SECTION 06 10 00

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 03 10 00 - 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. Current 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:

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 Current 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 the Instructions to Bidders, Section 3.3 Substitutions.

1.06 SUBMITTALS

Provide in accordance with Article 3 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*****

SECTION 06 17 00

PREFABRICATED STRUCTURAL WOOD & TRUSSES

PART 1 -- GENERAL

1.01 SUMMARY

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

1.02 DESCRIPTION OF WORK

Extent of prefabricated structural wood is indicted on drawings, work includes, but is not necessarily limited to furnishing and installing glued-laminated beams and MICRO=LAM lumber beams as shown on the structural drawings and as specified herein.

1.03 REFERENCES

A. American Institute of Timber Construction (AITC):

1. 117: Manufacturing Standard Specification for Structural Glued-laminated Timber of Softwood Species.

2. 302: Tension Lamination Recommendations

B. American Society of Testing Materials (ASTM):

1. D 2559 - Exterior Wood Adhesives

C. Truss Plate Institute (TPI): Design specifications for light-metal plate connected to wood trusses.

1.04 QUALITY ASSURANCE

A. A current licensee of the American Institute of Timber Construction shall manufacture all glued laminated beams.

B. All MICRO=LAM laminated veneer lumber must be manufactured in a plant and under a process approved by the National Research Board.

C. All wood trusses shall be manufactured in a plant, and under a process licensed by TPI.

1.05 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.06 SUBMITTALS

A. In accordance with Article 3 of the General Conditions.

A. Shop Drawings: Prior to fabrication or delivery of any glued laminated beams or wood trusses to the job site, submit shop drawings for all work of this section for review and for Building Department approvals.

B. Calculations: Provide structural calculations for review. Calculations shall demonstrate the adequacy of all wood trusses to meet the requirements of the contract drawings and specifications. All calculations shall be prepared by a California-licensed Civil or Structural Engineer and bear his seal and signature. Calculations shall be submitted which are approved by the Local Building Department.

C. Permits: After the architect completes a review with “no exceptions”, submit wood truss shop drawings and calculations to the City Department of Building & Safety for approval and issuance of a separate or deferred building permit. Submit a copy of the permit to the architect.

1.07 PRODUCT HANDLING

A. Protection: Use all means necessary to protect prefabricated structural wood before, during and after installation and to protect the installed work and materials of all other trades. Provide water-resistant reinforced kraft paper wrapping, covering all surfaces of each individual prefabricated structural wood member.

B. Replacements: In the event of damage, immediately make all repairs and replacement necessary to the approval of the contracting officer and at no additional cost to the Owner.

PART 2 -- PRODUCTS

2.01 GLUED-LAMINATED BEAMS

A. General: All glued-laminated wood beams shall bear the quality mark of the American Institute of Timber Construction for the grade specified.

B. Grades: All glued-laminated wood beams shall be AITC "Industrial Grade".

C. Lumber: All lumber for glued-laminated wood beams shall be Coast Region Douglas Fir in accordance with AITC 117. Inner and outer core lamination shall be as indicated by the drawings. Fabricated member sizes shall be as indicated.

D. Adhesives: Wet-use adhesive shall conform to ASTM D-2559.

2.02 MICRO-LAMINATED VENEER LUMBER

A. General: The MICRO=LAM laminated veneer lumber is to be identified with a stamp or stamps noting the name and plant number of the manufacturer, the grade, the National Research Board report number and the quality control agency.

B. Materials: The MICRO=LAM lumber beams shall be manufactured from MICRO=LAM brand parallel laminated veneer lumber utilizing 1/10" or 1/8" thickness Douglas Fir veneer glued up in a continuous process with all grain parallel with the length of the member. Laminated veneer lumber shall be a single one-piece length, free of finger joints, scarf joints or mechanical connections in full-length members. Veneers shall be dried as required. After drying, each veneer sheet shall be graded by an ultrasonic or other approved nondestructive test method. Adhesive used to laminate the veneer shall be waterproof, meeting the requirements of ASTM D-2559-76, uniformly applied to the veneer at the required spread rate.

C. Design: MICRO=LAM lumber beams shall be designed to meet the dimensions and loads indicated on the plans. All designs shall be in accordance with standard engineering practice. Complete design calculation showing member forces and stresses and allowable load are to be available upon request for each MICRO=LAM lumber design. The design of the MICRO=LAM lumber beams is to be under the supervision of a registered professional engineer and in accordance with the NRB acceptance, and the provisions of The National Design Specification for Wood, Latest edition.

D. Contractor may substitute an alternate brand of laminated veneer lumber, provided the criteria listed on the drawings and herein are satisfied, and provided he receives prior written approval by the Structural Engineer.

2.03 WOOD TRUSSES

A. General: Design and fabricate all trusses in accordance with the TPI design specification.

B. Lumber: All lumber for wood trusses shall be a Douglas fir with a minimum WWPA "stud" grade.

C. Moisture Content: 19% maximum, 7% minimum.

D. Connector Plates: A pressed-on galvanized steel plate with extruding teeth. Plate steel

shall conform to ASTM A446, Grade A.

2.04 PREFABRICATED ROUGH HARDWARE, BOLTS AND NAILS

Refer to Section 06100.

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 GENERAL

Verify that prefabricated structural wood may be erected in strict accordance with all referenced standards, the original design, and the approved shop drawings. In the event of discrepancy, immediately notify the Contracting Officer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved. Prior to installation of 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 commence.

3.03 ERECTION OF PREFABRICATED BEAMS

Properly and adequately shore and brace all prefabricated structural wood, all shoring and bracing in-place until all work necessary to provide stability for the structure is complete. Holes, cuts, or notches shall not be made.

3.04 TRUSSES

Trusses shall be installed in accordance with TPI specifications. Framing anchors shall be provided at every other truss to fasten truss to plates against uplift and movement of any kind. Anchors shall be 18-gauge steel sheet, punched and formed for nailing so that nails will be stressed in shear only, and zinc-coated after fabrication. A nail shall be driven in each nail hole provided in the anchor.

