PROJECT MANUAL

NEW ELEVATOR WORK

REMODELING OF THE ASCARATE ANNEX BUILDING

FOR

THE COUNTY OF EL PASO

CDA
CARL DANIEL ARCHITECTS
FRANCO
BALDAÑA

March 13, 2014

SET NO.

THE COUNTY OF EL PASO
NEW ELEVATOR WORK
ASCARATE ANNEX BUILDING

Note: The numbering and locations of sections is unique to this project. Read all sections of the specifications completely. Failure to do so, or assuming that items are included by others because of the organization of work in these documents, will not relieve the bidders from completing the entire job within the contract price. The General Contractor is responsible for bidding and providing a complete job and for coordinating his subcontractors' bids and work, wherever called for or specified herein or on the plans, period.

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THE COUNTY OF EL PASO (Front End Documents)

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LIST OF SUBCONTRACTORS
(To be filled out and Submitted with Bid Forms)

Owner's Project:

_____

To:

The Undersigned submits the following names of subcontractors.

Subcontractor's Name	Subcontractor's Work
_____	Mechanical (Sheet metal and HVAC)
_____	Mechanical (Plumbing)
_____	Electrical
_____	Roofing
_____	Hardware/Doors
_____	Painting
_____	Drywall
_____	Carpentry
_____	Glass & Glazing
_____	Millwork
_____	Masonry
_____	Insulation
_____	Concrete
_____	Tile (Acoustical)
_____	Tile (Ceramic)
_____	Steel Erection
_____	Earthwork
_____	Sitework
_____	Paving
_____	Landscape
_____	Fire Protection/Alarms
_____	Intrusion Alarm/ Sound Systems
_____	EMCS
_____	Special Equipment (_____)
_____	Special Equipment (_____)

Contractor _____

By _____

Name _____

Title _____

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1. SITE EXAMINATION:

A. Location: The extent and location of the work is as shown on the plans. The Contractor shall confine his use to the site and area, except as required by the Contract Documents to do work off the site, or as determined by direction of the Architect or Owner.

B. Inspection of Premises: The Contractor will be held to have examined the building, site and the scope of work as described in the Contract Documents and to have satisfied himself as to the conditions that will be obligated to perform his work, or conditions that will in any manner affect the work under this contract. No extra payment will be allowed for additional work that could have been determined by inspection.

C. The Contractor shall verify all measurements at the area of construction as the work progresses and shall be responsible for their correctness. Failure to do so will not constitute a reason for extra charge or compensation on account of differences between actual dimensions of the work and the measurements indicated on the drawings. Any difference which may be found shall be submitted to the Owner for consideration before proceeding with the work.

D. The General Contractor shall employ a full-time, competent field superintendent and during the progress of the work, the General Contractor shall lay out on the slabs the exact location of all partitions, doors openings and coordinate all other work and sub-trades as a guide to all trades. Offset lines for all partitions shall be distinctly indicated on the floors and shall be maintained as long as needed.

E. Before ordering any materials or doing any work the Sub-Contractor shall be responsible for the verification of all measurements of the area of construction he will be working and shall be responsible for their correctness. Failure to do so does not constitute a reason for extra charge or compensation on account of differences between the actual dimension of the work and the measurements indicated on the drawings should verification not be performed. Any differences found shall be submitted to the Owner for consideration before proceeding with the work or ordering of material.

2. **MINOR ADJUSTMENTS:** The Contractor is obligated to make minor adjustments in the field as directed by the Architect, without additional cost to the Owner.

3. **CONTRACTOR'S RESPONSIBILITY:** The Contractor, Sub-Contractors, and materials supplier's are separately and jointly responsible for the proper working, workmanship, installation, operations, appearance, and durability of items incorporated into the project. As a professional, the Contractor shall not use the excuse that work was installed as detailed or specified and does not function or fit properly. If the Contractor or Sub-Contractor are in disagreement with any items, details, methods, specifications, he shall notify the architect prior to ordering or starting the work in question. Such matters will be clarified in writing by the Architect prior to their incorporation into the project.

4. **STORAGE OF MATERIALS, ETC.:** The Contractor is responsible for materials stored on the site. Any loss of or damage to such materials will be borne by the Contractor. This is a dangerous site; protect your personnel and materials.

5. INSPECTION AND TESTING:

A. Inspection Agency: An independent testing laboratory will be selected by the Contractor to perform the specific testing of construction materials.

B. Payment for Testing: Testing laboratory charges shall be paid by the Owner and shall not be included as part of this Contract.

C. Payment for Retesting: Should the results of the laboratory tests indicate that the material or workmanship fails to comply with the requirements of the Specifications; the work shall be removed or reworked until it does satisfy the requirements. The final results shall be verified as acceptable by the laboratory tests, which shall be paid for the Contractor, at his own expense.

6. CODES, PERMITS, REGULATIONS AND LICENSES:

A. Compliance: All work pertaining to, all materials supplied for, and executing and completing this Contract, shall comply with the provisions specified in these Specifications and with latest editions of all applicable codes, requirements, laws regulations and ordinances, including any and all amendments and addenda thereto, as adopted by legally constituted authorities having jurisdiction and governing the work, including but not necessarily limited to those of:

1. Local Building Code, International Building Code, 2009
2. Federal Occupational Safety and Health Act.
3. Local Mechanical Code and Plumbing Code.
4. The National Local Electrical Codes.
5. National Fire Protection Association.
6. All other codes, laws, regulations and ordinances called for within applicable Sections of these Specifications.

B. Inclusion: Said codes, laws, regulations and ordinances are hereby made a part of the Contract Documents, as they may apply.

C. Copies at Site: Contractor shall secure and maintain at the project site one copy of all the Codes, Laws, and Ordinances as specified herein and within other sections of these Specifications.

D. Conflicts: In the event of a conflict between these documents and a code requirement, the code requirement shall govern (with the Architect's agreement prior to resolution of the problem), with no increase in price.

7. PUMPING AND DRAINAGE: Permit no surface or subsurface water or other fluid to accumulate in excavations or under structures. Should such conditions develop or be encountered, control water or other fluid and suitably dispose of by means of temporary pumps, piping, drainage lines and ditches, dams or other methods as approved by Architect at no cost to Owner.

8. WATERTIGHT-WEATHERTIGHT CONSTRUCTION: Anything in the Contract Documents not withstanding, the Contractor accepts the responsibility of constructing a watertight-weather tight structure.

9. **REPAIR:** All streets, curbs, utilities and adjacent structures or property damaged during this construction will be repaired or replaced by the Contractor at no cost to the Architect or Owner.

10. **LABOR:** All labor shall be performed in the best and work workmanlike manner, using current acceptable standards of practice, by mechanics skilled in their respective trades. The standards of work required throughout shall be such as will bring results of first class quality only. Sub Contractors or Mechanics whose work is unsatisfactory to the Owner or the Architect or are considered by the Owner to be unskilled or otherwise objectionable, shall be dismissed from the job.

11. **CONTRACT DOCUMENTS:** Bidder is reminded to carefully read all sections of the specifications, especially the Special Conditions and General and Supplementary General Conditions. The intent of these drawings and specifications shall be interpreted to meet all codes, good workmanship and acceptable standards of practice. Some drawings may be diagrammatic, but in all cases the measurements are to be checked from the work in place. Should a variation be found, it must be referred to the Architect for instructions.

12. **SUPERINTENDENCE:** The required Contractor's Field Superintendent shall be approved by the owner and shall as specified in the General Conditions, shall have authority to make decisions required on the job, and shall keep the project quality and progress of work consistent with the Agreement.

13. **SITE:** Accept the site on an "as-found" basis on date of "Notice to Proceed" and do all work required to render a complete project.

14. **CONSTRUCTION SCHEDULE:** Contractor is to provide a complete construction schedule, using approved scheduling method. First payment will be held until schedule is submitted. Schedule is to be presented in graphic form and in 4 copies, one copy to be at the job site. Schedule to be updated on monthly basis showing all changes in the schedule.

15. **PROTECTION:** It shall be the Contractor's responsibility to protect the safety of the public and employees by securing all work, materials, debris, machinery and equipment during and after working hours.

16. **GUARANTEES:** The Contractor shall deliver to the Owner, with his request for final payment, copies of all manufacturer's guarantees, service contracts, and all other guarantees specified, including his own guarantee for a one year period.

17. **SPECIFICATIONS:** The specifications are intended to supplement the drawings, the two being considered cooperative and therefore, it will not be the province of these specifications to mention any portion of the construction which the drawings are competent to explain, and such omission will not relieve the Contractor from carrying out such portions of the construction which the drawings are competent to explain, and such omission will not relieve the Contractor from carrying out such portions as are only indicated from the drawings, and should items be required by these specifications which are not indicated on the drawings, they are to be supplied and installed.

18. **HINDRANCES AND DELAYS:** No charge shall be made by the Contractor for hindrances or delay from any cause during the progress of any portion of work embraced in this contract.

19. **LOSSES FROM NATURAL CAUSES:** All loss or damage out of the nature of the work to be done, or from the action of the elements or from unforeseen circumstances in the prosecution of the same, or from unusual obstructions or difficulties which may be encountered in the prosecution of the work shall be sustained and borne by the Contractor at his own cost and expense.

20. **PARKING:** The Contractor shall use parking areas designated by the Owner only.

21. **SAFETY:** The Contractor and his Sub-Contractors are responsible for using good safety procedures and practices at all times. The Owner and the Architect are not responsible for any safety procedures or practice, at any time, on or off the job site, for any reason.

22. **OSHA REGULATIONS:** The Contractor shall abide by OSHA regulations and shall be responsible to see that all safety devices, guardrails, ladders, warning signs, etc., are provided and used by all persons at the construction site. He/she shall provide whatever temporary facilities are necessary to meet current OSHA regulations; to include all sub-contractors and suppliers.

23. **INTERPRETATION OF QUESTIONS:**

A. Only written instructions from the Owner, Architect or Contractor are binding throughout bidding and construction.

B. In case of specification and drawing conflict, or drawings conflict, the superior quality shall govern.

C. All questions directed to the Owner by telephone or letter shall come from the General Contractor only. **SUB-CONTRACTORS ARE TO WORK THROUGH THE GENERAL CONTRACTOR.**

24. **COMMON REFERENCE STANDARDS:** Reference in the Specifications to known standards such as codes, specifications, etc., promulgated by professional or technical associations, institutes and societies, are intended to mean the latest edition of each such standard referred to shall be considered a part of the specifications to the same extent as if reproduced therein in full. The following is a representative list of such entities:

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWSC	American Welding Society Code
CSI	Constructions Specifications Institute
FIA	Factory Insurance Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
UL	Underwriter's Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau

25. **CHANGE ORDERS:** The General Contractor may not issue change orders to sub-contractors without the written approval of the Architect.

26. **BRACING & SHORING:** Brace and shore all construction elements and all excavations to protect workers, the public and the project.

27. **INDEMNIFICATION:** The General Contractor shall indemnify the Architect of record and his/her consultants for any loss, accident or suit (including a suit from the Contractor's insurance carriers) which may occur relating to this construction project.

28. **COORDINATION:** The General Contractor is responsible for the assignment of work to the trades. Do not infer inclusion of an item to one Sub-Contractor over another due to placement within the drawings or specifications. All work covered in any area of the documents must be done. Who does what is determined by the General Contractor, who must read all specifications sections and all plans, and coordinate all work among the subs and deliver a complete job.

29. **SHOP DRAWING AND MATERIAL BROCHURES & SUBMITTALS:**

A. Shop drawings and materiel brochures & submittals are for the benefit of the contractor and establish his intent toward fabrication and installation of building components. The accuracy of design, dimensions and quantity shown on shop drawings and material submittals are the responsibility of the contractor not the Architect, or Owner. The Contractor shall approve the shop drawings and material submittal to the Architect, or Owner.

B. All items submitted must meet requirements of the General Conditions & must be approved by the General Contractor & appropriate Sub-contractor prior to submission. The Contractor's stamp indicating each item has been check and **meets plans & specification requirements** must appear on each submitted item or it will not be processed.

C. Submittal data will be accepted for processing ONLY when it is completely marked to indicate **compliance with each and every specification requirement**. Each and every requirement must be highlighted or written cost difference & explanation for non-compliance provided. Incomplete or inadequately marked submittals will not be processed.

D. It is the Contractor's responsibility to insure that submittals are complete, accurate, and reflect the intent of the Project Documents. Submittals processed by the Architect **does not** relieve the Contractor of responsibility for providing all equipment and materials in accordance with requirements of the Project Document.

E. Fabrication prior to complete processing of shop drawings and material submittals is at the Contractor's risk.

F. Shop drawings shall indicate clearly the number of items, their location, dimensions, materials, assembly, fastenings, finishes, specifications, and colors. They shall provide installation details at large enough scale to show definitely and accurately the requirements, including proper anchorage.

G. The original intent of the construction documents must be met, REGARDLESS OF SUBSTITUTIONS OR REVISIONS.

30. THE PROJECT LOG: The Contractor shall keep and maintain a Daily Log. All unforeseen conditions that impact the object shall also be recorded. The log must be accessible to the Owner and the Architect. Inventory of plumbing materials shall be kept in the project log book.

31. CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH CITY OF EL PASO FIRE MARSHALL'S' AND BUILDING INSPECTIONS IN THE FIELD.

1. CURRENT SITUATION
   City Inspectors & Fire Marshalls frequently interpret Building Code & ADA. requirements differently from: the contract documents (plans & specifications); existing conditions; the City plan checkers; the Codes & ADA requirements themselves; and the record plans previously stamped & approved by the city.
2. EXAMPLE
   An example of this situation is that an inspector may require relocation of: accessories, grab bars; plumbing fixtures, and/or toilet partitions (that are installed according to dimensions on the plans) by a fraction of an inch or inches in order to satisfy the inspector's interpretation of the code or ADA requirements (whether or not the inspector in correct). The actual situations in the field may vary widely and are not limited to these examples or areas.
3. REQUIREMENTS FOR CONTRACTOR
   The contractor must include in his base bid all the work to correct <u>any and all conditions</u> to meet the Fire Marshall's and City Building Inspector's demands, (no change orders will not be allowed for this category of extra work.

   MANDATORY REQUIREMENTS
4. Inclusion of the cost of this provision by the General Contractor in his bid is an absolute requirement of this project.

32. BONDS:
Contractors shall provide performance and payment bonds for 100% of the job cost and from a company licensed in the State of Texas and approved by the owner.

33. MATERIAL SAFETY DATA SHEETS

MSDS SHEETS: The contractor shall obtain and review all Material Safety Data Sheets of Shop Drawings/Product Data Samples and similar submittals, to ascertain that no Asbestos Materials, Asbestos-Containing Materials, or other Hazardous Materials are being utilized or installed. The Contractor shall submit, in compliance with the Texas Department of health; Texas Asbestos Health Protection Rules. Contractor shall compile the information from Material Safety Data Sheets (MSDS) of all products used in the construction of the building (project) and finding no asbestos in any of those products, may make this statement. Submit complete MSDS sheets and the statement to Architect and Owner with final pay application.

END SECTION 01000

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General, Supplementary and Special Conditions and other Division 1 Specification sections, apply to this section.

1.02 SUMMARY

A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 1 Section "Allowances", if any, for procedural requirements governing the handling and processing of allowances.

2. Division 1 Section "Unit Prices", if any, for administrative requirements governing use of unit prices.

3. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.

4. Division 1 Section "Application for Payment" for administrative procedures governing applications for payment.

5. Division 1 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 MINOR CHANGES IN THE WORK

A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Architect / Engineer on AIA form G710, Architect / Engineer's Supplemental Instructions.

1.04 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Request: Requests for proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect / Engineer, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1. Proposal request issued by the Architect / Engineer are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.

2. Unless otherwise indicated in the proposal request, within 14 days of receipt of the proposal request, submit to the Architect / Engineer for the Owner's review a detailed statement of cost (with labor and materials itemized separately) necessary to execute the proposed change.

a. Include a list of quantities of products to be purchased and unit costs, along wit the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

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

c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect / Engineer.

1. Include a statement outlining the reasons for the change and the effect of the change o the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum (in detail with labor and materials itemized separately) and Contract Time.

2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

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

4. Comply with requirements in Section "Product Substitutions" if the proposed change in the Work requires the substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use AIA Document G 709 for Change Order Proposal Requests.

1.05 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect / Engineer may issue a Construction Change Directive on AIA Form G714, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive will contain complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.

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

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

1.06 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Proposal Request, the Architect / Engineer will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the Conditions of the Contract.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01035

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL 1.1.

SECTION INCLUDES

A. Coordination.

B. Field Engineering.

C. Pre-construction Meeting.

D. Pre-installation Meeting.

E. Progress Meetings.

F. Preparation.

G. Cutting and Patching.

1.2 RELATED SECTIONS

A. Section 01041 - Project Coordination

1.3 COORDINATION

A. Coordinate scheduling, submittals and Work to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

C. Prior to OWNER occupancy of premises, the Contractor shall coordinate access to site for corrective of defective Work and Work not in accordance with Contract Documents.

D. Contractor shall obtain all necessary permits from regulatory agencies prior to beginning construction.

1.4 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of Texas and acceptable to the . OWNER and Architect

B. Control datum for survey is as indicated on the drawings of the Construction Documents.

C. All field engineering will be established and maintained by the Contractor.

D. Confirm all drawing dimensions and elevations.

E. Provide field-engineering services. Establish elevations and playcourt alignment, utilizing recognized engineering survey practices.

1.5 PRECONSTRUCTION MEETING

A. The OWNER will schedule a meeting after Notice of Award.

B. The Preconstruction meeting shall be conducted prior to the commencement of construction activities.

C. The Owner, Engineer, Contractor and its superintendent, major subcontractors and manufacturer's shall be required to attend the meeting.

D. Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Submission of list of Subcontractors and list of Products.
4. Tentative construction schedule.
5. Critical Work sequence.
6. Designation of responsible personnel.
7. Procedures for processing field decisions, submittals, substitutions, Contract closeout procedures and Change Orders.
8. Procedures for processing Applications for Payment.
9. Distribution of Contract Documents.
10. Submittal of Shop Drawings, Product Data and Samples.
11. Preparation of record documents.
12. Use of the premises.
    Office
13. Work and storage areas.
14. Equipment deliveries and priorities.
15. Safety procedures.
16. First Aid.
17. Security.
18. Housekeeping.
19. Working hours.
20. Use of premises by Owner and Contractor.
21. Owner's requirements and partial occupancy.
22. Use of temporary utilities.

23. Procedures for testing.

24. Inspection of construction activities.

E. Record minutes of meeting and distribute copies to all participants. 1.6

PRE-INSTALLATION MEETING

A. Conduct a pre-installation meeting at the site before each construction activity that requires coordination with other construction.

B. The Installer and representative 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.

C. Notify the Engineer four days in advance of the scheduled meeting dates

D. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation meeting, including requirements for:

1. Contract Documents.
2. Options.
3. Related Change Orders.
4. Purchases.
5. Deliveries.
6. Shop Drawings, Product Data and Quality Control Samples.
7. Possible conflicts.
8. Compatibility problems.
9. Time schedules.
10. Weather limitations.
11. Manufacturer's recommendations.
12. Compatibility of materials.
13. Acceptance of substrates.
14. Temporary facilities.
15. Space and access limitations.
16. Governing regulations.
17. Safety.
18. Inspection and testing requirements.
19. Protection.

E. Record significant discussions and agreements and disagreements of each conference meeting. Furnish all participants a copy of the recorded document, including the Owner and the Engineer.

F. Do not proceed if the conference cannot be successfully concluded. Initiate

whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible time.

1.7 PROGRESS MEETINGS

A. Progress meetings shall be conducted on regular scheduled intervals.

B. The scheduled meeting dates shall be determined by the agreement of the Owner, Engineer and the Contractor prior to beginning of construction activities.

C. Prepare agenda and furnish copies to all participants at least one day prior to the scheduled meeting.

D. Make arrangements for meetings and preside at meetings. E.

Agenda:

1. Review minutes of previous meetings
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problem, which impede planned construction activity.
5. Review of submittal schedule and status of submittals.
6. Review delivery schedules.
7. Maintenance of progress schedule.
8. Planned progress during succeeding work period.
9. Coordination of projected progress.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business related to Work.

PART 2 PRODUCTS

Not Used

3 EXECUTION

Not Used

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

This Section specifies administrative and supervisory requirements necessary for Project coordination including but not necessarily limited to:

1. Coordination
2. Administrative and supervisory personnel
3. General installation provisions
4. Cleaning and protection
5. Contractor's Construction Schedule
6. Scheduling & control of the project & of sub-contractors

1.03 COORDINATION

A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

B. Where installation of one part of the Work is dependent on installation of other of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

C. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

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

E. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

F. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

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

1. Preparation of schedules
2. Installation and removal of temporary facilities
3. Delivery and processing of submittals
4. Progress meetings
5. Project Close-out activities.

H. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

I. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.04 SUBMITTALS

A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

B. Show the interrelationship of components shown on separate Shop Drawings.

C. Indicate required installation sequences.

D. Comply with requirements contained in Section "Submittals."

E. Refer to Division-15 Section "Basic Mechanical Requirements," and Division-16 Section "Basic Electrical Requirements" for specific coordination Drawing requirements for mechanical and electrical installations.

F. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extend that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

F. Recheck measurements and dimensions, before starting each installation.

G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.02 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities 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. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading
2. Excessive internal or external pressures
3. Excessively high or low temperatures
4. Excessively high or low humidity
5. Air contamination or pollution
6. Water or ice
7. Solvents
8. Chemicals
9. Light
10. Radiation
11. Puncture
12. Abrasion
13. Heavy traffic
14. Soiling, staining and corrosion
15. Bacteria
16. Rodent and insect infestation
17. Combustion
18. Electrical current
19. High speed operation
20. Improper lubrication
21. Unusual wear or other misuse
22. Contact between incompatible materials
23. Destructive testing
24. Misalignment
25. Excessive weathering
26. Unprotected storage
27. Improper shipping or handling
28. Theft
29. Vandalism

END OF SECTION 01041

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General, Supplementary and Special Conditions and other Division 1 Specification sections, apply to this section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching of existing work or completed Work of this Contract.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division-15 and Division-16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

C. Demolition of selected portions of the building for alterations is included in Section "Selective Demolition."

1.03 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit to the Architect / Engineer and the Owner's Project Representative a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

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

2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

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

4. Indicate dates when cutting and patching is to be performed.

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

6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.

7. Approval by the Architect / Engineer or the Owner to proceed with cutting and patching does not waive the Architect / Engineer or the Owner's right to later require complete removal and replacement of a part of the Work found to be satisfactory.

1.04 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching proposal before cutting and patching any of the following structural elements, as they may appear as new or existing work:

a. Foundation construction

b. Bearing and retaining walls

c. Structural concrete

d. Structural steel

e. Lintels

f. Timber and primary wood framing

g. Structural decking

h. Stair system

i. Miscellaneous structural metals

j. Exterior curtain wall construction

k. Equipment supports

l. Piping, ductwork, vessels and equipment

m. Structural systems of special construction

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems, as they may appear as new or existing work:

a. Shoring, bracing, and sheeting

b. Primary operational systems and equipment

c. Air or smoke barriers

d. Water, moisture, or vapor barriers

e. Membranes and flashings

f. Fire protection systems

g. Noise and vibration control elements and systems

h. Control systems

i. Communication systems

j. Conveying systems

k. Electrical wiring systems

l. Special construction

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

2. If possible retain the original installer or fabricator to cut and patch the following categories of exposed Work, as they may appear as new or existing, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:

a. Processed concrete finishes

b. Stonework and stone masonry

c. Ornamental metal

d. Matched-veneer woodwork

e. Preformed metal panels

f. Window wall system

g. Stucco and ornamental plaster

h. Acoustical ceilings

i. Terrazzo

j. Finished wood flooring

k. Fluid-applied flooring

l. Carpeting

m. Aggregate wall coating

n. Wall covering

o. Swimming pool finishes

p. HVAC enclosures, cabinets or covers

PART 2 – PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 – EXECUTION

3.01 INSPECTION

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

1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding. Maintain minutes of the meeting and submit to Architect / Engineer and Owner for record.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workman to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

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

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

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Cut though concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.

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

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

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

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

2. 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.

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

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

3.04 CLEANING

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

END OF SECTION 01045

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Submittal Procedures

B. Construction progress schedules

C. Proposed Products list

D. Product Data

E. Shop Drawings

F. Samples

G. Design data

H. Test reports

I. Certificates

J. Manufacturer's instructions

1.2 RELATED SECTIONS

A. Section 01010 – Scope of Work

B. Section 01400– Quality Control

C. Section 01700 – Project Closeout: Contract Closeout Procedures

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with AIA Form G810 or ARCHITECT accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

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

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to CDA Architects at 305 Leon St. El Paso, Texas, 79902. Coordinate submission of related items.

F. For each submittal for review, allow 7 days excluding delivery time to and from the contractor.

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

H. Provide space for Contractor and Architect review stamps.

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

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

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

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in accordance with the General Conditions.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a computer generated horizontal bar chart with separate lines for each major portion of Work or operation, identifying the first workday of each week.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Submit the number of copies, which the Contractor requires, plus two copies, which will be retained by the Architect.

B. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturer's standard data to provide information unique to this project.

C. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 – CONTRACT CLOSEOUT.

D. Contractor shall submit the herbicide product to the ARCHITECT for review and approval by the SISD.

1.7 SHOP DRAWINGS

A. Submit the number of opaque reproductions, which Contractor requires, plus two copies which will be retained by the Architect.

B. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

1.8 SAMPLES

A. Samples For Review:

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

2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

B. Samples for Selection:

1. Submit to Architect for aesthetic, color, or finish selection.

2. Submit samples of finishes from the full range of manufacturer's standard colors, textures, and patterns for Architect selection.

3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 – CONTRACT CLOSEOUT.

C. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit the number of samples specified in individual specification sections; one of which will be retained by Architect.

F. Reviewed samples, which may be used in the Work are indicated in individual specification sections.

G. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.9 TEST REPORTS

A. Submit test reports to the Architect for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Architect, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Architect for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

END OF SECTION

PART 1 – GENERAL

1.01 SCOPE

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for quality control services.

B. Quality Control Services included inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect/Engineer.

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

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities.
2. Inspections, tests, and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for the Contractor to provide quality control services required by the Architect/Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide inspections, tests, and similar quality control services, specified in individual Specification Sections and/or required by governing authorities for materials to be incorporated into the Work. Costs for these services shall be included in the Contract Sum.

1. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
2. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

3. Re-testing: The Contractor is responsible for re-testing where results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

    a. Cost of re-testing construction revised or replaced by Contractor is the Contractor's responsibility, where required tests were performed on original construction.

4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance on operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:

    a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
    b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
    c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
    d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
    e. Security and protection of samples and test equipment at the Project Site.

B. Owner Responsibilities: The Owner will provide inspections, tests, and similar field quality control services for materials, products and systems during or after placement in the Work. Costs for these services are not included in the Contract Sum.

1. The Owner will employ and pay for the services of an independent agency, testing laboratory, or other qualified firm to perform services which are the Owner's responsibility.

C. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect/Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect/Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

D. Coordination: The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.04 SUBMITTALS

A. The independent testing agency shall submit a certified written report of each inspection, test, or similar service, to the Architect/Engineer, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test, or similar service through the Contractor, in duplicate.

1. Submit two additional copies of each written report directly to the Owner.
2. Report Data: Written reports of each inspection, test, or similar service shall include, but not be limited to:

    a. Date of Issue
    b. Project Title and Number
    c. Name, address, and telephone number of testing agency
    d. Dates and locations of samples and tests or inspections
    e. Names of individuals making the inspection or test
    f. Designation of the Work and test method
    g. Identification of product and Specification Section
    h. Complete inspection or test data
    i. Test results and an interpretation of test results
    j. Ambient conditions at the time of sample-taking and testing
    k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Documents requirements
    l. Name and signature of laboratory inspector
    m. Recommendations on re-testing

1.05 QUALITY ASSURANCE

A. Qualification for service agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching".

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 01400

A. RELATED DOCUMENTS: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

B. COORDINATION OF WORK: The Contractor (at his expense) is responsible for contracting the utility company for the appropriate utility line in question for instructions regarding the disposition of any utility line, under any of the following circumstances:

1. ACTIVE UTILITIES shown on the drawings shall (at no cost to Owner) be adequately protected from damage and removed or relocated as required, and as instructed by the appropriate utility company.

2. ACTIVE UTILITIES NOT SHOWN on the drawings and encountered at the site shall be protected, removed, or relocated as directed in accordance with written instructions from the Owner and all additional work will be adjusted by modification to the Contract.

3. INACTIVE OR ABANDONED UTILITIES encountered during grading or construction shall be removed, capped, or plugged. In the absence of specific requirements, all work under this heading shall be done in accordance to local codes, regulations, or instruction from the appropriate utility company. Contract will be adjusted.

4. INTERRUPTION OF UTILITIES: The Contractor shall notify the Owner should he need to interrupt any of the utilities. Prior notification shall be 24 hours.

5. DAMAGE TO UTILITIES: The Contractor shall be responsible for the replacement of any damaged utility lines above or below the ground, at no cost to Owner. The rules, regulations, codes, and ordinances shall govern any work done under this heading.

C. CAUTION: IN ALL CASES, CALL THE UTILITY COMPANY BEFORE YOU TOUCH THE LINE.

END OF SECTION 01445

SCOPE

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

GENERAL

A. Temporary barricades, screens, utilities and facilities shall be furnished, relocated and removed as the work progresses in order to maintain continuous progress in construction and a clean site.

B. Provide ground runners or pallets and weatherproof covers for all materials and equipment stored at the site.

UTILITIES FOR CONSTRUCTION

A. General: Contractor shall provide water, gas, electric lighting and power, sewage, and services required until the construction is completed and accepted by the Owner. Prevent leaks, short circuits, etc.; any such defects which develop shall be promptly repaired, at no cost to Owner. Provide adequate lighting for construction.

B. Toilet Facilities: The Contractor shall provide and maintain toilets for the use by workmen employed at the site.

C. Temporary Heat: Where and when heat is required in the construction, provide such heat from a temporary heat source.

D. Temporary Telephone: The Contractor shall provide telephone service in his construction office, (not a pay station) and pay regular service charges for same. Telephone toll charges shall be paid by the using party.

FIELD OFFICES

A. Provide weather-tight temporary offices (heated, cooled, and illuminated) for the use of the Contractor, Owner, and Architect for the duration of the job.

JOB SIGNS

A. Provide job signs as directed by the Architect.

END OF SECTION 01500

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Controls: Barriers and fencing, protection of the Work, water control, dust control, erosion and sediment control, noise control, and pollution control.

1.2 RELATED SECTIONS

A. Section 011010 – Scope of Work

B. Section 011039 – Coordination and Meetings

C. Section 01500 - Temporary Facilities

1.3 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walk-ways required by governing authorities for public rights-of-way.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non – owned vehicular traffic, stored materials, site and structures from damage.

1.4 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular gates with locks.

C. Chain Link fence shall prevent unauthorized persons entering the construction site.

1.5 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water.

B. Protect site from pudding or running water. Provide water barriers as required to protect site from soil erosion.

1.6 SECURITY

A. Coordinate with Owner's security program.

1.7 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.8 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.9 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.10 POLLUTION CONTROL

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

END OF SECTION 01560

PART 1 – GENERAL

1.01 SCOPE

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions and Division 1 Specification sections, apply to the work in this section.

1.02 SUMMARY

A. This section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," equipment," "system," and terms of similar intent.

    a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.04 SUBMITTALS

A. Product List Schedule: A list of products for this project is required. Prepare a schedule in tabular form showing each product. Include the manufacturer's name and proprietary product names for each item listed.

1.05 QUALITY

A. Source Limitations: To the fullest extend possible, provide products of the same kind, from a single source.

1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect for a determination of the most important product qualities before proceeding.

B. Compatibility of Options. When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operate equipment. Locate on an easily accessible surface which inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

   a. Name of product and manufacturer.
   b. Model and serial number.
   c. Capacity.
   d. Speed.
   e. Ratings.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instruction for handling, storing, unpacking, protecting and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instruction.

PART 2 – PRODUCTS

2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards, connections and other devices and details needed for a complete installation and for the intended use and effect.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations; include the following:

1. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand of trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
2. Performance Specification Requirements: Where Specifications compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
3. Compliance with Standards, Codes and Regulations: Where the Specification require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General, Supplementary and Special Conditions and other Division 1 Specification sections, apply to this section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for handling request for substitutions made after award of the Contract.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."

C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.

D. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment."

1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Request for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered request for "substitutions." The following are not considered substitutions:

1. Substitutions requested by bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this section for substitutions.

2. Revisions to Contract Documents requested by the Owner or Architect / Engineer.

3. Specified options of products and construction methods included in Contract Documents.

4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.04 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect / Engineer and the Owner.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.

2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

    a. Product Data, including Drawings and desription of products, fabrication and installation procedures.

    b. Samples, where applicable or requested.

    c. A detailed comparison of significant qualities of the proposed substitution with those of the Work Specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.

    d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.

    e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution on overall Contract Time.

    f. Cost Information, including a proposal of net change, if any in the Contract Sum.

    g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.

