2.03 COMPONENTS

A. Fence Posts:

Fabric Height	Line Post O.D.	Terminal Post O.D.
Under 6'	1-7/8"	2-3/8"
6' to 9'	2-3/8"	2-7/8"
9' to 12'	2-7/8"	4"

B. Swing Gate Posts:

Single Gate Width	Double Gate Width	Post O.D.
Up to 6'	Up to 12'	2-7/8"
7' to 12'	13' to 24'	4"
13' to 16-1/2'	25' to 33'	4-1/2" Group IC
17' to 18'	34' to 36'	6-5/8" Group IA
Over 18'	Over 36'	8-5/8" Group IA

C. Rails and Braces: 1-5/8" O.D. Group IA or IC or IV.

D. Gates: Frame assembly of 1-7/8" O.D. pipe Group IA or IC or IV with welded joints. Weld areas repaired with zinc-rich coating applied per manufacturer's directions. Fabric to match fence. Gate accessories, hinges, latches, center stops, keepers and necessary hardware of quality required for industrial and commercial application. Latches shall permit padlocking. Vinyl coated system to have pressed steel corning fittings securely riveted to the frame.

E. Fittings:

1. All fittings to conform to ASTM F 626.
2. Post Caps – Pressed steel, cast iron or cast aluminum alloy designed to fit snuggly over posts to exclude moisture. Supply dome style caps for terminal posts and loop type for line posts.
3. Rail and Brace Ends – Pressed steel, cast iron or cast aluminum alloy, cup-shaped to receive rail and brace ends.
4. Top Rail Sleeves – Tubular steel, 0.051 thickness x 7" long, expansion type.
5. Tension Bars – Steel strip, 5/8" wide x 3/16" thick (standard chain link fence). Steel strip, ¾" wide x 3/16" thick (minimum/medium security chain link fence).
6. Tension Bands – Pressed steel, 14 gauge thickness x 3/4" wide.
7. Brace Bands – Pressed steel, 12 gauge thickness x 3/4" wide.
8. Truss Rods – Steel rod, 3/8" diameter merchant quality with turnbuckle (take up). Steel rod, 5/16" diameter merchant quality with turnbuckle (take up) for minimum/medium security chain link fence.
9. Barbed Wire Arms – Pressed steel, cast iron or cast aluminum alloy fitted with clips or slots for attaching three strands of barbed wire. Arms shall be set outward on a 45 degree angle and be capable of supporting a 250 pound load at outer barbed wire connecting point without causing permanent deflection.

F. Tension Wire: Marcelled 7 gauge steel wire with minimum coating of 0.80 ounces of zinc or 0.40 ounces of aluminum per square foot of wire surface and conforming to ASTM A824.

G. Tie Wires: Aluminum, 9 gauge, alloy 1100-H4 or equal.

H. Hog Rings: Steel wire, 11 gauge, with a minimum zinc coating of 0.80 ounces per square foot of wire surface.

I. Barbed Wire: If required, commercial quality steel, 12-1/2 gauge, two strand twisted line wire with 4 point barbs at 5 inch spacing. Coating shall consist of a minimum of 0.80 ounces of zinc per square foot of wire surface conforming to ASTM A121 or a minimum of 0.30 ounces of aluminum per square foot of wire surface conforming to ASTM A585.

J. Barbed Tape for minimum to medium security chain link fence:

1. Based on Allied Tub & Conduit "Maze" product.
2. Barbed tape shall be 24" plus or minus 1" diameter concertina style coil consisting of 31 loops. Each loop shall contain 23 plus or minus 1 barb cluster per loop. Adjacent coil loops shall be alternately clipped together at 3 points about the circumference to produce the concertina effect upon deployment. Spacing between attachment points when deployed shall be 16" plus or minus 2".
3. Barbed tape shall be fabricated from AISI 430 series steel conforming to ASTM A 176. Stainless steel shall be 1" wide before fabrication by .025" thick and shall be hardened to Rockwell (30N) 37-40. The stainless steel strip shall have clusters of four barbs, each a minimum of 1.2" long, punched at 4" centers. Barbs shall be alternately offset .15 - .45" from the plan of the tape centerline.
4. Fabricated (punched) barbed tape shall be reinforced by permanently cold clenching it around a reinforcing wire. Core wire shall be galvanized steel wire per ASTM A 764, Finish 2, Class II, Type 3, with a minimum tensile strength of 240,000 psi. The stainless steel barbed tape shall be permanently roll formed about the core wire with a minimum wrap of 230 degrees. The finished reinforced barbed tape shall be a minimum of 0.325" wide in the throat area and shall exhibit two cut-resistant flanges. These flanges shall taper off in the immediate vicinity of the barb clusters to allow maximum barb penetration.
5. Reinforced barbed tape shall be converted to concertina by clipping alternate adjacent loops at 3 places about the circumference, continuous along the entire roll's length. Stainless steel clips shall be .375" by .065" and mechanically closed to withstand a minimum pull load of 200 pounds.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until satisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. General: Installation to conform to ASTM F567.

B. Height: Provide height as indicated on contract drawings.

C. Post Spacing: Space line posts at intervals not exceeding ten feet.

D. Post Setting: Set terminal, gate and line posts plumb in concrete footings. Top of footing to be 2" above grade and sloped to direct water away from posts.

E. Concrete Strength:

1. Allow concrete to attain at least 75" of its minimum 28-day strength before rails,

tension wires, and/or fabric is installed.

2. Do not, in any case, install such items in less than seven days after placement of concrete.
3. Do not stretch and tension fabric and wire, and do not hang gates, until concrete has attained its full design strength.

F. Bracing: Brace Gate and terminal posts back to adjacent line posts with horizontal brace rails and diagonal truss rods.

G. Top Rail: Install through line loop caps connecting sections with sleeves to form a continuous rail between terminal posts.

H. Top Tension Wire: When top rail is omitted, stretch tension wire through loop caps and fasten to terminal posts.

I. Bottom Tension Wire: Stretch between terminal posts 6" above grade and fasten to outside of line posts with tie wires.

J. Fabric: Pull fabric taut with bottom selvage 2" above grade. Fasten to terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 15" intervals. Tie to line posts and top rails with tie wires spaced at maximum 12" on posts and 24" on rails. Attach to bottom tension wire with top rings at maximum 24" intervals.

K. Barbed Wire: Anchor to terminal extension arms, pull taut and firmly install in slots of line post extension arms.

L. Barbed Tape: Securely attach to the chain link fence using 18 gauge stainless steel ties which shall be spaced approximately 16" on center along both the top of the chain link fabric and the top single strand of barbed wire. Each coil of barbed tape shall be extended a maximum of 20 ± 1 foot. Adjacent coils shall be permanently spliced together by overlapping one cluster each adjacent coil, and splicing with two new stainless steel tie wires placed around the shanks of the two coils between the barb clusters.

M. Gates: Install gates plumb, level and secure for full opening without interference. Anchor center stops and keepers in concrete.

N. Fasteners: Install nuts for fittings, bands and hardware bolts on inside of fence.

3.02 CLEAN-UP

The area of installation shall be left free of debris caused by the installation of the fence.

*****END OF SECTION*****

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SECTION 031000

CONCRETE FORMWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

Supply and installation of formwork required for all cast-in-place concrete as indicated.

B. Related Sections:

1. Section 032000 - Concrete Reinforcement.
2. Section 033000 - Cast-In-Place Concrete.

1.03 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.04 QUALITY ASSURANCE

A. General: Conform to ACI 347 Chapter 2 – Design; and Chapter 4 - Materials for Formwork.

B. Plywood: Conform to APA Form V345U "Concrete Forming, Design/Construction Guide".

C. Except as otherwise specified herein, work of this Section shall be in accordance with Section 1906 of the California Building Code.

PART 2 - PRODUCTS

2.01 GENERAL

Materials shall be new. Materials may be reused during progress of work, provided they are completely cleaned and reconditioned, recoated for each reuse, capable of producing formwork of required quality and are structurally sound.

2.02 MATERIALS

A. Footings, Foundations, Ramps, Landings, Steps and Floor Slabs: Douglas fir "Standard or Better" boards, wood or steel stakes.

B. Studs, Wales, Shoring, Bracing, Centering: "Standard" grade or "Better", Douglas fir, adequate designed size, not less than 2 x 4.

C. Form Oil: Form oil shall be non-staining type, appropriate for use with forms specified and not detrimental to finished concrete surface or applied finish materials.

D. Metal Construction Joints: "Keyed-Kold", by Burke Concrete Accessories or approved equal.

E. Void Forms: Expanded polystyrene conforming to ASTM C578, Type I.

PART 3 - EXECUTION

3.01 GENERAL

Forms shall be constructed to form final concrete structure, which conforms to shape, lines and dimensions of members required by Drawings and Specifications, and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together to maintain position and shape. Forms and their supports shall be designed so that previously placed structures will not be damaged. Forms shall be true to line within 1/250 of the span.

3.02 ERECTION

Plywood shall be laid out with horizontal joints level, vertical joints plumb and with all joints tight. Back all joints by studs or solid blocking, and fill where necessary for smoothness. Reused plywood shall be thoroughly cleaned, damaged edges or surfaces repaired and both sides and edges oiled with colorless form oil. Nail plywood along edges, and to intermediate supports, with common wire nails spaced as necessary to maintain alignment and prevent warping.

3.03 REMOVAL OF FORMS

A. Forms shall not be removed until concrete has hardened sufficiently to maintain its integrity and not be damaged by form removal operations. Shoring shall not be removed until member has acquired sufficient strength to support its weight, load upon it, and added load of construction.

B. Compressive strength of in-place concrete shall be determined by testing laboratory-cured specimens representative of concrete location or members, as specified in Section 033000 - Cast-In-Place Concrete.

END OF SECTION

SECTION 032000

REINFORCING STEEL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

Supply and install concrete steel reinforcement as indicated.

B. Related Sections:

1. Section 031000 - Concrete Formwork.
2. Section 033000 - Cast-In-Place Concrete.

1.03 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Submit reinforcement steel shop drawings in accordance with ACI 315. Include assembly diagrams, bending charts and slab plans. Show length and location of splices, and size and length of reinforcing steel. Deviations from the contract documents shall be clearly identified.

1.04 QUALITY ASSURANCE

A. All materials for the work under this Section shall comply with the following standards:

1. American Society for Testing and Materials (ASTM).
2. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".
3. American Welding Society (AWS).
4. American Concrete Institute (ACI).
5. California Building Code, Chapter 19, "Concrete".
6. Fabrication and placement of reinforcing shall be in accordance with Section 1907 of the California Building Code.

B. For testing and inspection requirements, see Section 01410 – Special Testing and Inspection Services.

1.05 PRODUCT HANDLING

A. Reinforcing steel bars, wire, and wire fabric shall be stored on site to permit easy access for proper examination and identification of each shipment. Material of each shipment shall be separated for size and shape in a manner approved by the District Inspector.

B. Protect reinforcing from excessive rusting or coating with grease, oil, dirt or other objectionable materials.

PART 2 - PRODUCTS

2.01 GENERAL

Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.

2.02 MATERIALS

A. Steel Reinforcing Bars: ASTM A615, deformed grade 60 billet or ASTM A706 steel unless otherwise specified or indicated.

B. Bars or Rod Mats: ASTM A184.

C. Steel Wire for Concrete: ASTM A82 (smooth).

D. Wire Fabric for Reinforcement: ASTM A185.

E. Tie Wire: Fully annealed, copper-bearing steel wire, 16 gage minimum.

F. Chairs, Spacers, Supports and Other Accessories: Standard manufacture conforming to ACI-315 "Manual of Standard Practice," made from steel wire of approved types and sizes. For reinforcement supported from grade, use properly sized dense precast blocks of concrete.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on approved shop drawings. Before placing, clean reinforcing of loose scale, rust, oil, dirt and any coating that would destroy or reduce bond.

B. Accurately position and secure reinforcing in place as indicated and specified. Secure reinforcing so that it will not be displaced while placing concrete.

C. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, use concrete blocks to support reinforcement at proper distance above earth.

D. Place and secure reinforcement to maintain proper clearance between parallel bars, and between bars and forms. Lapped splices shall be made wherever possible in a manner to provide proper clearance between sets of bars. Lapped splices shall in general be staggered. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is placed, and shall be cleaned of concrete adhering thereto immediately after completion of pour while concrete encrustations are still soft.

E. Reinforcing shall be checked before concrete is placed and cleaned again if required.

F. Use deformed bars everywhere except where Drawings or Specifications specifically call for plain or smooth reinforcement to be used.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

Supply and install Cast-In-Place Concrete as indicated.

B. Related Sections

1. Section 031000 - Concrete Formwork.
2. Section 032000 - Concrete Reinforcement.

1.03 REFERENCES

A. Standard references shall conform to current edition of following specifications relating to work of this Section.

B. American Concrete Institute (ACI) Publication:

1. ACI 211 Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
2. ACI 304 Guide for Measuring, Mixing, Transporting, and Placing Concrete
3. ACI 305 Hot Weather Concreting
4. ACI 306 Cold Weather Concreting
5. ACI 308 Guide to Curing Concrete
6. ACI 309 Guide for Consolidation of Concrete

C. American Society for Testing and Materials (ASTM) Standards:

1. A185 Standard Specification for Welded Steel Wire Reinforcement, Plain for Concrete
2. C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
3. C33 Standard Specification for Concrete Aggregates
4. C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
5. C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
6. C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
7. C94 Standard Specification for Ready-Mixed Concrete
8. C143 Standard Test Method for Slump of Hydraulic-Cement Concrete
9. C150 Standard Specification for Portland Cement
10. C171 Standard Specification for Sheet Materials for Curing Concrete

11. C172 Standard Practice for Sampling Freshly Mixed Concrete
12. C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
13. C227 Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
14. C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
15. C260 Standard Specification for Air-Entraining Admixtures for Concrete
16. C289 Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
17. C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
18. C330 Standard Specification for Lightweight Aggregates for Structural Concrete
19. C494 Standard Specification for Chemical Admixtures for Concrete
20. C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
21. C1017 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
22. D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

1.04 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

1. Mix Design: Testing laboratory, designated by the Owner and approved by the Governing Agency, shall submit a concrete mix design for each mix that will be used on job. Mix design shall be based on field experience or by trial mixtures in accordance with ACI Chapter 5. Include water/cement ratio, size of coarse aggregate and amount of any admixture, and historical strength records or results of trial mixtures. Predict minimum compressive strength, maximum slump and air content percentage.
2. Manufacturer of ready-mixed concrete shall deliver to the Owners Inspector a certificate with each mixer truck. Certificate shall bear the signature of representative of the testing laboratory, and shall state quantity of cement, water, fine and coarse aggregate and admixture, if any, contained in load.
3. Certificates: Submit a notarized certificate that each of following conform to standards indicated:
    a. Aggregates - See Section 01410 – Special Testing and Inspections.
    b. Admixtures - ASTM Standards.
    c. Curing materials - ASTM Standards.

1.05 QUALITY ASSURANCE

A. Continuous inspection shall be maintained at batch plant (Section 01410 – Special Testing and Inspections) and for transit-mixed concrete to verify sieve analysis of aggregate, verify moisture content of fine aggregate, verify design of mix, verify cement being used with test reports, verify loading of mixer trucks, and to certify quantities of materials placed in each mixer truck.

B. Inspection shall be made by a representative of a Testing Laboratory selected by the Owner. The Owner will pay for inspection costs. Contractor shall notify the Laboratory 24 hours in advance of time concrete is to be mixed, and shall promptly notify the Laboratory of postponement or cancellation of mixing. Contractor shall reimburse the Owner for costs incurred resulting from failure to give adequate notification of postponement or cancellation.

C. Continuous batch plant inspection requirement may be waived if batch plant is registered and approved to perform such work without continuous inspection (Section 01410 – Special Testing and Inspections). Such waiver shall be in writing, with approval of the Governing Agency.

D. Strength test of concrete, see Section 01410 - Testing and Inspections.

E. Floors shall conform to ASTM E1155 and specified and overall values of flatness, F(F) 25; and leveliness F(L) 20. Notify the independent testing agency to permit measurement within 24 hours according to ASTM E1155 for a randomly trafficked floor surface.

F. Finish and measure floor surface so gap at any point between surface and an unleveled freestanding 10 foot long straightedge. Resting on two high spots and placed anywhere on the concrete surface, does not exceed ¼". Any concrete surfaces supported on metal deck shall meet this criteria. Any costs associated with remedial measures required to meet this criteria shall be the responsibility of the contractor.

1.06 PRODUCT HANDLING

A. Mixing and placing concrete see Section 01410 – Special Testing and Inspections.

B. Ready mix concrete shall be mixed and delivered in accordance with ASTM C94. Each batch of concrete delivered at job site shall be accompanied by a time slip bearing departure time and signature of batch plant supervisor. Concrete shall be placed within 90 minutes after start of mixing.

C. Store cement and aggregate materials to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be used for concrete.

1.07 JOB CONDITIONS

A. Cold Weather Requirements:

1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.

2. When depositing concrete during freezing or near-freezing weather the mix shall have a temperature of at least 50° F., but not more than 90° F. when cement is added. Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. When necessary, concrete materials shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

B. Hot Weather Requirements: During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection and curing, to prevent excessive concrete temperatures or water evaporation, which would impair required strength or serviceability.

PART 2 - PRODUCTS

2.01 GENERAL

A. Ready-Mixed Concrete shall be mixed and delivered in accordance with requirements of ASTM C94.

B. Strength of Concrete shall be as indicated on the Drawings.

2.02 MATERIALS

A. Cement shall conform to ASTM C150 Standard Specification for Portland Cement.

B. Aggregates for normal weight concrete shall conform to ASTM C33 Standard Specification for Concrete Aggregate.

C. Aggregates for lightweight concrete shall be expanded shale conform to ASTM C330 Standard Specification for Lightweight Aggregates. Presize aggregates before firing to allow outer ceramic shell to remain intact.

D. Concrete aggregates shall be non-reactive as tested in accordance to ASTM C227 Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).

E. Water shall be potable and free from deleterious matter.

F. Chemical admixtures shall conform to ASTM C494. High-range water-reducing admixture shall conform to ASTM C1017.

G. Mineral admixtures shall conform to ASTM C618.

H. Concrete mixes covered under this section shall contain a minimum of 25% Fly Ash as Portland cement replacement. Fly ash shall conform to ASTM Standard C681.

