 723

15.2 MCM Panel Materials
15.2.1 Aluminum-Faced Panels
ASTM B209/B209M alloy as standard with manufacturer, temper as required to suit finish and forming operations 3105, H14 with 0.020-inch-thick, aluminum sheet facings.
A. Exterior Finish: Three-coat fluoropolymer.
1) Color: As selected by Architect from manufacturer's full range.

16. ACCESSORIES

16.1 Metal Subframing and Furring
ASTM C955 cold-formed, metallic-coated steel sheet ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of MCM system.

16.2 System Accessories
Provide components required for a complete, weathertight wall system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of MCM panels unless otherwise indicated.

16.3 Flashing and Trim
Provide flashing and trim formed from same material as MCM panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, end-walls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent MCM panels.

16.4 Panel Fasteners
Self-tapping screws designed to withstand design loads. Use gasketed or approved coated fasteners between dissimilar metals.

16.4.1 Aluminum Panels
Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

16.4.2 Provide exposed fasteners with heads matching color of MCM panels by means of factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

16.5 Panel Sealants
ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in MCM panels and remain weathertight; and as recommended in writing by MCM system manufacturer.

17. FABRICATION

17.1 Fabricate and finish MCM panels at the factory, by panel manufacturer's standard procedures and processes, as necessary to fulfill indicated panel performance requirements demonstrated by laboratory testing.

17.2 Shop-fabricate MCM systems and accessories by fabricator's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with requirements of MCM panel manufacturer, of indicated system profiles, and with dimensional and structural requirements.

17.2.1 Fabricate panels to dimensions indicated on Drawings based on an assumed design temperature of 70 degrees F. Allow for ambient temperature range at time of fabrication.

17.2.2 Formed MCM panel lines, breaks, and angles to be sharp and straight, with surfaces free from warp or buckle.

17.2.3 Fabricate panels with sharply cut edges and no displacement of face sheet or protrusion of core.

17.2.4 Fabricated Panel Tolerances
Shop-fabricate panels to sizes and joint configurations indicated on Drawings.

A. Width: Plus or minus 0.079-inch at 70 degrees F
B. Length: Plus or minus 0.079-inch at 70 degrees
C. Squareness: Plus or minus 0.079-inch at 70 degrees F

17.2.5 Fabricate MCM panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

17.3 Sheet Metal Flashing and Trim
Fabricate flashing and trim to comply with manufacturer's written instructions and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

17.3.1 Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

17.3.2 Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

17.3.3 Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams.

17.3.4 Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.

17.3.5 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

17.3.6 Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal manufacturer.

A. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal manufacturer for application, but not less than thickness of metal being secured.

18. FINISHES

18.1 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

18.2 Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

18.3 Coil-Coated Metal Finish

18.3.1 PVDF Fluoropolymer: AAMA 2605, 3-coat, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 – EXECUTION

19. EXAMINATION

19.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, MCM system supports, and other conditions affecting performance of the Work.

19.1.1 Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by MCM system manufacturer.

19.1.2 Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by MCM system manufacturer.

A. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

19.2 Examine roughing-in for components and assemblies penetrating MCM system to verify actual locations of penetrations relative to seam locations of MCM panels before installation.

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

20. INSTALLATION OF MCM SYSTEM

20.1 General

Install MCM system in accordance with system manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor MCM system securely in place, with provisions for thermal and structural movement.

20.1.1 Shim or otherwise plumb substrates receiving MCM system.

20.1.2 Flash and seal MCM system at perimeter of all openings. Fasten with self-tapping screws.

20.1.3 Install screw fasteners in predrilled holes.

20.1.4 Locate and space fastenings in uniform vertical and horizontal alignment.

20.1.5 Install flashing and trim as MCM system work proceeds.

20.1.6 Align bottoms of MCM panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

20.1.7 Provide weathertight escutcheons for all items penetrating system.

20.1.8 Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by MCM system manufacturer.

20.1.9 Attach MCM panels to supports at locations, spacings, and with fasteners recommended by manufacturer to meet listed performance requirements.

20.2 Attachment Assembly, General
Install attachment assembly required to support MCM panels and to provide a complete weathertight wall system, including tracks, drainage channels, anchor channels, perimeter extrusions, and panel clips.

20.2.1 Install subframing, furring, and other panel support members and anchorages in accordance with ASTM C955.

20.2.2 Install support system at locations, at spacings, and with fasteners recommended by MCM system manufacturer to meet listed performance requirements.

20.3 Install panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.

20.4 Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

20.4.1 Install accessory components required for a complete MCM system assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by MCM system manufacturer.

20.5 Flashing and Trim
Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

20.5.1 Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install trim to fit substrates and to result in waterproof performance.

20.5.2 Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

21. INSTALLATION TOLERANCES

Shim and align MCM panels within installed tolerance of 1/4-inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

22. FIELD QUALITY CONTROL

22.1 Testing Agency
Engage a qualified testing agency to perform tests and inspections.

22.2 Water-Spray Test
After installation, test area of assembly as directed by Architect for water penetration in accordance with AAMA 501.2.

22.3 Manufacturer's Field Service
Engage a factory-authorized service representative to test and inspect completed MCM system installation, including accessories, and submit detailed report of results of tests and inspections.

22.4 MCM system will be considered defective if it does not pass test and inspections.

22.5 Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with

23. CLEANING

23.1 Remove temporary protective coverings and strippable films as MCM panels are installed unless otherwise indicated in manufacturer's written installation instructions.
On completion of installation, clean finished surfaces as recommended by MCM panel manufacturer. Maintain in a clean condition during construction.

23.2 After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

24. PROTECTION

Replace MCM panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

End of Section 074213

SECTION 075423

THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Adhered TPO membrane roofing system

2.1.2 Roof insulation

2.2 Related Sections

2.2.1 Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking

2.2.2 Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, gravel stops, copings, and counter-flashings

2.2.3 Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

2.2.4 Division 22 Sections for roof drains.

3. DEFINITIONS

3.1 TPO: Thermoplastic polyolefin.

3.2 Roofing Terminology

See ASTM D1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

3.3 Thermal Resistivity (R-value) is the reciprocal of thermal conductivity (K-value) which is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivity (R value) is expressed by the temperature difference in degrees F between two (2) parallel surfaces required to cause one (1) Btu to flow through one (1) square foot of a homogenous material exactly 1 inch thick per hour at the mean temperature indicated.

3.4 Thermal Resistance (R-value) is the reciprocal of thermal conductance (C-value) which is the rate of heat flow through a material of the thickness indicated. Thermal resistance (R-value) is expressed by the temperature difference in degrees F between the two (2) exposed faces required to cause 1 Btu to flow through 1 square foot per hour at the mean temperature indicated.

4. PERFORMANCE REQUIREMENTS

4.1 General Performance

Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

4.2 Material Compatibility

Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

4.3 FM Approvals Listing

Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or non-combustible construction, as applicable. Identify materials with FM Approvals markings.

4.3.1 Fire/Windstorm Classification: Class 1A-90.

4.3.2 Hail Resistance: SH.

5. SUBMITTALS

5.1 Product Data: For each type of product indicated.

5.2 Shop Drawings

For roofing system. Include plans, elevations, sections, details, and attachments to other work.

5.2.1 Base flashings and membrane terminations

5.2.2 Tapered insulation, including slopes and crickets

5.2.3 Insulation fastening patterns for corner, perimeter, and field-of-roof locations

5.3 Samples for Verification

For the following products:

5.3.1 Sheet roofing, of color specified, including T-shaped side and end lap seam

5.3.2 Roof insulation

5.3.3 Walkway pads or rolls

5.3.4 Metal termination bars

5.3.5 Six insulation fasteners of each type, length, and finish

5.4 Informational Submittals

5.4.1 Qualification Data: For qualified Installer.

5.4.2 Manufacturer Certificates
Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
A. Submit evidence of compliance with performance requirements.

5.4.3 Minutes of preinstallation conference.

5.4.4 Maintenance Data: For roofing system to include in maintenance manuals.

5.4.5 Warranties: Sample of special warranties.

5.4.6 Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

6. QUALITY ASSURANCE

6.1 Installer Qualifications
A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

6.2 Source Limitations
Obtain components including roof insulation and fasteners for membrane roofing system approved by membrane roofing manufacturer.

6.3 Exterior Fire-Test Exposure
ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

6.4 Preinstallation Roofing Conference
Conduct conference at Project site.

6.4.1 Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

6.4.2 Review methods and procedures related to roofing installation, including manufacturer's written instructions.

6.4.3 Review and finalize Construction Schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

6.4.4 Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

6.4.5 Review structural loading limitations of roof deck during and after roofing.

6.4.6 Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

6.4.7 Review governing regulations and requirements for insurance and certificates if applicable.

6.4.8 Review temporary protection requirements for roofing system during and after installation.

6.4.9 Review roof observation and repair procedures after roofing installation.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

7.2 Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

7.2.1 Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

7.3 Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

7.4 Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

8. PROJECT CONDITIONS

Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

9. WARRANTY

9.1 Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

9.2 Special Warranty

Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

Scope of Coverage

A. Ordinary wear and tear of the elements
B. Manufacturing defect in materials
C. Defective workmanship used to install these materials
D. Damage due to winds up to 60 mph.
E. Membrane Roofing
F. Base Flashings
G. Fasteners
H. Roof Insulation
I. Cover Boards
J. Roofing Accessories
K. Prefinished Copings
L. 2-Piece flashing,
M. Termination Bars
N. Gravel stops
O. All other components of membrane roofing system
P. All materials used to complete the roof shall be manufactured or marketed by a single manufacturer.

9.3 Manufacturer Warranty Period: Twenty (20) years.
Warranty Period shall begin from the date of substantial completion.

9.4 Installer Warranty: Materials Warranty and two (2) year Labor / Maintenance Warranty

9.4.1 Installer to provide two (2) inspections a year for the span of 2-years starting after the date of Substantial Completion & inspect all work completed.

9.4.2 Any repairs required within the 2-year installer warranty will be completed at no cost to the Owner.

9.4.3 Any Material failures / issues will be coordinated with the Manufacturer by the installer.

10. TPO MEMBRANE ROOFING

10.1 Fabric-Reinforced Thermoplastic Polyolefin Sheet
ASTM D6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.

10.1.1 Basis-of-Design Manufacturer: The design for the TPO membrane system is based on Carlisle SynTec Incorporated. Subject to compliance with requirements, provide the named manufacturer or a comparable product by the following:
A. Carlisle SynTec Incorporated
B. Or approved equal

10.1.2 Thickness: 60 mils, nominal

10.1.3 Exposed Face Color: White

11. AUXILIARY MEMBRANE ROOFING MATERIALS

11.1 General

Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

11.1.1 Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

11.2 Sheet Flashing

Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

11.3 Bonding Adhesive

Manufacturer's standard, water based.

11.4 Metal Termination Bars

Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1- by 1/8-inch thick; with anchors.

11.5 Fasteners

Factory-coated steel fasteners and metal or plastic plates complying with corrosion resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

11.6 Miscellaneous Accessories

Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

12. ROOF INSULATION

12.1 General

Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

1. Provide installed thickness of insulation with an R-value which will result in an average coefficient of heat transmission, U-value, through the completed roof construction air to air, not in excess of 0.033-Btu per hour, per square foot, per degree F temperature with recognized methods in agreement with ASHRAE Handbook of Fundamentals. Roof construction air-to-air may include finish ceiling, provided unceilinged areas do not occur under the same roof area. Insulation thickness shall be uniform over common roof areas, except in those areas where tapered insulation is specified. Adjustments in thickness of wood blocking or dimensions of sheet metal counter-flashing required due to selection of specific type of insulation shall be made without increased cost to the Owner.

12.2 Polyisocyanurate Board Insulation

ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

12.2.1 Minimum Total R-Value of Roof Insulation: R-30.

12.3 Tapered Insulation
Provide factory-tapered insulation boards fabricated to slope of 1/4-inch per 12 inches unless otherwise indicated.

12.4 Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

13. INSULATION ACCESSORIES

13.1 General
Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

13.2 Fasteners
Factory-coated steel fasteners and metal or plastic plates complying with corrosion resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

13.3 Modified Asphaltic Insulation Adhesive
Insulation manufacturer's recommended modified asphalt, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.

13.4 Cover Board
ASTM C1177/C1177M, glass-mat, water-resistant gypsum substrate, 1/2-inch thick.
13.4.1 Products: Subject to compliance with requirements, provide the following:
A. Georgia-Pacific Corporation; Dens Deck Prime.

14. WALKWAYS

Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16-inch thick, and acceptable to membrane roofing system manufacturer.

PART 2 – EXECUTION

15. EXAMINATION

15.1 Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
15.1.1 Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

15.1.2 Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

15.1.3 Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Deck."

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

16. PREPARATION

16.1 Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

16.2 Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

16.3 Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

17. INSULATION INSTALLATION

17.1 Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

17.2 Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

17.3 Install tapered insulation under area of roofing to conform to slopes indicated.

17.4 Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two (2) or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

17.5 Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

17.6 Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4-inch with insulation.

17.6.1 Cut and fit insulation within 1/4-inch of nailers, projections, and penetrations.

17.7 Mechanically Fastened and Adhered Insulation
Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed
and sized for fastening specified board-type roof insulation to deck type.

17.7.1 Fasten first layer of insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.

17.7.2 Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.

17.7.3 Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

17.8 Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

17.8.1 Fasten cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.

18. ADHERED MEMBRANE ROOFING INSTALLATION

18.1 Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

18.2 Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

18.3 Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

18.4 Bonding Adhesive
Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

18.5 In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

18.6 Apply membrane roofing with side laps shingled with slope of roof deck where possible.

18.7 Seams
Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

18.7.1 Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.

18.7.2 Verify field strength of seams a minimum of twice daily and repair seam sample areas.

18.7.3 Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

18.8 Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

19. BASE FLASHING INSTALLATION

19.1 Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

19.2 Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

19.3 Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

19.4 Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

19.5 Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

20. WALKWAY INSTALLATION

Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

21. FIELD QUALITY CONTROL

21.1 Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

21.2 Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

21.3 Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

22. PROTECTING AND CLEANING

22.1 Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

22.2 Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

End of Section 075423

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following sheet metal flashing and trim:

- 2.1.1 Formed metal cap flashing
- 2.1.2 Formed roof drainage system
- 2.1.3 Formed low-slope roof flashing and trim
- 2.1.4 Formed wall flashing and trim
- 2.1.5 Formed equipment support flashing
- 2.1.6 Miscellaneous interior closure trims

2.2 Related Sections include the following:

- 2.2.1 Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking
- 2.2.2 Division 07 Section "Thermoplastic Membrane Roofing" for installing sheet metal flashing and trim integral with roofing membrane
- 2.2.3 Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units
- 2.2.4 Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants

3. PERFORMANCE REQUIREMENTS

3.1 General

Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

3.2 Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 and as indicated on Structural Drawings:

- 3.2.1 Basic Wind Speed: 115 mph
- 3.2.2 Exposure: C
- 3.2.3 Importance Factor: 1
- 3.2.4 Basic Velocity Pressure: 30.6 (at 45 feet)

3.3 Thermal Movements
Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress, as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

3.3.1 Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.

3.4 Water Infiltration
Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

4. SUBMITTALS

4.1 Product Data
For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

4.2 Shop Drawings
Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

4.2.1 Identify material, thickness, weight, and finish for each item and location in Project.

4.2.2 Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.

4.2.3 Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.

4.2.4 Details of expansion-joint covers, including showing direction of expansion and contraction.

4.3 Samples for Initial Selection
For each type of sheet metal flashing and trim indicated with factory-applied color finishes.

4.3.1 Include similar Samples of trim and accessories involving color selection.

4.4 Samples for Verification
For each type of exposed finish required, prepared on Samples of size indicated below:

4.4.1 Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.

4.4.2 Trim: 12 inches long. Include fasteners and other exposed accessories.

4.4.3 Accessories: Full-size Sample.

5. QUALITY ASSURANCE

5.1 Sheet Metal Flashing and Trim Standard
Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

5.2 Installer Qualifications
Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

5.3 Mockups
Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.

5.3.1 Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.

5.3.2 Notify Architect one (1) week in advance of the dates and times when mockups will be constructed.

5.3.3 Demonstrate the proposed range of aesthetic effects and workmanship.

5.3.4 Obtain Architect's approval of mockups before start of final unit of Work.

5.3.5 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

A. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

5.3.6 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

6.2 Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

6.3 Stack materials on platforms or pallets, covered with suitable weather-tight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

7. COORDINATION

7.1 Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

7.2 Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 – PRODUCTS

8. MANUFACTURERS

8.1 In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

8.1.1 Products: Subject to compliance with requirements, provide one (1) of the products specified.

8.1.2 Manufacturers: Subject to compliance with requirements, provide products by one (1) of the manufacturers specified.

9. SHEET METALS

Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 coating designation; structural quality.

10. COIL-COATED GALVANIZED STEEL SHEET FINISH

High-Performance Organic Coating Finish

Apply the following system by coil-coating process on galvanized steel sheet as recommended by coating manufacturers and applicator.

10.1 Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.

10.1.1 Resin Manufacturers: Subject to compliance with requirements, provide fluoropolymer coating systems containing resins produced by the following manufacturer: Elf Atochem North America, Inc. (Kynar 500).

11. UNDERLAYMENT MATERIALS

11.1 Polyethylene Sheet: 6-mil-thick polyethylene sheet complying with ASTM D4397

11.2 Felts: ASTM D226, Type II (No. 30), asphalt-saturated organic felt, non-perforated

11.3 Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

12. MISCELLANEOUS MATERIALS

12.1 General

Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

12.2 Fasteners

Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

12.2.1 Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.

12.2.2 Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.

12.2.3 Blind Fasteners: High-strength aluminum or stainless-steel rivets.

12.2.4 Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

12.3 Sealing Tape
Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, nonstaining tape.

12.4 Elastomeric Sealant
ASTM C920, elastomeric urethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

12.5 Epoxy Seam Sealer
Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

12.6 Bituminous Coating
Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

12.7 Asphalt Roofing Cement
ASTM D4586, asbestos-free, of consistency required for application.

13. MISCELLANEOUS MATERIALS AND ACCESSORIES

13.1 Fasteners
Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match color and finish of exposed heads with material being fastened.

13.2 Mastic Sealant
Polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.

13.3 Adhesives
Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

13.4 Metal Accessories
Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

14. FABRICATION, GENERAL

14.1 General
Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

14.2 Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

14.3 Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

14.4 Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

14.4.1 Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

14.4.2 Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat lock seams. Tin edges to be seamed, form seams, and solder.

14.5 Sealed Joints
Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

14.6 Expansion Provisions
Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

14.7 Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

14.8 Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

14.9 Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

14.9.1 Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

15. ROOF DRAINAGE SHEET METAL FABRICATIONS

15.1 Parapet Scuppers and Conductor Heads
Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.

15.1.1 Fabricate parapet scuppers and conductor heads from the following material:

A. Coil-Coated Galvanized Steel: 0.0336-inch (22-gauge)

B. Color: White, to match exterior wall panels

15.2 Downspouts
Fabricate rectangular downspouts from 24-gauge coil-coated galvanized steel, complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

15.2.1 Color: White, to match exterior wall panels.

16. LOW-SLOPE ROOF SHEET METAL FABRICATIONS

16.1 Cap Flashing
Fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Furnish with 6-inch-wide joint cover plates.

16.1.1 Joint Style: Lap, 4 inches wide.

16.1.2 Fabricate with scuppers at locations indicated, of dimensions required with 4-inch-wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.

16.1.3 Fabricate cap flashing from the following material:

A. Coil-Coated Galvanized Steel: 0.0336-inch (22-gauge)

B. Color: As selected by Architect from manufacturer's full range

16.2 Base Flashing, Counterflashing, Flashing Receivers, Roof Penetration Flashing, Equipment Support Flashing
Fabricate from the following material: Galvanized Steel: 0.0336-inch (22-gauge) thick

17. FINISHES

17.1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

17.2 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

17.3 Appearance of Finished Work
Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 – EXECUTION

18. EXAMINATION

Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

18.1 Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

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

19. INSTALLATION, GENERAL

19.1 General

Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

19.1.1 Torch cutting of sheet metal flashing and trim is not permitted.

19.2 Metal Protection

Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

19.2.1 Coat side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

19.2.2 Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.

19.2.3 Bed flanges in thick coat of asphalt roofing cement where required for water-proof performance.

19.3 Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

19.4 Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

19.5 Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

19.5.1 Space cleats not more than 12 inches apart. Anchor each cleat with two (2) fasteners. Bend tabs over fasteners.

19.6 Expansion Provisions
Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

19.7 Fasteners
Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4-inch for wood screws.
19.7.1 Galvanized or Pre-painted, Metallic-Coated Steel: Use stainless-steel fasteners.

19.8 Seal joints with elastomeric sealant as required for watertight construction.
19.8.1 Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 degrees F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 degrees F.

19.8.2 Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

20. ROOF DRAINAGE SYSTEM INSTALLATION

20.1 General
Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

20.2 Parapet Scuppers
Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
20.2.1 Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.

20.2.2 Loosely lock front edge of scupper with conductor head.

20.2.3 Seal or solder exterior wall scupper flanges into back of conductor head.

20.3 Conductor Heads
Anchor securely to wall with elevation of conductor head rim 1 inch below scupper discharge.

21. ROOF FLASHING INSTALLATION

21.1 General

Install sheet metal roof flashing and trim to comply with performance requirements, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

21.2 Roof Edge Flashing

Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

21.3 Copings

Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

21.3.1 Interlock exterior bottom edge of coping with continuous cleats anchored to substrate.

21.3.2 Anchor interior leg of coping with screw fasteners and washers at 18-inch centers.

21.4 Pipe or Post Counterflashing

Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

21.5 Counterflashing

Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

21.6 Roof-Penetration Flashing

Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

21.6.1 Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.

21.6.2 Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

22. MISCELLANEOUS FLASHING INSTALLATION

Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

23. CLEANING AND PROTECTION

23.1 Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

23.2 Clean and neutralize flux materials. Clean off excess solder and sealants.

23.3 Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

23.4 Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

End of Section 076200

SECTION 077200

ROOF ACCESSORIES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes roof hatches.

2.2 Related Sections include the following:

2.2.1 Division 05 Section "Metal Fabrications" for metal vertical ladders for access to roof hatches.

2.2.2 Division 06 Section "Rough Carpentry" wood blocking and nailers.

2.2.3 Division 07 Section "Sheet Metal Flashing and Trim" for metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

3. SUBMITTALS

3.1 Product Data

For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

3.2 Shop Drawings

Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

3.3 Coordination Drawings

Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

3.3.1 Size and location of roof accessories specified in this Section.

3.3.2 Method of attaching roof accessories to roof or building structure.

3.3.3 Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

3.3.4 Samples: For each type of exposed factory-applied finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.

4. QUALITY ASSURANCE

Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

5. DELIVERY, STORAGE, AND HANDLING

Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

6. PROJECT CONDITIONS

Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

7. COORDINATION

Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

PART 2 – PRODUCTS

8. MANUFACTURERS

Manufacturers: Subject to compliance with requirements, provide products by one (1) of the manufacturers listed in other Part 2 articles.

9. MATERIALS, GENERAL

9.1 Aluminum Sheets
ASTM B209-00 for Alclad Alloy 3005H25 or alloy and temper required to suit forming operations with mill finish, unless indicated otherwise.

9.2 Extruded Aluminum
ASTM B221-00 Alloy 6063-T52 or alloy and temper required to suit structural and finish requirements. Mill finish, unless indicated otherwise.

9.3 Structural-Quality Galvanized Steel Sheet
ASTM A653/A653M with G90 coating complying with ASTM A653/A653M, Grade 40, or to suit manufacturer's standards.

9.4 Commercial-Quality Galvanized Steel Sheet
With G90 coating complying with ASTM A653.

9.5 Galvalume-Coated Steel Sheet
ASTM A792 with class AZ-50 coating, Grade 40, or to suit manufacturer's standards.

9.6 Insulation
Manufacturer's standard rigid or semi-rigid glass-fiber board of thickness indicated.

9.7 Wood Nailers
Softwood lumber, pressure treated with water-borne preservatives for above ground use, complying with AWPA C2; not less than 1-1/2-inch thick.

9.8 Fasteners
Same metal as metals being fastened, or nonmagnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
9.8.1 Where removal of exterior exposed fasteners affords access to building, provide non removable fastener heads.

9.9 Gaskets
Manufacturer's standard tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

9.10 Bituminous Coating
SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.

9.11 Mastic Sealant
Polyisobutylene; nonhardening, non-skinning, nondrying, non-migrating sealant.

9.12 Elastomeric Sealant
Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C920-98el, Type S, Grade NS, Class 25, and Uses NT, G, and, A.

9.13 Roofing Cement
ASTM D4586-00, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

10. ROOF HATCHES

Fabricate roof hatches with insulated double-wall lids and insulated double-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weather-tight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.

10.1 Basis-of-Design Product: The design for roof hatches is based on Type "S" Series for Ladder Access by Bilco Co. Subject to compliance with requirements provide the named product or an approved equal product by one (1) of the following manufacturers:

A. Bilco Company (The)
B. Bristolite Skylights
C. J. L. Industries, Inc.
D. Milcor Inc.; a Gibraltar Company
E. Nystrom, Inc.
F. O'Keeffe's Inc.
G. ThyCurb; Div of Thybar Corporation
H. Wasco Products, Inc.

10.2 Ladder Safety Post
Manufacturer's standard ladder safety post. Post to lock in place on full extension. Provide release mechanism to return post to closed position.
10.2.1 Height: 42 inches above finished roof deck.

10.3 Safety Railing System
Manufacturer's standard complete system including rails, clamps, fasteners, safety barrier at railing opening, and all accessories required for a complete installation.
10.3.1 Basis-of-Design Product: The design for roof hatch safety railing system is based on DRA Safety Products; KeeHatch Railing System, Nesea Corporation Model RHSR Series.

10.3.2 Height: 42 inches above finished roof deck.

10.3.3 Comply with OSHA requirements.

PART 3 – EXECUTION

11. EXAMINATION
Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
11.1 Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.

11.2 Verify dimensions of roof openings for roof accessories.

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

12. INSTALLATION
12.1 General
Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
12.1.1 Except as otherwise indicated, install roof accessory items according to construction details of NRCA "Roofing and Waterproofing Manual."

12.2 Install roof accessories to fit substrates and to result in watertight performance.

12.3 Metal Protection
Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

12.4 Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

12.5 Roof Hatch Installation

12.5.1 Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.

12.5.2 Attach safety railing system to roof hatch curb.

12.5.3 Attach ladder safety post according to manufacturer's written instructions.

12.6 Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

13. TOUCH UP

13.1 Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.

13.2 Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

14. CLEANING

Clean exposed surfaces according to manufacturer's written instructions.

End of Section 077200

SECTION 078413

PENETRATION FIRESTOPPING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes through-penetration firestop systems for penetrations through fire resistance-rated constructions, including both empty openings and openings containing penetrating items.

2.2 Related Sections Include the Following: Division 07 Section "Fire-Resistive Joint Systems."

3. PERFORMANCE REQUIREMENTS

3.1 General

For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

3.1.1 Fire-resistance-rated walls including firewalls, fire partitions, fire barriers and smoke barriers.

3.1.2 Fire-resistance-rated horizontal assemblies including floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.

3.2 Rated Systems

Provide through-penetration firestop systems with the following ratings determined per UL 1479:

3.2.1 F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

3.2.2 T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

A. Penetrations located outside wall cavities

B. Penetrations located outside fire-resistance-rated shaft enclosures

C. Penetrations located in construction containing fire protection rated openings

D. Penetrating items larger than 4-inch diameter nominal pipe or 16-square-inch overall cross-sectional area.

3.2.3 All firestopping material shall be FM approved and shall be listed in the latest edition of the FM Approval Guide.

3.2.4 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

3.2.5 For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

A. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture resistant through-penetration firestop systems.

B. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.

C. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

3.2.6 For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

4. SUBMITTALS

4.1 Product Data
For each type of product indicated.

4.2 Shop Drawings
For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.

4.2.1 Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.

4.2.2 Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire resistance-rated assembly.

4.3 Through-Penetration Firestop System Schedule
Indicate locations of each through-penetration firestop system, along with the following information:
4.3.1 Types of penetrating items.

4.3.2 Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.

4.3.3 Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.

4.4 Qualification Data: For Installer.

4.5 Product Certificates
For through-penetration firestop system products, signed by product manufacturer.

4.6 Product Test Reports
From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

5. QUALITY ASSURANCE

5.1 Installer Qualifications
A firm experienced in 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.

5.2 Installation Responsibility
Assign installation of through-penetration firestop systems and fire resistive joint systems in Project to a single qualified installer.

5.3 Source Limitations
Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through 1 source from a single manufacturer.

5.4 Fire-Test-Response Characteristics
Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 “Performance Requirements” Article:
5.4.1 Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

5.4.2 Through-penetration firestop systems are identical to those tested per testing standard referenced in Part 1 “Performance Requirements” Article. Provide rated systems complying with the following requirements:
A. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.

B. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
1) UL in its "Fire Resistance Directory."

5.5 Preinstallation Conference
Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

6. DELIVERY, STORAGE, AND HANDLING

6.1 Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multi-component materials.

6.2 Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

7. PROJECT CONDITIONS

7.1 Environmental Limitations
Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

7.2 Ventilate through-penetration firestop systems per manufacturers written instructions by natural means or, where this is inadequate, forced-air circulation.

8. COORDINATION

8.1 Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

8.2 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

8.3 Notify inspecting agency at least seven (7) days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

8.4 Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 – PRODUCTS

9. MANUFACTURERS

Products

Subject to compliance with requirements, provide one (1) of the through-penetration firestop systems indicated for each application that are produced by one (1) of the following manufacturers:

9.1 A/D Fire Protection Systems Inc.

9.2 Grace, W. R. & Co. - Conn.

9.3 Hilti, Inc.

9.4 Johns Manville

9.5 3M; Fire Protection Products Division

9.6 Tremco; Sealant/Weatherproofing Division

9.7 USG Corporation

10. FIRESTOPPING, GENERAL

10.1 Compatibility

Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

10.2 Accessories

Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 “Performance Requirements” Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

10.2.1 Permanent forming/damming/backing materials, including the following:

A. Slag-/rock-wool-fiber insulation

B. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state

C. Fire-rated form board

D. Fillers for sealants

10.2.2 Temporary forming materials

10.2.3 Substrate primers

10.2.4 Collars

10.2.5 Steel sleeves

11. FILL MATERIALS

11.1 General
Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

11.2 Cast-in-Place Firestop Devices
Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one (1) end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

11.3 Latex Sealants
Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

11.4 Firestop Devices
Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

11.5 Intumescent Composite Sheets
Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

11.6 Intumescent Putties
Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

11.7 Intumescent Wrap Strips
Single-component intumescent elastomeric sheets with aluminum foil on 1 side.

11.8 Mortars
Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

11.9 Pillows/Bags
Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

11.10 Silicone Foams
Multi-component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

11.11 Silicone Sealants
Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
11.11.1 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.

11.11.2 Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.

11.11.3 Grade for Vertical Surfaces: Non-sag formulation for openings in vertical and other surfaces.

12. FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

12.1 Elastomeric Sealant Standard
Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

12.2 Sealant Colors
Provide color of exposed joint sealants to comply with the following:
12.2.1 Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

12.3 Multi-component, Non-sag, Urethane Sealant
Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

12.4 Products
Subject to compliance with requirements, provide one (1) of the following:
12.4.1 Multi-component, Non-sag, Urethane Sealant:
A. Dymeric, Tremco Inc.
B. Dynatred, Pecora Corp.
C. Dynatrol II, Pecora Corp.
D. Dynaflex, Pecora Corp.
E. Sonolastic NP 2, Sonneborn Building Products Div., ChemRex Inc.
F. STI Specified Technologies, Inc.

13. MIXING

For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 – EXECUTION

14. EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.

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

15. PREPARATION

15.1 Surface Cleaning

Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:

15.1.1 Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.

15.1.2 Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.

15.1.3 Remove laitance and form-release agents from concrete.

15.2 Priming

Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer’s recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

15.3 Masking Tape

Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

16. THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

16.1 General

Install through-penetration firestop systems to comply with Part 1 “Performance Requirements” Article and with firestop system manufacturer’s written installation instructions and published drawings for products and applications indicated.

16.2 Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

16.2.1 After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

16.3 Install fill materials for firestop systems by proven techniques to produce the following results:

16.3.1 Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

16.3.2 Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

16.3.3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

17. INSTALLING FIRE-RESISTIVE JOINT SEALANTS

17.1 General
Comply with the "System Performance Requirements" Article in Part 1, with ASTM C1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

17.2 Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

17.3 Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

17.4 Tool non-sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

18. IDENTIFICATION

Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:

18.1.1 The words "Warning - Through-Penetration Firestop System – Do Not Disturb. Notify Building Management of Any Damage."

18.1.2 Contractor's name, address, and phone number

18.1.3 Through-penetration firestop system designation of applicable testing and inspecting agency

18.1.4 Date of installation

18.1.5 Through-penetration firestop system manufacturer's name

18.1.6 Installer's name.

19. FIELD QUALITY CONTROL

19.1 Inspecting Agency: Contractor shall engage a qualified, independent inspecting agency to inspect through penetration firestops. Independent inspecting agency shall comply with ASTM E2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.

19.2 Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

19.3 Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and accepted by Architect, and firestop installations comply with requirements.

20. CLEANING AND PROTECTING

20.1 Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

20.2 Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

End of Section 078413

SECTION 078446

FIRE-RESISTIVE JOINT SYSTEMS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes fire-resistive joint systems for the following:

2.1.1 Floor-to-wall joints

2.1.2 Head-of-wall joints

2.1.3 Wall-to-wall joints

2.1.4 Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls

2.2 Related Sections include the following:

2.2.1 Division 07 Section "Penetration Firestopping" for systems installed in openings in walls and floors with and without penetrating items.

2.2.2 Division 07 Section "Joint Sealants" for non-fire-resistive joint sealants.

3. PERFORMANCE REQUIREMENTS

3.1 General

Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.

3.2 Joint Systems in and between Fire-Resistance-Rated Constructions

Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, indicated as determined by UL 2079.

3.2.1 Load-bearing capabilities as determined by evaluation during the time of test.

3.3 Perimeter Fire-Resistive Joint Systems

For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings indicated below and those indicated in the Fire-Resistive Joint System Schedule at the end of Part 3, as determined by UBC Standard 26-9, NFPA 285 and UL 2079.

3.3.1 UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one (1) side of joint.

3.4 For fire-resistive systems exposed to view, provide products with flame-spread and smoke developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

4. SUBMITTALS

4.1 Product Data: For each type of product indicated

4.2 Shop Drawings
For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.

4.2.1 Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.

4.3 Product Certificates
For each type of fire-resistive joint system, signed by product manufacturer.

4.4 Qualification Data: For Installer

4.5 Field quality-control test reports

4.6 Evaluation Reports
Evidence of fire-resistive joint systems' compliance with ICBO ES AC30, from the ICBO Evaluation Service.

4.7 Research/Evaluation Reports: For each type of fire-resistive joint system

5. QUALITY ASSURANCE

5.1 Source Limitations
Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.

5.2 Fire-Test-Response Characteristics
Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 “Performance Requirements” Article:

5.2.1 Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.

5.2.2 Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:

A. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.

B. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multi component materials.

6.2 Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

7. PROJECT CONDITIONS

7.1 Environmental Limitations

Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

7.2 Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

8. COORDINATION

8.1 Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

8.2 Coordinate sizing of joints to accommodate fire-resistive joint systems.

8.3 Notify inspecting agency at least seven (7) days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.

8.4 Do not cover up fire-resistive joint system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector of authorities having jurisdiction have examined each installation.

PART 2 – PRODUCTS

9. FIRE-RESISTIVE JOINT SYSTEMS

9.1 Compatibility

Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.

9.2 Accessories

Provide components of fire-resistive joint systems, including primers and forming materials that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 – EXECUTION

10. EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of work.

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

11. PREPARATION

11.1 Surface Cleaning

Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

11.1.1 Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.

11.1.2 Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.

11.1.3 Remove laitance and form-release agents from concrete.

11.2 Priming

Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

11.3 Masking Tape

Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

12. INSTALLATION

12.1 General
Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.

12.2 Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

12.3 Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

12.3.1 Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.

12.3.2 Apply fill materials so they contact and adhere to substrates formed by joints.

12.3.3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

13. FIELD QUALITY CONTROL

13.1 Inspecting Agency
Contractor shall a qualified independent inspecting agency to inspect fire resistive joint systems and prepare inspection reports.

13.2 Testing Services
Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.

13.2.1 Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.

13.3 Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.

13.4 Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

13.5 Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and accepted by Architect and fire-resistive joint systems comply with requirements.

14. CLEANING AND PROTECTING

14.1 Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.

14.2 Provide final protection and maintain conditions during and after installation that ensure fire resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately, and install new materials to produce fire resistive joint systems complying with specified requirements.

End of Section 078446

SECTION 079500

SEALANTS

PART 1 – GENERAL

1. SCOPE OF WORK

1.1 Self-Leveling exterior concrete pavement joint sealant, elastomeric joint sealants, joint backer materials and accessories needed to ensure a complete and durable weather-tight seal at all locations indicated.

1.2 Provide all labor, equipment, materials, and services required to complete all caulking and sealing in accordance with the Drawings and Specifications.

1.3 Related Sections

1.3.1 Caulking in connection with metal wall panels is specified under Sections on Flashing and Sheet Metal.

2. SUBMITTALS

2.1 Submit manufacturer's specifications and other data needed to prove compliance with the specified requirements.

2.2 Submit color cards indicating actual sealant samples for Architect's selection.

3. QUALITY ASSURANCE

3.1 Installer Qualifications

An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project.

3.2 Source Limitations

Obtain each type of joint sealant through one source from a single manufacturer.

3.3 Preconstruction Field-Adhesion Testing

Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:

3.3.1 Locate test joints on the rear elevation of the building.

3.3.2 Conduct field tests for each application indicated.

3.4 Installation Verification

Conduct field adhesion on installed sealant as recommended by the manufacturer.

4. DELIVERY, STORAGE, AND HANDLING

4.1 Deliver the materials to the job site in the manufacturer's unopened containers with all labels intact and legible at time of use.

4.2 Store materials in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

PART 2 – PRODUCTS

5. MATERIALS

5.1 Exterior Concrete Pavement Joint Sealant - Self-Leveling Silicone Joint Sealant
To be used on whole parking lot, all vehicle bays, all #500 rooms, and shelter mechanical yard #404.
890 SL by Dow Corning – Self-Leveling Silicone Joint Sealant, or approved equal.

5.2 Exterior Concrete Pavement Joint Sealant
To be used mainly at curb joints. Won't run out of the vertical portion of the joint.
888 (toolable) by Dow Corning, or approved equal.

5.3 ITP Backer Rod
To be used with both 890 and 888 Dow Corning sealants, as recommended by manufacturer.
ITB by Dow Corning, or approved equal.

5.4 Acrylic Latex Caulk
Pecora AC-20, Tremco Acrylic Latex Caulk, or equal conforming to ASTM C 834.

5.5 Fireproof Sealant
1-component neutral cure, silicone rubber sealant conforming to ASTM E814 and UL 1479.
Pensil 100 Sealant by GE Silicones, or approved equal.

5.6 Polyurethane 1-part Non-sag Sealant
1-part polyurethane non-sag sealant conforming to Federal Specification TT-S-00230C Type II. Pecora Dynatrol I, Sikaflex 1a, or approved equal.

5.7 Polyurethane 2-part Non-sag Sealant
2-part polyurethane sealant conforming to Federal Specification TT-S-227E Type II, non-sag.
Pecora Dynatrol II, Sikaflex 2c NS EZ, or approved equal.

5.8 Polyurethane 2-part Self-Leveling Sealant
2-part polyurethane sealant conforming to Federal Specification TT-S-227E self-leveling.
Pecora NR-200 Urexpan, Sikaflex 2c SL, or approved equal.

5.9 Silicone Low Modulus Sealant
1-part low modulus silicone rubber sealant conforming to Federal Specification TT-S-001543A and TT-S-00230C. GE Silpruf SCS2000, Pecora 864, or approved equal.

5.10 Sanitary Sealant
1-part silicone sealant meeting federal Specification TT-S-001543A. GE Silicone Sanitary 1700 Sealant, or approved equal.

5.11 Primer shall be as recommended by the manufacturer of the sealant.

5.12 Back-up material shall be polyethylene foam rod, urethane foam rod, or other approved material which is compatible with sealing compound.

PART 3 – EXECUTION

6. APPLICATION

6.1 Joints in interior finish materials, including joints around window and door frames, joints in and between gyp board, wood and masonry, and similar interior applications subject to painting, shall be sealed with Acrylic Latex Caulk.

6.2 Joints around entrances, frames and sills of doors, windows and other framed openings in exterior walls shall be sealed with Polyurethane 1-part, non-sag sealant.

6.3 Control joints in masonry and concrete walls shall be sealed with a Silicone low modulus sealant.

6.4 Joints in pavement, wall-to-pavement intersection, and other areas subject to foot and vehicular traffic shall receive Polyurethane 2-part self-leveling sealant.

6.5 Joints in interior concrete flooring shall receive Polyurethane 2-part non-sag sealant.

6.6 Through-wall penetrations and wall-to-wall, or wall-to- floor/ceiling joints in fire-rated walls, shall be caulked with Fireproof Sealant,

6.7 Joints around plumbing fixtures shall be sealed with Sanitary Sealant.

7. INSTALLATION

7.1 All surfaces to receive caulk or sealant shall be clean, dry, and sound.

7.2 The surfaces of all joints to be sealed shall be primed or treated with surface conditioner, as recommended by the manufacturer.

7.3 Install backup material as specified. Consult manufacturer for proper thickness of sealant. Maximum thickness shall not exceed 1/2 the width.

7.4 Mask adjacent areas of contrasting color to insure neat and true caulk lines.

7.5 Apply sealing compound and caulk with a gun having the proper nozzle and sufficient pressure to fill all joints solid.

7.6 Tool-caulk on non-sag sealant joints to a smooth, concave surface. Protect all self-leveling sealant from traffic until properly cured.

7.7 All caulking and sealing shall be applied in strict accordance with manufacturer's printed instructions. Clean off excess sealant. All joints shall be watertight.

8. FIELD QUALITY CONTROL

8.1 Field-Adhesion Testing
Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer.
8.1.1 Extent of Testing: Perform on test for each 300 m (1,000 feet) of joint length.

8.2 Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.

8.3 Inspect tested joints and report on the following:
8.3.1 Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates, or tore cohesively.

8.3.2 Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

8.3.3 Whether sealants filled joint cavities and are free from voids.

8.3.4 Whether sealants dimensions and configurations comply with specified requirements.

8.4 Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

8.5 Repair sealants pulled from test area by applying new sealants following the same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.

8.6 Evaluation of Field-Test Results
Sealants not evidencing adhesive failure from testing or non-compliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing, or to comply with other requirements. Retest failed applications until test results prove that sealants comply with indicated requirements.

End of Section 079500

SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Standard and custom hollow metal doors and frames

2.1.2 Steel sidelight, borrowed lite and transom frames

2.1.3 Louvers installed in hollow metal doors, as scheduled

2.1.4 Light frames and glazing installed in hollow metal doors

2.2 Related Sections

2.2.1 Division 01 Section “General Conditions”

2.2.2 Division 04 Section “Unit Masonry” for embedding anchors for hollow metal work into masonry construction

2.2.3 Division 06 Section “Rough Carpentry”.

2.2.4 Division 06 Section “Interior Architectural Woodwork”

2.2.5 Division 08 Section “Door Hardware Schedule”

2.2.6 Division 08 Section “Flush Wood Doors”

2.2.7 Division 08 Section “Storefronts”

2.2.8 Division 08 Section “Glazing” for glass view panels in hollow metal doors.

2.2.9 Division 08 Section “Door Hardware”

2.2.10 Division 08 Section “Access Control Hardware”

2.2.11 Division 09 Sections “Exterior Painting” and “Interior Painting” for field painting hollow metal doors and frames

2.2.12 Division 09 Sections on Painting

2.2.13 Division 26 Section “Electrical”

2.3 Codes and References

Comply with the version year adopted by the Authority Having Jurisdiction.

2.3.1 ANSI/SDI A250.8 – Recommended Specifications for Standard Steel Doors and Frames

2.3.2 ANSI/SDI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing

2.3.3 ANSI/SDI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames

2.3.4 ANSI/SDI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

2.3.5 ANSI/SDI A250.11 – Recommended Erection Instructions for Steel Frames

2.3.6 ANSI/BHMA A156.115 – Hardware Preparation in Steel Doors and Frames

2.3.7 ANSI/SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames

2.3.8 ANSI/NFPA 80 – Standard for Fire Doors and Fire Windows; National Fire Protection Association

2.3.9 ANSI/NFPA 105 – Standard for the Installation of Smoke Door Assemblies

2.3.10 ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

2.3.11 ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

2.3.12 ASTM A1008 – Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

2.3.13 ASTM C1363 – Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus

2.3.14 ASTM C1199 – Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods

2.3.15 ASTM E1423 – Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.

2.3.16 ANSI/BHMA A156.115 – Hardware Preparation in Steel Doors and Frames

2.3.17 ANSI/SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

2.3.18 ANSI/NFPA 80 – Standard for Fire Doors and Fire Windows; National Fire Protection Association

2.3.19 ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

2.3.20 ICC 500 – 2014/2020/2023 ICC/NSSA Standard for the Design and Construction of Storm Shelters.

2.3.21 NFPA 252 – Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association

2.3.22 UL 10C – Positive Pressure Fire Tests of Door Assemblies

2.3.23 UL 1784 – Standard for Air Leakage Tests of Door Assemblies

3. SUBMITTALS

3.1 Product Data
For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

3.2 Maintenance manual must be provided for tornado/hurricane storm shelter impact protective systems.

3.3 Door hardware supplier shall furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

3.4 Shop Drawings: Include the following:

3.4.1 Elevations of each door design

3.4.2 Details of doors, including vertical and horizontal edge details and metal thicknesses

3.4.3 Frame details for each frame type, including dimensioned profiles and metal thicknesses

3.4.4 Locations of reinforcement and preparations for hardware

3.4.5 Details of anchorages, joints, field splices, and connections

3.4.6 Details of accessories

3.4.7 Details of moldings, removable stops, and glazing

3.4.8 Details of conduit and preparations for power, signal, and control systems

3.5 Samples for Verification
Samples are only required by request of the Architect and for manufacturers that are not current members of the Steel Door Institute

4. QUALITY ASSURANCE

4.1 Source Limitations
Obtain hollow metal doors and frames through one (1) source from a single manufacturer wherever possible.

4.2 Quality Standard
In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames."

4.3 Fire-Rated Door Assemblies
Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40 inches above sill) or UL 10C.

4.3.1 Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire-rated door assemblies except for size.

4.3.2 Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F above ambient after 30 minutes of standard fire-test exposure.

4.3.3 Smoke Control Door Assemblies: Comply with NFPA 105.

A. Smoke "S" Label: Doors shall bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

4.4 Fire-Rated, Borrowed-Light Frame Assemblies
Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

4.5 Storm Shelter Openings
Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020/2023), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

4.5.1 Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

4.6 Pre-Submittal Conference
Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

5.2 Deliver welded frames with two (2) removable spreader bars across bottom of frames, tack welded to jambs and mullions.

5.3 Store hollow metal work under cover at Project site. Place in stacks of five (5) units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity.

5.3.1 Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames shall be stacked in a vertical upright position.

6. PROJECT CONDITIONS

Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

7. COORDINATION

7.1 Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

7.2 Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

8. WARRANTY

8.1 Special Warranty
Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

8.2 Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 – PRODUCTS

9. MANUFACTURERS

Subject to compliance with requirements, provide steel doors and frames from a SDI certified manufacturer:

9.1 CECO Door Products (C)

9.2 Curries Company (CU)

9.3 Pioneer Industries (PI)

9.4 Steelcraft (S)

10. MATERIALS

10.1 Cold-Rolled Steel Sheet
ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

10.2 Metallic-Coated Steel Sheet
ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

10.3 Frame Anchors
ASTM A653/A653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

11. HOLLOW METAL DOORS

11.1 General
Provide 1-3/4-inch 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/SDI A250.8 and ANSI/NAAMM HMMA 867.

11.2 Exterior Doors
Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

11.2.1 Design: Flush panel

11.2.2 Core Construction: Manufacturer’s thermally enhanced QMax core. Where indicated provide doors fabricated as thermal-rated assemblies with a minimum thermal rating of 0.35 BTU/hr-ft2-F.

11.2.3 Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.

11.2.4 Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

11.2.5 Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.

11.2.6 Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

11.3 Interior Doors

Face sheets fabricated of commercial-quality, cold-rolled steel that complies with ASTM A1008/A1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

11.3.1 Design: Flush panel

11.3.2 Core Construction: Manufacturer's standard kraft-paper honeycomb, or 1-piece polystyrene core, securely bonded to both faces.

A. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

11.3.3 Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042 inch-) thick steel, Model 2.

11.3.4 Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.

11.3.5 Hinge Reinforcement: Minimum 7 gauge (3/16-inch) plate 1-1/4-inch by 9 inches or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.

11.3.6 Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.

11.2.7 Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

11.4 Manufacturer's Basis of Design

11.4.1 CECO Door Products (C) QMax Core - Imperial Series

11.4.2 Curries Company (CU) - Honeycomb Core - 707 Series

11.4.3 Curries Company (CU) - QMax Core - 707 Series

11.4.4 Steelcraft (S)

12. HOLLOW METAL DOOR AND SHUTTER ASSEMBLIES FOR STORM SHELTERS

12.1 General

Provide complete tornado or hurricane storm shelter resistant assemblies constructed, test, and listed/labeled to resist the design pressures for components and cladding and missile impact resistance as described in ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

12.1.1 Door and shutter systems, tested and complying with ICC 500 (2014/2020/2023) and FEMA P-361 (2015/2021), Design and Construction Guidance for Community Safe Rooms and supported by third party test results.

12.1.2 Sheets fabricated on exterior openings from commercial quality hot dipped zinc coated steel complying with ASTM A924 A60. Gauges to be in accordance with manufacturers tested assemblies.

12.1.3 Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

12.1.4 Top Edge: Reinforce top of doors with a continuous steel channel extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached and welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

12.1.5 Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".

12.2 Manufacturers Basis of Design
12.2.1 CECO Door Products (C) – StormPro Series
12.2.2 Curries Company (CU) – StormPro Series

13. HOLLOW METAL FRAMES

13.1 General
Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

13.2 Exterior Frames
Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
13.2.1 Fabricate frames with mitered or coped corners. Profile as indicated on drawings.

13.2.2 Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.

13.2.3 Manufacturers Basis of Design:
A. CECO Door Products (C) – SU SR Series
B. Curries Company (CU) – M CM Series

13.3 Interior Frames
Fabricated from cold-rolled steel sheet that complies with ASTM A1008/A1008M.
13.3.1 Fabricate frames with mitered or coped corners. Profile as indicated on Drawings.

13.3.2 Frames: Minimum 16-gauge (0.053-inch-) thick steel sheet.

13.3.3 Manufacturer's Basis of Design:
A. CECO Door Products (C) – SU Series
B. Curries Company (CU) – M Series
C. Steelcraft (S)

13.3 Fire-Rated Frames
Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

13.4 Hardware Reinforcement
Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

14. FRAME ANCHORS FOR STORM SHELTERS

14.1 General
Subject to the same compliance standards and requirements as standard hollow metal frames, provide complete tornado or hurricane storm shelter resistant assemblies tested and labeled as complying with ICC 500 (2014/2020/2023) and FEMA P-361 (2015/2021) and supported by third party test listings.

14.1.1 Fabricate exterior frames from 14 gauge hot dipped zinc coated steel that complying with ASTM designations A924 A60.

14.1.2 Manufacturers Basis of Design

A. CECO Door Products (C) – StormPro Series

B. Curries Company (CU) – StormPro Series

15. FRAME ANCHORS

15.1 Jamb Anchors

15.1.1 Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, 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.