3. Architect / Engineer's Action: Within one week of receipt of the request for substitution, the Architect / Engineer will request additional information or documentation necessary for evaluation of the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Architect / Engineer, with the Owner's concurrence will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 – PRODUCTS

2.01 SUBSTITUTIONS

A. Conditions: The Contractor's substitution request will be received and considered by the Architect / Engineer when one or more of the following conditions are satisfied, as determined by the Architect / Engineer and the Owner; otherwise requests will be returned without action except to record noncompliance with these requirements.

    1. Extensive revisions to Contract Documents are not required.

2. Proposed changes are in keeping with the general intent of Contract Documents.

3. The request is timely, fully documented and properly submitted.

4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.

5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to purse the Work promptly or coordinate activities properly.

6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect / Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the compatibility.

9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.

10. the specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

B. The Contractor's submittal and Architect / Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01631

PART 1 – GENERAL

1.01 SCOPE

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

B. If any article or directions contained within this division conflict with PARTS I, II, III, and IV of these specifications, PARTS I, II, III, and IV shall govern.

1.02 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
2. General closeout requirements are included in Section "Project Closeout".
3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual sections of Divisions 2 through 16.
4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.

1. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work, regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

E. The Owner reserves the right to refuse to accept Work for the project where a special warranty, certification, or similar commitment is required on such Work or part of Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.04 SUBMITTALS

A. Submit written warranties to the owner's construction department. If the certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the work, or a designated portion of the work, submit written warranties upon request of the owner's construction department.

1. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the owner's construction department.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier, or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval before final execution.

1. Refer to individual Sections of Divisions 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

C. Form of Submittal: At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly, sequenced based on the Table of Contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½" by 11" paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
2. Identify each binder on the front and the spine with the typed or printed title "Warranties and Bonds", the project title or name, and the name of the Contractor.
3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION 01700

PART 1 – GENERAL

1.01 SCOPE

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Operating and Maintenance manual submittal.
2. Submittal of warranties.
3. Final Cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate sections in Divisions 2 through 16.

1.03 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Owner reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop drawings. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with a red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
2. Mark new information that is important to the Owner, but was not shown on Contract Drawings and Shop Drawings.
3. Note related Change Order numbers where applicable.
4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set.
5. Transfer all documented changes to a set of mylar reproducible drawings for submission to the Owner as final as-built drawings.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in

comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options, and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the Work, submit record Specifications to the construction department for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual work performed in comparison with information submitted. Include variations in products delivered to site, and from manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

1. Upon completion of mark-up, submit complete set of record Product Data to the Owner.

E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted samples that have been maintained during progress of the work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for the requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Owner.

G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency Instructions
2. Spare Parts List
3. Copies of warranties
4. Wiring diagrams
5. Recommended "turn-around" cycles
6. Inspection procedures
7. Shop Drawings and Product Data
8. Fixture lamping schedule

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance Manuals
2. Record documents
3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties and Bonds
12. Maintenance Agreements and similar continuing commitments

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up
2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective energy utilization.

3.02 FINAL CLEANING

A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations:

   a. Remove labels that are not permanent labels.
   b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are

noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean.
d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication ad other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
e. Clean the site, including landscaping development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose as directed and approved by the County of El Paso & City Code.

1. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01740

PART 1 – GENERAL

1.01 SCOPE:

A. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SECTION INCLUDES:

A. Excavating and backfilling for site structures, slabs on grade, rock walls, retaining walls, and building foundations.

1.03 REFERENCES

A. American National Standards Institute (ANSI)/ American Society for Testing and Materials (ASTM).

1. ANSI/ASTM C136 – Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ANSI/ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10 LB (4.54-Kg) Rammer and 18 inch (457 mm) drop.
3. ASTM D2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System).
4. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate Mixtures in Place by Nuclear Methods (Shallow Depth).
5. ASTM D3017 – Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
6. ASTM D4318 – Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.04 DEFINITIONS

A. Satisfactory Materials: Materials classified in accordance with ASTM D2487 as SM, SC, GW, GP, and SW and free of roots and other organic matter, trash, debris, frozen materials and stones larger than 6 inches in any dimension are satisfactory.

B. Unsatisfactory Materials: Materials classified in accordance with ASTM D 2487 as MH, CH, OL, OH, ML, CL, and PT, or have a Plasticity Index greater than 12 are unsatisfactory. In addition, materials which include man-made fills, refuse or stabilized backfills from previous construction are unsatisfactory.

C. Compaction: Degree of Compaction is a percentage of the maximum density obtained by the test procedure described in ASTM D1557 and is abbreviated in this section as a percent of laboratory maximum density.

D. Topsoil: Material obtained from site excavations and/or off site sources suitable for use as topsoil is defined as friable loam reasonably roots, rocks larger than ½ inch, subsoil, debris, large weeds and foreign matter, with an acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and not more than 25% inorganic matter and conforming to ASTM D2487 Group Symbols OH, SM, and SL.

1. Materials conforming to the above description and excavated from the top 6 inches of the site soils may be stored for reuse as topsoil.

E. Subexcavation: Subexcavation consists of the removal of undesirable, unsatisfactory or loose soil materials within the "Building Area" or foundation limits beyond finished subgrade elevations or dimensions to stable materials or to a point or elevation defined on the drawings. The materials removed by the subexcavation process will be replaced with structural fill or other acceptable fill materials to the subgrade elevations defined on the drawings.

F. Unauthorized Excavation: Unauthorized excavation is defined as excavation of materials beyond the limits, dimensions, or depths defined on the drawings without specific permission from the Owner and Architect. Unauthorized excavation and any remedial work required will be corrected, under the direction of the Architect, by the Contractor, at no cost to the Owner.

G. Additional Excavation: Excavations beyond the elevations and dimensions defined by the Plans required by unsuitable soil materials and specifically authorized by the Owner and Architect. Additional excavation will be paid on a unit price basis under the conditions of the Contract relative to changes in this work.

H. Subgrade: The layer of native soil materials immediately below structural or other fills on which structures, pavements, or other improvements constructed or installed.

I. Structures: Buildings, foundations, slabs, curbs, or other man-made stationary improvements constructed or installed above or below ground surface.

1.05 SUBMITTALS:

A. Submit in accordance with Section 01300 – Submittals.

B. 5 days prior to beginning excavation and backfill operations:

1. Name and Location of source(s) for imported soils and aggregate materials.
2. Certified test reports and analysis certifying that the soils and aggregate materials proposed for use on the project conform to the specified requirements.
3. Imported materials to be supplied from the same source throughout the work. Change of source requires Architect's approval.

C. During grading operations (within 24 hours of field testing):

1. Certified test reports and analysis for all tests conducted in accordance with 3.6, Field Quality Control, this Section.

D. 10 days prior to Final Acceptance:

1. Accurately record, on a set of the construction plans, actual locations of all existing improvements, monuments, and utilities remaining, as well as any changes to locations, numbers, etc. to the new improvements, structures, etc., as may have been approved during construction.
2. Actual locations to be shown with horizontal dimensions, elevations, inverts and slope gradients.

1.06 REGULATORY REQUIREMENTS:

A. All work shall be conducted in accordance with applicable Local, State, and Federal laws and regulations.

B. Shoring, bracing, and trench safety for all excavations shall be in strict accordance with all Local, State, and U.S. Department of Labor Occupational Safety and Health Administration (OSHA) rules and regulations.

1.07 GEOTECHNICAL DATA:

A. Geotechnical Report, bore hole locations, and findings of subsurface materials is included in these specifications. The data contained in the Geotechnical Report was used for the design of the project, however, the Engineer makes no guarantee as to the accuracy of the data and analysis contained in the report.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Type S1 – Ordinary Fill: Imported or site excavated materials, graded, free of lumps, clods, or rocks larger than 6 inches in any dimension and conforming to the definition of "Satisfactory Materials" in 1.4.A.

B. Type S2 – Structural Fill: Imported or site excavated materials processed to conform to the following characteristics:

1. Angular crushed stone and durable particles of stone with approved binder materials graded to:

Sieve Designations	Percent by Weight Passing Sieves
1-½ inch	100
1 inch	70 to 95

¾ inch	55 to 85
No. 4	30 to 60
No. 40	10 to 25
No. 200	3 to 10

2. The final gradations decided on within the limits designated above will be uniformly graded from coarse to fine, and may not vary from the low limit on one sieve to the high limit on the high sieves or vise versa.
3. The portion of the base aggregate including any blended material passing the No. 40 sieve will have a liquid limit of not more than 35 and a P.I. of not more than 12 in accordance with ASTM D4318.

C. Type S4 – Topsoil: Imported or site excavated materials conforming to the definition of "Topsoil" in 1.4.E.

D. Type A1 – Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials and organic matter; graded in accordance with ANSI/ASTM C136 and ASTM D2487 Group Symbol SW, SP, SM, SC, and SL; within the following limits:

Sieve Size	Percent Passing
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0

E. Type A2 – Select Granular Fill: Well graded sand, gravel, crushed gravel, crushed stone, or crushed slag composed of hard durable particles; containing not more than 10 percent by weight of material passing a No. 200 mesh sieve and not less than 95 percent by weight passing the 1-inch sieve. Maximum allowable aggregate size of 1 ½ inches.

F. Type A4 – 1 ½ inch Washed Gravel: Natural stone; washed, free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136, ASTM D2487 Group Symbol GM, GC to the following limits: Maximum size 1 ½ inches.

2.02 BORROW MATERIAL:

Borrow locations inside the project boundary are allowed; only at the direction and location of the engineer, architect and owner.

PART 3 – EXECUTION

3.01 EXAMINATION:

A. Verify site conditions.

B. Verify that service benchmark and intended elevations for the Work are as indicated on the drawings.

C. Verify haul routes and materials and equipment storage areas.

3.02 PREPARATION:

A. Identify required lines, levels, contours, and datum.

1. Notify utility companies and coordinate verification of existing utilities locations.

B. Stake and flag locations of known utilities.

C. Coordinate with utility companies the removal or relocation of utility lines or facilities designated on the drawings.

D. Protect above and below grade utilities designated to remain.

E. Protect plants, lawns, and other features designated to remain as part of final landscaping.

F. Protect benchmarks, existing structures, fences, sidewalks, paving, curbs, and other improvements designated to remain from excavating equipment and vehicular traffic.

3.03 EXCAVATION:

A. After topsoil has been removed, excavation of every description within the grading limits of project shall be performed to lines and grades indicated, regardless of materials encountered.

B. All elevations, grades, and contours indicated on the drawings are finished grades unless specifically called out otherwise.

C. All unsatisfactory material, including any soil which is disturbed by the Contractor's operations or softened by exposure to weather and water, shall be removed and replaced to the extent necessary to restore the disturbed areas to their specified condition.

D. Hand trim excavation, remove loose matter.

E. Install shoring, bracing, and other safety structures as required by Trench Safety Plan.

F. Notify Engineer and utility companies of unexpected underground lines or structures.

G. Acceptable materials to be reused in other areas of the project may be stockpiled in designated locations to depths not to exceed 8 feet.

H. Protect stockpiled material from erosion.

I. Excavations shall be kept free of water during construction.

3.04 FILLING:

A. Remove all roots, brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish, and other unsatisfactory materials from areas to receive fill materials.

B. Existing slopes greater than four horizontal to one vertical which are to receive fill shall be plowed, stepped, or broken up in such a manner that the fill material will bond with the existing surface.

1. Prepared surfaces that are to receive fill will be wetted or dried, as required, to obtain specified moisture content and density.

C. Fills and embankments shall be constructed in the locations and to lines and grades indicated. Completed fill will conform to shapes indicated by typical sections and contours.

D. Place fill materials in continuous horizontal layers of 8 inch (200 mm) loose depth for the full width of the cross section and compact in accordance with Schedule at end of Section.

E. Maintain moisture content to within plus or minus 3 percent of optimum moisture content as determined by laboratory tests of the fill materials.

F. Do not backfill over porous, wet, frozen, or spongy subgrade surface.

G. Use placement methods that will not disturb or damage existing structures of other work.

1. Backfill adjacent to structures shall be place and uniformly compacted in such a manner as to prevent wedging action or eccentric loading upon or against the structures.

H. Finished graded surfaces of all areas of the project, including excavated and filled sections and adjacent to transition areas, shall be uniformly smooth-graded.

1. Slope grade away from buildings at minimum slope of ¼ inch per foot (2%) for minimum of 10 feet unless noted otherwise.

I. Placing Topsoil:

1. For areas designated to receive topsoil, the compacted subgrade soils shall be scarified to a depth of 2 inches (50mm) for bonding of topsoil with subgrade.
2. Topsoil shall then be evenly spread to a depth of 6 inches (150 mm) and graded to the elevations and slope shown.
3. Do not spread topsoil when frozen or excessively wet or dry.

J. Remove unacceptable materials from the site.

3.05 TOLERANCES:

A. Top Surface of Subgrade: Plus or minus 1/10 foot.

3.06 FIELD QUALITY CONTROL:

A. Field Inspection and Testing will be performed under provisions of Section 01400.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at the expense of the Contractor.

D. Field inspection and testing will be performed under provisions of the following schedules:

Material	Test Backfills and Subgrade Material	Minimum Sampling and Testing Frequency
S1, S2, & A2	Gradation	1 every 500 cy or 1 per day for quantities exceeding 25 cy.
	In-Place Density	1 every 500 sy but not less than 3 tests per compacted lift.
	Moisture-Density Relationship	1 prior to start of backfilling operations, 1 every 20 densities, and any time material type changes.

Subgrade	In-Place Density	1 every 500 sy of each type subgrade material
	Moisture-Density Relationship	1 for every 20 densities for each material
	Gradation	1 for every moisture-density

COMPACTION SCHEDULE

1. Exterior Slab-On Grade:
   a. Fill type S1 or S2, 8 inches thick, compacted to 95%.

2. Backfill Behind Abutments, Retaining Walls, and Headwalls:
   a. Fill type S1 to top of subgrade elevation, each lift, compact to 95%.

3. Fill to Correct Over-Excavation:
   a. Fill type S1 or S2 flush to required elevation, compact to 95%.

4. Fill Under Portland Cement and Asphaltic Concrete Pavements:
   a. Compact subgrade 12 inches deep to 95%.
   b. Fill type S1 or S2 to subgrade elevation, each lift, compacted to 95%.

5. Interior Slab-On-Grade:
   a. Fill type S1 or S2, 8 inch thick lifts, compacted to 95%.
   b. Cover with fill type A2, 2 inches thick, compacted to 95%.

6. Exterior Side of Foundation Walls, Behind Retaining Walls, and Over Granular Filter Material French Drains and Foundation Perimeter Drainage:
   a. Fill type S1, in 8 inch, loose depth, lifts to subgrade elevation, each lift compacted to 95%.

7. Planter Boxes:
   a. Fill type S1 to 6 inches below top of wall, lightly tamped.

3.07 PROTECTION:

A. Newly graded areas shall be protected from traffic and erosion. Any settlement or washing away that may occur from any cause prior to acceptance shall be repaired and grades reestablished to the required elevations and slopes.

END OF SECTION 02222

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Formwork for cast-in place concrete.
2. Shoring, bracing, and anchorage.
3. Architectural form liners.
4. Form accessories.
5. Form stripping.

B. Related Sections:
1. Section 03200 - Concrete Reinforcement.
2. Section 03300 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 318 - Building Code Requirements for Structural Concrete.

B. American Society of Mechanical Engineers:
1. ASME A17.1 - Safety Code for Elevators and Escalators.

1.3 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 318 to conform to[design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.4 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M, desiccant method.

1.5 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
1. Submit formwork, shoring, and reshoring shop drawings.
2. Indicate the following:
a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
b. Means of leakage prevention for concrete exposed to view in finished construction.
c. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
d. Vertical, horizontal and special loads in accordance with ACI 347, Section 2.2 and camber diagrams, when applicable.
e. Notes to formwork erector showing size and location of conduits and piping embedded in concrete in accordance with ACI 318, Section 6.3.

f. Procedure and schedule for removal of shores and installation and removal of reshores.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318.

B. For wood products furnished for work of this Section, comply with AF&PA.

C. Perform Work in accordance with State's standard.

1.7 QUALIFICATIONS

A. Design formwork under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

1.8 COORDINATION

A. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Form Materials: At discretion of Contractor.

B. Lumber Forms:
1. Application: Use for edge forms and unexposed finish concrete.
2. Boards: 6 inches or 8 inches in width, shiplapped or tongue and groove, "Standard" Grade Douglas Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber. Surface boards on four sides.

C. Plywood Forms:
1. Application: Use for exposed finish concrete.
2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
4. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick.

D. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

E. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

F. Pan Type: Steel of size and profile required.

G. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.

H. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings.

I. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.2 FORMWORK ACCESSORIES

A. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

B. Form Anchors and Hangers:
1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
3. Penetration of structural steel members is not permitted.

C. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture.

D. Corners: Chamfer; 3/4x3/4 inch size; maximum possible lengths.

E. Vapor Retarder: Where indicated on Drawings, 8 mil thick polyethylene sheet.

F. Bituminous Joint Filler: ASTM D1751.

G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

B. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

A. Earth Forms:
1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
2. Trim sides and bottom of earth forms.
3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
4. Form sides of footings where earth sloughs.
5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.

B. Formwork - General:

1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.

C. Forms for Smooth Finish Concrete:
1. Use steel, plywood or lined board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full size sheets of form lines and plywood wherever possible.
5. Tape joints to prevent protrusions in concrete.
6. Use care in forming and stripping wood forms to protect corners and edges.
7. Level and continue horizontal joints.
8. Keep wood forms wet until stripped.

D. Architectural Form Liners:
1. Erect architectural side of formwork first.
2. Attach form liner to forms before installing form ties.
3. Install form liners square, with joints and pattern aligned.
4. Seal form liner joints to prevent grout leaks.
5. Dress joints and edges to match form liner pattern and texture.

E. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.

F. Framing, Studding and Bracing:
1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Construct beam soffits of material minimum of 2 inches thick.
4. Distribute bracing loads over base area on which bracing is erected.
5. When placed on ground, protect against undermining, settlement or accidental impact.

G. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 318.

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

I. Obtain Architect/Engineer's approval before framing openings in structural members not indicated on Drawings.

J. Install void forms in accordance with manufacturer's recommendations.

3.3 APPLICATION - FORM RELEASE AGENT

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

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

C. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

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

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install water stops continuous without displacing reinforcement.

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

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

H. Form Ties:
1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
2. Place ties at least 1 inch away from finished surface of concrete.
3. Leave inner rods in concrete when forms are stripped.
4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

I. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

J. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true and sharp.

K. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.

2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Specification sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

L. Openings for Items Passing Through Concrete:
1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
2. Coordinate work to avoid cutting and patching of concrete after placement.
3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

M. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
2. Slope slabs to drain where required or as shown on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

N. Screed Supports:
1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
2. Staking through membrane is not be permitted.

O. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

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

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

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

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

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

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

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

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 318.

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

C. Camber slabs and beams 1/4 inch per 10 feet in accordance with ACI 318.

3.8 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

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

C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforcing bars.
2. Reinforcement accessories.

B. Related Sections:
1. Section 03100 - Concrete Forms and Accessories.
2. Section 03300 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 530.1 - Specifications for Masonry Structures.
4. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:
1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
8. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
9. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
10. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
11. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
12. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

C. American Welding Society:
1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
1. CRSI - Manual of Standard Practice.

2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.

C. Certificates: Submit AWS qualification certificate for welders employed on the Work.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

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

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice and ACI 318.

B. Prepare shop drawings in accordance with ACI SP-66.

C. Perform Work in accordance with State's standard.

1.5 QUALIFICATIONS

A. Welders: AWS qualified within previous 12 months.

1.6 COORDINATION

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

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, plain billet bars, uncoated finish.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

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

C. Epoxy Coating Patching Material: Type as recommended by coating manufacturer.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice AND ACI 318.

B. Form standard hooks for 90 degree bend, stirrup and tie hooks as indicated on Drawings.

C. Form reinforcement bends with minimum diameters in accordance with ACI 318.

D. Fabricate column reinforcement with offset bends at reinforcement splices.

E. Form ties and stirrups from the following:

F. Weld reinforcement in accordance with AWS D1.4.

G. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.4 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.

B. Make completed reinforcement available for inspection at manufacturer's factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
   1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
   1. Do not weld crossing reinforcement bars for assembly.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

E. Maintain concrete cover around reinforcement in accordance with ACI 318.

3.2 ERECTION TOLERANCES

A. Section 01400 - Quality Requirements: Tolerances.

B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch

Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.

C. Provide free access to Work and cooperate with appointed firm.

D. Reinforcement Inspection:
1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
2. Welding: Inspect welds in accordance with AWS D1.1.
3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
4. Weldability Inspection: Inspect for reinforcement weldability when formed from steel other than ASTM A706/A706M.
5. Continuous Weld Inspection: Inspect reinforcement as required by ACI 318.
6. Periodic Weld Inspection: Other welded connections.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Building frame members.
   2. Elevator shaft walls.
   3. Foundation walls.
   4. Slabs on grade.
   5. Control, expansion and contraction joint devices.

B. Related Sections:
   1. Section 03100 - Concrete Forms and Accessories: Formwork and accessories.
   2. Section 03200 - Concrete Reinforcement.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 308.1 - Standard Specification for Curing Concrete.
   5. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C33 - Standard Specification for Concrete Aggregates.
   3. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   4. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   7. ASTM C150 - Standard Specification for Portland Cement.
   8. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   9. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   12. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
   13. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
   14. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
   15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
   16. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
   17. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.

18. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
19. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
20. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
21. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
22. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
23. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
24. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
25. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
26. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
27. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
28. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
30. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
31. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
32. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
33. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96/E96M, desiccant method.

1.4 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on joint devices, attachment accessories , and admixtures.

C. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work.
      b. Air entrained concrete work.
   2. Identify mix ingredients and proportions, including admixtures.
   3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

E. Perform Work in accordance with State's standard.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.

B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.7 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I – Normal, Type IA - Air Entraining, Type II – Moderate, Type IIA - Air Entraining.

B. Normal Weight Aggregates: ASTM C33.
1. Coarse Aggregate Maximum Size: 1 inch In accordance with ACI 318.

C. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

A. Furnish materials in accordance with State's standards.

B. Air Entrainment: ASTM C260.

C. Chemical: ASTM C494/C494M.

1. [Type A - Water Reducing].
2. [Type B - Retarding].
3. [Type C - Accelerating].
4. [Type D - Water Reducing and Retarding].
5. [Type E - Water Reducing and Accelerating].
6. [Type F - Water Reducing, High Range].

7. [Type G - Water Reducing, High Range and Retarding].

D. Fly Ash.

E. Silica Fume: ASTM C1240.

F. Slag: ASTM C989; Grade 80; ground granulated blast furnace slag.

G. Plasticizing: ASTM C1017/C1017M Type I, plasticizing.

2.3 ACCESSORIES

A. Bonding Agent: Polymer resin emulsion.

B. Vapor Retarder: ASTM E1745 Class A; 6 mil thick clear polyethylene film; type recommended for below grade application. Furnish joint tape recommended by manufacturer.

C. Non-Shrink Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days manufactured by .

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 3/4 inch thick; tongue and groove profile.

B. Sealant and Primer: type, as specified in Section 07900.

2.5 CONCRETE MIX

A. Select proportions for concrete in accordance with ACI 318 trial mixtures or field experience or both.

B. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.
   1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
   2. Do not use calcium chloride nor admixtures containing calcium chloride.
   3. Use set retarding admixtures during hot weather.
   4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing.
   5. For concrete exposed to deicing chemicals, limit fly ash, pozzolans, silica fume, and slag content as required by code.

C. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

D. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

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

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 318.

B. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by adhesive applied between overlapping edges and ends.

E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

F. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

G. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.

H. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

I. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.

J. Install joint covers in longest practical length, when adjacent construction activity is complete.

K. Deposit concrete at final position. Prevent segregation of mix.

L. Place concrete in continuous operation for each panel or section determined by predetermined joints.

M. Consolidate concrete.

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

O. Place concrete continuously between predetermined expansion, control, and construction joints.

P. Do not interrupt successive placement; do not permit cold joints to occur.

Q. Place floor slabs in saw cut pattern indicated.

R. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into ¼ depth of slab thickness.

S. Screed floors level, maintaining surface flatness of F_f of 20.

3.4 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, [roughen substrate concrete surface and] remove deleterious material. Broom and vacuum clean.

B. Place required dividers and other items to be cast in.

C. Apply bonding agent to substrate.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   1. Protect concrete footings from freezing for minimum 5 days.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure floor surfaces in accordance with ACI 318.

D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.6 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

E. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.
   3. Sample concrete and make one set of three cylinders for every 75 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
   5. Make one additional cylinder during cold weather concreting, and field cure.

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M.
   2. Air Content Test Method: [ASTM C173/C173M] [ASTM C231].
   3. Temperature Test Method: ASTM C1064/C1064M.
   4. Measure slump and temperature for each compressive strength concrete sample.
   5. Measure air content in air entrained concrete for each compressive strength concrete sample.

H. Cylinder Compressive Strength Testing:
   1. Test Method: ASTM C39/C39M.
   2. Test Acceptance: In accordance with ACI 318.
   3. Test one cylinder at 7 days.
   4. Test two cylinders at 28 days.
   5. Dispose remaining cylinders when testing is not required.

I. Core Compressive Strength Testing:
   1. Sampling and Testing Procedures: ASTM C42/C42M.
   2. Test Acceptance: In accordance with ACI 318.

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

3.7 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections in accordance with ACI 318.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

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

3.9 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Foundation Walls: 3,000 psi 28 day concrete, form finish with honeycomb filled surface.

B. Underside of Supported Floors and Structure Exposed to View: 4,000 psi 28 day concrete, sack rubbed finish.

C. Exposed Portico Structure: 4,000 psi 28 day concrete, air entrained, smooth stone rubbed finish.

3.10 SCHEDULE - JOINT FILLERS

A. Exterior Retaining Wall at Loading Dock: Joint filler Type F recessed 3/8 inch with sealant cover.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes mortar [and grout] for masonry.

1.2 SUBMITTALS

A. Samples: Submit two 2X2 inch in size illustrating mortar color and color range.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 Building Code Requirements for Masonry Structures and ACI 530.1 Specification for Masonry Structures.

B. Perform Work in accordance with State's standard.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

B. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph .

PART 2 PRODUCTS

2.1 COMPONENTS

A. Masonry Cement: ASTM C91, Type M or S gray color.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C206, Type S.

D. Grout Aggregate: ASTM C404, fine.

E. Water: Clean and potable.

F. Bonding Agent: Epoxy type.

G. Calcium chloride is not permitted.

2.2 MIXES

A. Mortar Mixes:Mortar for Structural Masonry: ASTM C270, Type M or S using Proportion specification Property specification.

B. Mortar Mixing:
   1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

C. Grout Mixes:
   1. Bond Beams and Lintels: mixed in accordance with ASTM C476 Fine grout.

D. Grout Mixing:
   1. Mix grout in accordance with ASTM C94/C94M.
   2. Do not use anti-freeze compounds to lower freezing point of grout.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install mortar and grout in accordance with ACI 530.1 Specification for Masonry Structures.

3.2 FIELD QUALITY CONTROL

A. Testing Frequency: One set of specified tests for every 5,000 sf of completed wall area.

B. Testing of Mortar Mix: In accordance with ASTM C780.

C. Testing of Grout Mix: In accordance with ASTM C1019.

3.3 SCHEDULES

A. Exterior Cavity Wall: Brick masonry with Type S mortar with Type N pointing mortar.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes concrete masonry units; reinforcement, anchorage, and accessories.

B. Related Sections:
1. Section 04065 – Masonry Mortar and Grouting.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 530 - Building Code Requirements for Masonry Structures.
2. ACI 530.1 - Specifications for Masonry Structures.

B. ASTM International:
1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
5. ASTM A580/A580M - Standard Specification for Stainless Steel Wire.
6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
9. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
10. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
11. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
12. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
13. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
14. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.

1.3 PERFORMANCE REQUIREMENTS

A. Concrete Masonry Compressive Strength f'm: 1,500 psi; determined by unit strength method.

1.4 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal requirements.

B. Shop Drawings: Indicate bars sizes, spacings, locations, reinforcement quantities, bending and cutting schedules, supporting and spacing devices for reinforcement, and accessories.

C. Product Data:
   1. Submit data for masonry units and fabricated wire reinforcement anchors and other accessories .

D. Design Data: Indicate required mortar strength, specified compressive strength of masonry, masonry unit assembly strength in each plane, and supportive test data.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

B. Perform Work in accordance with State's standard.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum three years [documented] experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements.

B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

1.9 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate masonry work with installation of window and door anchors.

PART 2 PRODUCTS

2.1 REINFORCED UNIT MASONRY ASSEMBLIES

A. Furnish materials in accordance with State's standards.

2.2 COMPONENTS

A. Hollow Load Bearing Concrete Masonry Units CMU: ASTM C90; normal weight.

2.3 ACCESSORIES

A. Single Wythe Joint Reinforcement: ASTM A951/A951M; truss type; steel 0.148 inch diameter side rods with 0.148 inch diameter cross ties mill galvanized.

B. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, plain billet bars, uncoated finish.

C. Preformed Control Joints: Neoprene material. Furnish with corner and tee accessories, heat fused joints.

D. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding.

2.4 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.

B. Test brick efflorescence in accordance with ASTM C67. Brick rated greater than "slightly effloresced" is not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify field conditions are acceptable and are ready to receive work.

C. Verify items provided by other sections of work are properly sized and located.

D. Verify built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

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

C. Wet clay and shale brick before laying when initial rate of absorption is greater than 30 grams when tested in accordance with ASTM C67.

3.3 INSTALLATION

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

B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.

C. Coursing of Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Placing And Bonding:

   1. Lay hollow masonry units with face shell bedding on head and bed joints.
   2. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
   3. Remove excess mortar as Work progresses.

E. Joint Reinforcement And Anchorage:
   1. Install horizontal joint reinforcement 16 inches oc.
   2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 24 inches each side of opening.
   3. Place joint reinforcement continuous in first joint below top of walls.
   4. Lap joint reinforcement ends minimum 6 inches.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

F. Masonry Flashings:
   1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and turn down on outside face to form drip.
   2. Turn flashing, fold, and seal at corners, bends, and interruptions.

G. Lintels:
   1. Install loose steel lintels over openings.
   2. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled or indicated.
   3. Do not splice reinforcing bars.
   4. Support and secure reinforcing bars from displacement.
   5. Place and consolidate grout fill without displacing reinforcing.
   6. [Allow masonry lintels to attain specified strength before removing temporary

H. Grouted Components:
   1. Reinforce bond beam with 2, No. 5 bars.
   2. Lap splices bar diameters required by code.
   3. Support and secure reinforcing bars from displacement.
   4. Place and consolidate grout fill without displacing reinforcing.
   5. At bearing locations, fill masonry cores with grout for minimum 24 inches either side of opening.

I. Reinforced Masonry:
   1. Lay masonry units with cells vertically aligned clear of mortar and unobstructed.
   2. Place reinforcing, reinforcement bars, and grout as indicated on Drawings.
   3. Splice reinforcement in accordance with Section 03200.
   4. Support and secure reinforcement from displacement.
   5. Place and consolidate grout fill without displacing reinforcing.
   6. Place grout in accordance with ACI 530.1 Specification for Masonry Structures.

J. Control And Expansion Joints:

1. Install control and expansion joints at the following maximum spacings, unless otherwise indicated on Drawings:
   a. Exterior Walls: 20 feet on center and within 24 inches on one side of each interior and exterior corner.
   b. Interior Walls: 30 feet on center.
   c. At changes in wall height.
2. Do not continue horizontal joint reinforcement through control and expansion joints.
3. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
4. Size control joint in accordance with Section 07900 for sealant performance.
5. Form expansion joint by omitting mortar and cutting unit to form open space.

K. Built-In Work:
1. As work progresses, install built-in metal door and glazed plates, embeds, and other items to be built-in the work and furnished by other sections.
2. Install built-in items plumb and level.
3. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
4. Do not build in materials subject to deterioration.

L. Cutting And Fitting:
1. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.4 ERECTION TOLERANCES

A. Section 01400 - Quality Requirements: Tolerances.

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

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

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

H. Maximum Variation for Steel Reinforcement:
1. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.
2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
3. Plus or minus 1 inch when distance is between 8 and 24 inches.
4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
5. Plus or minus 2 inches from location along face of wall.

3.5 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Concrete Masonry Units: Test each type in accordance with ASTM C140.

3.6 CLEANING

A. Section 01700 - Execution Requirements: Final cleaning.

B. Remove excess mortar and mortar smears as work progresses.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.7 PROTECTION OF FINISHED WORK

A. Section 01700 - Execution Requirements: Requirements for protecting finished Work.

B. Protect exposed external corners subject to damage.

C. Protect base of walls from mud and mortar splatter.

D. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

E. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

3.8 SCHEDULES

A. Interior Fire Walls: Single wythe reinforced concrete masonry units, 8 inch nominal thickness, to two hour fire assembly rating.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural pipe.
5. Structural plates [and bars].
6. Floor plates.
7. Bolts, connectors, and anchors.
8. Grout.