I. Expansion Joint Fillers shall be preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.

J. Curing Paper and Liquid Curing Compounds:

1. Curing Paper shall conform to ASTM C171, Type 1 – Regular.
2. Liquid Curing Compounds shall be clear liquid conforming to ASTM C309. Liquid curing compound shall be adversely affect adherence of finish materials to concrete substrate.

K. Abrasive: Aluminum Oxide grain, uniformly graded, screen size 12-13 or 16-30, "Alundum" or "Aloxite."

L. Underlayment: Latex underlayment for filling low spots in concrete.

M. Plastic Vapor Barrier Products: Moisture barrier is required where an interior area is to have finished floor installed.

1. Stego Industries, LLC; Stego Wrap Vapor Barrier, 15 mils, or equal.
2. Vapor Barrier membrane shall have the following properties, unless noted otherwise:
   a. Manufactured from prime virgin resins
   b. Water Vapor Barrier ASTM E-1745 Meets or exceeds Class A
   c. Water Vapor Transmission Rate ASTM E-96 0.006 gr./ft2/hr. or lower
   d. Permeance Rating ASTM E-96 0.01 perms or lower
   e. Puncture Resistance ASTM D-1709 minimum 2200 grams
   f. Tensile Strength ASTM D-882 minimum 50.0 lbf/in
3. Accessories
   a. Seam Tape
      i. Tape must have the following qualities: Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower
      ii. Product: Stego Tape by STEGO INDUSTRIES LLC
   b. Vapor Proofing Mastic

i. Mastic must have the following qualities: Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower Mastic

ii. Product: Stego Mastic by STEGO INDUSTRIES LLC

c. Pipe Boots

i. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

N. Stair Nosing: Two part abrasive stair nosing, type XH-330 as manufactured by Balco Inc., or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely and properly fastened in proper positions.

B. A record shall be kept on site of time and date of placing concrete in each portion of structure. Such record shall be kept until completion of structure and shall be available for examination by the Building Official.

3.02 PREPARATION

A. Thoroughly dampen subgrade to ensure that no moisture will be absorbed from fresh concrete except in areas to receive a moisture barrier.

B. Vapor Barrier:

1. Prior to placing of screeds and slab reinforcement, place a moisture barrier at all interior floor slabs. Ensure that subsoil is approved by architect or geotechnical firm. Level and tamp or roll aggregate, sand or tamped earth base

2. Place membrane in as large sheets as possible with the longest dimension parallel with the direction of the pour, lapped 12" sides and ends, with top lap placed in the direction of the spreading of concrete. Extend membrane and lap at least 6" onto all adjoining wall surfaces and seal with pressure-sensitized tape. Membrane placement shall be approved by the Owner Inspector before concrete is placed.

a. Place moisture barrier on 2" gravel base.

b. Patch punctures and tears in moisture barrier.

c. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.

d. Seal all penetrations (including pipes) per manufacturer's instructions.

e. No penetration of the Vapor Barrier is allowed except for reinforcing steel and permanent utilities.

f. Repair damaged areas by cutting patches of Vapor Barrier, overlapping damaged area 6 inches and taping all four sides with tape.

C. Reglets and Rebates:

1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Dimension and position of required reglets and rebates shall be verified with trades whose work is related thereto.

2. If concrete slabs on grade join a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete work. Reglet shall be full thickness of the slab and shall be 3/4" deep, unless otherwise indicated. Exterior walks need not be thus provided for, except where detailed.

D. Set screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been placed, but before starting to place concrete. Set screeds adjacent to all walls and in parallel rows not to exceed 8'-0" on centers.

3.03 INSTALLATION

A. Conveying and Placing:

1. Concrete shall be placed only in the presence of the Owners Inspector. Do not place concrete outside of regular working hours, unless the Owner's Inspector has been notified at least 48 hours in advance and is present.
2. Concrete shall be conveyed from mixer to place of final deposit by methods that will prevent separation or loss of materials.
3. Concrete shall be deposited as nearly as practicable to its final position to avoid segregation due to rehandling or flowing. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited, nor shall retempered concrete or concrete which has been remixed after initial set be used.
4. In depositing concrete in columns, walls or thin sections of considerable height, use openings in forms, elephant trunks, tremies or other approved devices that will prevent segregation and accumulation of hardened concrete on forms or metal reinforcement above level of concrete. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to placement surface shall be no greater than 6'-0".
5. Once concrete placing has started, it shall be carried on in a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.
6. All concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures using mechanical vibrators.
7. Where conditions make consolidation difficult, or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as used in the concrete, shall first be deposited in the forms to a depth of at least 1".

B. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8" of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with heavy straightedge until all depressions and irregularities are worked out, and surface is true to finish grades or elevations. Remove excess water and debris worked to surface.
2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface shall not be done. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

C. Floating and Troweling:

1. When concrete has hardened sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces, shall receive not less than two troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.
2. For interior finish slabs, final troweling shall produce hard, impervious, and nonslip surfaces, free from defects and blemishes. Finished surface shall contact a 10'-0" straightedge for its entire length. A maximum of 1/8" tolerance will be permitted. Sprinkling a mixture of dry cement and sand on concrete slab to absorb surface

moisture will not be permitted. Burnishing which produces smooth, slick surfaces, shall be avoided.

3. Finish exterior paving and cement walks as specified above, except surface shall be given a non-slip broom finish to match sample provided by the Owner Inspector.
4. Vertical concrete surfaces shall be finished smooth and free from marks.

D. Curing:

1. Concrete shall be maintained above 50° F and in a moist condition for at least the first 7 days after placing, except that high early strength concrete shall be maintained in such a condition for at least the first 3 days.
2. Before applying curing paper, interior floor treated with colored hardener shall be given a heavy protective coat of colored wax left unpolished, and then immediately covered with paper. If wax is not applied within two hours after final troweling, concrete shall be sprayed with a fine water mist and kept continuously moist until wax is applied, unless spraying is not recommended by hardener manufacturer. After all other work, including plastering and painting has been completed, curing paper shall be removed and waxed floors cleaned of protective wax coating. Clean all floors to their original condition.
3. Forms containing concrete, top of concrete between forms, and all exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for not less than seven consecutive days after placing.
4. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting no later than two hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been applied.
5. Immediately after finishing, roof slabs and monolithic floor finish that receive resilient floor covering, shall be uniformly and completely coated with liquid curing compound.
    a. Apply compound in a manner and quantity sufficient to produce a uniform continuous thin film of water-impervious membrane. Compound shall be applied in accordance with manufacturer's directions.
    b. Protect adjoining surfaces from damage during application. If curing compound is not applied immediately, cover finished concrete with wet burlap or curing paper and keep concrete surface wet for a period not to exceed thirty hours following finishing of concrete. At end of that time, burlap or paper shall be removed and curing compound applied as specified above.
6. Immediately after finishing, monolithic floor slabs that do not receive resilient floor coverings shall be covered with curing paper. Paper shall be lapped 3" at joints and sealed with waterproof sealer. Edges shall be cemented to finish. If paper is torn or damaged during construction operations, it shall be repaired or replaced in manner acceptable to the Owner Inspector. Paper shall be on work site before starting cement finishing, and shall remain in place until permission is given by the Owner Inspector to remove paper.
7. Within 24 hours after finishing, all exterior slabs and paving, and interior slabs to receive cement topping or mortar setting bed shall be covered with sand to depth of 2" and kept thoroughly wet for 7 days. Protection shall be removed when directed by the Owner Inspector, and surfaces washed clean.
    a. In lieu of sand covering, exterior walks and paving where no other surface treatment is specified, may be cured with clear liquid curing compound applied immediately, in accordance with manufacturer's directions.

E. Filling, Leveling and Patching:

1. Concrete slabs which have high or low spots and are to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required levels. Low spots shall be filled with latex underlayment, applied in strict accordance with manufacturer's printed instructions.

2. Holes resulting from form ties or sleeve nuts shall be solidly packed completely through all exterior walls by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded off flush and finished to match adjoining surfaces.

F. Cement bases shall be of height, thickness and shape detailed. Base shall be reinforced with 1" mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one volume portland cement, 2 volumes of fine aggregate and one volume pea gravel. Colored cement base, where called for, shall include a chemically inert mineral oxide pigment in mixture.

3.04 FINISHING

A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other such finishes, and which have been formed by oil-coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. All surfaces where smooth wood or waste molds have been used shall be scrubbed with a solution of 20% muriatic acid. As soon as surfaces have been scrubbed, they shall be washed with clean water.

B. Sacking: Exposed concrete curbs and walls shall be "sacked" by an application of portland cement grout, floated and rubbed. "Sacking" shall not be carried out until all patching and filling of holes has been performed. Entire "sacking" operation for any continuous area shall be started and completed same day.

1. Mix 1 part portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with brushes or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.

2. While grout is still plastic, finish surface with a sponge-rubber float, removing all excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove all dried grout. No visible film or grout shall remain after rubbing with burlap.

C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been used, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. All such surfaces shall be thoroughly washed with clear water after sandblasting.

D. Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, shall receive an abrasive finish. Abrasive grains in amount of 30 pounds per 100 square feet shall be evenly applied by "dust-on" method and embedded into surface during first troweling operation. Additional abrasive grains, in amount of 30 pounds per 100 square feet, shall then be evenly applied and embedded into surface during final troweling operation. The Owner Inspector shall verify that abrasive material is on site before Contractor orders concrete delivery.

E. Floor Hardener: All exposed interior concrete floors throughout shall be treated with floor hardener, as specified. Apply hardener after surface of concrete has reached the point where no excess moisture shows, but while it is still plastic. Hardener shall be applied as follows:

1. Colored Hardener: Apply at rate of 40 pounds per 100 square feet of surface for initial application.

2. Gray (natural) Hardener: Apply at rate of 20 pounds per 100 square feet of surface for initial application.

3. Hardener shall be evenly distributed and thoroughly floated into surface mortar with a wood float. An additional 20 pounds of hardener, colored or gray, specified as above, shall be applied over each 100 square feet, and troweled to an even surface having uniform color and texture.

F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at site and shall be composed of one volume of portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry and sufficient water added to make mixture flow under its own weight. When grout is used as a "dry-pack concrete", add sufficient water to make a stiff mixture that can be molded into a sphere.

G. Broom Finish: Exterior stair treads and landings shall receive a non-slip broom finish in addition to abrasive finish specified.

H. Abrasive Stair Nosing: All stairs shall receive an abrasive 2-part nosing. Nosing shall be installed according to manufacturer's recommendations.

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

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

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

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

3.05 EXPANSION AND CONSTRUCTION JOINTS

A. Construction Joints: Details and proposed location of construction joints shall be as indicated on Drawings, located to least impair strength of structure, as directed by the Structural Engineer, in accordance with following:

1. Thoroughly clean contact surface by sand blasting entire surface no earlier than 5 days after initial pour.

2. A mix containing same proportion of sand and cement used in concrete plus a maximum of 50% of coarse aggregate shall be placed to a depth of at least 1" on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.

3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be recleaned before applying mix.

B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. If joints are not indicated, they shall be spaced approximately 20'-0" apart. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8" thick unless otherwise indicated.

C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5'-0" wide.

3.06 TESTING

A. Molded Cylinder Tests: Section 01410 – Special Testing and Inspections.

1. The Owner Inspector shall prepare cylinders. Each cylinder shall be dated, given a number, point in structure from which sample was taken, mix design number, mix design strength and result of accompanying slump test noted.
2. Separate tests of molded concrete cylinders taken at same place and time shall be made at age of 7 days and 28 days. A strength test shall be the average of the compressive strength of two cylinders, made from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.
3. Test cylinders shall be made at job and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.

B. Core Test: If strength tests of laboratory cured cylinders fall below specified strength, f'c, by more than 500 psi, cores of hardened concrete shall be cut from the hardened structure representative of the area in question, for testing in accordance with CBC Section 1905.6.4 and ASTM C42.
1. Cores shall be taken from areas of the structure representative of the low strength results as designated by the Structural Engineer and shall be at least 4" in diameter.
2. Not less than 3 cores shall be taken from each area in question.
3. Where cores have been cut from work, Contractor shall fill void with drypack or non-shrink grout and patch the finish to match the adjacent existing surfaces.

C. Concrete Consistency: Measure consistency in accordance with ASTM C143. This test shall be made by the Owner Inspector twice each day or partial day's run of the mixer.

D. Adjustment of Mix: Should the strength of any grade of concrete for any portion of work, as indicated by molded test cylinders, fall below minimum 28 days compressive strength specified or indicated, the Structural Engineer will direct the testing laboratory to adjust mix for remaining portion of construction so that resulting concrete meets minimum strength requirements.

E. Defective Concrete:
1. Should strength of any grade of concrete, for any portion of work indicated by tests of molded cylinders and core tests, fall below minimum strength specified by CBC Section 1905.6.4, concrete will be deemed defective and shall be replaced or adequately strengthened in a manner acceptable to the Structural Engineer, the Owner Inspector and the Building Official.
2. Any concrete work that is not formed as indicated, is not true within 1/250th of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective and shall be removed and replaced.

F. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, concrete strength shall be 3000 psi at 28 days, proportioned and mixed in accordance with requirements of this Section. Exposed concrete shall have a hand-troweled finish with neatly rounded corners and edges. Cast in forms where necessary as described in Section 031000, Concrete Formwork, and reinforced as described under Section 032000. Calcium chloride shall not be used in concrete mix for underground electrical conduits. For concrete encasement of more than one conduit, use 3/4" to 1" normal weight aggregates as specified in this Section for concrete mix.

END OF SECTION

SECTION 033005

SITE CONCRETE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Cement Walks
2. Curbs
3. Gutters
4. Fence post footings
5. Sliding gate concrete tracks
6. Catch basins
7. Pipe bedding
8. Encasements
9. Thrust blocks
10. Transition structures
11. Flagpoles and light standard bases and footings

B. Related Requirements:

1. Section 312000 Grading.
2. Section 312333 Excavating, Backfilling and Compacting for Pavement.
3. Section 320717 Pavement Repair.
4. Section 321370 Base Course.

1.03 ACTION SUBMITTALS

A. Shop Drawings: Submit plans, elevations and details of concrete site work.

B. Product Data: Submit mix designs and manufacturer's technical data for materials and products. Submit 3" x 3" concrete sample of each specified color.

C. Material Sample: Submit one concrete bumper to the Inspector of Record for destructive testing.

1.04 QUALITY ASSURANCE

A. Comply with Standard Specifications For Public Works Construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete, Mortar and Related Materials: Comply with applicable provisions of Standard Specifications for Public Works Construction, Section 201 - Concrete, Mortar and Related Materials:

1. Concrete: 28-day compressive strength 2,500 psi, unless specified otherwise.
2. Reinforcing Mesh: ASTM A 185, 4x4/W1.4 x W1.4 welded wire mesh.
3. Expansion Joint Filler: Preformed expansion joint filler, bituminous type, complying with ASTM D 994.

B. Form Materials:

1. Side forms: Douglas fir, Construction Grade or Better or metal forms.
2. Stakes: Douglas fir, Construction Grade or Better or metal stakes.

C. Concrete Parking Bumpers:

1. Precast concrete, smooth and free of pits and rock pockets, providing a minimum 28-day compressive strength of 3,500 psi. Size at least 7-1/2 inches wide, 5-1/2 inches high and 6 feet long. Reinforce with 2 #5 reinforcing bars. Provide 2-3/4 inch diameter pre-drilled holes for anchor installation.
2. Bumper Anchors: Provide ½-inch diameter x 18-inch long galvanized steel pipe.
3. Bumper Adhesive: Provide adhesive recommended by bumper manufacturer/installer for fastening bumpers to concrete pavement.

PART 3 - EXECUTION

3.01 CONSTRUCTION OF FORMS FOR CAST-IN-PLACE STRUCTURES

A. Concrete Pavement: Install Portland cement concrete pavement in compliance with the Standard Specifications for Public Works Construction, Section 302- Roadway Surfacing.

B. Miscellaneous Exposed Concrete: Install concrete curbs, walks, gutters, cross gutters, access ramps, driveways, catch basins, yard boxes, vaults and similar structures, in compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.

C. Exposed Concrete Bases: Install bases, such as for post, flagpole, light standards and similar bases, in compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.

D. Post, flagpole, light standard footings below grade, underground conduit bedding, encasements, thrust blocks and similar structures may be placed \directly in excavations conforming to the required sizes.

E. Reinforcement installation and concrete placement, surface finishes, curing and removal of forms shall be performed in compliance with applicable provisions of Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction. Provide heavy broom finish at slopes exceeding six (6) percent and medium broom finish at slopes up to six (6) percent.

3.02 INSTALLATION OF PARKING BUMPERS

A. Install bumpers as indicated on the Drawings. On bituminous paving, install anchors through pavement and into the ground a minimum of 12 inches. On concrete pavement, install bumpers in a continuous bed of adhesive.

3.03 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion.

*****END OF SECTION*****

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SECTION 042200

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Furnish and lay concrete masonry units.
2. Furnish and place reinforcing steel.
3. Provide mortar, grout and grouting.
4. Place bolts, anchors, hardware, metal frames and other insert items.
5. Cure, protect and clean finish work.

B. Related Sections:

1. Section 031000 - Concrete Formwork
2. Section 032000 - Concrete Reinforcement
3. Section 033000 - Cast-In-Place Concrete

1.03 REFERENCE STANDARDS

A. In accordance with ACI 530

B. Section 01410 – Special Testing and Inspections.

1.04 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

1. Samples: Submit 3 samples each of each type of masonry unit required for work to the Architect for review prior to ordering, receiving or installing units in field.

1.05 QUALITY ASSURANCE

A. Concrete Masonry Units: Sample and test in accordance with ASTM C140.

1. Contractor shall notify the Testing Laboratory a minimum of 45 days in advance of laying concrete unit masonry, to allow for testing of the units for compression, shrinkage and absorption (absorption test requires 40 days).
2. The assigned Material Testing Laboratory shall receive 5 concrete masonry units per test from masonry unit manufacturer (units as designed or specified by the Architect or Engineer), performs and sends required test results to:
    a. Governing Authority.
    b. Inspection Agency.

c. General Contractor.

d. The Architect.

e. The Structural Engineer.