15.1.2 Stud Wall Type: Designed to engage stud and not less than 0.042-inch thick.

15.1.3 Compression Type for Drywall Slip-on (Knock-Down) Frames
Adjustable compression anchors.

15.1.4 Hurricane Opening Anchors: Types as tested and required for indicated wall types to meet specified design pressure and impact rating criteria.

15.1.5 Storm Shelter Anchors: Masonry T-shaped, wire masonry type, or existing opening type anchors as per manufacturers listing or anchor detail sheets including welded installation methods.

15.2 Floor Anchors: Floor anchors shall be provided at each jamb, formed from A60 metallic coated material, not less than 0.042-inch thick.

15.3 Mortar Guards: Formed from same material as frames, not less than 0.016-inch thick.

16. LOUVERS (where applicable)

16.1 Metal Louvers
Unless otherwise indicated, provide louvers to meet the following requirements:

16.1.1 Blade Type: Vision-proof inverted V or inverted Y.

16.1.2 Metal and Finish: Galvanized steel, 0.040-inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

16.2 Louvers for Fire-Rated Doors
Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

16.2.1 Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.

16.2.2 Metal and Finish: Galvanized steel, 0.040-inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

17. LIGHT OPENINGS AND GLAZING

17.1 Stops and Moldings
Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

17.2 Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames
Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

17.3 Fixed Frame Moldings
Formed integral with hollow metal frames, a minimum of 5/8-inch high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

17.4 Preformed Metal Frames for Light Openings
Manufacturer's standard frame formed of 0.048 inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

18. ACCESSORIES

18.1 Mullions and Transom Bars
Join to adjacent members by welding or rigid mechanical anchors.

18.2 Grout Guards
Formed from same material as frames, not less than 0.016-inch thick.

19. FABRICATION

19.1 Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings shall be fabricated in sections for splicing or splining in the field by others.

19.2 Tolerances
Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

19.3 Hollow Metal Doors

19.3.1 Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

19.3.2 Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.

19.3.3 Astragals: Provide overlapping astragals as noted in Door Hardware Sets in Division 08 Section "Door Hardware" on one (1) leaf of pairs of doors where required by NFPA 80 for fire performance rating or where indicated. Extend minimum 3/4-inch beyond edge of door on which astragal is mounted.

19.3.4 Continuous Hinge Reinforcement: Provide welded continuous 12-gauge strap for continuous hinges specified in Hardware Sets in Division 08 Section "Door Hardware."

19.4 Hollow Metal Frames

19.4.1 Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

19.4.2 Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

A. Welded frames shall be provided with two (2) steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

19.4.3 Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

19.4.4 High-Frequency Hinge Reinforcement: Provide high-frequency hinge reinforcements at door openings 48 inches and wider with mortise butt-type hinges at top hinge locations.

19.4.5 Continuous Hinge Reinforcement: Provide welded continuous 12-gauge straps for continuous hinges specified in Hardware Sets in Division 08 Section "Door Hardware."

19.4.6 Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.

19.4.7 Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

19.4.8 Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four (4) spot welds per anchor.

19.4.9 Jamb Anchors: Provide number and spacing of anchors as follows:

A. 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:

1) Two (2) anchors per jamb up to 60 inches high
2) Three (3) anchors per jamb from 60 to 90 inches high
3) Four (4) anchors per jamb from 90 to 120 inches high
4) Four (4) anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high

B. 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:

1) Three (3) anchors per jamb up to 60 inches high.
2) Four (4) anchors per jamb from 60 to 90 inches high.
3) Five (5) anchors per jamb from 90 to 96 inches high.
4) Five (5) anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
5) Two (2) anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

C. Storm Shelter Openings: Provide jamb, head, and sill anchors in accordance with manufacturer's certified assembly listings.

19.9.10 Door Silencers: Except on weather stripped or gasketed doors, drill stops to receive door silencers. Silencers shall be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware."

19.9.11 Bituminous Coating: Where frames are fully grouted with an approved Portland cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a third-party independent follow-up service procedure.

19.10 Hardware Preparation

Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

19.10.1 Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

19.10.2 Reinforce doors and frames to receive non-template, mortised and surface-mounted door hardware.

19.10.3 Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

19.10.4 Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

20. STEEL FINISHES

20.1 Prime Finishes

Doors and frames shall be cleaned and chemically treated to ensure maximum finish paint adhesion. Surfaces of the door and frame exposed to view shall receive a factory applied coat of rust-inhibiting shop primer.

19.1.1 Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 – EXECUTION

21. EXAMINATION

21.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

21.2 General Contractor shall verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

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

22. PREPARATION

22.1 Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

22.2 Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

22.3 Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

22.4 Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

22.5 Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

23. INSTALLATION

23.1 General

Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

23.2 Hollow Metal Frames

Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire-rated openings.

23.2.1 Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

23.2.2 Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

23.2.3 Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.

23.2.4 Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

23.3 Hollow Metal Doors

Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

23.3.1 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 3/4 inch

23.3.2 Fire-Rated Doors: Install doors with clearances according to NFPA 80.

23.4 Field Glazing

Comply with installation requirements in Division 08 Section “Glazing” and with hollow metal manufacturer’s written instructions.

24. ADJUSTING AND CLEANING

24.1 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 hollow metal work that is warped, bowed, or otherwise unacceptable.

24.2 Remove grout and other bonding material from hollow metal work immediately after installation.

24.3 Prime-Coat and Painted Finish Touch-up
Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc-rich primer (exterior and galvanized openings) or finish paint.

25. FIELD QUALITY CONTROL

25.1 Field Inspection (Punch Report)
Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

25.1.1 Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

End of Section 081113

SECTION 081416

FLUSH WOOD DOORS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.2.1 Fire-rated solid-core doors with wood-veneer faces

2.2.2 Solid-core doors with wood-veneer faces

2.2.3 Factory fitting flush wood doors to frames and factory machining for hardware

2.2.4 Factory finished flush wood doors with transparent finish

2.2 Related Section

Division 08 Section “Glazing” for glass view panels in flush wood doors.

3. SUBMITTALS

3.1 Product Data

For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

3.2 Shop Drawings

Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

3.2.1 Indicate dimensions and locations of mortises and holes for hardware.

3.2.2 Indicate dimensions and locations of cutouts.

3.3.3 Indicate fire-protection ratings for fire-rated doors.

3.3 Samples for Verification

Transparent finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three (3) samples showing typical range of color and grain to be expected in the finished work.

3.4 Warranty: Sample of special warranty.

4. QUALITY ASSURANCE

4.1 Source Limitations: Obtain flush wood doors from single manufacturer.

4.2 Quality Standard

In addition to requirements specified, comply with AWI’s “Architectural Woodwork Quality Standards Illustrated.”

4.3 Fire-Rated Wood Doors
Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Comply with requirements of referenced standard and manufacturer's written instructions.

5.2 Package doors individually in plastic bags or cardboard cartons.

5.3 Mark each door on top and bottom rail with opening number used on Shop Drawings.

6. PROJECT CONDITIONS

Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

7. WARRANTY

7.1 Special Warranty
Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

7.1.1 Failures include, but are not limited to, the following:

A. Warping (bow, cup, or twist) more than 1/4-inch in a 42- by 84-inch section.

B. Telegraphing of core construction in face veneers exceeding 0.01-inch in a 3-inch span.

7.1.2 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

7.1.3 Warranty Period for Solid-Core Interior Doors: Life of installation.

7.1.4 Warranty Period for Hollow Core Interior Doors: Two years.

7.2 Contractor's Responsibilities
Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 – PRODUCTS

8. MANUFACTURERS

Subject to compliance with requirements, provide products by one (1) of the following for solid core doors with wood veneer faces:

8.1 Algoma Hardwoods, Inc.

8.2 Eggers Industries

8.3 Graham; an Assa Abloy Group company

8.4 Mohawk Flush Doors, Inc.; a Masonite company

8.5 VT Industries Inc.

9. DOOR CONSTRUCTION, GENERAL

9.1 Low-Emitting Materials

Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

9.2 Particleboard-Core Doors

9.2.1 Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2, made with binder containing no urea-formaldehyde resin.

9.2.2 Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware and as follows:

A. 5-inch top-rail blocking, in doors indicated to have closers

B. 5-inch bottom-rail blocking, in doors indicated to have kick, mop, or armor plates

C. 5-inch midrail blocking, in doors indicated to have exit devices

9.3 Mineral-Core Doors

9.3.1 Core

Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.

9.3.2 Blocking

Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware and as follows:

A. 5-inch top-rail blocking

B. 5-inch bottom-rail blocking, in doors indicated to have protection plates

C. 5-inch mid-rail blocking, in doors indicated to have armor plates

D. 5-inch mid-rail blocking, in doors indicated to have exit devices

9.3.3 Edge Construction

At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

10. VENEERED-FACED DOORS FOR TRANSPARENT FINISH

Interior Solid-Core Doors

10.1 Grade: Custom, with Grade A faces

10.2 Species: Red oak

10.3 Cut: Plain sliced

10.4 Match between Veneer Leaves: Slip match

10.5 Assembly of Veneer Leaves on Door Faces: Center-balance match

10.6 Pair and Set Match
Provide for doors hung in same opening or separated only by mullions

10.7 Room Match
Provide door faces of compatible color and grain within each separate room or area of building

10.8 Exposed Vertical and Top Edges: Same species as faces

10.9 Core: Particleboard

10.10 Construction
Five (5) or seven (7) plies. Stiles and rails are bonded to core, and then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

11. LOUVERS AND LIGHT FRAMES

11.1 Wood Beads for Light Openings in Wood Doors
Provide manufacturer's standard wood beads as follows unless otherwise indicated.

11.1.1 Wood Species: Same species as door faces

11.1.2 Profile: Manufacturer's standard shape

11.1.3 At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

11.2 Wood-Veneered Beads for Light Openings in Fire-Rated Doors
Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

12. FABRICATION

12.1 Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
12.1.1 Comply with requirements in NFPA 80 for fire-rated doors.

12.2 Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
12.2.1 Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

12.2.2 Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

12.3 Openings: Cut and trim openings through doors in factory.
12.3.1 Light Openings: Trim openings with moldings of material and profile indicated.

12.3.2 Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

13. FACTORY FINISHING

13.1 General
Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
13.1.1 Finish faces, all 4 edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

13.2 Finish doors at factory.

13.3 Transparent Finish
13.1 Grade: Custom

13.2 Finish: AWI conversion varnish or catalyzed polyurethane system

13.3 Staining: As selected by Architect from manufacturer's full range

13.4 Sheen: Satin

PART 3 – EXECUTION

14. EXAMINATION

14.1 Examine doors and installed door frames before hanging doors.
14.1.1 Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

14.1.2 Reject doors with defects.

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

15. INSTALLATION

15.1 Hardware: For installation, see Division 08 Section "Door Hardware."

15.2 Installation Instructions
Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

15.3 Job-Fitted Doors
Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

15.3.1 Clearances: Provide 1/8-inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4-inch from bottom of door to top of threshold unless otherwise indicated.

A. Comply with NFPA 80 for fire-rated doors.

15.3.2 Bevel non-fire-rated doors 1/8-inch in 2 inches at lock and hinge edges.

15.3.3 Bevel fire-rated doors 1/8-inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

15.4 Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

15.5 Factory-Finished Doors
Restore finish before installation if fitting or machining is required at Project site.

16. ADJUSTING

16.1 Operation: Rehang or replace doors that do not swing or operate freely.

16.2 Finished Doors
Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

End of Section 081416

SECTION 083000

STORM DOORS

PART 1 – GENERAL

1. WORK INCLUDED

The work under this section shall include the furnishing of all items shown on the drawings and as specified including, but not limited to, the following:
Steel Door(s) and Frames(s)

2. REFERENCES

Steel Doors and Frames in this section must meet all standards as established by the following listing.

2.1.1 Door and Hardware Preparation ANSI 115

2.1.2 Life Safety Codes NFPA-101 (Latest edition)

2.1.3 Fire Doors and Windows NFPA-80 (Latest edition)

2.1.4 Steel Door Institute ANSI/SDI-100 (Latest edition)

2.1.5 Underwriters Laboratories UL10B fire testing

2.1.6 FEMA 361 Design and Construction Guidance for Community Shelters

3. SUBMITTAL

3.1 Coordinate approved shop drawings with all other trades and manufacturers whose products are used in conjunction with the Steel Doors and Frames under section 08100.

3.2 Doors and Frames will be prepared for (only) specific hardware as tested by system manufacturer.

3.3 The steel door and frame supplier will furnish to the architect (4) complete copies of the proposed steel door and frames schedule and/or shop drawings. Using the same reference number for details and openings as those on the contract drawings. After receipt of the approved door schedule the steel door and frame supplier will make any corrections and submit to the architect six (6) sets of corrected schedules.

3.4 Upon request of the architect four (4) copies of the steel door & frame manufacturers catalog cut sheets are to be submitted to the architect before any material is placed on the job site.

4. QUALITY ASSURANCE

4.1 Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest edition).

4.2 Steel Doors and frames shall be manufactured to high quality standards in manufacturing facilities with annual certified conformance to ISO9001.

5. DELIVERY, STORAGE AND HANDLING

5.1 Doors and frames must be properly marked with door opening mark number to correspond with the schedule.

5.2 Deliver all steel doors with corrugated edge protection and palletized to provide protection during transit and job storage.

5.3 Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the repair is equal to new work and acceptable to the architect.

5.4 Store doors and frames at the job site under cover. Place units on wood sills on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters, which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a ¼ inch space between stacked doors to promote air circulation.

PART 2 – PRODUCTS

6. ACCEPTABLE PRODUCTS

6.1 Steelcraft Paladin PW Series Flush Tornado Doors as manufactured by Allegion US,
Or approved equal meeting the following specifications:
SDI or NAAMM members that conform to the specific requirements of Paragraph 2 of this specification.

6.2 Manufacturer:
Allegion US, 11819 N Pennsylvania St, Carmel, IN 46032; phone: 317-810-3700.

7. STEEL DOORS AND FRAMES FOR SHELTER ENTRY

7.1 Shelter entry doors and their frames shall resist the design wind pressures for components and cladding as described in section 1 and the missile impact loads of Section 2 of the National Performance Criteria for Tornado Shelters Federal Emergency Management Agency Mitigation Directorate, latest edition. Only single opening and paired opening doors, and their frames, that can resist calculated design wind pressures and laboratory tested missile impacts are acceptable.

7.2 All doors shall have sufficient points of connection to their frame to resist design wind pressure and impact loads. Unless specifically designed for, each door shall be attached to their frame with a minimum six points of connection.

7.3 A protective missile resistant barrier is permitted to protect the door opening. The door should then be designed to resist wind pressures. The size and number of shelter doors shall be determined in accordance with applicable fire safety and building codes. In the event the community where the shelter is to be located has not adopted current fire safety and building codes, the requirements of the most recent editions of a model fire safety and a building code shall be used.

8. HARDWARE LOCATIONS AND GENERAL REINFORCEMENTS

8.1 Locate hardware on doors and frames in accordance with the system manufacturer's specific location.

8.2 Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.

8.3 Doors shall be mortised, reinforced and function holes provided at the factory in accordance with the hardware schedule and templates provided by the hardware supplier. Through bolt holes, attachment holes, or drilling and tapping for surface hardware, shall be done by others in the field.

9. MATERIAL

9.1 Sheets are to be made of commercial quality hot dipped zinc coated steel that complies with ASTM A924 A60.

9.2 Vertical edges will join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground and filled to make them invisible and provide a smooth flush surface.

9.3 Hinge reinforcement to be not less than 7 gage (3/16") plate 1-1/4 inch X 9 inches prepared for 4-1/2 x 4-1/2 x .180 hinges.

9.4 Reinforce tops and bottoms of all doors with an inverted continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet. Doors shall have a steel closure channel welded in place so the web of the channel is flush with the top of the face sheets of the door. Plastic fillers are NOT acceptable.

9.5 Door Performance

9.5.1 Doors are to be completely filled with 2.0 density rigid foamed-in-place polyurethane core chemically bonded to all interior surfaces with a minimum insulation value of R9.

9.5.2 Door systems, both single doors and paired openings, shall be tested and must comply with the FEMA 361 Design and Construction Guidance for Community Shelters and have available verifiable third-party conformance test results.

10. STEEL FRAMES

10.1 Materials

10.1.1 To be 14 gage hot dipped zinc coated steel that complies with ASTM designations A924 A60.

10.1.2 All frames are to be assembled so that the face miter seam is "closed and tight". Weld the face seam, grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.

10.1.3 Frame assembly for both single doors and paired openings, shall be tested and must comply with the FEMA 361 Design and Construction Guidance for Community Shelters and have available verifiable third-party conformance test results.

10.2 Fabrication

10.2.1 Provide steel frames for doors to the size and design as shown on the architectural drawings.

10.2.2 All finished work shall be strong and rigid, neat in appearance, square, true, and free of defects.

10.2.3 Jamb depths, trim, profile and backbends to be as scheduled and shown on approved shop drawings.

10.2.4 Hardware reinforcements shall be in accordance with the minimum standard gages as listed in SDI-100.

10.2.5 Frames shall be mortised, reinforced, drilled, and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template provided by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only, all drilling and tapping to be done in the field by others.

10.2.6 Hinge reinforcement to be not less than 7 gage (3/16") plate prepared for 4-1/2 x 4-1/2 x .180 hinges.

10.3 Anchors

10.3.1 Anchors for masonry walls to be of the masonry "T" type. Quantity of anchors installed as required for system performance.

10.3.2 Dust boxes/mortar guards to be no less than 26 gage.

10.3.3 All frames that are to be welded are to have a steel spreader during shipping and handling. Spreader bars are for bracing only and are not be used to size the frame opening.

10.3.4 Punch the stop for three (3) silencers on single door and two (2) on double door frames.

11. LABELED DOORS AND FRAMES

11.1 Construct and install doors and frames to comply with current issue of National Fire Protection Association (NFPA) Standard Number 80, as herein specified.

11.2 Doors and/or frames for labeled openings shall bear an applied label from Underwriters Laboratory.

11.3 All doors and frames are to have been tested in accordance with UL 10B Fire test of Door Assemblies and UL10C Standard for Positive Pressure Fire Tests of Door Assemblies

12. PRIME FINISH

Doors and frames are to be cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The finish to meet the requirements for acceptance stated in ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces." The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of paint to be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

PART 3 – EXECUTION

13. INSPECTION

13.1 It is the responsibility of the General Contractor to make sure that all dimensions for existing opening or existing frames (strike height, hinge spacing, hinge back set, etc.) given to the steel door and frame manufacturer are accurate.

13.2 It is the responsibility of the General Contractor to assure that scratches or disfigurements caused in shipping or handling are properly cleaned and touched up with a rust inhibitive primer.

14. INSTALLATION

14.1 Frames

14.1.1 Prior to installation, all frames must be checked for rack, twist and out of square conditions.

14.1.2 Fill frame jambs and head with mortar and install per manufacturer's specific system installation instructions.

14.1.3 SDI-105, "Recommended Erection Instructions for Steel Frames" and SDI-110 "Standard Steel Doors and Frames for Modular Masonry Construction" shall indicate the proper installation procedures.

14.2 Doors

14.2.1 Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.

14.2.2 Proper door clearance must be maintained in accordance with SDI-110, maximum door undercut shall be 3/8 inch.

14.2.3 Where necessary, only metal hinge shims are acceptable to maintain clearances.

14.2.4 Install Doors per manufacturer's specific system installation instructions.

14.2.5 "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.

14.3 Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

End of Section 08300

SECTION 083113

ACCESS DOORS AND FRAMES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes access doors and frames for walls and ceilings.

2.2 Related Sections include the following:

2.2.1 Division 09 Section "Non-Structural Metal Framing" for metal stud framing and suspended framing for gypsum board assemblies.

2.2.2 Division 09 Section "Gypsum Board" for gypsum board assemblies installed over non-structural metal framing.

2.2.3 Division 09 Section "Acoustical Panel Ceilings" for suspended acoustical ceilings and grids.

3. SUBMITTALS

3.1 Product Data

For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

3.2 Shop Drawings

Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

3.3 Access Door and Frame Schedule

Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

4. QUALITY ASSURANCE

4.1 Source Limitations

Obtain each type of access door(s) and frame(s) through one (1) source from a single manufacturer.

4.2 Fire-Rated Access Doors and Frames

Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

4.2.1 NFPA 252 or UL 10B for vertical access doors and frames.

4.2.2 ASTM E119 or UL 263 for horizontal access doors and frames.

4.3 Size Variations
Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

5. COORDINATION

5.1 Verification
Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work.

5.2 All valves, damper controls, adjusting devices, and all other items and devices requiring adjustment or service shall be accessible by access doors.

5.2.1 General Contractor shall verify required locations and sizes with Mechanical Contractor, Fire Protection Contractor, Electrical Contractor and other trades and shall provide access doors at all required locations.

5.2.2 Indicate locations and sizes in the schedule specified in "Submittals" Article.

PART 2 – PRODUCTS

6. STEEL MATERIALS

6.1 Steel Plates, Shapes, and Bars
ASTM A36/A36M.

6.1.1 ASTM A123/A123M, for galvanizing steel and iron products.

6.1.2 ASTM A153/A153M, for galvanizing steel and iron hardware.

6.2 Metallic-Coated Steel Sheet
ASTM A653/A653M, Commercial Steel (CS) with A60 zinc iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A924/A924M.

6.3 Steel Finishes
Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

6.3.1 Surface Preparation for Metallic-Coated Steel Sheet
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 A780.

A. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

6.3.2 Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.

6.4 Drywall Beads
Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

6.5 Plaster Beads
Casing bead formed from 0.0299-inch zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster.

7. ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

7.1 Manufacturers
Subject to compliance with requirements, provide products by one (1) of the following:
- 7.1.1 Babcock-Davis; A Cierra Products Co.
- 7.1.2 J. L. Industries, Inc.
- 7.1.3 Larsen's Manufacturing Company
- 7.1.4 Milcor Inc.
- 7.1.5 Nystrom, Inc.

7.2 Flush Access Doors and Frames with Exposed Trim
Fabricated from metallic-coated steel sheet
- 7.2.1 Locations: Wall and ceiling surfaces
- 7.2.2 Door: Minimum 0.060-inch-thick sheet metal, set flush with exposed face flange of frame
- 7.2.3 Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim
- 7.2.4 Hinges: Continuous piano
- 7.2.5 Latch: Self-latching bolt operated by hex-head wrench with interior release

7.3 Flush Access Doors and Trimless Frames
Fabricated from metallic-coated steel sheet
- 7.3.1 Locations: Wall and ceiling surfaces
- 7.3.2 Door: Minimum 0.060-inch-thick sheet metal, set flush with surrounding finish surfaces
- 7.3.3 Frame: Minimum 0.060-inch-thick sheet metal with drywall or plaster bead flange as applicable
- 7.3.4 Hinges: Continuous piano
- 7.3.5 Latch: Self-latching bolt operated by hex-head wrench with interior release

7.4 Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim
Fabricated from metallic-coated steel sheet.

7.4.1 Locations: Wall and ceiling surfaces

7.4.2 Fire-Resistance Rating: Not less than that of adjacent construction

7.4.3 Temperature Rise Rating: 250 degrees F at the end of 30 minutes

7.4.4 Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036-inch

7.4.5 Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim

7.4.6 Hinges: Continuous piano

7.4.7 Automatic Closer: Spring type

7.4.8 Latch: Self-latching device operated by flush key with interior release

7.5 Fire-Rated, Insulated, Flush Access Doors and Trimless Frames
Fabricated from metallic coated steel sheet.

7.5.1 Locations: Wall and ceiling surfaces

7.5.2 Fire-Resistance Rating: Not less than that of adjacent construction

7.5.3 Temperature Rise Rating: 250 degrees F at the end of 30 minutes

7.5.4 Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036-inch

7.5.5 Frame: Minimum 0.060-inch-thick sheet metal with drywall or plaster bead as Applicable

7.5.6 Hinges: Continuous piano

7.7.7 Automatic Closer: Spring type

7.7.8 Latch: Self-latching device operated by flush key with interior release

8. FABRICATION

8.1 General
Provide access door and frame assemblies manufactured as integral units ready for installation.

8.2 Metal Surfaces
For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

8.3 Doors and Frames
Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

8.3.1 Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.

8.3.2 For trimless frames with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.

8.3.3 For trimless frames with plaster bead for full-bed plaster applications, provide zinc coated expanded metal lath and exposed casing bead welded to perimeter of frames.

8.3.4 Provide mounting holes in frames for attachment of units to metal framing.

8.4 Latching Mechanisms
Furnish number required to hold doors in flush, smooth plane when closed.

PART 3 – EXECUTION

9. INSTALLATION

9.1 Comply with manufacturer's written instructions for installing access doors and frames.

9.2 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

9.3 Install doors flush with adjacent finish surfaces or recessed to receive finish material.

10. ADJUSTING AND CLEANING

10.1 Adjust doors and hardware after installation for proper operation.

10.2 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

End of Section 083113

SECTION 083300

COILING OVERHEAD FIRE DOORS

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

2. SUMMARY

2.1 Section Includes

Motorized, Overhead, Coiling, Fire Doors, to be installed at serving kitchen counters. Refer to Drawings.

2.1.1 The units shall be motorized with a fuseable link.

2.1.2 The units shall be tied to and activate from the Fire Alarm.

2.1.3 The units shall provide a minimum 1-hour Fire Rating.

2.1.4 The units shall include a cover, and a concealed housing unit.

2.1.5 The units shall be a lockable unit.

2.1.6 The Overhead Coiling Fire Doors are as shown on drawings. Refer to drawings. Field verify all opening measurements prior to fabrication.

2.2 Related Sections

A. 06100 – Rough Carpentry: Door opening jamb and head members

B. 08700 – Hardware

3. SUBMITTALS

Reference Section – 01300 Submittal Procedures; submit the following items:

3.1 Product Data

3.2 Shop Drawings

Include special conditions not detailed in Product Data. Show interface with adjacent work.

3.3 Quality Assurance / Control Submittals

Manufacturer's Installation Instructions

3.4 Closeout Submittals

A. Operation and Maintenance Manual

B. Certificate stating that installed materials comply with this specification

4. QUALITY ASSURANCE

4.1 Qualifications

A. Manufacturer Qualifications
Minimum five years' experience in producing doors of the type specified

B. Installer Qualifications
Approval by Manufacturer.

5. DELIVERY STORAGE AND HANDLING

Follow manufacturer's instructions.

6. WARRANTY

Standard Warranty: One year against defects in material and workmanship

PART 2 – PRODUCTS

7. APPROVED MANUFACTURERS

7.1 Cornell Cookson, LLC, 24 Elmwood Avenue, Mountain Top, PA 18707
Telephone: (800) 233-8366, or the approved equal.

Distributor: Overhead Door Company, 3506 West Harry, Wichita, KS 67213
Phone: (316) 710-6512

8. MATERIALS

8.1 Rolling Counter Doors: 22 gauge – refer to drawings

8.2 Curtain

A. Slats: No. 1F, interlocked flat-faced slats, 1-1/2 inches (38 mm) high by 1/2 inch (13 mm) deep, 22-gauge galvanized steel with plain steel bottom bar with lift handle(s) and vinyl astragal.

B. Fabricate interlocking sections with high strength galvanized steel end-locks riveted slats per UL requirements.

C. Slat Finish: Phosphate treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, minimum 32 colors, or custom color as selected by Architect; minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better

8.3 Guides
Steel: 12 Gauge formed shapes

8.4 Counterbalance Shaft Assembly

A. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width

B. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. (110 N). Provide wheel for applying and adjusting spring torque.

8.5 Brackets
Fabricate from reinforced steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.

8.6 Hood and mechanism covers
24-gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4-inch (6 mm) steel intermediate support brackets as required to prevent excessive sag.

8.7 Smoke Seals
Bottom Bar: UL Tested PVC double bulb seal 2. Guides and Head: Replaceable UL Listed nylon pile sealing against fascia side of curtain.

9. ACCESSORIES

Locking – Manual Crank Hoist
Padlock-able slide bolt on coil side of bottom bar at each jamb extending into slots in guides.

10. OPERATION

Motorized Crank Hoist
The units shall be motorized with crank hoist operators including crank gear box, steel crank drive shaft and geared reduction unit. Fabricate gearbox to completely enclose operating mechanism and be oil tight.

10.1 Activation: Melting of fusible link.

10.2 Motorized:
A. Provide key activation with the units.
B. Tie to fire alarm.

10.3 Average Closing Speed: Not less than 6 inches (150 mm) nor more than 24 inches (600 mm) per second.

10.4 Reset Procedure: Reset spring tension and mechanical dropouts; replace fusible link.

PART 3 – EXECUTION

11. EXAMINATION

11.1 Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

11.2 Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

11.3 Commencement of work by installer is acceptance of substrate.

11.4 **Field verify all openings before fabrication**.

12. INSTALLATION

12.1 General
Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports, **with full height of guides.**

12.2 Follow manufacturer's installation instructions.

13. ADJUSTING

Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

14. CLEANING

14.1 Clean surfaces soiled by work as recommended by manufacturer.

14.2 Remove surplus materials and debris from the site.

15. DEMONSTRATION

15.1 Demonstrate proper operation to Owner's Representative.

15.2 Instruct Owner's Representative in maintenance procedures.

End of Section 083300

SECTION 084000

STOREFRONTS

PART 1 – GENERAL

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

2. WORK INCLUDED

2.1 Furnish all necessary materials, labor, and equipment for the complete installation of aluminum framing as shown on the drawings and specified herein.

2.2 Structural support of the framing system, interior closures, trim, and metal sub-sills are not included in this section.

2.3 Sealants as required to maintain environmental separation as specified herein.

3. RELATED WORK SPECIFIED ELSEWHERE

3.1 Section 08520 – Aluminum Windows

3.2 Section 08700 – Finish Hardware. Refer for required hardware and templating.

3.3 Section 08800 – Glass and Glazing

4. QUALITY ASSURANCE

4.1 Drawings and specifications of the storefront are based upon the 1450 Series, 7041 Series, 250 series supplied by Manko Window Systems, 800 Hays Drive, Manhattan, Kansas; phone: 1-800-642-1488. Refer to sheet A.3.2

4.2 Whenever substitute products are to be considered, supporting technical literature, samples, drawings and performance data must be submitted five (5) days prior to bid in order to make a valid comparison of the products involved. Test reports certified by an independent test laboratory must be made available upon request.

4.3 Approved Manufacturers

EFCO	United States Aluminum Co, Inc.
Manko	Vista Wall
PPG Industries	

5. SUBMITTALS

5.1 Shop Drawings
Submit Shop Drawings and Manufacturer's Data for the following items in accordance with Section 013300 – Submittal Procedures.

5.2 Provide shop drawings showing sizes and details of installation prior to shipping window units to project. All dimensions and details shall be the responsibility of the installer and the manufacturer.

5.2.1 Entrances and storefronts, including details of all conditions for every member, joint, anchorage and glazing. Prepare anchorage details so that entrance and storefront

elements tie into structural system of the building. Prepare coordination details and erection diagrams. Indicate glass and metal thicknesses. Identify materials including metal alloys, glass types, glazing materials, fasteners. Identify shop and field sealants by product name and type. Indicate relative layout of adjacent walls, beams, columns, slabs, anchors, and other parts of the building structural system intended for support of the storefront design loads. Dimension position of glass edge relative to metal daylight. Indicate provisions for expansion and contraction. Indicate and schedule hardware, including manufacturer's name, catalog numbers and finish.

6. DELIVERY, STORAGE AND HANDLING

6.1 Delivery of Materials
Deliver materials (except bulk materials) in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size, and color.

6.2 Storage of Materials
Store materials in unopened containers. Store off ground and under cover protected from damage.

6.3 Handling Materials
Handle glass in accordance with manufacturer's recommendations. Provide cushions at edges to prevent impact damage. Protect faces from scratches and abrasions.

7. PROJECT CONDITIONS

Environmental Requirements: Do not install materials during inclement weather or when the temperature is below the minimum recommended by the manufacturer. Do not install sealants when extreme temperature conditions or heavy winds are predicted during the period of initial cure.

8. SEQUENCING/SCHEDULING

Schedule the installation of sealants during period of mean temperature (nominal joint width indicated) so that subsequent tensile and compressive stresses within the cured sealant will be minimized.

9. ALTERNATES

Refer to Section 01030 – Alternates where scope and description of alternates to the Contract requirements are given.

10. WARRANTY

Warrant entrances and storefronts against leaks or other defects for a period of 2 years.

11. PERFORMANCE REQUIREMENTS

11.1 Window Wall

11.1.1 When tested in accordance with ASTM E 283, air infiltration shall not exceed .06 CFM per square foot (.0003 $m^3/s\text{-}m^2$) of fixed area.

11.1.2 When tested in accordance with ASTM E 331, no water penetration at a test pressure of 6.24 P.S.F. (75 Pa).

11.1.3 Structural performance shall be based on

A. Maximum deflection of 1/175 of the span and

B. Allowable stress with a safety factor of 1.65.

11.1.4 The system shall perform to these criteria under a wind load of 25 PSF as per 1991 U.B.C.

11.2 Windows

11.2.1 Air, Water and structural test unit sizes and configuration shall conform to requirements set forth in ANSI/AAMA 101-88.

11.2.2 Thermal test unit sizes shall be 4 x 6 foot. Unit shall consist of a single typical vent.

11.2.3 Test procedures and performance:
A. Windows shall conform to all ANSI/AAMA 101-88 requirements.

11.2.4 Thermal transmittance test: Conductive U-Value

PART 2 – PRODUCTS

12. MATERIALS

12.1 Storefront

Aluminum Framing: Equal to the 7041 Series, 250 series, supplied by Manko Window Systems, Storefront Framing, or the approved equal.

12.1.1 Extrusions shall be 6063-T5 alloy and temper (ASTM B 221 alloy G.S. 10A-T5). Fasteners, where exposed, shall be aluminum, stainless steel or zinc plated steel in accordance with ASTM A 164-71. Perimeter anchors shall be aluminum or steel, providing the steel is properly insulated from the aluminum. Vertical Mullions shall be of sufficient strength to meet job requirements.

12.1.2 The interior glazing gasket shall be a resilient elastomer of 70 + or - 5 durometer. All mullions shall have a glazing gasket of elastomeric extrusions and sealant to be structural type silicone as recommended by the sealant manufacturer. Horizontals shall have flexible (PVC) thermal break material located on exterior side of glass plane. Exterior glazing shall be EDPM secured by extended aluminum pressure plates fastened to main horizontal grid members (synthetic polymer tape optional exterior glazing). Provisions shall be made at all sealed horizontals to lead moisture accumulation to exterior.

12.1.3 A cover shall be snapped over pressure plate to show only a sharp radiused, uninterrupted horizontal exterior profile.

12.1.4 Glazing

Vertical members of the curtain wall grid shall permit the application of a structural silicone sealant. The sealant, backer rod and other materials that come in contact with the silicone shall be compatible. The sealant manufacturer's instructions shall be followed.

12.1.5 The storefront is to be supported (vertically and horizontally) by the structural columns and vertical and horizontal mullions designed and detailed on the Drawings.

12.1.6 The manufacturer shall review and approve the system designed providing any and all additional engineering, miscellaneous components and reinforcing, required for a complete installation of the curtain wall system.

12.2 Doors

12.2.1 Exterior grid framing system for glazed walls shall be 1-3/4 x 4-1/2 inch flush glazing system with glazing vinyl on both sides of glass; components shall be equal "350" doors (wide style - single acting) as manufactured by Manko or those by Amarlite or those by Howmet or the approved equal.

12.2.2 Aluminum doors shall be equal to medium style tubular section and snap-in stop with bulb-type glazing neoprene. The hardware is specified in Section 08700. For these doors this supplier shall fabricate the doors to accommodate the specified hardware.

12.2.3 The aluminum sections shall be given a caustic etch followed by an anodic treatment to produce a high-density aluminum oxide coating of dark bronze, where noted.

12.2.4 Storefront System Manufacturer will be responsible for detailing and sizing of frame.

12.2.5 Extruded aluminum shall be 6063-T5 alloy and tempered.

12.2.6 Weather-strip shall be Santoprene or equal and closed cell sponge neoprene leaf on the pivot.

12.3 Glass and Glazing
Window manufacturer furnish and factory glaze the units with 1-inch insulated glazing, tinted grey. Refer to specification section 08800 Glass & Glazing.

12.4 Thermal Barrier
Barrier material shall be poured-in-place two-part polyurethane. A non-structural thermal barrier is unacceptable.

12.5 The door manufacturer under Section 08700 shall furnish all hardware.

13. FINISH

13.1 All exposed framing surfaces shall be free of scratches and other blemishes.

13.2 Aluminum mullions, all molding, trim and exposed flashing shall be Architectural Class II anodized AAM12C22A42/44. Color shall be "Dark Bronze".

PART 3 – EXECUTION

14. INSTALLATION

Window Wall

14.1 Framing shall be installed, glazed and adjusted by experienced workmen in accordance with the manufacturer's installation instructions and/or approved shop drawings.

14.2 All items under this heading shall be set in correct locations as shown in the details and shall be level, square and plumb and in alignment with other work in accordance with the manufacturer's installation instructions and approved shop drawings. All joints between framing and the building structure shall be sealed in order to secure a watertight installation.

14.3 Do not use exposed fasteners.

15. CLEANING AND PROTECTION

15.1 After installation all metal surfaces shall be cleaned to remove mortar, plaster, paint or other contaminants. After cleaning, all work shall be protected against damage until the General Contractor accepts it. Thereafter, it shall be the responsibility of the General Contractor to maintain protection and provide final cleaning.

15.2 After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the General Contractor.

16. WARRANTIES

Total Window System

16.1 The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.

16.2 Any deficiencies due to such elements not meeting the specifications shall be corrected by the contractor at his expense during the warranty period.

End of Section 084000

SECTION 084413

GLAZED ALUMINUM CURTAIN WALLS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following aluminum framing systems:
Glazed aluminum curtain wall, stick system installation (Basis-of-Design: Kawneer 1600 Wall Systems).

2.2 Related Sections: The following Sections contain requirements that relate to this Section:

2.2.1 Division 07 Section "Joint Sealants" for joint sealants installed as part of glazed aluminum curtain wall system.

2.2.2 Division 08 Section "Aluminum Entrances and Storefronts" for doors installed with glazed aluminum curtain walls.

2.2.3 Division 08 Section "Glazing" for insulating-glass requirements.

3. SYSTEM DESCRIPTION

3.1 General
Provide glazed aluminum curtain wall system that has the following capabilities based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:

3.1.1 Withstands loads and thermal and structural movement requirements indicated without failure. Failure includes the following:

A. Air infiltration and water penetration exceeding specified limits.

B. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.

3.2 Glazing is physically and thermally isolated from framing members.

3.3 System is reglazable from the exterior.

3.4 Wind Loads
Provide glazed aluminum curtain wall system, including anchorage, capable of withstanding wind-load design pressures as indicated on Structural Drawings, calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

3.4.1 Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4-inch, whichever is smaller, unless otherwise indicated.

3.4.2 Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass, or other fixed member immediately below to less than an inch.

3.4.3 Test Performance: Provide glazed aluminum curtain wall system that does not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E330.

A. Test Pressure: 150 percent of inward and outward wind-load design pressures.

B. Duration: As required by design wind velocity; fastest one (1) mile of wind for relevant exposure category.

3.5 Air Infiltration

Provide glazed aluminum curtain wall system with permanent resistance to air leakage through system of not more than 0.06-cfm/sq. ft. of fixed wall area when tested according to ASTM E283 at a static-air-pressure difference of 6.24 lbf/sq. ft.

3.6. Water Penetration

System shall meet a water test with no uncontrolled leakage at 15 psf pressure differential with a water rate of 5 gallons/hr/sq. ft. when tested in accordance with ASTM E331-86. Water penetration is defined as follows:

3.6.1 Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

3.7 Thermal Movements

Provide glazed aluminum curtain wall system, including anchorage, that accommodates thermal movements of system and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, noise or vibration, and other detrimental effects.

3.7.1 Temperature Change (Range): -10 degrees F to +120 degrees F.

3.8 Structural Support Movement

Provide glazed aluminum curtain wall system that accommodates structural movements including, but not limited to, sway, twist, column shortening, long-term creep, and deflection for the following Structural Loads:

3.8.1 Wind Loads:
- A. Basic Wind Speed: 115 mph
- B. Importance Factor: 1.0
- C. Exposure Category: C
- D. Basic Velocity Pressure: 30.6 psf (at 45 feet)

3.8.2 Seismic Loads: As indicated on Drawings.

3.9 Condensation Resistance
Provide glazed aluminum curtain wall system with condensation resistance factor (CRF) of not less than 55 when tested according to AAMA 1503.1.

3.10 Average Thermal Conductance
Provide glazed aluminum curtain wall system with an average U value of not more than 0.58-Btu/sq. ft. x h x degree F when tested according to AAMA 1503.1.

3.11 Dimensional Tolerances
Provide glazed aluminum curtain wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.

4. SUBMITTALS

4.1 Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

4.2 Shop Drawings showing fabrication and installation of glazed aluminum curtain wall system including plans, elevations, sections, details of components, and attachments to other units of Work.

4.2.1 For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

4.3 Samples for initial selection in the form of manufacturer's color charts showing the full range of colors available for components with factory-applied color finishes.

4.4 Samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

4.5 Cutaway Sample of each vertical-to-horizontal intersection of system, made from 12-inch lengths of full-size components and showing details of the following:

4.5.1 Joinery

4.5.2 Anchorage

4.5.3 Expansion provisions

4.5.4 Glazing

4.5.4 Flashing and drainage

4.6 Installer certificates signed by manufacturer certifying that installers comply with requirements in "Quality Assurance" Article.

4.7 Product test reports from a qualified independent testing agency evidencing compliance of glazed aluminum curtain wall system with requirements based on comprehensive testing by the testing agency within the last 3 years' current production of the system by the manufacturer.

4.8 Preconstruction Sealant Test Report
Compatibility and adhesion test reports from sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with sealants; include sealant manufacturer's interpretation of test results for sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.

4.9 Product Test Reports
Based on evaluation of comprehensive tests performed by a qualified testing agency, for structural-sealant-glazed curtain-wall systems.

5. QUALITY ASSURANCE

5.1 Professional Engineer Qualifications
A professional engineer who is legally qualified to practice in the 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 glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.

5.2 Installer Qualifications
Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing glazed and structural-sealant-glazed aluminum curtain wall systems similar to those required for this Project and who is acceptable to manufacturer.

5.3 Source Limitations
Manufacturer of glazed and structural-sealant-glazed aluminum curtain wall system shall be same manufacturer selected for aluminum entrances, storefronts and windows as specified in Section 084113 "Aluminum-Framed Entrances and Storefronts." Provide glazed and structural-sealant-glazed aluminum curtain wall system from 1 source from a single manufacturer.

6. PROJECT CONDITIONS

Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

6.1 Verify actual locations of structural-sealant-glazed-curtain wall systems and structural supports for structural-sealant-glazed-curtain wall system by field measurement before fabrication and indicate measurements on Shop Drawings.

7. WARRANTY

7.1 General Warranty

The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

7.2 Special Warranty

Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

- 7.2.1 Structural failures including, but not limited to, excessive deflection
- 7.2.2 Noise or vibration caused by thermal movements
- 7.2.3 Failure of system to meet performance requirements
- 7.2.4 Deterioration of metals, metal finishes, and other materials beyond normal weathering
- 7.2.5 Failure of operating components to function normally
- 7.2.6 Water leakage
- 7.2.7 Glazing breakage

7.3. Warranty Period: 2 years from date of Substantial Completion.

PART 2 – PRODUCTS

8. MANUFACTURERS

Basis-of-Design Product: The design for stick built glazed and structural-sealant-glazed curtain wall systems is based on "1600 Wall System," Kawneer North America; an Alcoa company.

9. MATERIALS

9.1 Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.

- 9.1.1 Sheet and Plate: ASTM B209-00.
- 9.1.2 Extruded Bars, Rods, Shapes, and Tubes: ASTM B221 M-00.
- 9.1.3 Extruded Structural Pipe and Tubes: ASTM B429-00.

9.2 Steel Reinforcement: ASTM A36 for structural shapes, plates, and bars; ASTM A1008-01 for cold rolled sheet and strip; or ASTM A1011 for hot-rolled sheet and strip.

9.3 Glazing as specified in Division 08 Section "Glazing."

9.4 Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; in hardness recommended by manufacturer.

9.5 Glazing sealants and fillers as specified in Division 08 Section "Glazing."

9.6 Framing system gaskets and joint fillers as recommended by manufacturer for joint type.

9.7. Sealants and joint fillers for joints within glazed aluminum curtain wall system and for joints at the interface of curtain wall construction and other work, as specified in Division 07 Section "Joint Sealants."

9.8 Aluminum brake metal; configured as detailed and required as follows:

9.8.1 Minimum 0.040-inch-thick brake metal for standard applications, drain pans, flashings, etc.

9.8.2 Minimum 0.0938-inch-thick brake metal for corners and covers 12 inches and wider.

9.9 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil thickness per coat.

10. COMPONENTS

10.1 Brackets and Reinforcements: Provide manufacturer's standard high-strength aluminum brackets and reinforcements. Provide nonstaining, nonferrous shims for aligning system components.

10.2 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Finish exposed portions to match glazed aluminum curtain wall.

10.2.1 At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.

10.2.2 Where fasteners anchor into aluminum less than 0.125-inch thick, provide reinforcement to receive fastener threads.

10.2.3 Use exposed fasteners with countersunk Phillips screw heads finished to match framing members, unless otherwise indicated.

10.3 Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

10.4 Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing, compatible with adjacent materials, and of type recommended by manufacturer.

11. FABRICATION

11.1 General: Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

11.2 Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

11.3 Prepare components to receive concealed fasteners and anchor and connection devices.

11.4 Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

11.5 Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."

11.6 Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

11.7 Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

12. ALUMINUM FINISHES

12.1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

12.2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

12.3 Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

12.4 Clear Anodic Finish or Dark Bronze Finish, as selected by Architect.

PART 3 – EXECUTION

13. EXAMINATION

Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of glazed aluminum curtain wall system. Do not proceed with installation until unsatisfactory conditions have been corrected or accommodations acceptable to Architect have been made.

14. INSTALLATION

14.1 General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.

14.2 Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

14.3 Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

14.4 Install framing members plumb and true, in alignment with established lines and grades.

14.5 Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.

14.5.1 Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

14.6 Install glazing according to Shop Drawings. Comply with requirements of Division 08 Section "Glazing," unless otherwise indicated.

14.7 Install sealant according to Shop Drawings. Comply with requirements of Division 07 Section "Joint Sealants," unless otherwise indicated.

14.8 Erection Tolerances: Install glazed and structural-sealant-glazed aluminum curtain wall system to comply with the following maximum tolerances:

14.8.1 Plumb: 1/8-inch in 10 feet; 1/4-inch in 40 feet

14.8.2 Level: 1/8-inch in 20 feet; 1/4-inch in 40 feet

14.8.3 Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16-inch; where a reveal or protruding element separates aligned surfaces by less than 2 inches, limit offset to 1/2-inch

14.8.4 Location: Limit variation from plane or location shown on Shop Drawings to 1/8-inch in 12 feet; 1/2 inch over total length.

15. PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure glazed aluminum curtain wall system is without damage or deterioration at the time of Substantial Completion.

End of Section 084413

SECTION 085200

ALUMINUM WINDOWS

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

2. WORK INCLUDED

This Contractor shall furnish all labor and materials to provide and install fixed aluminum windows complete (finish shall be Dark Bronze) as required by the drawings and/or herein specified.

3. MATERIALS

Windows shall be Manko Series 2727i, thermal insulated, tinted, aluminum windows as supplied by Manko Window Systems, 800 Hayes Drive, Manhattan, KS 66502, phone: 785-776-9643 / 800-642-1488, email: info@mankowindows.com or Kawneer Series 3225 TLF.

3.1 Extruded aluminum shall be 6063-T5 alloy and tempered.

3.2 Hardware

3.2.1 Locking handles shall be cam type and manufactured from white bronze alloy with a US25D brushed finish.

3.2.2 Operating Arms

A. Projected Vents: Anderberg series 301 4-bar stainless steel arms or equal.

B. Casement vents as specified.

C. Pivots: Pivot mechanism shall be extruded aluminum housing with a stainless-steel pin.

D. Projected vents; Anderberg Series 301 4-Bar stainless steel arm.

3.2.3 Weather-strip shall be Santoprene or equal and closed cell sponge neoprene leaf on the pivot.

3.2.4 Windows shall be provided with metal mesh insect screens.

3.3 Glass and Glazing

Window manufacturers furnish and factory glaze the units with 1-inch insulated glazing with Low-E coating. Refer to specification Section 08800 – Glass & Glazing.

3.4 Thermal Barrier

Barrier material shall be poured-in-place two-part polyurethane. A non-structural thermal barrier is unacceptable.

3.5 All windows shall be provided with sub-sills flashing with end dams.

4. QUALITY ASSURANCE

4.1 Inspection and approval by Architect is required before window framing, flashing, and installation work is covered up.

4.2 Provide tests reports from AAMA accredited laboratories certifying the performance as specified.

4.3 Test reports shall be accompanied by the window manufacturer's letter of certification stating that the tested window meets or exceeds the referenced criteria for the appropriate ANSI/AAMA 101-88 window type.

4.4 Testing and Performance Requirements

4.4.1 Air, Water and structural test unit sizes and configuration shall conform to requirements set forth in ANSI/AAMA 101-88.

4.4.2 Thermal test unit sizes shall be 4 foot-0 inch x 6 foot-0 inch. Unit shall consist of a single typical vent.

4.5 Test Procedures and Performance

4.5.1 Windows shall conform to all ANSI/AAMA 101-88 requirements.

4.5.2 Air infiltration test
With window ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 1.25 psf.

Air infiltration shall not exceed .10 cfm per foot of perimeter crack length.

4.6 Water Resistance Test

4.6.1 With window ventilators closed and locked, test unit in accordance with ASTM E547 at a static air pressure difference of 9.0 psf.

4.6.2 There shall be no uncontrolled water leakage.

4.7 Uniform Load Structural Test

4.7.1 With window ventilators closed and locked, test unit in accordance with ASTM E330 at a static air pressure difference of 90 psf positive pressure and 90 psf negative pressure.

4.7.2 At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms, nor any other damage, which would cause the window to be inoperable.

4.8 Thermal Transmittance Test (Conductive U-Value)

4.8.1 With window ventilators closed and locked, test unit in accordance with AAMA 1503.1 -1988.

4.8.2 Conductive thermal transmittance shall not be more than .56 BTU/hr/sf/F.

4.8.3 Windows tested shall be glazed with no more than two lites of clear, uncoated, annealed glass. Sealed insulating glass shall be of a standard construction.

4.9 Condensation Resistance Test

4.9.1 With window ventilators closed and locked, test unit in accordance with AAMA 1503.1- 1988.

4.9.2 Condensation resistance factor shall not be less than 54.

5. FABRICATION

5.1 All aluminum frame and vent extrusions shall have a minimum wall thickness of .062 inch.

5.2 Mechanical fasteners, welded components and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and sash corners. Depth of frame and sash shall not be less than 2 inches.

5.3 Frame components shall be mortise and tenon. Other means of mechanically fastening shall not be permitted.

5.4 Vents

5.4.1 All vent extrusions shall be tubular.

5.4.2. Each corner shall be mitered, reinforced with an extruded aluminum corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.

5.4.3 Each vent shall have two rows of Santoprene weather-stripping installed in specifically designed dovetail grooves in the sash extrusion.

5.5 Glazing

5.5.1 All shop glazed units shall be wet glazed with a silicone back-bed compound and extruded aluminum glazing with vinyl gasket.

5.5.2 All field glazed units shall be glazed with butyl tape, silicone cap seal, extruded aluminum glazing bead and a dense neoprene drive-in wedge.

6. SHOP DRAWINGS

See Section 01300 – Submittals, of these specifications.