1.2 SUBMITTALS

A. Shop Drawings: Indicate sizes, spacing, and locations of structural members, openings, connections, and welded connections.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
1. Structural Steel: AISC 360.
2. Architecturally Exposed Structural Steel: AISC 303, Section 10.
3. High Strength Bolted Connections: RCSC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.
4. Steel Cable Structures: ASCE 19.

B. Perform Work in accordance with State's standard.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

A. Structural W-Shapes: ASTM A992/A992M.

B. Channels and Angles: ASTM A36/A36M.

C. Square and Rectangular Hollow Structural Sections: ASTM A500/A500M, Grade B.

D. Structural Plates: ASTM A36/A36M.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts: Heavy hex, structural type.
1. ASTM A325; Type 1, plain, or Type 3, plain.
2.

B. Nuts: ASTM A563 heavy hex type.
1. Finish: Plain.

C. Washers: ASTM F436 ; Type 1, circular.
   1. Finish: Plain.

D. Threaded Rods: ASTM A36/A36M.
   1. Finish: Unfinished.

2.3 WELDING MATERIALS

A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 FABRICATION

A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

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

2.5 FINISHES

A. Prepare structural component surfaces in accordance with SSPC SP 3.

B. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication.

C. Galvanizing for Bolts, Connectors, and Anchors:
   1. Hot-Dipped Galvanizing:
      a. Bolts, Nuts, and Washers: ASTM F2329.
      b. Connectors and Anchors: ASTM A153/A153M.
   2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.6 ACCESSORIES

A. Shop Primer: SSPC Paint 15.

B. Touch-Up Primer: Match shop primer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify bearing surfaces are at correct elevation.

B. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

B. Field weld components and shear connectors indicated on Drawings.

C. Do not field cut or alter structural members without approval of Architect/Engineer.

D. After erection, touch up welds and abrasions to match shop finishes.

3.4 FIELD QUALITY CONTROL

A. Bolted Connections: Inspect in accordance with AISC 303.
   1. Visually inspect all bolted connections.
   2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.

B. Welding:
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Visually inspect all welds.
   3. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.

C. Correct defective bolted connections and welds.

END OF SECTION

PART 1 - GENERAL

PART 1 - GENERAL

SCOPE: Furnish and install the rough carpentry system, complete.

RELATED DOCUMENTS: The conditions of the contract, including General Conditions and General Requirements, apply to this section.

QUALITY ASSURANCE:

A. Lumber grading rules and wood specified to be in conformance with PS 20.

B. Grading rules of the following associations apply to materials furnished under this section:

1. West Coat Lumber Inspection Bureau (WCLIB).
2. Western Wood Products Association (WWPA).

C. Plywood Grading Rules:

1. Softwood Plywood-Construction and Industrial: PS-1.

D. Grade Marks:

1. Identify lumber and plywood by official grade mark.
2. Lumber:
   a. Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded were applicable, and condition of seasoning at time of manufacture.
   b. S-GRN: Unseasoned
   c. S-DRY: Maximum 19% moisture content
   d. MS-15 or KD: Maximum of 15% moisture content.
3. Softwood Plywood:
   a. Conforming to PS-1.

E. Testing:

1. ASTM E-84, maximum 25 flame spread rating.

F. Requirements of Regulatory Agencies:

1. Fire hazard classification: Underwriters Laboratories, Inc., for treated lumber and plywood.
2. Preservation treated lumber and plywood: American Wood Preservers Bureau, Quality Mark.
3. Pressure treated material: American Wood Preservers Bureau Standards.
4. Working stresses: Softwood Lumber, NATIONAL DESIGN SPECIFICATIONS, National Forest Products Association.

G. References Standards:

1. American Wood Preservers Bureau (AWPB).
   a. AWPB LP-2, Standard for Softwood Lumber, Timber and Plywood, Pressure Treated with Water-borne Preservatives for above ground use.

2. National Forest Products Association (NFPA):
   a. National Design Specifications for Wood Construction. 1982.
      1. Design Values for Wood Construction, July 1982.
      2. Working Stresses for Joists and Rafters.
      3. Wood Structural Design Data.
3. Product Standards (PS):
   a. PS 1-83, Construction and Industrial Plywood.
   b. PS 20-70, American Softwood Lumber Standard.
4. Western Wood Products Association (WWPA).
   a. Standard Grading Rules for Western Lumber.
5. A.I.T.C.

SUBMITTALS

A. Certification:
   1. Preservative treated wood: Submit certification for water-borne preservative that moisture content was reduced to 19 & maximum, after treatment.

PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Immediately upon delivery to job site, place materials in area protected from weather.

B. Store materials a minimum of 6 inches, above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation or ventilation.

C. Do not store seasoned materials in wet or damp portions of building.

D. Protect sheet materials from corner braking and damaging surfaces, while unloading.

COMPLIANCE WITH STANDARD AND INDUSTRY SPECIFICATIONS:

A. Any material or operation specified by reference to the published specifications of a manufacturer, the American Society for Testing and Materials (ASTM) or other published standard, shall comply with the requirements of the standard listed. In case of a conflict between the referenced specification and the project specification, the one having the more stringent requirements shall govern.

B. When compliance with such specifications is specified for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator, certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

PART II - PRODUCTS

MATERIALS

A. Lumber:

1. Dimensions:
   a. Specified lumber dimensions are nominal
   b. Actual dimensions to conform to SP-20
2. Surfacing: Surface four sides (S4S), unless specified otherwise
3. End jointed lumber:
   a. Structural purposes interchangeable with solid sawn lumber.

B. Plywood:

1. Exterior or graded plywood where edge or surface is permanently exposed to weather.
2. Roof Sheathing:
   a. Grade: C-C Ext., Structural I C-C Ext. Structural II C-C Ext.
   b. Identification Index: 32/16, 42/20: 5/8" thickness

C. Building paper:

1. Asphalt-saturated felt: ASTM D 226, #15 nonperforated.

D. Preservative Treated Wood Products:

1. Water-borne salt preservatives for painted, stained, or exposed natural wood products:
   a. AWPB LP-2, above ground application
   b. Lumber redried to maximum moisture content of 19%, stamped "DRY"
2. Untreated lumber: All heartwood grades of Western Red Cedar or Redwood.

E. Rough Hardware:

1. Nails and staples: FS FF-N-106, steel wire, common nails.
2. Ply clips: Extruded 6063-T6 aluminum alloy: Simpson "PSC", sizes 5/8.

PART III - EXECUTION

INSPECTION

A. Verify that surfaces to receive rough carpentry are prepared to required grades and dimensions.

B. Plumb & true-up the framing after initial installation, but before installation of wall board paneling or sheathing. The Contractor is responsible for a framing system that is plumb & true to line everywhere.

C. Provide bracing, shoring & miscellaneous work as required.

INSTALLATION

A. Roof Sheathing:

1. Plywood sheathing:

   a. Install plywood with face grain perpendicular to supports and with panel continuous over two or more spans. Panel end joints shall occur over framing. Stagger end joints of adjacent panels by one half length of the panels.

   b. Allow minimum space 1/16", between end joints and 1/8", at edge joints for expansion and contraction of panels.

   c. Support edge joints by use of solid lumber locking.

   d. Nail 6", o.c., along panel edges and 12", o.c., at intermediate supports.

   e. Nail 6", o.c., at all supports, for support spaced 4 ft., o.c.

   f. Use 6d common, smooth, ring-shank, or spiral-thread shank nails for panels 1/2", thick or less and 8d common for greater thickness, except when panels are 1 1/8" or 1 1/4", use 8d ring-shank or 10d common.

B. Preservative-Treated Wood Products:

1. Provide preservative-treated wood for all framing, blocking, furring, nailing strips built into exterior masonry or concrete walls, wood in contact with concrete and in conjunction with gravel stops, gutters, and built-up roofing.

2. Re-dry and clean lumber, after treatment, to minimum moisture content of 19% stamped "DRY".

3. Apply two brush coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber.

PROTECTION

A. Protect wood decking with protective waterproof covering until roofing has been installed.

B. Protect other rough carpentry as required.

END SECTION 06100

SECTION 07220 – ROOF DECK AND INSULATION

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Section includes roof insulation over the properly prepared deck substrate.

B. Related Sections:

1. Section 07600 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. Cast Iron Soil Pipe Institute, Washington, D.C. (CISPI)

C. Factory Mutual Research (FM):
1. Roof Assembly Classifications.

D. National Roofing Contractors Association (NRCA):
1. Roofing and Waterproofing Manual.

E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

F. Steel Deck Institute, St. Louis, Missouri (SDI)

G. Southern Pine Inspection Bureau, Pensacola, Florida (SPIB)

H. Insulation Board, Polyisocyanurate (FS HH-I-1972)

I. Insulation Board, Thermal (Fiberboard) (FS LLL-1-535B)

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Division 01 Section Submittal Procedures 01300.

B. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.

C. Certification

1. Submit roof manufacturer's certification that insulation, insulation fasteners and fastener plates furnished are acceptable to roof manufacturer in accordance with FM 4470, Class 1.

2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.5 QUALITY ASSURANCE

A. Fire Classification, ASTM E-108.

B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Class 1 for external fire and meets local or nationally recognized building codes.

C. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM 1-90.

D. Pre-installation Meeting: Refer to Division 07 roofing specifications for pre-installation meeting requirements.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.

C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).

D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis of Design: Performances specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

B. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.

1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a

professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.

3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 INSULATION MATERIALS

A. Thermal Insulation Properties and Approved Insulation Boards.

1. Rigid Polyisocyanurate Roof Insulation; ASTM C1289:

   a. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
   b. Thickness: Minimum five (5") inches.

2. Tapered Polyisocyanurate Roof Insulation; ASTM C1289:

   a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
   b. Thickness: Minimum ¼"
   c. Tapered Slope: As indicated on the drawings.

3. High Density Fiberboard Roof Insulation; ASTM C208

   a. Qualities: Rigid, composed of interlocking fibers factory blended treated with asphalt on all six (6) sides.
   b. Board Size: Four feet by four feet (4' x 4')
   c. Thickness: Minimum 1/2"

PART 3 — EXECUTION

3.1 INSPECTION OF SURFACES

A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.

1. Verify that work which penetrates roof deck has been completed.
2. Verify that wood nailers are properly and securely installed.

3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
4. Do not proceed until defects are corrected.
5. Do not apply insulation until substrate is sufficiently dry.
6. Broom clean substrate immediately prior to application.
7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
8. Verify that temporary roof has been completed.

3.2 INSTALLATION

A. Attachment with Mechanical Fasteners

1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation for FM 1-90 system.
2. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
3. Spacing pattern of fasteners shall be as per manufacturer's recommendation to meet the FM requirements.
4. Minimum penetrations into deck shall be as recommended by the fastener manufacturer. There is a minimum one (1") inch penetration passed the metal deck.

3.3 CLEANING

A. Remove debris from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

3.4 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction

END OF SECTION

SECTION 07500 - MODIFIED BITUMINOUS MEMBRANE ROOFING - HOT APPLIED

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes modified bituminous roofing system.

B. Related Sections:

1. Section 06100 - Rough Carpentry.
2. Section 07220 - Roof Insulation.
3. Section 07600 - Sheet Metal Flashing.

1.3 REFERENCES

A. American Society of Civil Engineers (ASCE):
1. ASCE 7-05, Minimum Design Loads for Buildings and Other Structures.

B. American Society for Testing and Materials (ASTM)

C. Factory Mutual Research (FM):
1. Roof Assembly Classifications.

D. National Roofing Contractors Association (NRCA):
1. Roofing and Waterproofing Manual.

1.4 SUBMITTALS FOR REVIEW

A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.

B. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

C. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.

D. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Class 1 for external fire and meets local recognized building codes.

E. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM 1-90.

F. Manufacturer's Certificate: Certify that the roof system furnished is approved by Factory Mutual Approval Standard 4470.

H. Manufacturer's Certificate: Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

I. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.

J. Manufacturer's Certificate: Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.

K. Manufacturer's Certificate: Written certification from the roofing system manufacturer will meet the required manufacturer inspections as detailed in the Manufacturer's Inspection article of this specification. The provided certification must be accompanied by a notarized company seal by the membrane manufacturer company.

L. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-05, Method 2 for Components and Cladding, sealed by a registered professional engineer. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.

M. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. The modified bituminous sheet roofing material consists of the SBS Modified and Flashing Membrane and Flashing Base Sheet. The test data must be provided by an independent laboratory and shall be ISO/IEC Certified.

O. Test Reports: Submit copy of the manufacturer's test reports, prepared by an independent testing agency, for all metal components on the low slope roof indicating compliance with ANSI SPRI ES-1.

P. Qualification data for firms and individuals identified in Quality Assurance Article below.

1.6 CONTRACT CLOSEOUT SUBMITTALS

A. General: Comply with Requirements of Division 01 Section - Closeout Submittals.

B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.

C. Demonstration and Training Schedule: Provide a schedule of proposed dates and times for instruction of Owner's personnel in the maintenance requirements for completed roofing work. Refer to Part 3 for additional requirements.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with not less than 12 years documented experience and have ISO 9001 certification.

B. Installer Qualifications: Company specializing in modified bituminous roofing installation with not less than 5 years experience and authorized by roofing system manufacturer as qualified to install manufacturer's roofing materials.

C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.

D. Maintain a copy of the Contract Documents in the possession of the Supervisor/Foreman and on the roof at all times.

E. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.

1. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

F. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.

1.8 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of modified bituminous roofing system installation and associated work.

B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities. Objectives of conference include:

1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.

2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
4. Review roofing system requirements (drawings, specifications and other contract documents).
5. Review required submittals both completed and yet to be completed.
6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).
8. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
9. Review notification procedures for weather or non-working days.

C. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.

D. The intent of the conference is to resolve issues affecting the installation and performance of roofing work. Do not proceed with roofing work until such issues are resolved to the satisfaction of the Owner. This shall not be construed as interference with the progress of Work on the part of the Owner.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to prevent moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

D. Secure all material and equipment on the job site. If any material or equipment is stored on the roof, assure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the Contractor's actions will be the sole responsibility of the Contractor, and the deck will be repaired or replaced at his expense.

1.10 MANUFACTURER'S INSPECTIONS

A. When the Project is in progress, the roofing system manufacturer will provide the following:

1. Report progress and quality of the work as observed.
2. Provide periodic job site inspections. A minimum of three (3) inspections, on three (3) different days, per week are required. Documentation of the weekly inspections to be provided to the Owner.
3. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
4. Confirm after completion that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.11 PROJECT CONDITIONS

A. Proceed with roofing work only when existing and forecasted weather conditions will permit a unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

B. Do not apply roofing insulation or membrane to damp deck surface.

C. Do not expose materials subject to water or solar damage in quantities greater than can be weatherproofed during same day.

D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank one (1) inch cap nails, or screws and plates at a rate of one (1) fastener per ply (including the membrane) at each insulation stop.

1.12 SEQUENCING AND SCHEDULING

A. Sequence installation of roofing with related units of work specified in other Sections to ensure that roof assemblies, including roof accessories, flashing, trim and joint sealers, are protected against damage from effects of weather, corrosion and adjacent construction activity.

B. Complete all roofing field assembly work each day. Phased construction will not be accepted.

1.13 WARRANTY

A. Upon completion of installation, and acceptance by the Owner and Architect, the Manufacturer will supply to the Owner the appropriate 30 year NDL edge-to-edge warranty. Multiple source warranties are not acceptable.

1. Manufacturer's 30 year edge-to-edge NDL warranty.
2. 20 year coverage on Kynar-finished metal including check, crazing, peeling, chalking, fading and or adhesion.

3. All metal shall supplied by membrane manufacturer and be ANSI/SPRI ES-1 certified.
4. Provide a single warranty by a single approved manufacturer for standing seam roof areas, membrane roof areas, and transitions between the two material types.
5. All base flashings, metal flashings, perimeter metal edging and miscellaneous flashings shall be cover under the 30 year edge-to-edge NDL warranty.

B. Installer will submit a two (2)-year warranty to the membrane manufacturer with a copy directly to Owner.

1.14 DESIGN AND PERFORMANCE CRITERIA

A. Uniform Wind Uplift Load Capacity

1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying FM 1-90 as calculated by ASCE 07-05, Method 2 for Components and Cladding. Submit copy of manufacturer's minimum design load calculations according to ASCE 7-05, Method 2 for Components and Cladding, sealed by a registered professional engineer.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis of Design: Performances specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

2.2 ACCEPTABLE MANUFACTURERS

A. The roof is designed around The Garland Company:

Garland Industries
3800 E. 91st St.
Cleveland OH 44105

B. or equal manufacturer

2.3 DESCRIPTION

A. Modified bituminous roofing work including but not limited to:

1. Minimum one ply of 80 mil SBS Base Sheet, ASTM D 6163 Type III.
2. Hot Bitumen: ASTM D312, Type IV special steep asphalt
3. Base Flashing Ply: One (1) ply of a double-coated polyester-fiberglass-polyester base sheet covered by an additional layer of modified bitumen membrane and set in bitumen.

4. Modified and Flashing Membrane: Environmentally Friendly; SBS (Styrene-Butylene-Styrene) mineral surfaced, rubber modified roofing membrane incorporating recycled rubber, fire retardant characteristics and reinforced with a fiberglass and polyester composite scrim.
5. Surfacing: ASTM G26 white acrylic top coating coating.

2.4 BITUMINOUS MATERIALS

A. Asphalt Primer: V.O.C. compliant, ASTM D41, as recommended and furnished by the membrane manufacturer.

B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D4586, Type II, as recommended and furnished by the membrane manufacturer.

C. Interply Adhesive: ASTM D312, Type IV.

2.5 SHEET MATERIALS

A. Field Base Sheet: 80 mil SBS Base Sheet, ASTM D6163, Type III, as recommended and furnished by the membrane manufacturer.

1. Tensile Strength (ASTM D2523)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 225 lbf/in CMD 225 lbf/in
2. Tear Strength (ASTM D4073)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 300 lbf CMD 300 lbf
3. Elongation at Maximum Tensile (ASTM D2523)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 4.0% CMD 4.0

B. Flashing Base Sheet: Double coated Polyester-Fiberglass-Polyester scrim with the following minimum performance requirements according to ASTM D5147.

1. Tensile Strength (ASTM D2523)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 315 lbf/in CMD 315 lbf/in
2. Tear Strength (ASTM D4073)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 550 lbf CMD 550 lbf
3. Elongation at Maximum Tensile (ASTM D2523)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 5.0% CMD 6.0

C. Modified Flashing and Field Membrane Properties (Finished Membranes): ASTM D6162, Type III Grade G with the following minimum performance requirements according to ASTM D5147.

1. Tensile Strength (ASTM D5147)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 310 lbf/in CMD 310 lbf/in
2. Tear Strength (ASTM D5147)
   a. 2 in/min. @ 73.4 ± 3.6°F MD 500 lbf CMD 500 lbf
3. Elongation at Maximum Tensile (ASTM D5147)

a. 2 in/min. @ 73.4 ± 3.6°F MD 3.5% CMD 3.5%

4. Low Temperature Flexibility (ASTM D5147): Passes -30°F (-34°C)

2.6 SURFACINGS

A. Mineral Surfaced Membranes - Roofing Granules shall meet requirements of ASTM D451 and/or be recommended by the membrane manufacturer. Loose granules for bleed out shall match size and color of granulated membrane sheet.

B. White Elastomeric Roof Coating: Energy Star approved white acrylic roof base coating, as provided and recommended by the membrane manufacturer:

1. Reflectance 80%
2. Emittance 0.89
3. SRI 100

2.7 RELATED MATERIALS

A. Roof Insulation: In accordance with Section 07 22 00.

B. Roof Insulation Fasteners: In accordance with Section 07 22 00.

C. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel. Fasteners shall be self-clinching type of penetrating type as recommended by the manufacturer of the deck material. Nails and fasteners shall be flush-driven through flat metal discs of not less than one (1) inch diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than one (1) inch diameter are used.

D. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than twenty eight (28) gauge and not less than one (1) inch in diameter. Form discs to prevent dishing. Bell or cup shaped caps are not acceptable.

E. Urethane Sealant: One part, non-sag sealant as recommended and furnished by the membrane manufacturer for moving joints.

F. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.

G. Non-Shrink Grout: Use an all weather fast setting chemical action concrete material to fill pitch pans.

H. Pitch Pocket Sealer: Two part, 100% solids, self leveling, polyurethane sealant for filling pitch pans as recommended and furnished by the membrane manufacturer.

I. Perlite Cant: Continuous triangular cross section made of perlite used as a cant strip as recommended and furnished by the membrane manufacturer.

J. Key Curb (K4) – Molded recycled rubber 3 ½" high, 6" wide, 9" long curb designed to support pipe diameters from ½" to 4" with a maximum pipe load not to exceed 150 lbs per ten foot spacing

K. Type II Base Sheet: Base sheet for mechanically fastening to the wood deck.

PART 3 — EXECUTION

3.1 EXAMINATION

A. Verify that deck surfaces and project conditions are ready to receive work of this Section.

B. Verify that deck is supported and secured to structural members.

C. Verify that deck is clean and smooth, free of depressions, projections or ripples, and is properly sloped to drains.

D. Verify that adjacent roof substrate components do not vary more than ¼ inch in height.

E. Verify that deck surfaces are dry.

F. Confirm that moisture content does not exceed twelve (12) percent by moisture meter tests.

G. Verify that openings, curbs, pipes, conduit, sleeves, ducts, and other items which penetrate the roof are set solidly, and that wood nailing strips are set in place.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer inspections required to perform services in connection with installing the roof system.

B. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the coal tar modified bituminous roofing system.

D. Coordinate installation of roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight. Provide cut-offs at end of each day's work to cover exposed ply sheets and insulation with two (2) plies of #15 organic roofing felt set in full moppings of bitumen and with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.

E. Asphalt Bitumen Heating: Heat and apply bitumen in accordance with the Equiviscous Temperature (EVT) Method as recommended by National Roofing Contractors Association (NRCA). Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5°F at point of application) more than one (1) hour prior to time of application. Determine flash point, finished blowing temperature, EVT, and fire-safe handling temperature of bitumen either from information by

manufacturer or by suitable test. Do not exceed recommended temperature limits during bitumen heating. Do not heat to a temperature higher than twenty five degrees (25°F) below flash point. Discard bitumen that has been held at temperature exceeding Finishing Blowing Temperature (FBT) for more than three (3) hours. Keep kettle lid closed except when adding bitumen.

F. Asphalt Bitumen Mopping Rate:

1. Interply Mopping: Apply bitumen at the rate of approximately twenty five (25) lb. of bitumen per roof square.
2. Modified Membrane Mopping: Apply bitumen at the rate of approximately thirty (30) lb of bitumen per roof square.

G. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

H. Apply roofing materials as specified by manufacturer's instructions.

1. Keep roofing materials dry before and during application.
2. Do not permit phased construction.
3. Complete application of roofing plies, modified sheet and flashing in a continuous operation.
4. Begin and apply only as much roofing in one day as can be completed that same day.

I. Cut-Offs (Waterstops): At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary covering of two (2) plies of #15 organic roofing felt set in full moppings of bitumen with joints and edges sealed.

J. Broadcast minerals into the bleed out of bitumen while bitumen is at its recommended EVT temperature to achieve uniform color throughout.

K. 4 lb. lead flashings on penetrations are not be acceptable. 24 gauge galvanized pitch pans and bonnets are the approved design and selected material for penetrations. All flanges must be primed on both sides and set in ¼" mastic. Metal joints must be welded.

L. Flashing height minimums must be eight (8") inches. Raise flashing heights where necessary, including but not limited to perimeter and base flashing, curb flashing, roof hatch and expansion joints. Flashing must be installed as designed. All flashings and counterflashings must have the butyl tape backing and term bar compression as specified and drawn in the details.

M. Install key curbs on gas line pipes every ten (10') feet on center.

N. 4 lb lead pipe stack sleeves and 4 lb. drain pan sheets are not acceptable. In lieu of 4 lb. lead components, zinc pipe stack sleeves and zinc drain pans, lead free components, are preferred and approved material.

3.3 BASE PLY INSTALLATION

A. Base Ply: Install one (1) ply sheets in twenty five (25) lbs per square of bitumen shingled uniformly to achieve two plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on felt rolls until asphalt has cooled, fish mouths should be cut and patched.

B. Lap ply sheet ends eight (8) inches. Stagger end laps twelve (12) inches minimum.

C. Lightly broom in fiberglass plies to assure complete adhesion.

D. Extend plies two (2) inches beyond top edges of cants at wall and roof projections and equipment bases.

E. Install base flashing ply to all perimeter and projection details after membrane application.

3.4 MODIFIED MEMBRANE APPLICATION

A. Solidly bond the modified membrane to the base layers with specified asphalt at the rate of twenty five (25) to thirty (30) lbs. per 100 square feet.

B. The modified membrane roll must push a puddle of asphalt in front of it with asphalt slightly visible at all side laps. Exercise care during application to eliminate air entrapment under the membrane.

C. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.

D. Install subsequent rolls of modified membrane across the roof as above with a minimum of four (4) inch side laps and eight (8) inch end laps. Stagger the end laps. Apply the modified membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.

E. Apply asphalt no more than five (5) feet ahead of each roll being embedded.

F. Extend membrane two (2) inches beyond top edge of all cants in full moppings of the specified asphalt.

3.5 FLASHING MEMBRANE INSTALLATION

A. Seal all curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.

B. Prepare all walls, penetrations, expansion joints to be flashed with asphalt primer at the rate of one hundred (100) square feet per gallon. Allow primer to dry tack free.

C. Use the modified membrane as the flashing membrane. Adhere to the underlying base flashing ply with specified asphalt unless otherwise noted in these specifications. Nail off at a minimum of eight (8) inches o.c. from the finished roof at all vertical surfaces.

D. Solidly adhere the entire sheet of flashing membrane to the substrate.

E. Seal all vertical laps of flashing membrane with a six (6") inch membrane strip.

F. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work.

G. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.

3.6 APPLICATION OF SURFACING

A. Mineral Surfaced Membrane System: While bleed out from the side and end laps are still hot, hand broadcast minerals into asphalt bleed out for a monolithic appearance. Apply mineral lap sealant to any areas of improper adherence of minerals and rebroadcast minerals while coating is still wet.

B. Reflective Coating:

1. Allow all cold applied mastics and coating to properly dry and cure before installing the aluminum coating.

2. Paint all exposed membrane with manufacturer's Energy Star base coat acrylic coating installed at a rate of two (2) gallon per square.

3.7 CLEANING

A. Remove bitumen adhesive drippings from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of this Section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.8 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during roofing procedures. Comply with requirements of authorities having jurisdiction.

3.9 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Contractor, Owner, and roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Roofing Contractor.

D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.

E. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

F. Notify the Owner upon completion of corrections.

G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

H. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

END OF SECTION

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Provide all labor, equipment, and materials to fabricate and install the following.

1. Counterflashing and Term Bar.
2. Pipe Stack Sleeves.
3. Metal Coping Cap.
4. Galvanized Steel Pitch Pans and Hoods.
5. New Gooseneck Vents, Vents and Heat Stacks.

B. Related Sections:

1. Section 06100 – Rough Carpentry
2. Section 07520 – Modified Bituminous Membrane Roofing

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)
1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal.

C. Factory Mutual Research Corporation (FMRC

D. Underwriters Laboratories (UL)

E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
1. 1993 Edition Architectural Sheet Metal Manual

F. National Roofing Contractors Association (NRCA)
1. Roofing and Waterproofing Manual

G. American Society of Civil Engineers (ASCE)
1. ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

1.4 SUBMITTALS FOR REVIEW

A. Product Data:

1. Provide manufacturer's specification data sheets for each product.
2. Metal material characteristics and installation recommendations.

B. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

C. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing shall conform to the requirements as defined by the FMRC Loss Prevention Data Sheet 1-49.

D. Certifications:

1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.

2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

3. Submit certification that the metal edge on the low slope roof meets ANSI SPRI ES-1.

1.5 CONTRACT CLOSEOUT SUBMITTALS

A. General: Comply with Requirements of Section 01 78 00 - Closeout Submittals.

B. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.

1.6 QUALITY ASSURANCE

A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years experience.

B. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years experience with the installation of similar system to that specified.

C. Source Limitation: Obtain components from a single manufacturer. Secondary products which cannot be supplied by the specified manufacturer shall be approved in writing by the primary manufacturer prior to bidding.

D. Upon request fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.8 PROJECT CONDITIONS

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

1.9 DESIGN AND PERFORMANCE CRITERIA

A. Thermal expansion and contraction:

1. Completed metal edge flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

PART 2 — PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis of Design: Materials specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

2.2 MATERIALS

A. Metal Coping Cap: 24 gauge Kynar-finished sheet metal, ANSI SPRI Certified.

B. Pitch Pan and Bonnet: 24 gauge galvanized steel sheet metal.

C. Zinc pipe flashing: ASTM B69-98a, 99.995% pure zinc.
   1. Thickness: 0.02".
   2. Pipe flashing: interior coated, exterior preprimed.

D. Lead free solder for zinc: SN 100C, Aim Solder, http://www.aimsolder.com/.

E. Flux for zinc: #17 or #70, Superior Flux Mfg. Co., www.superiorflux.com/.

F. Goose Neck Vents: 24 gauge galvanized sheet metal.

G. Counterflashing: 24 gauge galvanized sheet metal.

H. Term Bar: ¾" aluminum term bar.

I. Heat Stack: 24 gauge galvanized sheet metal.

J. Counterflashing Fasteners: 1 ¼" Masonry Drive Pins.

K. Metal Coping Cap Cleat: 22 ga. Galvanized sheet metal, ANSI SPRI Certified.

PART 3 — EXECUTION

3.1 PROTECTION

A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

3.2 GENERAL

A. Fastening of metal to walls and wood blocking shall comply with building code standards.

B. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

C. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.

3.3 INSPECTION

A. Verify that curbs are solidly set and nailing strips located.

B. Perform field measurements prior to fabrication.

C. Coordinate work with work of other trades.

D. Verify that substrate is dry, clean and free of foreign matter.

E. Commencement of installation shall be considered acceptance of existing conditions.

3.4 SHOP-FABRICATED SHEET METAL

A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

B. Hem exposed edges.

C. Angle bottom edges of exposed vertical surfaces to form drip.

D. Lap corners with adjoining pieces fastened and set in sealant.

E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

F. Install sheet metal to comply with referenced SMACNA and NRCA standards.

3.5 CLEANING

A. Clean installed work in accordance with the manufacturer's instructions.

B. Replace damaged work than cannot be restored by normal cleaning methods.

3.6 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated. Comply with requirements of authorities having jurisdiction

3.7 FINAL INSPECTION

A. At completion of installation and associated work, meet with Contractor, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Inspect work and flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Notify the Owner upon completion of corrections.

E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

END OF SECTION 07 62 00

PART 1 – GENERAL

1.01 SCOPE:

A. Scope: Furnish all labor, materials, and services in connection with caulking and sealant systems, complete. Use competent workmen.

B. Work included: Caulking and sealing shall include, but shall not be limited to joints between windows, doors, louvers, and exterior walls; thresholds, and all joints between dissimilar materials. All interior and exterior joints shall be caulked with appropriate sealant for area, and materials. Fill all voids of all joints.

C. Refer to Division-15 and 16 section for joint sealers in mechanical and electrical work; not work of this section except as listed on schedule of this section.

D. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SUBMITTALS:

A. Submit manufacturer's specifications including data for joint preparation and joint sealer application for each joint sealer required.

PART 2 – PRODUCTS

2.01 GENERAL:

A. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with each other and with joint substrates under conditions of service and application, as demonstrated by testing and experience.

B. Color of joint sealer will be selected by Architect from mfr.'s standard to match adjacent materials.

2.02 ELASTOMERIC JOINT SEALANTS:

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemical curing, elastomeric sealant of polymer indicated, complying with ASTM C 920 requirements.

B. Multi-Part Nonsag Urethane Sealant: Type M; Grade P; Class 25; Uses NT, M, G, A, and O.

C. Two-Part Pourable Urethane Sealant: Type M; Grade p; Class 25; Uses T, M, A, and as applicable for substrates indicated O.

D. Two-Part Nonsag Low-Modulus Urethane Sealant: Type M; Grade NS; Class 25; Uses NT, M, A as applicable to joint substrates indicated, O; with additional capability to withstand an increase and decrease 50% of joint width as measured at time of application and remain in compliance with other requirements ASTM C 920, based on manufacturer's recommendations and testing.

1. Product: Subject to compliance with requirements, provide following: "Vulken 922"; Mameco International, Inc.

E. Two-Part Water Immersion Polysulfide Sealant: Type M; Grade NS; Class 12-½; Uses T, M, A as applicable to joint substrates indicated O; with a history of successful field experience in sealing joints immersed intermittently or continuously in water.

1. Product: Subject to compliance with requirements, provide following: "Chem-Caulk 400"; Bostik Construction Products Div.