3. Contractor shall reflect time required for testing in Construction Schedule.

B. Portland Cement: Sample and test in accordance with ASTM C150.

C. Mortar: Sample and test in accordance with ASTM C780.

D. Grout: Sample and test in accordance with ASTM C404.

E. Compressive Tests:

1. Mortar: Not less than 800 psi at 7 days and 1,500 psi at 28 days.

2. Grout: Not less than 1,000 psi at 7 days and 2,000 psi at 28 days.

3. Do not test 28-day specimen when 7-day tests exceed 28-day requirements.

F. Inspection During Laying: An approved Deputy Inspector will be constantly present during laying of reinforced masonry.

G. Payment for original tests and inspection will be paid by the Owner. All costs incurred for retests and reinspections required because of failure of original tests will be paid by the Owner, charged to Contractor, and deducted from Contract price by Change Order.

H. Should core testing be required by the Structural Engineer, then all masonry cut or damaged by coring operation shall be removed and replaced with new masonry to match adjoining work. All costs of removal and replacement shall be borne by Contractor.

1.06 PRODUCT HANDLING

A. Store units above ground on level platforms that allows air circulation under stacked unit.

B. Cover and protect against wetting prior to use.

C. Handle units on pallets or flat bed barrows. Free discharge from conveyor units or transportation in mortar trays not permitted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Unit Masonry: Modular medium weight conforming to ASTM C90, grade N-1. (Hollow load-bearing concrete unit masonry).

1. Provide open-end units at walls to be grouted.

2. Provide closed-end units at walls and at openings where ends will be exposed in finish work; provide bond beam blocks where horizontal reinforcing is indicated.

3. Provide special shapes and accessory units at locations indicated on Drawings.

4. Except as otherwise specified, provide units in standard gray color.

B. Portland Cement: ASTM C150, Type I or II, from one source.

C. Mortar: ASTM C161.

D. Grout: ASTM C476.

E. Hydrated Lime: ASTM C207, Type S.

F. Admixture for Grout: Grout Aid No. 2 as manufactured by Sika Chemical Corp.

G. Water: Potable and fresh.

H. Cleaning Materials: Shure Klean No. 600 detergent by Process Solvent Co. Inc.

I. Miscellaneous Materials: As required to complete work.

J. Sampling and testing of mortar, see Section 01410 – Special Testing and Inspections.

K. The face of the concrete unit masonry shall be burnished for the interior walls for the gymnasium and MAC spaces.

PART 3 - EXECUTION

3.01 MORTAR AND GROUT MIXING

A. Mortar: Dry, loose volumes. Mix proportions shall be verified by Material Testing Laboratory.

1. Portland cement: 1 part
2. Hydrated lime: 1/4 to 1/2 parts
3. Mortar sand: 2-1/4 to 3 parts
4. Water: to produce required consistency.

B. Grout: Dry, loose volumes. Mix proportions shall be verified by Material Testing Laboratory.

1. Portland cement: 1 part
2. Grout sand: 2 1/4 parts to 3 parts
3. Pea gravel: 1 to 2 parts
4. Water: to produce required consistency

C. Measurements: Proportion by accurate volume measurements. Measure in suitable calibrated devices that can be easily and accurately checked at any time.

1. Add water for workable consistency.
2. Shovel measurements shall not be permitted.

D. Mixing: Place sand, cement, and water in mixer in that order, while mixer is running; mix for 3 minutes, add lime, and admixture (for grout), and continue mixing until a uniform mass is secured, but in no case less than 10 minutes.

1. Equipment for mixing and handling mortar and grout shall be acceptable to the Architect and the Governing Authority.
2. Batches of less than one sack of cement, and fractional sack batches will not be permitted.

E. Retempering Time Limit: Retemper on mortar boards, for not less than 3 minutes not more than 10 minutes when required, by adding water into a basin formed by mortar, and working mortar into it. Dashing, or pouring of water over mortar will not be permitted.

1. Do not retemper mortar that has become hard or non-plastic.
2. Discard mortar that has not been used within one-hour after original mixing.

F. Ready-Mix Grout: Grout batched off-site and delivered by mixer truck shall be subject to same procedures and controls as prescribed in Section 033000: Cast-In-Place Concrete.

3.02 LAYING CONCRETE UNIT MASONRY

A. Workmanship: Erect masonry plumb and true to line; with straight, level joints of uniform thickness. Maintain proper equipment, skilled masons, and adequate supervision. Keep masonry clean during and after laying.

1. Layout and incorporate all embedded hardware items.
2. Assist other trades with built-in items that require cutting and fitting of masonry.
3. Cut block units with a steel saw or carborundum wheel. Trowel or chisel cutting will not be permitted.

B. Reinforcing Steel: Place as indicated on Drawings. Except as indicated otherwise, place reinforcement in accordance with Standards of Concrete Reinforcing Steel Institute (CRSI): Conform also to requirements specified in Section 032000: Concrete Reinforcement.

C. Shoring: Provide, in place, temporary shoring for lintels, strong enough to carry load without deflecting. Remove temporary shoring after masonry has been in place 28 days.

D. Laying Block: Clean all dirt and dust from surfaces before laying.

1. Foundation preparation: Sandblast tops of concrete starting surfaces, wash-off by high-pressure water jet, and slurry coat surfaces with neat cement grout and bond to masonry as if it were masonry.
2. After bond bed has hardened slightly, spread mortar to required joint thickness. Lay blocks with 3/8" mortar bed on entire horizontal surface. Fill head joints solid, shove tightly to adjoining units. All joints shall be 3/8".
    a. Hold racking to a minimum.
    b. No toothing allowed.
    c. If it becomes necessary to move a unit after it has been set in place, remove the unit, discard the mortar, and re-set the unit in fresh mortar.
3. Anchor Bolts: Provide 1" minimum grout space around all protruding bolts.
4. Bond: Unless otherwise indicated, noted, or specified, lay all units in common running bond.
5. Finish Joint Treatment: Unless otherwise indicated, noted, or specified, cut both interior and exterior joints flush, and tool slightly concave to a dense, uniform surface.
6. Grouting: Unless noted otherwise on Drawings, completely fill all cells with grout.

E. Steel Door Frames:

1. Locate door frames accurately, erect plumb, and secure to floor and brace in position prior to start of masonry construction.
    a. Frames are specified to be furnished with adjustable anchors.
    b. Fill interior of frames solid with mortar or grout as walls are constructed.
2. Provide temporary wood spreaders from jamb to jamb and from head to floor to insure that jambs do not bow-in or distort from a straight line, or deflect from superimposed loads during construction.

3.03 GROUTING

A. After mortar in joints has firmly set, cores are cleaned of mortar and debris, reinforcing is properly in place and checked, grout cells in 5'-0" maximum lifts, using specified pea gravel grout mix. Grout pour height shall not exceed that shown in CBC Table 21-C.

B. Grout walls solid, without voids.

C. Grout may be placed by pump, tremie or bucket, using hoppers to avoid spilling on exposed surfaces.

D. Place an initial 5'-0" high lift all around, thoroughly compact, then place balance of each lift, compacting again through total lift, using hardwood spading sticks or pencil vibrators.

E. Stop grout pours 1-1/2" below top of each lift.

F. Remove and discard spilled grout from upper units before grout can harden.

G. Adequately brace walls against wind and other forces during construction.

H. Compacting:

1. Compact and recompact grout using 3/4" light-weight flexible cable vibrators.
2. First compaction shall be completely to bottom of lift immediately after placement, and in case of subsequent lifts, through previously placed lift.
3. Top lift shall be recompacted no sooner than 30 minutes after grout has been placed.
4. Vibrating of reinforcing steel is not permitted.

I. Bracing: Adequately brace walls against wind and other forces during construction.

3.04 CURING, CLEANING AND PROTECTION

A. Remove all efflorescence and grout stains.

B. Do not saturate masonry with water for curing or any other purposes.

C. Where atmosphere is dry, dampen the wall surface with a very light fog spray for 3 days to help cure mortar in joints.

D. At completion of masonry work, remove all misplaced mortar, grout or other foreign substances, and clean surfaces that will be exposed in finish work with specified cleaner, or with clean water and stiff fiber brushes.

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SECTION 051200

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

Supply and install structural steel as indicated.

B. Related Sections:

1. Section 09900 - Painting.

1.3 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

1. Materials Identification Report: A report of material identification, together with identified copies of the mill test reports, shall be submitted to Governing Agency by the Testing Laboratory when manufacturer's mill test reports are used to establish conformity with material specifications.
2. Shop and Erection Drawings: Submit checked prints of shop and erection drawings for structural steel work.
3. Record Set of Drawings: After structural steel has been erected and approved shop and erection drawings have been corrected to correspond with changes made in field, submit a complete corrected set of prints.

1.4 QUALITY ASSURANCE

A. Structural steel shall conform to CBC and Section 01410 – Special Testing and Inspections, except that steel manufactured by acid Bessemer process shall not be used for structural purposes.

B. Sheet and strip steels and steels that is not readily identifiable from markings and test records shall be tested to determine conformity to specified standards.

C. Structural steel used in welded construction shall have the properties suitable for welding.

D. Structural steel shall conform to "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings".

1.5 PRODUCT HANDLING

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

B. Protect steel from corrosion.

C. Store welding electrodes in accordance with AWS D 12.1.

D. Store other materials in a weather tight and dry place, until ready for incorporation into work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Stock Materials: Provide exact materials, sections, shapes, thicknesses, sizes, weights and details of construction indicated on Drawings. Changes because of material stock or shop practices will be considered for approval if net area of shape or section is not reduced thereby, if material and structural properties at least equivalent, and if overall dimensions are not exceeded.

2.2 MATERIALS

A. Structural Steel:

1. Wide Flange Shapes shall conform to ASTM A992, Grade 50.
2. Channels and Angle shapes and plates not part of the Seismic-Force-Resisting System (SFRS) shall conform to ASTM A36.
3. Plates used in SFRS shall conform to ASTM A572, Grade 50.

B. Steel Pipe shall conform to ASTM A53 - Type E or S, grade B.

C. Structural Tubing shall conform to ASTM A500, Grade B (Fy = 46 ksi)

D. Bar Stock for Anchor Bolts

1. Anchor bolts not part of the SFRS shall conform to ASTM F1554, Grade 36.
2. Anchor used in SFRS shall conform to ASTM F1554, Grade 55 (weldable).

E. Machine Bolts and Nuts shall conform to ASTM A307, grade A.

F. High Strength Steel Bolts shall conform to ASTM A325

G. Plain Washers shall conform to ASTM F436.

H. Galvanizing shall conform to ASTM A123.

I. Primer: "Tnemec 99" or approved equal.

J. Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 5% of the total value of the materials in the project.

2.3 FABRICATION

A. Cleaning and Straightening Materials: All materials being fabricated shall be thoroughly cleaned of all scale and rust, and straightened before being worked on. Cleaning and straightening methods shall not injure material. After punching or working component parts of a member, all twists or bends shall be removed before parts are assembled.

B. Fabricate work in accordance with CBC Section 2205.1.

C. Cutting, Punching, Drilling and Tapping: Unless otherwise indicated or specified, structural steel fabricator shall do all cutting, punching, drilling and tapping of his work so that work of other trades will properly connect to steel work.

D. Milling: Compression joints depending on contact bearing shall have bearing surfaces prepared to a common plane by milling.

E. Use of Burning Torch: Oxygen cutting of members shall be done by machine. Gouges greater than 3/16" that remain from cutting shall be removed by grinding. All reentrant corners shall be shaped notch free to a radius of at least 1/2". Gas cutting of holes for bolts or rivets is prohibited.

F. Galvanizing: After fabrication, items indicated or specified to be galvanized shall be galvanized in largest practical sizes. "Fabrication" includes all operations of shearing, punching, bending, forming, assembling or welding. Galvanized items shall be free from projections, barbs or icicles resulting from galvanizing process.

G. Welding:

1. Type of steel used in welded structures shall have chemical properties suitable for welding as determined by chemical analysis. Welds shall conform to the requirements of AWS D1.1, as indicated in Section 01410 – Special Testing and Inspections.
2. Materials and workmanship shall conform to the requirements specified herein and to CBC Section 2205:
    a. No welded splices shall be made except those indicated on Drawings unless approved in writing by Structural Engineer.
    b. Drawings will designate joints in which it is important that welding sequence and technique be controlled to minimize shrinkage stresses and distortion.
3. Welding shall be performed in accordance with requirements of the "American Welding Society" (AWS) and "Structural Welding Code."

H. Shop Finish:

1. Notify the Deputy Inspector when work is ready to receive shop prime coat. Work shall be inspected and approved by the Deputy Inspector before application of primer.
2. Structural steel and fittings, except galvanized items, which will be exposed when building is completed, shall receive a coat of primer.
3. The primer specified shall be spray applied, filling all joints and corners and covering all surfaces with a smooth unbroken film. The minimum dry film thickness of the primer shall be 2.0 mils. Follow manufacturer's instructions for thinning.

I. Architecturally Exposed Structural Steel

1. Architecturally Exposed Structural Steel (AESS) is shown on the Architectural Drawings.
2. All AESS shall conform to the Section 10 of the AISC "Code of Standard Practice for Steel Buildings and Bridges".

2.4 QUALITY CONTROL

A. Tests:

1. Structural steel shall be identified in accordance with CBC Section 2203.1, Section 01410 – Special Testing and Inspections. The grade and ASTM specification number or designation shall be indicated on each lift or bundle of fabricated elements.
2. If structural steel cannot be identified at least one tension and elongation test and one bend flattening test shall be made for each piece.
3. For castings and forgings, chemical analysis and one tension and elongation test will be required for each heat. Complete four-sided inspection shall be made of all castings.
4. For sheet and strip steel, one tension and elongation test and one bend or flattening test for each 5 tons or fractional part thereof for each size or gage will be required.
5. Test specimens shall be furnished by steel fabricator and taken under direction of the Testing Laboratory to dimensions required by "Standard Methods and Definitions for Mechanical Testing of Steel Products", ASTM A370.

6. Cost of tests of stock will be borne by the Owner, except that if a test fails to comply with requirements of Specifications, cost of testing shall be borne by Contractor.
7. If after fabrication and inspection, work is found to be defective and requires re-inspection, costs of such re-inspection shall be borne by Contractor.
8. Steel fabricator shall provide all labor, equipment and facilities necessary for moving and handling materials to be inspected.

B. Welding Inspections:

1. Inspection of all shop and field welding operations shall be made by a qualified Welding Inspector approved by the Governing Authority. The welding inspector shall make a systematic record of all welds (see Section 01410 – Special Testing and Inspections) including:
    a. Identification marks of welders.
    b. List of defective welds.
    c. Manner of correction of defects.
2. The Welding Inspector shall be notified at least 2 days before shop or field welding inspection is to be required.
3. The Welding Inspector shall check the material, equipment and procedures, as well as welds and competence of welder. He shall furnish a report that welding which is required to be inspected is proper and has been done in conformity with approved Drawings and Specifications.
4. The Welding Inspector shall use all means necessary to determine quality of weld and may use gamma ray, magnaflux, trepanning sonics or any other aid to visual inspection deemed necessary to assure adequacy of welding.

C. Inspection of Shop Fabrication: Shall be in accordance with CBC, indicated in Section 01410 – Special Testing and Inspections.

D. Inspection of High Strength Bolt Installation: Shall be in accordance with CBC, indicated in Section 01410 – Special Testing and Inspections.

E. Tests of End Welded Studs: End welded studs shall be tested in accordance with CBC, indicated in Section 01410 – Special Testing and Inspections.

PART 3 - EXECUTION

3.1 VERIFICATION

A. Verify governing dimensions and conditions at job site before commencing erection work.

3.2 ERECTION

A. Erect all steel in strict accordance with Drawings, approved shop drawings and all standards.

B. Where indicated for field connections, standard bolts (ASTM A307), do not require washers under head or under nut, except that beveled washers are required when outer face of the bolted parts have a slope greater than 5%.

C. Install high strength steel bolts at locations indicated. Assembly and installation shall be in accordance with CBC Section 2205.

D. Erect structural steel plumb and level and to proper tolerances as set forth in the AISC Manual. Provide all temporary bracing, supports or connections required for complete safety of structure until final permanent connections are made.

E. Set column bases within a tolerance of 1/8" of detailed center lines, and set and level at proper elevations. Support bases on double nuts and solidly fill all spaces under bases with

drypack cement grout rammed into place.

3.3 FINISHING

A. After erection, spots or surfaces where paint has been removed, damaged, or burned off and field rivets, bolts, and other field connections not concealed in work, shall be cleaned of dirt, oil, grease, and burned paint and given a spot coat of same primer used for shop priming.

B. Damaged galvanized surfaces shall be coated with Galvalloy, Galvabar or approved equal. Heat damaged surface to approximately 600 degrees Fahrenheit. Rub alloy bar over heated surface. Paint is not acceptable.

END OF SECTION

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SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

A. Provide all labor, materials, tools, facilities and equipment required for the fabrication and installation of rough carpentry and associated items (except that which is specified elsewhere) indicated on Drawings and necessary to complete the Work. Items include, but are not necessarily limited to, the following:
   1. Blocking, backing, stripping, furring, and nailers.
   2. Rough hardware.
   3. Wood framing.
   4. Wood sheathing.
   5. Preservative treatment.
   6. Drilling, saw cuts, knock-outs and framing for ventilation.
   7. Wood sheathing backing at tile walls.

1.03 RELATED WORK

Section 033000 - Concrete.

1.04 QUALITY ASSURANCE

A. General:
   1. Coordinate the work of all trades to ensure proper placement of all materials, anchors, etc., as well as providing for openings and anchors for the installation of surface mounted materials and equipment.
   2. Qualifications for Workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
   3. Rejection: In the acceptance or rejection of rough carpentry, no allowance will be made for lack of skill on the part of the workmen.

B. Standards and References: (Latest Edition unless otherwise noted)
   1. 2010 California Building Code (CBC).
   2. Lumber: West Coast Lumber Inspection Bureau (WCLIB); Standard Grading Rules for West Coast Lumber No. 17.
   3. Lumber: Western Wood Products Association (WWPA); Western Lumber Grading Rules 05.
   4. Redwood: Redwood Inspection Service (RIS); Standard Specifications for Grades of California Redwood Lumber.
   5. Wood Sheathing: The Engineered Wood Association; Specifications and Grades.
      a. Structural Plywood: United States Product Standard PS1, Group 1 Douglas Fir.
      b. APA rated sheathing: United States Product Standard PS2.
   6. Wood Preservative: American Wood-Preservers' Association (AWPA):
      a. U1, Use Category System: User Specification for Treated Wood.
      b. M4, Standard for the Care of Preservative-Treated Wood Products.
   7. 2005 National Design Specification for Wood Construction (NDS).