7. EXECUTION

7.1 Inspection

Job Conditions: verify that openings are dimensionally within allowable tolerance, plumb, level, clean, provide a solid anchoring surface and are in accordance with approved shop drawings.

7.2 Installation

7.2.1 Use only skilled tradesman with work done in accordance with approved shop drawings and specifications.

7.2.2 Plumb and align window faces in a single plane for each wall plane and erect windows and materials square and true adequately anchored to maintain positions permanently when subjected to normal thermal and building movement and specified wind loads.

7.2.3 Adjust windows for proper operation after installation.

7.2.4 Furnish and apply sealants to provide a weather-tight installation at all joints and intersections and at opening perimeters. Wipe of excess material and leave all exposed surfaces and joints clean and smooth.

7.3 Adjusting and Cleaning

After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the General Contractor.

8. WARRANTIES

8.1 Total Window System

8.1.1 The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.

8.1.2 Any deficiencies due to such elements not meeting the specifications shall be corrected by the contractor at his expense during the warranty period.

End of Section 085200

SECTION 087100

DOOR HARDWARE

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes commercial door hardware for the following:

2.1.1 Swinging doors

2.1.2 Other doors to the extent indicated

2.2 Door hardware includes, but is not necessarily limited to, the following:

2.2.1 Mechanical door hardware

2.2.2 Electromechanical door hardware

2.2.3 Automatic operators

2.2.4 Cylinders specified for doors in other sections

2.3 Related Sections:

2.3.1 Division 01 Section “General Conditions”

2.3.2 Division 06 Section “Rough Carpentry”

2.3.3 Division 06 Section “Finish Carpentry”

2.3.4 Division 08 Section “Operations and Maintenance”

2.3.5 Division 08 Section “Hollow Metal Doors and Frames”

2.3.6 Division 08 Section “Flush Wood Doors”

2.3.7 Division 08 Section “Aluminum-Framed Entrances and Storefronts”

2.3.8 Division 08 Section “Automatic Door Operators”

2.3.9 Division 26 Section “Electrical”

2.4 Codes and References

Comply with the version year adopted by the Authority Having Jurisdiction

2.4.1 ANSI A117.1 – Accessible and Usable Buildings and Facilities

2.4.2 ICC 500-2014/2020/2023, ICC/NSSA Standard for the Design and Construction of Storm Shelters

2.4.3 ICC/IBC – International Building Code

2.4.4 NFPA 70 – National Electrical Code

2.4.5 NFPA 80 – Fire Doors and Windows

2.4.6 NFPA 101 – Life Safety Code

2.4.7 NFPA 105 – Installation of Smoke Door Assemblies

2.4.8 UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.

2.4.9 State Building Codes, Local Amendments

2.5 Standards

All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

2.5.1 ANSI/BHMA Certified Product Standards – A156 Series

2.5.2 UL10C – Positive Pressure Fire Tests of Door Assemblies

2.5.3 ANSI/UL 294 - Access Control System Units

2.5.4 UL 305 – Panic Hardware

2.5.5 ANSI/UL 437- Key Locks

3. SUBMITTALS

3.1 Product Data

Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

3.2 Door Hardware Schedule

Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

3.2.1 Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule".

3.2.2 Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3.2.3 Content: Include the following information:

A. Type, style, function, size, label, hand, and finish of each door hardware item

B. Manufacturer of each item

C. Fastenings and other pertinent information

D. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule

E. Explanation of abbreviations, symbols, and codes contained in schedule

F. Mounting locations for door hardware

G. Door and frame sizes and materials

H. Warranty information for each product

3.2.3 Submittal Sequence
Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

3.3 Shop Drawings
Details of electrified access control hardware indicating the following:

3.3.1 Wiring Diagrams
Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

A. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.

B. Complete (risers, point-to-point) access control system block wiring diagrams.

C. Wiring instructions for each electronic component scheduled herein.

3.3.2 Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

3.4 Proof of Qualification
Provide copy of manufacturer(s) Factory Trained Installer documentation indicating proof of status as a qualified installer of tornado or hurricane storm shelter assemblies.

3.5 Keying Schedule
After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

3.6 Informational Submittals
Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

4. CLOSEOUT SUBMITTALS

4.1 Operating and Maintenance Manuals
Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

4.1.1 Maintenance manual must be provided for tornado/hurricane storm shelter impact protective systems.

4.2 Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

5. QUALITY ASSURANCE

5.1 Manufacturers Qualifications
Engage qualified manufacturers with a minimum five (5) years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

5.2 Certified Products
Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

5.3 Installer Qualifications
A minimum five (5) years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

5.4 Door Hardware Supplier Qualifications
Experienced commercial door hardware distributors with a minimum five (5) years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

5.5 Storm Shelter Impact Protective Assembly Installer Qualifications
Installers are to be factory trained for shop and field installation prior to project bid, and are responsible for commissioning, servicing, and warranting the installed equipment specified for the project. A pre-installation site inspection of the frame and floor conditions shall be conducted by the factory trained installer prior to any Storm Shelter Impact Protective assembly hardware applied to the opening.

5.6 Source Limitations
Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

5.6.1 Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

5.6.2 Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

5.7 Storm Shelter Openings: Provide complete door systems for hurricane or tornado resistant storm shelters and other areas of refuge complying and tested according to ICC 500 (2014/2020/2023), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

5.8 Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

5.9 Keying Conference
Conduct conference to comply with requirements in Division 01 Section “Project Meetings”. Keying conference to incorporate the following criteria into the final keying schedule document:

5.9.1 Function of building, purpose of each area and degree of security required

5.9.2 Plans for existing and future key system expansion

5.9.3 Requirements for key control storage and software

5.9.4 Installation of permanent keys, cylinder cores and software

5.9.5 Address and requirements for delivery of keys

5.10 Pre-Submittal Conference
Conduct coordination conference in compliance with requirements in Division 01 Section “Project Meetings” with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

5.10.1 Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

5.10.2 Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.

5.10.3 Review sequence of operation narratives for each unique access-controlled opening.

5.10.4 Review and finalize construction schedule and verify availability of materials.

5.10.5 Review the required inspecting, testing, commissioning, and demonstration procedures

5.10.6 At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

6. DELIVERY, STORAGE AND HANDLING

6.1 Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

6.2 Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

6.3 Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

7. COORDINATION

7.1 Templates

Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

7.2 Door and Frame Preparation

Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

8. WARRANTY

8.1 General Warranty

Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

8.2 Warranty Period

Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

8.2.1 Structural failures including excessive deflection, cracking, or breakage

8.2.2 Faulty operation of the hardware

8.2.3 Deterioration of metals, metal finishes, and other materials beyond normal weathering

8.2.4 Electrical component defects and failures within the systems operation

8.3 Warranty Period
Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

9. MAINTENANCE SERVICE

9.1 Maintenance Tools and Instructions
Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

9.2 Storm Shelter Openings
Furnish a complete set of operational and maintenance instructions as needed for Owner's continued adjustment, maintenance, and repairs of door hardware as required by ICC 500 (2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

PART 2 – PRODUCTS

10. MATERIALS

Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

11. BUTT HINGES

11.1 Hinges
ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

11.1.1 Quantity: Provide the following hinge quantity:

A. Two Hinges: For doors with heights up to 60 inches

B. Three Hinges: For doors with heights 61 to 90 inches

C. Four Hinges: For doors with heights 91 to 120 inches

D. For doors with heights more than 120 inches, provide four (4) hinges, plus one (1) hinge for every 30 inches of door height greater than 120 inches

11.2 Hinge Size
Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

11.2.1 Widths up to 3'0": 4-1/2" standard or heavy weight as specified

11.2.2 Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified

11.3 Hinge Weight and Base Material
Unless otherwise indicated, provide the following:

11.3.1 Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight

11.3.2 Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

11.4 Hinge Options
Comply with the following:
Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

11.5 Manufacturers
A. Hager Companies (HA) – BB Series, 5-knuckle
B. McKinney (MK) – TA/T4A Series, 5-knuckle
C. Dormakaba BEST (ST) – F/FBB Series, 5-knuckle

12. CONTINUOUS HINGES

12.1 Continuous Geared Hinges
ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of four (4) inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
12.1.1 Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.

12.1.2 Manufacturers
A. Hager Companies (HA)
B. Pemko (PE)
C. Dormakaba BEST (ST)

12.2 Pin and Barrel Continuous Hinges
ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.
12.2.1 Manufacturers
A. Markar Products; ASSA ABLOY Architectural Door Accessories (MR)
B. Pemko (PE)

12.2.2 Manufacturers (Storm Shelter Assemblies)
A. Markar Products; ASSA ABLOY Architectural Door Accessories (MR)
B. No Substitution

13. POWER TRANSFER DEVICES

13.1 Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

13.1.1 Manufacturers:

A. Hager Companies (HA) - ETW-QC (# wires) Option

B. McKinney (MK) - QC (# wires) Option

13.2 Concealed Quick Connect Electric Power Transfers

Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

13.2.1 Manufacturers

A. Pemko (PE) – EL-CEPT Series

B. Securitron (SU) – EL-CEPT Series

13.3 Electric Door Wire Harnesses

Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware.

Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

13.3.1 Provide one each of the following tools as part of the base bid contract:

A. McKinney (MK) – Electrical Connecting Kit: QC-R001

B. McKinney (MK) – Connector Hand Tool: QC-R003

13.3.2 Manufacturers

A. Hager Companies (HA) – Quick Connect

B. McKinney (MK) – QC-C Series

14. DOOR OPERATING TRIM

14.1 Flush Bolts and Surface Bolts

Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1

14.1.1 Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.

14.1.2 Furnish dust proof strikes for bottom bolts.

14.1.3 Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.

14.1.4 Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

14.1.5 Manufacturers
- A. Burns Manufacturing (BU)
- B. Door Controls International (DC)
- C. Rockwood (RO)

14.2 Coordinators
ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

14.2.1 Manufacturers
- A. Burns Manufacturing (BU)
- B. Door Controls International (DC)
- C. Rockwood (RO)

14.3 Door Push Plates and Pulls
ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

14.3.1 Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

14.3.2 Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

14.3.3 Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

14.3.4 Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.

14.3.5 Fasteners: Provide manufacturer’s designated fastener type as indicated in Hardware Sets.

14.3.6 Manufacturers
- A. Burns Manufacturing (BU)
- B. Hiawatha, Inc. (HI)
- C. Rockwood (RO)

15. CYLINDERS AND KEYING

15.1 General
Cylinder manufacturer to have minimum ten (10) years experience designing secured master key systems and have on record a published security keying system policy.

15.2 Cylinder Types
Original manufacturer cylinders able to supply the following cylinder formats and types:

15.2.1 Threaded mortise cylinders with rings and cams to suit hardware application.

15.2.2 Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

15.2.3 Bored or cylindrical lock cylinders with tailpieces as required to suit locks.

15.2.4 Tubular deadlocks and other auxiliary locks.

15.2.5 Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

15.3 Large Format Interchangeable Cores
Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

15.4 Patented Cylinders
ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

15.4.1 Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.

15.4.2 Manufacturers

A. Corbin Russwin (RU) – Access 3 AP

B. Sargent (SA) – Degree DG1

C. No Substitution

15.5 Keying System
Each type of lock and cylinders to be factory keyed.

15.5.1 Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.

15.5.2 Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

15.5.3 New System: Key locks to a new key system as directed by the Owner.

15.6 Key Quantity
Provide the following minimum number of keys:

15.6.1 Change Keys per Cylinder: Two (2)

15.6.2 Master Keys (per Master Key Level/Group): Five (5)

15.6.3 Construction Keys (where required): Ten (10)

15.6.4 Construction Control Keys (where required): Two (2)

15.6.5 Permanent Control Keys (where required): Two (2)

15.7 Construction Keying: Provide construction master keyed cylinders.

15.8 Construction Keying: Provide temporary keyed construction cores.

15.9 Key Registration List (Bitting List)

15.9.1 Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

15.9.2 Provide transcript list in writing or electronic file as directed by the Owner.

16. KEY CONTROL

Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

16.1 Manufacturers

A. Lund Equipment (LU)

B. MMF Industries (MM)

C. Telkee (TK)

17. MORTISE LOCKS AND LATCHING DEVICES

Mortise Locksets, Grade 1 (Heavy Duty)

Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

17.1 Provide locksets with functions and features as follows:

17.1.1 Heavy duty 12-gauge wrought steel case

17.1.2 Stainless steel 3/4-inch one-piece anti-friction reversible latch-bolt with a one-piece hardened stainless steel 1-inch projection deadbolt

17.1.3 Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas

17.1.4 Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code

17.1.5 Meets UL Certification Directory ZHLL.R21744 for products used in windstorm rated assemblies

17.1.6 Extended Cycle Test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 14.5 million cycles or greater

17.1.7 Extended Cycle Test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 16 million cycles or greater.

17.1.8 Status indicators inside, outside, or on both sides of doors as specified; available with wording for "locked/unlocked", "vacant/occupied" or custom wording options. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status.

A. Ten-year limited warranty for mechanical functions.

17.2 Manufacturers

17.2.1 Corbin Russwin Hardware (RU) – ML2000 Series

17.2.2 Sargent Manufacturing (SA) – 8200 Series

18. LOCK AND LATCH STRIKES

18.1 Strikes

Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

18.1.1 Flat-Lip Strikes: For locks with three-piece antifriction latch-bolts, as recommended by manufacturer.

18.1.2 Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

18.1.3 Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

18.1.4 Double-lipped Strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

18.2 Standards

Comply with the following:

18.2.1 Strikes for Mortise Locks and Latches: BHMA A156.13

18.2.2 Strikes for Bored Locks and Latches: BHMA A156.2

18.2.3 Strikes for Auxiliary Deadlocks: BHMA A156.36

18.2.4 Dustproof Strikes: BHMA A156.16

19. CONVENTIONAL EXIT DEVICES

19.1 General Requirements

All exit devices specified herein shall meet or exceed the following criteria:

19.1.1 Exit devices shall have a five-year warranty.

19.1.2 At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

19.1.3 Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

19.1.4 Except on fire rated doors, provide exit devices with hex key dogging device to hold the push-bar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

19.1.5 Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

19.1.6 Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

A. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.

B. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

19.1.7 Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

19.1.8 Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2-inch wide stiles.

19.1.9 Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

19.1.10 Rail Sizing: Provide exit device rails factory sized for proper door width application.

19.1.11 Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

19.2 Conventional Push Rail Exit Devices (Heavy Duty)
ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices.
Listed manufacturers shall meet all functions and features as specified herein.

19.2.1 Provide exit devices with functions and features as follows:

A. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas

B. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code

C. No Catch Points: Addition of applied deflectors or other added components are not allowed

D. No visible plastic

E. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes

F. Constructed of all stainless steel

G. Stainless steel pullman type latch with deadlock feature

H. Narrow or wide style exterior trim as specified in the hardware sets

I. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.

J. Ten-year limited warranty for mechanical features.

19.2.2 Electromechanical exit devices shall have the following functions and features:

A. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.

B. Wire routing for all non-access control electromechanical functions and EcoFlex trim to be contained within the carrier of the device eliminating the need for cavities in doors to be drilled. Include a protective film so that wires don't get damaged if the rail needs to be removed.

C. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.

D. Options to be available for request-to-exit or enter signaling, latch-bolt and touch-bar monitoring.

E. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.

19.2.3 Manufacturers

A. Corbin Russwin Hardware (RU) – PED4000 / PED5000 Series

B. Sargent Manufacturing (SA) – PE80 Series

19.3 Multi-Point Exit Devices (Storm Shelter Openings)

ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices specifically engineered for tornado or hurricane resistant storm shelter openings. Listed manufacturers shall meet all functions and features as specified herein.

19.3.1 Provide exit devices with functions and features as follows:

A. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.

B. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code

C. Meets UL Certification Directory ZHLL.R21744 for products used in windstorm rated assemblies

D. Meets FEMA P-361 (2020) and ICC 500 (2020) with respect to impact and pressure testing. Minimum missile impact speeds vary with the design wind speed desired for a particular product

E. No Catch Points: Addition of applied deflectors or other added components are not allowed

F. No visible plastic

G. Concealed hex key dogging with an active or passive dogging indicator where specified that shows visible indication of secured state

H. Chassis indicators as specified that show secured state of exterior trim

I. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes

J. Constructed of all stainless steel

K. Stainless steel pullman type latch with deadlock feature

L. Narrow or wide style exterior trim as specified in the hardware sets

M. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.

N. Ten-year limited warranty for mechanical features

19.3.3 Manufacturers

A. Corbin Russwin Hardware (RU) – FE PE5400S Series

B. Sargent Manufacturing (SA) – FM PE8700 Series

C. Substitution only with prior approval by architect.

20. STEEL REMOVABLE MULLIONS

ANSI/BHMA A156.3 steel removable mullions with options for fire rating, locking, through-wire electrification and hurricane compliance as specified.

20.1 Provide mullions with functions and features as follows:

A. Provide keyed removable feature where specified in the Hardware Sets.

B. Provide stabilizers and mounting brackets as required.

20.2 Manufacturers:

A. Same as exit device manufacturer.

21. SURFACE DOOR CLOSERS

21.1 All door closers specified herein shall meet or exceed the following criteria:

21.1.1 General
Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

21.1.2 Standards
Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

21.1.3 Size of Units
Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

21.1.4 Closer Arms
Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

21.1.5 Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

21.1.6 Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

21.1.7 Storm Shelter Compliance: Door closers to be U.L. listed for windstorm assemblies where applicable. Provide the appropriate storm shelter products that have been independently third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

21.2 Door Closers, Surface Mounted (Large Body Cast Iron)
ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force.

Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

21.2.1 Large body cast iron surface mounted door closers shall have a 30-year warranty.

21.2.2 Manufacturers

A. Corbin Russwin Hardware (RU) – DC8000 Series

B. Norton Rixson (NO) – 9500 Series

C. Sargent Manufacturing (SA) – 281 Series

22. DOOR CLOSERS, SURFACE MOUNTED (CAM ACTION)

ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

22.1.1 Manufacturers

A. Corbin Russwin (RU) – DC5000 Series

B. Norton Rixson (NO) – 2800ST Series

C. Sargent Manufacturing (SA) – 422 Series

23. ELECTROHYDRAULIC DOOR OPERATORS

Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that meet ANSI/BHMA A156.4 requirements and are UL listed for use on fire rated doors and UL10C certified that comply with requirements for the Americans with Disabilities Act (ADA). Operators shall be verified by GreenCircle to offer energy savings of 19% when compared to similar products to accommodate openings up 250 pounds and 48” wide. Provide accessories such as custom templates, special mounting brackets, spacers and drop plates as needed for proper installation. Operators shall accommodate openings up to 200 pounds and 48” wide. Listed manufacturers shall meet all functions and features as specified herein.

23.1 Provide operators with features as follows:

A. Non-handed with push and pull side mounting.

B. Operates as mechanical surface closer during close cycles, when door is opened manually or if power is off.

C. Activation by push button, hands-free or radio frequency devices.

D. On board electronics to collect usage and cycle count data to facilitate preventative maintenance/diagnostics.

E. Two-year limited warranty.

F. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building’s IT required.

1) Simple setup with no app required.

2) View status and make adjustments without removing the cover.

3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.

G. Mounting backplate to simplify and speed up installation.\

23.2 Operators shall have the following functionality:

A. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.

B. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.

C. Infinite Hold Open: Door will hold open at set position until power is turned off.

D. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.

E. Open Delay: Delays operator opening for locking hardware.

F. Overload Safety Shut-Off: After two minutes of receiving a door activation signal, inverter times out and door closes to prevent motor/inverter damage.

G. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.

H. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.

I. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.

J. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.

23.3 Manufacturers

A. Norton Rixson (NO) - 6000 Series

24. SURFACE MOUNTED CLOSER HOLDERS

Electromagnetic Door Holders: ANSI A156.15, Grade 1 electromagnetic door holder/releases with a minimum 25 to 40 pounds holding power and fail-safe operation; power failure releases door to close.

24.1 Manufacturers

A. Norton Rixson (RF) – 980/990 Series

B. Sargent Manufacturing (SA) – 1560 Series

25. ARCHITECTURAL TRIM AND ACCESSORIES

Door, Frame and Wall Protective Trim

ANSI/BHMA A156.6, protective products as specified in the hardware sets. Door protection plates shall be not more than 2 inch less than door width on stop side and 1 inch less door width on the pull side or on stop side of pairs of doors. Listed manufacturers shall meet all functions and features as specified herein.

25.1 Provide protective trim with functions and features as follows:

A. Meets ADA requirements for smooth bottom door surfaces.

B. UL Classified options for use on fire-rated doors up to 3 hours.

C. Fabricated from stainless steel, brass, bronze, aluminum, or high-impact plastic.

D Available in a variety of sizes, finishes, and profiles to suit aesthetic and functional requirements.

E. Designed to protect doors, frames, and adjacent walls from damage due to impact, abrasion, or traffic.

F. Fasteners included; adhesive-backed options available for select models.

G. Ten-year limited warranty.

25.2 Manufacturers:

A. Burns Manufacturing (BU)

B. Hager Companies (HA)

C. Hiawatha, Inc. (HI)

D. Rockwood (RO)

26 DOOR STOPS AND HOLDERS

26.2 Door Stops and Bumpers

ANSI/BHMA A156.16, Grade one (1) door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

26.2.1 Manufacturers

A. Burns Manufacturing (BU)

B. Hager Companies (HA)

C. Hiawatha, Inc. (HI)

D. Rockwood (RO)

26.3 Overhead Door Stops and Holders

ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

26.3.1 Manufacturers

A. Norton Rixson (RF)

B. Rockwood (RO)

C. Sargent Manufacturing (SA)

27. ARCHITECTURAL SEALS

27.1 General

Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

27.2 Smoke Labeled Gasketing
Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
30.2.1 Provide smoke labeled perimeter gasketing at all smoke labeled openings.

27.3 Fire Labeled Gasketing
Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
27.3.1 Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

27.4 Sound-Rated Gasketing
Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

27.5 Replaceable Seal Strips
Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

27.6 Hurricane and Storm Shelter Compliance
Devices to be U.L. listed for windstorm assemblies where applicable. Provide the appropriate hurricane or storm shelter products that have been independently third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

27.7 Manufacturers:
27.7.1 National Guard Products (NG)

27.7.2 Pemko (PE)

27.7.3 Reese Enterprises, Inc. (RE)

28. ELECTRONIC ACCESSORIES

28.1 Door Position Switches
Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1-inch diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
28.1.1 Manufacturers
A. Sargent Manufacturing (SA) – 3280 Series

B. Security Door Controls (SD) – DPS Series

C. Securitron (SU) – DPS Series

28.2 Switching Power Supplies
Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

28.2.1 Power supplies shall meet all functions and features as specified herein.

A. UL listed dual voltage 12 or 24 VDC field selectable continuous output.

B. Tolerates brownout or overvoltage input ± 15% of nominal voltage.

C. Thermal shutdown protection with auto restart.

D. Circuit breaker protection against overcurrent and reverse battery faults.

E. Integrated battery charging circuit to prevent overvoltage on locking devices.

F. Available with a single relay fire trigger or individually triggered relayed outputs.

G. Monitoring options as specified.

28.2.1 Manufacturers

A. Life Safety Power (LP)

B. Securitron (SU) – AQD Series

29. FABRICATION

Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

30. FINISHES

30.1 Standard
Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

30.2 Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

30.3 Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 – EXECUTION

31. EXAMINATION

31.1 Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

31.2 Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

32. PREPARATION

32.1 Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

32.2 Wood Doors: Comply with ANSI/DHI A115-W series.

33. INSTALLATION

33.1 Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

33.1.1 Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

33.2 Mounting Heights

Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

33.2.1 Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".

33.2.2 DHI TDH-007-20: Installation Guide for Doors and Hardware.

33.2.3 Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities".

33.2.4 Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

33.3 Retrofitting

Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

33.4 Push Plates and Door Pulls

When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

33.5 Thresholds

Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants".

33.6 Storage

Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

34. FIELD QUALITY CONTROL

34.1 Field Inspection (Punch Report)
Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

34.1.1 Organization of List
Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

34.2 Maintenance manual must be provided for tornado/hurricane storm shelter impact protective systems.

35. ADJUSTING

Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

36. CLEANING AND PROTECTION

36.1 Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

36.2 Clean adjacent surfaces soiled by door hardware installation.

36.3 Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

37. DEMONSTRATION

Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

38. DOOR HARDWARE SETS

38.1 The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

38.1.1 Quantities listed are for each pair of doors, or for each single door.

38.1.2 The supplier is responsible for handing and sizing all products.

38.1.3 Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

38.2 Manufacturer's Abbreviations

MK – McKinney
MR – Markar
PE – Pemko
SU – Securitron
RO – Rockwood
SA – SARGENT
NO – Norton Rixson
LU – Lund Equipment Co.

HARDWARE SETS

Set: 1.0
Doors: R100a
Description: Exterior

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
1	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 862	US10BE	SA	⚡
2	Core	DG1 6300 GMK	US4	SA	
1	Concealed Overhead Holder/Stop	6 Series	613E	NO	
1	Surface Closer	281 P10	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	Door Stop	462	US2C	RO	
1	Sweep	345DNB x Door Width		PE	
1	Threshold	278x292AFGPK x Opening Width		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.
Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 2.0
Doors: R100b
Description: Secure Check-In

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
1	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Rim Exit Device, Storeroom	DG1 56 59 64 PE8804 862	US10BE	SA	⚡
2	Core	DG1 6300 GMK	US4	SA	
1	Surface Closer	281 CPS	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	Sweep	315DN x Door Width		PE	
1	Threshold	2715A x Opening Width		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD2 X hardware requirements		SU	⚡

Notes: Card reader on both sides of the door furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. The push rail will also have a delayed egress built into the push rail of the exit device. When the push rail is pushed the alarm will sound and you will have seconds until the device is released. If the fire alarm goes off the doors will not have any delay and the doors will be unlocked and you can exit. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 3.0
Doors: R157
Description: Exterior

1	Continuous Hinge	CFMHD1 PT x Door Height		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 PSB	US32D	SA	⚡
2	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	TB 281 CPS	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Door Stop	462	US2C	RO	
1	Gasketing	S773BL (Head & Jambs)		PE	
1	Rain Guard	346C x Overall Frame Width		PE	
1	Sweep	345ANB x Door Width		PE	
1	Threshold	279x292AFGPK x Opening Width		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 4.0
Doors: F115a, ST201a, ST301a
Description: Exterior

1	Continuous Hinge	DFMSLI-HD1 or DFMSLF-HD1		PE	
1	Rim Exit Device, Exit Only	LD PE8810 EO	US10BE	SA	
1	Concealed Overhead Holder/Stop	6 Series	613E	NO	
1	Surface Closer	281 P10	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	Door Stop	462	US2C	RO	
1	Sweep	345DNB x Door Width		PE	
1	Threshold	278x292AFGPK x Opening Width		PE	
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡

Notes: No outside trim.

Set: 5.0
Doors: R137b, R177b
Description: Exterior

1	Continuous Hinge	CFMHD1 PT x Door Height		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 PSB	US32D	SA	⚡
2	Core	DG1 6300 GMK	US15	SA	
1	Surface Overhead Stop	590S Series	EN	SA	
1	Surface Closer	TB 281 PD10	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Door Stop	462	US2C	RO	
1	Gasketing	S773BL (Head & Jambs)		PE	
1	Rain Guard	346C x Overall Frame Width		PE	
1	Sweep	345ANB x Door Width		PE	
1	Threshold	279x292AFGPK x Opening Width		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 6.0
Doors: R137a, R157a, R177a
Description: Vestibule

1	Continuous Hinge	CFMHD1 x Door Height		PE
1	Rim Exit Device, Passage	PE8815 WENJ	US32D	SA
1	Door Closer	TB 281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S773BL (Head & Jambs)		PE
1	Door Sweep	315CN x Door Width		PE
1	Threshold	2715A x Opening Width		PE

Set: 7.0
Doors: B137a
Description: Exterior

2	Continuous Hinge	CFMHD1 x Door Height		PE
1	Mullion	L980S x Height Required	PC	SA
1	Rim Exit Device, Storeroom	64 PE8804 WENJ	US32D	SA
1	Rim Exit Device, Exit Only	PE8810 EO	US32D	SA
1	Mortise Cylinder	DG1 64 42	US32D	SA
2	Core	DG1 6300 GMK	US15	SA
2	Surface Overhead Stop	590S Series	EN	SA
2	Surface Closer	TB 281 PD10	EN	SA
2	Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO
2	Door Stop	462	US2C	RO
2	Astragal	305CN x Door Height		PE
1	Gasketing	S773BL (Head & Jambs)		PE
1	Rain Guard	346C x Overall Frame Width		PE
1	Gasketing	5110BL x Mullion Height		PE
2	Sweep	345ANB x Door Width		PE
1	Threshold	279x292AFGPK x Opening Width		PE
2	Position Switch	DPS-M-BK or DPS-W-BK		SU

Set: 8.0
Doors: B136a
Description: Exterior

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
2	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Mullion	L980S x Height Required	PC	SA	
1	Shim Kit	601		SA	
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 862	US10BE	SA	⚡
1	Rim Exit Device, Dummy	DG1 16 18 55 64 PE8810 862	US10BE	SA	⚡
1	Mortise Cylinder	DG1 64 42	US10BE	SA	
5	Core	DG1 6300 GMK	US4	SA	
2	Concealed Overhead Holder/Stop	6 Series	613E	NO	
2	Surface Closer	281 P10	US10BE	SA	
2	Drop Plate	281D	US10BE	SA	
2	Kit	581-2	US10BE	SA	
2	Door Stop	462	US2C	RO	
2	Astragal	305DN x Door Height		PE	
1	Gasketing	5110BL x Mullion Height		PE	
2	Sweep	345DNB x Door Width		PE	
1	Threshold	278x292AFGPK x Opening Width		PE	
2	ElectroLynx Harness	QC-C2500P		MK	⚡
2	ElectroLynx Harness	QC-C Length Required		MK	⚡
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.

Operation: The doors will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 9.0
Doors: B100a
Description: Exterior

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
2	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Mullion	L980S x Height Required	PC	SA	
1	Shim Kit	601		SA	
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 Less Pull	US10BE	SA	⚡
1	Rim Exit Device, Exit Only	DG1 16 18 55 64 PE8810 EO	US10BE	SA	⚡
1	Mortise Cylinder	DG1 64 42	US10BE	SA	
4	Core	DG1 6300 GMK	US4	SA	
2	Door Pull	RM7511-24 Mtg-Type 12HD	10BE	RO	
2	Concealed Overhead Holder/Stop	6 Series	613E	NO	
1	Surface Closer	281 P10	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	Automatic Opener	6021	690	NO	⚡
2	Door Stop	462	US2C	RO	
1	Astragal	305DN x Door Height		PE	
1	Gasketing	5110BL x Mullion Height		PE	
2	Sweep	345DNB x Door Width		PE	
1	Threshold	278x292AFGPK x Opening Width		PE	
2	ElectroLynx Harness	QC-C2500P		MK	⚡
2	ElectroLynx Harness	QC-C Length Required		MK	⚡
2	Door Switch	505		NO	⚡
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.

Operation: The doors will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 10.0
Doors: B100b
Description: Vestibule

2	Continuous Hinge	DFMSLI-HD1 or DFMSLF-HD1		PE	
2	Push Bar	PE8893	US10BE	SA	
2	Door Pull	RM7511-24 Mtg-Type 12HD	10BE	RO	
1	Surface Closer	281 CPS	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	Automatic Opener	6021	690	NO	⚡
2	Astragal	305DN x Door Height		PE	
2	Sweep	315DN x Door Width		PE	
1	Threshold	2715A x Opening Width		PE	
2	Door Switch	505		NO	⚡

Notes: Weatherstripping furnished by Aluminum Door Supplier.

Set: 11.0
Doors: B134a
Description: Exterior

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
2	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Mullion	L980S x Height Required	PC	SA	
1	Shim Kit	601		SA	
1	Rim Exit Device, Storeroom	DG1 56 59 64 PE8804 862	US10BE	SA	⚡
1	Rim Exit Device, Dummy	DG1 59 64 PE8810 862	US10BE	SA	⚡
1	Mortise Cylinder	DG1 64 42	US10BE	SA	
4	Core	DG1 6300 GMK	US4	SA	
2	Concealed Overhead Holder/Stop	6 Series	613E	NO	
2	Surface Closer	281 P10	US10BE	SA	
2	Drop Plate	281D	US10BE	SA	
2	Kit	581-2	US10BE	SA	
2	Door Stop	462	US2C	RO	
2	Astragal	305DN x Door Height		PE	
1	Gasketing	5110BL x Mullion Height		PE	
2	Sweep	345DNB x Door Width		PE	
1	Threshold	278x292AFGPK x Opening Width		PE	
2	ElectroLynx Harness	QC-C2500P		MK	⚡
2	ElectroLynx Harness	QC-C Length Required		MK	⚡
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD2 X hardware requirements		SU	⚡

Notes: Card reader on both sides of the door furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.

Operation: The doors will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. When the push rail is pushed the alarm will sound and you will have seconds until the device is released. If the fire alarm goes off the doors will not be delayed and the doors will be unlocked and you can exit. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 12.0
Doors: B134b
Description: Exterior

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
2	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Mullion	L980S x Height Required	PC	SA	
1	Shim Kit	601		SA	
1	Fail Secure Exit Device	DG1	WR W55 WH 60 PE8876-		
24v WENJ		US10BE	SA	⚡	
1	Rim Exit Device, Exit Only	W55 WH PE8810 EO	US10BE	SA	
1	Mortise Cylinder	DG1 64 42	US10BE	SA	
2	Core	DG1 6300 GMK	US4	SA	
2	Surface Closer	422 CTB2	US10BE	SA	
2	Astragal	305DN x Door Height		PE	
1	Gasketing	5110BL x Mullion Height		PE	
2	Sweep	315DN x Door Width		PE	
1	Threshold	1715A x Opening Width		PE	
2	ElectroLynx Harness	QC-C2500P		MK	⚡
2	ElectroLynx Harness	QC-C Length Required		MK	⚡
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.
Weatherstripping furnished by Aluminum Door Supplier.

Set: 13.0
Doors: B130b, R101a, R104a
Description: Serving Kitchen, Laundry (Rated)

2	Hinge, Full Mortise	T4A4786 or T4A3786 5" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 5" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 CPS	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Gasketing	S88BL (Head & Jambs)		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.

Lock body will have a REX or request to exit switch and DPS.
Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 14.0
Doors: B130c, R101b
Description: Serving Kitchen

1	Core	DG1 6300 GMK	US15	SA
1	Rim Cylinder	DG1 64 34 or DG1 64 42 as required	US32D	SA

Notes: Balance of hardware furnished by Coiling Door Supplier.

Set: 15.0
Doors: B112A, B125a, R103a, R103b
Description: Janitor, Elev. Equipment (Rated)

2	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 O	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
1	Gasketing	S88BL (Head & Jambs)		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 16.0
Doors: R105a
Description: Corridor

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
1	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Rim Exit Device, Storeroom	DG1 56 59 64 PE8804 WENJ	US10BE	SA	⚡
2	Core	DG1 6300 GMK	US4	SA	
1	Surface Closer	281 CPS	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD2 X hardware requirements		SU	⚡

Notes: Card reader on both sides of the door will be furnished by Owner.
Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. The push rail will also have a delayed egress built into the push rail of the exit device. When the push rail is pushed the alarm will sound and you will have seconds until the device is released. If the fire alarm goes off the doors will not be any delay and the doors will be unlocked and you can exit. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 17.0
Doors: H244a, R106a, R107a, R110a, R112a, R112b, R113a, R113b, R114a, R114b, R115a, R115b, R116a, R116b, R117a, R117b, R118a, R118b, R128a
Description: Storage, Time Away, Meeting

2	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 O	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
3	Silencer	608		RO	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.
Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 18.0
Doors: R108a, R109a, R143a, R144a, R163a, R164a, R183a, R184a
Description: Restroom

2	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Hinge, Full Mortise		T4A4786 or T4A3786	
QC12 4-1/2" x 4-1/2"		US26D	MK	⚡
1	Electrified Mortise Lock	V21 EMB 64 IDP PHR NAC-82281-24v LNNJ	US26D	SA ⚡
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 O	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S773BL (Head & Jambs)		PE
1	ElectroLynx Harness	QC-C2500P		MK ⚡
1	ElectroLynx Harness	QC-C Length Required		MK ⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Doors are normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the mortise lock will release and you can turn the lever and enter the space. When the door comes back closed the outside trim will relock. The inside trim will have a REX or request to exit switch built into the lock. The mortise lock body will also have a door position switch built into the lock body. You can always turn the inside lever and exit out of the space. When inside and you throw the dead bolt this locks out other credentials, giving privacy for those inside.

Set: 19.0
Doors: B113a, R119a, R120a
Description: Hallway

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE	
1	Electric Power Transfer	EL-CEPT	613E	SU ⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US10BE	SA ⚡
1	Core	DG1 6300 GMK	US4	SA
1	Surface Closer	281 P10	US10BE	SA
1	Drop Plate	281D	US10BE	SA
1	Wall Stop	406	10BE	RO
1	ElectroLynx Harness	QC-C2500P		MK ⚡
1	ElectroLynx Harness	QC-C Length Required		MK ⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 20.0
Doors: B110a, B129a, F117a, R123a, R126a
Description: Video, Janitor, Storage

2	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 CPS	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
3	Silencer	608		RO	
1	ElectroLynx Harness	QC-C2500P		MK	
1	ElectroLynx Harness	QC-C Length Required		MK	

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 21.0
Doors: H207a, R124a
Description: Video, Server, Storage

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 22.0
Doors: B106a, B107a, B116a, F110a, R125a, R127a
Description: Restroom

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Lock	V21 EMB 8265 LNNJ	US26D	SA
1	Wall Stop	406	US32D	RO
1	Gasketing	S773BL (Head & Jambs)		PE

Set: 23.0
Doors: R130a, R150a, R170a
Description: Commons (Rated)

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE	
1	Electric Power Transfer	EL-CEPT	613E	SU
1	Rim Exit Device, Storeroom	DG1 12 55 56 64 PE8804 WENJ	US10BE	SA
1	Core	DG1 6300 GMK	US4	SA
1	Surface Closer	281 CPS	US10BE	SA
1	Drop Plate	281D	US10BE	SA
1	Kit	581-2	US10BE	SA
1	ElectroLynx Harness	QC-C2500P		MK
1	ElectroLynx Harness	QC-C Length Required		MK
1	Position Switch	DPS-M-BK or DPS-W-BK		SU
1	Power Supply	AQD1 x hardware requirements		SU

Notes: Card reader furnished by Owner.
Gasketing furnished by the Aluminum Door and Frame Supplier.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 24.0
Doors: R132a, R133a, R134a, R135a, R136a, R139a, R140a, R141a, R152a, R153a, R154a, R155a, R156a, R159a, R160a, R161a, R172a, R173a, R174a, R175a, R176a, R179a, R180a, R181a
Description: Dorm (Rated)

3	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Dormitory/Exit Lock	60 8225 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S773BL (Head & Jambs)		PE
1	Door Bottom	STC411APK x Door Width		PE

Set: 25.0
Doors: B108a, B130a, B131a, B131b, R138a, R158a, R178a
Description: Storage, Serving Kitchen (Rated)

2	Hinge, Full Mortise	T4A4786 or T4A3786 5" x 4-1/2"	US26D	MK
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 5" x 4-1/2"	US26D	MK
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 O	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE
1	ElectroLynx Harness	QC-C2500P		MK
1	ElectroLynx Harness	QC-C Length Required		MK

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 26.0
Doors: B118a, H238a, R142a, R162a, R182a
Description: Janitor, Lab (Rated)

2	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE
1	ElectroLynx Harness	QC-C2500P		MK
1	ElectroLynx Harness	QC-C Length Required		MK

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 27.0
Doors: F101a, F102a, F104a, F105a, F106a, F107a, F108a, F113a, F114a, F116a, H200a, H201a, H202a, H204a, H205a, H206a, H208a, H211a, H212a, H214a, H215a, H216a, H217a, H219a, H220a, H223a, H225a, H226a, H227a, H228a, H229a, H242a, H243a, H248a, H250a, H257a, H258a, H259a, H262a, H263a, H265a, H266a, H267a, H269a, H270a, H271a, H273a, H274a
Description: Office

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office/Entry Lock	DG1 60 8205 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 28.0
Doors: H203a, H272a
Description: Stairs (Rated)

1	Continuous Hinge	DFMSLI-HD1 or DFMSLF-HD1		PE
1	Rim Exit Device, Passage	12 PE8815 WENJ	US10BE	SA
1	Surface Closer	281 CPS	US10BE	SA
1	Drop Plate	281D	US10BE	SA
1	Kit	581-2	US10BE	SA

Notes: Seals furnished by the Aluminum Door and Frame Supplier.

Set: 29.0
Doors: H209a, H233a, H256a
Description: Conference, Break, Meeting

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Latch	8215 LNNJ	US26D	SA
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 30.0
Doors: H213a
Description: Meeting

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Latch	8215 LNNJ	US26D	SA
1	Surface Overhead Holder/Stop	9 Series	652	NO
3	Silencer	608		RO

Set: 31.0
Doors: H222a
Description: IT Closet (Rated)

3	Hinge, Full Mortise	T4A4786 or T4A3786 5" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 CPS	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 32.0
Doors: B148a, H230a, H245a, H255a, H275a
Description: Storage (Rated)

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 O	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 33.0
Doors: H232a
Description: Storage (Rated)

6	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Set Auto Flush Bolts	2842 or 2942 as required	US26D	RO
1	Classroom Lock	DG1 60 8237 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Coordinator	2600 x length required	Black	RO
2	Door Closer	281 O	EN	SA
2	Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO
2	Wall Stop	406	US32D	RO
2	Astragal	18041CNB x Door Height		PE
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 34.0
Doors: H237a, H239a
Description: Men, Women

3	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Push Plate	70E	US32D	RO
1	Pull Plate	BF 107x70C	US32D	RO
1	Door Closer	281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 35.0
Doors: H251a
Description: Storage

3	Hinge, Full Mortise	TA2714 NRP-STD 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Surface Overhead Holder/Stop	9 Series	652	NO
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
3	Silencer	608		RO

Set: 36.0
Doors: B109a, B123b, B145b
Description: Hallway

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT	PE		
2	Electric Power Transfer	EL-CEPT	613E	SU	
1	Concealed Vert Rod Exit, Dummy	55 ADPE8410 862	US10BE	SA	
1	Concealed Vert Rod Exit, Nightlatch	DG1 55 56 64 ADPE8410 P106 x 862	US10BE	SA	
1	Core	DG1 6300 GMK	US4	SA	
2	Surface Closer	281 CPS	US10BE	SA	
2	Drop Plate	281D	US10BE	SA	
2	Kit	581-2	US10BE	SA	
2	Astragal	305DN x Door Height		PE	
2	ElectroLynx Harness	QC-C2500P		MK	
2	ElectroLynx Harness	QC-C Length Required		MK	
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	
1	Power Supply	AQD1 x hardware requirements		SU	

Notes: Card reader furnished by Owner.

Operation: The doors will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 37.0
Doors: B114a
Description: Stairs (Rated)

1	Continuous Hinge	DFMSLI-HD1 or DFMSLF-HD1		PE
1	Rim Exit Device, Passage	12 PE8815 WENJ	US10BE	SA
1	Surface Closer	281 O	US10BE	SA
1	Wall Stop	406	10BE	RO

Notes: Seals furnished by the Aluminum Door and Frame Supplier.

Set: 38.0
Doors: B117a
Description: Storage (Rated)

3	Hinge, Full Mortise	TA2714 NRP-STD 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 CPS	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 39.0
Doors: H240a, H247a
Description: Mechanical, Storage (Rated)

6	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Set Auto Flush Bolts	2842 or 2942 as required	US26D	RO
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Coordinator	2600 x length required	Black	RO
2	Door Closer	281 O	EN	SA
2	Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO
2	Wall Stop	406	US32D	RO
2	Astragal	18041CNB x Door Height		PE
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 40.0
Doors: B119a, B121a
Description: Conference

3	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1	Rim Exit Device	DG1 LD 49 60 PE8816 WENJ	US32D	SA
2	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 41.0
Doors: B120a, B122a
Description: Storage

6	Hinge, Full Mortise	TA2714 NRP-STD 4-1/2" x 4-1/2"	US26D	MK
2	Flush Bolt	555-12	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Storeroom/Closet Lock	DG1 64 8204 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
2	Surface Overhead Holder/Stop	9 Series	652	NO
2	Astragal	18041CNB x Door Height		PE
2	Silencer	608		RO

Set: 42.0
Doors: B123a, B135a
Description: Hallway

2	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT		PE	
2	Electric Power Transfer	EL-CEPT	613E	SU	
1	Concealed Vert Rod Exit, Nightlatch	DG1 56 59 60 ADPE8410 P106 x 862	US10BE	SA	
1	Concealed Vert Rod Exit, Dummy	DG1 59 ADPE8410 862	US10BE	SA	
1	Core	DG1 6300 GMK	US4	SA	
2	Surface Closer	281 CPS	US10BE	SA	
2	Drop Plate	281D	US10BE	SA	
2	Kit	581-2	US10BE	SA	
2	Astragal	305DN x Door Height		PE	
2	ElectroLynx Harness	QC-C2500P		MK	
2	ElectroLynx Harness	QC-C Length Required		MK	
2	Position Switch	DPS-M-BK or DPS-W-BK		SU	
1	Power Supply	AQD2 X hardware requirements		SU	

Notes: Card reader on both sides of the doors furnished by the Owner.
Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. The push rail will also have a delayed egress built into the push rail of the exit device. When the push rail is pushed the alarm will sound and you will have seconds until the device is released. If the fire alarm goes off the doors will not have any delay and the doors will be unlocked and you can exit. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 43.0
Doors: B127a, B128a
Description: Classroom, Game Area

3	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Security Intruder Lock	DG1 60 8238 LNNJ	US26D	SA
2	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 CPS	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
3	Silencer	608		RO

Set: 44.0
Doors: B127b
Description: Classroom

3	Hinge, Full Mortise	TA2714 NRP-STD 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Security Intruder Lock	DG1 60 8238 LNNJ	US26D	SA
2	Core	DG1 6300 GMK	US15	SA
1	Wall Stop	406	US32D	RO
3	Silencer	608		RO

Set: 45.0
Doors: B127c
Description: Classroom

2	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise ⚡	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Door Closer	281 P10	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
3	Silencer	608		RO	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 46.0
Doors: B132a
Description: Classroom

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Security Intruder Lock	DG1 60 8238 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Surface Overhead Holder/Stop	9 Series	652	NO
3	Silencer	608		RO

Set: 47.0
Doors: B137c
Description: Mechanical (Rated)

3	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 5" x 4-1/2"	US26D	MK
1	Rim Exit Device, Storeroom	DG1 12 60 PE8804 WENJ	US32D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Door Closer	281 P10	EN	SA
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE

Set: 48.0
Doors: B140a, B140b
Description: Exterior (Shelter)

2	Continuous Hinge	HG305 x Door Height	630	MR
2	Surface Vert Rod Exit, Classroom	DG1 12 64 FMPE8713 WENJ	US32D	SA
2	Core	DG1 6300 GMK	US15	SA
2	Door Closer	TB 281 CPS	EN	SA
2	Latch Cover Kick Plate	BFLG1050 10" x 34"	US32D	RO
2	Astragal	305CN x Door Height		PE
1	Gasketing	S773BL (Head & Jambs)		PE
1	Rain Guard	346C x Overall Frame Width		PE
2	Sweep	345ANB x Door Width		PE
1	Threshold	1715A x Opening Width		PE
2	Position Switch	DPS-M-BK or DPS-W-BK		SU

Notes: Cutout threshold so bottom strike can be mounted directly to the concrete floor and not to the threshold. Doors will have a 5/8" undercut.

Set: 49.0
Doors: B141a, B145a
Description: Gym (Rated), (Shelter)

2	Continuous Hinge	HG305 x Door Height	630	MR
2	Surface Vert Rod Exit, Classroom	DG1 12 64 FMPE8713 WENJ	US32D	SA
2	Core	DG1 6300 GMK	US15	SA
2	Door Closer	TB 281 P10	EN	SA
2	Latch Cover Kick Plate	BFLG1050 10" x 34"	US32D	RO
2	Electromagnetic Holder	998M	689	NO
2	Astragal	305CN x Door Height		PE
1	Gasketing	S773BL (Head & Jambs)		PE
1	Threshold	1715A x Opening Width		PE

Notes: Cutout threshold so bottom strike can be mounted directly to the concrete floor and not to the threshold. Doors will have a 5/8" undercut.

Set: 50.0
Doors: B141b
Description: Gym

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT		PE
1	Electric Power Transfer	EL-CEPT	613E	SU
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 862	US10BE	SA
2	Core	DG1 6300 GMK	US4	SA
1	Surface Closer	281 P10	US10BE	SA
1	Drop Plate	281D	US10BE	SA
1	Wall Stop	406	10BE	RO
1	ElectroLynx Harness	QC-C2500P		MK
1	ElectroLynx Harness	QC-C Length Required		MK
1	Position Switch	DPS-M-BK or DPS-W-BK		SU
1	Power Supply	AQD1 x hardware requirements		SU

Notes: Card reader furnished by Owner.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 51.0
Doors: B143a, B144a
Description: Restroom

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Lock	V21 EMB 8265 LNNJ	US26D	SA
1	Door Closer	281 O	EN	SA
1	Kick Plate	K1050 34" x 2" LDW CSK BEV	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S773BL (Head & Jambs)		PE

Set: 52.0
Doors: B142a
Description: Storage (Rated)

6	Hinge, Full Mortise	T4A4786 or T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Set Auto Flush Bolts	2842 or 2942 as required	US26D	RO
1	Classroom Lock	DG1 60 8237 LNNJ	US26D	SA
1	Core	DG1 6300 GMK	US15	SA
1	Coordinator	2600 x length required	Black	RO
2	Door Closer	281 O	EN	SA
2	Kick Plate	K1050 F 34" x 1" LDW CSK BEV	US32D	RO
2	Wall Stop	406	US32D	RO
1	Gasketing	S88BL (Head & Jambs)		PE

Notes: Metal overlapping astragal furnished by Hollow Metal Door Supplier.

Set: 53.0
Doors: B190a
Description: Riser

2	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 P10	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Wall Stop	406	US32D	RO	
3	Silencer	608		RO	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 54.0
Doors: B191a
Description: Electric (Rated)

2	Hinge, Full Mortise	T4A4786 or T4A3786 NRP 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	T4A4786 or T4A3786 QC12 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	DG1 64 IDP NAC-82271-24v LNNJ	US26D	SA	⚡
1	Core	DG1 6300 GMK	US15	SA	
1	Door Closer	281 CPS	EN	SA	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	
1	Gasketing	S88BL (Head & Jambs)		PE	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡

Notes: Card reader furnished by Owner.
Power furnished by Access Control Supplier.
Lock body will have a REX or request to exit switch and DPS.

Operation: Door is normally closed and locked. When a valid credential is presented to the wall mounted card reader the outside trim on the electrified lock will be released and you can turn the outside lever and open the door. When the door comes back closed the outside trim will relock. The inside lever will have a REX or request to exit switch built into the lock. You can always turn the inside lever and exit the space.

Set: 55.0
Doors: R111a
Description: Secure Check-In

1	Continuous Hinge	DFMSLF-HD1 PT or DFMSLI-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	613E	SU	⚡
1	Rim Exit Device, Storeroom	DG1 16 18 55 56 64 PE8804 862	US10BE	SA	⚡
1	Core	DG1 6300 GMK	US4	SA	
1	Surface Closer	281 CPS	US10BE	SA	
1	Drop Plate	281D	US10BE	SA	
1	Kit	581-2	US10BE	SA	
1	ElectroLynx Harness	QC-C2500P		MK	⚡
1	ElectroLynx Harness	QC-C Length Required		MK	⚡
1	Position Switch	DPS-M-BK or DPS-W-BK		SU	⚡
1	Power Supply	AQD1 x hardware requirements		SU	⚡

Notes: Card reader furnished by Owner.