3.05 INSTALLATION OF ROUGH HARDWARE

Install all fabricated rough hardware as required by the contract drawings. Dap seat plates flush at the tops of all prefabricated structural wood. Dapping shall not introduce vertical over-cuts into the beam lamination. Bolt holes shall be drilled 1/32" to 1/16" larger than bolts and accurately located. Locate bolts in the upper half of slotted bolt holes. Tighten by taking up snug. Retighten prior to closing-in or at the latest practicable time prior to project closeout.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 06 18 00

GLUED LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

The requirements of Division 1 apply to all Work of this Section.

1.02 SCOPE

Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication and delivery to job site of all glued laminated wood members.

1.03 QUALITY ASSURANCE

A. General:

1. Qualifications of Manufacturer: The fabricator shall have been engaged in the continuous manufacturing of glued laminated timbers for a minimum of at least two years and shall have the authority to use the AITC "Quality Inspected Stamp". Each timber member shall be stamped and placed in such a position not to be visible on finished erected members.

B. Submittals: (Submit under provisions of General Conditions Article 3.11 and Section 01 33 00):

1. Shop drawings showing full dimensions of each member and layout of entire structural system.
2. Show large scale details of connections, connectors and other accessories.
3. Indicate species and laminating combination, adhesive type, and other variables in required work.

C. Tests and Inspections:

1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the Current 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. Each structural glued-laminated member shall be stamped with an identifying mark. Mark shall include all pertinent data, such as grade and species of lumber, type of glue, extremes of moisture content and other such information as may be required.
3. Certificate of compliance with the above data.

D. Standards and References: (Latest Edition unless specified otherwise)

1. Current California Building Code (CBC).
2. 2012 National Design Specification for Wood Construction (NDS).
3. American Institute of Timber Construction, "Standard Specifications for Structural Glued Laminated Timber of Softwood Species, AITC 117.
4. ANSI/AITC Standard A190.1
5. ASTM D3737 “Design and Manufacture of Structural Glued Laminated Timber”.

1.04 MOCK-UP

A. Provide a mock-up for evaluation of wood stain color.

1. Locate mock-ups on site in locations and size directed by Architect.

2. Do not proceed with remaining work until workmanship, color and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.
4. Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging competed unit of Work.
5. Obtain Architect's acceptance of mock-ups before start of final unit of Work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver undamaged products to site in manufacturer's protective wrappings with legends intact. Store on site secure from weather, soil and physical damage.

B. Transport, handle and store in strict accordance with the manufacturer's recommendations. Use padded, non-marring slings.

C. Architectural Appearance Grade members shall be shipped, handled and stored with complete weather and damage protection wrapping. Maintain wrappings in place until immediately prior to deck installation.

D. Industrial Appearance Grade glued laminated timber members shall be wrapped in a water resistant covering during transit. Contractor shall be responsible for protection during hauling and unloading at job site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber:

1. Lumber used for laminating structural members shall be well manufactured and shall conform to requirements of Standard Grading and Dressing Rules No. 17, West Coast Lumber Inspection Bureau. Such lumber shall be inspected, identified by individual piece, and certified as meeting requirements of said standard specifications by an approved lumber grading agency. It is assumed that each lamination is graded on basis of requirement for nominal size of individual lamination. When lumber is resawn, it shall be regraded on basis of new size.

B. Type: Glued Laminated Timber Protected from Weather

1. Species: Douglas Fir or Western Larch
2. Stress Grade: AITC Combination 24F-V4 for simple beams, 24F-V8 for cantilever or continuous beams.
3. Extreme fiber bending - F_b = 2400 psi
4. Adhesives: Wet use
5. Appearance Grade: AITC Industrial for concealed uses, Architectural appearance at exposed uses.
6. Preservative Treatment: Portions of beams exposed to weather shall be preservative treated.
7.. Laminations: Provide outer tension laminations or proof load testing as required by ANSI/AITC A190.1.
8. Sealing: Shop seal all surfaces with 2 coats of clear penetrating sealer.

C. Type: Glued Laminated Timber Exposed to Weather

1. Species: Alaskan Yellow Cedar

2. Stress Grade: AITC Combination 20F-V12 for simple beams, 20F-V13 for cantilever or continuous beams.
3. Extreme fiber bending - F_b = 2000 psi
4. Adhesives: Wet use
5. Appearance Grade: Architectural
6. Laminations: Provide outer tension laminations or proof load testing as required by ANSI/AITC A190.1.
7. Sealing: Shop seal all surfaces with 2 coats of clear penetrating sealer.

2.02 FABRICATION

A. Fabrication shall be in compliance with the above standards and references.

1. Fabrication shall be in accordance with best practices with adequate plant and equipment and under supervision of properly qualified personnel.
2. Laminations shall be machine finished to a smooth surface, but not sanded, and to a uniform thickness with a maximum allowable variation of 1/64 inch. Warp, twist, or other characteristics which will prevent intimate contact of adjacent glued faces or interfere with uniform bending to a required curvature when under clamping pressure shall not be permitted. Surfaces to be glued shall be clean and free from oil, dust and other foreign material which would be detrimental to satisfactory gluing.
3. Moisture content of lumber at time of gluing shall be not less than 7 percent nor more than 12 percent.
4. Slips, misses, and wane are not permitted.
5. Boring of holes in members shall be in strict conformance with the Drawings. Notching is prohibited except where specifically detailed.
6. Field cuts and holes in preservative treated members shall be preservative treated and sealed.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to installation of the work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this installation may properly commence.

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

C. In the event of a discrepancy, immediately notify Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 PROTECTION

A. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.

B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

3.03 HANDLING

Use equipment and methods that avoid scarring corners and faces or otherwise injuring members. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

3.04 INSTALLATION

Glued Laminated members are to be erected and installed in accordance with the Drawings and manufacturer's recommendations.

3.05 CLEANUP

A. Keep premises free from accumulated waste materials, rubbish and debris resulting from this Work. Upon completion, remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory items used in or resulting from said Work, and legally dispose of off the site.

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

SECTION 06 20 00

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 the Instructions to Bidders, Section 3.3 Substitutions.