C. Submittals: (Submit under provisions of Section 01330)
   1. Certification:
      a. Preservative Treated Wood: Certification for waterborne preservative and that moisture content was reduced to 19 percent maximum, after treatment.

D. Tests and Inspections:
   1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
   2. If indicated on the Structural Drawings, load test expansion and epoxy anchors as indicated on the drawings.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protection:
   1. After delivery, store all materials off the ground, covered, and in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather. Maintain wood at the maximum moisture levels indicated in Materials Section.
   2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use. Do not allow installation of damaged or otherwise non-complying material.
   3. Use all means necessary to protect the installed work and materials of all other trades.
   4. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Sawn Lumber:
   1. Lumber (Wood Framing): Meet requirements of following minimum grades. All grades to WCLIB Grading Rules No. 17. Species shall be Douglas Fir - Larch

Item	Sizes	Grade	Maximum Moisture Content at Initial Use	Notes
All Material	2x	No. 2	19%	Unless Noted Otherwise
All Material	3x,4x	No. 2	30%	Unless Noted Otherwise
All Material	6x	No. 1	30%	Unless Noted Otherwise
Decking	2x	Select Dex	19%	

   2. "At initial use" shall be that point at which nails, screws, bolts, split rings, shear plates or other fasteners or the holes for said fasteners are placed in the wood.

3. All sawn lumber is assumed to be enclosed in the dry building envelope in the final service condition, unless noted otherwise, and free to dry to moisture content less than 19%.
4. The Contractor shall use whatever means necessary, including site drying to ensure that the moisture contents above are not exceeded.
5. All studs, plates, joists, rafters and beams 3x and thicker shall be free of heart center in accordance with the specified grading standards.

B. Wood Sheathing:
1. Roof and Wall Structural Sheathing: PS1 and PS2 APA rated sheathing with exterior glue. Thickness type and grade shall be as indicated on Drawings.
2. Where indicated on the Architectural Drawings as interior wall backing behind tile and in all toilet rooms behind sheet rock, to be C-C APA rated sheathing with exterior glue. Thickness shall be 5/8-inch at all locations.
3. Flooring: C-C APA Performance rated tongue and groove with exterior glue. Thickness type and grade shall be as indicated on the Drawings.

C. Building Paper: Fed. Spec. UU-B-790a, Type I, Grade B (15 lb. min. unless noted elsewhere.).

D. Rough Hardware Fastenings and Connections: All types including bolts, lag screws, nails, spikes, screws, washers and other rough hardware, of kinds that may be purchased and that require no further fabrication, shall be furnished and installed for all finish and rough carpentry and shall conform to 2005 NDS Standards and dimensions. All hardware exposed to weather shall be hot-dipped galvanized per ASTM A123 Standards. All nails used into pressure treated lumber shall be hot-dipped galvanized per ASTM A123 or stainless steel.
1. Common wire nails or spikes unless noted otherwise on the Drawings. Box nails and sinker nails are not permitted. Vinyl coating is permitted on nails when not exposed to weather.
2. Bolts: Bolt material shall conform to ASTM A307, Grade A. Bolt dimensions shall conform to ANSI/ASME B18.2.1 with hex head of sizes indicated.
3. Lag Screws: Lag screws shall conform to ASTM 307, Grade A. All lag screws shall have hex heads where exposed.
4. Washers: Standard flat washers shall conform to ANSI B18.22.1, Type A, Wide Pattern. Steel plate washers shall be Simpson BP or BPS or equivalent. Malleable iron washers shall be standard malleable iron washers.
5. Powder Driven Fasteners: Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems or equivalent. See Drawings for size, type and embedment.
6. Expansion Anchors: See Section 03300 for anchors to concrete and Section 04200 for anchors to masonry.
7. Adhesive Anchors: See Section 03300 for anchors to concrete and Section 04200 for anchors to masonry.
8. Fabricated Metal Timber Framing Connectors: Connectors shall be punched for nailing and bolting. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. All connectors must have specific ICC approval. Types as noted on Drawings are Simpson Strong-Tie. Hardware suppliers other than Simpson shall submit a comparative material list itemizing product designation, load rating and supported member size for review by the enforcement agency and the Structural Engineer.

2.02 FABRICATION

A. Lumber:

1. All lumber shall be air or kiln-dried to the maximum moisture content indicated in Materials Section.
2. Furnish S4S unless otherwise noted.
3. Size to conform to rules of governing standard. Sizes shown are nominal unless otherwise noted.

B. Wood Treatment:
1. Preservative Treatment: The treating process and results thereof shall conform to the appropriate AWPA Standards for exterior, above ground use (3B) and as indicated in CBC Section 2303.1.8.
2. After treatment and prior to shipping, air or kiln-dry lumber to maximum 19 percent moisture content.
3. All treated wood shall be identified with a label meeting the requirements of CBC Section 2303.1.8.1.
4. The amount of preservative to be injected into the wood shall be as required by the AWPA standard for each type of installation.
5. All wood in contact with concrete or masonry shall be preservative treated.
6. Cut surfaces and bored holes in pressure treated wood shall be protected in accordance with AWPA Standard M4.

C. Fire Treatment: All fire-retardant-treated wood shall be identified with a label meeting the requirements of CBC Section 2303.2.1. The treating process and results thereof shall meet the requirements of CBC Section 2303.2 . Moisture content of fire-retardant-treated wood shall meet CBC Section 2303.2.5. Treater shall submit design and fastener valves for treated wood to Structural Engineer for review. See Drawings for location of fire-retardant-treated wood.

2.03 SOURCE QUALITY CONTROL

A. Grade Mark each piece of lumber. Marking must be done by recognized agency.
1. Douglas Fir shall bear WCLIB or WWPA grade stamp.
2. Pressure treated Douglas Fir shall bear AWPA Quality mark.

B. Wood Sheathing: Each panel shall be legibly identified as to type, grade and specie by APA grade. If plies are spliced, the slope of the scarf shall not be steeper than 1:8. White pockets will not be permitted in face plies.

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection:
1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly proceed.
2. Verify that rough carpentry may be performed in strict accordance with the original design and all pertinent codes and regulations.

B. Discrepancies: In the event of discrepancy, immediately notify Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 WORKMANSHIP

A. General: All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.

B. Selection of Lumber Pieces: Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function.

C. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

D. Shimming: do not shim any framing component.

E. Care shall be taken that notching and boring of members is in strict conformance with the Drawings and that there are no over-cuts.

3.03 FASTENING

A. Nailing: Except as otherwise indicated on Drawings or specified, all nailing shall be as required by CBC Table 2304.9.1 - Fastening Schedule.
   1. Nails or Spikes shall be common wire unless noted otherwise. Penetration of nails or spikes shall be one-half the length of the nail or spike into the piece receiving the point. However, to connect pieces 2" in thickness, 16d nails shall be used unless noted otherwise.
      a. Bore holes for nails wherever necessary to prevent splitting.
      b. Use finish or casing for finish work.
      c. Use of machine nailing is subject to a satisfactory installation of nails. Minimum edge distances shall be maintained. Nails installed through sheathing with nail guns shall not penetrate into the outer plies deeper than hand nailing. Submittal of guns and nails is required.
      d. All nailing into Pressure-Treated lumber shall utilize hot-dipped zinc coated galvanized nails or stainless steel nails per CBC Section 2304.9.5.

B. Bolts and Lag Screws: Bolts shall be sizes indicated on Drawings. Holes for bolts shall be 1/16-inch larger than the bolt diameter. Malleable, Steel plate or standard flat washers shall be used where heads or nuts would otherwise bear directly on wood surfaces. Malleable or plate washers shall be used on all anchor bolts. Cut washers are not permitted. Lag screws shall be screwed (not driven) into place. For the shank, holes shall be bored the same depth and diameter as shank. For threaded portion, holes shall be pre-drilled as follows:

Lag Screw Size	Thread Portion Pre-Drill
1/2" diameter	1/4" diameter
5/8" diameter	5/16" diameter
3/4 diameter	3/8" diameter
7/8" diameter	1/2" diameter
1" diameter	5/8" diameter

Soap Lag screws prior to installation. Tighten all bolts and screws before closing in.

C. Framing Devices: Install according to the manufacturer's instructions unless otherwise noted.

3.04 FRAMING AND ROUGH CARPENTRY

A. Sills: Shall be in long lengths of sizes shown, fastened with anchor bolts as indicated, a minimum of two anchor bolts per piece. Place steel plate washers (but not standard flat or malleable iron washers) under nuts bearing on wood. Set sills level and true.

B. Studs, Posts and Columns: Shall be full length. Corners shall be as detailed. Partitions or walls containing plumbing, heating or other piping shall be so formed as to give proper

clearance for materials. Cut members as required to provide full bearing at ends. Connect to structure as indicated.

C. Plates: Shall be full length of wall segment or 12-foot minimum and spliced as shown.

D. Blocking: Blocking shall be same thickness and width of studs or joists unless shown otherwise. Blocking shall not be spaced over 8'-0" c.c. Install fire blocking in accordance with CBC. Horizontal fire blocking in walls shall be placed at floor lines and ceiling lines unless noted otherwise. Install blocking at all plywood joints where noted on the Drawings. Install wall width full height solid blocking at floor joists beneath all posts in walls. Blocking shall be installed around all wall, floor and roof penetrations.

E. Joists and Beams: Shall be full span length and spliced over bearings unless shown otherwise. Install with crown side up. Beams or headers indicated to be built up of two or more joists shall be fabricated on the job using full length members. For two piece 2x members, stitch nail pieces together with 16d common nails spaced not over 12 inches c.c. and staggered. Clinch nails protruding through members. For three or more piece members, stitch bolt pieces together with ½" bolts spaced not over 12 inches c.c. and staggered.
   1. Provide double joists and headers at all openings through roof unless otherwise shown on Drawings.
   2. Provide typical headers at all openings through walls where one or more studs are required to be cut. For penetration through walls narrower than stud spacing, provide solid blocking on all sides for fastening finish materials.

F. Wood Sheathing: Install to pattern indicated and provide blocking at joints where noted on the Drawings. Center all joints over bearing supports. Nail to framing as indicated. Install wood sheathing with face plies perpendicular to joists or studs unless indicated otherwise. Wall wood sheathing shall continue uninterrupted by ceilings or soffit from floor to floor or floor to roof unless specifically detailed on the Structural Drawings.

G. Wood Furring, Stripping: Install as shown or required to provide nailing materials or passage of pipes, conduits, etc., not otherwise accommodated including ceiling stripping for gypsum drywall construction.

H. Bridging: Space not over 8'-0" c.c. for spans over 16'-0". Joists 8 inches or less in depth shall not require bridging unless specifically indicated.

I. Solid Wood Backing: Solid wood backing shall be provided for all wall and ceiling finishes and for supporting of mounted items for all trades, including but not limited to metal toilet partitions, toilet room accessories, frames, cabinets, casework, mirrors, trim, applied wall finishes, athletic equipment, food service equipment, piping, conduit, ducts, etc. Contractor shall coordinate placement of backing and supports with Subcontractor supplying mounted items.

J. Building Paper: Install in all locations indicated except where included in other sections of the specifications.

K. Cant Strips and Crickets: Shape to sizes shown. Rigidly fasten to construction. Form neat mitered corners.

L. Wood Sheathing Backing: All toilet rooms, restrooms, single or joint occupancy shall have all walls backed with 5/8-inch thick wood sheathing with no surface voids. Install sheathing between the framing members and wallboard. The same wood sheathing shall also be provided and installed at all tile locations. At tile locations wood sheathing shall be installed between the framing members and the resin-cement backing board.

3.05 MISCELLANEOUS CARPENTRY WORK

A. Install all items under other sections specified to be furnished and installed in other sections which relate to the rough carpentry work.

B. Miscellaneous Carpentry Work not included under other sections but, indicated or required yet not specified elsewhere shall be furnished and installed hereunder, including appropriate fastening devices. Contractor shall provide miscellaneous carpentry work for all sections and divisions of work identified.

C. Wood Curbs for Equipment: Construct all wood curbs for roof mounted equipment as detailed. Provide all miscellaneous blocking, bracing, supports, and other wood items as shown or required to complete the work.

D. Plywood Backing for Electrical, telephone, and similar types of wall mounted equipment shall be provided hereunder where required. Plywood shall be 3/4-inch thick exterior A-C plywood with 'A' face exposed.

E. Fire/Draft Stops: Construct fire and drafts stops in furred attic spaces where indicated or required by CBC code. Unless otherwise indicated on Drawings construct of not less than 5/8-inch Type 'X' gypsum wallboard or ½" wood sheathing, adequately supported by 2x4's at 24 inches c.c., braced diagonally to the roof structure. Draft stop and installation work shall conform to code requirements.

F. Shoring and Bracing: Shore or brace for temporary support of all work as required during the construction period except any shoring and bracing specified and included under other sections of these specifications.

G. Temporary Enclosures: Provide and maintain all barricades and enclosures required to protect the work in progress.

H. Protect all work in progress and all work installed, as well as the work of all other trades. Any work damaged as a result of the work under this section shall be corrected to its original condition or replaced if directed by the Architect at no increase in cost to the Owner.

J. Ventilation: Contractor shall include all labor and materials necessary to provide ventilation requirements of roof overhangs, eaves, attics, and all other components of the building required by codes to be ventilated. Work shall include removing knock-outs in wood I-joists for cross ventilation, drilling of blocking, wood sheathing, and other wooden components of the structure necessary to comply with requirements of the CBC for ventilation of buildings.

*****END OF SECTION*****

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SECTION 06200

FINISH CARPENTRY

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

Supply and install complete Finish Carpentry Work as shown on Drawings and as specified herein. Provide hardware and attachment accessories as required for a complete and proper installation.

1.03 MEASUREMENTS

Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

1.04 QUALITY CONTROL

Following standards apply to Work of this Section except where more stringent requirements are specified herein:

A. Architectural Woodwork Institute "Quality Standards".

B. Western Wood Products Association Manual.

C. American Wood Preservers Association Specifications.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

A. In accordance with Article 3.11 of the General Conditions.

B. Submit shop drawings of millwork at full size or large scale showing sizes, materials, grain run, methods of construction, connection to adjacent members and installation. Indicate all backing members for installations and all hardware

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Douglas Fir: West Coast Lumber Inspection Bureau "Standard Grading and Dressing Rules" and Western Wood Products Association, graded "C" and better, flat grain grade marked by WCLIB or WWPA.

B. Douglas Fir Plywood: U.S. Product Standard PS-1, American Plywood Association, grade trademarked "C-D", plugged, exterior glue, sanded.

C. Blocking, Furring, etc.: Standard Grade Western White Pine, Construction grade Douglas Fir or other equally sound softwood, as graded by WCLIB or WWPA.

D. Softwood Lumber: PS 20; custom grade in accordance with AWI maximum moisture content of 6%; of quality capable of transparent finish.

E. Hardwood Lumber: FS MM-L-736; custom grade in accordance with AWI; maximum moisture content of 6% of quality capable of transparent finish.

2.02 ACCESSORIES

A. Nails, bolts, nuts, washers, blind fasteners, lags and screws, size and type to suit application.

B. Wood Filler: oil base, tinted to match surface finish color.

C. Shelf Standards and Rests: Knape and Vogt #255 & #256 for recessed application. Provide two hold down clips for each shelf in the slot above

D. Closet Hanger Bars and Supports: Knape and Vogt #770, #660, #734, #735, and #1195. Provide intermediate support of spans over 6'-0".

2.03 SHOP TREATMENT OF WOOD MATERIALS

A. Shop pressure treat wood materials requiring UL fire rating or preservations.

Provide UL approved identification on fire retardant treated material.

B. Wood Preservative (PT type) Wolmanized, Pressure Treated Lumber, manufactured by Osmose Wood Products or approved equal.

C. Fire Retardant (FR-S Type) chemically treated, and pressure impregnated, capable of providing a maximum rating of 25; manufactured by Demose Wood Products. Dricon FRT or approved equal.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

E. Verify that surfaces and openings are ready to receive work and field measurements are as shown on Shop Drawings and instructed by the fabricator.

F. Verify that mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.02 PRIMING

Back paint all wood surfaces inaccessible and unexposed after installation before delivery with an approved linseed oil and aluminum primer.

A. Prime coat all unfinished metal parts.

B. Prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.03 FINISH CARPENTRY INSTALLATION

A. Use only hot dip galvanized or aluminum finish or casting nails. Set nails for putty stopping in surface members. Hammer marks not acceptable on any exposed finished surface and may be cause rejection of Work by Architect.

B. Make all end splices exposed in finished members bevel splices and not square butted. Install members in as long lengths as possible.

C. Install Work to details shown, plumb, level and to line and securely anchored per AWI custom quality standard. Make scribes where required accurate. Miter corners of trim.

D. Provide and install other miscellaneous millwork items and related Work required to complete Work of this Section.

E. Prepare all woodwork installed hereunder by cleaning and sanding as required to receive finishes specified in Section "Painting and Finishing".

F. Install all doors and frames; finish hardware and bathroom accessories per manufacturer's recommendation.

G. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth and site finish.

***** END OF SECTION *****

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SECTION 07120

WATERPROOFING & DAMPROOFING

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

Work included: Provide and install membrane waterproofing where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.03 QUALITY ASSURANCE

A. This Contractor shall examine all surfaces before commencing work to see that they are in proper condition to receive his work. All surfaces shall be dry, smooth and clean. The Contractor shall immediately notify the Architect, in writing, of any defective work by others that might prevent him from properly performing his work in a first-class manner in accordance with these Specifications. He shall not proceed with any work until such defects are remedied and work approved by the Architect. This Contractor shall apply his work during normal working hours so that the project manager may have the opportunity to oversee the actual operation.

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

C. The Contractor shall see that all sleeves, metal work, flashings and counter flashings, to be furnished and/or installed under other divisions of the Specifications, are properly installed and assume full responsibility for the water-tightness of all such work.