Operation: This door will normally be closed and locked. When a valid credential is presented to the wall mounted card reader the latch on the exit device will retract and allow the door to be pulled open. When the door comes back closed the latch will extend and the door will be relocked. There will be a REX or request to exit switch built into the push bar of the exit device. You can always exit out of the space by pushing the push rail on the exit device and leaving. The power supply listed in this hardware set will be used to power the electric latch retract on the exit device.

Set: 56.0
Doors: Misc.
Description: Extra's on the Project

4	Control Key	DG1	SA	
100	Key Blank	DG1	SA	
2	ElectroLynx Harness	QC-C2500P	MK	⚡
2	ElectroLynx Harness	QC-C006P	MK	⚡
3	ElectroLynx Harness	QC-C300P	MK	⚡
1	Repair Kit	QC-R001	MK	⚡
1	Crimp Tool	QC-R003	MK	⚡
1	Key Cabinet	1202-A	LU	

Notes: Key blanks will be given directly to the owner.
Any unused cables will be given to the owner for owner stock.

Set: 57.0
Wrought Iron Gate
Description: Exterior Gate

1	Rim Exit Device, Storeroom	DG1 WH PE8804 WEB	US32D	SA

Notes: Balance of hardware furnished by gate supplier.

End of Section 087100

SECTION 088000

GLAZING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:

2.1 Windows and Bullet-Proof Transaction Windows

2.2 Entrances and other doors

2.3 Storefront construction

2.4 Vision panels in doors

2.5 Sidelights, borrowed lights and other openings

2.6 Insulating glass units

2.7 Sealed insulating spandrel panels

2.8 Laminated glass

2.9 Fire-rated glass

3. DEFINITIONS

3.1 Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.

3.2 Deterioration of Coated Glass
Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

3.3 Deterioration of Insulating Glass
Failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film on the interior surfaces of glass. Improper practices for maintaining and cleaning glass do not comply with the manufacturer's directions.

3.4 Deterioration of Laminated Glass
Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

4. SYSTEM PERFORMANCE REQUIREMENTS

General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

5. SUBMITTALS

5.1 Product data for each glass product and glazing material indicated.

5.2 Samples for verification purposes of 12-inch-square Samples of each type of glass indicated except for clear monolithic glass products, and 12-inch-long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two (2) strips of material representative in color of the adjoining framing system.

5.3 Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.

5.3.1 Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

6. QUALITY ASSURANCE

6.1 Glazing Publications

Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

6.1.1 FGMA Publications: "FGMA Glazing Manual" and "Sealant Manual."

6.2 Safety Glass

Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

6.2.1 Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

6.3 Fire-Resistive Glazing Products for Door Assemblies

Products identical to those tested per ASTM E152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

6.4 Insulating Glass Certification Program

Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:

6.4.1 Associated Laboratories, Inc.

6.4.2 Insulating Glass Certification Council (IGCC)

6.5 Glazier Qualifications
Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

6.6 Field-Constructed Mock-Up
Prepare mock-ups for insulating glass in locations directed by Architect. Construct mock-ups to match glazing systems required for Project, including typical pane size, framing system, and glazing materials and methods. Obtain Architect's acceptance of visual qualities before proceeding with the Work. Retain mock-ups in undisturbed condition during construction as a standard for judging completed work.

6.7 Single-Source Responsibility for Glass
To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

6.8 Single-Source Responsibility for Glazing Accessories
Obtain glazing accessories from one source for each product and installation method indicated.

7. DELIVERY, STORAGE, AND HANDLING

Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

8. PROJECT CONDITIONS

Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

8.1 Install liquid sealants at ambient and substrate temperatures above 40 degrees F.

9. WARRANTY

9.1 General
Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

9.1.1 Warranty Period: Manufacturer's standard, but not less than ten (10) years after date of Substantial Completion.

9.2 Manufacturer's Special Project Warranty on Insulating Glass
Provide written warranty signed by manufacturer of insulating glass agreeing to furnish F.O.B. point of manufacture, freight allowed Project site, within specified warranty period indicated below, replacements for those insulating glass units developing defects.

Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance.

9.2.1 Warranty Period: Manufacturer's standard, but not less than 10 years after date of Substantial Completion.

PART 2 – PRODUCTS

10. MANUFACTURERS

Subject to compliance with requirements, provide glass products by 1 of the following:

10.1 Guardian Industries Corp.

10.2 Pilkington Libbey-Owens-Ford

10.3 PPG Industries, Inc.

10.4 Technical Glass Products

10.5 Viracon, Inc.

10.6 Other manufacturer approved by Architect

11. GLASS PRODUCTS, GENERAL

11.1 Primary Glass Standard

Provide primary glass which complies with ASTM C1036-91 (1997) requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

11.2 Heat-Treated Glass Standard

Provide heat-treated glass which complies with ASTM C1048 requirements, including those indicated by reference to kind, condition, type, quality, class and, if applicable, form, finish, and pattern.

11.3 Sizes

Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

12. PRIMARY FLOAT GLASS PRODUCTS

12.1 Float Glass

ASTM C1036, Type I (transparent glass, flat), Class as indicated below, and Quality Q3 (glazing select).

12.1.1 Class 1 (clear) unless otherwise indicated

12.1.2 Class 2 (tinted, heat-absorbing, and light-reducing) where indicated

12.1.3 Color: As selected by Architect from Manufacturer's full range of colors

12.2 Refer to requirements for sealed insulating glass units for performance characteristics of assembled units composed of tinted glass, coated or uncoated, relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.

13. BULLET PROOF TRANSACTION WINDOWS (Control Desk)

General Contractor to provide and install ballistic-resistive construction, threat side only, and bullet proof transaction windows at desk to support a Level 3 Protection.

13.1.1 The Contractor will submit detailed Shop Drawings for review and approval by the architect, prior to ordering windows or related materials, in accordance with Section 13300 – Submittal Procedures and other requirements of this specification.

13.1.2 Windows will be as shown on the Drawings. Windows are as follows: Two (2) sliding windows and one (1) single window.

13.1.3 Transaction windows will be prefabricated modular units with steel frame, cased opening with rigid wall guard. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by the manufacturer and the architect.

13.1.4 Include natural speak-box at "T" type window only, as shown on drawings.

Surround Sound speak-box: Provide for two-way "natural voice" or "surround sound" communication permitted by the design of the window jambs and glazing technique. Units must be manufactured in strict accordance with the specifications, design and details.

13.1.5 Construction will include Sol surf transaction counter with deal tray insert / Sol surf workstation counter and tall splash.

13.1.6 Approved Product:
CRL S1V1A, or approved equal. Conditions to receive approval of an equal must occur during the bidding process.

14. HEAT-TREATED FLOAT GLASS PRODUCTS, GENERAL

14.1 Fabrication Process
By vertical (tong-held) or horizontal (roller-hearth) process, at manufacturer's option, except provide horizontal process tongless or free of tong marks.
Glass with visual distortions shall not be used and will not be accepted.

15. HEAT-TREATED FLOAT GLASS

15.1 Uncoated, Clear, Heat-Treated Float Glass
ASTM C1048-97b, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality Q (glazing select), kind as indicated below.
14.1.1 Kind FT (fully tempered)

15.2 Uncoated, Tinted, Heat-Treated Float Glass
ASTM C1048-97b, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality Q (glazing select), with tint color and performance characteristics for 6-mm-thick glass matching those indicated for annealed primary tinted float glass; kind as indicated below:
14.2.1 Kind FT (fully tempered)

16. INSULATING GLASS UNITS – Refer to Schedule

16.1 Sealed Insulating Glass Units

Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E774-97 and with other requirements indicated.

16.1.1 For properties of individual glass lites making up units, refer to requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units.

16.1.2 Provide heat-treated, Kind FT (fully tempered) at both interior and exterior panes of glass.

16.1.3 Performance Classification per ASTM E774-97: Class A

16.1.4 Thickness of Each Pane: 1/4-inch

16.1.5 Air Space Thickness: 1/2-inch

16.1.6 Interspace Content: Argon

16.1.7 Sealing System: Dual seal; primary and secondary sealant; manufacturer's standard materials.

16.1.8 Spacer Material: Aluminum

16.1.9 Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.

16.1.10 Corner Construction: Manufacturer's standard corner construction

16.1.11 Exterior Pane of Glass: Clear tempered glass

16.1.12 Interior Pane of Glass: Low-emissivity coated glass

16.1.13 Basis-of-Design Product: PPG Solarban 90

16.1.14 Color of glass as selected by Architect.

16.2 Performance Characteristics (1-inch insulated clear)

16.2.1 Visible Light Transmittance: 51 percent minimum

16.2.2 SHGC: 0.23 maximum

16.2.3 Interior Reflectance: 19 percent

16.2.4 Exterior Reflectance: 12 percent

16.2.5 Selection of color of glass by Architect may change these values.

17. SEALED INSULATED SPANDREL PANELS

Sealed Insulating Spandrel Panels
Ceramic Coated Heat Treated Spandrel Panels, Condition B (Spandrel Glass, 1 Surface Ceramic Coated), Type I (Transparent Glass, Flat), Class 1 (Clear), Quality Q3 (Glazing Select), with ceramic coating applied to second surface and third surface sf insulating spandrel panels and complying with the following requirements:

17.1 Kind HS (Heat Strengthened)

17.2 Color: Clear, to match insulating glass units

17.3 Fallout Resistance: Provide spandrel units identical to those passing Fallout-Resistant Test for Spandrel Glass Specified in ASTM C1048.

17.4 Thickness of Each Panel: 1/4-inch

17.5 Air Space Thickness: 1/2-inch

17.6 Interspace Content: Argon

17.7 Sealing System: Dual seal; primary and secondary sealant; manufacturer's standard materials.

17.8 Spacer Material: Aluminum

17.9 Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both

17.10 Corner Construction: Manufacturer's standard corner construction

17.11 Exterior Pane of Glass: Ceramic coating applied to second surface

17.12 Interior Pane of Glass: Ceramic coating applied to third surface

18. LAMINATED GLASS

18.1 Laminated Glass
Comply with ASTM C1172 for kinds of laminated glass indicated and other requirements specified.

18.1.1 Thickness: 1/2-inch laminated glass of 2 plies. Top ply of 1/4-inch clear, heat-treated glass and bottom ply of 1/4-inch heat-treated bronze glass to match color of insulated glass units.

18.2 Interlayer
Interlayer material as indicated below, clear, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.

17.2.1 Interlayer Material: Polyvinyl butyral sheets, clear

18.3 Laminating Process
Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:

18.3.1 Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

19. FIRE-RATED GLASS

Provide products of type indicated, complying with the following requirements:

19.1 Fire Rating: As indicated on Drawings for specific locations and applications

19.2 Thickness: Manufacturer's standard thickness, for fire rating indicated

19.3 Light Transmission Rating: 85 percent minimum

19.4 Impact Safety Resistance: As required by Building Codes and as indicated for specific application

19.5 Glazing material shall be optically clear, colorless and free from distortions

20. ELASTOMERIC GLAZING SEALANTS

20.1 General

Provide products of type indicated, complying with the following requirements:

20.1.1 Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

20.1.2 Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.

20.1.3 Colors: Provide color of exposed joint sealants to comply with the following:

A. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

20.2 Elastomeric Glazing Sealant Standard

Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C920-98e1 requirements, including those referencing ASTM classifications for Type, Grade, Class and Uses.

20.3 One-Part, Non-Acid-Curing, Silicone Glazing Sealant: Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to uses indicated, O; and complying with the following requirements for modulus and additional joint movement capability.

19.3.1 Medium Modulus: Tensile strength of not less than 45 nor more than 75 psi at 100 percent elongation when tested per ASTM D412-98a after 14 days at 77 degrees F and 50 percent relative humidity.

20.4 Products

Subject to compliance with requirements, provide one (1) of the following:

20.4.1 One-Part, Acid-Curing, High-Modulus, Nonsag Silicone Glazing Sealant:

A. "Chem-Calk 1200"; Bostik Construction Products Div.

B. "Dow Corning 999"; Dow Corning Corp.

C. "SCS 1200"; General Electric Corp.

D. "863"; Pecora Corp.

E. "Proglaze"; Tremco, Inc.

20.4.2 One-Part, Non-Acid Curing, Medium-Modulus, Non-sag Silicone Glazing Sealant:

A. "Dow Corning 795"; Dow Corning Corp.

B. "Silpruf"; General Electric Corp.

C. "Gesil"; General Electric Corp.

D. "Spectrum 2"; Tremco, Inc.

E. "864, 890"; Pecora Corp.

21. GLAZING TAPES

21.1 Back-Bedding Mastic Glazing Tape

Preformed, manufacturer's standard solvent-free, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with ASTM C1281 and AAMA 800 as recommended by glass manufacturer.

21.2 Products

Subject to compliance with requirements, provide one (1) of the following:

21.2.1 Preformed Butyl-Polyisobutylene Glazing Tape without Spacer Rod:

A. "Chem-Tape 40"; Bostik Construction Products Div.

B. "Extru-Seal"; Pecora Corp.

C. "Tremco 440 Tape"; Tremco Inc.

21.2.2 Preformed Butyl-Polyisobutylene Glazing Tape with Spacer Rod:

A. "Chem-Tape 60"; Bostik Construction Products Div.

B. "Pre-shimmed Tremco 440 Tape"; Tremco Inc.

C. "Shim-Seal"; Pecora Corp.

22. GLAZING GASKETS

Dense Compression Gaskets

Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

22.1 EPDM, ASTM C864

22.2 Silicone, ASTM C1115

22.3 Any material indicated above

23. MISCELLANEOUS GLAZING MATERIALS

23.1 General

Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

23.2 Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

23.3 Setting Blocks
Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

23.4 Spacers
Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

23.5 Edge Blocks
Elastomeric material of hardness needed to limit glass lateral movement (side walking).

23.6 Plastic Foam Joint Fillers
Preformed, compressible, resilient, nonstaining, non-extruding, non-outgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

23.7 Glazing Gaskets
Of size, type and form as recommended by glass manufacturer for uses indicated.

24. FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

24.1 Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

24.2 Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

24.3 Grind smooth and polish exposed glass edge.

PART 3 – EXECUTION

25. EXAMINATION

25.1 Examine glass framing, with glazier present, for compliance with the following:

25.1.1 Manufacturing and installation tolerances, including those for size, squareness, offsets at corners

25.1.2 Presence and functioning of weep system

25.1.3 Minimum required face or edge clearances

25.1.4 Effective sealing between joints of glass-framing members

25.2 Do not proceed with glazing until unsatisfactory conditions have been corrected.

26. PREPARATION

Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

27. GLAZING, GENERAL

27.1 Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

27.2 Glazing channel dimensions shall provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

27.3 Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one (1) horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening.

27.3.1 Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

27.4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

27.5 Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

27.6 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

27.7 Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:

27.7.1 Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.

27.7.2 Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

27.8 Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

27.9 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

27.10 Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

27.11 Install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

28. SEALANT GLAZING (WET)

28.1 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

28.2 Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" of bond of sealant to glass and channel surfaces.

28.3 Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

29. PROTECTION AND CLEANING

29.1 Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

29.2 Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

29.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

29.4 Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

29.5 Wash glass on both faces in each area of Project not more than four (4) days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

30. SCHEDULE

Glass Type 1: 1/4-inch-thick, equal to Solarban-90, Low-E float glass, as manufactured by Vitro Architectural Glass (formerly PPG).

Glass Type 2: 1/4-inch-thick, Clear, float glass, tempered as required.

Glass Type 3: 1/4-inch-thick, spandrel glass, Solarban-90, Low-E float glass, as manufactured by Vitro Architectural Glass (formerly PPG).

Glass Type 4: 1-inch insulating glass consisting of two (2) 1/4-inch float lights with air space tempered as required. Clear glass.

Glass Type 5: 1-inch insulating glass consisting of two (2) 1/4-inch float lights with air space tempered as required, Low-E. Solarban-90 as manufactured by Vitro Architectural Glass (formerly PPG).

Glass Type 6: 1-inch thick, insulated spandrel glass Solarban-90; (1) 1/4-inch polished spandrel light outer pane and 1/2-inch rigid insulating spacer and 1/4-inch hard board inner panel ready to receive paint.

Glass Type 7: 1/4-inch-thick, Mirrors shall be float glass, Number One quality; all in sizes and locations as indicated on the Drawings.

Glass Type 8: Provide and install as shown on plans, Firelite glass as manufactured by Technical Glass Products, (800) 426-0279 phone.

Glass Type 9: Not used.

Glass Type 10: Not used.

Glass Type 11: 1/4-inch-thick, Frosted glass, tempered as required.

Glass Type 12: Not used.

Glass Type 13: Not used.

Glass Type 14: 1-inch “Mapes” Porcelain panel, finish (2) sides.

Glass Type 15: 1-inch insulating glass consisting of (1) 1/4-inch-thick, Frosted glass on the inside, and (1) 1/4-inch glass on the outside, clear. With air space tempered as required. Low-E on exterior.

Glass Type 16: 5/16-inch Annealed laminated glass. Safety glazing to maintain 90-min rated opening. Manufacturer: TGP, Product: FireLite Plus.

Continued next page.

Glass Type 17: JSB-Ballistic Level 3: Glass is a component of modular window system, to be included only as a component of the complete window system.

Glazing: The glazing must be in accordance with U.L. 752 testing standards. Laminated glass, 1-7/8 inch (48 mm), Level 3.

Material: Laminated glass, polycarbonate or acrylic – Contractor's option. Assemblies shall comply with and be labeled by a qualified testing agency for ballistic-resistant protection to a Level 3 based on testing according to UL752. Each ballistic window unit shall be of the same material.

End of Section 088000

SECTION 088300

MIRRORS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes: Silvered flat glass mirrors, impact resistant and shatterproof.

2.2 Related Requirements
Section 102800 "Toilet, Bath, and Laundry Accessories" for metal framed mirrors.

3. ACTION SUBMITTALS

3.1 Product Data: For each type of product.

3.1.1 Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

3.2 Shop Drawings
Include mirror elevations, edge details, mirror hardware, and attachment details.

3.3 Samples
For each type of the following:

3.3.1 Mirrors: 12 inches square, including edge treatment on two (2) adjoining edges.

3.3.2 Mirror Clips: Full size

4. INFORMATIONAL SUBMITTALS

4.1 Product Certificates: For each type of mirror and mirror mastic.

4.2 Preconstruction Test Reports
From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

4.3 Sample Warranty: For special warranty.

5. CLOSEOUT SUBMITTALS

Maintenance Data: For mirrors to include in maintenance manuals.

6. QUALITY ASSURANCE

Installer Qualifications: A qualified installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

7. PRECONSTRUCTION TESTING

Preconstruction Mirror Mastic Compatibility Test
Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.

7.1 Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

8. DELIVERY, STORAGE, AND HANDLING

8.1 Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

8.2 Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

9. FIELD CONDITIONS

Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

10. WARRANTY

Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

10.1 Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 – PRODUCTS

11. MANUFACTURERS

11.1 Source Limitations for Mirrors
Obtain mirrors from single source from single manufacturer.

11.2 Source Limitations for Mirror Accessories
Obtain mirror-glazing accessories from single source.

12. SILVERED FLAT GLASS MIRRORS

12.1 Mirrors, General
ASTM C1503; manufactured using copper-free, lead-free mirror coating process.

12.2 Laminated Mirrors: ASTM C1172, Type II.

12.2.1 Glass for Outer Lite: Annealed float glass, Mirror Select Quality, ultraclear (low-iron) float glass with a minimum 91 percent visible light transmission and lead free.

12.2.2 Nominal Thickness for Outer Lite: 3.0 mm

12.2.3 Glass for Inner Lite: Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).

12.2.4 Nominal Thickness: 3.0 mm

12.2.5 Interlayer: Mirror manufacturer's standard 0.030-inch-thick, clear polyvinyl-butyral interlayer with a proven record of showing no tendency to delaminate from, or cause damage to, silver coating.

12.2.6 Mirror glass shall be impact resistant and shatterproof.

13. MISCELLANEOUS MATERIALS

13.1 Setting Blocks
Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

13.2 Edge Sealer
Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

13.3 Mirror Mastic
An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

13.3.1 Verify adhesives have a VOC content of 70 g/L or less.

13.3.2 Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

13.4 Film Backing for Safety Mirrors
Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

14. MIRROR HARDWARE

14.1 Mirror Bottom Clips
As required for complete and secure installation and as recommended by mirror manufacturer.

14.2 Mirror Top Clips
As required for complete and secure installation and as recommended by mirror manufacturer.

14.3 Fasteners
Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

14.4 Anchors and Inserts
Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

15. FABRICATION

15.1 Shop fabricate mirrors to greatest extent possible.

15.2 Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.

15.3 Mirror Edge Treatment
Flat high polished.

15.3.1 Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

15.3.2 Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 – EXECUTION

16. EXAMINATION

16.1 Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

16.2 Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.

16.3 Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

17. PREPARATION

Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

18. INSTALLATION

18.1 General
Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

18.1.1 NGA Publications: "Laminated Glazing Reference Manual," "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."

18.2 Provide a minimum airspace of 1/8-inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

18.3 Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

18.3.1 Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.

18.3.2 Install mastic as follows:

A. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.

B. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.

C. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8-inch between back of mirrors and mounting surface.

19. CLEANING AND PROTECTION

19.1 Protect mirrors from breakage and contaminating substances resulting from construction operations.

19.2 Do not permit edges of mirrors to be exposed to standing water.

19.3 Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

19.4 Clean exposed surface of mirrors not more than 4 days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

End of Section 088300

SECTION 092216

NON-STRUCTURAL METAL FRAMING

PART 1 – GENERAL

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

2. SUMMARY
2.1 This Section includes non-load-bearing steel framing members for the following applications:

2.1.1 Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).

2.1.2 Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

2.2 Related sections include Division 09 Section "Gypsum Board" for gypsum board attached to non-structural metal framing systems.

3. SUBMITTALS
Product Data: For each type of product indicated.

4. QUALITY ASSURANCE
STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

PART 2 – PRODUCTS

5. NON-LOAD-BEARING STEEL FRAMING, GENERAL
5.1 Framing Members, General
Comply with ASTM C754 for conditions indicated.

5.1.1 Steel Sheet Components
Comply with ASTM C645 requirements for metal, unless otherwise indicated.

5.1.2 Protective Coating
Coating with equivalent corrosion resistance of ASTM A653/A653M, G40, hot-dip galvanized, unless otherwise indicated.

6. SUSPENSION SYSTEM COMPONENTS
6.1 Tie Wire
ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.

6.2 Wire Hangers
ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

6.3 Carrying Channels
Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
6.3.1 Depth: 1-1/2 inches

6.4 Furring Channels (Furring Members)
6.4.1 Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8-inch deep
A. Minimum Base Metal Thickness: 0.0179-inch

7. STEEL FRAMING FOR FRAMED ASSEMBLIES

7.1 Steel Studs and Runners: ASTM C645.
7.1.1 Minimum Base-Metal Thickness: As indicated on Drawings.

7.1.2 Depth: As indicated on Drawings.

7.2 Slip-Type Head Joints
Where indicated, provide one (1) of the following:
7.2.1 Double-Runner System: ASTM C645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

7.2.2 Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
A. Products: Subject to compliance with requirements, provide one (1) of the following:
1) Steel Network Inc.; The VertiTrack VTD Series
2) Superior Metal Trim; Superior Flex Track System (SFT)

7.3 Flat Strap and Backing Plate: Steel sheet for blocking and bracing.
7.3.1 Minimum Base-Metal Thickness: Match thickness of steel stud in wall assembly.

7.4 Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.
7.4.1 Depth: 1-1/2 inches

7.4.2 Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel

7.5 Hat-Shaped, Rigid Furring Channels: ASTM C645
7.5.1 Minimum Base Metal Thickness: 0.0179-inch

7.5.2 Depth: 7/8-inch

8. AUXILIARY MATERIALS

8.1 General

Provide auxiliary materials that comply with referenced installation standards.

8.1.1 Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

8.2 Isolation Strip at Exterior Walls: Provide one (1) of the following:

8.2.1 Asphalt-Saturated Organic Felt: ASTM D226, Type I (No. 15 asphalt felt), nonperforated.

8.2.2 Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch thick, in width to suit steel stud size.

PART 3 – EXECUTION

9. EXAMINATION

Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

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

10. PREPARATION

Suspended Assemblies

Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

10.1 Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

11. INSTALLATION, GENERAL

11.1 Installation Standard

ASTM C754, except comply with framing sizes and spacing indicated.

11.1.1 Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

11.2 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

11.3 Install bracing at terminations in assemblies.

11.4 Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

12. INSTALLING SUSPENSION SYSTEMS

12.1 Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

12.2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

12.3 Suspend hangers from building structure as follows:

12.3.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

A. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

12.3.2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

A. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

12.3.3 Wire Hangers

Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

12.3.4 Do not attach hangers to steel roof deck. Attach hangers to structural members.

12.3.5 Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

12.3.6 Do not connect or suspend steel framing from ducts, pipes, or conduit.

12.4 Installation Tolerances

Install suspension systems that are level to within 1/8-inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

13. INSTALLING FRAMED ASSEMBLIES

13.1 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

13.2 Install studs so flanges within framing system point in same direction.

13.2.1 Space studs as follows:

A. Single-Layer Application: 16 inches on center, unless otherwise indicated.

B. Multilayer Application: 16 inches on center, unless otherwise indicated.

C. Tile Backing Panels: 16 inches on center, unless otherwise indicated.

13.3 Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

13.3.1 Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

13.3.2 Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

A. Install two (2) studs at each jamb, unless otherwise indicated.

B. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

C. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

13.3.3 Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

13.3.4 Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

13.4 Installation Tolerance

Install each framing member so fastening surfaces vary not more than 1/8-inch from the plane formed by faces of adjacent framing.

End of Section 092216

SECTION 092900

GYPSUM BOARD

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:

2.1.1 Interior gypsum board

2.2.2 Tile backing panels

2.2.3 Sound attenuation blankets

2.2.2 Ballistic Construction (where specified, refer to drawings)

2.2 Related Sections include the following:

2.2.1 Division 06 Section "Rough Carpentry" for wood framing that supports gypsum board.

2.2.2 Division 07 Section "Thermal Insulation" for sound attenuation insulation installed in assemblies that incorporate gypsum board.

2.2.3 Division 09 "Interior Painting" for primer and paint applied to gypsum board surfaces.

3. SUBMITTALS

Product Data: For each type of product indicated.

4. QUALITY ASSURANCE

STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

5. STORAGE AND HANDLING

Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

6. PROJECT CONDITIONS

6.1 Environmental Limitations

Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

6.2 Do not install interior products until installation areas are enclosed and conditioned.

6.3 Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

6.3.1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

6.3.2 Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 – PRODUCTS

7. PANELS, GENERAL

Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

8. INTERIOR GYPSUM BOARD

8.1 General

Complying with ASTM C36/C36M or ASTM C1396/C1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

8.1.1 Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

A. American Gypsum Co.

B. G-P Gypsum

C. National Gypsum Company

D. USG Corporation

8.2 Type X

8.2.1 Thickness: 5/8-inch

8.2.2 Long Edges: Tapered

8.3 Moisture- and Mold-Resistant Type

With moisture- and mold-resistant core and surfaces.

8.3.1 Core: 5/8-inch, Type X

8.3.2 Long Edges: Tapered

8.4 Acoustically Enhanced Gypsum Board

ASTM C1766. Multilayer products constructed of 2 layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

8.4.1 Core: 5/8-inch, Type X

8.4.2 Long Edges: Tapered

8.5 Ballistic Construction

Threat side of wall: Concealed liner panel with reinforced joints.
Liner Panel Basis of Design: CRL, BRF300. Materials and methods shall meet Standards of UL 752 3, S.P.S.A Protection. Method of application shall maintain bullet resistive rating at junctures with concrete floor slab, bullet resistive window frames, structural column (limit to height of wall), all required penetrations, and entire height / length of wall.

9. TILE BACKING PANELS

Glass-Mat, Water-Resistant Backing Board

9.1 Complying with ASTM C1178/C1178M.

9.1.1 Product: Subject to compliance with requirements, provide "DensShield Tile Guard" by G P Gypsum

9.2 Core: 5/8-inch, Type X

10. TRIM ACCESSORIES

Interior Trim: ASTM C1047

10.1 Material: Galvanized or aluminum-coated steel sheet or rolled zinc

10.2 Shapes

10.2.1 Cornerbead

10.2.2 LC-Bead: J-shaped; exposed long flange receives joint compound

10.2.3 L-Bead: L-shaped; exposed long flange receives joint compound

10.2.4 Expansion (control) joint

11. JOINT TREATMENT MATERIALS

11.1 General: Comply with ASTM C475/C475M

11.2 Joint Tape

11.2.1 Interior Gypsum Wallboard: Paper

11.2.2 Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh

11.2.3 Tile Backing Panels: As recommended by panel manufacturer

11.3 Joint Compound for Interior Gypsum Wallboard

For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

11.3.1 Prefilling: At open joints or beveled panel edges, and damaged surface areas, use drying type, all-purpose compound.

11.3.2 Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

A. Use setting-type compound for installing paper-faced metal trim accessories.

11.3.3 Fill Coat: For second coat, use drying-type, all-purpose compound.

11.3.4. Finish Coat: For third coat, use drying-type, all-purpose compound.

11.4 Joint Compound for Tile Backing Panels

11.4.1 Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting type, sandable topping compound.

11.4.2 Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

12. AUXILIARY MATERIALS

12.1 General
Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

12.2 Laminating Adhesive
Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

12.2.1 Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

12.3 Steel Drill Screws
ASTM C1002, unless otherwise indicated.

12.3.1 Use screws complying with ASTM C954 for fastening panels to steel members from 0.033- to 0.112-inch thick.

12.3.2 For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

12.4 Acoustical Sealant
As specified in Division 07 Section "Joint Sealants".

12.4.1 Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

12.5 Sound-Attenuation Blankets
Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C665 for Type I (blankets without membrane facing).

12.5.1 Sound-attenuation blankets shall be U.S. Gypsum Thermafiber Sound Attenuation Fire Blankets or equal. Thickness as indicated on Drawings.

PART 3 – EXECUTION

13. EXAMINATION

13.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

13.2 Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

14. APPLYING AND FINISHING PANELS, GENERAL

14.1 Comply with ASTM C840.

14.2 Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than 1 framing member.

14.3 Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16-inch of open space between panels. Do not force into place.

14.4 Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

14.5 Form control and expansion joints with space between edges of adjoining gypsum panels.

14.6 Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

14.6.1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 square feet in area.

14.6.2 Fit gypsum panels around ducts, pipes, and conduits.

14.6.3 Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

14.7 Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

14.8 Attachment to Steel Framing
Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

14.9 STC-Rated Assemblies
Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

14.10 Install sound-attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

15. APPLYING INTERIOR GYPSUM BOARD

15.1 Install interior gypsum board in the following locations:

15.1.1 Type X: As indicated on Drawings.

15.1.2 Moisture- and Mold-Resistant Type: As indicated on Drawings.

15.2 Single-Layer Application

15.2.1 On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.

15.2.2 On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

A. Stagger abutting end joints not less than 1 framing member in alternate courses of panels.

B. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

15.2.3 On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

15.2.4 Fastening Methods: Apply gypsum panels to supports with steel drill screws.

15.3 Multilayer Application

15.3.1 On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one (1) framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire resistance rated assembly.

15.3.2 On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least 1 stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

15.3.3 On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one (1) furring member. Locate edge joints of base layer over furring members.

15.3.4 Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

15.4 Laminating to Substrate

Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

16. APPLYING TILE BACKING PANELS

16.1 Water-Resistant Gypsum Backing Board

Install at wet walls (walls with plumbing) and scheduled to receive paint finish.
Install with 1/4-inch gap where panels abut other construction or penetrations.

16.2 Glass-Mat, Water-Resistant Backing Panel
Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.

16.3 Areas Not Subject to Wetting
Install regular-type gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.

16.4 Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

17. INSTALLING TRIM ACCESSORIES

17.1 General
For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

17.2 Control Joints
Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

17.3 Interior Trim: Install in the following locations:
17.3.1 Cornerbead: Use at outside corners.

17.3.2 LC-Bead: Use at exposed panel edges.

17.3.3 L-Bead: Use where indicated.

18. FINISHING GYPSUM BOARD

18.1 General
Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required, to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

18.2 Prefill open joints or beveled edges, and damaged surface areas.

18.3 Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

18.4 Gypsum Board Finish Levels
Finish panels to levels indicated below and according to ASTM C840 and GA-214-96:
18.4.1 Level 1: Ceiling plenum areas, concealed areas, and where indicated.

18.4.2 Level 2: Panels that are substrate for tile.

18.4.3 Level 5: At panel surfaces that will be exposed to view, unless otherwise indicated.
A. Primer and its application to surfaces are specified in other Division 09 Sections.

18.5 Glass-Mat, Water-Resistant Backing Panels
Finish according to manufacturer's written instructions.

19. PROTECTION

19.1 Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

19.2 Remove and replace panels that are wet, moisture damaged, and mold damaged.

19.2.1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

19.2.2 Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

End of Section 092900

SECTION 093013

TILING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes the following:
Unglazed porcelain mosaic tile.

2.2 Related Sections
The following Sections contain requirements that relate to this Section:

2.2.1 Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.

2.2.2 Division 09 Section "Gypsum Board" for drywall installed as part of gypsum wallboard systems.

3. SUBMITTALS

3.1 Product data for each type of product specified.

3.2 Samples for initial selection purposes in form of manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures, and patterns available for each type and composition of tile indicated. Include samples of grout and accessories involving color selection.

3.3 Samples for verification purposes of each item listed below, prepared on samples of size and construction indicated, products involve color and texture variations, in sets showing full range of variations expected.

3.3.1 Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on plywood or hardboard backing and grouted.

3.3.2 Full-size units of each type of trim and accessory for each color required.

3.3.3 Metal edge strips in 6-inch lengths.

3.3.4 Stone threshold in 6-inch length and profile indicated on the Drawings.

4. QUALITY ASSURANCE

4.1 Single-Source Responsibility for Tile
Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

4.2 Single-Source Responsibility for Setting and Grouting Materials
Obtain ingredients of a uniform quality from one (1) manufacturer for each cementitious and admixture component and from one (1) source or producer for each aggregate.

4.3 Installer Qualifications
Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

4.4 Field-Constructed Mock-Up
Before installing tile, erect mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.

4.4.1 Locate mock-ups on site in location and size indicated or, if not indicated, directed by Architect.

4.4.2 Demonstrate the proposed range of aesthetic effects and workmanship.

4.4.3 Obtain Architect's acceptance of mock-ups before start of final unit of Work.

4.4.4 Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging completed unit of Work.

A. Accepted mock-ups in undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

5. DELIVERY, STORAGE, AND HANDLING

5.1 Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

5.2 Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

6. PROJECT CONDITIONS

6.1 Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

6.2 Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

6.3 Maintain temperatures at 50 degrees F or more in tiled areas during installation and for seven (7) days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

PART 2 – PRODUCTS

7. MANUFACTURERS

Subject to compliance with requirements, provide products as follows:

7.1 Mortars and Grouts

7.1.1 American Olean Tile Co., Inc.

7.1.2 Bostik Construction Products Div.

7.1.3 C-Cure Chemical Co.

7.1.4 Laticrete International Inc.

8. PRODUCTS, GENERAL

8.1 ANSI Standard for Ceramic Tile

Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.

8.1.1 Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

8.2 ANSI Standard for Tile Installation Materials

Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

8.3 Colors, Textures, and Patterns

Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

8.3.1 Provide selections made by Architect from manufacturer's full range of colors, textures, and patterns for products of type indicated.

8.4 Factory Blending

For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one (1) package show the same range in colors as those taken from other packages and match approved samples.

9. ACCESSORIES

9.1 Trim Units

Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:

9.1.1 Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.

9.1.2 Shapes: As follows, selected from manufacturer's standard shapes:

A. Wainscot Cap for Thinset Mortar Installations: Surface bullnose.

B. External Corners for Thinset Installations: Surface bullnose.

C. Internal Corners: Field-butted square corners, except use coved base and cap angle pieces designed to member with stretcher shapes.

D. Special Shapes: Provide stop shapes and returns as required at door jambs where frames do not provide sufficient stop for the work.

10. SETTING MATERIALS

10.1 Thin Set Portland Cement Mortar

Where thin set Portland cement mortar applications are indicated, use the following unless otherwise required.

10.1.1 Dry Set Portland cement mortar, ANSI A118.1, factory sanded; or latex Portland cement mortar, ANSI A 118.4.

10.2 Chemical Resistant Epoxy Mortar

ANSI A118.3

10.2.1 Provide product capable of resisting continuous and intermittent exposure to temperatures of up to 140 degrees F and 212 degrees F, respectively, as certified by mortar manufacturer for intended use.

10.2.2 Use chemical resistant epoxy mortar at all porcelain tile and mosaic floors.

11. GROUTING MATERIALS

11.1 Latex Portland Cement Grout

Proprietary pre-blended compound of Portland cement selected and graded aggregates, color pigments and chemical additives gaged with latex additive to comply with manufacturer's directions. Comply with ANSI A118.6.

11.1.1 Use latex additive in grout, which is compatible with latex additive in latex-Portland cement mortar. Use un-sanded type at glazed wall tile.

11.2 Chemical-Resistant Epoxy Grout

ANSI A118.3

11.2.1 Provide product compatible with epoxy mortar: Use at mosaic floor at restrooms.

11.3 Grout Colors: Grout colors shall be as selected by Architect.

12. ELASTOMERIC SEALANTS

12.1 General

Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with requirements of Division 07 Section "Joint Sealants," including ASTM C920 as referenced by Type, Grade, Class, and Uses.

12.2 Colors

Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

12.3 One-Part Mildew-Resistant Silicone Sealant
Type S; Grade NS; Class 25; Uses NT, G, A, and as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

12.4 Chemical-Resistant Sealants
For chemical-resistant floors, provide sealants compatible with chemical-resistant mortars and grouts, approved for use indicated by manufacturers of both mortar/grout and sealant and with chemical-resistance properties equivalent to mortar/grout.

12.5 Products
Subject to compliance with requirements, provide one (1) of the following:
12.5.1 One-Part Mildew-Resistant Silicone Sealant
A. "Dow Corning 786"; Dow Corning Corp.
B. "SCS 1702"; General Electric Co.
C. "863 #345 White"; Pecora Corp.
D. "Proglaze White"; Tremco Corp.

13. MISCELLANEOUS MATERIALS

13.1 Metal Edge Strips
Zinc alloy or stainless-steel terrazzo strips, 1/8-inch wide at top edge with integral provision for anchorage to mortar bed or substrate unless otherwise indicated. Refer to the floor transition details in the Drawings.

13.2 Tile Cleaner
Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.

13.3 Release Coat: As recommended by manufacturer.

14. MIXING MORTARS AND GROUT

Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3 – EXECUTION

15. EXAMINATION

15.1 Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
15.1.1 Grind down all ridges and other irregularities.

15.1.2 Fill all cracks, holes, and depressions with leveling and patching compounds as recommended by ceramic tile manufacturer.

15.1.3 Check with the Contractor to ensure that the effects of the concrete curing agent have been removed and that the proper finish to receive the tile work is on the floor.

15.1.4 Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.

15.1.5 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located, in or behind tile has been completed before installing tile.

15.2 Do not proceed with installation until unsatisfactory conditions have been corrected.

16. PREPARATION

16.1 Blending
For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one (1) package show the same range in 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.

16.2 Field-Applied Temporary Protective Coating
Where needed to prevent adhesion or staining of exposed tile surfaces by grout, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating them with a continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

17. INSTALLATION, GENERAL

17.1 ANSI Tile Installation Standard
Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.

17.2 TCA Installation Guidelines
TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.

17.3 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

17.4 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 that plates, collars, or covers overlap tile.

17.5 Jointing Pattern
Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.

17.6 Grout tile to comply with the referenced installation standards, using grout materials indicated.

17.6.1 Mix and install proprietary components to comply with grout manufacturer's directions.

18. FLOOR INSTALLATION METHODS

18.1 Tile

Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types. Slope floor to floor drain.

18.1.1 Dry-Set Mortar or Latex-Portland Cement Mortar and Grout (at Dry, Non-Toilet Locations)

A. Concrete Subfloors, Interior: TCA F113

B. Grout: Latex-Portland cement

18.1.2 Chemical-Resistant Epoxy Mortar and Grout (at All Porcelain Tile and Mosaic Floors)

A. Concrete Subfloors, Interior: TCA F131

B. Grout: Chemical-resistant epoxy

18.2 Metal Edge Strips

Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

19. WALL TILE INSTALLATION METHODS

19.1 Install types of tile designated for wall application to comply with requirements indicated below for setting-bed methods, TCA installation methods related to subsurface wall conditions, and grout types:

19.1.1 Thin-Set Latex-Cement Mortar (at Dry, Non-Shower Locations)

A. Masonry, Interior: TCA W202

B. Metal Studs, Interior: TCA W245

C. Grout: Latex-Portland cement, un-sanded type

19.2 Install sealant at all joints at interior corners and door jambs.

20. CLEANING AND PROTECTION

20.1 Cleaning

Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

20.1.1 Remove grout residue from tile as soon as possible.

20.1.2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

20.1.3 Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to grout manufacturer. Trap and remove coating to prevent it from clogging drains.

20.2 Finished Tile Work
Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

20.3 Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of Substantial Completion.

20.3.1 When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

20.3.2 Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.

20.4 Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

End of Section 093013

SECTION 095113

ACOUSTICAL PANEL CEILINGS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

This Section includes:

2.1 Acoustical panels and exposed suspension systems for ceilings

2.2 Tectum Panels (Gym)

3. DEFINITIONS

3.1 AC: Articulation Class

3.2 CAC: Ceiling Attenuation Class

3.3 LR: Light Reflectance Coefficient

3.4 NRC: Noise Reduction Coefficient

4. SUBMITTALS

4.1 Product Data: For each type of product indicated.

4.2 Samples for Verification

For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

4.2.1 Acoustical Panel: Set of full-size Samples of each type, color, pattern, and texture.

4.2.2 Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch-long Samples of each type, finish, and color.

4.3 Maintenance Data: For finishes to include in maintenance manuals.

5. QUALITY ASSURANCE

5.1 Source Limitations

Obtain each type of acoustical ceiling panel and supporting suspension system through one (1) source from a single manufacturer.

5.2 Fire-Test-Response Characteristics

Provide acoustical panel ceilings that comply with the following requirements:

5.2.1 Surface-Burning Characteristics: Provide acoustical panels with surface-burning characteristics complying with ASTM E1264 for Class A materials as determined by testing identical products per ASTM E84.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

6.2 Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

6.3 Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

7. PROJECT CONDITIONS

Environmental Limitations

Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

7.1 Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

8. COORDINATION

Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 – PRODUCTS

9. ACOUSTICAL PANELS, GENERAL

9.1 Acoustical Panel Standard

Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.

9.1.1 Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E795.

9.2 Acoustical Panel Colors and Patterns

Match appearance characteristics indicated for each product type.

9.2.1 Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

9.3 Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment

Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274 or ASTM G21.

10. ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

10.1 Manufacturers
Subject to compliance with requirements, provide products scheduled on Drawings.

10.2 Color: As scheduled and shown on Drawings.

10.3 Edge/Joint Detail: As scheduled and shown on Drawings.

10.4 Thickness: As scheduled and shown on Drawings.

10.5 Modular Size: As scheduled and shown on Drawings.

10.6 Antimicrobial Treatment: Broad-spectrum fungicide and bactericide based.

11. METAL SUSPENSION SYSTEMS, GENERAL

11.1 Metal Suspension System Standard
Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C635.

11.2 Finishes and Colors, General
Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

11.3 Attachment Devices
Size for five (5) times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

11.3.1 Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing per ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

A. Type: Post-installed expansion anchors

B. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5 for Class SC one (1) service condition

C. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B164 for UNS No. N04400 alloy.

11.4 Wire Hangers, Braces, and Ties
Provide wires complying with the following requirements:

11.4.1 Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.

11.4.2 Nickel-Copper-Alloy Wire: ASTM B164, nickel-copper-alloy UNS No. N04400.

11.4.3 Size: Select wire diameter so its stress at three (3) times hanger design load (ASTM C635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

11.5 Hanger Rods: Mild steel, zinc-coated or protected with rust-inhibitive paint.

12. METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

12.1 Wide-Face, Capped, Double-Web, Steel Suspension System
Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc-coated, or hot-dip galvanized according to ASTM A653/A653M, not less than G30 coating designation, with prefinished 15/16-inch-wide metal caps on flanges.

12.1.1 Structural Classification: Intermediate-duty system

12.1.2 End Condition of Cross Runners: Override (stepped) or butt-edge type

12.1.3 Face Design: Flat, flush

12.1.4 Cap Material: Steel cold-rolled sheet

12.1.5 Cap Finish: Painted white

13. METAL EDGE MOLDINGS AND TRIM

13.1 Products
Subject to compliance with requirements, provide products by the acoustical panel ceiling manufacturer.

13.2 Roll-Formed, Sheet-Metal Edge Moldings and Trim
Manufacturer's standard moldings for edges and penetrations that comply with design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

13.2.1 Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.

13.2.2 For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

14. ACOUSTICAL SEALANT

14.1 Acoustical Sealant for Exposed and Concealed Joints
Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

14.2 Acoustical Sealant for Concealed Joints
Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

15. TECTUM PANELS

Provide and install Tectum Panels in Gym. All Tectum Panels shall have a square edge top and bottom. Provide chamfer edges to vertical butt joints. The panels shall be standard 4-foot wide panels. Tectum panels on the walls shall be 2 inches thick. The finish of the tectum shall be factory primed.

15.1 Install as follows:

A. Chamfer vertical butt joints

B. Tectum install with wood trim

C. 1-1/2 inch batt installation between nailers – batt unfaced

D. Masterweld 948 tp seal for high impact

E. For additional information, see details on Drawings.
Refer to Detail A on Sheet A6.10, and Detail 14 on Sheet A8.10.

PART 3 – EXECUTION

15. EXAMINATION

Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

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

16. PREPARATION

Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on Reflected Ceiling Plans.

17. INSTALLATION

17.1 General

Install acoustical panel ceilings to comply with ASTM C636 and design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

17.2 Suspend ceiling hangers from building's structural members and as follows:

17.2.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

17.2.2 Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

17.2.3 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

17.2.4 Secure wire hangers to ceiling suspension members and to supports above with a minimum of three (3) tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

17.2.5 Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

17.2.6 Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

17.2.7 When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

17.2.8 Do not attach hangers to steel deck tabs.

17.2.9 Do not attach hangers to steel roof deck. Attach hangers to structural members.

17.2.10 Space hangers not more than 48 inches on center along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

17.2.11 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

17.3 Secure bracing wires to ceiling suspension members and to supports with a minimum of four (4) tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with post-installed anchors.

17.4 Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

17.4.1 Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

17.4.2 Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8-inch in 12 feet. Miter corners accurately and connect securely.

17.4.3 Do not use exposed fasteners, including pop rivets, on moldings and trim.

17.5 Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

17.6 Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

17.6.1 Arrange directionally patterned acoustical panels as follows:

A. Install panels with pattern running in one (1) direction parallel to short axis of space.

17.6.2 For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

17.6.3 Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

18. CLEANING

Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

End of Section 095113

SECTION 096513

RESILIENT BASE, RESILIENT MATERIALS AND ACCESSORIES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Resilient base

2.1.2 Resilient molding accessories

2.1.3 Rubber Stair Treads

2.2 Related Sections: Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

3. SUBMITTALS

3.1 Product Data: For each type of product indicated.

3.2 Samples for Initial Selection: For each type of product indicated.

3.3 Samples for Verification
For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

4. QUALITY ASSURANCE

4.1 This contractor to identify different thicknesses, forms, and heights of materials, applicable to the project, prior to order and installation. Refer to Drawings.

4.2 Fire-Test-Response Characteristics
As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

4.3 Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

5. DELIVERY, STORAGE, AND HANDLING

Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F or more than 90 degrees F.

6. PROJECT CONDITIONS

6.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, in spaces to receive resilient products during the following time periods:

6.1.1 48 hours before installation

6.1.2 During installation

6.1.3 48 hours after installation

6.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.

6.3 Install resilient products after other finishing operations, including painting, have been completed.

PART 2 – PRODUCTS

7. RESILIENT BASE

7.1 Resilient Base

Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

7.1.1 Burke Mercer Flooring Products; Division of Burke Industries, Inc.

7.1.2 Johnsonite

7.1.3 Roppe Corporation, USA

7.1.4 VPI, LLC; Floor Products Division

7.2 Resilient Base Standard: ASTM F1861.

7.2.1 Material Requirement: Type TP (rubber, thermoplastic)

7.2.2 Manufacturing Method: Group I (solid, homogeneous)

7.2.3 Style: Cove (base with toe)

7.3 Minimum Thickness: 0.125-inch

7.4 Height: 4 inches

7.5 Lengths: Coils in manufacturer's standard length

7.6 Outside Corners: Job formed

7.7 Inside Corners: Job formed

7.8 Finish: Matte

7.9 Colors and Patterns: As selected by Architect from full range of industry colors

8. RESILIENT MOLDING ACCESSORY

8.1 Resilient Molding Accessory

Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

8.1.1 Burke Mercer Flooring Products; Division of Burke Industries, Inc.

8.1.2 Johnsonite

8.1.3 Roppe Corporation, USA

8.1.4 VPI, LLC; Floor Products Division

8.2 Description

Reducer strip for resilient floor covering, transition strips and other miscellaneous resilient accessories required for complete installation

8.3 Material: Rubber

8.4 Profile and Dimensions: As indicated and as required for specific application

8.5 Colors and Patterns: As selected by Architect from full range of industry colors

9. RUBBER STAIR TREADS

9.1 Furnish and install rubber stair treads and flooring, entry, and molded cover stair risers equal to Roppe, or the approved equal as detailed on the plans for treads and risers on stairs as specified in the Room Finish Schedule. Shall be round pattern, 3/16-inch- thick, in 19-11/16 x 19-11/16 inches square tile size. Tile shall have a Flame Spread Rating of 25 or less when tested in accordance with ASTM-E84 Test. Tile shall have a sanded back; be made of properly cured rubber compound, homogenous throughout, free from embedded foreign material, and shall be good quality, resistant to alkali, cleaning agents and light.

9.1.1 Rubber stair treads shall extend the full width of the stair and the depth of the treads. Provide one at the top step with safety rubber landing tile-abutting tread.

9.1.2 Provide and install two-piece rubber transition strips where tile flooring meets another flooring type (rubber, VCT and the carpeting).

10. INSTALLATION MATERIALS

10.1 Trowelable Leveling and Patching Compounds

Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

10.2 Adhesives

Adhesives by single-source manufacturer. Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 – EXECUTION

11. EXAMINATION

11.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

11.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

12. PREPARATION

12.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

12.2 Concrete Substrates for Resilient Stair Treads and Accessories
Prepare according to ASTM F710.

12.2.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

12.2.2 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

12.2.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

12.2.4 Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

A. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water/1,000 sq. ft. in 24 hours.

12.3 Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

12.4 Do not install resilient products until they are same temperature as the space where they are to be installed.

11.4.1 Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

12.5 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

13. INSTALLATION – GENERAL

All installations shall be performed in such manner that manufacturer's warranty is maintained. Comply with manufacturer's written instructions.

14. INSTALLATION – RESILIENT BASE

14.1 Comply with manufacturer's written instructions for installing resilient base.

14.2 Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

14.3 Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

14.4 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

14.5 Do not stretch resilient base during installation.

14.6 On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

14.7 Job-Formed Corners

14.7.1 Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.

14.7.2 Inside Corners: Use straight pieces of maximum lengths possible.

15. INSTALLATION – RESILIENT ACCESSORY

15.1 Comply with manufacturer's written instructions for installing resilient accessories.

15.2 Resilient Molding Accessories
Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

16. INSTALLATION – RUBBER STAIR TREADS

16.1 Comply with manufacturer's written instructions for installing rubber stair treads.

16.2 Installation shall be according to manufacturer's recommendations including the following:

16.2.1 Surface Preparation: Shall be clean, dry and free of dust, dirt, wax, grease, loose paint or particles, old adhesives, etc.