2.03 MISCELLANEOUS JOINT SEALANTS:

A. Acrylic-Emulsion Sealant: Manufacturer's standard, one part, nonsag acrylic, mildew resistant, emulsion sealant complying with ASTM C-834, formulated to be paintable and recommended for applications on interior involving joint movement of not more than +7.5%.

B. Butyl-Polyisobutylene Tape Sealant: Manufacturer's standard, solvent free, butyl-polyisobutylene tape sealants with a solids content of 100%; comply with AAME 804.1; formulated to be nonstaining, paintable, and nonmigrating in contact with nonporous surfaces; package on rolls with a release paper on one side; with or without reinforcement thread to prevent stretch.

C. Two-Part Jet Fuel (Diesel)-Resistant Cold-Applied Sealant: Manufacturer's standard pourable, chemically-curing, elastomeric sealant complying with FS SS-S-200 and of urethane formulation for base polymer complying with FS SS-S-00227, with maximum movement capability of 12 ½ %.

1. Product: Subject to compliance with requirements, provide one of the following:
"Vullkem 202"; Mameco International, Inc.
"Gardox"; W.R. Meadows, Inc.
"Urexpan NR-300"; Pecora Corp.

D. Fire Resistant Joint Sealers:

1. General: Provide Manufacturer's standard sealant and accessory materials with fire-resistance rating indicated which are identical to those assemblies whose fire endurance has been determined by testing per ASTM E814 by Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.
2. Foamed-In-Place Fire-Stopping Sealant: Two-part, Foamed-in-place, silicone sealant formulated for use as part of thorough-penetration fire-stop system for filling openings around cables, conduit, pipes, and similar penetration through walls and floors.
3. One-Part Fire-Stopping Sealant: One part elastomeric sealant formulated for use as part of thorough-penetration fire-stop system for sealing openings around cables, conduit, pipes, and similar penetrations through walls and floors.

2.04 MISCELLANEOUS MATERIALS:

A. Bituminous Fiber Joint Filler for Concrete Paving: Performed strips of asphalt saturated fiberboard complying with ASTM D 1751; full thickness and width joint.

B. Joint Sealant Backing: Provide sealant backing of material and type which are nonstaining and compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

C. Elastomeric Tubing Joint-Fillers: Neoprene, butyl, or EPDM tubing complying with ASTM D1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to –26 deg. F. (-15 deg. C.). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back (3rd) surface of joint. Provide self-adhesive tape where applicable.

E. Primer: Provide type recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from pre-construction joint sealer substrate and field tests.

F. Cleaners for Nonporous Surfaces: Provide nonstaining chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.

G. Masking Tape: Provide nonstaining, nonabsorbent tape compatible with sealants and to surfaces adjacent to joints.

PART 3 – EXECUTION

3.01 PREPARATION

A. Inspection: Contractor must inspect joints indicated to receive joint sealers for compliance with requirements for joint configurations, installation tolerances, and other conditions affecting joint sealer performance. Obtain installer's written report listing any conditions determined to performance of joint sealer work. Do not allow joint sealer work to proceed until satisfactory conditions have been corrected.

B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of the joint sealant manufacturer.

C. Joint Priming: Prime joint substrates where recommended by joint sealer manufacturer based on pre-construction joint sealer substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond- do not allow spillage or migration to adjoining surfaces.

D. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.02 INSTALLATION OF JOINT SEALERS

A. General: comply with joint sealer manufacturer's printed installation instructions Applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: ASTM C 962.

C. Latex Sealant Installation Standard: ASTM C 790.

D. Installation of Sealant Backings: Install sealant backing to comply with the following requirements:

1. 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 which allow optimum sealant movement capability.
    a. Do not leave gaps between end of joint-fillers.
    b. Do not stretch, twist, puncture, or tear joint-fillers.

c. Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint-fillers, or back of joints where required to prevent third-side adhesion sealant to back of joint.

E. Installation of Sealants: 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 widths which allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joints. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

G. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs.

3.03 PROTECTION AND CLEANING

A. Protect joint sealers during and after curing period from contact with contaminating Substances or from damage resulting from construction operations or other causes. If damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new material to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by mfr.'s of joint sealers and products in which joints occur.

JOINT SEALERS SCHEDULE

CONDITIONS	PRODUCT
Perimeter of exterior openings where frames meet exterior facade of building (i.e. windows, doors, sidelights, etc.). Provide where frames have been moved or replaced in existing construction and at all applicable locations in new construction.	Multi-Part Nonsag Urethane Sealant

Vertical joints between similar materials (i.e. concrete panels, masonry, etc.)	Two-Part Nonsag Polyurethane Sealant
Isolation joints between sidewalks or pavements and building at new construction.	Two-Part Pourable Urethane Sealant
Flashing joints, reglets, and receivers; sealant cavity in roof clamping devices at new construction.	Two-Part Pourable Urethane Sealant (except provide two-part Jet-Fuel (Diesel) Resistant cold-applied sealant where associated with bituminous waterproofing, damp-proofing, or roofing)
Thresholds: Provide under new thresholds.	Butyl-Polyisobutylene Tape
Vertical joint between dissimilar materials at new and existing remodeled construction	Multi-Part Nonsag Urethane Sealant
Perimeter of penetrations of exterior facade (i.e. pipes, conduits, etc.) at new construction	Multi-Part Nonsag Urethane Sealant
Joints submerged continually or intermittently in water (i.e. storm drains, roof drains, etc.)	Two-Part Water Immersion Polysulfide Sealant
Vertical joints in plaster	Two-Part Nonsag Low Modulus Urethane Sealant
Joints in glass unit masonry	Multi-Part Nonsag Urethane Sealant
Miscellaneous locations not listed above at flashings, between dissimilar materials which require filling for first-class workmanship and to prevent storm water from entering the building.	Multi-Part Nonsag Urethane Sealant

INTERIORS

Perimeters of exterior openings in exterior walls where frames meet interior finish. Provide where frames have been moved or replaced on existing construction and at all applicable locations in new construction.	Acrylic-Emulsion Sealant

Vertical joints between similar materials (i.e. concrete panels, masonry, etc.)	Two-Part Nonsag Polyurethane Sealant
Thresholds and saddles: Provide under new Thresholds,	Butyl-Polyisobutylene Tape
Sleeved penetrations through floors and Ceilings at new construction.	Two-Part Pourable Urethane Sealant, or, where required by condition: Multi-Part Nonsag Urethane Sealant
Control, isolation joints in gypsum board Construction, including perimeter joints.	As required by industry standards
Interior side perimeters of penetrations through exterior walls (i.e. pipes, conduits, etc.) at new construction.	Multi-Part Nonsag Urethane Sealant
Joints between dissimilar materials at new, existing, and remodeled construction.	Acrylic-Emulsion Sealant
Joint in glass unit masonry	Acrylic-Emulsion Sealant
Glass and glazing joints	As required by industry standards
Miscellaneous locations, not listed above, at all voids between materials which require filling for first-class workmanship and painting.	Acrylic-Emulsion Sealant

SPECIAL NOTE

Substitute fire-stopping sealants noted above on interior or fire side(s) of any of above conditions where above conditions occur in fire-rated construction (walls, floors, or ceilings).

Provide foamed-in-place fire-stopping sealant at conditions involving multiple pipes, conduits, etc., where joint widths are wide or not uniform in joint width.

Provide one-part fire-stopping sealant at conditions involving single pipes, conduits, etc., or where joint widths are narrow and of uniform width.

FINAL NOTE

Leave all joint caulking neat and smooth (as a baby's cheek), no wrinkles, no voids, no bulges, no sags.

END OF SECTION 07900

PART 1 GENERAL

1.01 DESCRIPTION:

A. The surfaces to be painted in this Work are indicated on the Drawings (in the Room Finish Schedule, List of Finishes, and as specifically noted) and in the Painting Schedule in this Section of these Specifications.

B. Surfaces to be painted: Except for surfaces specified or scheduled not to be painted and except for factory-finished items, job-paint all surfaces, interior and exterior, exposed to view or weather. Examine other sections of these specifications to determine other items which are factory-finished or prime-coated. Prime-coated items shall be job-finished under this section. Special attention must be given to the painting of all doors. All required finishes must be applied to all surfaces - See Section 3.04 N.

C. Surfaces not to be painted: Surfaces not to be finished under this Section: non-ferrous metals, acoustical ceilings, floor coverings, wallcoverings, and roofing. In mechanical and electrical equipment rooms and similar spaces used by maintenance personnel only, do not paint conduit, piping, structural steel or steel joists except for touch-up, unless scheduled otherwise.

1.02 SUBMITTALS:

A. Painting materials scheduled are products of **KWAL Paint Manufacturing Co.**, unless indicated otherwise. Substitutions may be requested in accordance with Shop Drawings and Submittals. Approved manufacturer's specifications must be adhered to. The following are acceptable, subject to specification compliance; first line products as selected by Architect:
Possible substitute colors must be exact computer match to the specified colors.

1. KWAL Paint Manufacturing Company
2. Pittsburgh
3. Sherwin-Williams
4. Benjamin Moore
5. Dunn-Edwards

B. Submittals: Before starting work, submit a schedule in triplicate showing the name of paint manufacturer, type of paint to be used on each different surface in building.

C. Color selections: Color schedules will be issued prior to beginning of painting work. In general, color schemes will be repeated so excessive number of colors are generally not required. However, for pricing purposes, the contractor, shall not base his bid on a color limit. No additional funds will be

colors are generally not required. However, for pricing purposes, the contractor, shall not base his bid on a color limit. No additional funds will be granted for multiple color and/or texture selections. Colors; factory mixed, but Contractor shall tint samples at job as required until the colors, textures are satisfactory.

D. Color samples: Prepare samples of each kind of painted work and each color for approval sufficiently in advance of beginning of work to permit adequate time for consideration of materials, colors. Prepared samples minimum 12" squares.

E. Provide certificates stating fire hazard classification of each material furnished for this project under any
specification provision related to fire resistance or surface burning characteristics.

1.03 PRODUCT HANDLING:

A. Deliver sealed containers with labels legible, intact.

B. Store and mix materials only in such rooms as may be assigned for this purpose and take all necessary precautions to prevent fire. Comply with health, fire regulations.

C. Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.

D. In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

1.04 QUALITY ASSURANCE:

All paint products used for interior spaces, must comply with "EPA Method 24", meaning it must contain less than 450 grams of VOC/VOS per liter of coating (3.8 pounds per gallon).

PART 2 PRODUCTS

2.01 PAINT MATERIALS:

A. Where necessary to thin any oil vehicle paint materials, use either pure linseed oil or turpentine unless manufacturer of material calls for other types of thinners.

B. Use one brand of materials insofar as possible. In any case, primers and sealers shall be same brand as finish coats.

C. Paint, varnish, fillers: Of type, brand hereinafter specified under "Schedule of Painting Materials" such as linseed oil, shellac, turpentine, etc. shall be of highest quality, with identifying labels on containers.

D. All paint to be Alkyd base unless noted otherwise.

PART 3 EXECUTION

3.01 ENVIRONMENTAL REQUIREMENTS:

A. Comply with manufacturer's recommendations as to environmental conditions under which coating, coating systems, can be applied.

B. Do not apply finish in area where dust is being generated.

3.02 EXAMINATION OF SURFACES:

Carefully inspect surfaces to be painted, covered or otherwise finished, and notify in writing of any defects, improper materials, workmanship or other defects which will affect satisfactory execution and permanency of work. Absence of such notification shall be construed as acceptance by this subcontractor of surfaces, and later claims of defects in surfaces will not relieve this subcontractor from responsibility under his guarantee.

3.03 PREPARATION OF SURFACES:

NOTE: The complete and proper preparation, including but not limited to, cleaning, sanding, stripping, patching, and leveling of all surfaces which have existing and old finishes, shall be part of this contract. It shall be the contractor's responsibility to examine all existing surfaces, prior to Bid. Requests for additional funding at a later time will not be granted.

A. Wood: Sandpaper to smooth, even surface, then dust off. Prime knots, pitch streaks, with two coats shellac before priming. After priming has been applied, thoroughly fill nail, other holes, cracks, with plastic wood or putty. Sandpaper, dust off between coats.

B. Steel and iron: Remove grease, rust scale, dust; touch up any chipped or abraded places on shop-coat. Remove heavy coating of scale from ferrous metal by wire-brushing or sandblasting as necessary to produce a satisfactory surface for painting.

C. Galvanized metal: Wash untreated surfaces with solution of chemical phosphoric metal etc., allow to dry at least 12 hours, dust off. All exposed galvanized surfaces shall be painted except at structural steel.

D. Gypsum board and plaster: Before painting, test with moisture testing device, apply no paint or sealer when moisture content exceeds 8%. Test sufficient

areas in each space as often as necessary, to determine proper moisture content for painting. Gypsum board and plaster used as backing for wall fabric shall receive one coat of size.

E. Not used

F. General: Before painting, remove hardware, accessories, plates, similar items or provide ample protection of such items. Upon completion of each space, replace. Remove doors to paint top and bottom edges.

G. Provide scaffolding, drop cloths and other equipment necessary to execute work, and which is not specifically mentioned to be provided by others.

3.04 APPLICATION:

A. Apply to highest standards by skilled mechanics.

B. Surfaces to be painted shall be clean, dry smooth, protected from dampness. Each coat of paint shall be well brushed on, worked out evenly. Comply with recommendations of product manufacturer for drying time between succeeding coats. Except as specifically approved otherwise by the Architect, confine spray application to metal frame work and similar surfaces where brush work would be obvious and undesirable.

NOTE: Where spray application is used, back rolling of prime coat on gypsum board is required. Do not double back with spray equipment to build up film thickness of two coats in one pass.

C. Vary slightly the color of successive coats. Secure approval of each coat before proceeding with next coat.

D. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paints, skipped or missed areas.

E. Make edges of paint adjoining other materials or colors clean, sharp with no overlapping.

F. Paint prime-coated hardware, grilles and registers same color surrounding material.

G. Back-priming shall be of same material as specified for front side; required for all wood cabinets, millwork, trim, except where finish is plastic laminate. Back primed concealed parts before erection. Take care that back painting does not contact exposed finish surface.

H. Do not paint sealant unless directed.

I. Fire and smoke rated partitions as identified on plans shall be permanently identified on both sides above ceilings and in concealed spaces by red-painted stenciled notices spaced not over 10 feet apart. Lettering shall be not less than one (1) inch high. Wording at corridors shall be "CORRIDOR PARTITION

-PROTECT OPENINGS". At smoke compartment boundaries, wording shall be "SMOKE PARTITION-PROTECT OPENINGS". At horizontal exit walls, exit enclosures, hazard enclosures and other fire walls wording shall be "ONE-HOUR FIRE BARRIER - PROTECT OPENINGS" (or TWO-HOUR, as indicated on plan).

J. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

K. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

L. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

M. Prime faces of wood doors, except where plastic faced, with one coat of clear alkyd sealer as soon as doors are delivered to job site.

N. Scheduled door finish (paint or stain with sealer - not only sealer!) must be applied to **all door surfaces, including tops, bottoms, and all sides**. Non-Compliance with this requirement will be subject to rejection of the installed doors. DO NOT REMOVE OR PAINT OVER DOOR LABELS INDICATING FIRE RATING!!!
NOTE: Prior to commencing the painting work, the painting contractor must provide a written statement to the Architect wherein they acknowledge that the content of the above requirements are completely understood, and will be fully implemented.

O. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

P. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.

Q. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

R. Provide satin finish for final coats, unless otherwise indicated.

S. Complete Work: Match approved samples for color, texture, and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

T. Paint all cover plates for electrical, plumbing, mechanical, telephone, computer, etc. regardless when these items get installed. At project completion all these items must be painted to match adjacent surface.

U. Unless noted otherwise, smooth surfaces, such as gypsum board, plaster, concrete, etc., shall receive a "TEXTURE COAT", prior to the application of all paint types. Typically, a minimum of three different texture field samples, including the selected paint color must be provided for the Architect's and Owner's selection.

V. "MULTI COLOR" paint types, such as, Zolotone, Aqua Fleck, Cor-O-Fect III, or equal. Must have lead painter who is 'manufacturer' trained and qualified in the application of this material. (It is a mandatory project requirement, that the painting contractor have a letter of recommendation from the manufacturer.)

W. Wherever paint is used on metal deck to receive fireproofing, it shall be the responsibility of the contractor to determine compatibility with spray-applied fire resistive material.

3.05 CLEANING:

A. At the completion of work of other trades touch-up and restore all damaged or defaced painted surfaces.

B. Remove spilled, splashed or splattered paint from all surfaces.

C. Leave unfinished space clean, in condition required for equivalent spaces in project.

3.06 PAINTING SCHEDULE:

(NOTE: Schedule is based on " KWAL PAINT COMPANY" Products, equal products from different manufacturer's may be approved by the Architect.) Substitutions would require exact computer match to the specified colors.

3.06.1 EXTERIOR PAINT SCHEDULE:

A. Concrete, Stucco, and Masonry (other than Concrete Unit Masonry): Provide the following finish systems over exterior concrete, stucco, and brick masonry substrates:

1. 100% Acrylic Flat Finish **Two finish coats** over a primer.

   a) Primer: 5860 Pro-Finish all purpose 100% acrylic primer undercoat. Applied at a dft of not less than 1.8 mils.

   b) Finish Coats: 6300 Accu-Pro 100% acrylic flat finish. Applied at a dft of not less than 1.7 mils.

2. Texture Coating: **One finish coat** over a properly prepared substrate.

   a) Primer: 5801 Epotilt Epoxy Modified 100% acrylic primer. Applied at a dft of not less than 3.0 mils, **or** self-priming after power washing.

b) Finish Coat: 59 Series Sunfoe Texture Coating. Applied at a dft of not less than 12.0 to 14.0 mils.

B. Concrete Unit Masonry: Provide the following finish systems over exterior concrete unit masonry:

1. 100% Acrylic Flat Finish: **Two finish coats** over block filler.

a) Block filler: 5890 Accu-Pro latex block filler. Applied to a dft not less than 8.0 to 12.0 mils.

b) Finish Coats: 6300 Accu-Pro 100% acrylic flat finish. Applied at a dft not less than 1.7 mils.

C. Exterior Gypsum Soffit Board: Provide the following finish systems over exterior gypsum soffit board:

1. 100% Acrylic Flat Finish: **Two finish coats** over an exterior alkali-resistant primer:

a) Primer: 5860 Pro-Finish All-Purpose 100% acrylic primer undercoat. Applied to a dft no less than 1.8. mils.

b) Finish Coats: 6300 Accu-Pro 100% acrylic flat finish. Applied to a dft not less than 1.7 mils.

2. 100% Acrylic Semi-Gloss enamel Finish: **Two finish coats** over a primer.

a) Primer: 5860 Pro-finish All-Purpose 100% acrylic primer undercoat. Applied to a dft not less than 1.8 mils.

b) Finish Coats: 3200 Ambassador 100% acrylic semi-gloss block resistant enamel. Applied to a dft of not less than 1.6 mils.

D. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items (spot prime as needed).

1. 100% Acrylic Gloss Enamel Finish: **Two finish coats** over a rust-inhibitive primer.

a) Primer: 5810 Ambassador G-Prim latex metal primer. Applied at a dft of not less than 1.8 mils.

b) Finish Coats: 8300 W.B. Industrial DTM gloss enamel. Applied at a dft of not less than 2.5 mils.

2. Full-Gloss Alkyd-Enamel Finish: **Two finish coats** over a rust-inhibitive primer.

a) Primer: 9210 Accu-Pro rust-inhibiting primer. Applied to a dft of not less than 2.0 mils.

b) Finish Coats: 9800 Accu-Pro alky gloss enamel. Aplied to a dft not less than 1.5 mils.

E. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-metal surfaces:

1. 100% Acrylic Gloss Enamel Finish: **Two finish coats** over a galvanized primer.

a) Primer: 5810 Ambassador G-Prime latex primer. Applied to a dft of not less than 1.8 mils.

b) Finish Coats: 8300 W.B. industrial DTM gloss enamel. Applied at a dft of not less than 2.5 mils.

2. Full-Gloss Alkyd-enamel: **Two finish coats** over a glavanized metal primer.

a) Primer: 5810 Ambassador G-Prime latex primer. Applied to a dft of not less than 1.8 mils.
b) Finish Coats: 9800 Accu-Pro alkyd gloss enamel. Applied at a dft of not less than 1.5 mils.

F. Aluminum: Provide the following finish systems over exterior aluminum surfaces:

Full-Gloss Alkyd-Enamel finish: **Two finish coats** over a primer.

a) Primer: 5810 Ambassador G-Prime latex primer. Applied to a dft of not less than 1.8 mils.

b) Finish Coats: 931-424 Urethane/Alkyd high gloss enamel (Duronodic Bronze Satin). Applied at a dft of not less than 1.5 mils.

3.06.2 INTERIOR PAINT SCHEDULE:

A. Concrete and Masonry (other than Concrete Unit Masonry): Provide the following paint systems over interior and brick masonry substrates:

1. Flat Acrylic Finish: **Two finish coats** over a primer.

a) Primer: 0800 Accu-Tone Hi-Hide PDQ Sealer. Applied at a dft of not less than 1.4 mils.

b) Finish Coats: 0910 Accu-Pro flat latex. Applied to a dft of not less than 1.6 mils.

2. Low-Luster Acrylic-enamel Finish: **Two finish coats** over a primer.

   a) Primer: 0800 Accu-Tone Hi-Hide PDQ Sealer. Applied at a dft of not less than 1.4 mils.

   b) Finish Coats: 0910 Accu-Pro PC latex eggshell. Applied to a dft of not less than 1.5 mils.

3. Waterborne Polyamide Gloss Epoxy: **Two finish coats** over a primer.

   a) Primer: 5860 Pro-Finish All-Purpose 100% acrylic primer undercoat. Applied at a dft of not less than 1.8 mils.

   b) Finish Coats: 3160 Water Epoxy Polyamide Coating. Applied to a dft of not less than 1.5 mils.

4. Multi-Color Seamless Wallcoating Finish: **Two finish coats** over a primer.

   a) Primer: 5860 Pro-Finish All-Purpose 100% acrylic primer undercoat. Applied at a dft of not less than 1.8 mils.

   b) Finish Coats: 9134 COR-O-FECT III Multi-Color Seamless Wallcoating Coating. Apply at 125 to 175 SF per gallon.

B. Concrete Unit Masonry: Provide the following finish systems over interior concrete unit masonry:

1. Flat Acrylic Finish: **Two finish coats** over block filler.

   a) Block Filler: 5890 Accu-Pro latex block filler. Applied to a dft of not less than 8.0 to 12.0 mils.

   b) Finish Coats: 0910 Accu-Pro flat latex. Applied to a dft of not less than 1.6 mils.

2. Low-Luster Acrylic enamel Finish: **Two finish coats** over block filler.

   a) Block Filler: 5890 Accu-Pro latex block filler. Applied to a dft of not less than 8.0 to 12.0 mils.

   b) Finish Coats: 2100 Accu-Pro latex eggshell. Applied to a dft of not less than 1.5 mils.

3. Semi-Gloss Acrylic Enamel Finish: **Two finish coats** over block filler.

   a) Block Filler: 5890 Accu-Pro latex block filler. Applied to a dft of not less than 8.0 to 12.0 mils.

   b) Finish Coats: 2300 Accu-Pro alkyd semi-gloss enamel. Applied to a dft of not less than 1.7 mils.

4. Semi-Gloss Alkyd-Enamel finsh: **Two finish coats** over block filler.

   a) Block Filler: 5890 Accu-Pro latex block filler. Applied to a dft of not less than 8.0 to 12.0 mils.

   b) Finish Coats: 4600 Accu-Pro alkyd semi-gloss enamel. Applied to a dft of not less than 1.7 mils.

C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1. Flat Acrylic Finish: **Two finish coats** over block filler.

   a) Primer: 0800 Accu-Tone Hi-Hide PDQ Sealer. Applied to a dft of not less than 1.4 mils.

   b) Finish Coats: 0910 Accu-Pro flat latex. Applied to a dft of not less than 1.6 mils.

2. Low-Luster Acrylic Enamel Finish: **Two finish coats** over block filler.
   a) Primer: 0800 Accu-Tone Hi-Hide PDQ Sealer. Applied to a dft of not less than 1.4 mils.

   b) Finish Coats: 2100 Accu-Pro latex eggshell. Applied to a dft of not less than 1.5 mils.

3. Semi-Gloss Acrylic Enamel Finish: **Two finish coats** over block filler.

   a) Primer: 0800 Accu-Tone Hi-Hide PDQ Sealer. Applied to a dft of not less than 1.4 mils.

   b) Finish Coats: 2300 Accu-Tone Semi-Gloss latex enamel. Applied to a dft of not less than 1.5 mils.

4. Multi-Color Seamless Wallcoating Finish: **Two finish coats** over a primer.

   a) Block Filler: 5890 Pro-Finish All-Purpose 100% acrylic primer undercoat. Applied to a dft of not less than 1.8 mils..

   b) Finish Coats: 9134 COR-O-FECT III Multi-Color Seamless Wallcoating. Apply at 125 to 175 SF per gallon.

5. Waterborne Polyamide Gloss Epoxy: **Two finsih coats** over a primer.

   a) Primer: 5860 Pro-Finish All-Purpose 100% acrylic primer undercoat. Applied at a dft of not less than 1.8 mils.

   b) Finish Coats: 3160 Water Epoxy Polyamide Coating. Applied to a dft of not less than 1.5 mils.

6. All In terior Gypsum Board Surfaces at Patient Care Areas of Hospitals. Low sheen 100% Acrylic Latex: **Two finish coats** over a primer.

    a) Primer: 0890 Accu-Pro Sandable Drywall Prime. Applied to a dft of not less than 1.4 mils.

    b) Finish Coats: 7100 Series Liquid Vinyl Low Sheen 100% Acrylic finish. Applied to a dft of not less than 1.5 mils.

D. Interior Concrete Floors: Provide the following paint finish system over interior concrete floors: **Must meet specifications for polished concrete floors**

1. Amine Adduct Gloss Epoxy; Abrasive blast followed by **two finish coats** over a Sealer coat.

    a) Seal Coat: 9142 Amine Adduct Epoxy thinned 25% with clean water.

    b) Finish Coats: 9142 Amine Adduct Epoxy. Applied not less than 3.0 to 4.0 mils wet.

2. Clear Low Gloss Sealer and Finish: **Two finish coats.**

    a) Finish Coats: OKON 940 Seal and Finish water based satin. Apply per manufacturer's recommendations.

E. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces:

1. Semi-Gloss Alkyd-Enamel finish: **Two finish coats** over a primer.

    a) Primer: 4200 Accu-Pro fast dry alkyd undercoat. Applied to a dft of not less than 1.8 mils.

    b) Finish Coats: 4600 Accu-Pro alkyd semi-gloss enamel. Applied to a dft of not less than 1.7 mils.

F. Ferrous Metal: Provide the following finish systems over ferrous metal:

1. Full-Gloss Alkyd-enamel Finsh: **Two finish coats** over a primer.

    a) Primer: 9210 Accu-Pro Rust-Inhibiting Primer. Applied to dft of not less than 2.0 mils.

    b) Finish Coats: 9800 Accu-Pro Alkyd Gloss enamel. Applied to a dft of not less than 1.5 mils.

G. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:

1. 100% Acrylic Gloss Enamel Finsh: **Two finish coats** over primer.

a) Primer: 5810 Ambassador G-Prime latex metal primer. Applied to dft of not less than 1.8 mils.

b) Finish Coats: 8300 W.B. Industrial DTM gloss enamel. Applied to a dft of not less than 2.5 mils.

2. Full-Gloss Alkyd-enamel Finish: **Two finish coats** over a galvanized metal primer.

a) Primer: 5810 Ambassador G-Prime latex metal primer. Applied to dft of not less than 1.8 mils.

b) Finish Coats: 9800 Accu-Pro alkyd gloss enamel. Applied to a dft of not less than 1.5 mils.

3.06.3 INTERIOR STAIN AND NATURAL-FINISH WOODWORK SCHEDULE:

A. Stained Woodwork and Wood Doors: Provide the following stained finishes over new interior woodwork and wood doors:

1. Alkyd-Based Stain Satin-Varnish Finish: **Two finish coats** of alkyd-based clear satin varnish over a sealer coat and interior wood stain.

a) Stain coat: 8709 Woodkraft Semi-Transparent stain.

b) Sealer Coat: 4048 Woodcraft Sealer/finish Satin.

c) Finish Caots: 4039 Woodcraft Satin Varnish.

NOTE 1. All exposed wood surfaces of any kind within the project shall be covered under this provision, unless they are specifically and clearly excluded. If in doubt, contractor must obtain clarification, prior to bidding.

NOTE: 2: Approximately six, 8" x 12" different color samples (on maple veneer) are required for the Architect's final selection.

3.07 MATERIAL COMPLIANCE:

Work in this section of the specifications shall be governed by General Requirements, Section 01 10 60 - Codes and Standards. If conflict exits between products and methods herein specified and the Section noted above, notify Architect before bidding.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Extent of minor alteration work is indicated in drawings and specifications & by conditions on the job sites.

B. Types of minor alteration work include, but are not limited to, the following:

1. Door Frames and hardware
2. Partitions walls, & ceiling including insulation
3. Floors
4. Architectural finishes
5. Framing & bracing
6. Toilet Partitions & accessories
7. Plumbing, mechanical and electrical work.
8. Work in areas adjacent to the primary work area.
9. Patch & repair; matching existing finishes.
10. Plumbing chases

C. Application of Requirements: Requirements specified in this section apply to alterations work throughout the Work whether specified in this or other sections.

D. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SUBMITTALS

A. Product Data: Submit manufacturers information, specifications and installation instructions for components and accessories.

1.03 QUALITY ASSURANCE

A. Test required materials and methods to be used in making repairs for compatibility with existing materials. Should the proposed materials or methods be incompatible or damaging to the existing materials, request clarification from Architect before proceeding. Do not use incompatible materials or methods.

1.04 JOB CONDITIONS

A. Disconnecting Services: Notify Owner and authorities owning or controlling affected services before starting operations. Refer to General and Supplementary Conditions, and Division 1 specification sections for additional requirements.

B. Damage Due to Alterations Work: Correct movement, remodeling or other damage to existing building resulting from inadequate, improper or careless construction procedures, or inadequate shoring, bracing, support or protection.

C. Differing Conditions: Should materials, systems or conditions be encountered that differ from those indicated, the work must be done under this contract amount. No extras will be allowed Request clarification from Architect; in each case and do not proceed without instructions.

PART 2 - PRODUCTS

2.01 SALVAGED MATERIALS AND ITEMS

A. Materials and Items to be Reused: Carefully remove salvageable materials and items. Store in a protected manner during construction alteration operations. Reinstall in the indicated location or, if not indicated, where directed by Architect.

B. Preparation for Reuse: Clean salvaged materials and items prior to reinstallation. Retain only materials and items which are in good condition; discard and replace those with objectionable chips, cracks, splits, checks, dents, scratches or other defects. Operating items must operate properly.

2.02 NEW MATERIALS AND ITEMS

A. General: Provide new materials and items to match existing adjacent materials for closing of openings, repairs, and reconstructions where suitable salvaged materials do not exist, or are insufficient in quantity to complete the Work, or where reuse is not permitted. Provide new materials matching existing for such characteristics as type, size, quality and color.

B. Materials for repairing existing surfaces, but not otherwise specified, shall conform to the highest standards or trade involved, and be in accordance with approved industry standards.

C. Wall/Partition, Ceiling, Flooring & Support Materials

1. At drywall/gypsum board partitions, comply with materials and requirements specified in Division 9.
2. At plaster partitions, match existing materials.
3. Miscellaneous Materials:
   a. General: Provide auxiliary materials for work of this type and grade recommended by the Architect.
   b. General: Provide auxiliary framing, support & substrate materials as recommended by the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which Work of this section will be performed. All incomplete or unsatisfactory conditions are to be corrected.

3.02 ALTERATIONS, PATCHING, AND REPAIRS

A. General: Perform patches and repairs in professional manner so that the completed work is not discernable from adjacent surfaces and finishes at a normal viewing distance.

B. Restoring Existing Finishes: Restore finishes damaged or defaced because of cutting, patching, demolition, alteration or repair work, to condition equal to that before Work began. Where work exposes damaged or unfinished surfaces, repair and finish or refinish, or remove the damaged or unfinished materials, and provide new or salvaged, acceptable, matching materials, to make continuous areas and surfaces uniform.

C. Operational Items: Maintain operating items in acceptable condition, properly performing function or service equal to that performed before Work began. Special attention shall be made to intrusion and fire alarm system.

D. Workmanship: Perform new work, and restore and refinish existing work to comply with applicable requirements of the specifications. Workmanship for repairing existing materials not otherwise specified shall conform to similar workmanship existing in or adjacent to space where alterations are to be made. Reinstall salvaged items where no similar items exist, in accordance with the highest standards of trade involved and in accordance with approved shop drawings.