D. Guarantee: Written guarantee is required from the applicator, guaranteeing this work against defective workmanship for a period of two years from date which the Owner records the Notice of Completion.

E. Certification: Upon completion, issue to the Architect a Certificate of Inspection and Compliance indicating that the completed work meets all the requirements of these Specifications and the manufacturer's printed instructions.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

C. Provide approved written guarantee per system specified; refer to Application Specification of manufacturer.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Membrane or membrane assemblies for concrete walls behind berms shall be such as to provide a watertight condition for the life of the building and shall be a waterproofing Contractor approved by the manufacturer as manufactured by W.R. GRACE & CO. System shall apply Bituthene Waterproofing System 3000.

1. Bituthene 3000 Waterproofing Membrane is a factory-made composite product with a minimum thickness of 60 mils (1.5 mm). It consists of 56 mils (1.4 mm) of rubberized asphalt and 4 mils (0.1 mm) of cross-laminated polyethylene film. Bituthene 3000 is supplied in rolls 36" (0.9m) wide and 60' (18.3 m) long. The rubberized asphalt is covered with release paper that is removed during installation. The membrane is self-adhesive and cold applied. No special adhesive or equipment is necessary to form laps.

2. Physical Properties - Bituthene Liquid Membrane LM-3000:

Property:	Typical Value:	Test Method:
Solids Content	100%	ASTM D-1644
Elongation	250%	ASTM D-412
Peel Adhesion	5 lb./inch width	See footnote 1
Pliability (180° bend over 1" mandrel)	Unaffected at -25°F	ASTM D-146
Hydrostatic head	75 ft. min.	See footnote 2

Footnotes:

1. Liquid Membrane is applied to dry concrete blocks and cured for 7 days. Membrane is then peeled from the concrete blocks at a 90° angle.
2. Hydrostatic head tests are performed by applying liquid membrane on primed concrete, then sealing the waterproofed concrete to a pressure chamber. Water is introduced under pressure equivalent to 75 head feet.
3. Elastomeric membrane 3000 and 3100:

Property:	Typical Value:	Test Method:
Color	Dark gray-black	
Pliability (180° bend over 1" mandrel)	Unaffected at -25°F (-32°C)	ASTM D-146
Tensile strength: membrane	250 (psi) minimum	ASTM D-412
Tensile strength: film	4000 (psi) minimum	ASTM D-412 (Die C) modified
Elongation - ultimate failure of rubberized asphalt (%)	300 minimum	ASTM D-412 (Die C) modified
Cycling over crack	No effect after 100 cycles at 15°F (-26°C)	See footnote 1
Cycle over 1" joint	No effect after 1000 cycles at 15°F (-26°C)	See footnote 1
Puncture resistance-Bituthene Membrane (lb.)(stretched by blunt object)	40 minimum	ASTM E154
Puncture resistance: Polyethylene film	250 minimum (in. oz. tear)	ASTM D781 (Impact from sharp object)
Peel Adhesion	(Lb./in. width)	

Property:	Typical Value:	Test Method:
Resistance to hydrostatic head	150 ft. of water minimum	See footnote 2
Exposure to fungi in soil 16 wks	Unaffected	GSA-PBS 07111
Permeance-perms	0.1 Maximum 0.2 (Grains/sq.ft./in.Hg)	ASTM E-96 Method B
Water Absorption: 72 hrs	0.25 maximum (% By weight)	ASTM D-1228

Footnotes:

1. Membrane is applied across two primed blocks with no separation between blocks. At -15°F. blocks are pulled apart to 1/4", then returned to original position. Cycle is repeated 100 times. For joint cycling, the blocks are double covered with membrane, separated by 1", then cycled at -15°F between 3/4" and 1 1/4" a minimum of 1000 cycles.
2. Hydrostatic head tests are performed by applying membrane on primed concrete, then sealing the waterproofed concrete to a pressure chamber. Water is introduced to 150 head feet.

B. Bituthene Primer P-3000 is a rubber-based primer in solvent specifically formulated to provide good initial adhesion and excellent permanent adhesion of Bituthene Waterproofing Membranes.

C. Bituthene Elastomeric Mastic EM-3000 is rubberized asphalt base mastic.

D. Bituthene Liquid Membrane LM-3000 is a two-component, elastomeric cold-applied mastic grade material.

E. Bituthene Protection Board PB-3000 is lightweight, expanded polystyrene having a nominal density of 1.0 lb./cu. ft.

1. Bituthene PB-3000 shall have the following physical properties:

Property:	Typical Value:	Test Method:
Nominal Density	1.0 lb./cu. ft.	
Thermal Conductivity K factor (BTU/Hr./Sq. Ft./F.In.)	.24 @ 40°F .26 @ 75°F	ASTM C-177
Thermal Resistance (R-Value)	1" thickness = 4 3/4" thickness = 3	ASTM C-177

F. Bituthene Protection Board Adhesive PBA-3000 is a fast drying, rubber-based cement.

G. All materials shall be furnished by the manufacturer whose specification is used to the extent of his standard and/or stock materials. Materials unable to be furnished by the manufacturer shall meet his reference specification requirements.

1. Contractor shall furnish a statement signed by the manufacturer or his authorized representative that the materials to be supplied are proper for the use indicated and that the manufacturer is in agreement with the Contractor's use of these material systems as they are applicable to this installation.
2. All materials shall be delivered to the site in the original unbroken manufacturer's wrapping material with the original labels thereon.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Verify that surfaces are solid, free of frozen matter, loose particles, cracks, pits, rough projections, and foreign matter detrimental to adhesion and application of waterproofing.

B. Do not apply waterproofing to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer.

C. The surface shall be inspected by a representative of the coatings manufacturer and by the waterproofing Contractor. A written notice to the prime Contractor shall be provided to indicate any substrate deficiencies that must be corrected prior to application of the waterproofing coatings. The start of the application work shall not commence until acceptance of the surface by the waterproofing Contractor and the representative of the manufacturer.

D. Surface preparation: A smooth monolithic concrete surface is required. A broom surface is not acceptable. The concrete surface shall be dry, frost free, clean and cured a minimum of seven days prior to the application. The primer and membrane surface shall be free of voids, spalled areas, sharp projections, loose aggregate, and form release agents. Concrete curing compounds containing oil, wax or pigments shall not be used. Form release agents shall be the self-dissipating type that will not transfer to the concrete. Any surface defects such as cracks, holes or cavities shall be filled and finished flush with a Portland cement grout or concrete. Top surfaces of projecting ledges, below grade, except footings, shall be finished to a steep bevel with Portland cement mortar. Smooth concrete block walls shall be protected with membranes by striking off joints flush with surface.

3.03 INSTALLATION

A. Foundation Walls and Vertical Surfaces

1. General: The membrane, when in place, must withstand a minimum static ground water pressure of 150 feet (46 m).

2. Priming: Application of primer shall be limited to what can be covered by Bituthene Waterproofing Membrane in a given workday. Primed areas not covered by membrane during the workday will be re-primed. Apply primer by spray, roller or brush at a rate of 250-350 square feet per gallon. Roller should be a natural material such as lamb's wool, having a nap of approximately one inch. Primer shall be applied to a clean, dry, frost-free and dust-free surface. Sufficient primer must be used on the dry surface to condition it to a dust-free state suitable for the application of Bituthene Waterproofing Membranes. Coverage of primer will vary due to the texture and porosity of the surface to receive the primer.

    a. Bituthene Primer P-3000 should not be applied below 40°F (5°C) on vertical surfaces. At temperatures below 40°F (5°C), Bituthene P-3100 Primer must be used and it may be used up to 90°F (32°C). Allow P-3000 to dry one hour or until tack-free. Allow P-3100 to dry 30 minutes.

3. Membrane Installation: Apply Bituthene Waterproofing Membrane vertically in sections of 8 feet in length or less. On higher walls apply two or more sections with the upper overlapping the lower by at least 2-1/2" (64 mm). Press all membrane in place with heavy hand pressure or rollers during application. Two piles of Bituthene Membrane are recommended for below grade or earth shelter applications on any wood surfaces.

4. Sealing Edges: Bituthene Waterproofing Membrane shall be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membranes are

terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press the edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene EM-3000 to all vertical and horizontal terminations. Bituthene Liquid Membrane LM-3000 can be used as an alternative method.

5. Sealing Seams: All edges and seams must be overlapped at least 2-1/2" (64 mm). Apply succeeding sheets with a minimum 2-1/2" (64 mm) overlap and stagger end laps. Roll or press the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with Bituthene Membrane. Slit any fish mouths, overlap the flaps, and repair with a patch of Bituthene and press or roll in place. The edges of the patch shall be sealed with a troweling of EM-3000. Laps within 12" (300 mm) of all corners shall be sealed with a troweling of EM-3000.

6. Corner Forming: Outside corners must be free of sharp edges. Inside corners should receive a fillet formed with Liquid Membrane LM-3000, latex modified cement mortar (such as Daraweld C mixed with cement mortar) or epoxy mortar. Do not use fiber or wood cants. One of two methods may be used for treating corners:

    a. Apply Bituthene Liquid Membrane LM-3000 six inches (150 mm) in each direction from the corner and form a fillet with a minimum 3/4" (19 mm) face.

    b. Install an 11" (280 mm) minimum strip of Bituthene membrane centered on the corner. Install Bituthene Membrane over the treated inside and outside corners.

7. Protection of Membrane: The Bituthene Protection System shall be used on foundation walls and vertical surfaces subject to damage from other trades.

B. Horizontal Surfaces

1. Priming: Application of primer shall be limited to what can be covered with Bituthene Waterproofing Membrane in a given workday. Primed areas not covered by membrane during the workday shall be re-primed. Apply by spray, roller or brush at a rate of 250 to 350 square feet per gallon. Roller should be a natural material such as lamb's wool, having a nap of approximately one inch (25 mm). Primer shall be applied to a clean, dry, frost-free and dust-free surface. Rollers should be dipped into pans to avoid pouring primer directly on the deck and creating puddles. Sufficient primer must be used to condition the surface to a dry, dust-free stale suitable for the application of Bituthene Waterproofing Membranes. Coverage of primer will vary due to the texture and porosity of the surface to receive the primer.

    a. Bituthene P-3000 Primer should not be applied below 25°F (-4°C) on horizontal surfaces.

2. Membrane Installation: Bituthene Waterproofing Membrane shall be applied to the primed surface starting at the low point. Successive sheets should overlap preceding ones by 2-1/2" (64 mm). Two plies of Bituthene Membrane are recommended for below grade or earth shelter applications on any wood surfaces. All membrane shall be firmly rolled as soon as possible to minimize bubbles. Roller shall be a linoleum roller or standard water filled garden roller less than 30" (760 mm) wide, weighing approximately 75 pounds (34 kg) when filled. Cover the face of the roller with a resilient material such as 1/2" (13 mm) plastic foam or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Apply a double layer of Bituthene Membrane around posts or projections at least 6" (150 mm) in all directions and seal all terminations with Bituthene EM-3000. At drains, apply a bead of EM-3000 over a double layer of membrane under clamping rings. Apply EM-3000 at all terminations and at all "T" joints at the end of each workday.

a. An alternate method is to apply Bituthene Liquid Membrane LM-3000 around posts and protrusions, overlapping the sheet membrane a minimum of 2" (50 mm). At drains, apply LM-3000 from the center of the drain out to the sheet membrane overlapping it by a minimum of 2" (50 mm).

3. Sealing Edges: Bituthene Waterproofing Membrane shall be turned up on surrounding walls and terminated into a reglet or under counter flashing, or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene Em-003000 to all vertical and horizontal terminations.

4. Sealing Seams: All edges and end seams must be overlapped at least 2-1/2" (64 mm). Apply succeeding sheets with a minimum 2-1/2" (64 mm) overlap and stagger end laps. Roll the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with Bituthene Waterproofing Membrane. Slit any fishmouths, overlap the flaps, and repair with a patch and press or roll in place. The edges of the patch shall be sealed with a troweling of EM-3000. Laps within 12" (300 mm) of all corners shall be sealed with a troweling of EM-3000.

5. Corner Forming: Outside corners must be free of sharp edges. Inside corners should receive a fillet formed with Liquid Membrane LM-3000, latex modified cement mortar (such as Daraweld C mixed with cement mortar) or epoxy mortar. Do not use fiber or wood cants. One of two methods may be used for treating corners:

   a. Apply Bituthene Liquid Membrane LM-3000 6" (150 mm) in each direction from the corner and form a fillet with a minimum 3/4" (19 mm) face.

   b. Install an 11" (280 mm) minimum strip of Bituthene Membrane centered on the corner. Install Bituthene waterproofing membrane over the treated inside and outside corners.

6. Testing of horizontal waterproofing shall be by flooding the entire waterproofed area with a minimum 2" (50 mm) head of water for 24 hours. Mark any leaks and repair when the membrane is dry. Before flood testing, ascertain from the structural engineer that the structure will withstand the dead load of the water.

7. Protection of Membrane: After testing the horizontal surfaces and allowing for the membrane to dry, apply the Bituthene Protection System to the entire horizontal surface.

*****END OF SECTION*****

SECTION 07210

THERMAL INSULATION

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section

1.02 SCOPE OF WORK

A. Furnish and install Thermal Insulation indicated on the Drawings and as specified herein.

B. The principal items of work include:

1. Thermal Insulation within roof.
2. Thermal Insulation within exterior walls.
3. Thermal Insulation within interior walls.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data:

1. Materials list of items to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

Provide Certification per Item 1.03.B.

B. As-Builts:

Not required

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than FIVE (5) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Provide thermal insulation as indicated on Drawings.

B. All insulation shall be inorganic glass fiber insulation. Insulation shall comply with ASTM Testing Standards. Fire Hazard Classification, Flame Spread Index, Smoke Developed Index, Combustibility, and Fire Endurance Ratings as required by Code.

C. Insulation shall be as manufactured by Certainteed, Johns-Manville, Owens-Corning, or Architect approved equal.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Verify adjacent materials are dry and ready to receive installation.

B. Verify mechanical and electrical services within walls have been installed and tested.

3.03 INSPECTION

A. Before any installation is started, determine that the other work is suitable to receive insulation.

B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

C. Remove or protect against projections in construction framing that may damage or prevent proper insulation.

3.04 INSTALLATION

A. All work shall be performed by licensed applicators, shall comply with the recommendations of the manufacturer and the National Association of Insulation Manufacturers.

B. Install insulation with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over and between framing numbers. Secure in place. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.

C. Trim insulation neatly to fit spaces. Use batts free of damage. Install batt insulation, in wall spaces without gaps or voids.

D. Install Insulation in all indicated walls from floor to underside of roof. Secure insulation with 19-gage wire or 1" wide, 20 gage steel strips. Architect shall approve all insulation details, including methods of fastening, before commencement of the work.

3.05 CLEAN UP AND DISPOSAL

At frequent intervals during and again upon completion of work, remove from building and working premises tools and equipment, surplus materials, all rubbish and debris of whatever nature not caused by other trades, and leave the work in a clean, orderly and acceptable condition approved by the Architect.

***** END OF SECTION *****

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SECTION 07220

ROOF AND DECK INSULATION

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 DESCRIPTION

A. Work included: Provide roof and deck insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, Special Conditions, and Sections in Division 1 of these Specifications.
2. Roofing.
3. Section 07600: Flashing and Sheet Metal.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. In addition to complying with all pertinent codes and regulations of governmental agencies having jurisdiction, comply with the following:

1. Roof and deck insulation shall be FM approved and U. L. Classified.
2. Conform to Federal Specifications HH-1-1972/Gen, HH-1-1972/1, 2.
3. Meet California Quality Standards Registry Number CA-7006 (UT).

1.04 SUBSTITUTIONS

Substitutions will be considered per 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Insulation System:

1. Provide tapered and non-tapered expanded polystyrene thermal roof insulation in flutes of metal roof decks with the following physical properties:

Property:	ASTM Test Method:	Specification:
- Nom. Density LB/FT^3		2.0
Thermal Resistance/R-Value (1 inch thickness)	C177/C518	4.76 at 40° F 4.35 at 75° F
Compressive resistance	D1621	25 (minimum psi)
Density	C303/D1622	1.80 (min. lb./ft.^{3})
Flexural strength - Transverse	C203	55-75 (minimum psi)
Water absorption by volume	C272	< 2%
Water vapor permeability	E96	0.60-2.0 Maximum (perm-inch)
Dimensional stability	D2126	< 2% (% Linear change, max.)
Flame spread	E84	< 25

2. Acceptable manufactures - subject to compliance with requirements, provide products of one of the following:
    a. Cello Foam Type IX (800) 241-3634.
    b. Atlas ACFoam-II (800) 477-1476.
    c. NRG Barriers: PSI-25 (800) 343-1285.

B. Fastener System:

1. Provide a roof insulation fastener system for use in fastening insulation to steel decks. System shall be Factory Mutual approved for I-90 rating. Use manufacturer's recommendations as submitted and approved. Fastening shall be similar to:
2. Deck screws for metal deck applications shall be #12 gage and made of case-hardened carbon steel with gimlet point and Perma-Seal coated.
3. Stress plates shall be high-density polyethylene, 3-1/4" diameter, or G-90 galvanized steel, 3" square.
4. Acceptable Products: Rawl Deck Screw, and Rawl Stress Plates as manufactured by Rawlplug Company, Inc., New Rochelle, NY, or equal products of other manufacturers.

2.02 OTHER MATERIALS

Provide other materials not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Remove or protect against projections in construction framing which may damage or prevent proper insulation.

D. Before roof insulation application is started, remove trash, debris, oil, water, moisture and contaminates which may affect the attachment of the insulation to the surface. All depressions, holes, deformations, etc. shall be made smooth prior to the roof insulation application.

E. The deck shall be sufficiently rigid to support the roofers and mechanical equipment without deflection that will strain or rupture any of the roofing components or deform the deck.

F. Treated wood insulation stops, the same thickness as the insulation, shall be mechanically fastened at the edges of the deck and around all projection and openings through the deck.

G. Do not proceed until unsatisfactory conditions are corrected.

H. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as accepted by the Architect, anchoring all components firmly into position.

1. Deck screws shall penetrate metal deck a minimum of 1/2 inch.
2. Provide a minimum of one (1) fastener per 3 linear foot of surface area.
3. Cut insulation to fill flutes of metal deck prior to installation of roofing.