1.06 SUBMITTALS

A. In accordance with Article 3 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 *****

THIS PAGE IS INTENTIONALLY BLANK

SECTION 06 40 00

CUSTOM CASEWORK

PART 1 -- GENERAL

1.01 SUMMARY

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

1.02 SCOPE OF WORK

A. Furnish all: labor, materials, equipment and services necessary and/or reasonably incidental to the proper execution of cabinetwork, including hardware as shown on Drawings and specified herein.

B. Work includes counters, shelving, countertops and cabinetry.

1.03 STANDARDS OF WORKMANSHIP

Quality of millwork and fabrication shall conform to:

1. Woodwork Institute of California (WIC)
2. National Kitchen Cabinet Association (NKCA)
3. American Woodworkers Institute (AWI)

1.04 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

A. In accordance with Article 3 of the General Conditions.

B. Submit:

1. Submit shop drawings, include materials, component profiles, fastening methods and schedule of finishes.
2. Submit samples of finishes.

1.06 WARRANTY

Contractor Guarantee: Contractor guarantees the work covered by the specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Softwood plywood: PS-1 graded per AWI. Application: 3/4" for cabinets -- plastic laminated.

B. Plastic Laminate: high pressure laminated plastic conforming to NEMA LP-3, 0.50" thickness for tops, and 0.028" thickness for vertical surfaces.

1. All splashes shall be 4" high; provide end splashes with sq. bottom joints.
2. Interiors: Low Pressure Melamine.
3. Backing Sheet: LD-3-BK 20 backing grade undecorated plastic laminate.

C. Wood particleboard: Per AWI standard, composed of wood chips, made with waterproof resin binders, sanded faces, application 3/4" for countertops.

D. Hardboard: PS-58: pressed wood fiber with resin binder, tempered grade, smooth two sides for drawer bottoms.

E. Hardwood Lumber: Grade in accordance with AWI; maximum moisture content of 6%; application.

F. Plastic Edge Trim: Same as face finish -- plastic laminate.

G. Adhesive - Type II adhesive -- an approved thermosetting-on-contact adhesive.

H. Doors and drawer fronts shall be 3/4" plywood with edges veneered or plastic laminate finish.

I. Hardware: Cabinet hardware shall be concealed self-closing hinges, drawer slide, shelf-standards and clips as manufactured by Blum, Knape & Voigt or equal.

J. Drawer Slides for Drawers 24” wide or less: 100 pound load rated, full extension, ball bearing. Accuride 3832.

Drawer Slides for File, Paper Storage and Heavy Duty Drawers 42” wide or less: 150 pound load rated, over travel extension, ball bearing. Accuride 4034.

2.02 FABRICATION

A. Assemble casework in Shop for delivery to site in units easily handled and to permit passage through building openings.

B. Apply plastic laminate finish in full-uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2' from sink cutouts.

C. Mechanically fasten splash backs to countertops with steel brackets 16" o.c.

D. Countertop edges and splashes to have radius corners.

E. Outside corners of force standing desks to be radiused per plans.

F. Apply laminated backing sheet to reverse side of plastic laminate finish surfaces.

G. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surface cut edges.

H. On items to receive transparent finishes, use wood filler that match surrounding surfaces. Apply wood filler in exposed nail and screw indentations. Sand work smooth.

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. Verify dimensions for work of other trades incorporated into the casework.

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

3.02 INSTALLATION

A. All parts shall be precision machined to close tolerances, accurately fitted and assembled with appropriate fastening and adhesives required to produce first quality fixtures, square, true, plumb and level.

B. Carefully scribe casework that is against other building materials, leaving gaps of 1/32" maximum. Do not use additional overlay trim for this purpose.

C. Anchor securely to wall and floor with all anchorage devices required. Coordinate to allow anchorage devices to be set with other work as applicable. Provide temporary protection over finish work as required during construction to protect the work from damage.

D. Installation shall be complete including continuous bases. All work shall be installed by skilled workmen under the control and supervision of personnel trained in the handling and installation of this cabinetwork and equipment.

E. Install and adjust cabinet hardware to correct operations.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 06 60 00

PLASTIC SURFACING MATERIALS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

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

1.02 SUMMARY

Provide factory-finished Surface Materials, and similar items where shown on the drawings, as specified herein, and as needed for a complete and proper installation. Work may include, but is not limited to:

1. Standard Decorative Laminates.
2. Solid Surfacing.

1.03 REFERENCES

A. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.

B. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

C. ISO 4586-2 - High Pressure Decorative Laminates; International Organization for Standardization.

1.04 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

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

B. Samples:

1. Selection Samples: Submit actual samples of surfacing materials to illustrate full range of colors, patterns, and finishes available.
2. Verification Samples: Submit two samples, each 12 inches square, illustrating each selected surfacing material in specified color, pattern, and finish.

C. Manufacturer's Instructions:

1. Submit manufacturer's printed installation instructions for each product.
2. Submit manufacturer's Safety Data Sheets (M.S.D.S.) for each adhesive.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

1.07 CLOSE-OUT: also comply with the requirements of Section 01 78 00 – Contract Closeout.

A. Reports: None required.

B. As-Builts: Not required

C. Operation and Maintenance Data: None required.

D. Extra Materials: None required.

E. Extended Warranty: Comply with the requirements of General Condition Article 3.5.

PART 2 – PRODUCTS

2.01 STANDARD DECORATIVE LAMINATES

A. Acceptable Products: As indicated on the Drawings and in the Finish Schedule.

B. Product Description: Decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.

C. Standard Decorative Laminate – General Purpose Type: having the following physical characteristics:

1. Sheet thickness: 0.048-inch (1.219 mm) plus/minus 0.005-inch (0.127 mm).
2. Exceeding performance requirements of NEMA LD 3-1995 Grade HGS.
3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 55; Smoke developed 30.
4. Patterns and Finishes: Selected from manufacturer's full range of available selections, as selected and approved by Architect.

2.02 SOLID SURFACING MATERIAL

A. Acceptable Product: As indicated on the Drawings and in the Finish Schedule.

B. Product Description: Homogenous sheet material composed of acrylic resins, fire-retardant filler materials, and coloring agents.