16.2.2 Adhesive must be as approved by manufacturer.

16.2.3 Stair Treads: After stair tread is cut to length, apply epoxy nose caulk as recommended by manufacturer.

A. The nose of the tread must fit tightly against the face of the stair-riser or nosing. Any open spaces at the nosing between the step and tread must be filled with epoxy caulking compound (Nose filler).

B. When butting treads together, make sure edges are square. Epoxy adhesive must be used.

C. Avoid traffic of finished floor for a minimum of twelve (12) hours after installation.

17. CLEANING AND PROTECTION

17.1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.

17.2 Perform the following operations immediately after completing resilient product installation:

17.2.1 Remove adhesive and other blemishes from exposed surfaces

17.2.2 Sweep and vacuum surfaces thoroughly

17.2.3 Damp-mop surfaces to remove marks and soil

17.3 Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

17.4 Cover resilient products until Substantial Completion.

End of Section 096513

SECTION 096519

RESILIENT TILE FLOORING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes luxury vinyl floor tile.

2.2 Related Sections

Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

3. SUBMITTALS

3.1 Product Data: For each type of product indicated

3.2 Samples for Initial Selection: For each type of floor tile indicated

3.3 Samples for Verification: Full-size units of each color and pattern of floor tile required

3.4 Maintenance Data: For each type of floor tile to include in maintenance manuals

4. QUALITY ASSURANCE

4.1 Installer Qualifications

A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation.

4.2 Fire-Test-Response Characteristics

As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

4.2.1 Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

5. DELIVERY, STORAGE, AND HANDLING

Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F or more than 90 degrees F. Store floor tiles on flat surfaces.

6. PROJECT CONDITIONS

6.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, in spaces to receive floor tile during the following time periods:

6.1.1 48 hours before installation

6.1.2 During installation

6.1.3 48 hours after installation

6.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.

6.3 Close spaces to traffic during floor tile installation.

6.4 Close spaces to traffic for 48 hours after floor tile installation.

6.5 Install floor tile after other finishing operations, including painting, have been completed.

PART 2 – PRODUCTS

7. LUXURY VINYL FLOOR TILE

Subject to compliance with requirements, provide products as scheduled on Drawings.

7.1 Approved Manufacturers / Products

7.1.1 Mannington Commercial and its subsidiary Burke Flooring: Luxury Vinyl Tile

7.1.2 Tarkett Commercial and its subsidiary Johnsonite Flooring: Luxury Vinyl Tile

7.1.3 Roppe Corp.: Northern Paralells Premium Vinyl Tile

7.1.4 Flexco Floors, a subsidiary of Roppe Corp.: Natural Elements Vinyl Tile

7.1.5 VPI Surfacing Everywhere: Premium Resilient Tile

7.2 Minumum Requirements

7.2.1 Minimum Requirements: ASTM F 1700 Solid Vinyl Floor Tile, Class III and shall meet Class 1 NFPA Life Safety Code.

7.2.1 Minimal Requirements: Min 20 mill wear layer

7.2.1 Nominal Thickness: Min .120 inch (3mm) gauge

7.2.1 Edge: Straight. Micro bevel accepted

7.2.1 Nominal Size: 12 in. x 24 in., or equivalent.

7.3 Color: To be selected by Architect from Manufacturer's standard Range.

7.4 Adhesive: Per MFR recommended adhesive and shall be manufactured by flooring company. Installation shall maintain a 20 year warranty.

8. INSTALLATION MATERIALS

8.1 Trowelable Leveling and Patching Compounds
Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated

8.2 Adhesives
Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
8.2.1 Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
A. VCT and Asphalt Tile Adhesives: Not more than 50 g/L

8.3 Floor Polish
Provide protective liquid floor polish products as recommended by manufacturer.

PART 3 – EXECUTION

9. EXAMINATION

9.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

9.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

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

10. PREPARATION

10.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

10.2 Concrete Substrates: Prepare according to ASTM F710.
10.2.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

10.2.2 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

10.2.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

10.2.4 Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
A. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1,000 sq. ft. in 24 hours.

10.3 Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

10.4 Do not install floor tiles until they are same temperature as space where they are to be installed.
10.4.1 Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

10.5 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

11. FLOOR TILE INSTALLATION

11.1 Comply with manufacturer's written instructions for installing floor tile.

11.2 Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
11.2.1 Lay tiles square with room axis.

11.3 Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
11.3.1 Lay tiles with grain running in 1 direction.

11.4 Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

11.5 Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

11.6 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other non-permanent, nonstaining marking device.

11.7 Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

11.8 Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

12. CLEANING AND PROTECTION

12.1 Comply with manufacturer's written instructions for cleaning and protection of floor tile.

12.2 Perform the following operations immediately after completing floor tile installation:
12.2.1 Remove adhesive and other blemishes from exposed surfaces

12.2.2 Sweep and vacuum surfaces thoroughly

12.2.3 Damp-mop surfaces to remove marks and soil

12.3 Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

12.4 Floor Polish
Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.

12.5 Cover floor tile until Substantial Completion.

End of Section 096519

SECTION 096536

STATIC-CONTROL RESILIENT FLOORING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes: Static-dissipative, vinyl composition floor tile.

2.2 Related Sections: Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with static-control resilient floor coverings.

3. PERFORMANCE REQUIREMENTS

3.1 Static-Dissipative Properties

Provide floor coverings with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.

3.1.1 Electrical Resistance: Point-to-point and point-to-ground: 106 to 109 ohms (Test Method ASTM F150).

3.1.2 Resistance in Combination with a Person: At 12 percent relative humidity with dissipative footwear: 106 to 109 ohms (Test Method ANSI/ESD STM 97.1).

3.1.3 Static Generation: At 40 percent relative humidity with dissipative footwear: <10 volts (Test Method ANSI/ESD STM 97.2).

3.1.4 Static Generation: At 12 percent relative humidity with dissipative footwear: <10 volts (Test Method ANSI/ESD STM 97.2).

3.1.5 Static Dissipation: At 12 percent relative humidity with dissipative footwear: 1,000 to 100 volts: 0.2 seconds avg. (Test Method ETS Dissipation).

3.2 International Product Specifications: ASTM F1066 Class 2 – Through Pattern.

4. SUBMITTALS

4.1 Product Data: For each type of product indicated.

4.2 Shop Drawings

For each type of floor covering. Include floor covering layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

4.2.1 Show details of special patterns.

4.2.2 Submit grounding diagram showing location of grounding strips and connections.

4.3 Samples for Initial Selection: For each type of floor covering indicated.

4.4 Qualification Data: For qualified Installer.

4.5 Product Test Reports
Based on evaluation of comprehensive tests performed by a qualified testing agency, for floor coverings.

4.6 Field quality-control reports.

4.7 Maintenance Data: For each type of floor covering to include in maintenance manuals.

5. QUALITY ASSURANCE

5.1 Installer Qualifications
A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation indicated.
5.1.1 Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

5.2 Fire-Test-Response Characteristics
As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
5.2.1 Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

5.3 Mock-Ups
Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
5.3.1 Build mock-ups for floor coverings including resilient base and accessories.
A. Size: Minimum 100 square feet for each type, color, and pattern in locations directed by Architect.

5.4 Preinstallation Conference
Conduct conference at Project site.
5.4.1 Review methods and procedures related to static-control resilient floor coverings including, but not limited to, the following:
A. Examination and preparation of substrates to receive floor covering

B. Installation

C. Field quality-control testing

6. DELIVERY, STORAGE, AND HANDLING

Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than 50 degrees F or more than 90 degrees F.
6.1 Floor Tile: Store on flat surfaces.

7. PROJECT CONDITIONS

7.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 85 degrees F, in spaces to receive floor coverings during the following time periods:

7.1.1 48 hours before installation

7.1.2 During installation

7.1.3 48 hours after installation

7.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.

7.3 Close spaces to traffic during floor covering installation.

7.4 Close spaces to traffic for 48 hours after floor covering installation.

7.5 Install floor coverings after other finishing operations, including painting, have been completed.

8. EXTRA MATERIALS

8.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

8.1.1 Floor Tile: Furnish one (1) box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 – PRODUCTS

9. STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

Static-Dissipative, Vinyl Composition Floor Tile
ASTM F1066 (vinyl composition floor tile, non-asbestos formulated), Class 2 (through-pattern tile).

9.1.1 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

A. Armstrong World Industries, Inc.; SDT; Static Dissipative Tile

9.1.2 Overall Thickness: Not less than 0.125-inch

9.1.3 Wear Layer Thickness: Not less than 0.125-inch

9.1.4 Size: 12 by 12 inches

9.1.5 Colors and Patterns: As selected by Architect from full range of industry colors

10. INSTALLATION MATERIALS

10.1 Trowelable Leveling and Patching Compounds
Latex-modified, Portland cement or blended hydraulic cement-based formulation provided or approved by manufacturer for applications indicated.

10.2 Static-Control Adhesive
Provided or approved by manufacturer; type that maintains electrical continuity of floor covering system to ground connection.
10.2.1 Vinyl Composition Floor Tile Adhesives: Not more than 50 g/L.

10.3 Grounding Strips
Provided or approved by manufacturer; type and size that maintains electrical continuity of floor covering system to ground connection.

10.4 Maintenance Floor Tiles
Special floor tiles inscribed "Conductive floor. Do not wax."

10.5 Floor Polish
Provide protective, static-control liquid floor polish products as recommended by floor covering manufacturer.

PART 3 – EXECUTION

11. EXAMINATION

11.1 Examine substrates, with Installer and manufacturer's representative present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

11.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.

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

12. PREPARATION

12.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings and electrical continuity of floor covering systems.

12.2 Concrete Substrates
Prepare according to ASTM F710.
12.2.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

12.2.2 Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

12.2.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

12.2.4 Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

A. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water/1,000 sq. ft. in 24 hours.

B. Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

12.3 Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

12.4 Do not install floor coverings until they are same temperature as space where they are to be installed.

12.4.1 Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

12.5 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

13. INSTALLATION, GENERAL

13.1 Install static-control resilient floor covering according to manufacturer's written instructions.

13.2 Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static control resilient floor covering surfaces to ground connections.

13.3 Scribe, cut, and fit floor coverings to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

13.4 Extend floor coverings into toe spaces, door reveals, closets, and similar openings. Extend floor covering to center of door openings.

13.5 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

13.6 Install floor coverings on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of floor coverings installed on covers. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

13.7 Adhere floor coverings to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

14. FLOOR TILE INSTALLATION

14.1 Comply with manufacturer's written instructions for installing floor tile.

14.2 Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

14.2.1 Lay floor tiles square with room axis.

14.3 Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.

14.3.1 Lay static-dissipative, vinyl composition floor tiles with grain running in one (1) direction unless otherwise instructed by Architect.

14.4 In each space where conductive, solid vinyl floor tile is installed, install maintenance floor tile identifying conductive floor tile in location approved by Architect.

15. FIELD QUALITY CONTROL

15.1 Testing

Engage a qualified testing agency to test electrical resistance of static-control resilient floor covering systems for compliance with requirements.

15.1.1 Arrange for testing after installation static-control adhesives have fully cured and floor covering systems have stabilized to ambient conditions and after ground connections are completed.

15.1.2 Arrange for testing of floor coverings after performing floor polish procedures.

15.2 Static-control resilient floor coverings will be considered defective if they do not pass tests and inspections.

15.3 Prepare test and inspection reports.

16. CLEANING AND PROTECTION

16.1 Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

16.2 Perform the following operations immediately after completing floor covering installation:

16.2.1 Remove static-control adhesive and other blemishes from exposed surfaces.

16.2.2 Sweep and vacuum surfaces thoroughly.

16.2.3 Damp-mop surfaces to remove marks and soil.

16.3 Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

16.3.1 Do not wax static-control resilient floor coverings.

16.3.2 If recommended in writing by manufacturer, apply protective static-control floor polish formulated to maintain or enhance floor covering's electrical properties to floor covering surfaces that are free from soil, static-control adhesive, and surface blemishes.

A. Verify that both floor polish and its application method are approved by manufacturer and that floor polish will not leave an insulating film that reduces floor coverings' effectiveness for static control.

16.4 Cover floor coverings until Substantial Completion.

End of Section 096536

SECTION 096723

RESINOUS FLOORING AND MATERIALS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

Section Includes

2.1 Resinous flooring

2.2 Integral cove base accessories

3. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3.1 Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.

3.2 Review details of integral cove bases.

3.3 Review manufacturer's written instructions for installing resinous flooring systems.

3.4 Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

4. ACTION SUBMITTALS

4.1 Product Data: For each type of product.

4.1.1 Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

4.2 Samples for Initial Selection: For each type of exposed finish required.

4.3 Samples for Verification

For each resinous flooring system required and for each color and texture specified, 6 inches square, applied to a rigid backing by Installer for this Project.

5. INFORMATIONAL SUBMITTALS

5.1 Material Certificates: For each resinous flooring component

5.2 Material Test Reports: For each resinous flooring system, by a qualified testing agency

5.3 Field quality-control reports

6. CLOSEOUT SUBMITTALS

Maintenance Data: For resinous flooring to include in maintenance manuals.

7. QUALITY ASSURANCE

7.1 Installer Qualifications

An authorized representative who is trained and approved by manufacturer.

7.1.1 Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

7.2 Mockups

Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

7.2.1 Apply full-thickness mockups on 96-inch-square floor area selected by Architect.

A. Include 96-inch length of integral cove base with inside corner.

7.2.2 General Contractor shall provide equivalent to finish lighting conditions for Architect's review of mockups.

7.2.3 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

7.2.4 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

8. DELIVERY, STORAGE, AND HANDLING

Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer’s labels indicating brand name and directions for storage and mixing with other components.

9. FIELD CONDITIONS

9.1 Environmental Limitations

Comply with resinous flooring manufacturer’s written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.

9.2 Lighting: General Contractor shall provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.

9.3 Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

PART 2 – PRODUCTS

10. PERFORMANCE REQUIREMENTS

10.1 Verify flooring products comply with the requirements of the California Department of Public Health’s “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.”

10.2 Flammability: Self-extinguishing in accordance with ASTM D635.

11. RESINOUS FLOORING

11.1 Resinous Flooring System

Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

11.1.1 Subject to compliance with requirements, provide products by Rio Flooring Systems, DESCO Coating, or approved equal

11.1.2 System Type: Modified urethane concrete

11.1.3 Surface Preparation: Shot blast, IRCI CSP 3-5

11.1.4 Body Coat: Eco-Crete SF 3/16-inch

11.1.5 Intermediate Coat: Broadcast Media: BC medium, quartz to excess

11.1.6 Finish Coat: Eco-Crete TC at approximately 150-square feet per gallon

11.2 Source Limitations

Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

11.3 System Characteristics

11.3.1 Color and Pattern: As selected by Architect from manufacturer's full range

11.3.2 Wearing Surface: Orange-peel texture

11.3.3 Overall System Thickness: 20 mils

12. INTEGRAL COVE BASE ACCESSORIES

12.1 Integral Cove Base

Impact-resistant, polymer-resin, cove base to match floor system.

12.1.1 Subject to compliance with requirements, provide products by the following, or approved equal:

A. Tenant to match resinous floor system

12.1.2 Radius Cove Base

4-inch-high base molding that provides approximately 1-inch radius cove at floor-to-wall joint; for adhesive installation as substrate for resinous flooring system to form an integral cove base.

PART 3 – EXECUTION

13. EXAMINATION

13.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

13.1.1 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

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

14. PREPARATION

14.1 Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.

14.2 Concrete Substrates

Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

14.2.1 Moisture Testing: Perform tests so that each test area does not exceed 1,000 sq. ft. and perform no fewer than 3 tests in each installation area and with test areas evenly spaced in installation areas.

A. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1,000 sq. ft. in 24 hours.

B. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

14.2.2 Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer.

14.2.3 Roughen concrete substrates as follows:

A. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

B. Comply with requirements in SSPC-SP 13/NACE No. 6, with a Concrete Surface Profile of 3 or greater in accordance with ICRI Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.

14.2.4 Add exposed termination at polished concrete transition to create keyway 0.3-inch wide and 3/16 inch deep.

14.2.5 Repair damaged and deteriorated concrete in accordance with resinous flooring Manufacturer’s written instructions.

14.3 Patching and Filling
Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.
14.3.1 Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.

14.4 Resinous Materials
Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.

15. INSTALLATION

15.1 Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
15.1.1 Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

15.1.2 Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.

15.1.3 Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

15.2 Primer
Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.

15.3 Field-Formed Integral Cove Base
Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and top-coating of cove base. Round internal and external corners.
15.3.1 Integral Cove Base: 4 inches high.

15.4 Body Coats
Apply slurry body coats in thickness specified for flooring system.
15.4.1 Aggregates: Broadcast aggregates at rate recommended in writing by manufacturer. After resin is cured, remove excess aggregates to provide surface texture indicated.

15.5 Topcoats
Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

16. FIELD QUALITY CONTROL

16.1 Material Sampling

Owner may, at any time and any number of times during resinous flooring installation, require material samples for testing for compliance with requirements.

16.1.1 Owner may engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

16.1.2 Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

16.1.3 If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reinstall flooring materials to comply with requirements.

16.2 Core Sampling

At Owner’s direction and at locations designated by Owner, take one (1) core sample per 1,000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two (2) additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

17. PROTECTION

General Contractor shall protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

End of Section 096723

SECTION 096813

TILE CARPETING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Modular carpet tile

2.1.2 Not included: Custom Floor Mats. Refer to Section 101500 this specification.

2.2 Related Requirements

Section 096513 “Resilient Base and Accessories” for resilient wall base and accessories installed with carpet tile.

3. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

3.1 Review methods and procedures related to carpet tile installation including, but not limited to, the following:

3.1.1 Review delivery, storage, and handling procedures

3.1.2 Review ambient conditions and ventilation procedures

3.1.3 Review subfloor preparation procedures

4. ACTION SUBMITTALS

4.1 Product Data

For each type of product.

4.1.1 Include manufacturer’s written data on physical characteristics, durability, and fade resistance.

4.1.2 Include manufacturer’s written installation recommendations for each type of substrate.

4.2 Shop Drawings

For carpet tile installation, plans showing the following:

4.2.1 Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.

4.2.2 Carpet tile type, color, and dye lot

4.2.3 Type of subfloor

4.2.4 Type of installation

4.2.5 Pattern of installation

4.2.6 Pattern type, location, and direction

4.2.7 Pile direction

4.2.8 Type, color, and location of insets and borders

4.2.9 Type, color, and location of edge, transition, and other accessory strips

4.2.10 Transition details to other flooring materials

4.3 Samples
For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
4.3.1 Carpet Tile: Full-size Sample

4.3.2 Exposed Edge, Transition, and Other Accessory Stripping
12-inch-long Samples

4.4 Samples for Initial Selection
For each type of carpet tile.
4.4.1 Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

4.5 Samples for Verification
For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
4.5.1 Carpet Tile: Full-size Sample

4.5.2 Exposed Edge, Transition, and Other Accessory Stripping
12-inch-long Samples

4.6 Product Schedule: For carpet tile. Use same designations indicated on Drawings.

5. INFORMATIONAL SUBMITTALS

5.1 Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

5.2 Sample Warranty: For special warranty.

6. CLOSEOUT SUBMITTALS

Maintenance Data: For carpet tiles to include in maintenance manuals.
Include the following:
6.1 Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

6.2 Precautions for cleaning materials and methods that could be detrimental to carpet tile.

7. MAINTENANCE MATERIAL SUBMITTALS

Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

7.1 Carpet Tile

Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

8. QUALITY ASSURANCE

8.1 Installer Qualifications

An experienced installer who is certified by the International Certified Floorcovering Installers Association.

8.2 Mockups

Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

8.2.1 Build mockups at locations and in sizes as directed by Architect.

8.2.2 Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9. DELIVERY, STORAGE, AND HANDLING

Comply with the Carpet and Rug Institute's CRI 104.

10. FIELD CONDITIONS

10.1 Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

10.2 Environmental Limitations

Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

10.3 Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

10.4 Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

11. WARRANTY

Special Warranty for Carpet Tiles

Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

11.1 Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.

11.2 Failures include, but are not limited to, the following:
11.2.1 More than 10 percent edge raveling, snags, and runs

11.2.2 Dimensional instability

11.2.3 Excess static discharge

11.2.4 Loss of tuft-bind strength

11.2.5 Loss of face fiber

11.2.6 Delamination

11.3 Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 – PRODUCTS

12. CARPET TILE

Refer to Drawings and Floor Finish Legend and Notes, Material Legend, and Room Finish Matrix on drawings. Confirm all product selections with drawings and architect, prior to placing order.

12.1 Manufacturers
Subject to compliance with requirements, provide products as scheduled on Drawings.

12.2 Colors: As selected by Architect from manufacturer's full range.

12.3 Patterns: As indicated on Drawings.

12.4 Performance Characteristics
12.4.1 Traffic Classification: Heavy

12.4.2 Dimensional Tolerance: Within 1/32-inch of specified size dimensions, as determined by physical measurement

12.4.3 Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test)

12.4.4 Flooring Radiant Panel: Passes ASTM E648

12.4.5 Smoke Density: 450 or less in compliance with ASTM E662

12.4.6 Flammability: Passes Methenamine Pill Test (DOC-FFI-70)

13. INSTALLATION ACCESSORIES

13.1 Trowelable Leveling and Patching Compounds
Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

13.2 Adhesives
Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

13.2.1 Verify adhesives have a VOC content of 50 g/L or less.

13.2.2 Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 – EXECUTION

14. EXAMINATION

14.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

14.2 Examine carpet tile for type, color, pattern, and potential defects.

14.3 Concrete Slabs
Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

14.3.1 Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

A. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1,000 sq. ft. in 24 hours.

B. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

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

15. PREPARATION

15.1 General
Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

15.2 Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32-inch unless more stringent requirements are required by manufacturer's written instructions.

15.3 Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

15.4 Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

16. INSTALLATION

16.1 General
Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

16.2 Installation Method: As recommended in writing by carpet tile manufacturer.

16.3 Maintain dye-lot integrity. Do not mix dye lots in same area.

16.4 Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.

16.5 Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

16.6 Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

16.7 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

16.8 Install pattern parallel to walls and borders.

17. CLEANING AND PROTECTION

17.1 Perform the following operations immediately after installing carpet tile:

17.1.1 Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.

17.1.2 Remove yarns that protrude from carpet tile surface.

17.1.3 Vacuum carpet tile using commercial machine with face-beater element.

17.2 Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.

17.3 Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

End of Section 096813

SECTION 096820

CUSTOM FLOOR MATS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

2.1.1 Custom Floor Mats

3. SUBMITTALS

3.1 Product Data

For each type of product.

3.1.1 Include manufacturer's written data on physical characteristics, durability, and fade resistance.

3.1.2 Include manufacturer's written installation recommendations for each type of substrate.

3.2 Shop Drawings

For custom floor mat design, show the following:

3.2.2 Carpet type, color, and dye lot

3.2.6 Pattern type, location, and direction

3.2.8 Type, color, and location of design.

3.3 Samples for Verification

For custom product and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings.

4. INFORMATIONAL SUBMITTALS

4.1 Product Test Reports: For custom floor mat, for tests performed by a qualified testing agency.

4.2 Sample Warranty: For special warranty.

5. CLOSEOUT SUBMITTALS

Maintenance Data: For custom floor mats, to include in maintenance manuals.
Include the following:

5.1 Methods for maintaining custom floor mat, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

5.2 Precautions for cleaning materials and methods that could be detrimental to floor mat.

6. DELIVERY, STORAGE, AND HANDLING

Comply with the Carpet and Rug Institute's CRI 104.

7. FIELD CONDITIONS

7.1 Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

7.2 Environmental Limitations
Do not deliver or install custom floor mat(s) until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

7.3 Do not install custom floor mat(s) over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by custom floor mat manufacturer.

8. WARRANTY

Manufacturer's warranty.

8.2 Failures include, but are not limited to, the following:

8.2.1 More than 10 percent edge raveling, snags, and runs

8.2.2 Dimensional instability

8.2.3 Excess static discharge

8.2.4 Loss of tuft-bind strength

8.2.5 Loss of face fiber

8.2.6 Delamination

8.3 Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 – PRODUCTS

9. CUSTOM FLOOR MATS

Furnish and install custom floor mats, as shown on Drawings.
Floor mats will be imprinted with Sedgwick County Seal.

9.1 Approved manufacturer and products will be determined by architect.

PART 3 – EXECUTION

10. EXAMINATION

10.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting custom floor mat performance.

10.2 Examine custom floor mat for type, color, pattern, and potential defects.

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

11. PREPARATION

11.1 General
Comply with the Carpet and Rug Institute's CRI 104 and with custom floor mat manufacturer's written installation instructions for preparing substrates indicated to receive floor mat.

11.2 Broom and vacuum clean substrates to be covered immediately before installing floor mat.

12. CLEANING AND PROTECTION

12.1 Perform the following operations immediately after installing floor mat:

12.1.1 Remove excess adhesive and other surface blemishes using cleaner recommended by custom floor mat manufacturer.

12.1.2 Remove yarns that protrude from carpet surface.

12.1.3 Vacuum custom floor mat.

12.2 Protect custom floor mat against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by custom floor mat manufacturer.

End of Section 096820

SECTION 097200

WALLCOVERINGS

PART 1 – GENERAL

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

2. SUMMARY
This Section includes vinyl wallcovering.

3. SUBMITTALS
3.1 Product Data: For each type of product indicated.

3.2 Samples: For each type of wallcovering and for each color, texture, and pattern required.

4. QUALITY ASSURANCE
4.1 Fire-Test-Response Characteristics
Provide wallcoverings and adhesives with the following fire test response characteristics as determined by testing identical products applied with identical adhesives to substrates per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

4.1.1 Surface-Burning Characteristics: As follows, per ASTM E84:

A. Flame-Spread Index: 25 or less

B. Smoke-Developed Index: 450 or less

4.1.2 Fire-Growth Contribution: Textile wallcoverings tested according to NFPA 265 and complying with Method A test protocol in IBC 2000, Section 803.5.1.

PART 2 – PRODUCTS

5. PERFORMANCE REQUIREMENTS
Verify that all materials comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

6. MANUFACTURERS
6.1 General
Comply with FS CCC W 408A and CFFA W 101 A for types required and comply with requirements specified herein.

6.2 Products
As indicated on Drawings for various applications.

6.2.1 Manufacturer: Designtex
Contact: Kathy Anderson, email: kanderson@designtex.com

A. Style: Birch Bark Stripe coated wallcovering #6568-101

B. Flammabiltity: ASTM E 84 Adhered Class A

C. Width: 50 inch; Repeat: V 56.00 inches x H 50.00 inches

D. Low VOC, No antimicrobials, no flame retardants, no PFAS, no PVC; Backing: None

6.3 Provide rolls of each type of wallcovering from the same run number or dye lot.

7. ACCESSORIES

7.1 Adhesives

Provide manufacturer's recommended adhesive, primer, and sealer, produced expressly for use with selected wallcovering on substrate as shown on Drawings. Provide materials, which are strippable, mildew-resistant, and nonstaining to wallcovering. and with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

7.1.1 Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

7.2 Release Coat

Oil-base sealer or enamel undercoated for virgin drywall substrates as recommended by wallcovering manufacturer.

7.3 Seam Tape: As recommended in writing by wallcovering manufacturer.

PART 3 – EXECUTION

8. PREPARATION

8.1 Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

8.1.1 Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.

8.1.2 Gypsum Board: Prime with primer recommended by wallcovering manufacturer.

8.1.3 Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

8.2 Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

8.3 Acclimatize wallcovering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

9. INSTALLATION

9.1 Cut wallcovering strips in roll number sequence. Change roll numbers at partition breaks and corners.

9.2 Install strips in same order as cut from roll.

9.3 Install reversing every other strip.

9.4 Install wallcovering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.

9.5 Match pattern 72 inches above the finished floor.

9.6 Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.

9.7 Fully bond wallcovering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

9.8 Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

10. CLEANING

10.1 Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

10.2 Use cleaning methods recommended by wallcovering manufacturer.

10.3 Replace strips that cannot be cleaned.

10.4 Replace removed hardware and hardware accessories, electrical plates and fixtures, and similar items; verify cut edges of wallcoverings are completely concealed.

10.5 Remove surplus materials, rubbish, and debris resulting from wallcovering installation upon completion of work, and leave areas of installation in neat, clean condition.

10.6 Provide protective methods and materials needed to ensure that wallcoverings will be without deterioration or damage at time of Substantial Completion.

End of Section 097200

SECTION 097750

ENGINEERED ARCHITECTURAL WALL SYSTEM
OR COMPOSITE METAL PANELS

PART 1 – GENERAL

All Work under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto. The "Scope of Work" is as shown on the drawings, and generally described as:

1. SCOPE OF WORK

ACM Panels where indicated on Drawings.

2. QUALITY ASSURANCE

2.1 Panel manufacturer shall have a minimum of ten (10) years' experience.

2.2 When possible, field measurements should be taken prior to completion of shop manufacturing and assembly.

2.3 Maximum deviation form vertical and horizontal alignment of erected panels, 1/8 inches in 20 feet.

2.4 All panel fabrication and assembly shall be performed by factory authorized fabricator.

3. REFERENCES

3.1 American Society for Testing and Materials

B117:	Method of Salt Spray Testing
D822:	Practice for operating light and water exposure apparatus (carbon arc type) for testing paint
D1735:	Method for water for testing of organic coatings

3.2 Federal Test Method Standards (FSC 8010)

141A/6152:	Accelerated weathering (enclosed arc apparatus)
141A/6160:	Conducting exterior exposure tests of paints on metals

3.3 National Coil Coaters Association

NCCA II-6:	Test method for measurement of impact resistance of painted aluminum or steel
NCCA II-12:	Specification for determination of relative pencil hardness
NCCA II-16:	Test method for determination of film adhesion by "cross hatch" tape test after reverse impact.

4. SUBSTITUTIONS

4.1 The materials and products specified in this section establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

4.2 No substitution will be considered unless written request for the approval has been submitted by the bidder and has been received by the Architect 10 days prior to the date for receipt of bids.

4.3 Each request shall include the name of the materials and a complete description of the proposed materials, including test performance and any other information necessary for evaluation.

4.4 Approved products are:

4.4.1 ACM / Exterior Panel Systems, as distributed by SGH Concepts, the new Claco / a division of SGH Redglaze Holdings
Contact: Trevor Jessick; phone (316) 264-9354; email: tjessick@sghconcepts.com; www.sghconcepts.com

4.4.2 Omega Products, manufactured by Laminators, Inc.
(800) 523-2347, www.laminatorsinc.com

4.4.3 Citadel Architectural Products, as distributed by Jim Day Company,
(913) 722-3213, www.citadelap.com

4.4.4 Alpolic, as distributed by TFC Canopy, 260-357-6665; 1-800-422-7270, www.alpolic-americas.com

4.2.5 ACM, as distributed by Architectural Fabricators Company, Inc. – Oklahoma; Phone (800) 942-8672

4.2.6 Alucoworld – Alcan Composites USA, as distributed by Baker-Smith Sheet Metal, (816) 220-1313.

4.2.7 Una-Clad; 1-800-426-7737; www.unaclad.com.

5. SUBMITTALS

5.1 Submittals shall be in conformance with Section 01300.

5.2 Samples

5.2.1 Panel Assembly: Two samples of each type assembly 8 x 10 inches

5.2.3 Two samples of each color of finish selected 3 x 5 inches

5.3 Submission Drawings
Indicate thickness and dimension of parts; fastening and anchoring methods; detail and location of joints; including joints necessary to accommodate thermal movement.

5.4 Affidavit certifying material meets requirements specified

5.5 Two copies of manufacturer's literature for panel material

5.6 Test reports from certified lab on ASTM E-84, E330, E331 & E283

6. DELIVERY, STORAGE AND HANDLING

6.1 Protect finish and edges in accordance with panel manufacturer's recommendations.

6.2 Store materials in accordance with panel manufacturer's recommendations.

PART 2 – PRODUCTS

7. PANELS - LAMINATED PANELS

7.1 Envelope 2000® Engineered Architectural Wall System (route and return system)
Panel 24AX phenolic based thermoset polymer composite manufactured by Citadel Architectural Products. Panel shall consist of an exterior skin of .024 inch aluminum and an interior skin of .010 inch aluminum. Interior sides of exterior aluminum skins shall have an epoxy primer to prevent corrosion. Panel shall be 4 mm thick. Structural core shall be a 35% phenolic-based thermoset polymer composite.

7.2 Acceptable Alternatives
Panels of similar composite construction are acceptable, providing manufacturer has a minimum of 10 years' experience.

8. FINISH

8.1 Coil coated Kynar 500® (PVDF) resin

8.2 Color: **As selected by the architect.**

8.3 Coating Thickness: 1.0 mil (+/- .02 mil)

8.4 Hardness: NCCA II-12 F Minimum

8.5 Impact: NCCA II-6 Coating shall withstand direct and reverse impact of 1.5 pounds per mil substrate thickness

8.6 Adhesion

8.6.1 Coating shall adhere tightly to metal when subjected to #600 Scotch tape pick off test. Slight micro cracking permissible. No star cracking shall occur.

8.6.2 Test method. NCCA II-16 performed at room temperature at 32 degrees.

8.6.3 Coating shall not pick off when subjected to an 11 x 11 inches x 1/16-inch grid with reverse impact of 1.0 pound per mill substrate thickness and taped with #610 Scotch tape.

8.7 Humidity Resistance
ASTM 1735. No formation of blisters when subjected to condensing water fog at 100 degrees (F.) for 2000 hours.

8.8 Salt Spray
ASTM B117 Expose single coat system to 2000 hours, using 5% NaCl solution. Corrosion creepage from scribe line 1/16 inch. No blistering or pin-holing allowed.

8.9 Weather Exposure
8.9.1 Outdoor. NCCA 141A/6160. One-year exposure at 45-degree angle, facing south in Miami, Florida. No checking, crazing or loss of adhesion.

8.9.2 Accelerated. NCCA 141A/ 6152: 500 hours or ASTM D-822, 1000 hours in Atlas type D.M.S. Weatherometer; using cycle of 102 minutes light and 18 minutes diminished light and demineralized water. No checking, crazing or adhesion loss.

8.10 Chemical Resistance
24-hour immersion in mineral spirits, 0.5% Tide solution. 2% Ivory soap solution. Allow recovery period before evaluation. No loss of gloss, adhesion or color change.

9. PANEL FABRICATION

9.1 Composition
Two sheets of aluminum bonded to a .105" thermoset phenolic core

9.2 Aluminum Face
Thickness .024 inch Alloy 3105 H24

9.3 Aluminum Back
Thickness .010 inch Alloy 3103 H24

9.4 Panel Weight
1.47 lbs. per square foot

9.5 Tolerances
9.5.1 Lengthwise bow (.6% of dimension)
9.5.2 Crosswise bow (.6% of dimension)

9.6 Panel lines, breaks, and angles shall be sharp, true and surfaces free from warp and buckle.

9.7 Panel that comprises the band on the curtainwall – The joints in the panels shall match and align with the vertical mullions on the exterior of the building.

10. ACCESSORIES

10.1 Fasteners as supplied or recommended by panel manufacturer. Related materials to complete installation as recommended by panel manufacturer. Fastener sizes, and locations shall be as required by manufacturer's system.

10.2 Fabricator shall furnish panel system and accessories fully tested and designed by the panel manufacturer.

10.3 Weatherseals shall be as recommended and supplied by the panel manufacturer. Recommended: Polyurethane caulk with 20-year life expectancy (i.e. Tremco DyMonic; Sonneborn Sonolastic NP1; or equivalent) or silicone sealants.

PART 3 – EXECUTION

11. INSTALLATION

11.1 Erect panels plumb, level and true to intended plane.

11.2 Anchor panels securely in place in accordance with manufacturer's approved submission drawings.

11.3 Conform to manufacturer's instructions for installation attachment systems.

11.4 Surfaces to receive panels shall be even, smooth, sound, clean and free from defects detrimental to panel installation. Needed correction of these surfaces shall be the responsibility of someone other than the panel manufacturer or the installer.

11.5 Weather-seal all joints as required using methods and materials as specified above.

End of Section 09775

SECTION 099113

EXTERIOR PAINTING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes surface preparation and the application of paint systems on the following exterior substrates:

2.1.1 Steel

2.1.2 Galvanized metal

2.1.3 Aluminum (only where indicated to be field painted)

2.2 Related Sections include the following:

2.2.1 Division 05 Sections for shop priming of metal substrates with primers specified in this Section.

2.2.2 Division 09 Section “Interior Painting” for surface preparation and the application of paint systems on interior substrates.

3. SUBMITTALS

3.1 Product Data: For each type of product indicated.

3.2 Samples for Initial Selection: For each type of topcoat product indicated.

3.3 Samples for Verification

For each type of paint system and each color and gloss of topcoat indicated.

3.3.1 Submit Samples on rigid backing, 8 inches square.

3.3.2 Step coats on Samples to show each coat required for system.

3.3.3 Label each coat of each Sample.

3.3.4 Label each Sample for location and application area.

3.4 Product List

For each product indicated, include the following:

3.4.1 Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

3.4.2 Printout of current “MPI Approved Products List” for each product category specified in Part 2, with the proposed product highlighted.

4. QUALITY ASSURANCE

MPI Standards

4.1 Products
Complying with MPI standards indicated and listed in "MPI Approved Products List."

4.2 Preparation and Workmanship
Comply with requirements in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" for products and paint systems indicated.

5. DELIVERY, STORAGE, AND HANDLING

Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.

5.1 Maintain containers in clean condition, free of foreign materials and residue.

5.2 Remove rags and waste from storage areas daily.

6. PROJECT CONDITIONS

6.1 Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.

6.2 Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

PART 2 – PRODUCTS

7. MANUFACTURERS

Subject to compliance with requirements, provide products by one (1) of the following:

7.1 Benjamin Moore & Co.

7.2 ICI Paints

7.3 Porter Paints

7.4 PPG Architectural Finishes, Inc.

7.5 Sherwin-Williams Company (The)

8. PAINT, GENERAL

8.1 Material Compatibility

8.1.1 Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

8.1.2 For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

8.2 Colors: As selected by Architect from manufacturer's full range.

PART 3 – EXECUTION

9. EXAMINATION

9.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

9.2 Maximum Moisture Content of Substrates
When measured with an electronic moisture meter as follows:

9.2.1 Concrete: 12 percent

9.2.2 Masonry (Clay and CMU): 12 percent

9.2.3 Wood: 15 percent

9.2.4 Plaster: 12 percent

9.2.5 Gypsum Board: 12 percent

9.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

9.4 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

9.4.1 Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

10. PREPARATION

10.1 Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" applicable to substrates and paint systems indicated.

10.2 Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.

10.2.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection, if any.

10.2.2 Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

10.3 Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

10.3.1 Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

10.4 Steel Substrates
Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

10.5 Galvanized-Metal Substrates
Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

11. APPLICATION

11.1 Apply paints according to manufacturer's written instructions.

11.1.1 Use applicators and techniques suited for paint and substrate indicated.

11.1.2 Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

11.2 If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

11.3 Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

12. CLEANING AND PROTECTION

12.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

12.2 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

12.3 Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

12.4 At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

13. EXTERIOR PAINTING SCHEDULE

13.1 General: Provide the following paint systems for the various substrates indicated.

13.2 Ferrous Metal
Primer is not required on shop-primed items.

13.2.1 High-Gloss Alkyd Enamel: 2 finish coats over primer.

A. Primer: Synthetic rust-inhibiting primer

B. First Coat: High-gloss alkyd enamel

C. Second Coat: High-gloss alkyd enamel

13.3 Zinc-Coated Metal

13.3.1 High-Gloss Alkyd Enamel: 2 finish coats over primer.

13.3.2 Preparatory Coat: Phosphoric acid solution equal to GALVAPREP #5.

A. Primer: Galvanized metal primer

B. First Coat: High-gloss alkyd enamel

C. Second Coat: High-gloss alkyd enamel

13.4 Aluminum (Only Where Indicated to be Field Painted)

13.4.1 High-Gloss Alkyd Enamel: 2 finish coats over primer

A. Primer: Alkyd-type zinc chromate primer

B. First Coat: Alkyd high-gloss enamel

C. Second Coat: Alkyd high-gloss enamel

End of Section 099113

SECTION 099123

INTERIOR PAINTING

PART 1 - GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 This Section includes surface preparation and the application of paint systems on the following interior substrates:

2.1.1 Steel

2.1.2 Galvanized metal

2.1.3 Aluminum (not anodized or otherwise coated and indicated to be painted)

2.1.4 Gypsum board

2.1.5 Cotton or canvas insulation covering

2.2 Related Sections include Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

3. SUBMITTALS

3.1 Product Data: For each type of product indicated.

3.2 Samples for Initial Selection: For each type of topcoat product indicated.

3.3 Samples for Verification

For each type of paint system and in each color and gloss of topcoat indicated.

3.3.1 Submit Samples on rigid backing, 8 inches square

3.3.2 Step coats on Samples to show each coat required for system

3.3.3 Label each coat of each Sample

3.3.4 Label each Sample for location and application area

3.4 Product List

For each product indicated, include the following:

3.4.1 Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

3.4.2 Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

4. QUALITY ASSURANCE

MPI Standards

4.1 Products
Complying with MPI standards indicated and listed in "MPI Approved Products List."

4.2 Preparation and Workmanship
Comply with requirements in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" for products and paint systems indicated.

5. DELIVERY, STORAGE, AND HANDLING

Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.

5.1 Maintain containers in clean condition, free of foreign materials and residue.

5.2 Remove rags and waste from storage areas daily.

6. PROJECT CONDITIONS

6.1 Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.

6.2 Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

7. EXTRA MATERIALS

Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

7.1 Quantity: Furnish an additional 5 percent, but not less than one (1) gallon of each material and color applied.

PART 2 – PRODUCTS

8. MANUFACTURERS

Subject to compliance with requirements, provide products by one (1) of the following:

8.1 Benjamin Moore & Co.

8.2 ICI Paints

8.3 Porter Paints

8.4 PPG Architectural Finishes, Inc.

8.5 Sherwin-Williams Company (The)

9. PAINT, GENERAL

9.1 Material Compatibility

9.1.1 Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

9.1.2 For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

9.2 VOC Content of Field-Applied Interior Paints and Coatings
Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

9.2.1 Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L

9.2.2 Non-Flat Paints, Coatings, and Primers: VOC content of not more than 150 g/L

9.2.3 Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals
VOC not more than 250 g/L

9.2.4 Shellacs, Clear: VOC not more than 730 g/L

9.2.5 Shellacs, Pigmented: VOC not more than 550 g/L

9.2.6 Primers, Sealers, and Under Coaters: VOC content of not more than 200 g/L

9.3 Chemical Components of Field-Applied Interior Paints and Coatings
Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

9.3.1 Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

9.3.2 Restricted Components: Paints and coatings shall not contain any of the following:

A. Acrolein

B. Acrylonitrile

C. Antimony

D. Benzene

E. Butyl benzyl phthalate

F. Cadmium

G. Di (2-ethylhexyl) phthalate

H. Di-n-butyl phthalate

I. Di-n-octyl phthalate

J. 1,2-dichlorobenzene

K. Diethyl phthalate

L. Dim ethyl phthalate

M. Ethyl benzene

N. Formaldehyde

O. Hexavalent chromium

P. Isophorone

Q. Lead

R. Mercury

S. Methyl ethyl ketone

T. Methyl isobutyl ketone

U. Methylene chloride

V. Naphthalene

W. Toluene (methylbenzene)

X. 1,1,1-trichloroethane

Y. Vinyl chloride

9.3.4 Colors: As selected by Architect from manufacturer's full range.

10. INTUMESCENT PAINT MATERIALS

10.1 Material Compatibility

Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

10.2 Material Quality

Provide the best quality grade of intumescent paints. Materials not displaying manufacturer's identification as a best-grade product will not be acceptable.

10.2.1 Provide water-reducible or solvent-reducible, pigmented intumescent paint materials, formulated to retard flame spread and intended for use on interior combustible and noncombustible surfaces.

10.3 Intumescent Paints

Provide the manufacturer's recommended factory-formulated, latex- or vinyl-type, pigmented, intumescent finish coat materials that are compatible with the substrate and prime coat materials that are compatible with the substrate and prime coat materials indicated.

10.3.1 Paint plywood substrates for electrical and telephone equipment in electrical, telephone, equipment storage rooms, etc., with intumescent paint unless otherwise noted.

PART 3 – EXECUTION

11. EXAMINATION

11.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

11.2 Maximum Moisture Content of Substrates
When measured with an electronic moisture meter as follows:
11.2.1 Concrete: 12 percent
11.2.2 Masonry (Clay and CMU): 12 percent
11.2.3 Wood: 15 percent
11.2.4 Gypsum Board: 12 percent
11.2.5 Plaster: 12 percent

11.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

11.4 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
11.4.1 Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

12. PREPARATION

12.1 Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" applicable to substrates indicated.

12.2 Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.
12.2.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection, if any.

12.2.2 Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

12.3 Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
12.3.1 Remove incompatible primers and re-prime substrate with compatible primers as required to produce paint systems indicated.

12.4 Concrete Substrates
Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

12.5 Clay Masonry Substrates
Remove efflorescence and chalk. Do not paint surfaces if moisture content of surfaces or alkalinity of mortar joints to be painted exceeds that permitted in manufacturer's written instructions.

12.6 Concrete Masonry Substrates
Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

12.7 Steel Substrates
Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

12.8 Galvanized-Metal Substrates
Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

12.9 Aluminum Substrates: Remove surface oxidation.

12.10 Wood Substrates
12.10.1 Scrape and clean knots, and apply coat of knot sealer before applying primer.

12.10.2 Sand surfaces that will be exposed to view, and dust off.

12.10.3 Prime edges, ends, faces, undersides, and backsides of wood.

12.10.4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

12.9 Gypsum Board Substrates
Do not begin paint application until finishing compound is dry and sanded smooth.

12.10 Plaster Substrates
Do not begin paint application until plaster is fully cured and dry.

12.11 Cotton or Canvas Insulation Covering Substrates
Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

13. APPLICATION

13.1 Apply paints according to manufacturer's written instructions.
13.1.1 Use applicators and techniques suited for paint and substrate indicated.

13.1.2 Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

13.1.3 Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

13.2 If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

13.3 Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

13.4 Painting Mechanical and Electrical Work
Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

13.4.1 Mechanical Work

A. Uninsulated metal piping

B. Uninsulated plastic piping

C. Pipe hangers and supports

D. Tanks that do not have factory-applied final finishes

E. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets

F. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material

G. Mechanical equipment that is indicated to have a factory-primed finish for field painting

13.4.2 Electrical Work

A. Switchgear

B. Panelboards

C. Electrical equipment that is indicated to have a factory-primed finish for field painting

14. FIELD QUALITY CONTROL

14.1 Testing of Paint Materials
Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

14.1.1 Owner may engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

14.1.2 Testing agency will perform tests for compliance with product requirements.

14.1.3 Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two (2) paints are incompatible.

15. CLEANING AND PROTECTION

15.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

15.2 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

15.3 Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

15.4 At completion of construction activities of other trades, touch-up and restore damaged or defaced painted surfaces.

16. INTERIOR PAINTING SCHEDULE

16.1 Gypsum Drywall Systems

16.1.1 First Coat: Interior latex base primer coat

16.1.2 Second Coat: Interior low-luster satin latex wall paint

16.1.3 Third Coat: Interior low-luster satin latex wall paint

16.2 Aluminum (Only Where Indicated to Be Painted)

16.2.1 First Coat: Universal metal primer

16.2.2 Second Coat: Semi-gloss alkyd enamel

16.2.3 Third Coat: Semi-gloss alkyd enamel

16.3 Ferrous Metal

16.3.1 First Coat: Synthetic rust-inhibiting primer

16.3.2 Second Coat: Semi-gloss alkyd enamel

16.3.3 Third Coat: Semi-gloss alkyd enamel

16.3.4 First coat not required on items that are shop primed

16.4 Exposed structure, including but not limited to structural steel beams, girts, joists, girders, metal deck, and miscellaneous exposed steel:

16.4.1 Apply one (1) coat over shop primer equal to The Glidden Company, "Dry Fog White," Gloss, 18308.

16.4.2 Protect walls and other substrates not scheduled to receive dry fog system from overspray.

16.5 Zinc-Coated Metal

16.5.1 First Coat: Phosphoric acid solution equal to GalvaPrep #5.

16.5.2 Second Coat: Zinc dust-zinc oxide primer

16.5.3 Third Coat: Enamel undercoat

16.5.4 Fourth Coat: Semi-gloss alkyd enamel

16.6 Opaque Woodwork

16.6.1 First Coat: Interior enamel undercoat

16.6.2 Second Coat: Odorless interior semi-gloss enamel

16.6.3 Third Coat: Odorless interior semi-gloss enamel

16.7 Stained Woodwork
Stained Varnish Satin Finish: 3 finish coats over stain plus filler on open grain wood. Wipe filler before applying first varnish coat

16.7.1 Stain Coat: Oil-type interior wood stain

16.7.2 First Coat: Sanding sealer

16.7.3 Filler Coat: Paste wood filler

16.7.4 Second Coat: Oil-base satin varnish

16.7.5 Third Coat: Oil-base satin varnish

16.8 Cotton or Canvas Covering Over Insulation on Piping and Ductwork:
16.8.1 First (Size) Coat: Interior latex emulsion

16.8.2 Second Coat: Interior latex emulsion

16.8.3 Add fungicidal agent to render fabric mildew-proof

End of Section 099123

SECTION 099600

HIGH-PERFORMANCE COATINGS

PART 1 – GENERAL

1. SUMMARY

1.1 Contractor shall coordinate and verify the specific high-performance epoxy coating systems, the required gloss, and MPI numbers, required and/or indicated in the Drawings and the Specifications, with the Architect, and receive approval for proposed products.

1.2 Section includes surface preparation and the application of high-performance coating systems on the following substrates:

1.2.1 Interior Substrates

A. Concrete, vertical and horizontal surfaces

B. Concrete masonry units (CMUs)

C. Steel

D. Gypsum board

2. DEFINITIONS

2.1 MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523

2.2 MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523

2.3 MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523

3. ACTION SUBMITTALS

3.1 Product Data

For each type of product. Include preparation requirements and application instructions.

3.1.1 Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

3.2 Sustainable Design Submittals

3.2.1 Product Data: For paints and coatings, indicating VOC content.

3.2.2 Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.

3.2.3 Environmental Product Declaration (EPD): For each product.

3.3 Samples

For each type of coating system and in each color and gloss of topcoat indicated.

4. QUALITY ASSURANCE

4.1 Mockups

Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

4.1.1 Architect will select one (1) surface to represent surfaces and conditions for application of each coating system.

A. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.

B. Other Items: Architect will designate items or areas required.

4.1.2 Final approval of color selections will be based on mockups.
If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

PART 2 – PRODUCTS

5. MANUFACTURERS

5.1 Basis-of-Design Product

Subject to compliance with requirements, provide products by Dex-O-Tex or comparable product by one (1) of the following:

5.1.1 Behr Paint Company; Behr Process Corporation

5.1.2 Benjamin Moore & Co.

5.1.3 Comex Industrial Coatings; Comex Group

5.1.4 Corotech Coatings; Benjamin Moore & Co.

5.1.5 Devoe Coatings; Akzo Nobel

5.1.6 Diamond Vogel Paints

5.1.7 Dulux (formerly ICI Paints); a brand of AkzoNobel

5.1.8 PPG Paints

5.1.9 Rust-Oleum Corporation; a subsidiary of RPM International, Inc.

5.1.10 Sherwin-Williams Company (The)

5.1.11 Tnemec Inc.

5.2 Products

Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior High-Performance Coating Schedule for the coating category indicated.