END OF SECTION 13990

SECTION 14240
HYDRAULIC ELEVATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
   1. Standard pre-engineered hydraulic passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Jack(s).
   4. Operation and control systems.
   5. Accessibility provisions for physically disabled persons.
   6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   7. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
   2. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
   3. Division 5 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   4. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   5. Division 15: Plumbing:
      a. Sump pit and oil interceptor.
   6. Division 15: Heating, Ventilation and Air Conditioning
      a. Heating and ventilating hoistways and machine rooms.
   7. Division 16 Sections:
      a. Providing electrical service to elevators, including fused disconnect switches.
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in machine room, hoistway and pit.

C. Work Not 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.

   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.
   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. 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.
   4. Elevator hoistways shall have barricades, as required.
   5. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
   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.

7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
8. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.
9. Machine room to be enclosed and protected.
10. Machine Room temperature must be maintained between 55° and 90° F.
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.
12. Access to the machinery space and machine room must be in accordance with the governing authority or code.
13. Provide an 8" x 16" cutout through machine room wall, for oil line and wiring duct, coordinated with elevator contractor at the building site.
14. All wire and conduit should run remote from either the hoistways or the machine room.
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.
16. Install and furnish finished flooring in elevator cab.
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.
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.
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.
20. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.
21. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.
22. General Contractor shall fill and grout around entrances, as required.
23. Elevator sill supports shall be provided at each opening.
24. All walls and sill supports must be plumb where openings occur.
25. For applications with jack hole, free and clear access to the elevator pit area for the jack hole-drilling rig is required.
26. Where jack hole is required, remove all spoils from jack hole drilling.
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.
28. Locate a light fixture and convenience outlet in pit with switch located adjacent to the access door.
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).
30. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway (or in the machine room).
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.
32. Wall thickness may increase when fixtures are mounted in drywall. These requirements must be coordinated between the general contractor and the elevator contractor.

33. Provide supports, patching and recesses to accommodate hall button boxes, signal fixtures, etc..
34. Locate telephone and convenience outlet on control panel.

1.02 SUBMITTALS

A. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:
   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.
   2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
   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.
   4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Powder Coat Paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.

D. Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:
   1. Owners Manual and Wiring Diagrams.
   2. Parts list, with recommended parts inventory.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing elevators of the type required for the project.
   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.
      a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
   2. The manufacturer shall have a documented, on-going quality assurance program.
   3. ISO-9001:2000 Manufacturer Certified
   4. ISO-14001:2004 Environmental Management System Certified

B. 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.

C. Regulatory Requirements:
   1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. Building Code: National.
   3. NFPA 70 National Electrical Code.

4. NFPA 80 Fire Doors and Windows.
5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
6. CAN/CSA C22.1 Canadian Electrical Code.
7. CAN/CSA B44 Safety Code for Elevators and Escalators.

D. 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).

E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
1. Arrange for inspections and make required tests.
2. Deliver to the Owner upon completion and acceptance of elevator work.

1.04 DELIVERY, STORAGE AND HANDLING

A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.05 PROJECT CONDITIONS

A. 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.

1.06 WARRANTY

A. 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.

1.07 MAINTENANCE

A. 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.

1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: ThyssenKrupp Elevator, Otis Elevator Company, or equal

2.02 MATERIALS, GENERAL

A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.

B. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
   3. Finish: Factory-applied baked enamel.

C. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness.

D. Carpet: By others.

2.03 HOISTWAY EQUIPMENT

A. 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.

B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.

D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.

E. 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.

F. 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. 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.

G. 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.

H. 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 readily biodegradable oil as specified by the manufacturer of the power unit (see Power Unit section 2.04.G for further details)

2.04 POWER UNIT

A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit consisting of the

following items:

1. Oil reservoir with tank cover.
2. An oil hydraulic pump.
3. An electric motor.
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.

B. 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.

C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.

D. Control System: Shall be microprocessor based and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure.

E. 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.

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.
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.
3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
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.

F. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

G. Oil Type: USDA certified bio based product, ultra-low toxicity, readily biodegradable, energy efficient, high performing fluid made from canola oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives. Especially formulated for operating in environmentally sensitive areas. USDA certified bio based product, >90% bio-based content, per ASTM D6866.

2.05 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.

1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
2. Main landing door & frame finish: ASTM A1008 steel panels, factory applied powder coat finish.
3. Typical door & frame finish: Powder coat.

B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by

code. Provide door restriction devices as required by code.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.06 CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type TKS, reinforced cold-rolled steel. Walls shall be finished with factory applied powder coat.
   2. Canopy: Cold-rolled steel with hinged exit.
   3. Ceiling: Suspended type, fluorescent lighting with translucent diffuser mounted in a metal frame.
   4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
   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.
      a. Door Finish: ASTM A1008 steel panels, factory applied powder coat enamel finish.
      b. Cab Sills: Extruded aluminum, mill finish.
   6. Handrail: Provide 1.5" diameter cylindrical metal on side walls. Handrails shall have a stainless steel, no. 4 brushed finish.
   7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.

B. 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.

2.07 DOOR OPERATION

A. 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.

   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.
   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.

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.
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.
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.
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.
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.
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.

B. Door Protection Devices: Provide a door protection system using 150 or more microprocessor controlled infra-red 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.

2.08 CAR OPERATING STATION

A. 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.

B. Emergency Communications System: Integral phone system provided.

C. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

2.09 CONTROL SYSTEMS

A. 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.

B. 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.

2.10 HALL STATIONS

A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.
   1. Provide one pushbutton riser with faceplates having a brushed stainless steel finish.
   2. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Corridor Call Station Pictograph Signs: Provide hall push button stations with engraved text and graphics as required by authorities having jurisdiction, indicating that in case of fire elevators are out of service and exits should be used instead.

C. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

A. 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.

PART 3 EXECUTION

3.01 EXAMINATION

A. 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.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. 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.
   1. Install casing for jack unit.
   2. Provide HDPE jack protection system for all in ground jacks.
   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.

C. 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.

D. 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.

E. Lubricate operating parts of system where recommended by manufacturer.

3.03 FIELD QUALITY CONTROL

A. 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.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

A. 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.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.06 PROTECTION

A. 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.

3.07 DEMONSTRATION

A. 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.

B. 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.

3.08 ELEVATOR SCHEDULE

A. Elevator Qty. 1

1. Elevator Model: Endura 21A Twinpost Single-Stage
2. Rated Capacity: 2100 lbs.
3. Rated Speed: 80 ft./min.
4. Operation System: TAC32
5. Travel: 10'-3"
6. Landings: 2 total
7. Openings:
   a. Front: 1
   b. Rear: 1
8. Clear Car Inside: 5' - 8" wide x 4 - 3 1/2" deep
9. Cab Height: 8'-0" nominal
10. Hoistway Entrance Size: 3' - 0" wide x 7'-0" high
11. Door Type: Single Speed
12. Power Characteristics: TBD volts, 3 Phase, 60 Hz.
13. Seismic Requirements: Zone 1
14. Fixture & Button Style: Traditional Signal Fixtures

END OF SECTION

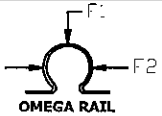
DATA AND GENERAL NOTES

OILDRAULIC ELEVATOR CONTRACT DATA

TYPE:	ENDURA 21 II A	ELEVATOR:	1
SPEED:	80FPM UP 105FPM DOWN	CAPACITY:	2100
CAR ENCLOSURE:	TKS	DOOR HAND:	LEFT FRONT, RIGHT REAR
FINISHED FLOOR:	BY OTHERS	PLATFORM THICKNESS:	3 3/8"
CAR WEIGHT:	2495	TELEPHONE:	BY ELEVATOR COMPANY
PIT LADDER:	BY ELEVATOR COMPANY	POWER UNIT:	EP-60, 15 HP
OPERATION:	TAC32	POWER SUPPLY:	208 V 3 PHASE 60 CYCLES
STARTING:	SOLID STATE STARTING	JACK MODEL:	2S2 TWINPOST
GLOPU:	4805	GLOJ:	4595
PLUNGER WALL THICKNESS:	0.244"	PLUNGER DIAMETER	3"
CYLINDER O.D.:	5.5625"	CYLINDER WALL THICKNESS:	0.219"
PLUNGER WEIGHT:	210.00 LBS	NET AREA:	14.020 SQ.IN.
BOTTOM CAR RUNBY:	6"	CAR BUFFER STROKE:	2 1/2"
BETWEEN PIT FLOOR & CAR BOLSTER ON COMPRESSED BUFFER:	2' 4 1/8"		
BUFFER REACTION (TYP. AT EACH BUFFER)	11,288 LBS	SPRING #:	780CB1
EST. WORKING PRESS:	377 PSI	SPRING CAP:	15,223 LBS

CAR FRAME

FORMED STILE	S = 1.38	I = 2.17	R = 1.009	T = 10GA
FORMED CROSSHEAD	S = 3.27	I = 9.82	A = 1.85	7GA X 6" X 2 1/2"
FORMED BOLSTER	S = 5.429	I = 21.71	A = 2.26	7GA X 8" X 2 3/4"

RAIL FORCES	F1	F2		
 OMEGA RAIL	289 LBS	217 LBS		

CAR STATION FEATURES: TRADITIONAL BUTTONS, TRADITIONAL WHITE TRADITIONAL BUTTONS, TELEPHONE, POSITION INDICATOR

FLOOR MARKINGS: PUSH BUTTONS LABELED AS 1, 2

CAR RIDING LANTERN LOCATION: RETURN

HOISTWAY PLAN VIEWS NOTES

1. 6" WIDE x 8" WIDE HIGH ELECTRICAL, RACEWAY, 8" x 8" PIPE SLEEVE, LOCATION DETERMINED BY RELATIONSHIP TO THE MACHINE ROOM.
2. A MEANS TO AUTOMATICALLY DISCONNECT THE MAIN LINE POWER SUPPLY TO THE ELEVATOR PRIOR TO THE APPLICATION OF WATER IN THE ELEVATOR MACHINE ROOM OR HOISTWAY WILL BE FURNISHED BY THE ELECTRICAL CONTRACTOR THIS MEANS SHALL NOT BE SELF RESETTING.

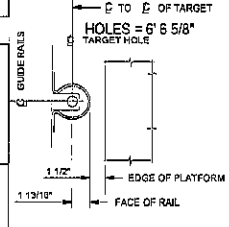
MACHINE ROOM

3. A MINIMUM OF 3'-6" (OR 1'-0" WHEN FACING EACH OTHER) REQUIRED ON ALL FRONTS OF ELECTRICAL PANELS
4. DISCONNECT SWITCH, CAR LIGHT , ALARM CIRCUIT WITH DISCONNECT, SWITCH, AND/OR PHONE CIRCUIT AND JUNCTION BOX.
5. TELEPHONE JUNCTION, CONDUIT AND WIRING TO CONTROLLER BY OTHERS
6. 2" OIL LINE FROM TANK TO 2" SHUTOFF VALVE, 2" SCH 40 BLK PIPE. ASTM A-53; TYPE E OR S, GRADE S OR EQUIVALENT TO JACK.

SECTION VIEW NOTES

8. SAFETY BEAM REQUIRED PER OSHA 1926.502 PROVIDED AND INSTALLED BY OTHERS, AS DIRECTED BY THYSSENKRUPP FIELD OFFICE DESIGN LOAD = 5000 LBS. (STATIC, NOT IMPACT)
9. VENTILATE HOISTWAY AS REQUIRED PER LOCAL BUILDING CODE

FORMED GUIDE RAIL INSTALLATION



BY OTHERS

THE FOLLOWING CONDITIONS MUST BE MET BEFORE INSTALLATION IS COMPLETED, AND ARE NOT INCLUDED IN THE ELEVATOR CONTRACT

1. A PLUMB, PROPERLY VENTILATED HOISTWAY (ACCORDING TO CODE AND SIZES SHOWN)
2. ADEQUATE SUPPORT FOR JACK, GUIDE RAIL BRACKETS, AND BUFFERS (FOR REACTIONS SHOWN)
3. HOISTWAY BARRICADES AND ALL CUTTING AND PATCHING TO INSTALL HOISTWAY ENTRANCES, SILLS, HALL FIXTURES, OIL, AND ELECTRIC LINES.
4. PIT LIGHTS AND SWITCH, CONVENIENCE OUTLETS WITH GFCI PROTECTION PER NEC, PIT LADDER PER CAR (ACCORDING TO CODE)
   NOTE: MUST BE CLEAR OF ALL ELEVATOR EQUIPMENT.
5. DEDICATED 120 VOLT, 15 AMP SERVICE, ALONG WITH TELEPHONE CIRCUIT WHEN REQUIRED TO TERMINALS OF EACH REQUIRED CONTROLLER (AS LOCATED ON PLAN VIEW) FOR THE FOLLOWING:
   - CAR LIGHT AND ALARM CIRCUIT WITH GFCI PROTECTION PER NEC
   - GROUP CONTROL WHEN REQUIRED
   NOTE: IF STANDBY POWER IS SUPPLIED TO ELEVATOR, CAR LIGHT AND ALARM CIRCUIT AND GROUP CONTROL SERVICE MUST BE STANDBY POWER BACKED
6. AN ENCLOSED MACHINE AREA (ACCORDING TO CODE), WITH ADEQUATE LIGHT, HEAT AND VENTILATION (MIN. 50°F., MAX. 90°F WITH NON-CONDENSING HUMIDITY OF 10-90%) AND SEALED CONCRETE FLOOR SLAB SURFACE.
   NOTE: MUST PROVIDE ADEQUATE DOOR SIZE TO ALLOW INSTALLATION OF EQUIPMENT, OR LEAVE WALL OUT UNTIL EQUIPMENT IS IN PLACE.
7. ENTRANCE WALL WITH LINTELS MUST BE PROVIDED AFTER ENTRANCE FRAMES ARE SET OR LEAVE A ROUGH OPENING 15" WIDER AND 15" HIGHER THAN THE FRAME OPENING. SEE INSTALLATION PROCEDURES FOR FRAME-TO-WALL INTERFACE DETAILS TO ENSURE CONFORMANCE WITH THE LABELED ENTRANCE INTERFACE CONSTRUCTION.
8. POCKETS IN CORRIDOR WALL FOR HALL FIXTURES.
   NOTE: MUST BE LOCATED AS DIRECTED BY ELEVATOR CONTRACTOR
9. SMOKE SENSORS (AS REQUIRED)
10. CONDUIT AND WIRING FROM HOISTWAY TO ELEVATOR MONITORING PANELS (FOR SECURITY, LIFE SAFETY, OR FIRE REQUIREMENTS)
11. PIPE SLEEVES, TRENCHING, AND BACK FILLING FOR OIL AND/OR CONDUIT LINES AS SHOWN OR LOCATED BY ELEVATOR CONTRACTOR.
12. ELEVATOR MEETS ASME A17.1 CODE.

REVISION HISTORY

REV	DESCRIPTION	DATE	DESIGNER
C		12/17/2013	LG

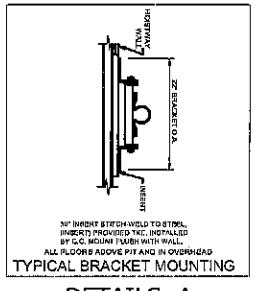
FOR: EL PASO COUNTY BLDG

ADDRESS: 301 MANNY MARTINEZ DR

CITY: EL PASO, TX 79905

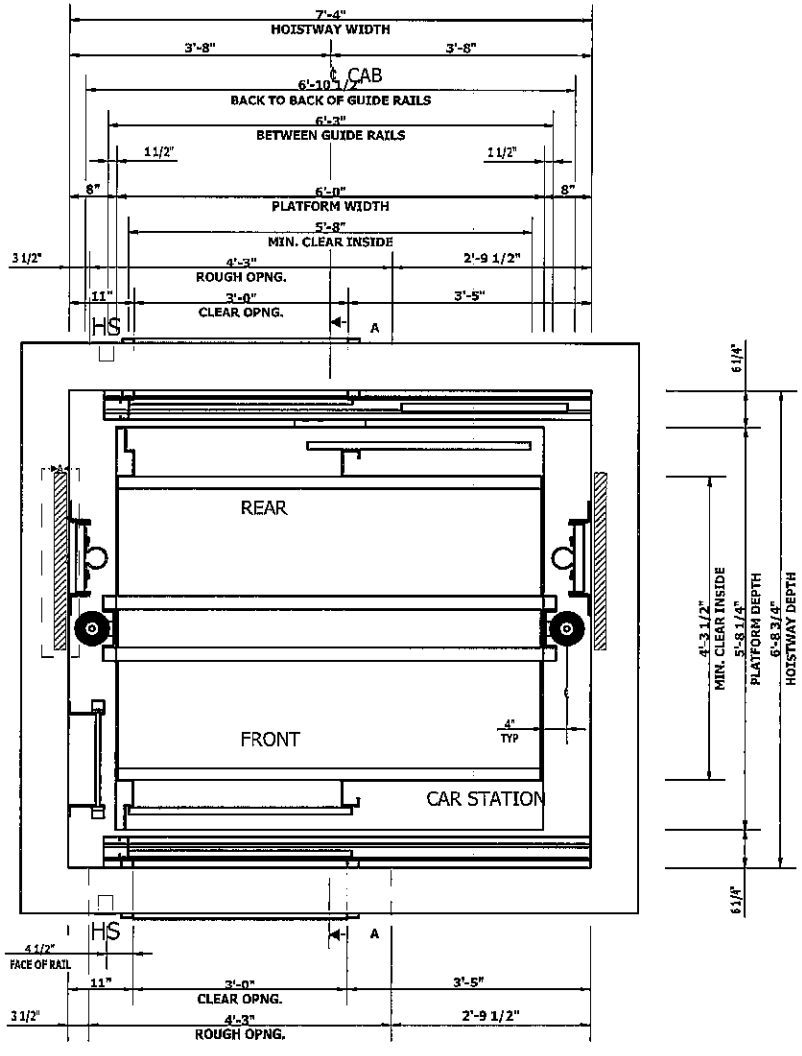
DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	3 of 10

HOISTWAY SIZE:	☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____
HAND OF DOOR:	☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____
APPROVAL: _____	DATE: _____



TYPICAL BRACKET MOUNTING

DETAILS: A



HOISTWAY PLAN

CAB INSIDE SQ FT: 24.3

☐ GENERAL NOTES
○ JOB SPECIFIC NOTES

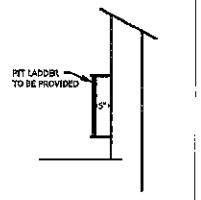
NOTE A: OIL PIPE LINES AND FITTINGS SHALL BE PROPERLY SUPPORTED TO RELIEVE STRAIN.
NOTE B: ALL REACTIONS INCLUDE ALLOWANCE FOR IMPACT.
NOTE C: THYSSENKRUPP ELEVATOR TO BE NOTIFIED OF ANY CHANGE TO ELEVATOR HOISTWAY OR MACHINE ROOM DESIGN.
NOTE D: ELEVATOR DESIGN & FABRICATION BASED ON ESTIMATED CAB WEIGHT SHOWN. LAYOUT APPROVAL WILL BE CONSTRUED AS FINAL CAB WEIGHT, UNLESS OTHERWISE NOTIFIED.

FOR: EL PASO COUNTY BLDG
ADDRESS:301 MANNY MARTINEZ DR
CITY: EL PASO, TX 79905

ThyssenKrupp Elevator Americas

ThyssenKrupp

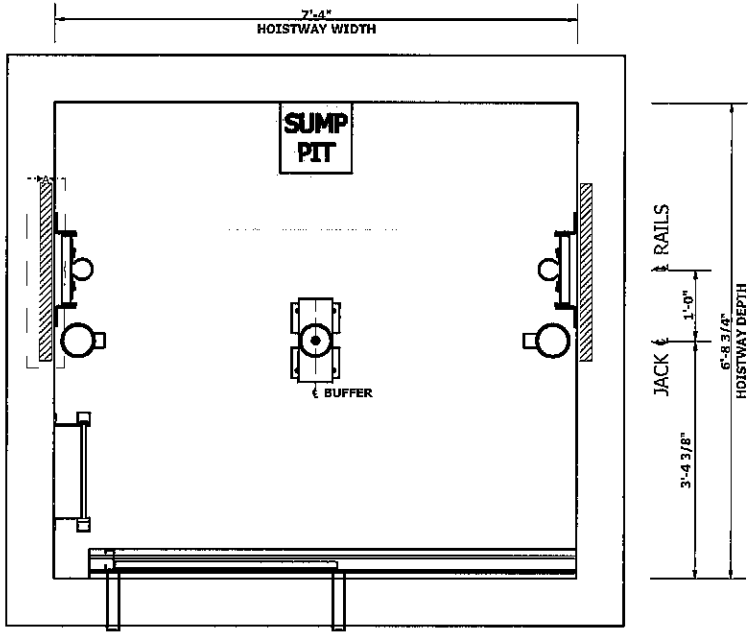
DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	4 of 10



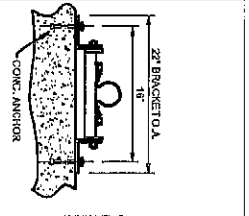
SUMP PUMP SHOULD BE CAPABLE REMOVING 50 GALLONS/MINUTE.

SUMP PIT IS TYPICALLY 24" X 24" X 24"

INSERTS WILL BE PROVIDED TO GC TO SET IN CMU HOISTWAY WALL.



SECTION P-P



TYPICAL BRACKET MOUNTING
DETAIL: A

2 PIT PLAN

☐ GENERAL NOTES
○ JOB SPECIFIC NOTES

FOR: EL PASO COUNTY BLDG

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CITY: EL PASO, TX 79905

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DRAWN	REV	JOB NUMBER	DATE	SHEET
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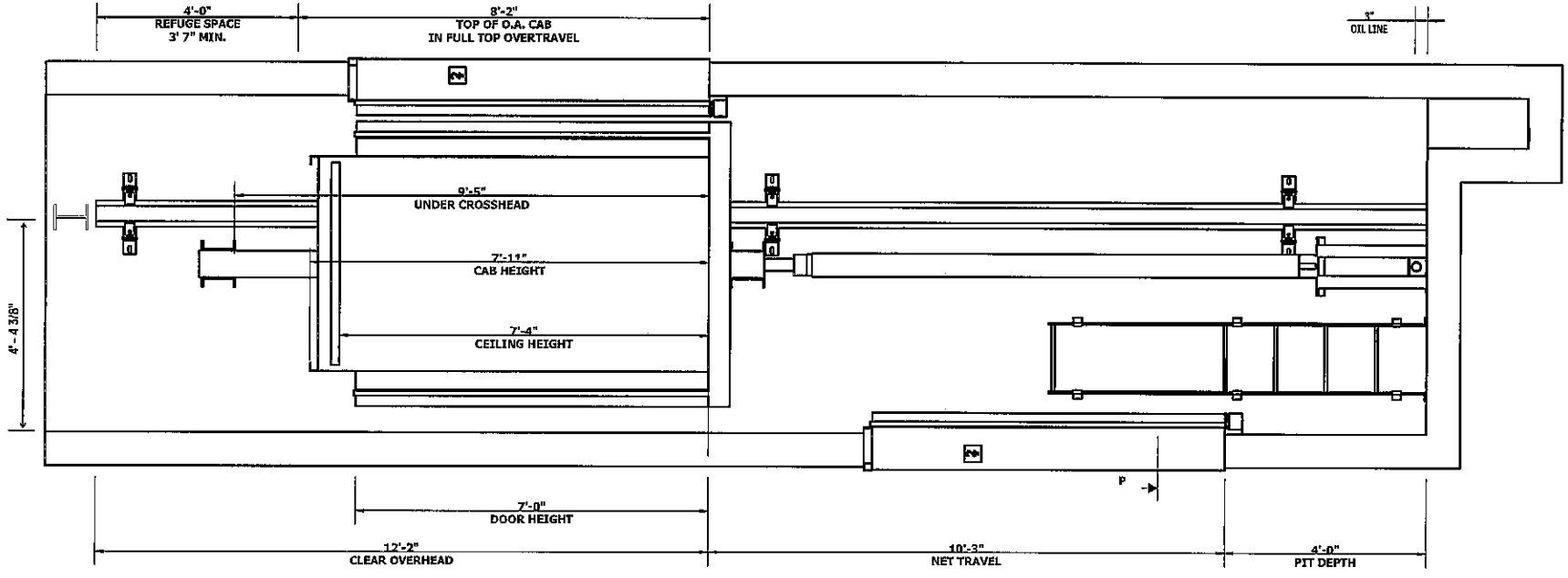
ELEVATOR SAFETY BEAM LOCATED AT 4' 4 3/8" OFF THE FRONT WALL. TOP OF HOISTBEAM MUST BE LOCATED A MINIMUM OF 2" FROM THE CEILING



CYLINDER LENGTH = 14' 0"

PLUNGER LENGTH = 14' 2 3/4"

R = 5251 LBS. JACK REACTION
(SEE PIT SHEET FOR LOCATION)

8

☐ GENERAL NOTES
○ JOB SPECIFIC NOTES

STOP SCHEME

FRONT DESIGNATION	REAR DESIGNATION
N/A	2
1	N/A

CAR RAIL BRACKETS AND INSERT LOCATIONS REQ. AT:

LOCATION	DESCRIPTION
15'9"	MAXIMUM UNSUPPORTED RAIL BRACKET SPACING
1'3"	BELOW EACH FLOOR, TYPICAL
11'6"	ABOVE TOP FLOOR

FLOOR TO FLOOR TRAVEL

	TRAVEL
FLOOR TO FLOOR 1 - 2	10' 3"
NET TRAVEL	10' 3"
TOP OVER TRAVEL	3"
BOTTOM OVER TRAVEL	10"
TOTAL TRAVEL	11' 4"

NET TRAVEL: ☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____

CLEAR OVERHEAD: ☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____

PIT DEPTH: ☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____

APPROVAL: _____ DATE: _____

FOR: EL PASO COUNTY BLDG

ADDRESS: 301 MANNY MARTINEZ DR
CITY: EL PASO, TX 79905

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DRAWN	REV	JOB NUMBER	DATE	SHEET
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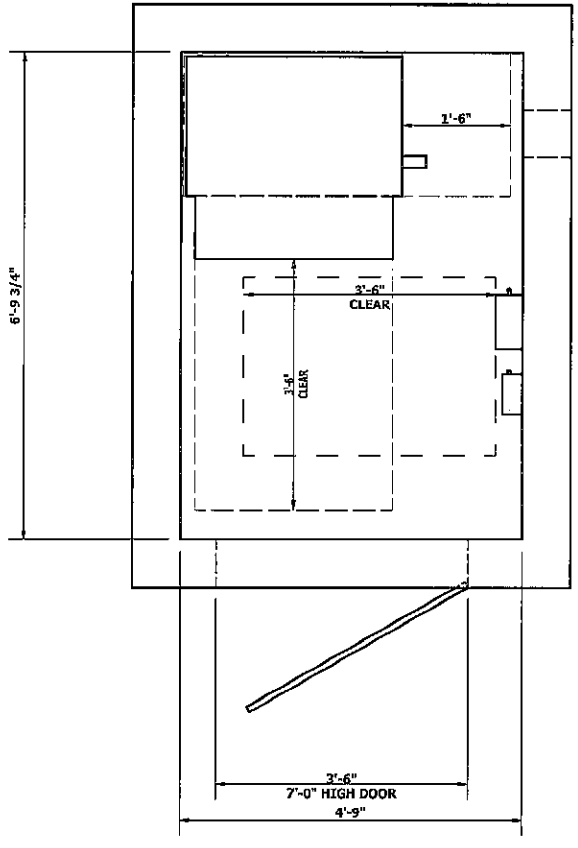
POWER UNIT AND CONTROLLER INFORMATION						
Designation	Power Unit Width x Depth	Tank Height	Oil Line Height	Oil Line Size	Tank Weight w/ Oil	Controller Height
1	2' 11 15/16" X 2' 10"	2' 8 1/2"	2' 3 1/4"	2"	1470	3' 11"



HYDRAULIC FLUID REQUIRED IN SYSTEM = 65 GALLONS

☐ GENERAL NOTES
○ JOB SPECIFIC NOTES

3 4 5 6

MACHINE ROOM

HEAT LOAD IN MACHINE ROOM DUE TO ELEVATOR EQUIPMENT = 6486 BTU/HR
MINIMUM MACHINE ROOM CEILING HEIGHT = 7'-6"
ADJACENT AT FLOOR 1

MACHINE ROOM SIZE:	☐ CONFIRMED AS SHOWN ☐ CORRECTED: _____

APPROVAL: _____ DATE: _____

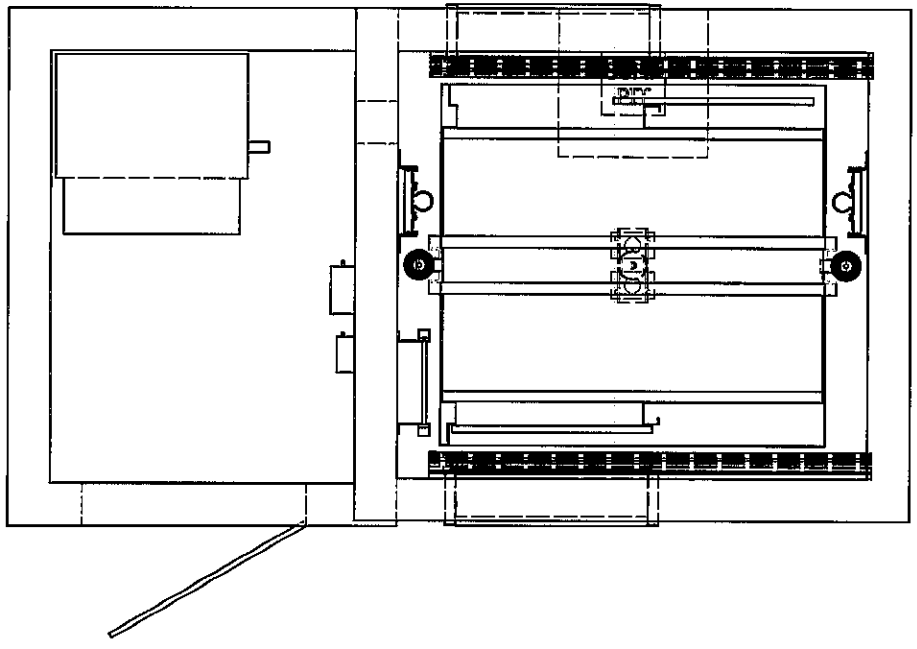
FOR: EL PASO COUNTY BLDG

ADDRESS: 301 MANNY MARTINEZ DR
CITY: EL PASO, TX 79905

ThyssenKrupp Elevator Americas

ThyssenKrupp

DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	7 of 10



N

KEY PLAN

FOR: EL PASO COUNTY BLDG

ADDRESS: 301 MANNY MARTINEZ DR

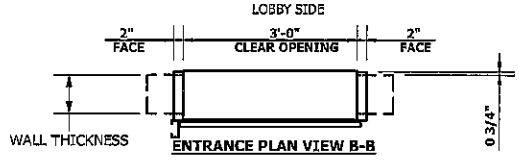
CITY: EL PASO, TX 79905

ThyssenKrupp Elevator Americas

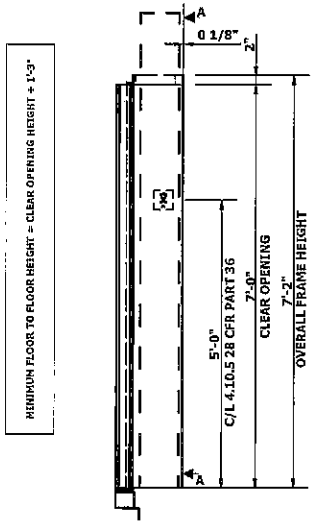
ThyssenKrupp

DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	8 of 10

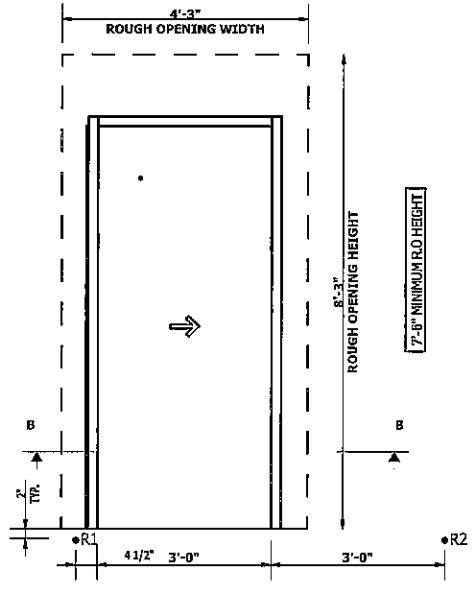
DOOR REACTION	
	CASE 1
R1	537
R2	224



ENTRANCE PLAN VIEW B-B



SECTION1



ENTRANCE ELEVATION VIEW A-A

Entrance Type : M721
For Elevator 1

1 SPEED
LEFT HAND FRONT ENTRANCE
FOR 1

ELEVATOR DESIGNATION(S):

FOR ELEVATOR(S): 1

TOTAL WEIGHT	ELEVATOR 1
CAB AND HALL DOORS	268 LBS

FEATURES OF YOUR ENTRANCES		
FEATURES	FINISH	LOCATION
DOOR OPEN STRUT BUMPERS:	N/A	@1
KICKPLATES:	———	@1
BINDERS:	———	@1
SILL FINISH:	ALMN	@1

FEATURES OF ENTRANCE	DATA
SILL MAXIMUM WHEEL LOADS	625.00 LBS
KEYHOLES TO BE	INCLUDED
THIS FRAME HAS A WARNOCK HERSEY LABEL OF	2 HOURS
DUST COVERS	INCLUDED

NOTES:

GENERAL CONTRACTOR RESPONSIBLE FOR HOISTWAY REINFORCING AT FLOOR SLAB BEFORE INSTALLATION OF ENTRANCE FRAMES. MINIMUM OF 4" HIGH X 8" WIDE REINFORCED CONCRETE, REINFORCED OF OPENING REQUIRED FOR ANCHORING SILL SUPPORT ASSEMBLY, REINFORCING TO BE LOCATED WITH RESPECT TO REACTION POINTS, REFERENCE INSTALLATION DRAWINGS 494JT, AND 494JV, ARE AVAILABLE UPON REQUEST.