1. Nominal sheet thickness: 0.50 inch (13 mm).
2. Surface burning characteristics in accordance with ASTM E 84: Flame spread less than 25; Smoke developed less than 25.
3. Liquid Absorption, ISO 4586-2, for 1/2-inch material thickness: 0.4 percent after 2 hours boiling water.

C. Izod Impact, ASTM D 256, Method A: 0.2 foot pounds per inch.

1. Tensile Modulus, ASTM D 638 Nominal: 1.7 million pounds per square inch.
2. Thermal Expansion, ASTM D 696: 0.000019-inch per inch per degree F, maximum.
3. Hardness, ASTM D 2583, Barcol Impressor: 59.
4. Flexural Modulus, ASTM D 790: 1.6 million pounds per square inch.
5. Deflection Temperature under load, ASTM D 648: 90 degrees C.
6. Stain Resistance: ANSI Z124.6 modified, Method 3.4: No effect.
7. Boiling Water Resistance, NEMA LD 3-1995, Method 3.5: No effect.
8. High Temperature Resistance: NEMA LD 3-1995, Method 3.6: No effect.
9. Radiant Heat Resistance: NEMA LD 3-1995, Method 3.10: No effect.
10. Light Resistance: NEMA LD 3-1995, Method 3.3: No effect.
11. Ball Impact Resistance, NEMA LD 3-1995, Method 3.8, one half pound ball, unsupported: 125 inches.
12. Specific Gravity: 0.977 ounces per cubic inch (1.69 grams per cubic centimeter).
13. Approximate weight: 4.2 pounds per square foot (20.5 kg/square m).
14. Weatherability: ASTM D 2565: Pass.
15. Fungus Resistance, ASTM G 21: Pass.
16. Bacterial Resistance, ASTM G 22: Pass.

17. Pittsburgh Protocol Toxicity: 66.9 grams.
18. Patterns and Finishes: Selected from manufacturer's full range of available selections, selected and approved by Architect.
19. Impact Resistance NEMA LD3-1995 (1/2 lb. Ball) SSV bonded to substrate*** Method 3.08 modified. 125" (No Failure)
20. Tensile Toughness ASTM D 638. 21 (in. – lb./in. ^{3})
21. Tensile Modulus ASTM D 638 Nominal. 1.7 x 10^{-5} lb./in.^{3}
22. Density 1.60 gram/cm^3
23. Approximate weight 4.2 lbs./ft^2
24. Pittsburgh Protocol Toxicity = 30 grams range

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

Surface preparation: Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer's printed installation instructions.

3.03 APPLICATION

Install materials in accordance with manufacturer's printed instructions.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 06 64 00

FIBERGLASS REINFORCED PANELS (FRP)

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. Work included: Provide sanitary wall and ceiling panels and trim where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions, and Sections in Division 1 of these Specifications.

1.03 QUALITY ASSURANCE

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 for proper performance of the work of this Section.

1.04 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

A. In accordance with Article 3 of the General Conditions.

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

1. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements;

2. Samples of the full range of colors and patterns available from the proposed manufacturer in the specified range; if substituting product / color selected.

3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures for the Work.

C. Mock-ups:

1. At an area on the site where accepted by the Architect, provide a mock-up panel of the Work of this Section.

a. Make the mock-up panel approximately 4'-0" high by 4'-0" wide and consisting of a minimum of two 2'-0" x 2'-0" panels butted together.

b. Provide one mock-up panel for each color and pattern of vinyl-coated fabric wall covering used on the Work.

c. The mock-ups may be part of the Work, and may be incorporated into the finish work when so accepted by the Architect.

d. Revise as necessary to secure Architect's acceptance.

2. The mock-up panels, when accepted by the Architect, will be used as datum points for comparison with the remainder of the work of this Section for the purpose of

acceptance or rejection.

3. If the mock-up panels are not permitted to be part of the finished work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

D. Maintenance Instructions:

1. Furnish a copy of the vinyl-coated fabric manufacturer's maintenance instructions at project's Final Completion.

2. Include recommended cleaning materials and methods of application therefor together with precautions in cleaning materials' use if such are improperly applied.

1.06 PRODUCT HANDLING

A. Deliver pre-finished panels in undamaged condition as packaged by the manufacturer, in sealed, labeled containers.

B. Store panels in a cool, clean, and dry storage area off the ground. Maintain storage area temperature above 45° F with normal humidity.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Temperatures:

1. Install pre-finished panels only when normal temperatures and humidity conditions approximate the same conditions that will exist when building is occupied.

2. Maintain areas to receive pre-finished panels at a minimum temperature of 65° F measured at floor level.

3. Maintain minimum temperature for 72 hours before, during, and 48 hours after applications of wall coverings.

B. Ventilation:

1. Provide adequate continuous ventilation as required for the various wall coverings, sealers and adhesives used in the spaces scheduled, but in no case, for a time less than that recommended by the manufacturer for full drying or curing.

PART 2 -- PRODUCTS

2.01 FIBERGLASS REINFORCED PANELS (FRP)

A. Provide fiberglass reinforced plastic panels complying with ASTM D5319.

B. Basis of Design: Nudo Products, Fiber-Lite Liner Panel, Class A, Pebbled finish or approved equal.

C. Colors as indicated on the drawings or will be selected by the Architect.

D. Performance Criteria:

1. Scratch Resistance: ASTM d2583

2. Abrasion Resistance: Taber Abrasion Test using CS-17 abrasive wheels with 1000g
weight. Panels shall exhibit weight loss after 25 cycles of no more than 0.038%.

3. Impact Strength: ASTM D5420 showing no visible damage on finish side.

E. Accessories:

1. Moldings, Trim and Caps: One-piece extruded polypropylene or PVC, configured to cover panel edges and corners. Color as selected by Architect from manufacturer's full product range.

2. Adhesive: As recommended by panel manufacturer for the required substrates.

3. Sealants: A single-component, mildew-resistant silicone as recommended by panel manufacturer.

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. Ascertain that substrates are straight within a maximum tolerance of 1/8 inch in 10 feet, and not greater than 1/16 inch in one foot.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust or other contamination.