6. HIGH-PERFORMANCE COATINGS, GENERAL

6.1 MPI Standards

Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

6.2 Material Compatibility

6.2.1 Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

6.2.2 For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

6.2.3 Products shall be of same manufacturer for each coat in a coating system.

6.3 Colors: As selected by Architect from manufacturer's full range.

7. HIGH-PERFORMANCE FLOOR COATING

7.1 Materials

Decorative colored-quartz troweled-epoxy flooring shall be Dex-O-Tex Décor-Flor as manufactured by Crossfield Products Corp., in Rancho Dominguez, California and Roselle Park, New Jersey.

7.2 Properties

7.2.1 Colors: As selected by Architect from manufacturer's full range of colors.

7.2.2 Physical Properties

Provide flooring system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

7.2.3 Typical Physical Properties at 75 Degrees F

A. Compressive Strength ASTM C579 10,500 psi
(Resin, Hardener and Aggregate) (738 kg/cm2)

B. Compressive Strength ASTM D695 12,900 psi
(Resin and Hardener) (907 kg/cm2)

C. Tensile Strength ASTM C307 1,800 psi
(Resin, Hardener and Aggregate) (127 kg/cm2)

D. Tensile Strength ASTM D638 5,000 psi
(Resin and Hardener) (352 kg/cm2)

E. Flexural Strength ASTM C580 4,000 psi
(281 kg/cm2)

F. Surface Hardness ASTM D2240 Shore D 80-85

G. Indentation Characteristics
(Steadily Applied Load) MIL-PRF-3134 0.005-inch
Para. 4.7.4.2.1, 2,000 Pounds on 1-Inch Steel Ram (0.127 mm)
Imposed for 30 Minutes Over a Concrete Substrate, Indented

H. Indentation Characteristics MIL-PRF-3134, Para. 4.7.3
(Impact Load) 0.011-inch
(2 Pounds…908 kg.) Indent From Steel Ball Dropped Twice (0.28 mm)
From 8-Foot Height

I. Adhesion ASTM D4541 > 400 psi
(100 Percent Failure in Concrete) (28.1 kg/cm2)

J. Water Absorption MIL-PRF-3134 < 1.0 percent

K. Abrasion Resistance ASTM D4060
(CS17, 1,000gr Load, 1,000 Cycles) 0.04 gr

L. Anti-Microbial Resistance ASTM G21 Passes

M. Flammability ASTM D635 Self-Extinguishing Bonded to Concrete

7.3 Supplemental Materials

7.3.1 Waterproofing or Fluid-Proofing Membrane
Type recommended or produced by manufacturer of epoxy resin composition flooring system for type of service and floor condition indicated.

7.3.2 Anti-Microbial Additive
Incorporate anti-microbial chemical additive to control growth of most algae, bacteria, fungi, mildew and mold.

7.3.3 Moisture Mitigation System
Concrete slab-on-grade shall be tested in accordance with ASTM F1869. If pounds exceed flooring limit, remedial action must be taken prior to application of high-performance floor coating.

8. HIGH-PERFORMANCE WALL COATINGS

8.1 Materials
Epoxy resin chemical-resistant wall coating shall be Dex-O-Tex Flex-Glaze as manufactured by Crossfield Products Corp in Rancho Dominquez, California and Roselle Park, New Jersey.

8.2 Properties

8.2.1 Colors: As selected by Architect from manufacturer's full range of colors.

8.2.2 Physical Properties
Provide wall coating that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

A. Compressive Strength ASTM D695 8,000 psi

B. Tensile Strength ASTM D638 3,500 psi

C. Tensile Elongation ASTM D6388 percent

D. Adhesion ASTM D952 Exceeds internal strength of backing

E. Hardness ASTM D2240 Shore D 80-85

F. Water Resistance MIL-D-1044 16 mg

G. Water Absorption MIL-D-3134 Para 4.7.8 < 0.5 percent

H. Chemical Resistance ASTM D1308 (See Chemical Resistant Chart)

I. Microbial Resistance ASTM G21 Passes

8.3 Supplemental Materials

8.3.1 Anti-Microbial Additive
Incorporate anti-microbial chemical additive to prevent growth of most bacteria, fungi, algae and actinomycetes.

9. SOURCE QUALITY CONTROL

Testing of Coating Materials
Owner reserves the right to invoke the following procedure:

9.1 Owner may engage services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

9.2 Testing agency will perform tests for compliance with product requirements.

9.3 Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, both coatings are incompatible.

PART 3 – EXECUTION

10. EXAMINATION

10.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

10.2 Maximum Moisture Content of Substrates
When measured with an electronic moisture meter as follows:

10.2.1 Concrete: 12 percent

10.2.2 Masonry (Clay and CMUs): 12 percent

10.2.3 Gypsum Board: 12 percent

10.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

10.4 Proceed with coating application only after unsatisfactory conditions have been corrected.

10.4.1 Application of coating indicates acceptance of surfaces and conditions.

11. PREPARATION

11.1 Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

11.2 Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

11.2.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

11.3 Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

11.3.1 Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

12. APPLICATION

12.1 Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

12.2 Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

13. INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

13.1 Concrete Substrates, Vertical Surfaces
Coordinate required coating system and gloss with Basis of Design coating system and Architect's approval.

13.1.1 Epoxy System MPI INT 3.1F

A. Prime Coat: Epoxy, matching topcoat

B. Intermediate Coat: Epoxy, matching topcoat

C. Topcoat: Epoxy, gloss, MPI #77

13.1.2 Epoxy, High-Build System MPI INT 3.1P

A. Prime Coat: High-build epoxy, matching topcoat (reduced)

B. Intermediate Coat: High-build epoxy, matching topcoat

C. Topcoat: High-build epoxy, low gloss, MPI #108

D. Topcoat: High-build epoxy, gloss, MPI #98

13.1.3 Epoxy-Modified Latex System MPI INT 3.1G

A. Prime Coat: Epoxy-modified latex, matching topcoat

B. Intermediate Coat: Epoxy-modified latex, matching topcoat

C. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215

D. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6), MPI #115

13.2 Concrete Substrates, Horizontal Surfaces
Coordinate required coating system and gloss with Basis of Design coating system and Architect's approval.

13.2.1 Epoxy System MPI INT 3.2C

A. Prime Coat: Epoxy, matching topcoat

B. Intermediate Coat: Epoxy, matching topcoat

C. Topcoat: Epoxy, gloss, MPI #77

13.2.2 Epoxy, High-Build System MPI INT 3.2L

A. Prime Coat: High-build epoxy, matching topcoat (reduced)

B. Intermediate Coat: High-build epoxy, matching topcoat

C. Topcoat: High-build epoxy, low gloss, MPI #108

D. Topcoat: High-build epoxy, gloss, MPI #98

13.2.3 Pigmented Polyurethane System MPI INT 3.2D

A. Prime Coat: Epoxy, gloss, MPI #77

B. Intermediate Coat: Polyurethane, 2-component, pigmented, gloss, matching topcoat

C. Topcoat: Polyurethane, 2-component, pigmented, gloss (MPI Gloss Level 6), MPI #72

13.2.4 Clear (Two-Component) Polyurethane System MPI INT 3.2K

A. Prime Coat: Two-component polyurethane matching topcoat

B. Intermediate Coat: Two-component polyurethane, matching topcoat

C. Topcoat: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7), MPI #78

13.3 CMU Substrates

13.3.1 Epoxy System MPI INT 4.2G

A. Block Filler: Block filler, epoxy, MPI #116

B. Intermediate Coat: Epoxy, matching topcoat

C. Topcoat: Epoxy, gloss, MPI #77

13.3.2 Epoxy, High-Build System MPI INT 4.2R

A. Prime Coat: Epoxy block filler, MPI #116]

B. Intermediate Coat: High-build epoxy, matching topcoat

C. Topcoat: High-build epoxy, low gloss, MPI #108

D. Topcoat: High-build epoxy, gloss, MPI #98

13.4 Steel Substrates

13.4.1 Epoxy System MPI INT 5.1L

A. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101

B. Intermediate Coat: Epoxy, matching topcoat

C. Topcoat: Epoxy, gloss, MPI #77

13.4.2 High-Build Epoxy over Epoxy Zinc-Rich Primer System MPI INT 5.1P

A. Prime Coat: Primer, zinc-rich, epoxy, MPI #20

B. Intermediate Coat: Epoxy, high build, low gloss, MPI #108

C. Topcoat: Epoxy, gloss, MPI #77

D. Topcoat: Epoxy, high-build, low gloss, MPI #108

13.4.3 Epoxy, High-Build System MPI INT 5.1Y

A. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101

B. Intermediate Coat: High-build epoxy, matching topcoat

C. Topcoat: High-build epoxy, low gloss, MPI #108

D. Topcoat: High-build epoxy, gloss, MPI #98

13.4.4 Pigmented Polyurethane over Epoxy Primer System MPI INT 5.1F

A. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101

B. Intermediate Coat: Polyurethane, 2-component, pigmented, matching topcoat

C. Topcoat: Polyurethane, 2-component, pigmented, gloss (MPI Gloss Level 6), MPI #72

13.4.5 Pigmented Polyurethane over High-Build Epoxy System MPI INT 5.1G

A. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101

B. Intermediate Coat: Epoxy, high build, MPI #108

C. Topcoat: Polyurethane, 2-component, pigmented, gloss (MPI Gloss Level 6), MPI #72

13.4.6 Pigmented Polyurethane over Epoxy Zinc-Rich and Epoxy System MPI INT 5.1J

A. Prime Coat: Primer, zinc rich, epoxy, MPI #20

B. Intermediate Coat: Epoxy, gloss, MPI #77

C. Topcoat: Polyurethane, 2-component, pigmented, gloss (MPI Gloss Level 6), MPI #72

13.5 Gypsum Board Substrates

13.5.1 Epoxy System MPI INT 9.2E

A. Prime Coat: Primer sealer, latex, interior, MPI #50

B. Intermediate Coat: Epoxy, matching topcoat

C. Topcoat: Epoxy, gloss, MPI #77

13.5.2 Epoxy, High-Build System MPI INT 9.2N

A. Prime Coat: Primer sealer, latex, interior, MPI #50

B. Intermediate Coat: High-build epoxy, matching topcoat

C. Topcoat: High-build epoxy, low gloss, MPI #108

D. Topcoat: High-build epoxy, gloss, MPI #98

13.5.3 Epoxy-Modified Latex System MPI INT 9.2F

A. Prime Coat: Primer sealer, latex, interior, MPI #50

B. Intermediate Coat: Epoxy-modified latex, matching topcoat

C. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

D. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6), MPI #115

End of Section 099600

SECTION 100100

WINDOW TREATMENTS

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

All requirements under Division One of these specifications shall be a part of this section. Each Contractor is responsible to thoroughly familiarize himself with all its contents as to requirements, which affect this division or section.

2. SCOPE OF WORK

Provide and install window shades, in accordance with specifications, drawings, and contract documents.

2.1 Hunter Douglas horizontal aluminum blinds with 1-inch slat, perforated.

2.2 Roller shades for manual operation and accessories.

3. RELATED SECTIONS

3.1 Division 6, Section 06100 – Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

3.2 Division 9, Section 09200 – Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures, and related accessories.

3.3 Division 9, Section 09500 – Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures, and related accessories.

3.4 Division 10, Section 10000 – Specialty Equipment: Coordination with Projection Curtain.

4. REFERENCES

4.1 ASTM International (ASTM)
ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi, Current Edition.

4.2 National Fire Protection Association (NFPA)
NFPA 70 – National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films. Current Edition.

4.3 Underwriters Laboratories (UL)
UL (GGG) – GREENGUARD Gold Certified Products; Current Edition.

4.4 Window Covering Manufacturers Association (WCMA)
ANSI/WCMA A100.1 – Safety of Window Covering Products; 2018. Current Edition.

5. SUBMITTALS

5.1 Product Information

Submit Manufacturer's product literature, Installation Instructions and Warranty documents.

5.2 Shop Drawings

A. Show fabrication and installation details for window treatments.

B. Indicate field-measured dimensions of openings which are to receive shades, and details of mounting surface and sill conditions, details of corners and conditions between adjacent shades. Record actual locations of control system components and show interconnecting wiring.

5.3 Samples

Submit a sample of each type and color of material specified.

A. For each color and texture specified, submit 2 sets of samples representing manufacturer's standard range of finishes for window coverings.

B. Include Samples of accessories involving color selection.

C. Window treatments Schedule: Use same designations indicated on Drawings.

5.4 Informational Submittals

A. Product Data: Manufacturer's descriptive literature shall be submitted indicating materials, finishes, construction and installation instructions and verifying that product meets requirements specified. Manufacturer's recommendations for maintenance and cleaning shall be included.

B. Drawings and Diagrams: Wiring diagrams of any motorized components or units, working and assembly drawings shall be supplied as requested.

D. Sample: Responsible contracting officer or agent shall supply one sample shade of each type specified in this contract for approval. Supplied units shall be furnished complete with all required components, mounting and associated hardware, instructions and warranty.

E. Qualification Data: For Installer.

F. Product Certificates: For each type of window treatments, signed by product manufacturer.

G. Product Test Reports: For each type of window treatments, for tests performed by manufacturer and witnessed by a qualified testing agency.

5.5 Closeout Submittals

A. Maintenance Data: For window treatments, to include in maintenance manuals.

B. Sample warranty document.

5.6 Maintenance Submittals

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B Bill of materials for all components with part numbers. Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware controls.

6. QUALITY ASSURANCE

6.1 Supplier

Manufacturer, subsidiary or licensed agent shall be approved to supply the products specified, and to honor any claims against product presented in accordance with warranty.

6.2 Installer

Installer or agent shall be qualified to install specified products by prior experience, demonstrated performance and acceptance of requirements of manufacturer, subsidiary, or licensed agent. Installer shall be responsible for an acceptable installation.

6.3 Include child friendly operation to meet Safety Standards per ANSI/WCMA A100.1-2022- Safety of Window Covering Products; 2022 for chain retainers.

7. DELIVERY, STORAGE, AND HANDLING

7.1 Packing and Shipping

Materials shall be delivered to the Project in Manufacturer's original unopened packaging with labels intact.

7.2 Storage

7.2.1 Product shall be handled and stored to prevent damage to materials, finishes and operating mechanisms.

7.2.2 Materials shall be stored in a clean area which is free of corrosive fumes, dust, and away from construction activities.

7.2.3 Materials shall be stacked horizontally using plastic or wood shims such that drainage and ventilation are provided for and such that water cannot accumulate in, about, or upon the containers.

7.2.4 Stacks shall be covered with tarpaulins or plastic such that ventilation is provided for, and such that contaminants are prevented from contacting surfaces.

8. PROJECT/SITE CONDITIONS

8.1 Environmental Limitations

Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

8.1.1 Interior temperature shall be maintained between 60° F. and 90° F. during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

8.1.2 Ceilings, window pockets, electrical, and mechanical work above the product shall be complete.

8.2 Electrical power (110-volt AC) shall be available for installer's tools within 50 ft. of product installation areas.

8.3 Power and control wiring shall be complete and certified, fully operational with uninterrupted communication on the lines and minimal noise certified by a commissioning agent specified in other sections.

A. 485, ICON, Lonmark and Dry Contract Network: Noise on the line not to exceed shade manufacturer's limits.

9. WARRANTY

9.1 Blinds: Hunter Douglas shall repair or replace for five years from date of purchase of the blind, at its option without charge, any part found to be defective in workmanship or materials as long as the blind remains in the same window for which it was purchased.

9.2 Roller Shades: Roller Shade Hardware and Chain Warranty – Manufacturer's standard non-depreciating transferrable warranty for interior shading. Shade and Shade Hardware – 10 years, unless otherwise indicated. Roller Shade Installation: (1) year from date of Substantial Completion.

PART 2 – PRODUCTS

10. PRODUCTS – BLINDS

10.1 Furnish and install Hunter Douglas blinds, or Architect approved equal, on door sidelites, and on windows between commons and hallways in residential area, as shown on the Drawings, with sizes indicated on Drawings, or as confirmed by the architect. Locate on staff side of space.

10.2 Acceptable Manufacturer: Hunter Douglas, Architectural Window Coverings, 9900 Gidley Street, El Monte, CA 91731. Contact: Justin Pratt (214) 499-5513; justin.pratt@hunterdouglas.com.

10.3 Product

Riviera Commercial 1-inch Aluminum Horizontal Blind, with matching clear anodized aluminum valance, manufactured by Hunter Douglas

A. Materials: Steel headrail and aluminum blind

B. Size Specifications:
Width: Minimum 10-1/2 inches to maximum 120 inches, 144 inches with 2 on one Headrail

Height: Minimum 12 inches to maximum 84 inches fully operable. Maximum 130 inches partially operable.

A. Slats: 1 inch .008 gauge aluminum slat in dust resistant finish

B. Slat Support: 1.4mm Corded, braided ladder at 22mm spacing

C. Headrail: Integrated valance, curved steel at 1.375 inch wide by 1.375 inch depth, 0.024 gauge

D. Valance: Matching clear anodized aluminum valance

E. Bottom Rail: 1-1/2 inch wide by 1-1/8 inch high steel bottom rail with end cap, optional hold downs

F. Lifting Mechanism: Cordless lift with balanced spring motor

G. Tilting Mechanism: Wand tilt

H. Tilt Control Wand: Standard clear wand in control positions, left or right, as selected by architect / owner, at the height selected by architect / owner.

K. Mounting Hardware:
Box Bracket dimension 1-1/2 inch height by 1-1/4 inch depth. Support brackets as required by blind width. Hidden Brackets optional.

L. Fabrication:
Outside Mount: 0 inch deduction from headrail, 0 inch deduction from blind width
Inside Mount: ½ inch deduction from headrail, ½ inch deduction from blind width

M. Slat Finish: Aluminum / Silver

N. Slat Support: Braided ladders shall be color coordinated with slat

11. PRODUCTS – ROLLER SHADES

Provide and install window shades, as shown on the Drawings.
Manufacturer and Product Description: Mecho Shade, or Architect approved equal.

11.1 Approved Manufacturer:
Mecho Shade Systems, 42-03 35th Street, Queens, NY 11101

Approved Distributor: Hart Associates, Sarah Hart Hall, 913-526-8586
email: sarah@hartks.com.

11.2 Quality Assurance
Obtain roller shades system through one source from a single manufacturer.

11. 3 Shade Operation
See Drawings for locations of manual and motorized shades. Confirm locations with architect. Some shades will have manual operation utilizing the Mecho/7 shade system, while some shades will include motorized upgrade, using the Standard Electro3 Motorized Shade system.

11.4 Hardware: Mecho/7, providing additional hardware to manually operate raising and lowering. Include fascia to headrail.

11.4.1 Manual Shades: Provide all brackets, stops, retainers, etc. necessary for complete operation.

11.4.2 Motorized Shades: Provide all components required to install and operate Standard Electro3 Motorized shades, where specified.

11.5 Hardware to be an inside mount to face of frame, and cover window width.

11.6 Include child friendly operation to meet Safety Standards per ANSI/WCMA A100.1-2022- Safety of Window Covering Products; 2022 for chain retainer.

11.7 Shade Cloth to run full height of window unit.

11.8 Shade Cloth Fabric: Confirm Shade Cloth fabric selection with architect prior to order.

11.8 Shade Cloth – Transparency and Color
See Drawings for locations of shades.

11.8.1 Shades installed on Exterior windows will be Commercial Solar Shades with 5% openness.

11.8.2 Shades installed on Interior windows (windows between two interior rooms) for privacy will be 1% openness.

11.8.3 Color to be determined by architect. Confirm Shade Cloth fabric selection with architect prior to order.

11.9 Concealed Pocket
One shade, located on an exterior window in the Lab will utilize / include a concealed pocket. Refer to Drawings.

11.10 Include hembars, exposed metal.

PART 3 – EXECUTION

12. INSPECTION AND EXAMINATION

12.1 This Contractor shall be responsible for inspection on-site, approval of mounting surfaces, installation conditions and field measurement for this work.

12.2 Do not begin installation until substrates have been properly prepared.

12.3 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

12.4 Start of installation shall be considered acceptance of substrates.

12.5 Other Interacting Trades shall receive drawings of shade systems, dimensions, assembly and installation methods from subcontractor upon request.

13. PREPARATION

13.1 Clean surfaces thoroughly prior to installation.

13.2 Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

13.3 Coordinate with window installation and placement of concealed blocking to support shades.

14. INSTALLATION – BLINDS

14.1 Minimum depth for inside mount is 7/8 inch with hidden bracket and 1-inch with box bracket.

14.2 Install product level, plumb and aligned with adjacent units per installation instructions.

14.3 Provide final installation conditions to ensure product is without damage at the time of substantial completion in a dust-free environment.

15. INSTALLATION – ROLLER SHADES

Furnish and Install Responsibilities

15.1 Roller shade installation and setting of intermediate stops of all shades to assure the alignment of the shade bands within a single group, which shall not exceed +/- 0.125 inches, and to assure the alignment between shade groups, which shall not exceed +/- 0.25 inches.

15.2 Provide accurate to 0.0625 inches; field measurements for custom shade fabrication on the Roller Shades manufacturer's input forms.

15.3 Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and as specified here in. Blocking for roller shades furnished and installed under the contract of the interior General Contractor shall be installed plumb, level, and fitted to window mullion as per architect's documents and in accordance with industry standard tolerances. The horizontal surface of the shade pocket shall not be out-of-level more than 0.625 inches over 20 linear feet.

15.4 Shades shall be located so the shade band is not closer than 2 inches to the interior face of the glass. Allow proper clearances for window operation hardware.

15.5 Adjust, align and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

15.6 Installer shall set Upper, Lower and up to 3 intermediate stop positions of all motorized shade bands, and assure alignment in accordance with the above requirements.

15.7 Clean roller shade surfaces after installation, according to manufacturer's written instructions.

15.8 This contractor shall train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

15.8.1 Use operation and maintenance manual as a reference, supplemented with additional training materials as required.

16. PROTECTION AND CLEANING

16.1 Protect installed products until completion of project.

16.2 Touch-up, repair or replace damaged products before Substantial Completion.

16.2.1 Clean soiled shades, slats, and exposed components as recommended by manufacturer.

16.2.2 Replace shades that cannot be cleaned to "like new" condition.

17. MAINTENANCE

Include a complete description of preventive maintenance, systematic examination, adjustment, parts and labor, cleaning, and testing, with a detailed schedule.

End of Section 10010

SECTION 100425

SIGNAGE

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required specially to refer thereto.

2. WORK INCLUDED

2.1 Building Signage (Exterior) per Sedgwick County Brand Guide, current edition.

2.2 Interior Room Signs – Owner to provide. Owner to install.
General Contractor to coordinate with Owner on placement of signs. Refer to Drawings.

2.3 Building Plaque – Refer to Section 05990 – "Miscellaneous Metals and Metal Specialties".

3. QUALITY ASSURANCE

Signage shall comply with American National Standards Institute (ANSI). ANSI 117.1 for buildings and facilities. Signage shall comply with American with Disabilities Act (ADA).
2010 ADA Standard for Accessible Design (ADA), International Building Code (IBC), International Fire Code (IFC), and local jurisdiction requirements.

4. SUBMITTALS

Product Data Sheets
Submit manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each sign as required.

5. SHOP DRAWINGS

5.1 Provide shop drawings for fabrication and erection of signs. Include plans, elevations and section of typical members and other components. Show anchorage, grounds, reinforcement, accessories, layout and installation details.

5.2 Provide message list for each sign required, including scale details of wording and layout of lettering.

5.3 For signs letters anchored to permanent construction, provide setting drawings, templates and directions for installation of anchor bolts and other anchors to be installed as a unit of work in other Sections.

PART 2 – PRODUCTS

6. BUILDING SIGNAGE (Exterior)

6.1 Aluminum Painted Circle Cabinet:
Sedgwick County Seal/Logo as described for the 'Circle Cabinet':
Oversized Seal shown on Exterior Elevations.
'Circle Cabinet' is provided by the Owner and installed by the General Contractor.

6.1.1 For reference only, the 'Circle Cabinet' is as follows: Shape: Round.
Face: 3/16-inch White Plex Face with Trim Cap.
Graphic: Premium Digital Print Translucent Vinyl Graphics- UV Stable. with Cast Laminate - UV Stable.

Backlight: Face lit with even illumination. Returns: 3 inches deep . Switch operation with programmable timer. Coordinate with the Owner the actual 'Circle Cabinet' construction.

6.1.2 8-inch diameter is large and requires approval.

6.1.3 Mounting height cannot exceed 20 feet. Mount per fabricator's recommendation and guidelines in accordance with best practices for Exterior mounting of signage. 'Circle Cabinet' mounts at exterior facades that vary per location. G.C. and Sign Fabricator shall coordinate concealed mounts accounting for the thickness of the exterior finish where placed. G.C. shall provide 'In-Wall' Blocking to support oversized cabinet, hardware to anchor into sub wall assembly, and the accessories/components necessary to securely attach the 'Circle Cabinet'. G.C is responsible for making the final electrical connections for a fully operational backlit 'Circle Cabinet'. G.C. is to coordinate with the sign fabricator, the actual sign construction. The G.C. is to furnish erection template of the actual 'Circle Cabinet'. Mock Up when requested of the 'Circle Cabinet' and Lettering templates in the field and shall be set together.

6.2 Acrylic Letters

Single Individual Letters, Flat Cut Acrylic, Exterior Sign: 1/2-inch thick minimum, laser cut, custom font, UV-stable flat acrylic. Printed with UV Colorlast color when required. When possible and when in compliance, use UV-resistant, pigmented pre-made opaque color, white or black sheets.

6.2.1 Color as noted on Exterior Elevation. Exposed edges: Ground Smooth.

6.2.2 Approved Font requires obtaining an Adobe License in a compatible format for the sign company, provisions and license by this contractor.

Font Style: URW DIN for bidding purposes. Standard Mounting: 'Flush Stud Mount', unless noted otherwise on Exterior Elevations. Mount to-receive, and set-with 10-24 threaded studs or 1/4-20 stainless steel threaded rods, securely anchored. Take provisions to properly install in accordance with a combination of critcial ASTM specifications, and federal/local building codes.

6.2.3 Move / adjust locations and spacing on wall, in field when requested by Owner.

6.2.4 Exterior Sign installation shall have structural stability, material and hardware integrity and the weatherproofing to the building envelope maintained.

6.2.5 Exterior Sign shall be in accordance with the current edition of Sedgwick County Brand Guidelines, and/or Sedgwick County's currently adopted Sign Codes. Sign Material, Fabrication and Installation shall be by a Licensed Commercial Sign Vendor and by a County Approved Vendor.

A. Non-Approved Vendors who would like County Approval for this specific project shall submit a request during the bidding process. Requests are to be received in a timely manner for the owner to determine and respond publicly before bid day.

6.2.6 This contractor is required to be in strict adherence to OSHA's Safety regulations, including but not limited to the fall protection and elevated work platform regulations.

6.2.7 Furnish erection templates in the field, verify spacing with Architect prior to developing template. Field Mock-up when requested. Coordinate with General Contractor to set this template together with the 'Circle Cabinet' Template.

6.2.6 This contractor shall provide concealed mounts accounting for the thickness of the exterior finish where placed. This contractor shall coordinate 'In-Wall' blocking prior to exterior finishes are installed. General Contractor is responsible for providing 'In-Wall' blocking to support the individual letters at approved Final Placement. Final Placement will be determined after mock-up of template and field review/updates by Architect and Owner. This contractor is responsible for installing sign, including but not limited to the hardware to anchor signs into sub wall assembly, and the accessories/components necessary to securely attach the individual Letter Signs.

6.3 Exterior Elevations

6.3.1 Individual Letters as shown on Exterior Elevations: Height and Placement.

6.3.2 Individual Letters not shown on Exterior Elevations as follows: SEDGWICK COUNTY. Size adjusted to site specific conditions and to comply with the Sedgwick County Brand Guidelines. Apply to East and North Exterior Elevations.

Note: If more locations are indicated, refer to Exterior Elevation drawings for quantity.

6.4 Vinyl Stickers: White.
Adhere to exterior side of glazing at the front entry transom. Field Locate.
Individual Numbers Size: comply with local zoning and building codes.

Font style: Approved Font requires obtaining an Adobe License in a compatible format for the sign company, provisions and license by this contractor.
Font Style: URW DIN for bidding purposes.

6.4.1 Individual Numbers: 8 8 1

6.4.2 At Entrance: B134a Transom: Individual Letters as follows:
J S B Building, approx. 9 inches height. Color: TBD

6.4.3 At Entrance: Building B – General Offices: Individual letters as follows:
Entry to Juvenile Court. Color: TBD

8. INTERIOR SIGNAGE

Owner to provide. Owner to install. General Contractor to coordinate with Owner on placement of signs. Refer to Drawings. Final spacing, layout, and location shall be reviewed and approved by the Owner prior to installation.

8.1 Signage Type A: Signage for Administrative areas; will be provided and installed by Owner. General Contractor will be responsible for coordinating field changes with the Owner's signage provider.

Note: Signage Type A occurs in all areas, except the Residential area. (Image below.)



8.2 Signage Type B: JRF Residential Signage; will be provided and installed by Owner. General Contractor will be responsible for coordinating field changes with the Owner's signage provider.

Note: Signage Type B occurs in the Juvenile Residential Facility (JRF) Residential Area.

8.2 Owner's Signage Provider / Interior Signage Contact:
David Stiles, Superior Signs & Engraving, Inc.
(316) 263-4264 phone; email: david@superiorsigns.biz
2130 E. Douglas, Wichita, Kansas 67214

9. CLEANING AND PROTECTION

At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

End of Section 10425

SECTION 101500

INTERIOR SPECIALTIES

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. The Contractor for this portion of the work is required to refer especially thereto.

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

1.3 All requirements under Division One of these specifications shall be a part of this section. Each Contractor is responsible to be thoroughly familiar with all its contents as to requirements, which affect this division or section.

2. WORK INCLUDED

Furnish all labor and materials to complete all miscellaneous site furnishings and specialty work shown on the drawings and/or herein specified, as follows:

2.1 Motorized Projection Screens

2.2 Prescription Cabinet

2.3 Key Watcher (Electronic Key Vault) – Provided by Owner. Installed by Owner.

2.4 Wall Clock – Provided by Owner. Installed by Owner.

2.5 Time Card Reader – Provided by Owner. Installed by Owner.

2.6 Not included: Custom Floor Mats (Refer to Section 096820)

3. RELATED SECTIONS

3.1 Division 6, Section 061000 – "Rough Carpentry"

3.2 Division 9, Section 092900 – "Gypsum Board"

4. QUALITY OF WORKMANSHIP

All work that is to be performed under these specifications shall be done by the mechanics and artisans skilled in their respective trades, in order to produce first-class installation of the work.

5. SUBMITTALS

Submit Shop Drawings and Product Data

5.1 Show in detail the construction, gauges, jointing, methods of installation, fastening and supports, location, anchoring, hangers, and other pertinent data and information.
Submit details drawn to scale at not less than 1/4 inch per foot.
Shop Drawings shall contain the design, type of steel and load assumptions.

5.2 Submit (2) samples of actual specified products.

5.3 Field verify all dimensions.

6. INSTALLATION

All items shall be installed per manufacturer's published installation instructions, and in strict accordance with manufacturer's recommendations.

7. PRESCRIPTION CABINET – Lab and Nurse's Station

7.1 Furnish and install Lakeside Narcotic Cabinet with handle, two shelves, double door, double lock; size 30-in H x 18-in W x 10-in deep; Model LNC-6DFT, as manufactured by Lakeside Healthcare, West Milwaukee, Wisconson, phone: 1-800-558-8565 or (414) 902-6400, web: www.elakeside.com, email: info@elakeside.com; or approved equal.

7.1.1 Item Description:

A. Two (2) keys per lock

B. Constructed of heavy steel, and powder coated

C. Hinges ship standard on side shown; door hinges can easily be switched in the field by turning cabinet upside down and flipping over shelves.

D. Overall Dimensions: 30" H x 18" W x 10" D

E. Interior Dimensions: 25.75" H x 15.5" W

F. Interior Shelving: Two (2) adjustable shelves

G. Color: Beige

H. Shipping Weight: 37 lbs.

7.1.2 Note: If larger size is available in a comparable, double door, double lock prescription cabinet, please notify Owner/Architect of alternate product prior to procurement of cabinet. Potential substitutions must be submitted in accordance with Section 013300 "Submittal Procedures", Division 1 of these specifications, and Sedgwick County Standards and procedures.

7.2 Refer to Drawings for cabinet room and location. Confirm cabinet room and location with Owner prior to installation.

8. MOTORIZED PROJECTION SCREENS

8.1 Furnish and install Da-Lite Advantage with SightLine™ ceiling-recessed electric projection screens, recessed box mounted into ceiling, as noted in this specification, and where shown or noted on the drawings, as manufactured by Da-Lite, or the approved equal. Refer to drawings for number, type, location, and additional details.

8.1.1 Approved manufacturer:
Legrand | Da-Lite Screen Company, Inc., PO Box 137, Warsaw, Indiana 46581
phone: 800-622-3737; web: https://www.legrandav.com/products/da-lite

8.1.2 Motorized Projection Screens shall be Da-Lite Advantage with SightLine™ ceiling recessed electric projection screen, glass bead, matte white.

The length of the ceiling mounted pole shall drop to an adequate length to support full view on screen.

8.1.2 Include Standard and Additional Features:

A. Silent motor

B. Standard white case

C. The assembly includes the case with closure door and screen. Provide and install additional accessories as needed for complete installation.

D. All sized standard with 2-inches of black drop. See available options for extra drop pricing.

E. Built-in low voltage controls are standard. Include controls to raise and lower wall at box. See electrical drawings and specifications.

8.1.3 Note: Screen surface and format is listed for bidding purposes – verify product selection and product details with Owner prior to ordering.

8.2 Screen Locations: Refer to Drawings. Confirm Model numbers, type of screen, and screen locations with architect prior to placing order.

8.2.1 Conference Room # H209
Da-Lite Advantage with Closure Door – 16:9 HDTV Format, model 94280, 54 inch x 96 inch, approx. 8 feet wide, 24-inch drop, 110 nominal diagonal.

8.2.2 Room B119 and Room B121
Da-Lite Advantage with Closure Door – 16:9 HDTV Format, model 88159, approx. 10 feet wide, 65 inch x 116 inch, 12-inch drop, 133 nominal diagonal. One (1) in each room.

9. KEY WATCHER (Electronic Key Vault) – By Owner
Product to be provided and installed by Owner.

10. WALL CLOCK – By Owner
Product to be provided and installed by Owner.

11. TIME CARD READER – By Owner
Product to be provided and installed by Owner.

End of Section 101500

SECTION 100520

EMERGENCY EYEWASH STATIONS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes wall-mounted emergency eyewash station(s).

3. SUBMITTALS

3.1 Product Data

For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for eyewash station(s), and mounting brackets.

3.2 Product Schedule

Coordinate final Eyewash Station Schedule to ensure proper fit and function.

3.3 Operation and Maintenance Data

For eyewash stations, to include in maintenance manuals.

3.4 Warranty: Sample of warranty.

4. QUALITY ASSURANCE

4.1 Emergency eyewash station must be installed by a qualified licensed plumber with a thorough understanding of and must be competent to meet ANSI/ISEA Z358.1-2014 standards, and OSHA standards.

5. COORDINATION

Coordinate type of eyewash station to ensure fit and function.

6. WARRANTY

Manufacturer's standard two-year manufacturer limited warranty against defects in materials and faulty workmanship. The warranty covers repair or replacement of the unit but excludes labor, transportation, or damage resulting from improper installation or alteration.
Warranty unconditionally warrants against manufacturing defects; warranty is invalid if modified by other than authorized personnel.

6.1 Warranty Period: Two (2) years from date of purchase.

PART 2 – PRODUCTS

7. EYEWASH STATION

7.1 Fully assembled and hydrostatically tested unit to meet all OSHA requirements and ANSI Z358.1-2014 standards; type as indicated:

7.1.1 Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:

Guardian Equipment (Guardian Eyewash Corp)
1140 N North Branch St, Chicago, IL 60642
Phone: 1-800-690-7700; email: customerservice@gesafety.com
web: www.gesafety.com

7.1.2 Approved Product: Guardian G1814 Wall Mount Emergency Eyewash Station, Stainless Steel, with two GS-Plus spray-type spray heads; or approved equal.

7.1.3 Included Components: Stainless steel bowl, two spray heads with flip-top dust covers, stainless steel bowl, unit activated by a 1/2-inch IPS chrome plated brass stay-open brass ball valve with Teflon seals and cast aluminum flag handle, and ANSI-compliant identification sign.

7.1.4 Mounting Bracket: Heavy-duty cast aluminum wall bracket with a corrosion-resistant powder-coated finish.

7.1.5 Fully factory-assembled and water tested before shipment.

PART 3 – EXECUTION

9. EXAMINATION

9.1 Before installation, examine units to ensure they are free of damage. Ensure that equipment and components are properly assembled, configured, and undamaged prior to use. Confirm that the unit matches manufacturer specifications and is in good working order. Inspect units for structural damage, cracks, or flaws.

9.1.1 Remove and replace damaged or defective units.

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

10. INSTALLATION

Ensure the unit is installed according to local codes, OSHA requirements, and ANSI Z358.1-2014 standards.

10.1 Site Inspection shall include knowledge of plumbing codes, ability to ensure proper tepid water temperature (16 to 38 degrees Celsius), and to ensure that no trip hazards exist.

10.2 Installers must strictly adhere to all of manufacturer's written installation guidelines.

10.3 When installed, the eyewash station must meet the following criteria, including but not limited to:

10.3.1 Eyewash station must be located within 10 seconds (approx. 55 feet) of hazards, on the same level, with an unobstructed path.

10.3.2 Water Quality & Temperature: The eyewash fluid must be "tepid," defined as 60–100°F (16–38°C).

10.3.3 The eyewash station must meet the following performance metrics:

A. Valve Operation: Must activate in one second and stay open without the use of hands.

B. Flow Duration: Must provide at least 15 minutes of uninterrupted, potable water.

C. Coverage: Must provide simultaneous, low-pressure flow to both eyes.

D. Signage: Must be in well-lit, and unit must be marked with highly visible signs.

E. Protection: Nozzle covers must remain in place and be automatically removed when eyewash is activated.

10.4 Installer Responsibilities

10.4.1 Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

10.4.2 Positioning: Install the station within 10 seconds of reaching hazard, free of obstructions, and on the same level.

10.4.3 Height Requirement: Eyewash heads should be positioned 33 to 53 inches from the ground.

10.4.4 Flow Rate Verification: Ensure a 15-minute flow at 0.4 GPM for eyewash (or 3 GPM for eye/face wash).

10.4.5 Signage & Lighting: Install with high-visibility signage in a well-lit area.

10.4.6 Protection: Ensure valves remain open (hands-free) and that the unit has dust covers and is protected from freezing.

10.4.7 Testing: Installer must perform an initial performance test to ensure no leaks and proper, immediate flow.

End of Section 100520

SECTION 101550

TOILET PARTITIONS

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. This Contractor is required to refer especially thereto.

2. WORK INCLUDED

2.1 This section of the specifications shall include the furnishing of all labor and materials as required in connection with the installation of the toilet partitions.

2.2 Provide and install privacy toilet partitions in the women's toilet room stalls as shown on plans. Toilet stalls are standard height with privacy covers provided and installed to eliminate gaps between stall doors and panels, to ensure privacy.

2.3 Provide and install privacy partitions in the men's toilet room stalls as shown on plans.

2.4 Provide and install urinal screen in the men's toilet room as shown on plans.

3. QUALITY OF MATERIALS

3.1 All materials of every kind which enter into the construction of this work shall be of the best obtainable in the market for use in the best grade of construction.

3.3 Prior to shipping, protect stainless steel panel finish with PVC film. Do not remove until installation at site.

3.4 Doors, panels, and pilasters constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent, and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

4. QUALITY OF WORKMANSHIP

All work that is to be performed under these specifications shall be done by the mechanics and artisans skilled in their respective trades. In order to produce first-class construction and installation of the work.

5. MATERIALS

5.1 Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface;

A. Fire-resistance Rating: Tested in Accordance with NFPA 286.
B. Fire-resistance Rating: Tested to meet ASTM E84, Class B.
C. Standard Collection, Does not meet NFPA 286 or ASTM E84

5.2 Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.

5.3 Aluminum Die Castings: ASTM B85, A380 alloy.

5.4 Stainless Steel Castings: ASTM A167, Type 304.

5.5 Rubber: Abrasion resistant Styrene Butadiene Rubber, 65 to 80 Shore A durometer, black.

6. TOILET COMPARTMENTS AND SCREENS

Toilet compartments and screens shall be overhead braced type, and shall be constructed from premium, American-made 1-inch solid plastic HDPE (high density polyethylene) with a solid color throughout. Toilet compartments and screens shall be HDPE, with a hammered texture (Silver color), and shall be a standard partition with privacy no-gap closure, as manufactured by Scranton Products, Inc., or the approved equal.

6.1.1 Approved equals:

a. ASI Global Partitions, standard partition with privacy no-gap closure, Solid Plastic (HDPE), Hammered (Color to be selected by Architect)

b. General Partitions standard partition with privacy no-gap closure, Solid Plastic (HDPE), 501 Hammered (Color to be selected by Architect)

6.2 Doors, panels, and pilasters constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent, and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

6.3 Doors and Dividing Panels:
Toilet compartment doors are required on the women's and men's toilet rooms.
Standard Height: 58 inches high.

6.4 Toilet Compartment Hardware
Hardware shall be stainless steel hinges, latch #43, latch keeper and bumper #44, full height aluminum wall brackets #257, full height aluminum panel to pilaster brackets #259,), full height aluminum pilaster to wall brackets #257, coat hooks #45, stainless shoes, heavy duty headrail, and theft-proof bolts.

6.5 Urinal Screen in men's toilet room. Screens hung from wall with brackets; to match toilet partitions, or as specified in drawings.

6.6 Doors to be 1-inch thick high straight cut with fine radius edges.

6.7 Shower Stall and Changing Rooms
Hardware shall be stainless steel, full height aluminum wall brackets #257, full height aluminum panel to pilaster brackets #259, full height aluminum pilaster to wall brackets #257, coat hooks #45, stainless shoes, heavy duty headrail, and theft-proof bolts.

6.7 Changing rooms shall be floor mount top rail braced similar to the toilet stalls.

7. PRIVACY

Eliminate sight-lines / gaps in stalls by providing and installing privacy hinges and toilet partition privacy cover strips applied to the designated toilet partitions that are compatible with specified toilet compartment and by same partition manufacturer. Refer to Drawing for locations of toilet stalls to receive privacy covers.

8. FITTINGS

8.1 Attachment Hardware
Chrome plated, one-way vandal proof sex bolts and No. 14 stainless steel metal screws of length recommended by manufacturer.

8.2 Connection Brackets
Non-ferrous cast alloy, chrome plated.

8.3 Pilaster Trim
Minimum 3 inches high by 0.031 inch thick [76 mm by 0.76 mm thick] stainless steel shoe.

9. HARDWARE

9.1 Hinges
Chrome plated non-ferrous cast pivot hinges with nylon cams and adjustable for door closing position. Top hinge mounted within door cutout.

9.2 Combination coat hook and rubber bumper: Cast alloy, chrome plated.

9.3 Concealed latch operating handle: Cast alloy, chrome plated mechanism that does not require twisting or turning of wrist to operate. Provide cover for exterior side.

9.4 Combination latch keeper and door stop with rubber bumper: Cast alloy, chrome plated.

9.5 Door Pull
Cast alloy, chrome plated, straight loop design.

9.6 Provide internal reinforcement for accessories and grab bars as indicated.

9.7 Coat Hooks

9.7.1 In ADA stalls, provide and install coat hook at a maximum height above the finished floor of 48 inches for a forward approach or 54 inches for a side approach and that is accompanied by clear floor space of 30 by 48 inches that allows a forward or parallel approach by a person using a wheelchair.

9.7.2 In non-ADA stalls, install coat hook at standard height, placed at 60-inch to 66-inch height.

11. FACTORY FINISHING

All exposed stainless steel components shall have No. 4 surface.

12. PREPARATION

12.1 Coordinate requirements for blocking in stud walls to ensure proper support is provided for wall attachments.

12.2 Coordinate requirements for structural support members and bracing above ceiling for adequate [suspension of ceiling hung toilet compartments] [attachment of floor to ceiling pilaster].

12.3 Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

13. INSTALLATION

13.1 Install partitions secure, plumb, and level in accordance with manufacturer's instructions.

13.2 Maintain uniform space between wall and panels and between wall and end pilasters.

13.3 Attach panel brackets securely to walls using anchor devices recommended by manufacturer.

13.4 Where indicated on approved shop drawings, pilasters intersecting adjacent walls shall be terminate 12 - 3 inches [305] [76] mm] above floor and attach to wall with brackets.

13.5 Where indicated on approved shop drawings, pilasters intersecting adjacent walls shall be attached with brackets.

13.6 Attach panels and pilasters to brackets with sheet metal screws.

13.7 Suspend pilasters from auxiliary structural framing directly above finished ceiling. Attach with two [3/8 inch] [10 mm] threaded studs [5 inches] [127 mm] long. Use leveling nuts and washers to adjust position of pilaster. Conceal ceiling attachment with pilaster shoes.

14. ERECTION TOLERANCES

14.1 Maximum variation from true position: 1/4 inch.

14.2 Maximum variation from plumb: 1/8 inch.

15. ADJUSTING AND TOUCH-UP

15.1 Remove protective film from stainless steel panels.

15.2 Remove minor scratches by buffing surface and blending such that refinishing cannot be detected.

15.3 Adjust hinges to locate in-swinging doors in partial open position and out-swinging doors in closed position when unlatched.

15.4 Adjust and align hardware to uniform clearance at vertical edge of doors.

16. CLEANING

16.1 Remove protective maskings.

16.2 Clean surfaces and wash with mild soap. Rinse thoroughly and dry. Do not use abrasives.

17. WARRANTY

Guarantee for all work supplied or installed against defects resulting from the use of inferior materials, hardware, or workmanship, for a period of ten (10) years from the date of final completion when properly stored, handled, and maintained under normal usage.

End of Section 101550

SECTION 102600

WALL AND DOOR PROTECTION

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes

- 2.1.1 Wall Guards (Vinyl Chair Rails)
- 2.1.2 Rub Rails
- 2.1.3 Corner Guards
- 2.1.4 End-wall Guards

2.2 Related Requirements

Section 055000 “Metal Fabrications” for pipe guards and bollards.

3. ACTION SUBMITTALS

3.1 Product Data for each type of product

- 3.1.1 Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- 3.1.2 Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.

3.2 Shop Drawings

For each type of wall protection showing locations and extent.

- 3.2.1 Include plans, elevations, sections, and attachment details.
- 3.2.2 Detail drawings indicating mounting details with the appropriate adhesives for specific project substrates.

3.3 Samples for Verification

For each type of exposed finish on the following products, prepared on Samples of size indicated below:

- 3.3.1 Corner and End-Wall Guards: 6 inches long.

4. INFORMATIONAL SUBMITTALS

4.1 Sample Warranty: For special warranty.

4.2 Cleaning and maintenance instructions for door and wall protection systems.

5. CLOSEOUT SUBMITTALS

Maintenance Data

For each type of wall and door protection product to include in maintenance manuals.

5.1 Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

6. MAINTENANCE MATERIAL SUBMITTALS

Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

6.1 Corner and End-Wall Guards: Two (2) of each; full height.

6.2 Mounting and Accessory Components
Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

7. QUALITY ASSURANCE

7.1 Certified Wood
Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.

7.2 Vendor Qualifications
A vendor that is certified for chain of custody by an FSC-accredited certification body.

8. DELIVERY, STORAGE, AND HANDLING

Deliver materials in unopened factory packaging to the jobsite and store in original packaging in a climate-controlled location away from direct sunlight. Store wall and door protection in original undamaged packages and containers inside well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

8.1 Maintain room temperature within storage area at not less than 70 degrees F during the period plastic materials are stored.

8.2 Keep plastic materials out of direct sunlight.

8.3 Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 degrees F.

A. Store corner-guard covers in a vertical position.

9. PROJECT CONDITIONS

Products must be installed in an interior climate-controlled environment.

10. WARRANTY

10.1 Special Warranty

Manufacturer agrees to repair or replace components of wall- and door protection units that fail in materials or workmanship within specified warranty period.

10.1.1 Failures include, but are not limited to, the following:

A. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.

B. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

10.1.2 Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 – PRODUCTS

11. QUALITY ASSURANCE

11.1 Provide all chair rails (wall guards) and corner guards and from the approved source. Provide and install any parts and accessories required for installation of the specified products, including, but not limited to product-specific returns and corners.

11.2 Install per manufacturer's recommendation. Provide radius returns necessary to terminate run at wall, if available from manufacturer.

12. MANUFACTURERS

Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

13. PERFORMANCE REQUIREMENTS

13.1 Surface Burning Characteristics

Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

11.1.1 Flame-Spread Index: 25 or less

11.1.2 Smoke-Developed Index: 450 or less

13.2 Regulatory Requirements

Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities.

14. WALL GUARD (VINYL CHAIR RAIL)

Approved Manufacturer / Product
InPro Corp., 1500 Wall Guard rigid vinyl, 5-inch profile height, 1-inch wall distance, or approved equal. Color: Faux Wood Finish, color to be selected by architect from manufacturer's standard wood finish colors. www.inprocorp.com. See also Material Legend, Drawings.
Contact: Natalie Green, Phone: 262-679-9010 ext. 5162.

15. RUB RAIL

Approved Manufacturer / Product (See Material Legend, Drawings)
InPro Corp., Palladium® Rigid Vinyl Rub Rail 500 Wall Guard rigid vinyl, height as shown on drawings to be 5-inch or 6-inch height, or approved equal.
Color: Woodgrain or Faux Wood Finish, color be selected by architect from manufacturer's standard wood finish colors. www.inprocorp.com. See also Material Legend, Drawings.
Contact: Natalie Green, Phone: 262-679-9010 ext. 5162.

16. CORNER GUARDS

16.1 Metal Corner Guards

Fabricated as one (1) piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

Manufacturer / Product
Inpro Corp., Surface Mount Stainless Steel Corner Guard, Type 304, 14 gauge, Wing size: 3-1/2 inches, or approved equal.
Contact: Natalie Green, Phone: 262-679-9010 ext. 5162.

Product shall be installed using PL Premium Heavy Duty Adhesive.
Install in accordance with manufacturer's recommendation.

16.2 Vinyl Corner Guards

Manufacturer / Product
Inpro Corp., 150 High Impact Corner Guard, surface mount, rigid vinyl, 3-inch wing size, or approved equal. Color be selected by architect from manufacturer's standard colors, or manufacturer's standard woodgrain colors.
www.inprocorp.com. See also Material Legend, Drawings.
Contact: Natalie Green, Phone: 262-679-9010 ext. 5162.

17. END-WALL GUARDS

Approved Manufacturer / Product
InPro Corp., 150D High Impact End Wall Protector, surface mount, rigid vinyl, 3-inch wing size, or approved equal. Color be selected by architect from manufacturer's standard colors, or manufacturer's standard woodgrain colors. www.inprocorp.com.
See also Material Legend, Drawings.
Contact: Natalie Green, Phone: 262-679-9010 ext. 5162.

18. APPROVED EQUALS

Approved equal manufacturers / products are subject to approval by architect, and to compliance with requirements:

18.1 Inpro Corporation

18.2 Tarkett, Inc.

18.3 Schluter-Systems Ltd.

18.4 Babcock-Davis

18.5 Construction Specialties, Inc.

18.6 J. L. Industries

18.7 Pawling Corporation

18. MATERIALS

Adhesive: As recommended by protection product manufacturer.