REACTIONS (LBS.) DUE TO LOADS ON DOOR PANELS, APPROX. HORIZONTAL LOADS AND LOCATION TO BUILDINGS SHOWN PER ASME A17.1 PART II,
THE SPECIFIED LOADS ARE CONSIDERED IMPACTED.

FOR: EL PASO COUNTY BLDG

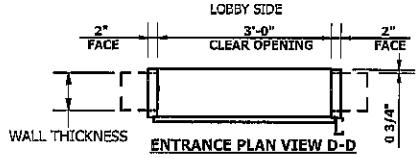
ADDRESS: 301 MANNY MARTINEZ DR
CITY: EL PASO, TX 79905

ThyssenKrupp Elevator Americas

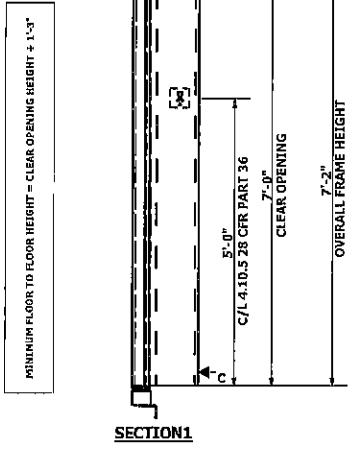
ThyssenKrupp

DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	9 of 10

DOOR REACTION	
	CASE 1
R1	537
R2	224

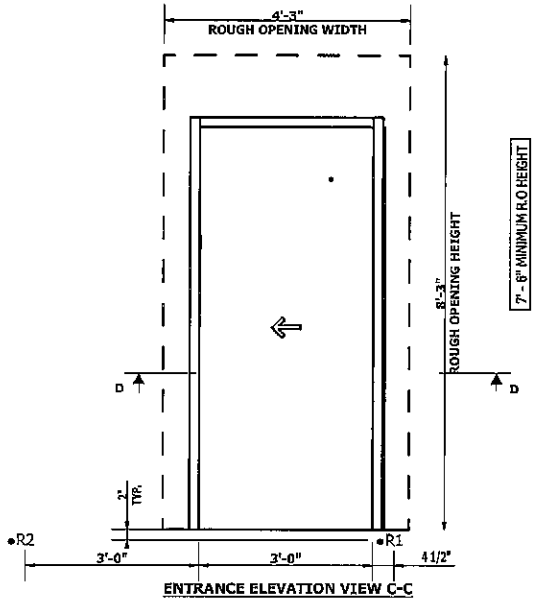


ENTRANCE PLAN VIEW D-D



SECTION1

Entrance Type : M721
For Elevator 1



ENTRANCE ELEVATION VIEW C-C

1 SPEED
RIGHT HAND REAR ENTRANCE
FOR 1

ELEVATOR DESIGNATION(S):

FOR ELEVATOR(S): 1

TOTAL WEIGHT	ELEVATOR 1
CAB AND HALL DOORS	268 LBS

FEATURES OF YOUR ENTRANCES		
FEATURES	FINISH	LOCATION
DOOR OPEN STRUT BUMPERS:	N/A	@2
KICKPLATES:	———	@2
BINDERS:	———	@2
SILL FINISH:	ALMN	@2

FEATURES OF ENTRANCE	DATA
SILL MAXIMUM WHEEL LOADS	625.00 LBS
KEYHOLES TO BE	INCLUDED
THIS FRAME HAS A WARNOCK HERSEY LABEL OF	2 HOURS
DUST COVERS	INCLUDED

NOTES:

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FOR: EL PASO COUNTY BLDG

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DRAWN	REV	JOB NUMBER	DATE	SHEET
LG	C	112-649-01A	12/17/2013	10 of 10

Electrical Power Requirements

Hydraulic Elevator
Three Phase Submersible Power Unit
with Solid State Starting

15 HP

Job Name: *El Paso County Bldg*
Elevator Model: *Endura 21A II Twinpost*
Net Travel: *10'-3"*
Speed: *80 FPM*

		Branch Circuit Protection Device and Size Recommendations					Full Load Up High Speed		
Name Plate HP	3 Phase Voltage	Non time Delay Fuse	Thermal Circuit Breaker	Dual Element Time Delay Fuse	Rated A.C. Amps	Starting A.C. Amps	Motor A.C. Amps	Control Trans. A.C. Amps	Total A.C Amps
15	200/208	150	125	90	51.7	103-233	72	4	76
	230	110	90	80	44.6	89-201	62	4	66
	460	60	45	40	22.3	45-100	31	2	33
20	200/208	175	150	125	65.1	130-293	91	4	95
	230	150	110	100	57.1	114-257	80	4	84
	460	70	70	50	28.4	57-127	40	2	42
25	200/208	200	175	150	78.7	157-354	110	4	114
	230	175	150	125	68	136-306	95	4	99
	460	90	70	60	34	68-153	48	2	50
30	200/208	250	200	175	94.3	189-424	132	4	136
	230	200	175	150	81.8	164-368	115	4	119
	460	100	90	80	40.9	82-184	57	2	59
40	200/208	300	250	225	122.5	245-551	172	4	176
	230	275	225	200	105.4	211-474	148	4	152
	460/480	150	110	100	52.7	105-237	74	2	76
50	200/208	400	350	300	156	312-702	218	4	222
	230	350	300	250	136.1	272-612	190	4	194
	460	175	150	125	68.1	136-306	95	2	97
60	200/208	450	400	350	190	380-855	266	4	270
	230	400	350	300	165	330-742	231	4	235
	460	200	175	150	82.5	165-371	116	2	118

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions, and Division 1 – General Requirements apply to work of this section.

1.02 DESCRIPTION:

A. Work covered by this Division shall consist of furnishing all labor, equipment, supplies and materials and in performing all operations necessary for the installation of complete and operating mechanical systems as required by these specifications and/or shown on the drawings, subject to the terms and conditions of the contract. The work shall also include the completion of such mechanical and electrical details not mentioned or shown which are necessary for the successful operation of all systems described on the drawings or required by these specifications; this includes the furnishing all materials for the filling the systems to make them operable, including water, refrigerant, oil and grease. Prove satisfactory operation of all equipment and controls to the Engineer on request.

B. Work not included – Certain labor, material and equipment may be furnished and/or installed under other divisions of these specifications. This Contractor shall coordinate with other trades and arrange his work to make the parts fit together. The following items are to be accomplished under other divisions of these specifications:

1. Temporary Heat: Refer to paragraph in this Section.
2. Temporary Water and Toilet: Refer to General Conditions.
3. Electrical Equipment and Wiring: Refer to paragraph in this Section.
4. Concrete: Refer to paragraph in this Section.

C. Equipment Furnished by Owner – Rough-in services pipes to locations as required by architectural and mechanical drawings and equipment shop drawings. Provide service valves on all pipes except waste and vent pipes. Plug and cap all waste and vent pipes. Final Connection to equipment will be made by this Contractor.

1.03 BIDDING:

A. All mechanical equipment shall be new unless specified otherwise in the specifications or on the drawings.

B. All bids must be based only on the equipment and materials as scheduled on the drawings and as specified or on equivalent equipment and materials from a preapproved alternative manufacturer. No bid may be based on a substituted or other alternative without specific written prior approval from the Engineer. Any Contractor who assumes equivalence of products and who bases his bid on that assumption does so at his own risk.

C. A listing of approved alternative manufacturers does not mean that all products of a particular alternative manufacturer are acceptable alternative to the scheduled items; it merely means that for bidding prior approval is not required. All fixtures and devices must still be submitted according to the prescribed procedures. In

addition, some items that have an important visual affect, e.g. electric water coolers, may be required to receive Owner's or Architectural approval also.

1.04 EXISTING UTILITIES:

A. The drawings indicate the locations, type and sizes of various utilities within the site where known. These utilities are indicated as accurately as possible. If the Contractor encounters any utilities or differing conditions during construction, which are not shown on the drawings, they shall request in writing for written instructions from the Architect and/or Engineer. Any relocation or remodeling required will then be directed by a change order. This Contractor shall assume all responsibility for protection of all utilities, shown or not, and for repair required by this construction.

B. Contractor shall verify location, size, elevation, pressure and any other pertinent data of the existing utilities. The Contractor shall provide a written report with drawings indicating this existing utilities information, such as utility locations and sewer invert information. Additional costs incurred due to failure to verify such data and to coordinate associated work with respective utility providers shall not be the Owner's responsibility but shall be borne by the Contractor.

C. All costs associated with providing utilities including, but not limited to, connection fees, meters, boring under roads, etc., shall be included in the Contractor's bid price whether such costs are incurred by Contractor or charged by the utility company.

D. Submission of a bid by the Contractor shall be considered an acknowledgment by the contractor of his compliance with this section.

E. The Contractor shall coordinate with Owner, Architect, and this Engineer's office any work that has the potential to hinder mechanical and plumbing services to areas outside this contract. All shut downs or tie-ins relating to these systems shall be scheduled and submitted in writing to be approved by the Owner, Architect, and this Engineer's office. Contractor shall submit in writing a schedule of construction phasing that indicates areas of first priority during each phase and anticipated completion times. Schedules shall be submitted a minimum of 7 days prior to commencing work. Owner, Architect, and this Engineer's office shall review these schedules and notify the contractor of acceptance prior to commencement of work.

1.05 CODES, PERMITS AND FEES:

A. Contractor shall comply with all local, state and national codes and shall pay for all applicable costs, meter costs, fees, permits, licenses and inspections for this division

B. The mechanical work shall be performed in strict accordance with the applicable and Adopted provisions of the International Building Code International Plumbing Code, International Mechanical Code and International Energy Conservations Code as adopted and interpreted by the State of Texas, City of El Paso and the National Fire Protection Association (NFPA) regulations, current adopted edition regarding mechanical systems, fire systems and electrical systems. All materials and labor necessary to comply with Rules, regulations and ordinances shall be provided. Where the drawings and/or Specifications indicate materials or

construction in excess of code requirements, the Drawings and/or specifications shall govern. The contractor shall hold and save the Owner, Architect and Engineers free and harmless from liability of any nature or kind Arising from his failure to comply with all applicable codes and ordinances.

1.06 TEMPORARY HEAT:

A. Temporary heat will be furnished by the General Contractor. Use of the permanent heating system will not be allowed without written authorization from the Engineer, Architect, and Owner. In case the permanent heating system is used for temporary heat, the General Contractor shall pay all the costs until acceptance by the Owner. Warranty of equipment shall not start until acceptance by the Owner.

1.07 DRAWINGS:

A. Contract drawings are diagrammatic only and are not intended to be scaled for dimensions. All dimensions shall be taken from Architectural drawings, certified equipment drawings and from the structure itself before fabricating and work. All space requirements shall be verified, coordinated with other trades, as it is the various Contractors' responsibility to install the systems complete in the space provided without extra charges to the Owner.

B. It is intended that anything, including labor and materials, which is usually furnished as part of any equipment specified and which is necessary for operation shall be furnished as part of the Contract without additional cost, whether or not shown or described.

C. All piping in finished areas of the building shall be concealed except where otherwise noted on the drawings.

D. All equipment shall be installed in accordance with manufacturer's recommendations, unless approval is given in writing be the Consulting Mechanical Engineer for deviation prior to commencement of work.

1.08 REQUIREMENTS OF REGULATORY AGENCIES:

A. The mechanical work shall be performed in strict accordance with the local and state codes, ordinances, and regulations governing the particular work involved. Furnish, without extra charge, any additional material and labor when and where required to comply with these Rules and Regulations, though the work is not mentioned in the Specifications or shown on the Drawings. When the Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned Rules and Regulations, the provisions of these Specifications and accompanying Drawings shall take precedence.

1.09 QUALIFICATIONS:

A. All mechanics shall be capable journeymen, apprentices, or helpers, skilled in the work assigned to them with licensing required by the inspecting authority. All welders must have been certified within the past three years to perform the work, which they are doing.

1.10 WARRANTY:

A. All materials and equipment shall be new unless otherwise specified.

B. Guarantee all workmanship, material, and equipment and replace any found defective without cost to the Owner, for ONE year after final acceptance, as defined in General Conditions.

C. Each warranty for longer than one year as described above (that comes with equipment used on the job) shall be passed into the Owner in the Operation and Maintenance Manual, along with the dates of start and end of warranty.

D. Refer to General Conditions for additional information regarding specific warranty requirements.

1.11 PROJECT RECORD DOCUMENTS:

A. Before final payment, provide the Architect with one clean set of drawings and specifications corrected up-to-date as job progress. These documents shall reflect the As-Built conditions. Refer to General Conditions for additional information.

1.12 SUBMITTALS:

A. The intent of this section is to give general submittal information, refer to specific submittal information in the subsequent mechanical sections.

B. Within 10 days after award of the contract, and before orders are placed, Contractor shall submit specific information on list of equipment and principal materials specified. Contractor shall indicate and/or provide names of manufacturers, catalog and model numbers, cut sheets, and such other supplementary information as necessary for evaluation. Minimum of six (6) copies, or as directed by the Engineer, of each shall be submitted and shall include all items mentioned by model number and/or manufacturer's name in the specifications or in schedules on the drawings.

C. Requirements for each submittal:

1. Bear a dated stamp or specific written indication that the Contractor has reviewed and approved all submittal prior to submission to Engineer,
2. Have all information deleted by Contractor that pertains to the means and methods of construction or to fabrication, assembly, installation, or erection (approval by Engineer shall not extend to these areas unless specifically noted by Engineer),
3. **BE CLEARLY AND SPECIFICALLY** marked as to which specific piece of equipment is being submitted, bye use of a permanent marker, stamp, etc., so as to distinguish it from other pieces of equipment that may occur on the same page,
4. **BE CLEARLY AND SPECIFICALLY** marked as to which available options are being submitted that are associated with a piece of equipment, and

5. Be complete with respect to quantities, dimensions, specific performance, materials, and similar data to enable the Engineer to review the proposed equipment.
6. Omission by Contractor of any of the above requirements or submittals will subject submittal to automatic rejection without review.
7. Any submittals received by Engineer that were not requested shall be returned without review of any kind.
8. Submittals shall indicate minimum access and service clearances if required by the submitted equipment.

D. Installation Instructions – For certain products or systems as identified in subsequent specifications sections or on the drawings, the Contractor shall be required to provide copies of manufacturer's installation instructions with the submittal. When required as such, the installation instructions are considered part of the submittal and their omission may result in automatic rejection of the submittal. Where more than one identical device are scheduled, only one set of installation instructions needs to be submitted, e.g. if seven five-ton split systems air conditions are scheduled, only one five-ton unit installation instruction needs to be submitted. Similarly, if one set of installation instructions is identified by the manufacturer and on the instructions to be applicable to more than one type or size of devices, e.g. if one set of air conditioner instructions is good for three, four, five-ton units, then only one instruction set is required for these devices.

E. This Engineer will review the submittals for approval twice. Any additional reviews that are required by the engineer for whatever reason after the initial two reviews will result in additional compensation for the Engineer's time by the submitting Contractor at the Engineer's rate.

1.13 PRIOR APPROVAL OF SUBSTITUTED PRODUCTS:

A. Material or equipment specified by Manufacturer's name and model number is being used as a basis of standard and performance. No substitution is allowable without Engineer's written approval **FOURTEEN (14) DAYS PRIOR TO BID DUE DATE** unless the manufacturer is listed on the drawings or in the specification as being a preapproved alternative manufacturer.

B. A prior approval submittal package shall at a minimum consist of the following items:

1. One copy of the product submittal in accordance with the paragraph in this section titled SUBMITTALS.
2. Plan layouts sketches of mechanical rooms or systems of the substituted equipment showing that the proposed equipment will fit within the space allocated with the manufacturers and code required clearances for the substituted equipment as well as the other equipment in the space.
3. Indications of any structural modifications required for the proposed substitution, such as additional weight or opening size changes.
4. Indications of any electrical modifications required for the proposed substitution, such as changes in breaker sizes, wiring requirements.
5. Indication of any deviations from the specified equipment or their performance.

C. It shall be the Manufacturer and/or their authorized Representative's responsibility to verify that submitted substitute equipment will fit in space available. The Manufacturer and/or their authorized Representative's submittal for acceptance of

the substitute shall include a written statement of whether or not such acceptance would require any subsequent or associated changes to the drawings or specifications. Any such changes shall be described in writing, briefly but complete.

D. The Manufacturer and/or their authorized Representative's shall be responsible for the costs of any such modifications due to substitution of materials or equipment for that which was specified or scheduled. The cost shall be complete, that is, it shall include the cost affect of any and all other trades.

1.14 SUBSTITUTED PRODUCTS:

A. Material or equipment specified by Manufacturer's name is being used as a basis of standard. No substitution is allowable without Engineer's written approval ten (10) days prior to bid due date unless the manufacturer is listed on the drawings or in the specification as being a preapproved alternative manufacturer. Any submittal received without such written approval or prior approval is subject to unqualified rejection.

B. It shall be the Contractor's responsibility to verify that submitted substitute equipment will fit in space available. The contractor's submittal for acceptance of the substitute shall include a written statement of whether or not such acceptance would require any subsequent or associated changes to the drawings or specifications. Any such changes shall be described in writing, briefly but complete.

C. The Contractor shall be responsible for the costs of any such modifications due to substitution of materials or equipment for that which was specified or scheduled. The cost shall be complete, that is, it shall include the cost affect of any and all other trades.

D. The Engineer may request detailed shop drawing or plan layouts of mechanical rooms or systems of the substituted equipment.

1.15 SAFETY:

A. General – Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work, and Contractor shall comply with all laws governing safety, specifically the "Occupational Safety and Health Standards" and the "Safety and Health Regulations for Construction", state and federal.

B. According to OSHA, a hazardous chemical is any chemical, which is a physical hazard or a health hazard. This may include items such as paints, solvents, adhesives, sealants, cleaners, etc. If a contractor produces, uses, or stores hazardous chemicals at the workplace, them contractor shall develop, implement, and maintain a hazard communication program in compliance with the latest OSHA requirements. In projects with multiple tenants in which the building is partially occupied during all or part of the project, Contractor shall inform the building

manager or Owner, according to OSHA guidelines, of any hazardous chemicals being produced, stored, or used in the building so that other tenants may be notified. Contractor shall employ required methods of training, information, handling, ventilation, labeling, storing, disposal, and removal of hazardous chemicals.

1.16 LABELING:

A. Each device for which an independent testing authority has established a standard shall have affixed a label indicating its compliance and listing. Refer to General Conditions for list of such independent testing authorities.

1.17 SITE VISIT REPORTS:

A. During the course of the job, the Engineer will make site visits to observe work in progress and will subsequently prepare a written site visit report, which will be sent to the Contractor and to whomever else the Engineer desires. The Contractor shall prepare a written and typed response within seven (7) calendar days of his receiving the site visit report. The Contractors shall accompany the Engineer during this final punchlist visit upon the request of the Engineer. The General Contractor shall include in his response the following information.

1. Date of site visit by the Engineer,
2. Date of receipt of the site visit report,
3. Name and title of the preparer of the response,
4. An item number referenced to the site report,
5. A brief three or four word description of the item,
6. The Contractor or Subcontractor affected,
7. The proposed course of action, and
8. An expected time of completion of the action.

1.18 FINAL PUNCH REPORTS:

A. At the completion of the job, the Engineer will make punchlist site visits to observe completed work and will subsequently prepare a written site visit punchlist report, which will be sent to the Contractor and to whomever else the Engineer desires. The Contractor upon completion of the listed punchlist items shall prepare a type written response to the list indicating completion of each item. The Contractor shall include in his response the resolution of each item. The Contractors shall accompany the Engineer during this final punchlist visit upon the request of the Engineer.

1.19 CUTTING AND PATCHING:

A. No joists, beams, girders, columns, slabs, or other structural elements shall be cut, drilled, or altered in any way by the Contractor without first obtaining written permission and instructions from the Engineer and Architect.

B. Where it is necessary to cut through any non-structural elements of walls, floors, or ceilings to permit the installation of any work under this contract, or to repair any defects that may appear up to expiration of the guarantee, such cutting shall be

done by the Contractor with as little damage as reasonably possible to the element being cut or to adjacent elements.

C. After the necessary work has been completed, the damage shall be repaired by the respective Contractor, who shall pay all costs of such cutting, repairs and patching. All patching or sealing of cuts and penetrations, including final appearance of same, shall be done to the approval of the Engineer and Architect.

D. The Contractor shall fire stop all penetrations through fire and smoke rated barriers as required by code. Refer to Division 7 for fire stopping material information.

1.20 INSURANCE:

A. The Contractor shall have required insurance. Required insurance shall be provided by this Contractor for protection against public liability and property damage for the duration of work.

1.21 CONFLICTS AND CORRECTION OF WORK:

A. Promptly correct work rejected or failing to conform to the requirements of the Contract, whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear cost of correcting such rejected and nonconforming work including additional testing and inspections and including compensation for observing mechanical and electrical engineering firm's services and expenses made necessary thereby.

B. If a conflict occurs on the bid documents, the Contractor shall contact the Architect's and Engineer's offices with a written request for clarification. If the conflict is un-resolvable at the time of bid, the most expensive interpretation of the conflict shall be bid so the conflict can be resolved in a deductive manner at a later time if necessary.

C. If a conflict is discovered during construction, the Contractor shall stop work and that portion of the project and contact the appropriate party for clarification. The request for clarification shall be in written form. The Contractor shall bare the burden of replacing work that has been installed incorrectly as a result of a conflict on the drawings where he has not sought the Architect's and Engineer's guidance for clarification.

D. If during construction a conflict is discovered between the drawings, the specifications, and/or the manufacturer's installation requirements the most stringent shall apply unless written clarification is obtained from the Engineer.

1.22 COORDINATION:

A. In a timely manner, coordinated with all work involved for the following areas:

1. Where new work of three or more trades or subcontractors is installed.
2. Where new work is installed in existing areas.
3. Where lead times are critical to the project schedule.
4. Provide construction grade drawing as needed to acquire approval of work plan.

5. Access or service spaces required for HVAC and plumbing equipment.

B. Any occasion that requires the Engineer to be in attendance, the Contractor shall give the Engineer 24-hour notification.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. All materials shall be new and of specified quality, unless specifically noted otherwise. Materials shall be free from defects. Where manufacturer names are mentioned in the specifications or on the drawings, it has been done in order to establish a standard of quality and construction.

B. Contractor will be responsible for transportation of his material to and from the job site, and will be responsible for the storage and protection of his materials and work until the final acceptance of the job. At the end of each day of work, each Contractor is responsible for covering or protecting his work and/or materials that may be susceptible to damage even if such damage is the result of unforeseen causes, e.g. an overnight thunderstorm. Failure to do so will be sufficient cause for rejection of any item in question, and any such item shall be replaced by Contractor at no cost to the Owner.

C. Contractor shall verify that all pieces of equipment will fit through available openings in the building and that all equipment can be installed without modification of building structure.

2.02 EQUIPMENT SCHEDULE:

A. All equipment major items are specified in the equipment schedules on the drawings and shall be new and furnished complete with all accessories normally supplied with the catalog item listed and all other accessories necessary for a complete and satisfactory installation.

B. Equipment items so noted will require start-up by factory-trained personnel. Equipment items so noted will require factory approved service personnel who shall provide all service, including all parts and all labor, as requested by the Owner, during the full period of equipment warranty.

2.03 EQUIPMENT RATINGS:

A. Equipment capacities as scheduled on the drawings are at project site altitude. Capacities of submitted equipment must be corrected for project site altitude unless otherwise noted.

2.04 WORKMANSHIP:

A. The workmanship shall, in all respects, be of the highest grade, and all construction shall be done according to the best practices of the trade. Piping, ducting, and conduit shall be concealed unless otherwise noted, and installed square to the building lines. Any work not meeting this requirement shall be replaced or rebuilt without extra expense to the Owner.

2.05 ELECTRICAL EQUIPMENT AND WIRING FOR ARCHITECTURAL AND MECHANICAL DIVISION:

A. Responsibility

1. Unless otherwise indicated, all motors, conduit, wiring, and controls (including temperature) shall be furnished, set in place, and wired in accordance with the following schedule. (MD is Mechanical Division AD is Architectural Division, and ED is Electrical Division)

MECHANICAL-ELECTRICAL ARCHITECTURAL COORDINATION TABLE 1

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
1. Equipment Motors and Thermal Overloads	MD	MD	ED
2. Disconnect switches, fused or unfused, HP rated switches	ED (1)	ED (1)	ED
3. Pushbutton stations, pilot lights, float switches, thermostats, control relays, time clocks,	MD	MD (2)	MD (2)
4. Contactors, 120V control circuit outlets for control panels and for elevator controls and fire/smoke detectors	ED	ED	ED
5. Architectural Equipment as listed in Divisions 2 through 20 such as elevator, ADA door openers, projections screen, etc	AD (5)	MD (4 & 5)	ED (4 & 5)
6. Fire and Smoke Duct Detectors	ED	MD	ED (3)

Notes:
1. If furnished as part of factory wired equipment, wiring, conduit, and connection only be ED
2. If float switches, line voltage thermostats, PE switches, time switches etc., carry the FULL LOAD CURRENT of any motor, they shall be furnished by the Mechanical Division, but shall be set in place, wired and connected by the Electrical Division, except that where such items are and integral part of the mechanical equipment, or directly attached to ducts, piping, etc., they shall be set in place under the Mechanical Division and wired and connected by the Electrical Division. If they do not carry the FULL LOAD CURRENT to any motor they shall be furnished, set in place, and wired under the Mechanical Division.
3. Wiring and conduit from alarm contacts to alarm system and conduit for control functions by ED; all control function wiring by MD.
4. Wiring and conduit from alarm contacts and kitchen equipment shutdown to kitchen fire suppression system by ED; all control functions by MD.
5. Architectural division to set in place, Mechanical Contractor to make mechanical connections and Electrical Contractor to make electrical connections.

B. Connections

1. Connection to all control directly attached to ducts, piping and mechanical

equipment shall be made with flexible connections not to exceed 3 linear feet.

2.06 ELECTRICAL WIRING AND CONTROL EQUIPMENT:

A. All disconnects, motor starters, relays, wiring, conduits, etc. shall be provided by and comply with all requirements of 26 05 00 Sections of the electrical specifications.

B. The Mechanical Contractor must refer to the electrical control equipment and wiring shown on the Electrical Drawings. Any changes or additions required by specified equipment furnished shall be the complete responsibility of the Contractor furnishing the equipment.

C. All electrical equipment characteristics (voltage, phase, etc.) must be verified by the Contractor prior to ordering. It is imperative that voltage and phase characteristics are checked with the electrical drawings.

D. All motors shall be built in accordance with the current applicable IEEE, ASA, and NEMA standards. All general-purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. Motors shall be rated explosion-proof when located in hazardous atmospheres. Type II weather-protected motors may be used in lieu of TEFC motors on roof fan units and similar equipment. Motors mounted in direct sun shall be provided with a shield to forbid direct radiation from the sun when the sun is 45 degrees or greater above the horizon.

E. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40°C rise and total temperature rise of 65°C ambient and when powered from the system voltage feeding the motor. TEFC motors shall have a service factor of 1.00 with total temperature rise of 65°C in the above conditions. Single-phase motors shall be NEMA Type N split phase induction motors with built-in thermal protectors. Single-phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors.

F. All motors shall be all copper wound, high power factor, high efficiency motors. Electric motors shall be an energy efficient type as defined in the latest edition of NEMA document no. MG1. Motor efficiency shall be made available to the Engineer as required.

2.07 PROTECTION OF PENETRATION:

A. All penetrations of fire or smoke barriers shall be sealed, sleeves (if any), insulation (if any), and vibration isolation (if any) that maintain the fire or smoke resistance of the barrier in accordance with the latest edition of NFPA 101 Life Safety Code.

B. Contractor shall verify locations and type of all partitions penetrations from the drawings. Sealing material and methods shall be per UL recommendations. The Contractor shall fire stop all penetrations through fire and smoke rated barriers as required by code. Refer to Division 7 for fire stopping material information.

2.08 EQUIPMENT AND PIPING SUPPORTS:

A. All supporting systems for piping, equipment, and materials supported by the building structure shall be submitted to the Engineer for approval prior to purchase and installation.

2.09 ACCESSIBILITY:

A. Access to Equipment

1. All pipes, tubing, conduit, etc. including, but not limited to, draining piping of any type, electrical conduit, wiring not in conduit, and pneumatic control tubing shall be installed in such a way so as not to prevent and/or not to make necessary difficult the removal, operation, use, or maintenance of equipment, access panels or doors, pathways (especially in attics or crawlspaces), observation ports, measurement or balancing devices, junction boxes.
2. If access for these purposes is prevented or made unreasonably difficult in the opinion of the Engineer, then the Contractor shall make modifications or repairs at no cost to anyone except the Contractor. Such modifications or repairs shall be considered neither complete nor adequate until the Engineer is satisfied that access for the above purpose is achieved.

PART 3 – EXECUTION

3.01 STORAGE:

A. Provide for proper storage of all materials and equipment and assume responsibility for losses due to any cause. All storage shall be within the contract limits of the building site or in a bonded warehouse. All equipment and materials must be covered and stored out of the elements; any item, which has become rusted, will not be permitted to be used.

B. Each Contractor shall provide temporary storage facilities suitable for equipment stored at the job site. Storage facilities shall be rainproof and lockable as required. Materials or equipment stored on site but not in a lockable rainproof storage facility shall be stored above ground or above slab. Contractor shall take necessary precautions to prevent entry of and/or damage from dirt, trash, water, or vermin. Equipment not properly stored and protected shall be, at the discretion of the Engineer, replaces at no cost to the Owner. Roofs are not acceptable storage areas unless specifically allowed in writing by the Engineer.

3.02 INSTALLATION AND ARRANGEMENT:

A. Install all work to permit removal (without damage to other parts) of coils, heat exchanger bundles, boiler tubes, fan shafts and wheels, filters, belt guards, sheaves and drives, plumbing fittings, and all other parts which might require periodic replacement or maintenance. Arrange pipes, ducts and equipment to permit ready access to valves, traps, starters, motors, control components and to clear opens of doors and of access panels.

B. Offsets, transitions, and changes in direction in pipes and ducts shall be made as required to maintain proper head room and pitch of sloping pipes whether or not indicated on the drawings. Furnish and install all traps, air vents, sanitary vents, as required to affect these offsets, transitions, and changes in direction.

C. Mechanical Contractor shall coordinate with other trade with regards to equipment going under mechanical equipment.

D. Mechanical Contractor shall install HVAC and plumbing equipment in a manner to provide the manufacturer's recommended service clearance and access space. The Mechanical Contractor shall be responsible for maintaining these clearances, coordinating them with the other trades and have installed work modified to maintain these clearances at no additional charge to the project or the Owner.

3.03 PROTECTION OF WORK AND PROPERTY:

A. Where there are existing facilities, be responsible for protection thereof, whether or not such facility is to be removed or relocated or remain as installed. Moving or removing any facility must be done so as not to cause interruption the work or Owner's Operation.

B. All pipe and duct openings shall be closed with caps or plugs during installation. All fixtures shall be covered and protected against injury. At final completion, all work shall be cleaned and delivered in an unblemished condition, or refinished and repainted at the desecration of the Architect.

3.04 CONCEALED AND EXPOSED WORK:

A. "Concealed" is intended to mean within such spaces as pipe chases, pipe trenches, above plaster ceilings, in walls and buried pipe is inaccessible when building is completed. "Exposed" is intended to be within equipment rooms, unfinished spaces, above "pushup" ceilings, accessible pipe tunnels, where pipe is accessible.

3.05 PROTECTION OF PENETRATION:

A. All penetrations of fire or smoke barriers shall be sealed, sleeves (if any), insulation (if any), and vibration isolation (if any) that maintain the fire or smoke resistance of the barrier in accordance with the latest edition of NFPA 101 Life Safety Code.

B. Contractor shall verify and coordinate locations and type of all partitions penetrations from the drawings. Sealing material and methods shall be per UL recommendations. The Contractor shall fire stop all penetrations through fire and smoke rated barriers as required by code. Refer to Division 7 for fire stopping material information.

3.06 CONCRETE:

A. This Contractor shall coordinate all requirements for concrete. All concrete shall be furnished under the Architectural Divisions of these specifications.