B. Condition panels by unpacking and placing in installation space no less than 24 hours before installation.

C. Lay out paneling before beginning installation. Locate panel joints to provide equal panel widths at ends of walls and so that trimmed panels at corners are not less than 12 inches wide.

3.03 INSTALLATION

A. General: Comply with panel manufacturer's Installation Guide #6876.

B. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.

C. Install panels with manufacturer's recommended gap for panel field and corner joints. Pre-drill fastener holes in panels, 1/8" greater in diameter than fastener. Install panels in a full spread of adhesive. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

D. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.

E. Sealant: Fill grooves in trim accessories with sealant before installing panels and be inside corner trim in a bead of sealant. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths.

3.04 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any installed products that have been damaged.

C. Clean installed panels in accordance with manufacturer's instructions prior to Owner's

acceptance.

D. Remove and lawfully dispose of construction debris from project site.

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

SECTION 06 65 00

RESILIENT FLOORING

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

Furnish all 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:

1. Resilient tile flooring.
2. Floor substrate surface.
3. Rubber base.

1.03 REGULATORY REQUIREMENTS

Conform to applicable code for flame rating requirements of 75 or less in accordance with ASTM E84.

1.04 SUBMITTALS

A. Provide product data on specified products, describing physical and performance characteristics.

B. Submit two samples, illustrating color and pattern for each floor material or base, substituted for those indicated in the Drawings.

C. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedure used on the Work.

1.05 OPERATION AND MAINTENANCE DATA

Submit cleaning and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.07 EXTRA MATERIALS

Provide 5% of each pattern and color of flooring and of base specified.

PART 2 -- PRODUCTS

2.01 VINYL COMPOSITION TILE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.02 RESILIENT SHEET

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.03 RESILIENT PLANK/TILE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.04 BASE MATERIALS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.05 ACCESSORIES

A. Subfloor Filler: Latex cement underlayment as recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Sealer and Wax: Types recommended by flooring manufacturer.

D. Welding rod: Use same manufacturer as flooring manufacturer and install per manufacturer's instructions. Colors to be selected from standard colors. All flooring in medical procedure rooms and in restrooms shall be heat welded.

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

2.06 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

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. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.

E. Verify concrete floors are dry to the maximum moisture content of 2.5% (two and one half percent); and exhibit negative alkalinity, carbonization, or dusting. Provide test results to indicate that the substrate meets moisture requirements prior to starting work. Higher moisture content will be as accepted by manufacturer in their written warranty.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Maintain the temperature of the space to receive the flooring and the materials to be installed at a minimum of 65 degrees F and maximum of 100 degrees F for at least 48 hours prior to, during, and 48 hours after installation. Maintain a minimum temperature of 55 degrees F

thereafter.

F. Install flooring after all other trades, including painting, have been completed.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, conventional full-spread system.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place; press with heavy roller to attain full adhesion.

D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

E. Install edge strips at unprotected or exposed edges, and where flooring terminates.

F. Scribe flooring to walls, columns, permanent cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION -- BASE MATERIAL

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of thickness and fold.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to doorframes and other interruptions.

3.05 PROTECTION

Prohibit traffic on floor finish for 48 hours after installation.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 05 00

CONCRETE FLOOR TESTING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

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

1.02 SUMMARY

This Section includes the following:

1. Administrative and procedural requirements for testing interior concrete slabs for moisture vapor emission rate, alkalinity, and temperature and humidity.
2. Testing shall be conducted by the Owner's Testing Agency.

1.03 RELATED DOCUMENTS

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

1.04 REFERENCES

A. ASTM F-1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.

B. ASTM F-710 Standard Practice for Preparing Concrete Floors and other Monolithic Floors to receive Resilient Flooring.

C. ASTM F-2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.05 SUBMITTALS

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

B. Reports: Reports of results of testing shall be submitted by the Owner's Testing Agency. Reports shall include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. For each test provide a record of interior temperature, humidity, moisture vapor emission, in-concrete relative humidity and alkalinity results for testing period.
8. Test and inspection results and an interpretation of test results.
9. Provide on the Architectural Floor Plan(s) as furnished by the Architect a test number identifying each test conducted.
10. Name and signature of laboratory inspector.
11. Recommendations on retesting and reinspecting.

1.06 COORDINATION

A. Owner Responsibilities: Owner will engage a qualified testing agency to perform testing indicated.

1. Owner will furnish Construction Manager with name, address, and telephone number of testing agency.

2. Payment for testing services will be made by the Owner directly to the testing agency.

a. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be paid by the Owner and charged to Contractor by an adjustment to the Contract Sum through a Change Order.

B. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken.

3. Perform tests and submit a certified written report of each test, inspection, and similar quality-control service to Owner, Architect, Construction Manager and Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

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

5. Do not perform any duties of Contractor.

C. Contractor Responsibilities: Coordinate sequence of activities to accommodate required testing services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities. Notify agency sufficiently in advance of operations to permit assignment of personnel.

2. Acclimate enclosed spaces to the anticipated occupied temperature and humidity as required by the manufacturer of the specified flooring material(s) and in accordance with ASTM testing requirements.

3. Cooperate with agencies performing required tests and inspections, provide reasonable auxiliary services as requested. Provide the following:

a. Access to the Work.

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

c. Security and protection for testing and inspecting equipment at Project site.

4. Project Meeting: Schedule and conduct project meeting not less than 30 days prior to flooring installation to discuss testing requirements, specifications and locations prior to testing. Attendees shall include Owner, Architect, Construction Manager, Contractor, Testing Agency, and adhered floor installer representatives.

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

A. Reports: Final Reports related to Item 1.06.

B. As-Builts: Not required

C. Operation and Maintenance Data: None required.

D. Extra Materials: None required.

E. Extended Warranty: Refer to specific Floor Finish Specification Sections for requirements. Comply with the requirements of the General Condition Article 3.5 and Section 01740.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment to be provided by Testing Agency.