19. FABRICATION

19.1 Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

19.2 Factory Assembly
Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

19.3 Quality
Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

20. FINISHES

20.1 Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

20.2 Appearance of Finished Work
Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 – EXECUTION

21. EXAMINATION

21.1 Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

21.2 Complete all finishing operations, including painting, before beginning installation of rails and guards. Examine areas and conditions in which the chair rail and guard systems will be installed.

21.3 Wall surface shall be dry and free from dirt, grease, and loose paint. Surface must be dry, clean and properly sealed.

21.4 Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

21.4.1 For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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

22. PREPARATION

22.1 Complete finishing operations, including painting, before installing wall and door protection.

22.2 Before installation, clean substrate to remove dust, debris, and loose particles.

23. INSTALLATION

23.1 Installation Quality
Install wall and door protection in strict accordance with manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

23.2 Mounting Heights
Install wall and door protection in locations and at mounting heights indicated on Drawings.

23.3 Locate the chair rail and corner guard as indicated on the approved detail drawing for the appropriate substrate and in compliance with the manufacturer’s installation instructions.

23.4 Install chair rail and corner guard level and plumb at the height indicated on the drawings.

23.5 Corner Guards installed with adhesive:
Apply a bead of PL Premium Heavy-Duty Adhesive in a zigzag pattern over the back of each wing of the corner guard. Position corner guard on the wall and apply pressure until a tight fit is achieved.

23.6 Remove protective plastic covering from the exposed surface of the corner / chair rail.

24. CLEANING

24.1 Immediately after completion of installation, clean surfaces in accordance with the manufacturer's clean-up and maintenance instructions.

24.2 Remove excess adhesive using methods and materials recommended in writing by manufacturer.

End of Section 102600

SECTION 102800

TOILET ACCESSORIES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

Section Includes

A. Paper Towel Dispensers: Locate at sinks and lavatories; models vary.

B. Soap Dispensers: At sinks and lavatories.

C. Grab Bars: At ADA height water closet, and at ADA showers.

D. Combo Toilet Paper + Seat Cover Dispenser: At each toilet.

E. Trash Receptacles; models vary.

F. Specimen Pass-Through Box (with Turntable)

G. Other Toilet Accessories as listed in this specification and on Drawings.

3. SCOPE OF WORK

This contractor shall furnish and deliver to the project all items of toilet accessories hereinafter specified in the plans or specifications or obviously required to complete this part of the contract. Items not specifically mentioned but necessary to complete the work shall be furnished matching in quality and finish the items described or specified.

3.1 All items are to be provided and installed by the General Contractor.

3.2 Items 16 through 18 listed below in "Products" are to be as specified to meet Sedgwick County Standards – no substitutions.

3.3 Items 19 through 28 listed below in "Products" are basis of design products, approved equals can be considered. Manufacturer shall be as shown on the drawings, or the approved equal. Submissions for approved equals must be submitted in accordance with Section 013300 "Submittal Procedures," Division 1, of these specifications, and Sedgwick County Standards and procedures.

3.4 Automatic Paper Towel Dispensers in Public Areas as noted in restrooms, unless otherwise indicated.

3.5 Tri-fold Paper Towel Dispensers at sinks in single-user restrooms with CMU walls.

3.6 Semi-Recessed Combination Units in multi-user restrooms that include paper towel dispenser and trash module.

3.7 Semi-Recessed Combination Units in single-user restrooms that include automatic paper towel dispenser and trash module.

3.8 Refer to Drawings/Plans for quantity.

4. REFERENCES

Related Sections include:

A. Section 101550 – "Toilet Partitions"
Note: Toilet stalls are standard height with privacy covers and privacy hinges provided and installed on the designated restroom stalls to eliminate gaps between stall doors and panels, to ensure privacy.

B. Section 064023 – "Interior Architectural Woodwork"

C. Section 088000 – "Glazing": For mirrors, where noted.

5. COORDINATION

5.1 Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

5.2 Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

6. SUBMITTALS, SCHEDULE AND SAMPLES

A complete schedule of accessories shall be submitted to the architect for his approval. Samples of all items appearing on the schedule shall be submitted to the Owner/Architect for approval prior to ordering.

6.1 Product Data
For each type of product

6.1.1 Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

6.1.2 Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

6.1.3 Include electrical characteristics.

6.2 Product Schedule
Indicating types, quantities, sizes, and installation locations by room of each accessory required.

6.2.1 Identify locations using room designations indicated.

6.2.2 Identify accessories using designations indicated.

6.3 Informational Submittals: Sample Warranty for manufacturer's special warranty.

7. CLOSEOUT SUBMITTALS

Maintenance Data: For accessories to include in maintenance manuals.

8. DELIVERY

The General Contractor shall receive and check and be responsible for all accessories delivered to the job site. All accessories shall be properly stored until ready for application and shall be protected against damage to finish or operation after application. Installation shall be in strict accordance to the factory instructions and all accessories shall be in proper working order and adjustment upon completion of installation.

9. GENERAL REQUIREMENTS

The accessories contractor shall check accessories hardware with details and be responsible for fitting of same. If accessories specified will not fit properly, he shall notify the architect or owner so that adjustment can be made before accessories are ordered.

10. WARRANTY

10.1 General Warranty

Special warranty specified in this Article shall not deprive Owner of other rights. Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

10.2 Minimum Warranty Period: 15 years from date of Substantial Completion.

11. WARRANTY – MIRRORS

Manufacturer's Special Warranty for Mirrors

Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

11.1 Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated. Failures include, but are not limited to visible silver spoilage defects.

11.2 Warranty Period: 15 years from date of Substantial Completion.

12. INSTALLATION

12.1 Surface-mounted toilet accessories: unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

12.2 Recess toilet accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless steel hinge. Provide anchorage that is fully concealed when unit is closed.

12.3 Framed glass-mirror units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

12.3.1 Provide galvanized steel backing sheet, not less than 0.034-inch and full mirror size, with non-absorptive filler material. Corrugated cardboard is not an acceptable filler material.

13. TOILET ACCESSORIES

See notes under "Scope of Work" this Specification. Refer to Drawings.

PART 2 – PRODUCTS

14. MATERIALS

15.1 Stainless Steel
ASTM A666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

15.2 Fasteners
Screws, bolts, and other devices of same material as accessory unit and tamper- and theft-resistant where exposed, and of galvanized steel where concealed.

14.3 Chrome Plating
ASTM B456, Service Condition Number SC 2 (moderate service).

14.4 Mirrors
ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

15. FABRICATION

15.1 General
Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

15.2 Keys
Provide universal keys for internal access to accessories for servicing and resupplying. Provide the requested number of keys to Owner's representative.

16. PLACEMENT / TYPE – PAPER TOWEL DISPENSERS

14.1 Generally Applied Placement and Type – Paper Towel Dispensers

14.1.1 Framed wall construction and where ADA clearances are encroached by a typical 4-inch deep dispenser, utilize the specified Semi-Recessed unit.
Refer to Drawings.

14.1.2 CMU wall construction and at Kitchen sinks: Surface mount.

14.1.3 In all areas except for JRF and above kitchen sinks: Automatic.

14.1.4 JRF and Kitchen: Surface mount, manual, C-fold towels.

14.1.5 Where Semi-Recessed units are placed, the unit is above an in-wall waste module.

PRODUCT LISTING
Final selections to be made by Owner / Architect; confirm selection prior to procurement of items.

These items are to be as specified to meet Sedgwick County Standards or are considered an approved equal by Sedgwick County – no substitutions.

17. PAPER TOWEL DISPENSER – Automatic, Surface-Mounted Roll Unit
Surface-Mounted Automatic Paper Towel Dispenser, for 8-inch diameter / 8-inch wide roll, Satin Finish; Single Source Manufacturer: Bobrick, Model: B2974

18. PAPER TOWEL DISPENSER – Automatic, Semi-Recessed Roll Unit
Semi-Recessed Automatic Paper Towel Dispenser, for 8-inch diameter / 8-inch wide roll, Satin Finish; Single Source Manufacturer: Bobrick, Model: B29744

19. PAPER TOWEL DISPENSER – Manual, Surface-Mounted Roll Unit
Surface-Mounted Manual Roll Paper Towel Dispenser, for C-fold paper towels, Fino Collection, Satin Finish; Single Source Manufacturer: Bobrick, Model: B9262

20. PAPER TOWEL DISPENSER – Manual, Semi-Recessed Roll Unit
Semi-Recessed Manual Paper Towel Dispenser, for C-fold paper towels, Classic Series Convertible Folded Towel Dispenser Module, Satin Finish; Single Source Manufacturer: Bobrick, Model: 3944-152

21. COMBO TOILET PAPER AND SEAT COVER DISPENSER
To be selected by Owner / Architect.

22. AUTOMATIC SOAP DISPENSER
To be selected by Owner / Architect.

These items are basis of design products, submittals for approved equals can be considered.

23. SANITARY NAPKIN DISPOSAL
Manufacturer: Bobrick, Model: B-270

24. URINAL SHELF
Manufacturer: Schluter, Shelf Wave
Item: SWS1 D10 EB. Installation during tile installation.

25. FOLDING SHOWER SEAT
Manufacturer: Bobrick. Model: B-51815

26. DRESSING BENCH
Manufacturer: Lockers.com, Model: # 77771-ADA.
Bench anchors to floor.

27. TOWEL HOOKS
Mount at different heights, in compliance with ADA requirements.
Distributor: Hafele. Item No: 842.34.050

28. SHOWER CURTAIN AND CURTAIN ROD – HOOKLESS CURTAIN
Distributor: Inpro. Item: ENSBSCRTNKIT-36.

29. GRAB BARS – IN SINGLE-USER RESTROOM AND ADA STALLS
In each restroom: Refer to drawings / details and comply with ADA requirements.
Manufacturer: Bobrick 6806 - varies; Stainless steel with concealed flange/escutcheon.
Varied lengths. Include Vertical and horizontal grab bars.

30. GRAB BARS – SHOWER ENCLOSURE
In each shower enclosure: refer to details and ADA requirements
Manufacturer: Bobrick 6861.99 Two-Wall Grab bar; Stainless steel with concealed flange/escutcheon. Plus Vertical Grab bar: Bobrick 6806.99- 18. Peened finish.

31. BABY CHANGING STATION(S)
Provide and install baby changing stations as indicated on Drawings. The changing stations shall be equal to "Koala Bear Kare Baby Changing Station", as manufactured by JBJ Industries, Inc., 380 Oak Grove Parkway, St. Paul, MN 55127-8536, (800) 666-0363.

32. SHOWER CURTAIN ROD AND SHOWER CURTAIN LINER – Residences
Provide and install, per Drawings:

32.1 Shower Curtain Rod: Straight Shower Curtain Rod, 1-inch diameter, with flange, by Inpro Corp. Color to be selected by Architect from manufacturer's standard colors. Width: 72 inches.

32.1 Shower Curtain Liner: Commercial-Grade Vinyl Hookless Shower Liner, by Inpro Corp, or approved equal. Minimum weight: 8 gauge. Color to be selected by Architect from manufacturer's standard vinyl shower curtain liners. Width: 36 inches.

32.3 Manufacturer: Inpro Corp., Muskego, Wisconsin, phone: 1-800-222-5556, www.inpro.com; or approved equal.

Contact: Pam Reynolds, Territory Manager, phone: 913-283-0872, email: preynolds@inprocorp.com.

33. SPECIMEN PASS-THROUGH BOX (with Turntable)

33.1 Furnish and install one (1) Specimen pass-through box with turntable, mounted into the wall, as noted in this specification and where shown or noted on the drawings, as manufactured by ASI American Specialties, Inc., or the approved equal.

33.1.2 Approved manufacturer:
ASI American Specialties, Inc., 441 Saw Mill River Road, Yonkers, NY 10701
phone: (914) 476-9000; web: https://www.americanspecialties.com

33.1.2 Specimen pass-through box shall be ASI American Specialties, Inc., Model # 0515 with turntable – recessed, or the approved equal.

A. Overall Dimensions: 14.75 inches wide x 15.5 inches high.

B. Construction: 304 Stainless Steel, Satin finish.

C. Recessed mounting.

D. Turntable cylinder is 12-inch diameter with 10.5 inch x 6 inch opening.

E. Stainless-steel, self-lubricating ball-bearing plates mounted on top and bottom to permit the unit to rotate freely.

F. Positioned bullet catches prevent uncontrolled rotation.

G. Tumbler-lock allows for removal of cylinder for sterilizing or auto-claving when needed.

H. Turntable cylinder is manually rotated clockwise or counterclockwise 180 degrees to present the specimen container. Service access is gained by unlocking and opening the door.

33.1.3 Additional Product Details

A. Turntable Cylinder Assembly: 18 gauge, 0.05 inch, stainless steel, 12 inch diameter, with 10-1/2 inch x 6 inch opening; removable cylinder housing with lock; No.4 satin finish.

B. Cabinet Trim: 22 gauge, 0.0312 inch stainless steel, 1-inch flange with 1/4 inch returns, four sides; joints welded, sight-exposed welds finished to match sheet finish; adjustable for wall thickness 3 to 7 inches.

C. Main Body: Self-lubricating ball bearing plate mounted on top and bottom permits unit to revolve freely; positioned bullet catch prevents uncontrolled rotation.

33.2 Pass-through Box Location: Lab Restroom. Refer also to Drawings.

33.3 Substitutions: Submissions for approved equals must be submitted in accordance with Section 013300 “Submittal Procedures,” Division 1, of these specifications, and Sedgwick County Standards and procedures.

PART 3 – EXECUTION

34. INSTALLATION

34.1 Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

34.2 Grab Bars
Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

35. ADJUSTING AND CLEANING

35.1 Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

35.2 Remove temporary labels and protective coatings.

35.3 Clean and polish exposed surfaces according to manufacturer’s written instructions.

RESTROOM ACCESSORIES

Refer to Drawings for accessory locations and quantity. Especially reference Drawings A6.2 through A6.16, however, details may not be limited to these Drawings.

Items / manufacturer to be selected by Owner / Architect if not specified. Refer also to Sedgwick County Standards.

RESTROOMS: R108, R125, R143, H239
Each Restroom to typically have the following:

A. Mirror (refer to Drawings for sizes and locations)

B. Semi-recessed Paper Towel Dispenser, Automatic

C. Soap Dispenser, Automatic

D. Combo Toilet Paper + Seat Cover Dispenser

E. Grab Bars Set

F. Coat Hooks

G. Towel Hooks

H. Grab Bars

Each Restroom to have ONE of the following:

A. Combo Unit: Paper Towel Dispenser (Automatic) with Trash Disposal (include optional plastic liner with trash can).

B. Surface-mounted Paper Towel Dispenser: Roll Unit. May be Automatic or Manual; Refer to Drawings.

C. Semi-recessed Paper Towel Dispenser: Roll Unit. May be Automatic or Manual; Refer to Drawings.

Additional Items:
In addition to items listed above, a Restroom may have the following:

A. Baby Changing Station (include "purse" hook)

Womens' Restrooms:
In addition to items listed above, Womens' Restrooms typically have the following:

A. Bobrick Model # B-270, Surface Mounted

B. Folding Purse Shelves: Bobrick Model # B-287, Stainless Steel

M**ens' Restrooms:**
In addition to items listed above, Mens' Restrooms typically have the following:

A. Wallet Shelves

SHOWER ROOMS: R143

Each Shower Room to typically have:

A. Mirror with shelf Bobrick Model # 166-2436 24 x 36 inches
B. Paper towel dispenser
C. Toilet paper + Seat Cover Dispenser
D. Sanitary Napkin Disposal: Bobrick Model # B-270, Surface Mounted
E. Shower Rod with Hookless Curtain
F. Dressing Bench: Salsbury Model # 77782-ADA or Model # 77771-ADA
G. Grab Bars Set
H. Shower Caddy – Recessed
I. Soap/Bottle Cubby
J. Fixed Dressing Room Bench
K. Coat Hooks
L. Towel Hooks

Additional Items – Shower Rooms:

In addition to items listed above, Shower Room(s) may have the following:

A. Baby Changing Station (include "purse" hook)

End of Section 102800

SECTION 104116

EMERGENCY KEY CABINETS

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. The Contractor for this portion of the work is required to refer especially thereto.

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

1.3 All requirements under Division One of these specifications shall be a part of this section. Each Contractor is responsible to be thoroughly familiar with all its contents as to requirements, which affect this division or section.

2. WORK INCLUDED

Furnish all labor and materials to complete all miscellaneous site furnishings and specialty work shown on the drawings and/or herein specified, as follows:

2.1 EMERGENCY KEY CABINET (KNOX BOX®) – BUILDING EXTERIOR
Masonry, recessed mount.

2.2 EMERGENCY KEY CABINET (KNOX BOX®) – BUILDING INTERIOR, ELEVATOR
Recessed mount.

3. SUBMITTALS

3.1 Provide membrane manufacturer's printed data sufficient to show that all components of emergency key cabinet comply with the specified requirements and with the manufacturer's requirements and recommendations for the emergency key cabinet specified; include data for each product used.

3.2 Installation Instructions
Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

3.2.1 Shop Drawings
Provide:

A. The manufacturer's standard details customized for this project for all relevant conditions.

B. Provide project-specific layout, dimensions, and locations for each cabinet.

3.3 Warranty: Submit prior to starting work.

4. QUALITY ASSURANCE

4.1 Installer Qualifications
A qualified firm specializing in performing the work of this section with at least five (5) years of experience in installing the specified product(s), and that is eligible to receive manufacturer's warranty.

4.1.1 Installer shall be responsible for all work associated with emergency key cabinet(s), including all components.

4.2 Source Limitations
Obtain all components for the emergency key cabinet(s) from the cabinet manufacturer.

4.3 Pre-Installation Certificate
Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of the cabinet and components.

4.3.1 Require attendance with all parties directly influencing the quality of the work or affected by the performance of the work.

5. DELIVERY, STORAGE, AND HANDLING

Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

5.1 Store materials clear of ground and moisture with weather protective covering.

6. WARRANTY

6.1 General Warranty
Limited Lifetime Warranty guaranteeing that products are free from defects in materials and workmanship.

6.2 Installer Warranty
Materials Warranty and 2-year Labor / Maintenance Warranty

6.2.1 Any repairs required within the 2-year installer warranty will be completed at no cost to the Owner.

6.3 Warranty Period shall begin from the date of substantial completion.

PART 2 – PRODUCTS

7. KNOX BOXES

Provide and install two (2) Emergency Key Cabinets (Knox Box®), per the drawings – consisting of:

7.1 One (1) Emergency Key Cabinet (Knox Box®) installed on the exterior of the building, per drawings; and

7.2 One (1) Emergency Key Cabinet (Knox Box®) installed side the building, to meet safety requirements for the elevator, per drawings. Refer also to Section 142400 – Hydraulic Elevators, this specification.

7.3 This contractor shall provide recessed mounting kit for each box; each box shall be installed using Recessed Mounting Kit (RMK) from the manufacturer – KnoxBox Company.

7.4 Products / Emergency Key Cabinets

The two (2) Emergency Key Cabinets shall be Knox-Box 3200 Series hinged door model, high security industrial / government key box, or approved equal. Emergency Key Cabinets shall be masonry recessed mount (building exterior), or recessed mount (building interior).

7.4.1 Approved Manufacturer:

Knox Company
1601 W. Deer Valley Road, Phoenix, AZ 85027
Phone: 1-800-552-5669 or (623) 687-2300 for information / technical assistance
Email: info@knoxbox.com
Web: www.knoxbox.com

7.4.2 Product Description

A. Hinged-door 3200 Series Knox-Box, recessed mount, 1/4-inch plate steel housing, 1/2-inch thick steel door with interior gasket seal and stainless steel door hinge. Box and lock UL Listed. Lock to have 1/8-inch thick stainless steel dust cover with tamper-seal mounting capability.

Lock: UL Listed. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key.

B. Product Features:

- Heavy 1/8-inch thick stainless steel lock cover.
- 1/2-inch solid plate steel door with gasket
- Stainless steel door hinge
- 1/4-inch solid steel housing, 100% welded
- Hole for tamper seal
- Holds up to 10 keys or one (1) access card in interior compartment
- Ensures high security. Box and lock are UL® Listed
- Includes a Knox-Coat® finishing process with four times more protection than standard powder coat.
- Resists moist conditions with a weather resistant door gasket
- Hinged door allows single-handed operation
- Color: To be selected by Owner / Architect from standard colors: Black, Dark Bronze or Aluminum
- Weight: Surface mount - 8 lbs.
- Recessed mount - 9 lbs.

C. Dimensions:
Recessed mount flange: 7 inch H x 7 inch W x 3 inch D

Rough-in Dimensions: 6-1/2 inch H x 6-1/2 inch W x 5 inch D

PART 3 – INSTALLATION

8. GENERAL

8.1 Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

8.2 Obtain all relevant instructions and maintain copies at project site for duration of installation period.

8.3 Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.

8.4 Perform work using competent and properly equipped personnel.

9. INSTALLATION

9.1 Contractor shall install emergency key box(es) in strict accordance with the published recommendations and instructions from the manufacturer, in accordance with the governing authority or code, MACBD requirements, ASME requirements, and in compliance with any other applicable safety standards.

9.2 Contractor shall install box(es) at manufacturer's suggested minimum mounting height:
If installed outdoors: Six (6) feet finished grade; or if installed indoors six (6) feet above floor.

9.3 Outdoor Box:
An emergency key box must be provided and installed outside the building, recessed and flush-mounted into the masonry exterior of the building, mounted 6 feet above finished grade, within 3 to 10 feet of the main entrance or the fire department access point. Emergency key box must be secured to a solid, permanent structure.

9.4 Indoor Box – Elevator:
An emergency key box must be provided and installed inside the building, within ten (10) feet of the elevator, and must be within sightline of the elevator doors.

10. FIELD QUALITY CONTROL

Inspection: Provide final inspection of the emergency key cabinet(s), and perform all corrections necessary.

11. CLEANING

11.1 Repair or replace components and finished surfaces damaged or defaced due to the work of this section.

11.2 Clean and remove leftover materials, trash, debris, equipment from project site and surrounding areas.

End of Section 104116

SECTION 104413

FIRE EXTINGUISHER CABINETS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section Includes: Fire protection cabinets for portable fire extinguishers.

2.2 Related Sections: Division 10 Section "Fire Extinguishers."

3. SUBMITTALS

3.1 Product Data

For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

3.1.1 Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

3.2 Product Schedule

For fire protection cabinets. Coordinate final Fire Protection Cabinet Schedule with Fire Extinguisher Schedule to ensure proper fit and function.

3.3 Maintenance Data: For fire protection cabinets to include in maintenance manuals.

4. COORDINATION

4.1 Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

4.2 Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 – PRODUCTS

5. MATERIALS

5.1 Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

5.2 Aluminum

Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

5.2.1 Sheet: ASTM B209

5.2.2 Extruded Shapes: ASTM B221

5.3 Stainless-Steel Sheet: ASTM A666, Type 304

5.4 Transparent Acrylic Sheet
ASTM D4802, Category A-1 (cell-cast sheet), 6 mm thick, with Finish 1 (smooth or polished)

6. FIRE EXTINGUISHER CABINETS

6.1 Furnish and install fully-recessed SS-O-2409 fire extinguisher cabinets where shown or noted on the drawings, as manufactured by Larsen's Manufacturing Company, or the approved equal.

6.2 Cabinets shall be from the "Occult Series", or approved equal. The box shall be 20 gauge cold rolled. The door shall be vertical duo, panel door, stainless steel with the standard DSA glass.

6.3 Cabinet Construction: Non-rated

6.4 Cabinet Material: Cold-rolled steel sheet

6.5 Recessed Cabinet
Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

6.6 Cabinet Trim Material: Cold-rolled steel sheet

6.7 Door Material: Cold-rolled steel sheet

6.8 Door Style: Occult, to match Owner's standard

6.9 Door Glazing: Acrylic sheet
Acrylic Sheet Color: Clear transparent acrylic sheet

6.10 Door Hardware
Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

6.10.1 Provide recessed door pull and friction latch.

6.10.2 Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

6.11 The words "Fire Extinguisher" in vinyl cut letters shall be applied onto the door. The color of the letters shall be as selected by the Architect.

Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

A. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
   1) Location: Applied to cabinet door
   2) Application Process: Decals or pressure-sensitive vinyl letters

3) Lettering Color: As selected by the Architect
4) Orientation: Vertical

6.12 Accessories

6.12.1 Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

7. FABRICATION

7.1 Fire Protection Cabinets

Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

7.1.1 Weld joints and grind smooth.

7.1.2 Provide factory-drilled mounting holes.

7.2 Cabinet Doors

Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

7.2.1 Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2-inch thick.

7.2.2 Miter and weld perimeter door frames.

7.3 Cabinet Trim

Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

8. GENERAL FINISH REQUIREMENTS

8.1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

8.2 Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

8.3 Finish fire protection cabinets after assembly.

8.4 Appearance of Finished Work

Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

8.5 Cold-Rolled Steel

ASTM A1008/A1008M, Commercial Steel (CS), Type B

8.5.1 Finish: Baked enamel

8.5.2 Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

8.5.3 Color: As selected by Architect from manufacturer's full range

PART 3 – EXECUTION

9. EXAMINATION

9.1 Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.

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

10. PREPARATION

Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

11. INSTALLATION

11.1 General

Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

11.1.1 Fire Protection Cabinets: 54 inches above finished floor to top of cabinet, or as directed by local Fire Department.

11.2 Fire Protection Cabinets

Fasten cabinets to structure, square and plumb.

11.2.1 Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.

11.2.2 Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

11.3 Identification: Apply decals or vinyl lettering at locations indicated.

12. ADJUSTING AND CLEANING

12.1 Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

12.2 Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

12.3 On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

12.4 Touch up marred finishes or replace fire protection cabinets that cannot be restored to factory finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

12.5 Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

End of Section 104413

SECTION 104416

FIRE EXTINGUISHERS

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

2.1 Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

2.2 Related Section: Division 10 Section "Fire Extinguisher Cabinets."

3. SUBMITTALS

3.1 Product Data
For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

3.2 Product Schedule
For fire extinguishers. Coordinate final Fire Extinguisher Schedule with Fire Protection Cabinet Schedule to ensure proper fit and function.

3.3 Operation and Maintenance Data
For fire extinguishers, to include in maintenance manuals.

3.4 Warranty: Sample of special warranty.

4. QUALITY ASSURANCE

4.1 NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

4.2 Fire Extinguishers
Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
4.2.1 Provide fire extinguishers approved, listed, and labeled by manufacturer.

5. COORDINATION

Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

6. WARRANTY

6.1 Special Warranty

Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

6.1.1 Failures include, but are not limited to, the following:

A. Failure of hydrostatic test according to NFPA 10.

B. Faulty operation of valves or release levers.

6.1.2 Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 – PRODUCTS

7. PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

7.1 Fire Extinguishers

Type, size, and capacity for each fire protection cabinet indicated.

7.1.1 Manufacturers: Subject to compliance with requirements, provide products by the following: Larsen's Fire Extinguishers, Occult Series to match Owner's standard.

7.1.2 Valves: Manufacturer's standard.

7.1.3 Handles and Levers: Manufacturer's standard.

7.1.4 Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

7.2 Multipurpose Dry-Chemical Type in Steel Container

UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

8. MOUNTING BRACKETS

8.1 Mounting Brackets

Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated baked-enamel finish.

8.1.1 Manufacturers: Subject to compliance with requirements, provide products by the following: Larsen's Company.

8.2 Location

Mount fire extinguishers only where fire extinguisher cabinets are not identified.

8.3 Identification

Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

8.3.1 Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red-letter decals applied to mounting surface.

A. Orientation: Vertical, reading from top to bottom.

PART 3 – EXECUTION

9. EXAMINATION

9.1 Examine fire extinguishers for proper charging and tagging.

9.1.1 Remove and replace damaged, defective, or undercharged fire extinguishers.

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

10. INSTALLATION

10.1 General

Install fire extinguishers in cabinets or on mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

10.1.1 Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

10.2 Mounting Brackets

Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

End of Section 104416

SECTION 105613

STORAGE SHELVING

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

This Section includes the following:
Mobile four-post type metal wire shelving.

2.1 Adjustable Height Shelving, Heavy Duty System

2.2 Mobile Rack – Type 1

2.3 Mobile Rack – Type 2

3. RELATED SECTIONS

3.1 Division 6, Section 061000 – Rough Carpentry

3.2 Division 6, Section 064023 – Interior Architectural Woodwork

3.3 Division 10, Section 102800 – Toilet Accessories (See Custodial Accessories)

4. REFERENCES

4.1 American National Standards Institute (ANSI) Standards:
Applicable standards for fasteners used for assembly.

4.2 American Society for Testing and Materials (ASTM) Standards:
Applicable standards for steel sheet materials used for fabrication.

4.3 American Institute of Steel Construction (AISC) Standards:
Applicable standards for steel materials used for fabrication.

5. PERFORMANCE REQUIREMENTS

5.1 Design Requirements: Refer to Drawings.

5.2 Seismic Performance
Provide four-post metal shelving capable of withstanding the effects of earthquake movement when required by applicable building codes.

6. SUBMITTALS

6.1 Product Data

Submit manufacturer's product literature and installation instructions for each type of four-post shelving required. Include data substantiating that products to be furnished comply with requirements of the contract documents.

6.2 Shop Drawings

A. Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of four-post shelving installation layout including quantities, locations and types of accessory units required. Include notations and descriptions of all installation items and components.

B. Show installation details at non-standard conditions, if any.

C. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures.

D. Provide installation schedule and complete erection procedures to ensure proper installation.

67.3 Samples

Provide minimum 3-inch square example of each color and texture on actual substrate for each component to remain exposed after installation.

6.4 Selection Samples

For initial selection of colors and textures, submit manufacturer's color charts consisting of actual product pieces, showing full range of colors and textures available.

6.5 Warranty

Submit draft copy of proposed warranty for review by the Architect.

6.6 Maintenance Data

A. Provide in form suitable for inclusion in maintenance manuals for four-post shelving.

B. Data shall include operating and maintenance instructions, parts inventory listing, purchase source listing, emergency instructions, and similar information.

C. Submit manufacturer's instructions for proper maintenance materials and procedures.

D. Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated Use conditions. Include precautions against using materials and methods, which may be detrimental to finishes and performance.

7. QUALITY ASSURANCE

7.1 Manufacturer Qualifications
Engage an experienced manufacturer who is ISO 9001 certified for the design, production, installation and service of four-post shelving. Furnish certification attesting ISO 9001 quality system registration.

7.2 Installer Qualifications
Engage an experienced installer who is a manufacturer's authorized representative for the specified products for installing four-post shelving.

7.3 Minimum Qualifications
1-year experience installing four-post shelving of comparable size and complexity to specified project requirements.

8. DELIVERY, STORAGE AND HANDLING

Follow manufacturer's instructions and recommendations for delivery, storage and handling requirements.

9. PROJECT CONDITIONS

9.1 Field Measurements
Verify quantities of four-post shelving units before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

9.2 Established Dimensions
Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating four-post shelving units without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

10. SEQUENCING AND SCHEDULING

10.1 Sequence four-post shelving units with other work to minimize possibility of damage And soiling during remainder of construction period.

10.2 Schedule installation of specified four-post shelving after finishing operations; including painting have been completed.

10.3 Provide components, which must be built in at a time, which causes no delays general progress of the Work.

10.4 Pre-installation Conference
Schedule and conduct conference on project site to review methods and procedures for installing four-post shelving units including, but not limited to, the following:

10.4.1 Recommended attendees include: Owner's representative, prime Contractor or Contractor's representative, Architect, Manufacturer's representative.

10.4.2 Subcontractors or installers whose work may affect, or be affected by, the work of this section.

11. WARRANTY

11.1 Provide a written warranty, executed by Contractor, Installer, and Manufacturer, agreeing to repair or replace units, which fail in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have under General Conditions provisions of the Contract Documents.

11.2 Limited Lifetime Warranty
Subject to the terms in the written warranty, warrant the original purchaser exclusively that the shelving manufactured by it will be free from defects in materials and workmanship for the lifetime of the shelving.

12. MAINTENANCE

Provide manufacturer's extended maintenance agreement, commencing on the day the standard maintenance warranty ends.

PART 2 – PRODUCTS

13. MANUFACTURERS

Products are based upon four-post shelving as specified.

13.1 Provide materials and quality of workmanship, which meets or exceeds established industry standards for products specified. Use furniture grade sheet metal, wood panels, plastic laminate and fasteners for component fabrication unless indicated otherwise. Material thicknesses/gauges are manufacturer's option unless indicated otherwise.

13.2 Refer to Drawings for placement of shelving.

14. ADJUSTABLE HEIGHT SHELVING, HEAVY DUTY SYSTEM

Wall-mounted, 14 and 16 gauge steel construction, Titanium finish. Include 82 Series standards, 182 brackets, and bookends. For Shelves, refer to Division 6 – Interior Architectural Woodwork. Shelves to run continuously per location. Standard height: 78 inches, depth: TBD.

15. MOBILE RACK – TYPE 1

Mobile racks that are 5 shelf height. Heavy duty with laminate shelves with casters. Depth options are 18-inch and 24-inch. Length options: 36, 48, 60, and 72 inches.



16. MOBILE RACK – TYPE 2

Wire Mobile racks and metal shelves for serving kitchen / laundry room: racks (epoxy coated): 5 shelf height. Heavy duty shelving for food areas. Depth options are 18-inch and 24-inch. Length options: 36, 48, 60, and 72 inches.



PART 3 – EXECUTION

17. EXAMINATION

17.1 Examine shelving units scheduled to receive accessories [with Installer present] for compliance with requirements for installation tolerances and other conditions affecting performance of specified accessory items.

17.2 Verify that intended installation locations of sorter unit units will not interfere with or Block established required exit paths or similar means of egress once units are installed.

17.3 Proceed with accessory installation only after unsatisfactory conditions have been corrected.

18. INSTALLATION

General: Follow manufacturer's written instructions for installation of each type of accessory item specified.

19. FIELD QUALITY CONTROL

19.1 Verify accessory unit alignment and plumb after installation. Correct if required following manufacturer's instructions.

19.2 Remove components that are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

20. ADJUSTING

Adjust all accessories to provide smoothly operating, visually acceptable installation.

21. CLEANING

Immediately upon completion of installation, clean components and surfaces. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

22. DEMONSTRATION / TRAINING

22.1 Schedule and conduct demonstration of installed accessory items and features with Owner's personnel.

22.2 Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair Procedures that end user personnel would normally perform.

23. PROTECTION

Protect system against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

End of Section 105613

SECTION 107500

EXTERIOR SPECIALTIES

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. The Contractor for this portion of the work is required to refer especially thereto.

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

1.3 All requirements under Division One of these specifications shall be a part of this section. Each Contractor is responsible to be thoroughly familiar with all its contents as to requirements, which affect this division or section.

2. WORK INCLUDED

Furnish all labor and materials to complete all miscellaneous site furnishings and specialty work shown on the drawings and/or herein specified, as follows:

2.1 BUILDING IDENTIFICATION SIGNAGE

2.2 FLAGS AND FLAGPOLES

3. EXTERIOR BUILDING SIGNAGE

Furnish erection template for Architect's approval. Final spacing, layout, and location shall be reviewed and approved by the Architect prior to installation.

3.1 BUILDING IDENTIFICATION SIGNAGE
Install cast aluminum letters with baked enamel finish where shown. Letters shall be as fabricated by the approved manufacturer. Size, font, and case shall be as detailed on the Drawings. Finish and color to be as selected by the Architect. No exposed fasteners.

3.2 EXTERIOR LETTERS
Shall be cut from 3/4-inch-thick aluminum. Size, font, and case shall be as detailed on the Drawings. Finish and color to be as selected by the Architect. No exposed fasteners.

3.3 Provide shop drawings for fabrication and installation of letters, numerals, and signs. Include plans, elevations and section of typical members and other components. Show anchorage, grounds, reinforcement, accessories, layout and installation details.

Provide message list for each sign required, including scale details of wording and layout of lettering.

Provide manufacturer’s color chips consisting of actual sections of material including the full range of colors available for each material as required, showing color, pattern, and surface texture.

At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

4. FLAGS AND FLAG POLES

Provide and install two (2) model # FP-EXT-GS-45x8x188-2-CLR, 45-foot flag poles, anodized clear aluminum (CLR), external halyard, ground with sleeve. Provide with two (2) 5 x 8 foot nylon flags – (1) State of Kansas, (1) USA, as manufactured by Concord American Flagpole, 4155 Patriot Drive, Suite 100, Grapevine, Texas; (800) 527-3902, or the approved equal.

Approved Distributor: Flagforce Unlimited, P.O. Box 500, Wimberly, Texas; (913) 631-3524 Dan Pitcher, (512) 934-1812 cell, email: dan@flagsourceunlimited.com

End of Section 10700

SECTION 113013

APPLIANCES

PART 1 – GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

Section Includes

2.1.1 Appliances shall be supplied by the Owner and installed by the Contractor.

2.1.2 Installation of rough-in and appliances for Owner-supplied and Contractor-installed appliances as scheduled on Drawings.

2.1.3 Contractor shall verify selection and installation of appliances with Owner and Architect prior to any procurement activities.

3. SCOPE OF WORK

This section of the specifications shall include the furnishing of all labor and materials as required with the installation of the following:

3.1 General Contractor to install all appliances.

3.2 Contractor shall verify selection and installation of appliances with Owner and Architect prior to any procurement activities.

3.2.1 General Contractor shall coordinate millwork and equipment, and verify selection and installation of appliances to verify and confirm that each appliance will fit into the designated space(s).

3.2.3 General Contractor will install small appliances as required, and will ensure that the required space is available for each appliance.

3.4 General Contractor to make final connections where appliances are specified with electrical connections and/or plumbing connections.

3.5 General Contractor to provide “in wall” blocking for equipment items that are mounted to the wall.

Scope of work includes, but is not limited to:

3.6 Field measurement to verify installation details, and locations of connections.

3.7 Scheduling, coordination with other parties (e.g. Owner, Contractors, and Architect, etc.), and making arrangements for building access.

4. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

5. ACTION SUBMITTALS

5.1 Product Data

For each type of product:

5.1.1 Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.

5.1.2 Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

5.2 Samples

For each exposed product and for each color and texture specified, in manufacturer's standard size.

6. INFORMATIONAL SUBMITTALS

6.1 Product Certificates: For each type of appliance.

6.2 Sample Warranties: For manufacturers' special warranties.

7. CLOSEOUT SUBMITTALS

Operation and Maintenance Data

For each residential appliance to include in operation and maintenance manuals.

8. WARRANTY

Special Warranties

Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

8.1.1 Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 – PRODUCTS

9. MANUFACTURERS

Source Limitations: Obtain each type of residential appliance from single manufacturer.

10. PERFORMANCE REQUIREMENTS

10.1 Electrical Appliances

Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

10.2 Accessibility

Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ’s 2010 ADA Standards for Accessible Design.

PART 3 - EXECUTION

11. EXAMINATION

11.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.

11.2 Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.

11.3 Examine walls, ceilings, and roofs for suitable conditions where appliances will be installed.

11.4 Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

12. INSTALLATION

12.1 Install appliances according to manufacturer's written instructions.

12.2 Built-in Equipment
Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

12.3 Freestanding Equipment
Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

13. FIELD QUALITY CONTROL

13.1 Perform the following tests and inspections:

13.1.1 Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

13.1.2 Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.

13.1.3 Operational Test: After installation, start units to confirm proper operation.

13.1.4 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

13.2 An appliance will be considered defective if it does not pass tests and inspections.

13.3 Prepare test and inspection reports.

14. DEMONSTRATION

Engage a service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

15. APPLIANCE SCHEDULE

Appliances are to be located in kitchen(s), breakroom(s), exam room(s), and Nurse's Station. Refer to Drawings, and Appliance Schedule on Drawings.

End of Section 113013

SECTION 115000

SPORTS EQUIPMENT

1. GENERAL

All work included under this heading shall be subject to the General Conditions of the entire operation. The Contractor for this portion of the work is required to refer especially thereto.

2. WORK INCLUDED

The Contractor shall furnish all labor and materials necessary to provide and completely install the specified sports equipment.

2.1 Basketball Equipment

2.2 Volleyball Equipment

2.3 Wall Pads

2.4 Divider Curtains

2.5 Scoreboard

3. SUBMITTALS

Refer to Section 013300 “Submittal Procedures” where scope and description of Submittals to the Contract requirements are given.

4. VOLLEYBALL

Volleyball equipment shall be of a type and quality as here below stated and as manufactured by AALCO MFG. CO. PV35 system; or Schelde Telescopic TCS Competition Volleyball; or the approved equal.

4.1 Provide to the Owner two (2) complete power volleyball systems and standards (pair #PV35), meeting the specifications of the National High School Federation; consisting of:

(2) end standards with winch and top pulley

(2) end standards with pins on top attached cable

(4) total pole pads

(4) total antenna

(1) volleyball net; 1 x 10 metal, single-cabled (each #110DC)

(6) floor sleeves and cover plates for wood floor specified

(1) volleyball pad

(2) floor sleeve and cover plate for concrete floor installation

(2) referee stand (AJP and AJPP) complete with padding

(1) volleyball transport storage rack

4.2 Floor sleeve shall be installed by the “General Contractor” as directed by the wood flooring contractor; coordinate delivery date.

5. BASKETBALL BACKSTOPS AND GOALS

5.1 Basketball backstop equipment shall be of a type and quality as here below stated and as manufactured by AALCO Mfg. Co., or approved equal. Manufacturers include: AALCO, Bison, Draper, Gladiator, Goalrilla, Goalsetter, Jaypro, and SNA Sports.

5.1.1 (7) 28HS4 Safe-release goals with nets
Goal shall be made from 5/8-inch diameter cold drawn alloy steel rod and formed into an eighteen-inch (18") diameter ring. The rim shall be MIG welded to eight (8) gauge positive latch type back plate. Release mechanism and hardware shall be located behind a removable cover. Rim shall be braced by a 1/2-inch diameter cold drawn steel rod MIG welded to the rim. The net shall be attached to the rim by multiple net hangers fabricated from a single wire and resistance welded to the underside of the rim. Goal shall be factory set for proper flex and rebounding requirements. Finish shall be a durable electrostatic powder coating equivalent to an epoxy/polyester paint with wear characteristics superior to cold process paints. Color of goal shall be official orange.

5.1.2 (2) PS-102 Rectangular board protection pad
Padding shall be molded to meet or exceed all standards set forth by the NCAA. National Federation of State High School Associates and FIBA. Padding shall be cellular construction with a skin of an average minimum thickness of .06". The skin shall be produced integral to the cushion using a self-skinning molding process. The tear strength of the skin shall be a minimum 125 psi. The padding system shall be capable of mounting to all brands and styles of rectangular backboards by means of eight bolts (provided). A steel track molded into the padding shall provide rigidity and strength to the mounting system. The two "L" shaped padding segments shall be joined in the center under the rim by two line-ups pins. The corners of the padding shall be molded square for maximum safety and shall not require mitering, gluing or forming for attachment. All hardware shall be zinc-plated. Padding system shall be available in official gray, royal, navy, columbia blue, scarlet, orange, gold, kelly green, forest green, black, maroon, and purple. Final selection shall be by the Architect. Colors shall be continuous throughout the thickness of the padding, not only on the skin. The warranty shall extend for 5 years and cover tearing and deterioration as well as detachment from the backboards. Padding must extend to the front and back of the backboard.

5.1.3 (2) RKG Rectangular glass backboard, 42 in. x 72 in.
Backboard shall have aluminum frame and 1/2-inch tempered plate glass with fired in border and target, approved by the National Basketball Committee. The outer perimeter frame shall be solid extruded aluminum “F” section with radiused corners. Glass is to be cushioned in the frame with a continuous rubber-like strip. Brackets shall be the keyhole slot type. Brackets shall be plated.

5.1.4 (5) BHA Backboard height adjustable
Shall be a mechanism for supporting backboard and goal from another structure and vertically adjusting same for goal heights from 8 to 10 feet by means of a 3/4-inch acme screw set in a ball thrust thrust bearing. A removable hand crank with extension shall enable allow operation of the screw from floor level.

5.1.5 (4) 75RC Remote control electrical operation hoists
Contractor shall coordinate voltage and phases with electrical contractor.

5.1.6 (4) 138-RF Backstop, cradle & miscellaneous attachments: Series designed for use with short glass backboard.
Backboard shall be supported 6-inch from a one-piece, all-welded drop frame constructed of 3-inch square steel tube in the form of a ladder 72 inches in width. Rungs shall be located 6 inches from the top of the ladder, 6 inches above the top of the backboard and in between as necessary for intervals of 4 feet or less.
The main frame shall be supported to the rear by an inclined brace frame of 1-7/8 inches O.D. pipe which shall jackknife fold when tripped by tension on the hoist cable. Each of the hinges supporting the main drop shall be mounted on a four-wheel carrier.

5.1.7 (3) 20SW-601 basketball backstops

5.1.8 (4) AST "Safe-tether" Safety catch for basketball backstops
Safety catch shall be completely automatic, non-electric mechanism capable of catching and holding a basketball backstop at any time and at any position of "folding" should it fall due to a failure in the hoist system. The catch shall mount to an independent portion of the backstop by means of a tether which wind/rewinds from a spring-powered storage reel. The tether shall be of 2 inches wide, 6000 lb. tensile, nylon webbing. A flyweight mechanism of the catch shall provide response to high speed unwinding of the tether strap by tripping the engagement of a ratchet catch.

5.2 Verify all actual dimensions before fabrication, provide all attachments and accessories necessary for complete and proper attachment.

5.3 All backstop parts, except as itemized hereafter, shall be finish painted in best grade black enamel. Other items shall be as follow: Wood stringers – two coats, clear lacquer; Nuts, bolts, etc. – black oxide; Cable - galvanized; Glass backboards – official markings in white vitreous enamel; Goals - two coats; baked orange enamel.

6. WALL PADS

Provide and install in two (2) locations in the Gymnasium as shown on the Drawings. Foam shall be a 6-lb. density bonded foam 2-inches thick with covering of a minimum 14 oz. vinyl. Pads shall have two (2)-alternating colors. Colors shall be as selected by the Architect. Each pad shall be two feet (2') wide by six feet (6') tall.

6.1 General Contractor shall provide furring and installation as required.

6.2 Provide shop drawings and samples to Architect. Final approval shall be by the Architect.

7. CEILING STORED CURTAINS

7.1 Gym dividing curtain shall be composed of (1) Curtain mounted on structural frame at mid court. Shall be No. VSC-M Fold-up (1) 24 ft.-6 in. high by 36 ft. wide as manufactured by Aalco Manufacturing Company, St. Louis, MO, 1-800-537-1259; or approved equals National Gym Equipment and Ultra Play. Field verify and adjust actual height once the metal building frame is established. Verify all dimensions before fabrication.

7.2 Lower 10 ft. of curtain shall be a solid, polyester-reinforced vinyl fabric weighing 18 oz./sq. yd. Fabric shall be rot and mildew resistant and show minimum results from Fed. Std. Textile Test 191 of 300 lbs./inch tensile strength, 100 lbs./inch tear strength, and such fire retardants as to self-extinguish in less than 5 seconds. Color to be selected by Architect.

7.3 Upper area of curtain shall be a white, vinyl coated, polyester "screen" approximately 50% open weave and weighing 6 oz./sq. yd. Fabric shall be fire resistant and have a tensile strength of 100 lbs./inch.

7.4 The curtain shall be electronically welded to size 5 feet wide horizontal panels using 1.5 inch lap welds.

7.5 The top edge of the curtain shall house a 1.9-inch diameter, continuous, rigid-coupled, tubular steel batten to provide uniform line and support. A line-batten shall provide uniform line and ballast in a sleeve in the bottom edge.

7.6 Raising of the fold-up shall be by hoist lines of 1/8 inch, 7 x 19 aircraft cable, equally spaced across width of curtain at intervals of 10' or less. Each line shall secure at one end to the bottom batten and run up the curtain, passing from one side to the other every 18 inches by means of a row of 5 rolled-edge, spur-grip brass grommets so as to accomplish accordion-folding of the curtain when the lines are raised. At ceiling the hoist lines shall wind onto individual reels mounted on a common tubular-steel drive shaft, running the length of the curtain, supported regularly by roller brackets and driven at one end by the electric operator.

7.7 The curtain hall is powered by an electric operator with the following features: Load support at all times thru self-locking worm gearing; 115V. cap-start, overload-protected motor of a H.P. to provide 20 ft./min. curtain speed; lubed-for-life bearings; reversing magnetic contractor for remote control; key-operated, spring-return-to-off, flush-mounting wall switch; and control limit mechanism for up and down travel

7.8 All conduit, wiring, etc. to power and to wall switch shall be by electrical contractor.

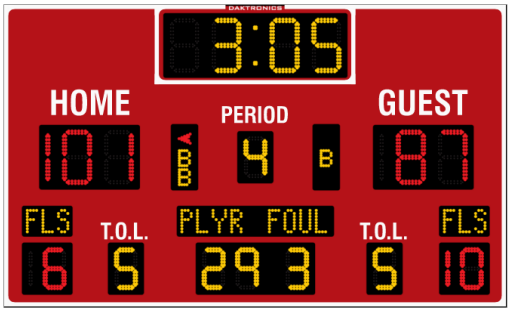
7.9 Total of three divider curtains.

8. SCOREBOARD

The General Contractor shall supply and install a total of two (2) Basketball Scoreboards Model Number BB-2155 as manufactured by Daktronics, 201 Daktronics Drive, Brookings, SD 57006-5128; 1-800-325-8766. Color to be selected by Owner.

BB-2155

Single-Sided Basketball Scoreboard



End of Section 115000

SECTION 120000

EQUIPMENT

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 All requirements under Division One (1) of these specifications shall be a part of this section. Each Contractor is responsible to thoroughly familiarize himself with all its contents as to requirements, which affect this division or section.

2. WORK INCLUDED

This section of the specifications shall include the furnishing of all labor and materials as required with the installation of the following:

2.1 The Contractor will provide and install the specified items.

2.1.1 Narcotic Cabinets (in Lab and Nurses' Station)
Refer to Drawings for details and locations.

2.2 The following equipment will be provided by the Owner. The Contractor shall furnish all labor and materials necessary to provide and completely install the specified equipment and furniture.

2.2.1 Televisions (by Owner, installed by G.C.)

2.2.2 Copiers / Printers (by Owner, installed by G.C.)

2.2.3 Plotters (by Owner, installed by G.C.)

Refer to Drawings for details and locations.

2.3 General Contractor to make final connections where furniture, equipment, or fixtures are specified with electrical connections.

2.4 General Contractor to provide "in wall" blocking for cabinets, furniture, artwork, and signs that are mounted to the wall. For example, where televisions mount to wall, to prevent tipping.

3. QUALITY OF MATERIALS

All materials of every kind which enter into the construction of this work shall be of the best obtainable in the market for use in the best grade of construction.

4. QUALITY OF WORKMANSHIP

All work that is to be performed under these specifications shall be done by the mechanics and artisans skilled in their respective trades. In order to produce first-class installation of the work.

5. SUBMITTALS

Submit Shop Drawings for colors, lay-out, dimensions, type of construction and materials as per Specification Section 01300 – Submittals.

Refer to Section 01300 – Submittals where scope and description of Submittals to the Contract requirements are given.

5.1 Shop Drawings and Product Data
Submit Shop Drawings and Product Data.

5.1.1 Show in detail the construction, gauges, jointing, methods of installation, fastening and supports, location and sizes of welds, anchoring, hangers, and other pertinent data and information. Submit details drawn to scale at not less than 1/4 inch per foot. Shop Drawings shall contain the design, type of steel and load assumptions.