3.03 CLEANING

Remove trash and debris from the roof insulation surface prior to the application of the roofing membrane.

3.04 PROTECTION

A. Installed insulation shall not be left exposed to the weather. It shall be covered and waterproofed at once.

B. All exposed edges left at the end of a day's work shall be temporarily sealed by lapping roofing membrane over the exposed edge of the insulation and sealing it in place. Remove this membrane seal when work resumes. Installed insulation that becomes wet and/or damaged shall be removed and replaced with solid and dry materials.

C. Protect installed insulation and membrane from roof traffic damage and/or abuse by using surface protection such as plywood in areas where heavy and/or repeated traffic is anticipated both during and after installation.

***** END OF SECTION *****

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SECTION 07510

SILICONE POLYURETHANE FOAM ROOFING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Work included: Provide a polyurethane foam/elastomeric silicone coating roofing system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. All work shall be in conformance with U. L. Design No. P818.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. The manufacturer of the elastomeric silicone coating shall have successfully applied its coating system on other installations in California for a period of ten years prior to the bid date.

C. Use an applicator approved in writing by the manufacturer of the accepted roofing system. Submit letter to Architect.

D. Cooperate as required in performance of the specified inspecting and testing.

E. Furnish Owner with Certificate from manufacturer that roof complies with Class A fire retardant roofing.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product Data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
4. Certification of Manufacturer: Submit on corporate letterhead, a letter from the manufacturer of the foam and of the coating stating that the applicator of this product is qualified by the manufacturer.
5. Similar jobs: The approved applicator shall submit a list of five similar sized projects that the applicator has completed in the last five years. The applicator shall have installed a minimum of 100,000 square feet of the materials specified for this project.
6. Submit a copy of the manufacturer's ten-year guarantee.

7. Samples: Submit two samples of the proposed coating system applied on urethane foam. Samples shall be four inches by four inches in size.

8. Underwriter's Laboratories Follow-up Service: The foam and coating shall be registered under the U. L. follow-up service and bear U. L. labels. Submit current U. L. card.

9. The manufacturer shall furnish the Owner with a certificate certifying that the roof meets Factory Mutual Class 1 rating and requirements for Class A rating on non-combustible decks. (Class B on combustible decks.)

1.06 GUARANTEE

The coating manufacturer shall issue a ten-year full system non-depreciating guarantee. The coating manufacturer shall provide materials and the Contractor shall provide labor for all repairs covered under the guarantee.

1.07 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Storage of materials:

1. All materials shall be stored in their original containers and away from heat and moisture, especially after the seals have been broken and the materials have been opened.

2. Containers must be labeled with manufacturer's name, brand name, control numbers where appropriate, installation, instructions and identifications of various items. U. L. classified materials shall bear U. L. labels.

3. Materials shall be stored indoors at a temperature between 50° F and 75° F.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Primer

1. All surfaces to receive foam shall be primed.

2. Provide a chlorinated rubber primer recommended by the foam manufacturer and accepted by the roof coating manufacturer and Architect.

B. Polyurethane Foam

1. Shall be a two component polyurethane foam system formulated for use through airless equipment, and shall exhibit the following typical properties:

PROPERTY:	VALUE:	TEST:
Density lbs./cu. ft.	2.5	ASTM D-1622
Compressive strength psi	40	ASTM D-1621
Closed cell content, %	90	ASTM D-2856

Thermal conductivity "K" Factor	0.14 Max.	ASTM C-518
R Factor (aged) 1/K	6.25 Min.	
Dimensional Stability % vol. change	15% Max.	ASTM D-2126
Flame Spread	75	ASTM E-84

2. Manufacturers of polyurethane foam shall be on the Roof Coatings Manufacturer's list of Certified Polyurethane Foam manufacturers and systems.
3. Acceptable product for use with Dow Corning 3-5000:
   a. Stepan Company 1.5"lift - 3" thick: RS-9700 Series (847) 446-7500. IL
   b. Polythane Systems, Inc. 1.5" lifts - 3" thick: RSH 200-30. (713) 350-9000. TX
   c. Urethane Technologies, Inc. 1.5" lifts - 3" thick: UT 5100. (714) 973-0800. CA

C. Fluid Applied Elastomeric Coating

1. The elastomeric coating system shall be a 100% silicone rubber coating.
2. Dow Corning Corporation 3-5000 system or approved equal shall be used. The product base coat and topcoat shall be Dow Corning "3-5000 Construction Coating" as manufactured by Dow Corning Corporation, Midland, Michigan, with the following physical properties:

PROPERTY:	VALUE:	TEST:
Solids content, % by Volume	62	ASTM D-2687
Solids content, % by Weight	77	ASTM D-2687
Flash Point, ° F	100 Min.	
Tensile strength, psi	400	ASTM D-412
Elongation, %	150	ASTM D-412
Ultraviolet exposure: 4,000 hrs.	No degradation	
Permeability	3.7	ASTM E-96

3. The minimum dry mil thickness of the silicone coating shall be 30 mils; topcoat shall be 20 mils of this application.
4. Materials such as single component urethanes, catalyzed urethanes, plasticized acrylics, vinyls, EVA's, terpolymers and PVA coatings shall not be considered.

D. Granules

1. Provide #11 roofing granules in color selected by the Architect. Granules shall be colored with permanent pigments ceramically bonded by firing process and treated with a coater to promote adhesion.
2. Accepted manufacturer: 3M Brand Roofing Granules as manufactured by Minnesota Mining and Manufacturing Co., St. Paul, Minnesota.

E. Accessories

1. Sealant: Dow Corning #795 Silicone Building Sealant. Color shall match top coating.

2. Substrate Primer: Use primer recommended by polyurethane manufacturer and approved by coating manufacturer. Submit approvals and recommendations in writing with submittals.

3. Walkways: Provide from all roof access to all roof top equipment. Pads shall be "Yellow Spaghetti" as manufactured by Greenstreak Inc.

2.02 EQUIPMENT

A. Equipment for spraying foam shall be manufactured specifically for the application of polyurethane foam. The equipment shall be airless, capable of maintaining a 1:1 volume ratio and have primary and hose heaters.

B. Coating equipment shall be an airless type as recommended by the coating manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the area and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 ROOFING SYSTEM INSPECTING AND TESTING

A. Prior to start of polyurethane foam/elastomeric coating roofing installation, conduct a job site meeting attended by the representative of the installing subcontractors, the Contractor's field superintendent, the manufacturer, and the Architect, to agree upon procedures to be followed.

B. Prior to start of installation, the Contractor shall verify that materials at the job site comply with the specified standards, the subcontractor is qualified to the extent specified, and that the installing personnel are fully informed as to procedures to be followed.

C. Prior to start of installation, the manufacturer's representative shall inspect roof substrate, flashings, roof drains, roof hatches, etc., and notify Contractor of any defective work. The Contractor shall correct the defective work.

D. During installation at each stage of the Work, the manufacturer's representative shall verify that the materials are installed in strict accordance with the manufacturer's recommendations and shall prepare "Foam Roofing Inspection Report" (see Section 3.09) for submittal to the Architect.

E. The manufacturer's representative shall make test cuts at completion of Work to verify conformity with the specified requirements. The number of test cuts shall be as follows:

Size of Roof (Squares):	Core Samples*:	Slit Samples*:
0 - 100	2	10
101 - 200	3	12
201 - 400	4	16
401 - 600	5	20
601 - 1200	6	30
1201 - 2000	8	40

2000	1 per 200 squares	1 per 50 squares

*Take more samples, if necessary, to establish size or exact location of a problem.

3.03 SURFACE PREPARATION

A. All roof surfaces shall be clean, dry and free of mastics, grease, oil, solvent, dirt and loose particulates prior to spraying of materials. Cooperate with other trades in correcting defective work.

B. All surfaces shall be primed with a material and at a rate as specified by the foam manufacturer. Neoprene primers are acceptable only for combustible decking. Urethane primers will not be acceptable for this application.

C. All surfaces not to receive foam such as walls, air conditioners and other roof mounted equipment shall be carefully masked with tape and paper to avoid over-spraying of these surfaces with foam or coating. All coating shall be terminated in clean straight lines.

3.04 APPLICATION OF URETHANE FOAM

A. Environmental Conditions

1. Wind velocity shall not exceed 12 miles per hour.
2. Application of spray foam shall not proceed if ambient temperature is less than 40° F, or if the substrate temperature is less than 50° F.
3. Spray foam shall not be applied over moist substrates or when rain or inclement weather is imminent.

B. Spray Applications

1. The polyurethane foam shall be applied in minimum one-half inch passes (1/2") to a minimum thickness of one and one-half inches (1-1/2").
2. Only as much area as can be brought to final thickness shall be installed in a day. Phasing of the foam is strictly forbidden. (Phasing is foam application on one day and coming back the next day or thereafter and applying another layer of foam.) If additional foam must be added after the 24-hour period, the existing foam shall be primed and a minimum of one-half inch (1/2") of foam in a single pass shall be applied.
3. The foam shall be free from bumps, pinholes, and ridges. The surface shall exhibit a smooth or orange peel surface texture. Popcorn or tree bark surfaces or surfaces that exhibit ridges, crevices, voids or pinholes shall be deemed unacceptable.
4. The foam thickness shall be checked every 500 square feet prior to coating application.
5. Apply additional foam at crickets, roof edges and parapets to provide positive drainage of water to roof drains.

3.05 APPLICATION OF FLUID APPLIED PROTECTIVE COATING

A. Environmental Conditions

1. Wind velocity shall not exceed 12 miles per hour.
2. Application of protective coating shall not proceed if ambient temperature is less than 50° F. or above 110° F.
3. Protective coating shall not be applied over moist substrate or when rain or inclement weather is imminent.

B. Spray Application

1. Verify that insulation to be coated has a surface texture that meets the requirements of the coating manufacturer and that the surfaces to be coated are dry and free of grease, oil, dirt or other contaminants.
2. Apply base coat the same day as the polyurethane foam application. If more than 24 hours elapse between application of the polyurethane foam and application of base coat, inspect the polyurethane foam for UV degradation, indicated by a darkening or friability of the polyurethane foam surface. If either is present, mechanically scarify, prime with a chlorinated rubber primer, and refoam prior to the coating application.
3. Apply base coat at an ambient temperature above 40° F (4.4° C) and more than an hour after the finished polyurethane foam application.
4. Apply base coat by spraying, brushing or rolling using equipment recommended and approved by the coating manufacturer; however touch-up, edging work, trim coating, etc., using brush or roller application is permissible.
5. Apply base coat to at least 2 inches beyond all terminal edges of applied polyurethane foam, where applicable, and mask to provide a neat, finished appearance. Remove masking materials after trimming polyurethane foam. Use new masking for final coating trim detailing.
6. Ensure that base coat is not subjected to foot traffic or disturbed until it is tack free. Base coat must be clean and completely free of all moisture prior to application of topcoat.
7. After the base coat has cured and before the topcoat is applied, inspect the coating for any pinholes, cracks, or other defects. Back-roll all defects with additional base coat.
8. Apply topcoat at right angles to base coat. Apply the topcoat within 48 hours of the base coat application.
9. The minimum dry film thickness of base coat must be 10 mils.
10. The minimum dry film thickness of topcoat must be 20 mils.
11. The minimum combined dry film thickness of topcoat and base coat required shall be 30 mils.
12. The manufacturer's representative with the use of an optical comparator shall determine the thickness of the coating.

3.06 APPLICATION OF GRANULES

A. Spray-apply roofing granules onto topcoat. Apply immediately following topcoat application to obtain maximum wet-out and embedment. Apply at a minimum rate of 50 pounds per 100 square feet of coated surface.

B. Use equipment intended for granule application. Do not hand cast granules. The granulated surface should be free of bare spots. After 48 hours remove excess loose granules with a soft-bristled broom.

3.07 FLOOD TEST

Flood test all roof surfaces prior to final completion of work to demonstrate waterproofness. Maintain roof completely covered with water for at least 24 hours and obtain Architect's acceptance before water is removed. Repair any defects in the roof and any damage to other work caused by leaks, at no extra cost to Owner.

3.08 CLEAN-UP

Upon completion of all work in this Specification, the Contractor shall remove all equipment, material, and debris, leaving the area in an undamaged and acceptable condition.

3.09 INSPECTION

A representative from the coating manufacturer shall inspect the roof after completion to assure that the detail work at the protrusions, drains, parapets and edges has been completed in conformance with good practice and that the work of this Section has been installed in accordance with manufacturer's recommendations.

3.010 FOAM ROOFING INSPECTION REPORT

The manufacturer's representative shall submit Foam Roofing Inspection Report in accordance with Paragraph 3.01.D above.

*****END OF SECTION*****

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SECTION 07600

FLASHING & SHEET METAL

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SCOPE OF WORK

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

A. All metal wall flashings, related flashing, coping and caps.

B. Flashing at curbed openings, and other miscellaneous areas where indicated on the drawings.

C. Flashing flanges for roof drains and overflows.

D. Flashing at parapet walls that receive roofing membrane.

E. Flashing and metal covers at mechanical equipment platforms.

F. Gutters and downspouts.

G. Shop and field priming, shop painting, galvanizing, screening, caulking, anchors and anchor straps, clips, etc.

H. Shop drawings of all sheet metal work including expansion joints.

1.03 QUALITY ASSURANCE

A. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces.

B. Report to the Architect all conditions that prevent proper execution of this work.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Shop Drawings: submit: all information required for fabrication, finishing and installation of this work in complete details.

1.06 PRODUCT HANDLING

Adhere to requirements of Section 01620.

1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than FIVE (5) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Galvanized Sheet Metal: Conform to ASTM A525, thickness indicated or specified, but not less than 24-gauge. Zinc coating shall weigh not less than 1-1/2 ounces, or more than 1-1/2 ounces per square foot of surface covered.

B. Solder: Standard Grade-A brand of 50:50 Alloy Lead-Tin, complying with ASTM B32. Name of manufacturer and grade designation shall be cast or die-marked on each bar.

C. Solder Flux: Raw muratic acid for galvanized metal and zinc; resin for tin, lead, and tinned copper; and non-corrosive soldering salts for uncoated copper.

D. Sheet Metal Fasteners: Rivets, nails, sheet metal screws, self-tapping screws, and stove bolts, of the type and size best adapted to the condition of use. Provide fasteners of the type specified or indicated.

1. Use: galvanized steel, cadmium-plated steel or 300 Series alloy stainless steel.
2. Pop rivets may be used for metal-to-metal connections when future disassembly is not required. Open-end type may be used for all applications except where watertight connections are required, in which case, use closed end type.

E. Caulking Compound: Provide as specified under Section 07900. Apply as recommended by the manufacturer; caulking compound of proper consistencies for gun and knife application as necessary.

F. Shop Prime Coat: Rust-Oleum Corporation. Apply #3202 to 1/2 mil wet coating thickness, #3268 to 1-mil dry coating thickness or provide primer as specified under Section 09900.

G. Shop Color Coat: Pre-coat in shop with coating of color to match adjoining surfaces.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 FABRICATION AND ASSEMBLY

A. Workmanship: Fabricate and finish metal work in a first class manner in accordance with best trade practices with all joints and corners accurately machined, filed and fitted, and rigidly framed together and connected. Carefully match components to produce perfect continuity of line and design. Make joints and connections in exterior face metal watertight, using approved scaling materials and methods of assembly. Fit faces of metal in contact with hairline joints, except as otherwise indicated or required for expansion or fitting. Conceal fastenings, unless otherwise indicated. Conceal required reinforcements within the finished assembly.

B. Expansion and Contraction: Form and fabricate work to adequately provide for thermal expansion and contraction and building movement in the completed work, without over-stressing the materials, breaking connections, or producing wrinkles and distortion in finished surfaces. Finish sheet metal work water and weathertight throughout.

C. Attachment Clips: Where subject to thermal expansion and contraction, attach members with clips to permit movement without damage to the installation, or provide slotted or over-size holes with washers where appearance is not critical, as approved by the Architect.

D. Lock Seams: Make lock seam work flat and true to line; sweat full of solder except where installed to permit expansion and contraction. Lap flat lock seams, and lap seams where soldered, according to pitch but in no case less than 4". Make seams in direction of flow. Fill expansion joints with sealant. Plane surfaces shall be free of buckles. Provide reinforcement as necessary. Cleat and fasten substantially on approximately eight-inch centers. All cap flashing and gutter seams to be flat lock seams.

E. Soldering: Thoroughly clean and tin material prior to soldering. Solder with heavy coppers of blunt design, properly tinned before use. For flat seam work they shall not weight less than ten pounds per pair, and for other work not less than size pounds per pair. Solder slowly with well-heated coppers, heating the seams thoroughly and completely filling them with solder. Finish surfaces neatly, full flowing and smooth. Wash acid flux thoroughly with a soda solution after soldering and completely remove soldering flux on exposed surfaces.

F. Welding: Conform to the requirements of AWS "Standard Code for Arc and Gas Welding". Perform welding in a manner resulting in strong, durable, tight, flush, smooth, and clean joints. Weld sheet steel to produce full and complete fusion welds without inducing locked-in stresses in the metal or surface distortions. Welding on exposed surfaces shall be ground smooth and flush and finished to match adjacent surfaces.

G. Caulking: Where indicated, caulk joints in sheet metal work and between sheet metal work and adjacent construction with polysulfide sealing compound. Apply in accordance with Caulking and Sealants Section.

H. Coping: Shall be attached to top of parapets in strict conformance with the latest written specifications of the Sheet Metal Industry Fund of Los Angeles, and as indicated on the drawings.

I. All sheet metal work shall be examined carefully the Contractor, Owner and Architect and if necessary, tested. The Contractor shall make all repairs to damaged items as a result of this testing, leaving them in a condition satisfactory to the Architect.

***** END OF SECTION *****

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SECTION 07840

FIRE STOPPING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

A. Work included: Provide firestopping where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. It is the intent of this section of the specifications to establish a single, competent source to be responsible for providing all labor, materials, products, equipment and services, to supply and install the firestopping and smoke seal work for the entire project, at the following locations, as indicated on the drawings:

1. Openings in fire rated walls, floors and roofs both empty and those containing penetrations such as cables, conduits, cable trays, pipes, ducts and similar penetrating items.
2. Gaps between fire-rated floor slabs and exterior curtain walls.
3. Gaps between fire-rated walls and exterior curtain walls.
4. Gaps located within expansion joints.
5. Gaps between the tops of fire rated walls and underside of fire rated floor or roof assemblies.
6. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
7. Openings at each floor level in fire rated shafts or stairwells.