B. American Moisture Test, Inc. www.dometest.com (866) 670-9700

1. ASTM F1869 Moisture Vapor Emission Test kits
2. ASTM F-2170 In-Concrete Relative Humidity Testing System
3. ASTM F-710 Alkalinity-pH wide range 1 – 14pH meter

PART 3 - EXECUTION

3.01 EXAMINATION

Site: Weatherproofed, doors installed and windows secured. Do not start testing process when site has standing water, surface contaminates, exposed to exterior conditions or concrete installation is less than 90 days of age.

3.02 PREPARATION

Contractor Responsibilities:

1. Preparation of Substrates:
    a. Prepare concrete substrates according to ASTM requirements.
    b. Verify that substrates are dry and free of curing compounds, sealers, and hardeners for vapor emission testing per ASTM F-1869.
    c. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
2. Temperature and Humidity: Maintain site at the temperature and humidity conditions to those anticipated during normal occupancy and maintain these conditions 48 hours prior and during testing period. If meeting this criteria is not possible, then minimum conditions should be 75± 10°F and 50± 10% relative humidity.
    a. When a building is not under HVAC control, record temperature and humidity at start and end of testing using a portable data logging system.

3.03 TESTING

Testing: Testing Agency shall perform tests as follows:

1. Water vapor emission testing, ASTM F 1869.
    a. Perform all gram scale weights on site.
    b. Expose dome for 60 to 72 hours.
    c. Report results as pounds of emission per 24 hours per ASTM F-1869.
    d. Perform subfloor moisture testing in accordance with the Manufacturer's requirements for each floor system type. Do not proceed with flooring

installation until results of moisture tests are acceptable. All test results shall be documented and retained

2. In-Concrete Relative humidity testing, ASTM F 2170.
    a. Satisfactory results shall have a maximum 75 percent relative humidity level measurement.
3. Alkalinity Testing:
    a. Apply neutral-pH solution to form a 1-inch diameter circle directly to interior of moisture dome.
    b. Allow to absorb into concrete for 1 minute.
    c. Apply flat tip pH meter to solution and document result as required by manufacturer.
    d. Perform pH tests on concrete floors regardless of their age or grade level in accordance with the Manufacturer's requirements for each floor system type. PH level shall not exceed range of the Manufacturer's requirements for each floor system type. All test results shall be documented and retained

B. Adhered floor coverings shall not be installed in areas where satisfactory test results have not been obtained.

C. Consult Architect on remedial measures to reduce concrete levels prior to installing flooring. Installation of flooring deems acceptance of on-site conditions for a warranted application.

3.04 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

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

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

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

SECTION 07 10 00

WATERPROOFING AND DAMPROOFING

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 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 the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

A. In accordance with Article 3 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 07 19 00

WATER REPELLENT COATINGS

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 water repellent coatings on all masonry and masonry veneer, 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.

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. Manufacturer's certification: Make required arrangements and pay the costs for a visit to the job site by an authorized representative of the manufacturer of the accepted water repellent coating, who shall inspect and certify that:

1. The surfaces to which the water repellent coating was to be applied were in proper condition to receive that application;

2. The installers were properly trained in the manufacturer's recommended installation procedures and were prepared to use the application equipment recommended by the manufacturer; and

3. The materials delivered to the job site were those accepted by the Architect for the work of this Section.

C. Comply with State of California Volatile Organic requirements in accordance with ASTM D-4457 and ASTM D-3960.

1.04 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

A. In accordance with Article 3 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. Samples of masonry veneer unit and concrete unit masonry with water repellent coating applied.

C. Upon completion of the work of this Section, and as a condition of its acceptance, deliver to the Architect two copies of the manufacturer's certificate required under Paragraph 1.02-B above.

1.06 WARRANTY

Upon completion of the work of this Section, and as a condition of its acceptance, deliver to the Architect two copies of a written warranty signed by the Contractor, the water repellent coating application subcontractor, and the water repellent coating manufacturer, under which:

1. The three parties mutually agree to maintain the water repellent coated surface free from the penetration of water for a period of two years following Date of Owner accepted Final Completion; and

2. The water repellent coating manufacturer agrees to provide water repellent coating materials as required for that purpose for a period of five years following Date of Owner accepted Final Completion; and

3. These warranty services will be provided at no additional cost to the Owner.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. At all unit masonry and masonry veneer walls, provide one of the following products or equal accepted in advance by the Architect:

1. "Hydrozo Enviroseal Double 7 for brick" manufactured by Hydrozo Coatings Company, Lincoln, NE (402) 474-6981 or (800) 422-1902.

2. Approved equal, which has been submitted under requirements of Section 01340.

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. 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 INSTALLATION

Apply sufficient coats of the accepted material to achieve a consistent and uniform appearance, free from runs and sags, and with a uniformly resistive surface, which will successfully prevent penetration of water through the walls for the required period of warranty.

3.03 TESTING AND INSPECTING

A. Twenty days after completion of this portion of the Work, and as a condition of its acceptance, demonstrate by running water test that the work of this Section will successfully repel water.

1. Notify the Architect at least 72 hours in advance, and conduct the test in the Architect's presence.

2. By means of an outrigger, or similar acceptable equipment, place the nozzle of a 3/4" garden hose at a point approximately 10'-0" away from the top of the wall where accepted by the Architect, aiming the nozzle at a slight downward angle to direct the full stream of water onto the wall.

3. Run the water onto the wall at full available force for not less than four hours.

4. Upon completion of the four-hour period, inspect the interior surfaces of the wall for evidence of moisture penetration.

B. If evidence of moisture penetration is discovered, apply an additional coat of the accepted water repellent to the exterior surface in areas directed by the Architect, repeating the application and the testing (at no additional cost to the Owner) until no evidence of moisture penetration is found.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 21 00

THERMAL INSULATION

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

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

1.02 SUMMARY

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 SUBMITTALS

A. 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.

1.05 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.06 EXTENDED WARRANTY

A. Extended Warranty:

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. 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 Certain-Teed, 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 *****

SECTION 07 22 00

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 07 60 00: 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 the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

In accordance with Article 3 of the General Conditions.

1.06 PRODUCT HANDLING

Comply with pertinent provisions of Section 01 66 00.