5.1.2 Submit (2) complete color selection palettes for products specified of actual product.

5.1.3 Field verify all dimensions.

6. TELEVISIONS

The General Contractor shall provide and install one (1) television in each room:

6.1 Approved Product:
Samsung 43-inch Class Q60D Series QLED Smart Tizen TV, or approved equal

6.2 Product Features with approved TV:
Dual LED, 100% Color Volume with Quantum Dot, Quantum Processor Lite with 4K Upscaling, Motion Xcelerator, Object Tracking Sound Lite, Quantum HDR, AirSlim slim minimal design, Samsung Tizen OS, PANTONE Validated, Gaming Hub, TV Speakers / Soundbar able to connect in Sync.

7. TV SUPPORT MOUNTING BRACKETS

7.1 The General Contractor shall provide and install one (1) wall-mounted TV bracket for each television, and G.C. shall mount each TV on its bracket. Brackets shall be full-motion, tilt, or fixed position, as specified – refer to drawings and confirm with architect prior to placing order.

7.3 Install in strict accordance with manufacturers' instructions.

8. COPIERS / PRINTERS

The General Contractor shall provide and install copiers / printers. Product selected to be approved by the Architect / Owner.

9. PLOTTERS

The General Contractor shall provide and install plotters. Product selected to be approved by the Architect / Owner.

End of Section 120000

SECTION 120500

FURNISHINGS

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

1.1 All work included under this heading shall be subject to the General Conditions of the entire operations. All work is subject to the terms published by the Sedgwick County, Kansas, Division 100 – General Conditions, and related documents. This Contractor is required to refer especially thereto.

In the event of discrepancy between these specifications and any documents published by Sedgwick County, documents by the Sedgwick County shall govern.

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

2. WORK INCLUDED

Furnish all labor and materials to complete all furnishings and related work shown on the drawings and/or herein specified, as follows:

2.1 Mail Stations

2.2 Laminate Shelving – Mobile Racks

2.3 Epoxy-coated Wire Shelving – Mobile Racks

2.4 Metal Shelving

2.5 Island – Serving Kitchen

2.6 Workstations

2. SCOPE OF WORK

This Furniture Contractor shall be responsible to provide and install the furnishings, and shall provide all labor and materials necessary to complete the project scope.

Scope of work includes, but is not limited to:

2.1 Management and installation of all furnishings for the project.

2.2 Shop Submittals, including fabric memo samples and mock custom finishes.

2.3 Ordering and field measurement, including units with custom color or finishes.

2.4 Receiving and storing of items off-site in a temporary, controlled, safe and secure environment.

2.5 Take delivery of all items, and unloading of all items.

2.6 Delivery and transfer to site, as necessary.

2.7 Unpacking of items, including proper disposal of debris off-site, and inspection of items.

2.8 Installation and assembly (where required to provide). All items shall maintain manufacturer's warranty, unless specified noting otherwise.

2.9 General Contractor will be responsible for providing all electrical connections and blocking, as required for each item. Items will be placed by other parties. General Contractor will be responsible for making final connections.

2.9.1 General Contractor to make final connections where furniture, equipment, or fixtures are specified with electrical connections.

2.9.2 General Contractor to provide "in wall" blocking for furniture, artwork, and signs that are mounted to the wall.

2.10 Field modification, where noted.

2.11 Scheduling, coordination with other parties (e.g. Owner, Contractors, and Architect, etc.), and making arrangements for building access.

2.12 Return and re-order any manufacturer-defective items, or damaged items within 18 weeks of discovery.

2.13 Coordination of Owner-provided items, if applicable.

2.14 Coordination with General Contractor and General Contractor's scope of work.

2.15 Post-Occupancy Evaluation, 12-month inspection for repairs covered by manufacturer warranty.

2.16 Training – Maintenance of Furniture and Fabrics

4. WORK NOT INCLUDED

The following are not included in the Scope of Work for this project:

4.1 Equipment, Appliances

5. REFERENCE STANDARDS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Reference most current publication.

5.1 ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials. Refer to the most recent published edition.

5.2 ASTM International (ASTM)

5.2.1 ASTM D4157 (2013; R) Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)

5.2.2 ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials

5.2.3 ASTM E1537 Standard Test Method for Fire Testing of Upholstered Furniture

5.3 BIFMA International (BIFMA)

5.3.1 ANSI/BIFMA X5.1 American National Standards – General Purpose Office Chairs

5.3.2 ANSI/BIFMA X5.3 (2007; R) American National Standards – Vertical Files

5.3.3 ANSI/BIFMA X5.4 American National Standards – Lounge Seating

5.3.4 ANSI/BIFMA X5.5 American National Standards – Desk Products

5.3.5 ANSI/BIFMA X5.6 American National Standards – Panel Systems

5.4 National Fire Protection Association (NFPA)

5.4.1 NFPA 101 (TIA 21-1) Life Safety Code

5.4.2 NFPA 260 Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture

5.5 36 CFR 1191Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act(ABA) Accessibility Guidelines

5.6 Underwriters Laboratories (UL)
UL 723 UL Standard for Safety Test for Surface Burning Characteristics of Building Materials

5. RELATED SECTIONS

5.1 Division 6 – Wood and Plastics

5.2 Textiles – Specifications on Cover Sheets

6. QUALITY OF MATERIALS

All materials of every kind which enter into the construction of this work shall be of the best obtainable quality in the market for use in the best grade of construction.

7. QUALITY OF WORKMANSHIP

All work that is to be performed under these specifications shall be done by the mechanics and artisans skilled in their respective trades, in order to produce first-class installation of the work.

7.1 Installer Qualifications
A company specializing in performing the work of this section with a minimum of three (3) years' of experience.

7.2 When required by the furniture manufacturer, furniture must be installed by an authorized dealer and a certified furniture installation crew must be used on the project. Installers / technicians must be: an Authorized Dealer, Certified Furniture Installers, Licensed Electrician(s), and Certified Telecommunications Installer(s).

7.3 Services provided for the reuse of existing furniture must comply with manufacturer's warranty requirements to maintain warranty. If warranty for existing furniture to be reused has expired, services must be completed by a furniture installation crew with a minimum of five (5) years' experience.

7.4 All furniture requiring hardwiring must be completed by a licensed electrician. Communications installers must be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level or have a minimum of three (3) year's experience in the installation of the specified cables and components. All installers, furniture, electrical and communications, must be on-site if questions arise.

7.5 Submit copies of authorized dealer, furniture installation crew, licensed electrician and certified telecommunications installer certifications.

8. APPROVED EQUALS

Furniture items shall be as specified, or shall be an approved equal, approved in writing by the Architect.

9. SUBMITTALS

Shop Drawings and Product Data Sheets: Submit Shop Drawings and Product Data

Submit product data for all furniture items, to include catalog cuts, brochures, product information, and other necessary literature to indicate compliance with specifications.

9.1 Submit (2) complete color selection palettes for products specified of actual product.

9.2 Field verify all dimensions.

9.3 Product Data: Provide specification sheets on products including model number, accessories and finishes.

9.4 Shop Drawings: Indicate dimensions and layout. Shop Drawings shall include the design, materials, fabrics, quantities, field modification, etc. for each unit.

9.5 Manufacturer's Instructions: Indicate clean and care instructions.

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

9.7 Fabric and Finish Submittals
Submit samples of all furniture fabric and finishes. Samples must be actual samples, not photographic representations, size must be a approx. 3 x 3 inches. If necessary, provide larger size samples to clearly represent pattern. Label samples with fabric or finish code, furniture item code and name, manufacturer name, and color information. Fabric samples must also be labeled with fiber content and double rub-testing information.

10. SUMMARY OF FURNITURE PURCHASE

10.1 Refer to Drawings, and applicable Legends on Drawing. Confirm product selections with architect prior to placing order.

11. DELIVERY, STORAGE, AND HANDLING

11.1 Deliver furniture, products and equipment in manufacturer's original unbroken packaging designed and constructed to protect the contents from physical or environmental damage. Protect furniture with original manufacturer's packaging.

11.2 Furniture Inspection
Inspect furniture and provide notification of damage within the timeframe required by the shipping company, while carrier is still on-site. Complete claims for concealed damage within the timeframe required by the shipping company and furniture manufacturer. A claim file must be maintained that documents each claim. Forward copies of claims to the Furniture Contractor on a timely basis, not exceeding 30 days after discovery.

11.3 Clearly and Fully Mark: Identify as to manufacturer, item, and installation location.

11.4 Handle products or equipment in accordance with these specifications and manufacturer's recommendations and instructions.

11.5 Store materials in accordance with manufacturer's recommendations and requirements of these specifications.

11.6 Make necessary provisions for safe storage of materials and equipment. Store in accordance with manufacturer's requirements. Do not store furniture in a manner that could crush the packaging.

If storage is required, furniture must be stored in a dry location that is adequately ventilated and free from dirt and dust, water, and other contaminants, in a manner that permits easy access for inspection and handling, and in an environment in accordance with furniture manufacturer's instructions.

11.7 If it is determined by the County that storage space not available on-site, and furniture must Be stored at an off-site location, Furniture Contractor shall provide any storage space Required for furniture, and transport stored furniture to the project site for installation. Storage location must be approved by the City of Wichita at the time of the furniture order.

11.8 Coordinate location of the furniture staging area off site.

11.9 Maintain uniform temperature of minimum of 60 degrees F (16 degrees C) and maximum humidity of 60 percent prior to, during and after installation.

12. WARRANTY

Provide manufacturer's warranty against manufactured defects in products.

12.1 Furniture Contractor shall correct defective work within eighteen (18) weeks after the date of substantial completion.

12.2 Certificates or registration stubs shall be included with the shop drawings submitted for the Owner upon completion of the work. The Furniture Contractor's responsibility stipulated in the paragraph before this one, terminates as stipulated therein. The Owner shall administrate manufacturer's warranties/guarantees thereafter.

12.3 Standard guarantee forms are to be provided by the manufacturer for the product specified. The Furniture Contractor shall fill out forms and file with the manufacturer for the Owner.

12.4 Provide manufacturer performance guarantees or warranties for single-shift service and include parts, labor, and transportation.

12.5 Provide items not listed with a 1-year minimum warranty. When manufacturer's standard performance guarantees or warranties exceed the minimum requirements identified, provide the standard performance guarantee or warranty. Submit manufacturer's warranty information for all furniture items.

PART 2 – PRODUCTS
Bidder to install the products listed. Provide Furniture that complies with applicable testing methods for furniture and flammability.

13. MAIL STATIONS
Provide and install three (3) Mail Stations in Work Rooms H231 and H268, in accordance with Drawings. See Drawings, elevation on A6.18. Mail Stations are 36-inch width sections.
Countertop at Mail Stations will be by millwork contractor.
Refer to product sheets following this section.

13.1 Approved Product Line:
Action Office System Components, as manufactured by Herman Miller, or approved equal.
Herman Miller, 855 E. Main Avenue, Zeeland, Michigan; phone: 1-888-798-0202

3.1.1 Approved Distributor: John Marshall Co., Wichita, Kansas
Contact: Jennifer Drace, phone: (316) 260-0121, email: JDrace@jamarshall.com

13.2 Mail Station Components include, but are not limited to the following:

Wall Strips model # AO213

Rail Tile model # A3615

B-Style Flipper Door Unit model #s A3352 and A3353

Squared-Edge Rectangular Work Surface model # A2310

Tackboards B-Style Tackboard model # A3410

Lateral Storage

Overhead Storage

Workstations,

Paper Tray(s)

Storage Case(s)

Other components as required by owner / architect.

14. LAMINATE SHELVING – MOBILE RACKS
Provide and install H.D. Mobile racks in accordance with Drawings.

15. EPOXY-COATED WIRE SHELVING – MOBILE RACKS
Provide and install Epoxy coated Wire shelf Mobile Racks in accordance with Drawings.

16. METAL SHELVING
Provide and install Metal Shelving in accordance with Drawings.

17. ISLAND – SERVING KITCHEN
Provide and install two stainless steel tables / kitchen islands in Serving Kitchen, Room B130 – by the General Contractor.

18. WORKSTATIONS
Workstations will be custom workstations, built and assembled by the General Contractor.
Build and install workstations in accordance with Specifications and Drawings.
Workstations will include:

18.1 Workstation top with metal workstation supports:
Metal workstation supports shall occur on spans greater than 32-inch length of top, unsupported. See detailed info in complete set of drawings. Manufacturer A&M Hardware, steel workstation and counter support brackets. Size and spacing to accommodate a fully loaded workstation and counter.

18.2 Grommets and Wire Management:
Grommets, and wire management components below the workstation top are required. When applicable, provide workstation electrical and communications, with wire management as specified. Grommet colors must be compatible and coordinated with workstation finish colors. Confirm selection(s) with architect prior to placing order.

PART 3 – EXECUTION

14.1 Execution – General

14.1.1 The approved Furniture Contractor shall be familiar with details of the work, inspect all areas and conditions under which furniture is to be installed, and coordinate scheduling of delivery. Notify the Owner and Architect in writing of any conditions detrimental to the proper and timely completion of the installation. Work will proceed only when conditions have been corrected.

14.1.2 Building Protection
Protect building surfaces to prevent soiling and damage during delivery and installation. Any soiling and damage that occurs to the building during the installation of furniture must be cleaned and repaired, or replaced to its original condition and must be approved by the Owner.

14.2 Installation

14.2.1 Installation Drawings
Installation drawings must include furniture layout, critical dimensions and locations of electrical and communications. Reflect field verified conditions in furniture layouts.

Drawings must be to scale, unless otherwise specified. Provide typical plans and isometrics/elevations of desks and workstations.

14.2.2 Furniture Installation Procedures
Complete installation in accordance with manufacturer's installation instructions, assembly manuals, warranty requirements, and approved installation drawings. Also comply with the following requirements:

A. Use material handling equipment with rubber wheels.

B. Furniture and components must be installed level, plumb, square, and with proper alignment with adjoining furniture.

C. Check drawers, doors, lighting, and other operable items and mechanisms for proper operation.

D. Remove all protective wrapping tape, residue, and related type items.

E. Securely interconnect furniture components where required.

F. Securely attach and anchor furniture components to the building, when required.

G. Securely anchor furniture such as shelving and storage units to the building when required by the manufacturer.

H. All items with an electrical plug, such as but not limited to task lighting and tables with electrical power, must be fully operational.

I. All hardwired furniture, such as but not limited to furniture systems, must be fully operational. Verify that voltage is present in electrical outlets. Verify controlled-circuit outlets are properly configured in accordance with the installation drawings.

J. Furniture must not block jacks or the jack enclosures on walls. Report conflicts to the Owner and Architect, to discuss resolution.

K. Upon completion of installation, all furniture must be completely cleaned, finished, leveled, aligned, operational and functional.

15. Cleaning

Remove all packing materials and other trash from the jobsite. General Contractor will provide trash bins for a limited time. Coordinate in advance.

Upon completion of installation, all products must be clean, including inside all drawers and doors, and the area must be free of debris and left in a clean and neat condition. Any defects in or damage to furniture must be repaired or replaced and approved by the Owner and Architect. Damaged products that cannot be satisfactorily repaired must be replaced. Correct any problems with assembly and installation. Prior to any furniture repair, replacement, and/or assembly and installation corrections, protect the building surfaces.

16. Operation and Maintenance Manuals

Submit the Furniture Package in accordance with this specification, and include the following:

16.1 Assembly Manuals: Describe assembly and re-configuration procedures.

16.2 Installation Instructions

Provide a copy of the instructions used to install the furniture. Also describe any special procedures or helpful hints learned during the installation process.

16.3 Maintenance Manuals

Describe proper cleaning and minor repair procedures, include cleaning instructions for fabrics.

16.4 Special Tools

Provide three (3) sets of special tools necessary for assembly and disassembly of furniture and components from each manufacturer. Mark tool(s) with manufacturer and product information.

16.5 Furniture Drawings

Provide hard copy and electronic, showing installed furniture layout. Include all modifications. Provide electronic copies on a CD-ROM. Coordinate type (such as AutoCad 2D) and version required with Architect.

Include critical dimensions, and locations of building and furniture electrical and communications. Code all furniture with furniture item code identified in this specification.

16.6 Furniture Listing

Provide complete listing, hard copy and electronic, of furniture provided. Include all modifications. Provide electronic copies on a CD-ROM. Coordinate type of electronic file required with User (such as but not limited to Word and Excel).

Listing must include furniture item code used in the list of Furniture Quantities, item description, part / model numbers, fabrics and finishes for all components furnished. Organize listing by item name and code and provide building totals.

16.7 Order Form Documentation
Provide Order Form Documentation with Purchase Order number and project name and location to allow the Owner to follow up on warranty issues, and help with future purchases.

End of Section 120500

SECTION 122216

DRAPERY TRACK AND ACCESSORIES

PART 1 – GENERAL

1. GENERAL REQUIREMENTS

All requirements under Division One (1) of these specifications shall be a part of this section. Each Contractor is responsible to thoroughly familiarize himself with all its contents as to requirements, which affect this division or section.

2. SECTION INCLUDES

2.1 Curtains

2.2 Formed steel track

2.3 Extruded aluminum track

2.4 Nylon carriers, cords, and accessories

3. DEFINITIONS

3.1 Approved Agency: An established and recognized agency that is regularly engaged in conducting tests of furnishing inspection services, where such agency has been approved by the building official.

3.2 Flame-proofing: Process of treating materials chemically so that they will not support combustion.

3.3 Flame Spread. The propagation of flame over a surface.

3.4 Flammable Material: Material capable of being readily ignited from common sources of heat or at a temperature of 600 deg F (316 deg C) or less.

3.5 Inherently Flame Resistant: Material that meets requirements set forth in NFPA 701. Inherently flame resistant fabric is woven from fibers that are non-combustible for life of material.

4. REFERENCE STANDARDS

4.1 ICC (IBC)-2018 - International Building Code; 2018

4.2 NFPA 289 - Standard Method of Fire Test for Individual Fuel Packages; 2019

4.3 NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019

5. SUBMITTALS

5.1 Product Data

Provide track profiles, acceptable load data, finishes available, and electrical characteristics and connection requirements, flame-proofing literature.

5.2 Shop Drawings

Indicate end track location, width of window opening, location of blocking for anchors, appurtenances and interferences, adjacent construction, operating hardware, and support bracket details.

5.3 Samples
5.3.1 24 inch wide and 48 inch high sample including all specified elements of finished curtains, including flame retardant certification tag. Do not fabricate Project drapes until sample has been reviewed and approved by Architect.

5.3.2 Submit sample with Product Data submittal. Sample will serve as standard by which to evaluate Project curtains.

5.4 Certificates
Certificate from approved agency showing compliance to IBC 806.4 requirements.

5.5 Qualification Statement
5.5.1 Fabricator/Installer
Provide Qualification documentation if requested by Architect or Owner.

5.6 Manufacturer's Installation Instructions: Indicate procedures, perimeter conditions requiring attention.

5.7 Maintenance Data
Include data for motor, shaft and gearing, lubrication frequency, control adjustments, spare part sources.

5.8 Closeout Submittals
Include following in Operations and Maintenance Data specified in Section 017823:
5.8.1 Operating and maintenance instructions.

5.8.2 Manufacturers' Documentation:
A. Fabric Supplier's literature or cut sheets on fabric.
B. Curtain Rod Manufacturer's literature or cut sheets.
C. Color and style selection.
D. Certificate of compliance from approved agency.

6. QUALITY ASSURANCE

Fabricator / Installer: Requirements of Section 014000 applies, but not limited to following: Minimum three (3) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding. Upon request, submit documentation.

PART 2 – PRODUCTS

7. ASSEMBLIES

7.1 Manufacturers / Suppliers
A. Conso / Wright, West Warren, MI www.conso.com
B. Coral, Div Charles Samelson, New York City, NY www.coralofchicago.com
C. Fred Krieger & Co. Inc., Jericho, NY www.fredkriegerfabrics.com
D. Graber Div of Springs Industries, Montgomery, PA www.graberblinds.com
E. Hanes Fabric Co, Conover, NC www.hanesfabric.com
F. InterSpec, Allenwood, NJ (800) 526-2800 or (732) 938-4114
G. Kirsch Co, Freeport, IL www.kirsch.com

H. Roc-lon Fabrics, New York, NY www.roc-lonfabrics.com

I. Rowley Co, Gastonia, NC. www.rowleyco.com

7.2 Materials

7.2.1 Design Criteria

A. Meet requirements of IBC 806.4 'Acceptance Criteria And Reports':

1) Where required to exhibit improved fire performance, curtains, draperies, fabric hangings and similar combustible decorative materials suspended from walls or ceilings shall be tested by an approved agency and meet the flame propagation performance criteria of Test 1 or 2, as appropriate, of NFPA 701, or exhibit maximum heat release rate of 100 kW when tested in accordance with NFPA 289, using 20 kW ignition source. Reports of test results shall be prepared in accordance with test method used and furnished to building official upon request.

B. Attach permanent tag to each panel attesting to flame retardant quality of material used.

7.2.2 Fabric

Approved Products: As specified, or approved equal. Refer to Drawings, Material Legend and Room Finish Matrix on Drawings. Confirm product selections with architect prior to placing order.

7.2.4 Drapery Rods

A. Traverse Rods: Drapery will have hookless attachment to traverse rod. Traverse rods shall include wall-mounted spring-loaded tension pulleys for endless cord operation.

B. Approved Products: As specified, or approved equal. Refer to Drawings, Material Legend and Room Finish Matrix on Drawings. Confirm product selections with architect prior to placing order.

7.3 Fabrication

7.3.1 Drapery will have hookless attachment to traverse rod.

7.3.2 Double top and bottom hems unless specifically specified otherwise.

7.3.3 Provide necessary weights at seam and side hems.

7.3.4 Fullness shall be minimum of 2-1/2 times width of space covered by drape.

7.3.5 Space pleats 4 inches (100 mm) maximum center of pleat to center of pleat.

7.3.6 Drapes shall have:

A. Fabric inspected over back-lite table for flaws.

B. Straight, even blind-stitched side and bottom hems.

C. Seams hidden beside pleats.

D. Joined seams surged and overcast with no puckering.
E. 4 inch double bottom hems and headings.
F. 1-1/2 inches double side hem.
G. 2 inch overlap, total of 4 inches on pair.
H. Stack-off of 1/3 of window width.
I. Specified woven, permanent crinoline / buckram used in heading.
J. Seams match up on bottom hems.
K. Corners of bottom hems closed with hand stitching.
L. Pleats evenly spaced to size.
M. Straight edge across top after pleating.
N. Straight, even folds.
O. Polyester thread matching fabric color for seams and hems.

PART 3 – EXECUTION

8. EXAMINATION

8.1 Verify that concealed anchors are in correct position.

8.2 Verify that electrical service is correctly located and of proper characteristics.

9. INSTALLATION

9.1 Install drapery tracks in accordance with manufacturer’s instructions.

9.2 Install tracks, wall or ceiling mount, with mounting device head no larger than No. 6, to yield direct withdrawal strength of 25 lbs. minimum.

9.3 Support spacing to be as recommended in Manufacturer's literature.

9.4 Install blackout drapery as a separate drape on separate rod behind primary drape.

10. CLEANING

10.1 Tracks to be free of marring, scratches, and foreign material.

End of Section 122216

SECTION 136000

PRE-ENGINEERED BUILDING COMPONENTS

1. GENERAL

1.1 The building shall include all primary and secondary structural framing members, connection bolts, canopies, roof extensions, covering, roof curbs, flashing, trim, fasteners, closures, sealer, insulation, gutters, downspouts, louvers, ventilators, and other miscellaneous items as stated in the specifications and/or shown or called for on the drawings.

1.2 All building manufacturers shall be a member of Metal Building Manufacturer Association. Approved Manufacturers are as follows: Must match MBCI profile and colors

- MBCI
- Chief
- Behlem Manufacturing
- Kustom Buildings
- Star Buildings
- Butler
- BC Steel Building Systems
- Varco Pruden

1.3 Criteria

1.3.1 Roof Pitch
Single slope – 1-inch vertical rise for each 12 inches of horizontal run

2. SUBMITTALS

Refer to section 01300 – Submittals where scope and description of Submittals to the Contract requirements are given. Metal Building manufacturers shall submit to the Architect a complete set of construction documents for review before erection of the building components.

3. DESIGN

3.1 Design Criteria

3.1.1 All structural steel sections and welded plate members shall be designed in accordance with the AISC, "Specifications for the Design, Fabrication and Erection of Steel Buildings", latest edition, and the AWS "Code for Welding in Building Construction", latest edition.

3.1.2 All light gauge cold-formed structural members and exterior coverings shall be designed in accordance with the AISI "Specifications for the Design of Cold-Formed Steel Structural Members", latest edition.

3.1.3 The primary and secondary framing and covering shall be designed for all applicable loads and combinations of these loads as set for the in the MBMA, "Recommended Design Practices Manual", latest edition.

3.2 Design Loads

3.2.1 Roof live loads shall be applied to the horizontal projection of the roof.

3.2.2 Wind loads shall be applied as specified by the MBMA, "Recommended Design Practices Manual", latest edition.

3.3 Auxilary Load Designs
Auxiliary loads shall be applied in accordance with the AISC "Specification for the Design, Fabrication and Erection of Steel Buildings", latest edition.

3.4 Load Combinations
Design load combinations when applicable shall be as follows:
D = Dead load plus specified collateral loads 10#
L = Roof Live Load 20 PSF
S = Roof Snow Load 20 PSF Ground
W = Wind Load 90 MPH – Exposure C
E = Seismic Load as required per structural general notes

D + L	D + S
D + A	D + W (or E)
D + S + A	D + S + E
D + .5W (or 1.0 E) + A	D + S + .5W

Max. allowable deflection for structural members:
Member loaded with LL + DL = L/240
Member loaded with LL only = L/360

4. STRUCTURAL FRAMING

4.1 Metal building manufacturer shall coordinate efforts with the General Contractor in the review of construction documents for the inter-related structural system:

4.2 General

4.2.1 All hot-rolled sheet, plate, and strip from 1/8-inch to 7/32-inch thick, inclusive, shall conform to the provisions of ASTM A-570, Grade 50 (50,000 psi minimum yield stress). All hot-rolled steel plate 1/4-inch thick and greater shall conform to the provisions of ASTM A-572 (50,000 psi minimum yield stress). All hot-rolled or cold-rolled sheet and strip less than 5/32-inch thick used in fabrication of cold-formed structural members shall be of ASTM A-570, Grade 50 (50,000 psi minimum yield stress).

4.2.2 Cable used for diagonal bracing shall be extra high strength Grade-7 wire Class A coating, left hand lay, Galvanized steel strand, conforming to the provisions of ASTM Specification A-475.

4.2.3 Structural steel members shall be sheared, formed, punched, welded and primed in the plant of the manufacturer. All shop connections shall be welded in accordance with the AWS "Standard Code for Welding in Building Construction", or CWB "General Specifications for Welding of Steel Structures". Welders and welding operators shall have been previously qualified as provided in this code. All flange to web welds shall be continuous submerged-arc fillet welds. Other welds shall be gas metal-arc process with CO2 shielding. Butt welds in flange and web plates shall be full penetration.

4.2.4 All field connections shall be bolted with high strength bolts and nuts (ASTM A-325 or SAE J429 Grade 5).

4.2.5 Light gauge cold-formed sections shall be manufactured by precision roll or brake forming. All dimensions shall be true, and the formed member shall be free of fluting, buckling, or waviness.

4.2.6 All structural framing members shall be given one shop coat of red oxide primer to a thickness of .5 mil (+/- .2 mil). The primer will be baked for twenty minutes at 350 degrees F. The uniformly deposited prime coat shall have excellent adhesion to steel, shall be tough, hard, and flexible.

4.3 Primary Structural Members

4.3.1 Frames, tapered beams, rigid frame multi-spans, sidewall columns, intermediate columns and canopy beams shall be welded, built-up "WF" shapes, either constant depth or tapered, with base plates, necessary clips, and splice plates for complete bolted field assembly and attachment of secondary members.

4.3.2 Rafter beams and end-wall columns shall be either built-up "I" shapes or roll-formed "C" sections as required to satisfy load and span requirements.

4.4 Secondary Structural Member

4.4.1 Purlins and girts shall be precision roll-formed "C" or "Z" sections of adequate size and thickness as determined by the design criteria. Purlins shall be either simple span or continuous span members.

4.4.2 Allow the space to accommodate insulation systems, considering sag rod, sag angles, horizontal or cross bridging.

5. ROOF AND WALL COVERINGS

5.1 Color-Coated Galvanized Steel Panels

5.1.1 Galvanized steel for roof and wall panels shall have a minimum yield strength of 80,000 psi in accordance with ASMT A-466. The galvanized coating class shall be 1.25 oz. per square food (G 90) in accordance with ASTM A-525.

5.1.2 The spangle for colored sheets is minimized spangle in accordance with ASTM A-525 3.2.

5.1.3 Galvanized roof and color coated wall panels shall consist of galvanized steel, as described in 4-2, subjected to a chemical conversion treatment and factory coated by a precision roller coating machine to a uniform exterior film thickness of 1 mil (+/- .2 mil) and a white interior coat film thickness of .5 mil (+/- .1 mil).

5.2 Roof, Soffit, Fascia, and Wall Panel Materials
All to be equal to MBCI in color and profile.

5.2.1 Wall Panel: Equal to MBCI 24 Ga.
Color to be selected by Architect.

5.2.2 **Fascia color to be selected by Architect.**

5.2.3 **Soffit color to be selected by Architect.**

5.2.4 Roof Panels

A. Equal to MBCI standing seam panel **Ultra Dek** shall be 2-1/2-inch deep with two minor ribs and having a net coverage of 18-inch matching the roofing profile, 24 Ga., **Color to be selected by Architect.** Vertical ribs of the wall panel shall align with the roofing. The standing seal shall be mechanical seamed. Snap together systems are not considered equal.

B. Roof panels to be continuous length from ridge to eave where possible. Splice connection detail shall be submitted for review and approval by the architect prior to ordering materials.

5.2.5 Prefinished Steel Ceiling
36-inches wide, 29 ga. Steel PBC panel. Panel shall be of domestic manufacture, prefinished with white, siliconized polyester. Provide matching perforated panels where noted on the Drawings. Perforated panels may be .024 aluminum with matching profile and finish. Screws for ceiling shall be self-tapping, hez head, pre-finished to match the panels.

5.2.5 Prefinished Steel Soffit
24 ga. galvanized concealed fastener panel with factory applied Kynar finish. Berridge Vee-Panel or approved equal. Color to match roofing and fascia.

5.3 The deck shall be designed and manufactured in accordance with Specifications for the Design of Light Gage Structural Members and published by the American Iron and Steel Institute. Manufacturer's load tables shall have the approval of the Steel Deck Institute.

5.4 Provide all closures, shelf tees, headers, and any other accessories as may be required to give a neat, complete job.

5.5 All metal roofing deck and accessories shall be cleaned of all oil, grease, and dirt, and given a shop coat of priming paint.

5.6 Screws shall be self-drilling, self-tapping Traxx fasteners as manufactured by Buildex or approved equal. Use #14 Traxx/2 for side laps and #12 Traxx/5 for deck to joist connections.

5.7 "CS" Fasteners

5.7.1 All screws and metal washers shall be .0005 minimum zinc plated steel with a clear chromate coating on screws that are not color-coated.

5.7.2 Color-coated screws to match building manufacturer's color-coated galvanized panels or trim shall be furnished.

5.7.3 Zinc plated hex head self-drilled screw pre-assembled with a one-piece bonded metal and neoprene sealing washer.

5.8 Tape Sealant
Tape mastic for side laps, end laps and flashing shall be 3/8-inch width x 3/32-inch thick butyl rubber pressure sensitive tape.

5.9 Installation of "R" Panels
All panels shall be fabricated in one piece from base to eave for wall panels and from eave to ridge for roof panels, providing the length does not exceed practical limits for shipment and/or construction.

5.10 Flashing and Trim

5.11.1 26 Ga. color-coated flashing or trim shall be provided at eave, ridge, rake, corners and wherever necessary to insure a weathertight building.

5.11.2 Flashings and trim shall be attached with self-drilling screws at a maximum spacing of 12 inches C.C.

5.11.3 All associated trim shall match metal panel.

5.11 Closures

5.11.1 Closures shall be machine die cut or precision molded to exactly match the panel configuration.

5.11.2 Closure material shall be 1-inch wide and manufactured of non-shrinking laminated cross-linked polyethylene with dovetail joint.

5.11.3 Closure shall be provided at the eave of roof sheet and at the base of all wall sheets on non-insulated buildings. On insulated buildings, closure will be provided at the eave of roof sheet. Any other closure will be provided as necessary to completely seal the building from the elements.

6. ACCESSORIES

6.1 Hollow Metal Doors and Hollow Metal Door Frames

6.1.1 Hollow metal doors and hollow metal door frames are specified under Section 08110. Finish hardware is specified under Section 08700.

6.1.2 This Contractor shall be responsible for any and all additional framing and bracing required for exterior wall/roof penetration of the pre-fabricated steel building, including flashing and caulking.

6.2 Roof Curb Accessories

6.2.1 Furnish and install where indicated on the mechanical plans pre-fabricated roof curbs including additional framing members.

6.2.2 Location of roof curbs shall be such that the corrugations of the curb align with corrugations of roof panels.

62.3 Roof curb shall be sized accordingly with the mechanical equipment. Verify exact size before fabrication. All curbs shall be adjusted for the various roof slopes to provide a level surface to set equipment a minimum of 10” above roof surface.

6.3 Insulation

6.3.1 Roof insulation shall be the Simple Saver System as manufactured by Thermal Design, P.O. Box 468, Madison, ME 68748, (800) 255-0776 phone with white Rip-stop Vapor Barrier or the approved equal. Refer to the website at thermaldesigns.com.

6.3.2 The system shall be installed by a licensed and/or qualified contractor approved by the manufacturer.

6.4 Eave Gutters and Downspouts

6.4.1 Eave Gutters shall be a box section formed from pre-coated galvanized 26-gauge steel, color to match roofing, with a minimum cross-sectional area of 40 square inches. The outside face of the gutter shall be supported with galvanized steel straps to the roof panel major ribs at a maximum spacing of 3 feet-0 inches. Preformed rubber closures matching the building manufacturer's panel configuration shall be provided between the eave strut and the roof panels. Gutters shall be assembled with 1/4 inch – 14 x 3/4 inch lap-tek self-drilling screws and sealed with gutter sealant. **Color to be selected by the Architect.**

6.4.2 Downspouts shall be pre-coated galvanized 26-gauge steel, rectangular in shape, with a cross-sectional area of not less than 14 square inches. Each downspout shall be supported by pre-coat galvanized steel straps secured to the wall covering with 1/4-inch – 14 x 3/4-inch lap-tek self-drilling screws at 10 feet-0 inches maximum spacing and shall be equipped with a 75-degree elbow at the bottom. Provide a concrete splash block at each downspout. Guttering shall be the **color selected by the Architect.** Refer to the elevations for locations.

7. GUARANTEE

7.1 In addition to the General Contractor's one (1) year guarantee of all labor and materials incorporated in the building, the pre-engineered building shall carry a warranty of five (5) years on the structural frame, twenty (20) years on the wall and roof panels against fading, cracking, crazing, and peeling in accordance with the manufacturer's standard warranty.

7.2 The metal building components will also be guaranteed against leaks for a period of two (2) years. All leaks will be repaired at no cost to the owner during this guarantee period.

End of Section 136000

SECTION 142400

HYDRAULIC ELEVATORS

PART 1 – GENERAL

1. SUMMARY

Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:

1.1 Standard pre-engineered hydraulic passenger elevators.

1.2 Elevator car enclosures, hoistway entrances and signal equipment.

1.3 Jack(s).

1.4 Operation and control systems.

1.5 Accessibility provisions for physically disabled persons.

1.6 Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.

1.7 Materials and accessories as required to complete the elevator installation.

2. RELATED SECTIONS

2.1 Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.

2.2 Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.

2.3 Division 5 Metals

2.3.1 Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.

2.3.2 Providing steel angle sill supports and grouting hoistway entrance sills and frames.

2.4 Division 9 Finishes

Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.

2.5 Division 22 Plumbing

2.5.1 Sump pit and oil interceptor.

2.6 Division 23: Heating, Ventilation and Air Conditioning

2.6.1 Heating and ventilating hoistways and machine rooms.

2.7 Division 16 Sections

2.7.1 Providing electrical service to elevators, including fused disconnect switches.

2.7.2 Emergency power supply, transfer switch and auxiliary contacts.

2.7.3 Heat and smoke sensing devices.

2.7.4 Convenience outlets and illumination in machine room, hoistway and pit.

3. WORK INCLUDED

General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.

3.1 Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.

3.2 Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.

3.3 Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point.

3.4 Elevator hoistways shall have barricades, as required.

3.5 Install bevel guards at 75 degrees on all recesses, projections or setbacks over 2 inches (4 inches for A17.1 2000 areas) except for loading or unloading.

3.6 Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide divider beams between hoistway at each floor and roof.

3.7 Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.

3.8 Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42-inch minimum, (48-inch minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.

3.9 Machine room to be enclosed and protected.

3.10 Machine Room temperature must be maintained between 55º and 90º F.

3.11 If machine room is remote from the elevator hoistway, clear access must be available above the ceiling or metal/concrete raceways in floor for oil line and wiring duct from machine room.

3.12 Access to the machinery space and machine room must be in accordance with the governing authority or code.

3.13 Provide an 8 inch x 16 inch cutout through machine room wall, for oil line and wiring duct, coordinated with elevator contractor at the building site.

3.14 All wire and conduit should run remote from either the hoistways or the machine room.

3.15 When heat, smoke or combustion sensing devices are required, connect to elevator machine room terminals, contacts on the sensors should be sided for 120-volt D.C.

3.16 Install and furnish finished flooring in elevator cab.

3.17 Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.

3.18 Where sheet rock or drywall construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Drywall contractor to coordinate with elevator contractor.

3.19 Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.

3.20 To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.

3.21 The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.

3.22 General Contractor shall fill and grout around entrances, as required.

3.23 Elevator sill supports shall be provided at each opening.

3.24 All walls and sill supports must be plumb where openings occur.

3.25 For applications with jack hole, free and clear access to the elevator pit area for the jack hole-drilling rig is required.

3.26 Where jack hole is required, remove all spoils from jack hole drilling.

3.27 When not provided by Elevator Contractor, jack hole shall accommodate the jack unit. If required, the jack hole is to be provided in strict accordance with the elevator Contractor's shop drawings.

3.28 Locate a light fixture and convenience outlet in pit with switch located adjacent to the access door.

3.29 A light switch and fused disconnect switch for each elevator should be located inside the machine room adjacent to the door, where practical, per the National Electrical Code (NFPA No. 70).

3.30 As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway (or in the machine room).

3.31 For signal systems and power operated door: provide ground and branch wiring circuits, including main line switch. For car light and fan: provide a feeder and branch wiring circuits, including main line switch.

3.32 Wall thickness may increase when fixtures are mounted in drywall. These requirements must be coordinated between the general contractor and the elevator contractor.

3.33 Provide supports, patching and recesses to accommodate hall button boxes, signal fixtures, etc.

3.34 Locate telephone and convenience outlet on control panel.

4. SPECIAL INSTRUCTIONS

4.1 Smoke detector(s) must be provided and installed in accordance with the governing authority or code, at the top of the hoistway when sprinklers are located in those hoistways. Provide and install smoke detectors in accordance with MACBD requirements, ASME A17 requirements, and in compliance with any other applicable safety standards.

4.2 A compliant retractable pit ladder must be provided and installed in accordance with 2022 code requirements, with the governing authority or code, MACBD requirements, ASME requirements, and in compliance with any other applicable safety standards.

4.3 A Knox Box must be provided and installed inside the building, within ten (10) feet of the elevator, and must be within sightline of the elevator doors, in accordance with the governing authority or code, MACBD requirements, ASME requirements, and in compliance with any other applicable safety standards.

5. SUBMITTALS

5.1 Product Data
When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.

5.2 Shop Drawings

5.2.1 Show equipment arrangement in the machine room/control space, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.

5.2.2 Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.

5.2.3 Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.

5.2.4 Indicate electrical power requirements and branch circuit protection device recommendations.

5.3 Powder Coat Paint Selection
Submit manufacturer’s standard selection charts for exposed finishes and materials.

5.4 Plastic Laminate Selection
Submit manufacturer’s standard selection charts for exposed finishes and materials.

5.5 Metal Finishes: Upon request, standard metal samples provided.

5.6 Operation and maintenance data. Include the following:
5.6.1 Owner's Manual and Wiring Diagrams.

5.6.2 Parts list, with recommended parts inventory.

6. QUALITY ASSURANCE

6.1 Manufacturer Qualifications
An approved manufacturer with minimum fifteen years' experience in manufacturing, installing, and servicing elevators of the type required for the project.
6.1.1 Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.

6.1.2 The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.

6.1.3 The manufacturer shall have a documented, on-going quality assurance program.

6.1.4 ISO-9001:2000 Manufacturer Certified

6.1.5 ISO-14001:2004 Environmental Management System Certified

6.2 Installer Qualifications
The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.

6.3 Regulatory Requirements
6.3.1 ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code

6.3.2 Building Code: National

6.3.3 NFPA 70 National Electrical Code

6.3.4 NFPA 80 Fire Doors and Windows

6.3.5 Americans with Disabilities Act Accessibility Guidelines (ADAAG)

6.3.6 CAN/CSA C22.1 Canadian Electrical Code

6.3.7 CAN/CSA B44 Safety Code for Elevators and Escalators

6.4 Fire-rated Entrance Assemblies
Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2-hour label by a Nationally Recognized Testing Laboratory (2-hour label in Canada).

6.5 Inspection and Testing
Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.

6.5.1 Arrange for inspections and make required tests.

6.5.2 Deliver to the Owner upon completion and acceptance of elevator work.

7. DELIVERY, STORAGE AND HANDLING

Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

8. PROJECT CONDITIONS

8.1 Prohibited Use
Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

8.2 Provide the hole for the jack unit (if required by the type of jack provided), based on excavation through normal soil or clay which can be removed by manual digging or by standard truck-mounted regular drilling unit. Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.

8.2.1 If a physical obstruction or hindrance is encountered below the ground surface, including boulders, rock, gravel, wood, metal, pilings, sand, water, quick sand, caves, public utilities or any other foreign material, obtain written authorization to proceed with excavating using special excavation equipment.

8.2.2 Maintain a daily log of time and material costs involved.

8.2.3 Elevator contractor will be compensated on a time and material basis for additional costs incurred after encountering the physical obstruction or hindrance, including the cost of the special excavation equipment.

9. WARRANTY

Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion.

10. MAINTENANCE

10.1 Furnish maintenance and call back service for a period of 12 months for each elevator from date of Substantial Completion during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.

10.1.1 Manufacturer shall have some service office and full-time service personnel within a 100 mile radius of the project site.

PART 2 – PRODUCTS

11. MANUFACTURERS

11.1 Manufacturer: ThyssenKrupp Elevator

12. MATERIALS, GENERAL

12.1 Colors, Patterns, and Finishes
As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.

12.2 Steel

12.2.1 Shapes and Bars: Carbon

12.2.2 Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish

12.2.3 Finish: Factory-applied baked enamel

12.3 Plastic Laminate
Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050-inch thickness.

13. HOISTWAY EQUIPMENT

13.1 Platform
Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

13.2 Sling
Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

13.3 Guide Rails
Steel, omega shaped, fastened to the building structure with steel brackets.

13.4 Guide Shoes
Slide guides shall be mounted on top and bottom of the car.

13.5 Buffers
Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor or continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

13.6 Jack
Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction.

13.6.1 Provide the following jack type: Twin post holeless. Two jacks piped together, mounted one on each side of the car with a polished steel hydraulic plunger housed in a sealed steel casing having sufficient clearance space to allow for alignment

during installation. Each plunger shall have a high-pressure sealing system which will not allow for seal movement or displacement during the course of operation. Each Jack Assembly shall have a check valve built into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in the section.

13.7 Automatic Self-Leveling
Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

13.8 Wiring, Piping, and Oil
Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade oil as specified by the manufacturer of the power unit.

14. POWER UNIT

14.1 Power Unit (Oil Pumping and Control Mechanism)
A self-contained unit consisting of the following items:

14.1.1 Oil reservoir with tank cover

14.1.2 An oil hydraulic pump

14.1.3 An electric motor

14.1.4 Oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids

14.2 Pump
Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.

14.3 Motor
Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.

14.4 Control System
Shall be micro-processor based and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure.

14.5 Oil Control Unit
The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.

14.5.1 Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.

14.5.2 Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.

14.5.3 Check valve shall be designed to close quietly without permitting any perceptible reverse flow.

14.5.4 Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.

14.6 Solid State Starting
Provide an electronic starter featuring adjustable starting currents.

15. HOISTWAY ENTRANCES

15.1 Doors and Frames
Provide complete hollow metal type hoistway entrances at each hoistway opening bolted \ knock-down construction.

15.1.1 Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.

15.1.2 Main landing door & frame finish: Stainless steel panels, no. 4 brushed finish.

15.1.3 Typical door & frame finish: Stainless steel panels with no. 4 brushed finish.

15.2 Interlocks
Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.

15.3 Door Hanger and Tracks
Provide sheave type two-point suspension hangers and tracks for each hoistway horizontal sliding door.

15.3.1 Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.

15.3.2 Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.

15.3.3 Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

15.4 Hoistway Sills
Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

16. CAR ENCLOSURE

16.1 Walls
Cab type TKAP, reinforced cold-rolled steel with two coats factory applied baked enamel finish, with applied vertical wood core panels covered on both sides with high pressure plastic laminate.
16.1.1 Reveals and frieze: Stainless steel, no. 4 brushed finish

16.2 Canopy: Cold-rolled steel with hinged exit.

16.3 Ceiling: Downlight type, metal pans with suspended LED downlights.

16.4 Cab Fronts, Return, Transom, Soffit and Strike
Provide panels faced with brushed stainless steel.

16.5 Doors
Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
15.5.1 Door Finish: Stainless steel panels: No. 4 brushed finish.

15.5.2 Cab Sills: Extruded aluminum, mill finish.

16.6 Handrail
Provide 1.5 inch diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.

16.7 Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.

16.8 Flooring: Carpet

16.9 Car Top Inspection
Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

17. DOOR OPERATION

17.1 Door Operation
Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor-controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.
17.1.1 No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.

17.1.2 Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.

17.1.3 Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse, and the door will reopen to answer the other call.

17.1.4 Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.

17.1.5 Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.

17.1.6 Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.

17.1.7 Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.

17.1.8 Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

17.2 Door Protection Devices

Provide a door protection system using 150 or more microprocessor controlled infrared light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

18. CAR OPERATING STATION

18.1 Car Operating Station, General

The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless-steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements.

Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

18.2 Emergency Communications System: Integral phone system provided.

18.3 Auxiliary Operating Panel: Not Required

18.4 Column Mounted Car Riding Lantern: Not required for this application

18.5 Special Equipment: Not Applicable

19. CONTROL SYSTEMS

19.1 Controller

The elevator control system shall be microprocessor based and software oriented. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

19.2 Automatic Light and Fan Shut Down

The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

19.3 Special Operation: Not Applicable

20. HALL STATIONS

20.1 Hall Stations, General

Provide buttons with red-illuminating LED halos to indicate that a call has been registered at that floor for the indicated direction. Provide 1 set of pushbutton risers. Provide one pushbutton riser with faceplates having a brushed stainless-steel finish.

20.1.1 Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

20.2 Floor Identification Pads

Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

20.3 Hall Position Indicator

An electronic dot matrix position indicator shall be provided and mounted for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. When hall lanterns are provided, the position indicator shall be combined with the hall lanterns in the same faceplate. Faceplates shall match hall stations. Provide at main landing only.

20.4 Hall Lanterns

A hall lantern with adjustable chime shall be provided at each landing and located adjacent to the entrance. The lanterns, when illuminated, shall indicate the elevator car that shall stop at the landing and in what direction the car is set to travel. When the car reaches a predetermined distance from the floor where it is going to stop, the corresponding hall

lantern shall illuminate, and the chime shall sound. The hall lantern shall remain illuminated until the car doors close in preparation for leaving the floor. Illumination of the arrow shall be with LED's. Faceplates shall match the hall station finish. Provide at all typical landings.

20.5 Special Equipment: Not Applicable

20. MISCELLANEOUS ELEVATOR COMPONENTS

21.1 Oil Hydraulic Silencer

Install an oil hydraulic silencer (muffler device) at the power unit location. The silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line.

22. SMOKE DEVICES

Provide and install Smoke Detector(s), in accordance with the governing authority or code, safety requirements including ASME, NFPA, and any other applicable safety standards; including, but not limited to the following guidelines. State or local requirements must be used if more stringent.

22.1 A smoke sensor is required in top of the hoistway for a machine roomless elevator (MRL).

22.2 A means to remove power from the elevator prior to the application of water from a sprinkler (called shunt trip). This is typically a heat sensor within 24 inches of the sprinkler head but can also be an inline flow switch in the sprinkler line. This is only for sprinklers in elevator equipment areas (pits, hoistways, machine/control rooms, etc.), and does not typically apply to sprinklers in the lobbies.

22.3 Smoke and heat detectors shall be installed in pits of hydraulic elevators that have sprinklers.

22.4 Sprinklers are required in the pits and machine rooms of hydraulic elevators and hoistway of some traction elevators that use non-fire rated hoisting belts. Where sprinklers are installed in the pits, shunt trip is typically required, though there is an exception for the pit location only. If the application of water will not cause unsafe elevator operation, the pit sprinkler does not need shunt tripped. In the event that the manufacturer is not willing to provide documentation to this effect, shunt tripping of sprinklers in pits will be required.

23. PIT LADDER

Provide and install retractable Pit Ladder(s), meeting or exceeding 2022 code requirements, in accordance with the governing authority or code, MACBD requirements, ASME requirements, and any other applicable safety standards. State or local requirements must be used if more stringent.

23.1 Approved Product:

Retracta RL-60 Ladder, as manufactured by Smart Elevator Tech;
phone (415) 819-5744, email: sales@smartelevatortech.com; or approved equal.

PART 3 – EXECUTION

24. EXAMINATION

24.1 Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

24.2 Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

25. INSTALLATION

25.1 Install elevator systems components and coordinate installation of hoistway wall construction.

25.2 Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.

25.3 Comply with the National Electrical Code for electrical work required during installation.

25.4 Jack unit excavation (if required by the type of jack provided)
Drill or otherwise excavate below elevator pit construction as required to install the jack unit.

24.4.1 Install casing for jack unit.

24.4.2 Provide HDPE jack protection system for all in ground jacks.

24.4.3 Set casing for jack unit assembly plumb, and partially fill with water-settled sand, eliminating voids. Back fill depth shall be sufficient to hold the bottom of the jack in place over time.

25.5 Coordination
Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

25.6 Alignment
Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

25.7 Lubricate operating parts of system where recommended by manufacturer.

26. FIELD QUALITY CONTROL

26.1 Acceptance Testing
Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.

26.2 Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

27. ADJUSTING

Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

28. CLEANING

Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.

28.2 At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

29. PROTECTION

At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

30. DEMONSTRATION

30.1 Instruct Owner’s personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

30.2 Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

31. ELEVATOR SCHEDULE

31.1 Elevator Qty. 1

A. Elevator Model: AMEE 25

B. Rated Capacity: 2500 lbs.

C. Rated Speed: 80 ft./min.

D. Operation System: TAC32

E. Travel: 12'-6"

F. Landings: 2 total

G. Openings:
   1. Front: 1
   2. Rear: 0

H. Clear Car Inside: 6' - 8" wide x 4' - 3" deep

I. Cab Height: 8'-0" nominal

J. Hoistway Entrance Size: 3' - 6" wide x 7'-0" high

K. Door Type: Center Opening

L. Power Characteristics: 208 volts, 3 Phase, 60 Hz

M. Seismic Requirements: Zone 1

N. Fixture & Button Style: Signa4 Signal Fixtures

O. Special Operations: None

End of Section 142400