1.03 RELATED WORK

A. Openings through Floors and Walls:

1. Fire Rated: Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
2. Non-Rated: Non-rated openings through floors and walls shall be sealed under applicable mechanical and electrical specification sections.

B. Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions. Firestopping and smoke seals around outside of such mechanical and electrical assemblies, where they penetrate fire rated separations, are the responsibility of this section.

1.04 REFERENCE STANDARDS/DOCUMENTS

A. ASTM E814 - Test Method of Fire tests of Through Penetration Firestops.

B. ANSI/UL 1479 - Fire Tests Of Through-Penetration Firestops

C. ANSI/UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems

D. UL: Fire Resistance Directory, Volume 2.

E. ITS: Directory of Listed Products.

F. Factory Mutual, Approvals Guide

1.05 SYSTEM DESCRIPTION

A. Firestopping Materials: Provide firestopping system(s) of sufficient thickness, width and density to provide and maintain a fire resistance rating, as indicated on drawings and in accordance with [UL], [WH], or [FM] design numbers.

B. Provide a seal completely filling all annular spaces to prevent the passage of flame, smoke and gases through the opening in the fire separation in which it is installed.

C. Material Compatibility: Provide materials which are compatible with all materials used in the system including materials used in or on penetrating items as well as all construction materials used in conjunction or contiguous with the system.

D. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials
2. Temporary forming materials
3. Substrate primers
4. Collars
5. Steel sleeves

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.07 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Manufacturer's Data: Submit manufacturer's specifications, installation instructions and product data for each material required. Include [UL], [WH], or [FM] tested systems or designs to show compliance with the Contract Documents.

C. Shop Drawings: Submit shop drawings showing typical installation details including reinforcement, anchorage, fastenings and method of installation for each type of firestopping condition.

D. Samples: If requested, submit samples of each type of firestopping systems, smoke seals and accessories. Indicate location where material/system shall be utilized.

1.08 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products of this Section with minimum ten (10) years documented experience, and having a quality management system that is registered as conforming to the requirements of ISO9001.

B. Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein on projects comparable to this project. The firm shall have the written authorization of the firestopping material manufacturer (s).

1.09 REGULATORY REQUIREMENTS

A. Conform to applicable local Building Codes for fire resistance ratings.

B. Provide materials, accessories and application procedures which have been listed by [UL], [WH], [FM] or [tested by a nationally recognized independent testing agency] in accordance with [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] to achieve the required fire protection rating(s).

1.010 ENVIRONMENTAL REQUIREMENTS

A. Do not proceed with the installation of firestopping materials when temperatures or weather conditions exceed the manufacturer's recommended limitations for installation.

B. Ventilate solvent based and moisture-cure firestopping per firestopping manufacturer's instructions by natural means or, where this is inadequate, by forced air circulation.

1.011 DELIVERY, STORAGE AND HANDLING

Deliver materials to Site in manufacturer's sealed and labelled containers intact. Handle and store materials in accordance with manufacturer's instructions.

1.012 PROJECT/SITE CONDITIONS

Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.

1.013 SEQUENCING AND SCHEDULING

Do not install firestopping system(s) until Work within opening has been completed. Coordinate with other applicable Sections. Schedule work of other trades so that firestopping applications can be inspected prior to being covered by subsequent construction.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Provide fire-stopping silicone sealants, water-based sealants, intumescent sealant, mortars, or firestop devices from the following manufacturer: A/D Fire Protection Systems Inc. or Architect approved equal.

2.02 MATERIALS

A. Provide a complete system of asbestos-free firestop systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] and listed by [UL], [WH], or [FM] and in addition are approved by jurisdictional authorities and the Consultant.

B. A/D FIRE BARRIER Silicone Sealants: For use in: openings with penetrating items subject to high movement; multiple penetration systems; for combustible pipes up to 2-in. diameter; in control joints; in curtain wall joints; expansion joints; floor/wall joints; wall/wall joints; head of wall joints; and as a sealant for smoke barrier construction.

C. A/D FIRE BARRIER Intumescent Caulk: For general use as a firestop sealant with: insulated pipes; pipes; electrical cables and conduit; ducts.

D. A/D FIRE BARRIER Seal and Seal NS: Water based firestop sealants for use with: control joints; head of wall joints; floor/wall joints; wall/wall joints; multiple penetration systems; plumbing; mechanical; electrical; and where sprayed sealant application is required or desired.

E. A/D FIRE BARRIER Mortar: For use in: large openings; static non-moving penetrations such as cable trays; for multiple penetration systems; electrical and communication bundles; conduits; non-combustible sleeves; and insulated pipes.

F. A/D FIRE BARRIER Collars: For use in openings with single combustible pipe penetrations greater than 2-in. diameter.

G. A/D FIRE BARRIER Pillows: For use in openings with: cable tray; multiple cable penetrations; where retrofitting of penetrating items is anticipated, and as a temporary fire stop system.

H. Fire stop system ratings: Comply with applicable Building Code requirements for locations and ratings.

2.03 ACCESSORIES

A. Damming and backup materials, supports and anchoring devices: Non-combustible, to manufacturer's recommendations and in accordance with the tested system being installed as acceptable to jurisdictional authorities.

B. Primers: As required by firestopping manufacturer and compatible with selected system and contiguous materials.

C. Water: Potable.

D. Firestopping for vertical (wall) applications: Non-sag caulk or spray grade sealants, Mortar, Collars or Pillows.

E. Firestopping for horizontal (floor) applications: Non-sag caulk or self-levelling or spray grade sealants, Mortar, Collars or Pillows.

F. Firestopping for overhead applications: Non-sag caulk or spray grade sealants or Mortar.

G. Tape: Pressure sensitive masking tape as recommended by the firestopping manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Examine substrates, openings, voids, adjoining construction and conditions under which the Work is to be installed. Confirm compatibility of surfaces scheduled to receive firestopping.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Verify that penetrating elements are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings.

E. Do not proceed with Work until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Surfaces to receive firestopping shall be free of dirt, dust, grease, oil, rust, loose materials, form release agents, frost, moisture or any other matter which would impair the bond of firestopping material to the substrate of penetrating item(s).

B. Prime substrates in accordance with manufacturer's written instructions or recommendations. Confine primers to areas of bond; do not allow spillage or migration onto exposed surfaces.

C. Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

D. Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other related materials used in the actual fire tests are provided.

E. Mask where necessary to prevent firestopping materials from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.

F. Installation is not to proceed until submittals have been completed.

3.03 INSTALLATION

A. Manufacturer's Instructions: Comply with [UL], [WH] or [FM] Listings and manufacturer's instructions for the type of material and condition of opening in each case. Consult with the manufacturer's technical representative to determine proper procedure for conditions not fully

covered by printed instructions. Record in writing any oral instructions received, with copy to manufacturer.

B. Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal. Tool or trowel exposed surfaces. Remove excess firestopping material promptly as the Work progresses and upon completion.

C. Damming: Provide leak-proof dams as required to seal openings and contain liquid sealants, putty or mortar until cured. Install damming in accordance with manufacturer's instructions.

D. Damming Boards: Install forming/damming materials and other accessories of type required to support fill materials during their application and in the position needed to produce the shapes and depths required to achieve fire ratings of through-penetration fire stop systems.

1. Combustible Type: For temporary dams only. Remove after firestopping material has cured.

2. Non-Combustible Type: For temporary or permanent dams. Provide non-combustible type wherever damming material cannot be removed after applying firestopping materials.

E. Void Filler: Use materials recommended by the firestopping manufacturer to seal gaps created by non-combustible type damming boards and to seal around cables, conduits, pipes and where void filler material becomes part of the fire rated assembly.

F. Sealant: Install damming material or mineral wool as required. Apply sealant so air voids are not present and sealant is in full contact with penetrating items. Tool sealant to ensure substrate contact. Remove excess sealant in accordance with manufacturer's recommendations.

G. Mortar: Install damming material as required. Mix mortar in strict accordance with manufacturers instructions. Pump, trowel or hand pack mortar through openings to minimum thickness as recommended by manufacturer and as listed by [UL], [WH] or [FM], to achieve required fire rating.

H. Firestopping Mineral Wool: Install firestopping by compressing material to the minimum required by [UL], [WH] or [FM] listing. Apply firestopping in sufficient thickness, depth and density so as to achieve the required fire resistance rating. Use impaling clips to support and secure firestopping where required by tested system.

3.04 FIELD QUALITY CONTROL

A. Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestopping materials.

B. Arrange for inspections by the Owners independent inspection and testing company, appointed and paid for by Owner.

C. Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.

3.05 CLEANING AND PROTECTION

A. Upon completion of this work, remove all materials, equipment and debris from the site.

B. Leave work area and adjacent surfaces in a condition acceptable to the Consultant.

C. Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

*****END OF SECTION*****

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SECTION 07900

CAULKING & SEALANTS

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SCOPE OF WORK

Work included: Throughout the work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and passage of air.

1.03 QUALITY ASSURANCE

A. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data: submit:

1. List of items that will be provided under this Section.
2. Manufacturer's Data: catalog cuts, dimensioned drawings, and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Not required.

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

Provide for Owner's use a minimum of 2 percent, but not less than one tube, of the each of the sizes and colors used, boxed and clearly labeled.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. The guarantee specified herein shall include warranties against leakage, hardening, cracking, crumbling, melting, running, shrinking or staining adjacent surfaces.
4. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than five (5) years from the date of Substantial Completion.

PART 2 -- PRODUCTS

2.01 SEALANTS

A. Except as specifically otherwise accepted by the Architect, use only the types of sealants described as follows:

1. One component polyurethane sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, ASTM-C-920, Class 25, for vertical and horizontal joints in connection with all building materials. Do not use in traffic areas. Minimum ¼" joint; maximum 1-1/4" x 3/8"d.
    a. Dymonic by Tremco
    b. Sonolastic NP1 by Sonneborn
2. One-part silicone sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Class A, for vertical and horizontal joints in connection with aluminum, glass and concrete materials which require greater movement capabilities. Do not use in traffic areas. Minimum joint ¼" x 3/16"d; maximum1" x ½"d.
    a. Spectrum 1 by Tremco
    b. Omniseal by Sonneborn
    c. Dow Corning 790
3. One-part silicone sealant, medium modulus, neutral cure, FS S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, ASTM C920, Class 25, for vertical and horizontal joints in connection with non-porous surfaces such as aluminum, glass, tile, laminated plastic and concrete. Do not use in traffic areas.
    a. Spectrum 2 by Tremco
    b. Omni Plus by Sonneborn
    c. Dow Corning 795
    d. Construction 1200 by GE
4. Multi-Component polyurethane sealant, FS TT-S-00227E, Type I, Class A, ASTM C920 for horizontal joints in traffic areas. Minimum 3/8" wide, depth to be 3/8" to ½" - use primer.
    a. THC-900/901 by Tremco
    b. Chem. Caulk 950 by Bostick
5. One-part translucent silicone sealant, low modulus, moisture curing, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, for vertical joints in

connection with butt glazing.

a. 895 Silicone by Pecora

b. Silglaze N by GE

6. One-part mildew resistant silicone sealant meeting requirements of FDA Regulation 21 CFR 177.2600, for vertical and horizontal joints in connection with non-porous applications as sealing around bathroom fixtures, shower-tub enclosures, sinks and urinals.

a. Dow Corning 786

b. Sanitary 1700 by GE

7. One-part siliconized acrylic latex polymer caulk, ASTM C834-76, for interior horizontal and vertical joints in connection with window and door buck perimeters, interior wall surfaces, etc.

a. AC-20 by Pecora

b. Acrylic Latex by Tremco

8. Roof Penetrations: Use asphalt mastic conforming to ASTM D491.

9. For other services, provide products especially formulated for the proposed use and accepted in advance by the Architect.

B. Colors:

1. The Architect will select Colors for each sealant installation to match adjacent finishes from a standard color list normally available from the specified manufacturers.

2. Should a matching standard color not be available from the accepted manufacturer except at additional charge, the Contractor shall provide such colors at no additional cost to the Owner.

3. In concealed installations, and in partially or fully exposed installations where so accepted by the Architect, use standard gray or black sealant.

2.02 PRIMERS

Use only those primers that are: non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials that are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

B. Acceptable types include:

1. Closed-cell resilient urethane or polyvinyl chloride foam;

2. Closed-cell polyethylene foam;

3. Closed-cell sponge of vinyl or rubber;

4. Polychloroprene tubes or beads;

5. Polyisobutylene extrusions;

6. Oil-less dry jute.

C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

2.04 BOND-PREVENTATIVE MATERIALS

Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:

1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated;
2. Aluminum foil complying with MIL-A-148E;
3. Wax paper complying with Fed. Spec. UU-P-270.

2.05 JOINT PACKING

Shall be installed in all joints to receive sealant. Material shall be a resilient type such as closed cell PVC foam or as recommended by the manufacturer. Oakum or other types of absorptive materials shall not be used as packing material.

2.06 OTHER MATERIALS

A. For masking around joints, provide masking tape complying with Fed. Spec. UU-T-106c.

B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Concrete and ceramic tile surfaces:

1. Install only on surfaces that are dry, sound, and well brushed, wiping free from dust.
2. At open joints, remove dust by mechanically blown compressed air if so required.
3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
5. Remove laitance and mortar from joint cavities.
6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.

B. Steel surfaces:

1. Steel surfaces in contact with sealant:
   a. Sandblast as required to achieve acceptable surface for bonding.
   b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
   c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
2. Remove protective coatings on steel by sandblasting or by using a solvent that leaves

no residue.

C. Aluminum surfaces:

1. Remove temporary protective coatings, dirt, oil, and grease.
2. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
3. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

A. Use only the backup material recommended by the manufacturer of the sealant used, and accepted by the Architect for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.

B. When using backup of tub or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

C. Interior and exterior joints where no backing has been provided or which is in excess of 3/4" deep shall be packed by this subcontractor with fiberglass or a suitable joint filler to reduce the depth to 1/2" maximum. Maximum movement: the width of the joint shall be at least four times its maximum movement.

3.04 PRIMING

A. Use only the primer recommended by the manufacturer of the sealant, and accepted by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as accepted by the Architect.

B. The priming of joints shall be by brush to reach all surfaces to which compound will be applied. Primer shall be provided on masonry, concrete and wood surfaces as recommended by sealant manufacturer. Primer shall not be applied to surfaces that will be exposed after caulking is completed.

3.05 BOND-BREAKER INSTALLATION

Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the installation recommendations as accepted by the Architect.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment:

1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.
2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and complete mask joints where the appearance of sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations as accepted by the Architect, thoroughly filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

F. Cleaning up:

1. Remove masking tape immediately after joints have been tooled.
2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
3. The excess material shall be cleaned from the surfaces adjacent to the joint, following the caulking operation and the top of the compound deposit shall be left with a smooth even finish. No material is permitted on the exposed face of aluminum sections.

***** END OF SECTION *****

SECTION 08100

METAL DOORS AND FRAMES

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SCOPE OF WORK

Work under this section comprises of furnishing hollow metal doors and frames, including transom frames, sidelight and window frames with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled.

1.03 REFERENCES

A. Standards:

1. 2010 NFPA 80 – Fire Doors and Window
2. ANSI/SDI-100 – Recommended Specifications for Standard Steel Doors an Frames
3. ASTM-F 476 – Standard Test Methods for Security of Swinging Doors Assemblies
4. HMMA 862 – Guide Specifications for Commercial Security Hollow Metal Doors and Frames
5. SDI-105 – Recommended Erection Instructions for Steel Frames
6. SDI-107 – Hardware on Steel Doors (reinforcement application)
7. ANSI-A250.4 – Steel Doors and Frames Physical Endurance
8. UL10C - Standard for Positive Pressure Fire Tests of Door Assemblies
9. UL752 – Ballistic Standards

B. Codes:

1. 2009 NFPA-101 – Life Safety Code
2. 2009 CBC – California Building Code
3. ANSI-A117.1 – Accessible and Usable Building and Facilities
4. 2010 DOJ – ADA Standards for Accessible Design - DOJ

1.04 QUALITY ASSURANCE

A. Manufacturer shall be a member in good standing of the Steel Door Institute (SDI).

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

C. Unless specifically otherwise accepted by the Architect, provide all products of this Section from a single manufacturer.

D. Fire Rated Door Assemblies:

1. All labeled fire door assemblies to be of a type that have been classified and listed in accordance with the latest edition of NFPA80 and test in compliance with NFPA-252, and UL10C. A physical label is to be affixed to the fire door at an authorized facility; embossed labels are acceptable on standard 3 sided door frames.

2. For openings required to be fire rated exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.
3. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
4. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data: submit:

1. List of items that will be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
4. Provide a schedule of doors and frames using same reference numbers for details and door openings as those on the contract documents.
5. Submit shop drawings. Shop drawings should include the following information:
    a. Material thickness and/or gauge.
    b. Door core material.
    c. Mortises and reinforcements.
    d. Anchorage types.
    e. Locations of exposed fasteners.
    f. Glazed, louvered and paneled openings.
    g. Mounting locations of standard hardware

1.07 DELIVERY, STORAGE, AND HANDLING

A. Adhere to requirements of Section 01620.

B. The supplier shall deliver all materials to the project site; direct factory shipments are not allowed unless agreed upon beforehand. Supplier shall coordinate delivery times and schedules with the contractor.

C. Deliver doors cardboard wrapped or crated to provide protection during transit and jobsite storage. Provide additional protection to prevent damage to any factory-finished doors. Mark all doors and frames with opening numbers as shown on the contract documents and shop drawings.

D. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the architect. Otherwise, remove and replace damaged goods as directed.

E. Store doors and frames at the building site in a dry and secure place.

1. Place units on minimum 4" high wood blocking.
2. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber.
3. If cardboard wrapper on door becomes wet, remove carton immediately.
4. Provide 1/4" spaces between stacked doors to promote air circulation.