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

Property:	ASTM Test Method:	Specification:
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 *****

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 25 00

WEATHER BARRIER

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

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

1.02 SUMMARY

A. Weather barrier membrane.

B. Weather barrier membrane flashing

1.03 QUALITY ASSURANCE

Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.

1.04 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

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

B. Submit the following:

1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
2. Submit manufacturer current technical literature for each component.
3. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.

C. Mock-Up

1. Pre-installation Meeting: Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, installer, Owner's Representative, and weather barrier manufacturer's designated representative
2. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
    a. Mock-up size: [10 feet by 10 feet]
    b. Mock-up Substrate: Match wall assembly construction, including window opening.
    c. Mock-up may remain as part of the work.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01 66 00.

1.07 CLOSE-OUT: also comply with the requirements of Section 01 78 00 – Contract Closeout.

A. Reports: Provide copy of Reports related to Item 3.08.

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 01 74 00.
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. Weather barrier manufacturer's warranty for weather barrier for a period of ten years from date of Substantial Completion.

PART 2 -- PRODUCTS

2.01 MANUFACTURER

E.I. du Pont de Nemours and Company ; 4417 Lancaster Pike, Chestnut Run Plaza 721, Wilmington, DE 19805; 1.800.44TYVEK (8-9835); http://construction.tyvek.com

2.02 MATERIALS

Basis of Design: DuPont™ Tyvek® CommercialWrap® D and related assembly components.

2.03 ACCESSORIES

A. Seam Tape: 3" DuPont™ Tyvek® Tape as manufactured by DuPont.

B. Fasteners:

1. Steel Frame Construction DuPont™ Tyvek® Wrap Cap Screws.
2. Wood Frame Construction DuPont™ Tyvek® Wrap Caps.

C. Sealants: DuPont Commercial Tyvek Sealant or equal

D. Adhesives: Loctite Pro Series or equal

E. Primers: Loctite Pro Series or equal

F. Flashing

1. DuPont™ FlexWrap™: Flexible membrane flashing materials for window openings and penetrations.
2. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
3. DuPont™ StraightFlash™ VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

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 INSTALLATION

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendation.

B. Install weather barrier prior to installation of windows and door.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacture.

F. Window and Door Openings: Extend weather barrier completely over openings

G. Overlap weather barrier

1. Exterior corners: minimum 12 inches.

2. Seams: minimum 6 inches

H. Weather Barrier Attachment

Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.03 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION for use with non-flanged windows – all cladding types

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.05 FLASHING for use with non-flanged windows – all cladding types

A. Use the 7-inch wide FlexWrap™ with 2 by 4 framing and 9-inch wide FlexWrap™ with 2 by 6 framing.

B. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.

C. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

D. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

E. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.

F. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

G. Install DuPont™ FlexWrap™ at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

H. Coordinate flashing with window installation.

I. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

J. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

K. Tape top of window in accordance with manufacturer recommendation.

L. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.06 OPENING PREPARATION for use with flanged windows

A. Cut weather barrier in a modified "I-cut" pattern.

1. Cut weather barrier horizontally along the bottom of the header.
2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
4. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.07 FLASHING (for use with flanged windows)

A. Use the 7-inch wide DuPont™ FlexWrap™ with 2 by 4 framing and 9-inch wide FlexWrap™ with 2 by 6 framing.

B. Cut DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.

C. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

E. Install window according to manufacturer's instructions.

F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations.

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.08 FIELD QUALITY CONTROL

Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.09 PROTECTION

Protect installed weather barrier from damage.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 27 00

AIR BARRIERS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

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

1.02 SUMMARY

A. Air barrier.

B. Flexible flashing.

1.03 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.04 ACTION SUBMITTALS

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

B. Product Data: For each type of product.

1.05 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For air barrier from ICC-ES.

B. Verification of compliance with ASTME 2357

C. Product Data: Submit manufacturer current technical literature for each component

D. Samples: Air Barrier Membrane, minimum 8-1/2 inches by 11 inch

1.06 PRE-INSTALLATION CONFERENCE

A. Contractor shall convene one week prior to commencing Work of this section, to ensure all contractors responsible for creating a continuous plane of water tightness are present.

B. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of air barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection

1.07 WARRANTY

A. Provide manufacturer's standard material warranty in which manufacturer agrees to provide replacement material for air barrier sheets installed in accordance with manufacturer's instructions that fails due to material defects within 10 years of the date of Substantial Completion.

B. Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

PRODUCTS

2.01 AIR BARRIER

A. Air Barrier: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Basis of Design:

a. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap. http://www2.dupont.com/Tyvek_Weatherization/en_US/products/commercial/comm_commercialwrap.html?src=partner_comm_commercialwrap

b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrapD. http://www2.dupont.com/Tyvek_Weatherization/en_US/products/commercial/comm_commercialwrapd.html

c. Vaproshield LLC; WallShield. http://www.vaproshield.com/products/wallshield

d. Or approved equal

B. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2357

2. Water Vapor Transmission: 12 perms or greater, when tested in accordance with ASTM E96, Method B.

3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.

4. Basis Weight: 2.7 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.

5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.

6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.

7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.

8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

9. Surface abrasion test: Air Barrier must have a water resistance of 280 cm as measured by AATCC 127 after ASTM D 3511has been performed on material for 6 cycles.

C. Air Barrier Seam Tape: Three inch pressure-sensitive plastic tape recommended by air barrier manufacturer for sealing joints and penetrations in air barrier.

2.02 MISCELLANEOUS MATERIALS

A. Window and Door Flashing: Self-adhesive butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

1. Basis of Design:

a. DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing FlexWrap and StraightFlash.

i. Use 7 inch wide FlexWrap with 2 by 4 framing.

ii. Use 9 inch wide FlexWrap with 2 by 6 framing.

b. Vaproshield LLC; VaproFlashing, and Vapro 3D Factory Formed Corner.

c. Or approved equal.

B. Adhesives or Spray Primers

1. DuPont OSI Spray Adhesive 13.5oz

C. Sealants

1. OSI QuadMax
2. Dow Corning 732, or 799
3. Or approved equal

PART 2 - EXECUTION

3.01 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION -WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers by 6” as well as vertical overlaps. Maintain weather barrier plumb and level.