3.07 TRENCHING AND BACKFILLING:

A. All excavation, trenching, and backfilling required for the mechanical installation shall be provided by this Contractor. Excavation and backfilling shall be done in strict accordance with the specification section for trenching, excavation, and backfilling, see Division 33.

3.08 FIELD MEASUREMENTS:

A. The Contractor shall verify the dimensions and conditions governing work at the project site. He shall examine adjoining work on which his work is dependent, for perfect efficiency, and shall report any work, which must be corrected.

3.09 LUBRICATION:

A. The Contractor shall provide all oil and grease for the operating of all equipment until acceptance. The Contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up to the date of acceptance of the equipment. The Contractor shall protect all bearings and shafts during installation and shall thoroughly grease the steel shafts to prevent corrosion.

3.10 MANUFACTURER'S DIRECTION:

A. The Contractor shall install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the plans and specifications, the Contractor shall report such conflicts to the Engineer who shall make changes deemed necessary and desirable.

3.11 FLUSHING, CLEANING & STERILIZING:

A. Before final connections are made in the piping systems, all piping shall be blown out with air and then completely washed out with cleaning compounds. The systems shall be flushed for complete removal of all foreign materials. Furnish all temporary connections, equipment, and valves required for this purpose.

B. Refer to specific sections for testing requirements.

3.12 TESTS:

A. Tests shall be complete prior to final inspection and prior to covering with insulation or earth.

B. All pressure tests shall be charted using a stripe chart recorder with enough paper for the duration of the test shown. Refer to other specifications for additional requirements. The test results shall include test run, test date, person doing the testing, and Engineer or authority having jurisdiction signature.

C. All tests shall be witnessed and approved by the Engineer and the local authority having jurisdiction before covering or insulating. Provide Engineer with a minimum of 24 hour written notice prior to any testing.

D. Test all vent, and waste lines with standing water test of 12 feet of head. Test to be held for a minimum of six (6) hours.

E. The satisfactory operation of blowers, pumps and other equipment with moving parts shall be demonstrated to the Engineer. Equipment without movable parts shall have pressure or other tests performed by the Contractor to demonstrate satisfactory operation.

F. Furnish all instruments, pumps, blowers and equipment required for the testing.

G. Provide written approved copies of these test reports for inclusion on the Operations and Maintenance Manuals.

3.13 PAINTING:

A. Surfaces of all equipment and material not provided with a factory finish coat shall be thoroughly cleaned, primed (if not factory primed) and finish coated with a high quality alkyd industrial enamel of a color chosen by the Owner.

3.14 SPECIAL OPENINGS:

A. The contractor shall attempt to schedule delivery of all large equipment requiring special openings for installation prior to enclosing of area. Where this is not possible written notice of required openings which must be provided shall be listed by size and location and submitted to the General Contractor prior to enclosing of areas involved. Work required to construct openings and the associated cost of enclosing them shall be done at no additional cost to the Owner.

3.15 PLACING IN OPERATION:

A. All ducts, pipes, equipment, controls, hangers, and supports shall be cleaned of plaster and other foreign debris.

B. Before final acceptance, all strainers shall be thoroughly cleaned or replaced, all bearings shall be oiled or greased, and all drains shall be cleaned out and primed. All permanent filters shall be cleaned; throwaway type filters shall be replaced with new filters.

C. The systems shall be placed in operation.

D. The contractor shall verify that all controls are set to meet operating conditions specified.

1. Example: Boiler operating control set at 200°F. Limit control set at 220°F.

E. The Contractor shall verify that all pieces of equipment are operable and that all sequences of controls are being met.

F. Contractor to adjust seating through the first (1^{st}) year as required by Engineer.

3.16 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. Contractor shall prepare and provide a minimum of four (4) copies of operating and maintenance manuals. Contractor shall deliver four bound sets to the Engineer for

approval. Each manual shall be in a ring binder and shall be indexed with dividers for each section. Delivery of required documents is a condition of final acceptance.

B. Each manual shall contain, but not limited to, the following general sections:

1. Waiver of all liens if required by Division 1 requirements,
2. Warranties with starting dates and end dates for each pieces of equipment and/or for each system (warranties shall begin on date of substantial completion and acceptance by the Owner),
3. Names, telephone and fax numbers and addresses of all subcontractors, vendors, manufacturer's representatives, and warranties providers, (On Contractor's letterhead stationary),
4. Certification letters from each Contractor that each system furnished and installed by that contractor and/or subcontractors is started-up, balanced, adjusted and checked for proper operation in accordance with the intent of the contract documents,
5. Spare parts lists for each piece of equipment,
6. Lubrication charts showing type of lubrication and application methods and frequencies,
7. Preventative maintenance schedule for checking all items such as belt drives, safety controls, oil and refrigerant charges, and seasonal changer over recommendations. Cleaning of all strainers, traps, coils, tower pans, tubes, sprays, etc. (on Contractor's letterhead stationary),
8. Normal operating instructions including a sequence of operations (on Contractor's letterhead stationary),
9. Instructions as to procedures to be followed for emergency situations, such as alarms or safety items being tripped. (on Contractor's letterhead stationary),
10. Instruction on who to call for service during guarantee period, (on Contractor's letterhead stationary),
11. Include copies of all start-up reports on the equipment.
12. Copies of As-Built drawings on reproducible vellum as produced by a Xerox or photographic process or on CD or DVD and,
13. Copies of all **APPROVED** shop drawing submittals including nameplate date, design parameters, name, telephone and fax numbers, address of vendor, manufacturer's representative and warrantee provider.

C. Approval will not be given for final payment until the tests, balancing, and operating instruction portions have been completed.

D. Coordinate with commissioning specifications for additional requirements concerning operations and maintenance instructions.

3.17 INSTRUCTIONS TO THE OWNER:

A. Contractor shall instruct the Owner's operating personnel in the operations and maintenance of all mechanical systems and equipment. There shall be a minimum of four (4) hours of training. Contractor shall furnish any special servicing tools required for maintenance.

B. Contractor shall conduct a demonstration of 'the installation upon completion and final acceptance of the work. There shall be a minimum four (4) hour

demonstration. Prior to this all work shall have been completed, tested, balanced, and placed in operation. Qualified personnel must be present at the demonstration to operate all the systems and prove the performance of the equipment. The schedule for this demonstration shall be coordinated with the Engineer.

3.18 INSTALLATION CHECK:

A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated below shall visit the site of the work and inspect, check, adjust if necessary, and approve the equipment installation. IN each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Manufacturer's Representative and Engineer.

B. Each equipment supplier's representative shall furnish to the Engineer a written report certifying that the equipment (1) has been properly installed and lubricated; (2) is in accurate alignment; (3) is free from any undue stress imposed by connecting piping or anchor bolts; and, (4) has been operated satisfactorily.

1. Equipment Requiring Installation Check:
   a). Elevator Sump System

3.19 CONSTRUCTION POWER:

A. Electrical power for conducting construction activities shall be acquired as indicated by Architect and carefully coordinated with Owner's personnel.

END OF SECTION 15000

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK:

A. Drawings: Refer to the E-series drawings for graphic representations, schedules and notations showing electrical work.

B. This work includes furnishing and installing all electrical material, accessories, supports, conduit, wire, connections, grounding, excavating and all other labor and materials indicated on the drawings or specified herein and required by codes. This includes all electrical materials and connections required for operation of all items of equipment furnished under other sections of these specifications. For clarity some items may be noted as "BY ELECTRICAL CONTRACTOR" or "IN THIS CONTRACT".

C. Work Included:

The work under this section is not limited to, but shall include:

1. All electrical equipment and work required for a complete and functional elevator installation meeting all manufacturer's requirements and all applicable codes and standards.
2. Conduit, wiring and connections for all line voltage electrical equipment furnished and installed by others (see Mechanical, Elevator, Fire Control drawings).
3. Conduit and wire for low voltage controls. Final connections by electrical contractor.
4. Permit, plan check and inspection fees. Any fees or assessments required by local authorities are a part of the electrical contract.

D. Equipment provided under other sections, but connected under this section:

1. Mechanical.
2. Elevator.

1.03 BIDDING

A. All electrical equipment shall be new unless specified otherwise in the specifications or on the drawings.

B. All bids must be based only on the equipment and materials as scheduled on the drawings and as specified or on equivalent equipment and materials from a pre-approved alternative manufacturer. No bid may be based on a substituted or other alternative without specific written prior approval from the Engineer. Any Contractor who assumes equivalence of products and who bases his bid on that assumption does so at his own risk.

C. A listing of approved alternative manufacturers does not mean that all products of a particular alternative manufacturer are acceptable alternative to the scheduled items; it merely means that for bidding prior approval is not required. All fixtures and devices must still be submitted according to the prescribed procedures. In addition, some items that have an important visual affect, e.g. electric water coolers, may be required to receive Owner's or Architectural approval also.

1.04 COORDINATION OF ELECTRICAL WORK:

A. General: Refer to the Division 1 sections for general coordination requirements applicable to the entire work. It is recognized that the contract documents are diagrammatic in showing certain physical relationships, which must be established within the electrical work, and in its interface with other work including utilities and mechanical work, and that such establishment is the exclusive responsibility of the Electrical Subcontractor.

B. Arrange electrical work in a neat, well organized manner with conduit and similar services running parallel with primary lines of the building construction, and with a minimum of 8'-0" overhead clearance where possible.

C. The electrical plans are diagrammatic, but shall be followed as closely as actual construction and the work of the other trades will allow. Such minor changes as are necessary to make the electrical work conform to the work of other trades and to the building shall be made without cost to the Owner.

D. The maximum number of circuits combined in one raceway shall be three; however, no circuit shall be combined without prior approval of the Engineer or unless specifically shown on the drawings.

E. The Electrical Subcontractor shall not combine circuits not shown to be combined. Furthermore, this electrical subcontractor shall not extend circuits, shown on the drawings as routed in the floor, overhead or extend circuits, shown on the drawings as routed overhead, in the floor, without first obtaining approval from the Engineer. This electrical subcontractor shall not prepare and/or use electrical subcontractor prepared rough-in drawings without first obtaining approval from the Engineer.

F. Where unauthorized design changes are found, the work shall be disapproved and the contractor shall remove the work and extend it as shown on the Drawings.

G. The Electrical Contractor shall coordinate the installation of electrical conduits with any cable tray to maintain required clearances.

1.05 QUALITY ASSURANCE AND STANDARDS:

A. General: Refer to Division 1 for general administrative/procedural requirements related to compliance with codes and standards. Specifically, for the electrical

work (in addition to standards specified in individual work sections), the following standards are imposed, as applicable to the work in each instance:

1. ANSI C 2, National Electrical Safety Code.
2. NECA standards for installation.
3. NEMA standards for materials and products.

1.06 LAWS, CODES AND ORDINANCES:

A. All work and material shall conform to the requirements of OSHA and all national and state Laws and ordinances having jurisdiction at the job site. The (NEC) National Electrical Code, 2008 Edition, or latest edition being enforced, shall be strictly adhered to. NEC requirements are considered "minimum requirements". Where requirements of the contract documents exceed NEC, the contract documents govern.

B. Secure permits and pay permit and inspection fee as required by local authorities.

C. Upon completion of the work, furnish to the Owner a certificate of final inspection and approval from the electrical inspection bureau having jurisdiction.

D. All electrical systems shall be grounded in strict accordance with the requirements of the National Electrical Code.

1.07 INDUSTRY PUBLICATION STANDARDS:

A. The publications and standards of the latest issue at the time of bid, of the following organizations, where referenced in these specifications or on the drawings, shall apply:

1. ANSI-American National Standards Institute
2. ASTM-American Society of Testing and Materials
3. CBM-Certified Ballast Manufacturers Association
4. IEEE-Institute of Electrical and Electronic Engineers
5. IPCEA-Insulated Power Cable Engineers Association
6. NEC-National Electrical Code
7. NECA-National Electrical Contractors Association
8. NEMA-National Electrical Manufacturers Association
9. NESC-National Electrical Safety Code
10. NFPA-National Fire Protection Association
11. UL-Underwriters Laboratory
12. IESNA-Illuminating Engineering Society of North America

1.08 EXISTING UTILITIES

A. The drawings indicate the locations, type and sizes of various utilities within the site where known. These utilities are indicated as accurately as possible. If the Contractor encounters any utilities or differing conditions during construction, which are not shown on the drawings, they shall request in writing for written

instructions from the Architect and/or Engineer. Any relocation or remodeling required will then be directed by a change order. This Contractor shall assume all responsibility for protection of all utilities, shown or not, and for repair required by this construction.

B. Contractor shall verify location, size, elevation, and any other pertinent data of the existing utilities. The Contractor shall provide a written report with drawings indicating this existing utilities information, such as utility locations information. Additional costs incurred due to failure to verify such data and to coordinate associated work with respective utility providers shall not be the Owner's responsibility but shall be borne by the Contractor.

C. All costs associated with providing utilities including, but not limited to, connection fees, meters, boring under roads, etc., shall be included in the Contractor's bid price whether such costs are incurred by Contractor or charged by the utility company.

D. Submission of a bid by the Contractor shall be considered an acknowledgment by the contractor of his compliance with this section.

E. The Contractor shall coordinate with Owner, Architect, and this Engineer's office any work that has the potential to hinder electrical services to areas outside this contract. All shut downs or tie-ins relating to these systems shall be scheduled and submitted in writing to be approved by the Owner, Architect, and this Engineer's office. Contractor shall submit in writing a schedule of construction phasing that indicates areas of first priority during each phase and anticipated completion times. Schedules shall be submitted a minimum of 7 days prior to commencing work. Owner, Architect, and this Engineer's office shall review these schedules and notify the contractor of acceptance prior to commencement of work.

1.09 SUBMITTALS:

A. General: Refer to Division 1 for general requirements concerning work related and administrative submittals. All descriptive and technical data and shop drawings shall bear signed certification by the Electrical Subcontractor to the effect that they have been carefully examined and found to be correct with respect to dimension, space available, non-interference with other trades and that the equipment complies with all the requirements of these specifications. Submittals will be rejected if signed certification is not included. Where catalog data are submitted, the proposed items shall be clearly "flagged" or otherwise identified, so that no confusion exists.

1.10 DRAWING AND DRAWING CONFLICTS

A. Contract drawings are diagrammatic only and are not intended to be scaled for dimensions. All dimensions shall be taken from Architectural drawings, certified equipment drawings and from the structure itself before fabricating and work. All space requirements shall be verified, coordinated with other trades, as it is the various Contractors' responsibility to install the systems complete in the space provided without extra charges to the Owner.

B. It is intended that anything, including labor and materials, which is usually furnished as part of any equipment specified and which is necessary for operation shall be furnished as part of the Contract without additional cost, whether or not shown or described.

C. All conduits in finished areas of the building shall be concealed except where otherwise noted on the drawings.

D. All equipment shall be installed in accordance with manufacturer's recommendations, unless approval is given in writing by the Engineer for deviation prior to commencement of work.

E. In the event of a conflict or inconsistency between items indicated on the drawings and in the specifications or conflicts with code requirements applying to the same item, that drawing indication, note, specification or code which prescribes and establishes the higher standard, provides for a better grade of material or provides a more complete job shall take precedence. The Contractor shall notify Engineer and Architect to obtain a clarification.

F. All materials not approved by Engineer and Architect and all material not properly installed, shall be promptly removed from the premises by the Contractor, whether or not it has been incorporated into the work. The Contractor shall then promptly replace and reconnect all work in accordance with the drawings and specifications, at his own expense, and shall also bear the expense of restoring all work of other trades damaged or dislocated by such removal or replacement.

G. Should the Contractor refuse to remove and replace unsatisfactory materials and installation, and restore work of other trades after having been notified by Engineer and Architect, then Engineer/Architect and owner shall have the right to enter upon the work and procure such materials and labor required to remove and replace all unsatisfactory work and restore work of other trades, in order to complete the project. All costs incurred by Owner/Engineer/Architect for such corrective work shall be borne by the Contractor.

H. Submittals shall indicate minimum access and service clearances for the submitted equipment.

1.11 STRUCTURAL CONDITIONS - SPECIAL NOTE

A. Where conduits, sleeves, inserts, supports, cabinets, fixtures and other material are to be attached to, pass through, or interfere with, any structural member, or where notching, boring or cutting of any structural member is necessary, or where special openings are required through floors, footings, foundations, walls, roofs, or other structural elements to accommodate the electrical work, this Contractor shall obtain the approval of Owner/Engineer/Architect and shall coordinate all such work with the General Contractor, and other trades. The Electrical Contractor shall perform all such work and shall patch and repaint all members and surfaces damaged or soiled in performing the electrical installation, unless specifically instructed otherwise.

B. Where conduits pass through walls or foundations, seal around conduits to make the work watertight. Where conduits pass through roofs, provide galvanized metal flashing and seal with a suitable compound, intended for the purpose to make the work watertight.

C. See schematics and plans for conduits through roof on Architectural and M/E/P drawings.

1.12 WARRANTY

A. All materials and equipment shall be new unless otherwise specified.

B. Guarantee all workmanship, material and equipment and replace any found defective without cost to the Owner, for ONE year after final acceptance, as defined in General Conditions.

C. Each warranty for longer than one year as described above (that comes with equipment used on the job) shall be passed into the Owner in the Operation and Maintenance Manual, along with the dates of start and end of warranty.

D. Refer to General Conditions for additional information regarding specific warranty requirements.

1.13 PROJECT RECORD DOCUMENTS

A. Before final payment, provide the Architect with one clean set of drawings and specifications corrected up-to-date as job progress. These documents shall reflect the As-Built conditions. Refer to General Conditions for additional information.

1.14 SUBMITTALS

A. The intent of this section is to give general submittal information, refer to specific submittal information in the subsequent electrical sections.

B. Within 10 days after award of the contract, and before orders are placed, Contractor shall submit specific information on list of equipment and principal materials specified. Contractor shall indicate and/or provide names of manufacturers, catalog and model numbers, cut sheets, and such other supplementary information as necessary for evaluation. Minimum of six (6) copies, or as directed by the Engineer, of each shall be submitted and shall include all items mentioned by model number and/or manufacturer's name in the specifications or in schedules on the drawings.

C. Requirements for each submittal:

1. Bear a dated stamp or specific written indication that the Contractor has reviewed and approved all submittal prior to submission to Engineer,
2. Have all information deleted by Contractor that pertains to the means and methods of construction or to fabrication, assembly, installation, or

erection (approval by Engineer shall not extend to these areas unless specifically noted by Engineer),

3. **BE CLEARLY AND SPECIFICALLY** marked as to which specific piece of equipment is being submitted, bye use of a permanent marker, stamp, etc., so as to distinguish it from other pieces of equipment that may occur on the same page,
4. **BE CLEARLY AND SPECIFICALLY** marked as to which available options are being submitted that are associated with a piece of equipment, and
5. Be complete with respect to quantities, dimensions, specific performance, materials, and similar data to enable the Engineer to review the proposed equipment.
6. Omission by Contractor of any of the above requirements or submittals will subject submittal to automatic rejection without review.
7. Any submittals received by Engineer that were not requested shall be returned without review of any kind.

D. Installation Instructions - For certain products or systems as identified in subsequent specifications sections or on the drawings, the Contractor shall be required to provide copies of manufacturer's installation instructions with the submittal. When required as such, the installation instructions are considered part of the submittal and their omission may result in automatic rejection of the submittal. Where more than one identical device are scheduled, only one set of installation instructions needs to be submitted.

E. This Engineer will review the submittals for approval twice. Any additional reviews that are required by the engineer for whatever reason after the initial two reviews will result in additional compensation for the Engineer's time by the submitting Contractor at the Engineer's rate.

1.15 SUBSTITUTED PRODUCTS

A. Material or equipment specified by Manufacturer's name is being used as a basis of standard. No substitution is allowable without Engineer's written approval **TEN (10) DAYS PRIOR TO BID DUE DATE** unless the manufacturer is listed on the drawings or in the specification as being a preapproved alternative manufacturer. Any submittal received without such written approval or prior approval is subject to unqualified rejection.

B. It shall be the Contractor's responsibility to verify that submitted substitute equipment will fit in space available. The contractor's submittal for acceptance of the substitute shall include a written statement of whether or not such acceptance would require any subsequent or associated changes to the drawings or specifications. Any such changes shall be described in writing, briefly but complete.

C. The Contractor shall be responsible for the costs of any such modifications due to substitution of materials or equipment for that which was specified or scheduled. The cost shall be complete, that is, it shall include the cost affect of any and all other trades.

D. The Engineer may request detailed shop drawing or plan layouts of electrical rooms or systems of the substituted equipment.

1.16 SAFETY

A. General – Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work, and Contractor shall comply with all laws governing safety, specifically the "Occupational Safety and Health Standards" and the "Safety and Health Regulations for Construction", state and federal.

B. According to OSHA, a hazardous chemical is any chemical, which is a physical hazard or a health hazard. This may include items such as paints, solvents, adhesives, sealants, cleaners, etc. If a contractor produces, uses, or stores hazardous chemicals at the workplace, them contractor shall develop, implement, and maintain a hazard communication program in compliance with the latest OSHA requirements. In projects with multiple tenants in which the building is partially occupied during all or part of the project, Contractor shall inform the building manager or Owner, according to OSHA guidelines, of any hazardous chemicals being produced, stored, or used in the building so that other tenants may be notified. Contractor shall employ required methods of training, information, handling, ventilation, labeling, storing, disposal, and removal of hazardous chemicals.

1.17 LABELING

A. Each device for which an independent testing authority has established a standard shall have affixed a label indicating its compliance and listing. Refer to General Conditions for list of such independent testing authorities.

1.18 SITE VISIT REPORTS

A. During the course of the job, the Engineer will make site visits to observe work in progress and will subsequently prepare a written site visit report, which will be sent to the Contractor and to whomever else the Engineer desires. The Contractor shall prepare a written and typed response within seven (7) calendar days of his receiving the site visit report. The General Contractor shall include in his response the following information.

1. Date of site visit by the Engineer,
2. Date of receipt of the site visit report,
3. Name and title of the preparer of the response,
4. An item number referenced to the site report,
5. A brief three or four word description of the item,
6. The Contractor or Subcontractor affected,
7. The proposed course of action, and
8. An expected time of completion of the action.

1.19 CUTTING AND PATCHING

A. No joists, beams, girders, columns, slabs, or other structural elements shall be cut, drilled, or altered in any way by the Contractor without first obtaining written permission and instructions from the Engineer and Architect.

B. Where it is necessary to cut through any non-structural elements of walls, floors, or ceilings to permit the installation of any work under this contract, or to repair any defects that may appear up to expiration of the guarantee, such cutting shall be done by the Contractor with as little damage as reasonably possible to the element being cut or to adjacent elements.

C. After the necessary work has been completed, the damage shall be repaired by the respective Contractor, who shall pay all costs of such cutting, repairs and patching. All patching or sealing of cuts and penetrations, including final appearance of same, shall be done to the approval of the Engineer and Architect.

1.20 INSURANCE

A. The Contractor shall have required insurance. Required insurance shall be provided by this Contractor for protection against public liability and property damage for the duration of work.

1.21 CONFLICTS AND CORRECTION OF WORK

A. Promptly correct work rejected or failing to conform to the requirements of the Contract, whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear cost of correcting such rejected and nonconforming work including additional testing and inspections and including compensation for observing mechanical and electrical engineering firm's services and expenses made necessary thereby.

B. If a conflict occurs on the bid documents, the Contractor shall contact the Architect's and Engineer's offices with a written request for clarification. If the conflict is unresolvable at the time of bid, the most expensive interpretation of the conflict shall be bid so the conflict can be resolved in a deductive manner at a later time if necessary.

C. If a conflict is discovered during construction, the Contractor shall stop work and that portion of the project and contact the appropriate party for clarification. The request for clarification shall be in written form. The Contractor shall bare the burden of replacing work that has been installed incorrectly as a result of a conflict on the drawings where he has not sought the Architect's and/or Engineer's guidance for clarification.

1.22 COMMISSIONING

A. Coordinate all work with the commissioning agent and the commissioning specifications.

1.23 COORDINATION

A. In a timely manner, and coordinated with all work involved, prepare and submit a trade composite work plan to be integrated into the Commissioning Plan for the following areas:

1. Where new work of three or more trades or subcontractors is installed.
2. Where lead times are critical to the project schedule.
3. Provide construction grade drawing as needed to acquire approval of work plan.
4. Access or service spaces required for Electrical equipment.

B. Provide final coordination plan to be integrated into the Commissioning Plan to account for:

1. Matching the work to the final selection of equipment; incorporating manufacturer's published instructions into the design;
2. Changes in equipment arrangement, and associated changes in equipment piping, ducting, and electrical work different from what is shown or specified;
3. Changes by manufacturer between date of design and date of delivery of equipment;
4. Relocations resulting from more than one trade being shown or specified in these drawings and specifications in the same location;
5. Addition of minor structural, mechanical, and electrical work for a complete system;
6. And similar circumstances as described above;
7. Work shall not be installed prior to written reply acknowledging that coordination drawing submittals have accomplished the specified intent of coordination. Relocations of work installed prior to coordination drawing acknowledgment, if subsequently required to avoid interference, shall be made.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. General: Refer to Division 1 sections for general requirements on products, materials and equipment. The following provisions expand or modify the requirements as applicable to electrical work:

B. Materials List: Within 15 days after award of contract, the Electrical Subcontractor shall submit to the Engineer a list, seven (7) copies, of all equipment, fixtures, materials, etc. to be furnished. Where such equipment will be furnished "as specified", a listing of the specific equipment manufacturer to be used on this project is sufficient. Where substitutions are proposed, complete data must be furnished showing performance, quality and dimensions. Written approval of the Engineer must be obtained before purchasing any substitute equipment.

C. All materials shall be new and shall bear the label of the Underwriter's Laboratories, Inc., or be listed under reexamination service. All materials shall be of the best grade and latest pattern of manufacturer as specified.

D. All work shall be performed in a neat, workmanlike manner and shall present a neat electrical appearance when completed.

E. All similar materials and equipment shall be the product of the same manufacturer.

F. Where no specific material, apparatus or appliance is mentioned, any first-class product made by a reputable manufacturer may be used, providing it conforms to the contract requirements and meets the approval of the Engineer.

G. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current and standard design.

H. Altitude: Equipment affected by altitude shall perform satisfactorily for the function intended at the altitude of the project site.

I. Compatibility: Provide products, which are compatible with other products of the electrical work, and with other work requiring interface with the electrical work, including electrical connections and control devices. For exposed electrical work, coordinate colors and finishes with other work.

J. Substitution: Manufacturer's catalog numbers are specified for the purpose of establishing a standard. All proposed substitutions on specific materials (lighting fixtures but not limited to) shall be submitted in duplicate ten (10) days prior to bid openings. This request shall be accompanied by complete descriptions of the substitutes offered, including catalog cut sheets, performance, quality and dimensions. The entire burden of proof of equality shall be placed on the Electrical Subcontractor and the decision of the Engineer shall be final. All other electrical equipment, devices, etc. may have substitutions only if equal in quality and function to, or better than, the specified item. Complete descriptive and technical data shall be submitted on all proposed substitute items, together with the same data on the specified items. Material samples of the proposed substitute item, together with samples of the specified items, shall be submitted for comparison and test when requested by the Engineer.

K. Work Quality: Fabrication, erection and installation of the complete electrical system shall be done in a first class workmanlike manner by qualified personnel experienced in such work and shall proceed in an orderly manner so as not to hold up the progress of the project. The Electrical Subcontractor shall check all areas and surfaces where electrical equipment material is to be installed, removed or relocated and report any unsatisfactory conditions to the Engineer before starting work. Commencement of work signifies this Electrical Subcontractor's acceptance of existing conditions. In the acceptance or rejection of the finished installation, no allowance will be made for lack of skill on the part of the workmen.

2.02 ELECTRICAL EQUIPMENT AND WIRING FOR ARCHITECTURAL AND MECHANICAL DIVISION:

A. Responsibility

1. Unless otherwise indicated, all motors, conduit, wiring, and controls (including temperature) shall be furnished, set in place, and wired in accordance with the following schedule. (MD is Mechanical Division AD is Architectural Division, and ED is Electrical Division)

MECHANICAL-ELECTRICAL ARCHITECTURAL COORDINATION
TABLE 1

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
1. Equipment Motors and Thermal Overloads	MD	MD	ED
2. Disconnect switches, fused or unfused, HP rated switches	ED (1)	ED (1)	ED
3. Pushbutton stations, pilot lights, float switches, thermostats, control relays, time clocks,	MD	MD (2)	MD (2)
4. Contactors, 120V control circuit outlets for control panels and for elevator controls and fire/smoke detectors	ED	ED	ED
5. Architectural Equipment as listed in Divisions 2 through 20 such as elevator, ADA door openers, projections screen, etc	AD (5)	MD (4 & 5)	ED (4 & 5)
6. Fire and Smoke Duct Detectors	ED	MD	ED (3)

Notes:
1. If furnished as part of factory wired equipment, wiring, conduit, and connection only be ED
2. If float switches, line voltage thermostats, PE switches, time switches etc., carry the FULL LOAD CURRENT of any motor, they shall be furnished by the Mechanical Division, but shall be set in place, wired and connected by the Electrical Division, except that where such items are an integral part of the mechanical equipment, or directly attached to ducts, piping, etc., they shall be set in place under the Mechanical Division and wired and connected by the Electrical Division. If they do not carry the FULL LOAD CURRENT to any motor they shall be furnished, set in place, and wired under the Mechanical Division.
3. Wiring and conduit from alarm contacts to alarm system and conduit for control functions by ED; all control function wiring by MD.
4. Wiring and conduit from alarm contacts and kitchen equipment shutdown to kitchen fire suppression system by ED; all control functions by MD.
5. Architectural division to set in place, Mechanical Contractor to make mechanical connections and Electrical Contractor to make electrical connections.

B. Connections

1. Connection to all control directly attached to ducts, piping and mechanical equipment shall be made with flexible connections not to exceed 3 linear feet.

2.03 PROTECTION OF PENETRATION

A. All penetrations of fire or smoke barriers shall be sealed, sleeves (if any), insulation (if any), and vibration isolation (if any) that maintain the fire or smoke resistance of the barrier in accordance with the latest edition of NFPA 101 Life Safety Code.

B. Contractor shall verify locations and type of all partitions penetrations from the drawings. Sealing material and methods shall be per UL recommendations. The Contractor shall fire stop all penetrations through fire and smoke rated barriers as required by code. Refer to Division 7 for fire stopping material information.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS:

A. Comply with manufacturer's recommended installation procedures for electrical equipment.

3.02 ELECTRICAL INSTALLATION

A. Install all work to permit removal (without damage to other parts) of breakers and all other parts, which might require periodic replacement or maintenance. Arrange conduit and equipment to permit ready access to panels and to clear opens of doors and of access panels.

B. Electrical Contractor shall coordinate with other trade with regards to equipment going under mechanical equipment.

C. Electrical Contractor shall install electrical equipment in a manner to provide the manufacturer's recommended service clearance and access space. The Electrical Contractor shall be responsible for maintaining these clearances, coordinating them with the other trades and have installed work modified to maintain these clearances at no additional charge to the project or the Owner.

3.03 PROTECTION OF PENETRATION

A. All penetrations of fire or smoke barriers shall be sealed, sleeves (if any), insulation (if any), and vibration isolation (if any) that maintain the fire or smoke resistance of the barrier in accordance with the latest edition of NFPA 101 Life Safety Code.

B. Contractor shall verify locations and type of all partitions penetrations from the drawings. Sealing material and methods shall be per UL recommendations. The Contractor shall fire stop all penetrations through fire and smoke rated barriers as required by code. Refer to Division 7 for fire stopping material information.

3.04 ELECTRICAL WORK CLOSEOUT:

A. General: Refer to the Division 1 sections for general closeout requirements. Upon completion of the work, the various systems operated under load conditions shall be tested for short circuits and grounds in accordance with the method and resistance values outlined in the National Electrical Code and for load balance on feeders and branch circuits.

B. The complete system shall operate satisfactorily in every respect. Make any repairs or adjustments necessary to this end to the satisfaction of the Engineer.

C. Furnish all instruments and labor for testing.

3.05 GUARANTEE:

A. The work to be performed shall be guaranteed for a period of one year after final acceptance against faulty workmanship and/or materials, and any failure or trouble due to such causes within the period of guarantee shall be made good upon demand of the Owner and without cost to the Owner.

3.06 MISCELLANEOUS ITEMS:

A. Miscellaneous items not covered in these specifications shall be as indicated on the drawings, installed and connected by the proper method and as recommended by the manufacturer.

B. Coordinate the thickness of the wall to accommodate the concealed conduits and its associated hangers, if required. I.E. 4-inch conduit requires a 6-inch thick wall.

3.07 PRODUCT HANDLING:

A. Use all means necessary to protect electrical materials and equipment before, during and after installation and to protect the installed work of other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no extra cost to him.

3.08 AS-BUILT DRAWINGS:

A. During progress of the Work, maintain an accurate record of the installation of the system. Upon completion of the installation, transfer all record data to blue line prints of the original drawings and furnish to the Engineer.