1.08 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

1. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
2. All doors and frames shall be warranted in writing by the manufacturer against defects in materials and workmanship for a period of one (1) year commencing on the date of final completion and acceptance.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

Subject to compliance with requirements, provide standard hollow metal doors and frames by one of the following:

A. Security Metals

B. Door Components

C. Ceco Corporation

D. Curries Company

E. Steelcraft Company

2.02 MATERIALS

A. All doors and frames shall be manufactured of commercial quality cold rolled steel per ASTM-A366 and A568 general requirements; galvanized to A60 or G60 or galvanealed to A40 minimum coating weight standard per ASTM-A924. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569

B. Supports and anchors shall be fabricated of not less that 18-gauge sheet steel, galvanized where galvanized frames are used.

C. Where items are to be built into exterior walls, inserts, bolts and fasteners shall be hot dipped galvanized in compliance with ASTM-A153, Class C or D as applicable.

D. Rust inhibitive enamel or paint primer shall be used, baked on, and suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces on Steel Doors and Frames."

E. Where specified supply embossed steel doors with wood grain appearance. Wood grain shall follow the pattern of a stile and rail wood door with both vertical and horizontal grain patterns. Doors with vision lites are required to have wood grain window kits.

F. Finish: See Door & Hardware Schedule and Finish Schedules.

2.03 METAL DOORS

A. Provide 1 3/4" thick doors of materials and ANSI/SDI-100 grades and models specified below, or as indicated on drawings or schedules:

1. Interior Doors: Level 2, Model 2 – Seamless

   Interior doors shall be minimum 16-gauge steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door. Acceptable Manufacturers/Products:

   a. Ceco: Regent-16-SEM

   b. Curries: 707N-16

   c. Steelcraft: LF16

   d. Architect Approved Equal

2. Exterior Doors: Level 3, Model 2 – Seamless

   Exterior doors shall be minimum 16-gauge galvanized or galvanealed steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door. Exterior doors shall be insulated with a solid slab of expanded polystyrene or polyurethane foam permanently bonded to the inside of each face skin. The top of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes. Acceptable Manufacturers/Products:

   a. Ceco: Legion-16-SEM

   b. Curries: 707N-16

   c. Steelcraft: LF16-Polystyrene

   d. Architect Approved Equal

3. Security Doors: Level 3, Model 2 – Seamless

   Doors shall be minimum 14-gauge steel with both lock and hinge rail edge of door continuously wire welded the entire height of the door. Doors shall be reinforced, stiffened, insulated, and sound deadened with continuous 20 gauge vertical steel stiffeners spaced not more than 6" (152) apart. The stiffener ends shall be welded together at the top and bottom ends. All spaces between stiffeners shall be insulated with .75 pound density fiberglass insulation. The top of all doors shall be closed flush by the addition of a 14-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes. Acceptable Manufacturers/Products:

   a. Ceco: Medallion-14

b. Curries: 747T-14

c. Steelcraft: BW14

d. Architect Approved Equal

4. Bullet Resistant Doors

a. Bullet resistant hollow metal doors shall be constructed with vertical steel stiffeners and fully welded vertical edge seams for enhanced strength and aesthetic appearance. Internal door construction and concealed armor plate shall vary and is dependent on the required ballistic rating. Provide ballistic level doors as follows:

i. Level 1: Super 38 Automatic

ii. Level 2: .357 Magnum Revolver

iii. Level 3: .44 Magnum Revolver

iv. Level 4: 30-06 Rifle

b. Subject with compliance to the outline requirements, provide products by the following manufacturers:

i. Ceco: Armorshield

ii. Curries: 847/857

iii. Security Metals

iv. Architect Approved Equal

B. All doors shall be reinforced for hardware as shown below where necessary to preclude the use of thru-bolts.

1. Exit Devices: 14-gauge

2. Door Closers: 12-gauge

C. All doors shall be beveled 1/8" in 2" and shall have top and bottom channels of not less than 16-gauge, flush or inverted, welded to the face sheets. Doors shall have a full height 14-gauge hinge rail reinforcement channel, or individual 10 gauge hinge reinforcements

D. All doors to conform to ANSI-A250.4 Level "A" criteria and shall be tested to 1,000,000 operating cycles and 23 twist tests. Certification of Level "A" doors is to be submitted with approval drawings by supplier upon request. Do no bid or supply any type or gauge of door not having been tested and passed these criteria

2.04 METAL FRAMES

A. Provide hollow metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the drawings and schedules. Conceal fastenings unless otherwise indicated:

1. Interior Frames: Level 2, 16-gauge

2. Exterior Frames: Level 2, 16-gauge, galvanized or galvanealed

3. Security Grade Frames: 14-gauge

B. Acceptable Manufacturers/Products:

1. Ceco: SU Series

2. Curries: M Series

3. Steelcraft: F Series

C. All frames over 36" in width shall be 14-gauge.

D. Fabricate frames with mitered corners. Weld both the inside the throat of the corners and the face of the corners, re-prime at the welded areas. All welds to be flush with neatly mitered or butted material cuts.

E. All frames shall have minimum 7-gauge hinge reinforcements, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.

F. All frames shall have minimum 7-gauge hinge reinforcements with an additional high frequency 12-gauge hinge reinforcement welded to the top hinge, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.

G. Provide temporary shipping bars to be removed before setting frames.

H. Except on weather stripped frames, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.

I. Provide minimum 0.0179" thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings

2.05 DOOR LOUVERS

A. Fire-Rated Louver:

1. Each fire-rated louver shall have the listing mark of Underwriter's Laboratories Inc. affixed to louver assembly.

2. All louvers in fire-rated doors shall be 16-gauge cold rolled steel with stainless steel operating springs.

3. Louvers shall be sight-proof per SDI-111C.

B. Fixed-Blade Louver:

1. All fixed blade louvers shall be 18-gauge cold rolled steel with mitered and welded frames and countersunk mounting holes.

2. Louvers shall be sight-proof per SDI-111C.

3. Provide insect screen where louver occur in exterior doors.

2.06 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

1. Clearances shall be no more than 1/8" at jambs and heads except between non fire rated pairs of doors which may be no more than 1/4."

2. Clearances shall be no more than 3/4" at the bottom of the doors.

3. Clearances shall be no more than 1/4" at thresholds and curbs allow unless otherwise detailed.

B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.

1. All doors shall be of types and sizes on the drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Doors shall be strong, rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.

2. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

3. Top and bottom edges shall be closed with a continuous recessed 16 gauge steel channel extending the full width and spot welded to both faces. Exterior doors shall have an additional flush closing channel at the top edge. Opening shall be provided in the bottom closer for escape of entrapped moisture.

4. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully template hardware only. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only, with drilling and tapping to be done in the field.

5. The Face sheets of Exterior and Security doors shall be stiffened by continuous vertical formed steel sections occupying the full thickness of the interior space between door faces. These stiffeners shall be not less than 20 gauge, spaced not more than 6" apart and securely attached to both face sheets by spot welds not more than 4" o.c. Spaces between stiffeners shall be sound deadened and insulated the full height of the door with an inorganic non-combustible batt-type material.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

1. All door and louver frames shall be strong and rigid, neat in appearance, square, true and free of defects, warp and buckle. Molded members shall be clean cut, straight and of uniform profile and back-bends shall be as detailed.

2. Corner joints shall have all contact edges closed tight, with trim faces and stops mitered and continuously welded. All welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

3. Unit frames for installation in stud partitions shall be provided with steel anchors of suitable design for welding to steel studs. Anchors shall be not less than 16-gauge and shall be securely welded inside each jamb. Anchors are to be spaced at 24" on center.

4. Dust cover boxes of not less than 26-gauge shall be provided at all hardware mortises on frames to be set in masonry or drywall partitions.

D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

E. Unless otherwise indicated, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.

F. Labeled doors and frames shall be provided for those openings requiring fire protection ratings, as scheduled on the drawings. Such doors and frames shall be constructed as tested by the Underwriter's Laboratories, Inc., and shall bear their label for the required rating. Provide additional frame accessories as required to maintain the fire protection ratings once the frames are installed in the openings.

G. At exterior locations and elsewhere as shown or scheduled, assemblies fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies. Unless otherwise indicated, provide thermal-rated assemblies with a minimum U-value rating of 0.41 Btu/sq. ft. x h x deg F.

H. Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413. Unless otherwise indicated, provide acoustical assemblies with STC sound ratings of 33 or better.

I. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI-107 and ANSI-A115 Series specifications for door and frame preparation for hardware.

J. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site. Provide internal reinforcements for all doors to receive door closers and exit devices.

K. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

L. Provide glazing stops with minimum 0.0359-inch- thick steel or 0.040-inch- thick aluminum.

M. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

N. Provide screw-applied, removable, glazing beads on inside of glass and other panels in doors.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 FIELD MEASUREMENTS

Verify all opening dimensions in the field prior to fabrication and assembly of frames.

3.03 INSTALLATION

A. Install steel doors, frames, and accessories according to shop drawings, manufacturer's data, and as specified.

B. Comply with provisions of SDI-105, "Recommended Erection Instructions for Steel Door Frames," unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.

2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

3. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.

4. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

5. Install fire-rated frames according to NFPA 80.

C. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100. Install fire rated doors with clearances specified in NFPA 80.

3.04 ADJUST AND CLEAN

A. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

B. Immediately before final inspection, remove protective wrappings from doors and frames.

C. Final adjustments:

1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
2. Leave work in complete and proper operating condition.
3. Remove defective work and replace with work complying with the specified requirements.

***** END OF SECTION *****

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SECTION 09200

LATH AND PLASTER

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section

1.02 SCOPE OF WORK

Supply and install all Lath and Plaster Work as shown on the Drawings and as specified herein, for a complete and proper installation.

1.03 REFERENCE STANDARDS

Comply with all applicable requirements of the California Lathing and Plastering Contractor's Association "Reference Specifications" except where more stringent requirements are indicated herein or in local building codes.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Submit Product Data and color samples and manufacturers application data.

C. Make (2) samples, at least one-foot square, of selected specified plaster system.

1.06 QUALITY ASSURANCE

A. In all Work under this Section, coordinate with all other trades whose work connects with, is affected or concealed by lathing and plastering. Before proceeding, make certain all required inspections have been made. Do all cutting and patching required to accommodate the work of other trades.

B. Inspect surfaces to receive lath and plaster before starting Work and do not start until surfaces are acceptable. Starting Work under this Section implies acceptance of surfaces.

1.07 PRODUCT HANDLING

A. Adhere to requirements of Section 01620.

B. Deliver all manufactured materials in original packages bearing manufacturer's name and brand. Use only one brand of each material throughout job. Store materials in dry areas.

1.08 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

PART 2 -- PRODUCTS

2.01 LATH

Paperbacked Lath: K-Lath Corporation: "Aqua K-Lath", or as approved by Architect, 16 gauge wires spaced 1-1/2 inches o.c. vertically and welded to 16 gauge wires spaced 2 inches o.c. horizontally, with perforated Kraft paper to insure plaster embedment and Type I Class B waterproof building paper laminated to back side.

2.02 ACCESSORIES

A. Corner Bead: #1X Type, Keene or equal, expanded metal flanges integral with nose bead of solid metal, galvanized.

B. Corner Lath: As specified for expanded metal, three (3) inch legs bent to a 105-degree corner, - "Cornemaster #30" by Keene, or equal.

C. Casing Beads: #66 Type, Western, or equal, expanded metal flange, galvanized, depth as required by plaster thickness, weighing approximately 200# per 1000 lineal feet for 3/4-inch and 7/8-inch types.

D. Expansion Joints: #15 by Keene or equal. Cut lath passing under expansion joints. Install where indicated on Drawings, with the following minimum conditions:

1. No length should be greater than 18 feet in either direction
2. No panel shall exceed a maximum of 144 square-feet for vertical applications.
3. No panel shall exceed a maximum of 100 square-feet for horizontal, curved or angular sections.
4. No length-to-width ratio should exceed 2.5 to 1 in any given panel.

E. Bonding Agent: As recommended for application over smooth monolithic concrete shells. Concrete shells shall be cleaned with bonding agent applied prior to plastering interior.

F. Wire: Soft, annealed, galvanized steel, 8-gauge for hangers, 16-gauge for channel ties and 18-gauge for lath ties.

G. Nails: Concrete nails, case hardened steel, 3/4 inch long.

H. Weep Screed: by Keene or equal. 1-1/4" ground, galvanized.

I. Building Paper: 15#, asphalt impregnated. Install over Weather Barrier specified in Section 07250 and shown on the Drawings.

J. Miscellaneous Items: Furnish all miscellaneous components not specified herein but shown on the Drawings and any other items required to complete the installation.

K. Water: Clean and free of deleterious matter.

2.03 PORTLAND CEMENT PLASTER

A. Portland Cement: Conforming to ASTM C-150, Type 1.

B. Sand for Cement Plaster: Conforming to ASA A42.2.

C. Hydrated Lime: Conforming to ASTM C-206, Type S.

D. Quick Lime: Conforming to ASTM C-5.

E. Exterior Cement Plaster:

1. Scratch Coat: One part Portland Cement, four (4) parts sand and hydrated lime equal to 25% volume of cement.
2. Brown Coat: One part Portland Cement, five parts sand and hydrated lime equal to 25% of the volume of cement.
3. Finish Coat: Portland Cement-Lime: one part standard Portland Cement, not more than 1/2 part dry hydrated lime (or an equivalent amount of lime putty) and not more than one part #20 mesh, and one part #16 mesh silica sand. Submit finish sample(s) for Architect's approval.
4. Thickness: 7/8 inch thick, measured from back of lath.
5. Finish coat to contain integral color. Submit samples to Architect for approval based upon colors indicated on Drawings.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and condition under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 GENERAL

A. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.

B. Provide ventilation to properly dry plaster during and subsequent to application. In glazed areas, accomplish by keeping windows open sufficiently to provide air circulation; in enclosed areas lacing normal ventilation, mechanically remove moisture-laden air.

3.03 LATHING

A. Apply lath with long dimension at right angles to supports; lap side and ends as recommended by manufacturer. Stagger vertical laps. Make no vertical joints at any corner; bend lath around all corners, internal and external.

B. Attach lath to studs by fasteners at spacings required by local building codes. All attachments to be corrosion resistant.

C. Install all accessories to plumb, true and level lines, and backing plates as located by the trade furnishing these items.

D. Install beads, corner laths, control joints, reglets, screeds, and like items, using single lengths wherever possible. Provide corner beads at all exterior corners shown, mitering or coping as required, and fastening at six (6) inches o.c., both sides. Provide casing beads wherever interior plaster angles are shown and wherever one or both abutting surfaces are metal lathed, except corner laths are not required where metal lath is continuous around corner at junctions of walls, or where ceiling lath turns down a wall. Tie outer edges only to adjoining lath at six (6) inches o.c. or stub nail to any concrete. Install access panels supplied by other trades.

E. Start installation at bottom of wall, working up and from right to left. Apply lath with long dimension at right angles to supports; lap sides and ends as recommended by manufacturer.

Stagger vertical laps. Make no vertical joints at any corner; bend lath around all corners, internal and external.

F. Attach lath to metal and/or wood studs by means of tie wire and nails respectively at spacings as required by Local Building Codes. All attachments shall be corrosion resistant.

G. Install corner beads at all external corners. Use single length except where standard length is not sufficient. Miter or cope as required; fasten with tie wire at six (6) inches o.c., both sides.

H. Install at interior angles and sheer one or both abutting surfaces are metal lath. Corner laths are not required where metal lath is continued around corner at junction of walls and where ceiling lath turns down wall unless otherwise noted on drawings. The outer edges only to adjoining lath at six (6) inches o.c., or stub nail to concrete.

3.04 PLASTERING

A. Do not apply plaster below 55 degrees F temperature. Apply no plaster to frosty surfaces. Dampen any surfaces on which suction must be reduced with fog-spray. Maintain all screeds plumb and true.

B. Except when had mixing small batches is approved, use approved mechanical mixers. Clean mixers, mixing boxes and tools after mixing each batch. Thoroughly mix with water until uniform in color and consistency. Retempering not permitted. Discard plaster, which has begun to stiffen. Mix in strict accordance with manufacturer's printed directions.

C. Except in the case of specifically formulated plasters, which require only water added job site, proportion by volume as specified.

D. Scratch coat: Apply with sufficient material and pressure to shove material through metal lath and form a good key; 3/8 inch minimum thickness, score in horizontal direction with metal scorer with clipped teeth to provide good mechanical key for second coat. Dampen concrete and concrete block surfaces to reduce suction prior to application.

E. Brown coat: Apply not sooner than 48 hours after application of scratch coat; properly dampen scratch coat; apply sufficient pressure to force plaster into scratches and build out to within 1/8 inch to screeds; for, float and darby to true, plumb surfaces and corners; leave rough for finish coat.

F. Curing: Keep Brown coat moist for at least 48 hours; commence moistening as soon as plaster has hardened sufficiently so to prevent injury; apply water in a fine fog spray; avoid soaking; curing shall proceed over holidays, Saturdays and Sundays if necessary. If atmospheric conditions are hot and dry, curing time shall be extended as necessary at no additional cost to Owner. Allow plaster base coats to cure for a minimum of fourteen (14) days before applying finish coat.

G. Finish coats Apply to partially dry base coat, or to a thoroughly dry base coat that has been evenly wetted by brushing or spraying; avoid use of excessive water. Trowel all finish surfaces of plaster to perfectly true and even surface without scratches, ridges, voids, cracks, etc. Fill fissures or breaks in brown coat and existing plaster before application of finish coat. Make coats uniform in thickness with average thickness about 1/8 inch; minimum thickness anywhere: 1/16 inch.

3.05 CLEANING AND PATCHING

A. A clean floor of droppings immediately after each coat is applied. At any exterior locations, remove droppings or splashes from all concrete, masonry or other finish surfaces.

B. Patch after all other Work, except painting, has been completed. Cut out damaged or broken plaster to straight lines with clean, sharp edges. Cut out cracks to width of at least one (1) inch. Fill areas to be patched with base materials, and then give a finish coat of same material as adjoining plaster. Patched areas shall match adjoining work in finish and texture.

Joining shall be flush and smooth so joints between patch and existing plaster are not noticeable.

C. At completion of Work, remove excess plaster from beads, screeds, etc., and leave Work clean and ready for painting. Promptly remove plaster, rubbish, surplus material, scaffolding and other equipment from job site. Leave areas broom clean.

***** END OF SECTION *****

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