END OF SECTION 16000

construction quality control
testing and engineering

Construction Materials Testing
Geotechnical Engineering
Environmental Site Assessments
Forensic Analysis /Testing

PRELIMINARY PROJECT TECHNICAL LETTER REPORT
GENERAL SOILS EVALUATION REPORT

DATE: December 30, 2013

TO: Mr. Steven Franco, AIA
Carl Daniel Architects
305 Leon Street
El Paso, Texas 79901
sfranco@cdaelpaso.com

CC: Mr. Salvador Alonzo
County of El Paso (Client)
Public Works / Facilities Management
500 E. San Antonio, 13th Floor
El Paso, Texas 79901
SAlonzo@epcounty.com
MAguilar@epcounty.com

SUBJECT: Preliminary Project Technical Letter Report
General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas
CQC Project No. AGCQC13-052

In accordance with our authorized scope of work under CQC Proposal No. PGCQC13-088 dated November 5, 2013, this project technical letter report has been prepared for the County of El Paso (Client), c/o Carl Daniel Architects for the County of El Paso – Army Reserve Building – Elevator shaft Design Project. We understand that this project consists of the design and construction of an elevator shaft within the lobby area of the main entrance of the existing two-story County of El Paso – Army Reserve Building located at 301 Manny Martinez Drive in El Paso, El Paso County, Texas. We anticipate that the elevator shaft shall contain CMU block walls supported by a mat concrete foundation system. Please note that at the time that this technical letter report was completed structural loads and/or a site grading plan were not available for our review.

I. General Field Exploratory Sampling Methods

In accordance with our agreed scope of services, we have performed a single soil boring drilled to an approximate depth of 20 feet below the existing ground surface at the location indicated on the attached "General Soil Boring and Core Location Plan", Sheet 1. As a result of the limited access, our exploratory soil boring was performed within the exterior perimeter of the building, relatively near to the proposed elevator shaft location. The boring was drilled utilizing a CME-55 drilling rig and hollow stem auger drilling techniques.

During our drilling activities Standard Penetration Tests were performed in accordance with ASTM procedures at discrete intervals to estimate the relative field bearing resistance of the subsurface soils near the proposed elevator shaft area. In conjunction with our penetration tests, soil samples were collected using conventional split-spoon sampling techniques. Our soil boring log is presented as Sheet 2.

In addition, the existing exterior concrete slab located just beyond the lobby entrance was cored in order to evaluate the thickness of the existing concrete slab. A photograph of the concrete slab core is presented in Sheet 9. In general, the concrete slab was measured to be approximately 11½ inches thick. Based on our observations of concrete slab, it appears that the concrete slab is composed by two sections

(top and bottom). An apparent cold may be observed within the top and bottom sections of the core. This may be an indication that the concrete slab section at the top was poured above the existing bottom sections were placed during separate events.

All collected soil samples were properly identified with date, sample location, sample depth and penetration measurements. Collected soil samples were transported to our laboratory for further evaluation and soil classification testing. The results of our laboratory soil classification tests (i.e. moisture contents, plasticity index and sieve analysis tests) are presented in Sheet 7. Sieve analysis test results are presented in Sheets 3 through 6.

II. General Encountered Subsurface Soil Conditions

Based on our laboratory and field test results, medium stiff, sandy silts were encountered from below the surface and extending to an approximate depth of 7½ feet. Based on our plasticity index tests, sampled and tested silt soils are relatively non-plastic. These soils may be classified as ML in accordance with the Unified Soil Classification System (USCS).

Loose to medium dense, poorly graded sands were encountered below the sandy silts and extended to at least the approximate boring termination depth of 20 feet. Based on our soil classification tests these sands are relatively non-plastic and may be classified as SP-SM in general accordance with the USCS.

III. General Foundation Design Considerations

The following section presents our general foundation design considerations for the design team's consideration. At the time this report was completed, design plans and specifications of the existing building were not available for our review and consideration in the preparation of our recommendations. As a result, we anticipate that the existing building may have been constructed on imported Select Fill soils to some degree. However, based on the anticipated required depth of the elevator shaft foundation, we anticipate that the specified depth of the foundation shall be below past imported Select Fill soils. As a result, we have prepared our recommendation based on the anticipation that the foundation system shall bear on existing native soils to some degree. We also anticipate that the existing conditions shall limit lateral and vertical excavation depths and associated soil bearing improvements within the existing building.

Our soils evaluation considered that the proposed new elevator shaft CMU walls may be supported by a concrete mat foundation bearing on prepared and compacted Select Fill soils. The following allowable soil bearing capacities, minimum footing embedment depths and foundation widths may be used in foundation analysis and design. Our recommendations below considered a factor of safety of at least 2 with respect to the soil bearing capacity presented below.

The following foundation guidelines are based on the results of our field evaluation and laboratory soil classification tests performed on the encountered subsurface soil materials. Our Client and design representative may utilize the following information to proportion the elevator shaft foundation system. Please contact CQC in the event that additional information is required and/or if the owner or structural engineer is considering alternative foundation types.

Net Allowable Soil Bearing Capacity: (Mat Foundation bearing on moisture conditioned and compacted Select Fill)	1,800 psf
Presumptive Mat Foundation Embedment Depth: (Below existing concrete slab surface where elevator is planned)	48-inches
Minimum Mat Foundation Thickness:	12-inches
Minimum Foundation Select Fill Soil Support (Compacted to 95% per ASTM D1557)	12-inches
Soil Modulus of Subgrade Reaction (*k*)	140 pci
Maximum Design Soil Unit Weight	115 pcf

The concrete mat should extend laterally beyond the projected CMU block walls. Concrete mat foundation slab should be supported by a minimum of 12 inches of compacted Select Fill. The Select Fill should extend at least 12-inches beyond the edges of the concrete mat foundation. Select Fill soil materials should be moisture conditioned and compacted to a minimum of 95 percent of maximum dry density in accordance with ASTM D1557 and maintained at ±3 percent of optimum moisture content until finally covered. The Select Fill should be placed in maximum 4-inch loose lifts, since hand tampering compaction methods are anticipated to be required due to the confined working space.

Prior to Select Fill placement, the subgrade soils below the indicated cut depth should be scarified to a minimum depth of 8-inches and recompacted to at least 95% of maximum dry density and should be maintained within ±3% of optimum moisture content. Please note that adequate braced shoring shall be required to allow for earthwork excavations and concrete mat foundation slab forming. All excavations should be performed in accordance with OSHA procedures to protect the public and workers.

The mat foundation thickness and foundation steel reinforcement design should be determined by the project structural engineer. Reinforcing steel should be checked for size and placement prior to concrete placement. Placement of concrete should be accomplished as soon as possible after excavations to reduce changes in the moisture content or the state of stress of the foundation materials. No foundation element should be left open over 4 days without concreting and moisture content of the footing trenches should be maintained daily. The contractor should also follow the ACI recommended guidelines with respect to the poured concrete temperature during hot and cold weather conditions.

The means and methods to perform excavations, shoring, and inspection of earthwork excavations for this project shall be the responsibility of the general contractor in accordance with OSHA regulations. CQC and our Client shall have no liability for the general contractors selected means and methods to perform excavations and applicable trench safety systems.

IV. Fill Materials

Select Fill should preferably consist of a crushed stone base (CSB) coarse material conforming to requirements of a TXDOT Item 247 – Flexible Base, Type A, Grade 2 soil material. The flexible base material should meet the gradation requirements below and exhibit a plasticity index of 12 or less. The

flexible base material should also exhibit a maximum dry density of at least 140 pcf determined in accordance with ASTM D 1557. It is not recommended that recycled concrete base material be considered as a substitute for the requirement above, unless approved by the project engineer.

Sieve Size (square opening)	% Passing by Weight
2½ -inch	100
1¾ -inch	90 – 100
No. 4	25 – 55
No. 40	15 – 50

Alternative Select Fill soils may consist of granular clayey, silty sands or sandy clayey, silty gravel mixtures, free of clay lumps, deleterious materials, organic material, cobbles or boulders over 3 inches in nominal size. The Alternative Select Fill should have a liquid limit less than 35 and a plasticity index from 3 to 12. The Select Fill shall also exhibit an optimum dry density of at least 125 pcf determined in accordance with ASTM D-1557. Alternative Select Fill soils should also meet the gradation requirements below.

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	85 – 100
No. 4	35 – 85
No. 200	5 – 35

Alternative Select Fill soils should classify as SP-SM, SM, SC, SC-SM, GM, GC, GC-GM, GP-GM, and GP-GC in accordance with the Unified Soil Classification System (USCS). Alternative Select Fill soils that meet the gradation, optimum dry density, and soil classification requirements indicated above, but are non-plastic by test, shall be accepted only if these soils exhibit a bar linear shrinkage between 2 to 7 percent determined by test method TEX-107-E.

Suitable Native Fill Soil should consist of granular clayey, silty sands or sandy gravel mixtures, free of clay lumps, deleterious materials, organic material, cobbles or boulders over 3 inches in nominal size. The Suitable Native Fill soils should have a liquid limit less than 40 and a plasticity index less than 15. Suitable Native Fill soils should meet the gradation requirements below.

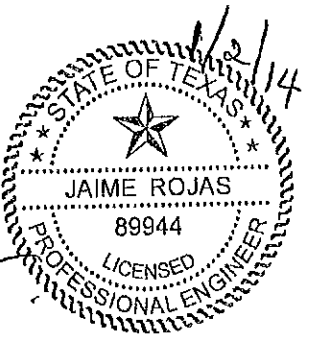
Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	70 – 100
No. 4	45 – 100
No. 200	3 – 45

Suitable Native Fill soils classified in the following list according to the USCS may be considered satisfactory for use: SM, SW, SC, SP-SM, SP-SC, SC-SM, GW, GP, GM, GC, GP-GM and GP-GC, provided that these soils also meet the requirements above.

Soils classified as CH, CL, MH, ML, OH, OL and PT or a combinations of these under the USCS classification and soils that exhibit a plasticity index greater than 15 are not considered suitable for use as Suitable Native Fill and Select Fill soil materials.

Please call us if you have any questions with respect to this letter report.

Respectfully Submitted,
CQC Testing and Engineering LLC
TBPE Firm Registration No. F-10632



Hector A. Hernandez, E.I.T.
Project Engineer
hhernandez@cqceng.com

Jaime Rojas, P.E.
President / Principal Engineer
jrojas@cqceng.com

Attachments:
1.) Soil Boring and Core Location Plan, Sheet 1
2.) Soil Boring Log, Sheet 2
3.) Sieve Analysis Test Reports, Sheets 3 through 6
4.) Summary of Field and Laboratory Soil Classification Test Results, Sheet 7
5.) Project Site Existing Conditions Photographs, Sheets 8 and 9

Copies:
1.) Above Distribution – 1 copy by e-mail
2.) STUBBS Engineering, Inc. – 1 copy by e-mail (mstubbs@stubbseng.com)
Attn: Mr. Michael A. Stubbs, P.E.

construction quality control
testing and engineering

Soil Boring and Core Location Plan

General Soils Evaluation
Preliminary Project Technical Memorandum
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

Client: County of El Paso c/o Carl Daniel Architects	
Project No. AGCQC13-052	
Scale: NTS	Check by: JR
Date: 12/30/13	Sheet 1

CQC Testing and Engineering LLC - TBPE Firm No. F-10632
6802 Commerce, Unit "A"
El Paso, Texas 79915
Telephone: (915) 771-7766
Fax: (915) 771-7786

BORING NUMBER B-1

CLIENT County of El Paso c/o Carl Daniel Architects
PROJECT NAME Army Reserve Building - Elevator Shaft Design Project
PROJECT NUMBER AGCQC13-052
PROJECT LOCATION El Paso, El Paso County, Texas
DATE STARTED 12/12/13 **COMPLETED** 12/12/13
GROUND ELEVATION Ext. Grade **HOLE SIZE** 6 inches
DRILLING CONTRACTOR SS
GROUND WATER LEVELS:
DRILLING METHOD CME-55 w/3-1/4" ID HSA
AT TIME OF DRILLING None Encountered
LOGGED BY CS **CHECKED BY** HH
AT END OF DRILLING ---
NOTES Soil Boring Location: See Attached Sheet 1
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	BLOW COUNTS (N VALUE)	% -200	PI (LL-PL)	USCS
0	SS 1		SILT, Non-Plastic, Sandy, Brown to Multicolored, Medium Stiff to Stiff, Moist -with organic material (i.e. grass roots) at the surface	1-2-4 (6)			
	SS 2			5-6-4 (10)	57		ML
5	SS 3			4-4-6 (10)	63	NP	ML
	SS 4		SAND, Fine to Medium Grained, Poorly Graded, Multicolored, Loose to Medium Dense, Dry to Slightly Moist with silt	2-3-8 (11)	7		SP-SM
10	SS 5			3-4-5 (9)	6		SP-SM
15	SS 6			4-6-7 (13)			
	SS 7			4-7-9 (16)			
20			NOTE: SS - Split Spoon Sample NP - Non Plastic by Test Bottom of hole at 20.0 feet.				

SPT N VALUE
10 20 30 40
PL MC LL
20 40 60 80
% - 200
20 40 60 80

SIEVE ANALYSIS TEST REPORT

PROJECT NO.: AGCQC13-052 **REPORT DATE:** 12/30/2013

PROJECT NAME: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

SAMPLE INFORMATION

SAMPLE DATE: 12/12/2013 **SAMPLE NO.:** S-2

BORING NO.: B-1 **SAMPLE DEPTH:** 2½' - 4'

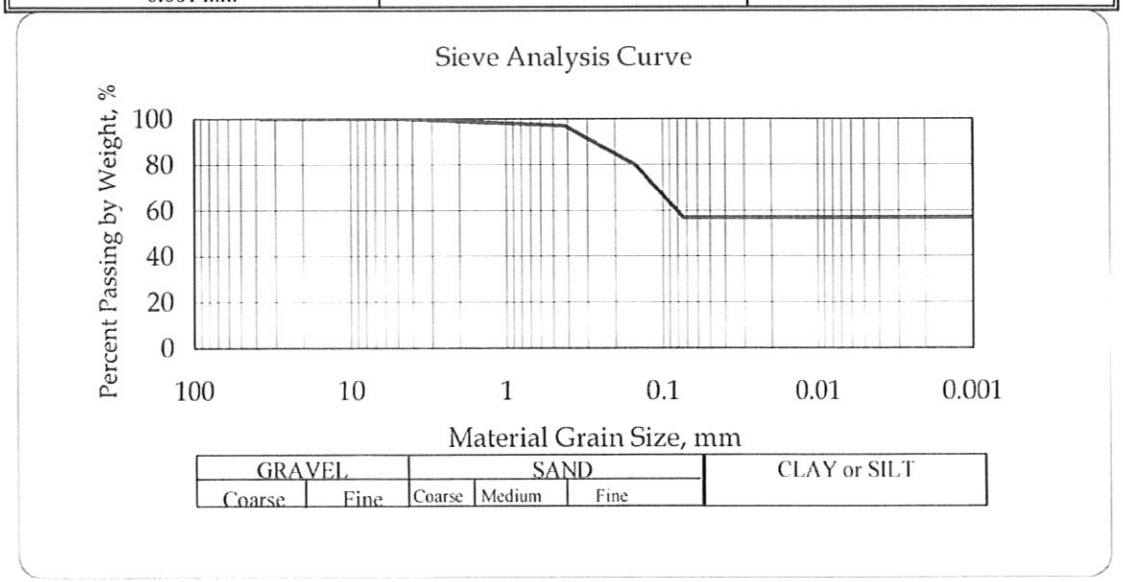
SOIL TYPE/DESCRIPTION: On-Site Subsurface Soils / SILT, Non-Plastic, Sandy, Brown to Multicolored

ANALYSIS TEST RESULTS

Sieve Analysis Test:

Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
1-1/2 inch	0	100
1 inch	0	100
3/4 inch	0	100
1/2 inch	0	100
3/8 inch	0	100
No. 4	0	100
No. 10	1	99
No. 40	3	97
No. 100	20	80
No. 200	43	57
0.005 mm	-	-
0.001 mm	-	-



SIEVE ANALYSIS TEST REPORT

PROJECT NO.: AGCQC13-052 **REPORT DATE:** 12/30/2013

PROJECT NAME: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

SAMPLE INFORMATION

SAMPLE DATE: 12/12/2013 **SAMPLE NO.:** S-3

BORING NO.: B-1 **SAMPLE DEPTH:** 5' - 6½'

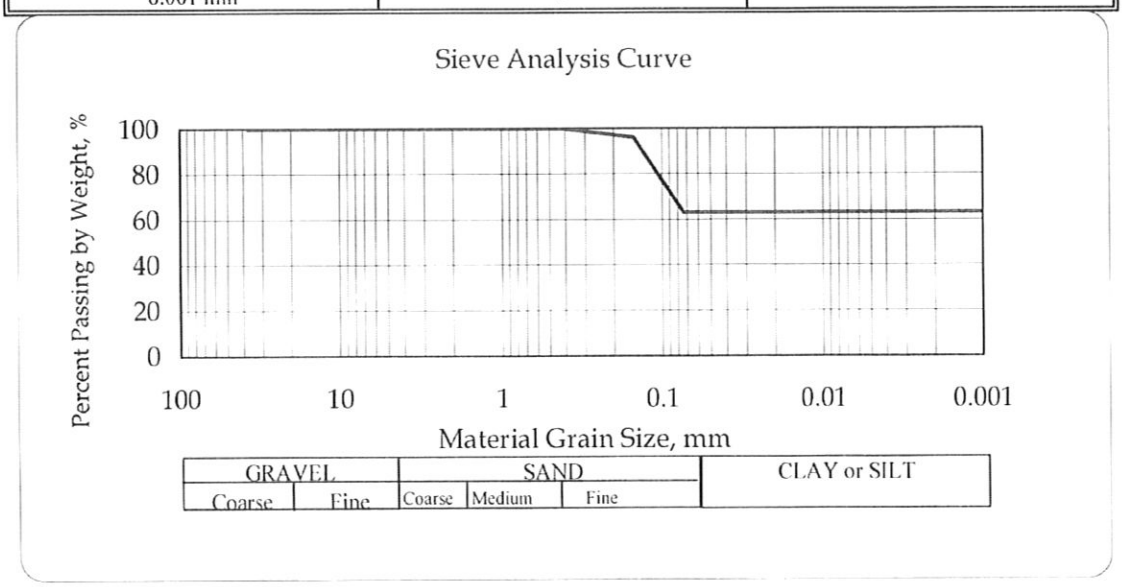
SOIL TYPE/DESCRIPTION: On-Site Subsurface Soils / SILT, Non-Plastic, Sandy, Brown to Multicolored

ANALYSIS TEST RESULTS

Sieve Analysis Test:

Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
1-1/2 inch	0	100
1 inch	0	100
3/4 inch	0	100
1/2 inch	0	100
3/8 inch	0	100
No. 4	0	100
No. 10	0	100
No. 40	0	100
No. 100	4	96
No. 200	37	63
0.005 mm	-	-
0.001 mm	-	-



SIEVE ANALYSIS TEST REPORT

PROJECT NO.: AGCQC13-052 **REPORT DATE:** 12/30/2013

PROJECT NAME: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

SAMPLE INFORMATION

SAMPLE DATE: 12/12/2013 **SAMPLE NO.:** S-4

BORING NO.: B-1 **SAMPLE DEPTH:** 7½' - 9'

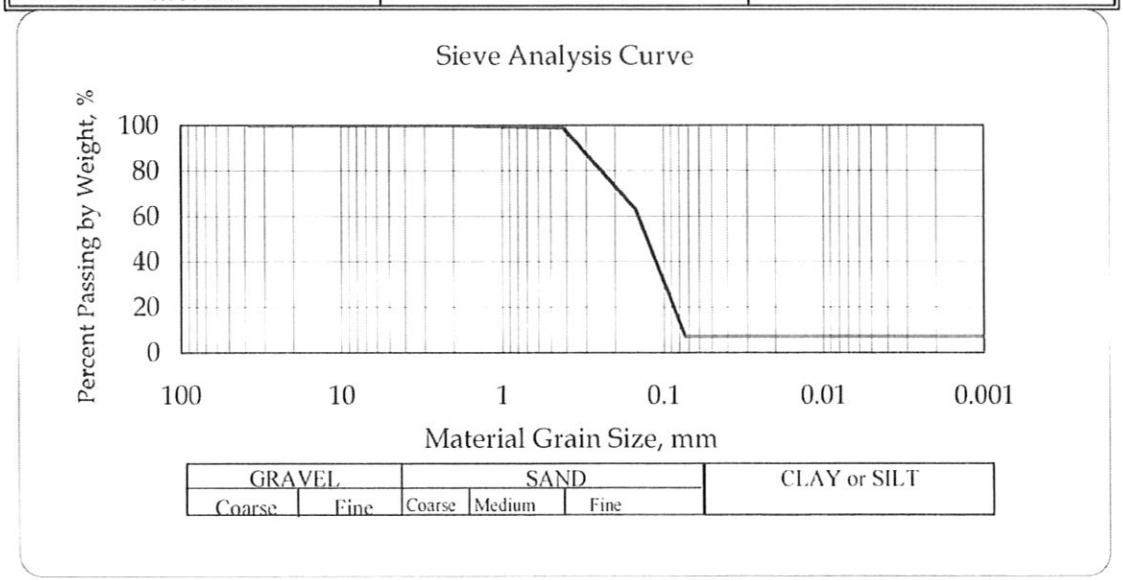
SOIL TYPE/DESCRIPTION: On-Site Subsurface Soils / SAND, Fine to Medium Grained, Poorly Graded, Mutilcolored with silt

ANALYSIS TEST RESULTS

Sieve Analysis Test:

Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
1-1/2 inch	0	100
1 inch	0	100
3/4 inch	0	100
1/2 inch	0	100
3/8 inch	0	100
No. 4	0	100
No. 10	0	100
No. 40	1	99
No. 100	37	63
No. 200	93	7
0.005 mm	-	-
0.001 mm	-	-



SIEVE ANALYSIS TEST REPORT

PROJECT NO.: AGCQC13-052 **REPORT DATE:** 12/30/2013

PROJECT NAME: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

SAMPLE INFORMATION

SAMPLE DATE: 12/12/2013 **SAMPLE NO.:** S-5

BORING NO.: B-1 **SAMPLE DEPTH:** 10' - 11½'

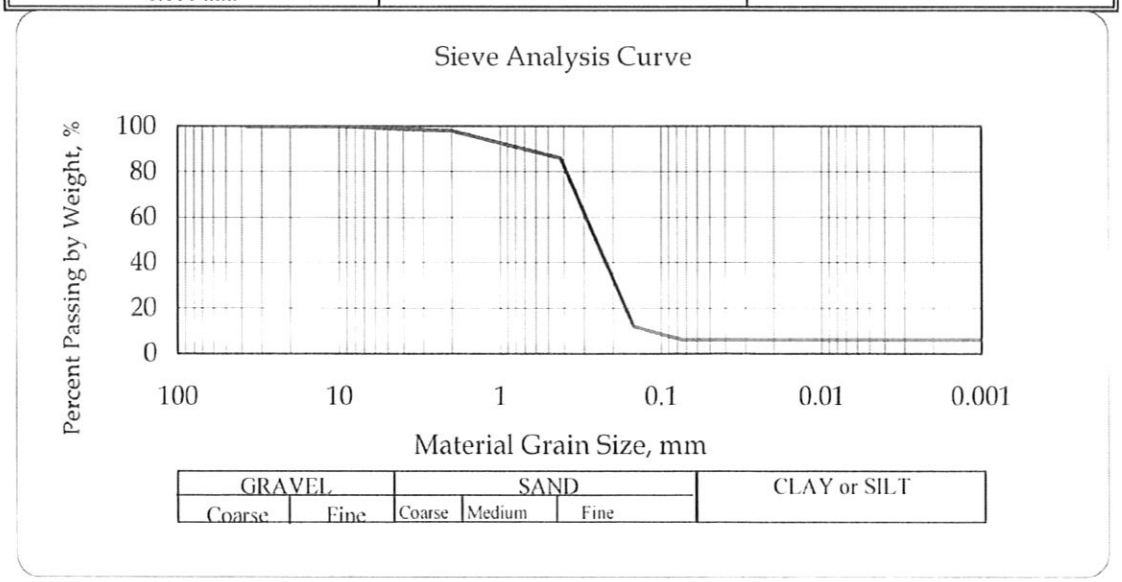
SOIL TYPE/DESCRIPTION: On-Site Subsurface Soils / SAND, Fine to Medium Grained, Poorly Graded, Mutlcolored with some silt

ANALYSIS TEST RESULTS

Sieve Analysis Test:

Test Method: ASTM D 6913

Sieve Size/No.	Percent Retained	Percent Passing
1-1/2 inch	0	100
1 inch	0	100
3/4 inch	0	100
1/2 inch	0	100
3/8 inch	0	100
No. 4	1	99
No. 10	2	98
No. 40	14	86
No. 100	88	12
No. 200	94	6
0.005 mm	-	-
0.001 mm	-	-



SUMMARY OF FIELD & LABORATORY SOIL CLASSIFICATION TEST RESULTS

PROJECT NAME: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas

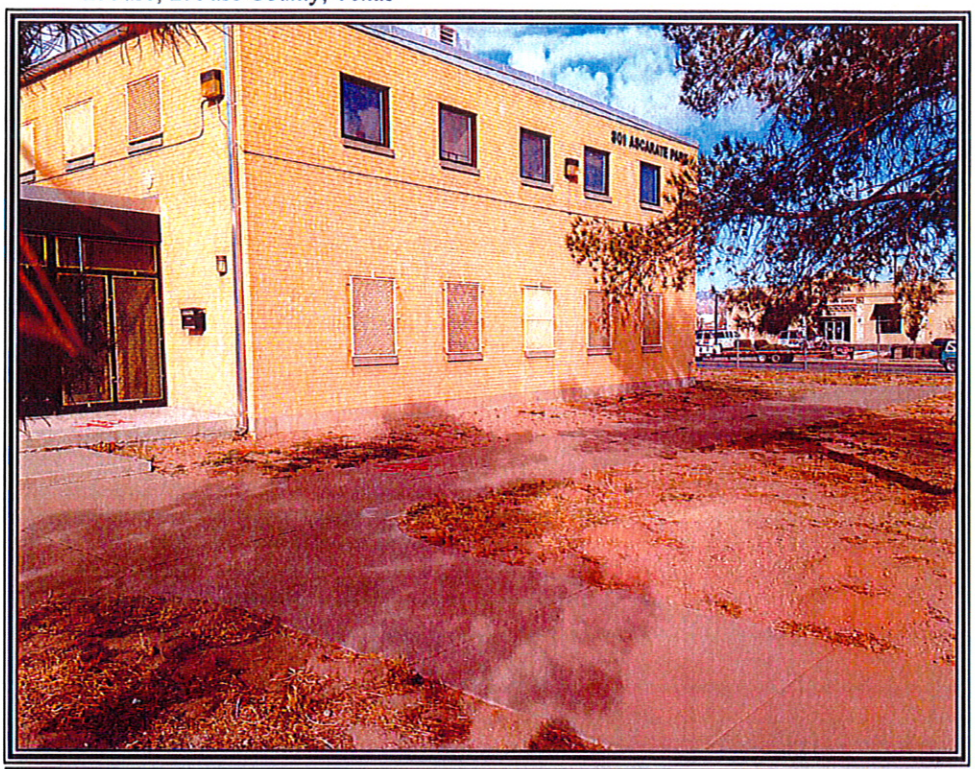
DATE: 12/30/13

PROJECT NO.: AGCQC13-052
CLIENT: Carl Daniel Architects

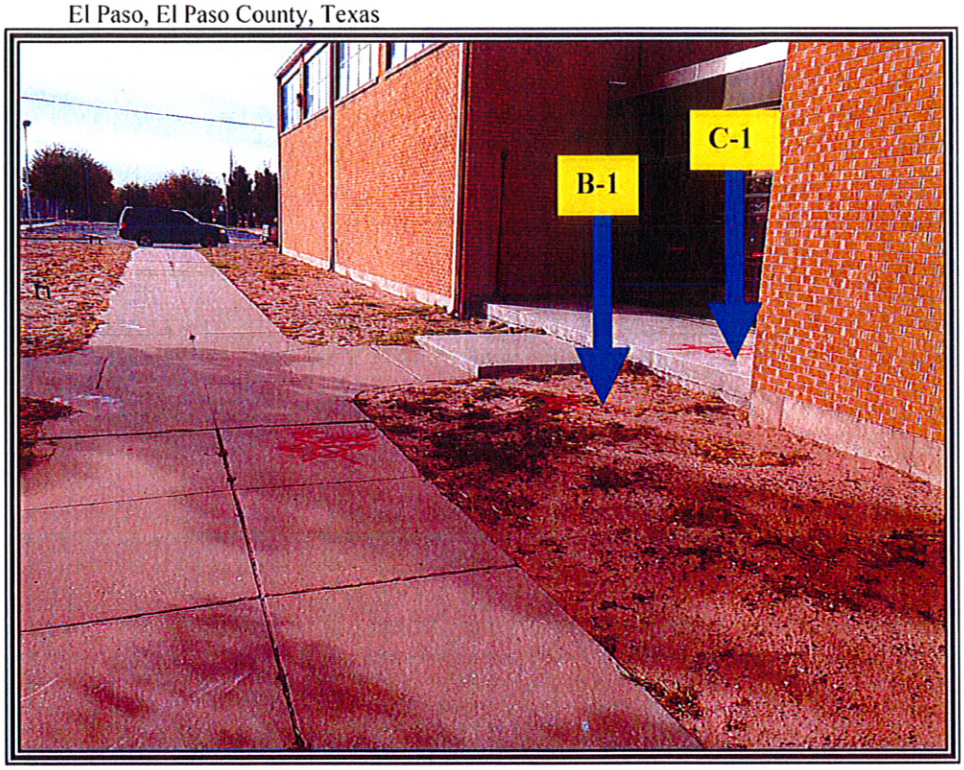
Boring No.	Sample No.	Sample Type	Approx. Sample Depth (ft.)	N-Value	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 4 Sieve	% Passing No. 200 Sieve	USCS
B-1	1	SS	0'-1½'	6							
	2	SS	2½'-4'	10	9.9				100	57	ML
	3	SS	5'-6½'	10	8.6	-	-	NP	100	63	ML
	4	SS	7½'-9'	11	2.8				100	7	SP-SM
	5	SS	10'-11½'	9	4.1				100	6	SP-SM
	6	SS	15'-16½'	13							
	7	SS	18½'-20'	16							

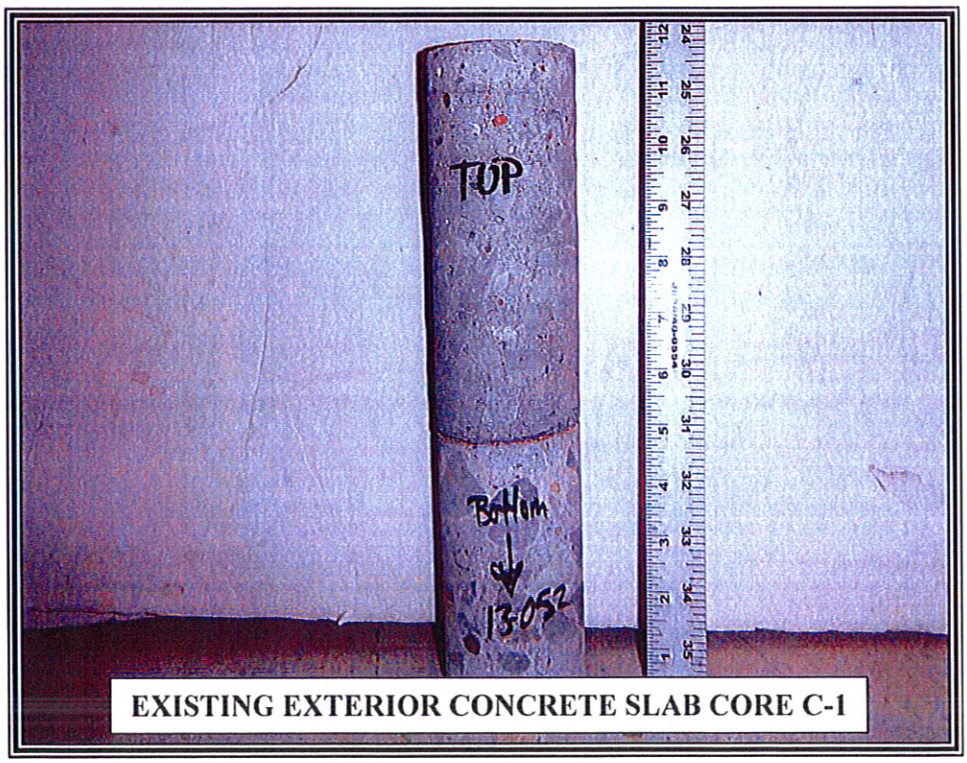
Note: SS – Split Spoon Sample NP – Non-Plastic by Test

CQC Project Name: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas



CQC Project Name: General Soils Evaluation
County of El Paso – Army Reserve Building –
Elevator Shaft Design Project
El Paso, El Paso County, Texas





EXISTING EXTERIOR CONCRETE SLAB CORE C-1