E. Window and door Openings: Extend weather barrier over jamb openings only when flanged windows are in use.

F. Overlap weather barrier

1. Exterior corners: minimum 12 inches.
2. Seams: minimum 6 inches.

G. Weather Barrier Attachment:

1. Steel or wood frame construction - attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6-18 inches vertically on center along stud line, and 24 inches on center, maximum horizontally.

3.03 SEAMING

A. Seal seams of weather barrier with 3” seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION for use with non-flanged windows - all cladding types

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.05 FLASHING for use with non-flanged windows - all cladding types

A. Cut DuPont FlexWrap a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont FlexWrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corner by working in along the sill before adhering up the jambs.

C. Fan DuPont FlexWrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. Apply 9 inch wide stops of DuPont StraightFlass at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash at head of opening and lap sill flashing down to the sill.

E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

F. Install DuPont FlexWrap at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

G. Coordinate flashing with window installation.

H. On exterior, install backer rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealants manufacturer's instructions and ASTM C 1193.

I. Position weather barrier head flap across head flashing. Adhere using 4 inch wide DuPont StraightFlash over the 45-degree seams.

J. Tape top of window in accordance with manufacturer recommendations.

K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealing in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.06 OPENING PREPARATION for use with flanged windows

A. Cut weather barrier in a modified "I-cut" pattern.

1. Cut weather barrier horizontally along the bottom of the header.
2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
4. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.07 FLASHING for use with flanged windows

A. Cut DuPont FlexWrap a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont FlexWrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont FlexWrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

E. Install window according to manufacturer's instructions.

F. Apply 4 inch wide strips of DuPont StraightFlash at jambs overlapping entire mounting flange. Extend jamb flashing 1 inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4 inch wide strip of DuPont Straightflash as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4 inch wide DuPont StraightFlash over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations.

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.08 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.09 PROTECTION

A. Protect installed weather barrier from damage.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 41 00

METAL WALL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. SterraCore aluminum-faced composite panels, attachments and sealants.

1.2 RELATED SECTIONS

A. Section 05 10 00 – Supporting from Structure

B. Section 06 10 00 – Rough Carpentry

C. Section 07 21 00 – Thermal Insulation

D. Section 07 60 00 – Flashing and Sheet Metal

E. Section 07 90 00 – Joint Sealants

F. Section 09 21 16 – Gypsum Board Systems

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM) B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

B. American Society for Testing and Materials (ASTM) C481 - Laboratory Aging of Sandwich Constructions.

C. American Society for Testing and Materials (ASTM) E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

D. American Society for Testing and Materials (ASTM) E84 - Surface Burning Characteristics of Building Materials.

E. American Society for Testing and Materials (ASTM) E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.

F. American Society for Testing and Materials (ASTM) E289 - Linear Thermal Expansion of Rigid Solids with Interferometry.

G. American Society for Testing and Materials (ASTM) E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors.

H. American Society for Testing and Materials (ASTM) E331 - Water Penetration for Exterior Windows, Curtain Walls, and Doors.

I. American Society for Testing and Materials (ASTM) D1781 - Climbing Drum Peel for Adhesives.

J. American Society for Testing and Materials (ASTM) - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

K. American Architectural Manufacturers Association (AAMA) 501 – Water Penetration using Dynamic Pressure.

L. American Architectural Manufacturers Association (AAMA) 605.2 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

M. American Architectural Manufacturers Association (AAMA) TIR-a11 - Maximum Allowable Deflection of Framing Systems for Building Cladding Components at Design Wind Loads.

1.4 SYSTEM DESCRIPTION

A. Design Requirements:

1. Design system to accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to temperature and humidity ranges reasonably anticipated.

2. Design system to accommodate tolerances of structure.

B. Performance Requirements:

1. Submit test data witnessed by an independent testing agency for the following requirements:

a. Structural tests for wind loads by "Chamber Method" in compliance with ASTM E72.

1) Standard test design loading: 20 psf (960 Pa) positive and negative wind load.

2) Design panel system to withstand code imposed design loads and a deflection limit of L/180 shall apply to positive load pressures only.

3) Design panel system to withstand code imposed design loads and a deflection limit of L/175 shall apply to positive load pressures only.

b. Air Infiltration: 0.06 cfm per square foot (32 lps per square meter) air leakage under a static pressure of 1.56 psf (7.65 kg per square meter) when tested in accordance with ASTM E283.

c. Water Penetration: No uncontrolled water penetration through the standard vertical panel and sealed joints at a static pressure of 6.24 psf (30.5 kg per square meter) when tested in accordance with ASTM E331.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Shop Drawings: Submit shop drawings showing layout, flashings, drainage, ventilation, vapor barriers, vapor retarders, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 3 inches (76 mm) by 5 inches (128 mm) representing actual product, color, and patterns.

F. Quality Assurance Submittals: Submit the following:

1. Test reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Installer Qualifications:

1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

2. Panel Installer shall assume responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.

C. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store panels horizontally, off-the-ground, in manufacturer's unopened packaging until ready for installation.

B. Examine delivered materials upon receipt to insure that no damage has occurred during shipment. Store metal-faced composite wall panels horizontally, covered with a suitable weather tight and ventilated covering. Store metal-faced composite wall panels to ensure dryness, with a positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. DO NOT allow storage space to exceed 120 degrees F (49 degrees C).

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Finish Warranty: Commencing on Date of Substantial Completion.

1. Provide 20-year written warranty with PVDF fluoropolymer finish color coated metal finish covering color fading, chalking, and film integrity.

2. Chalking, fading or erosion of finish measured by the following tests:

a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D659.

b. Finish coating shall not change color or fade in excess of 8 NBS units as determined by ASTM D2244.

B. Material and Installation Warranty: Commencing on Date of Substantial Completion.

1. When installed as directed by ATAS International, panels covered by this warranty are warranted not to delaminate (separate) at any ATAS produced glue line for a period of five years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: ATAS International; 6612 Snowdrift Road, Allentown, PA 18106. ASD. Tel: 610-395-8445. Toll Free: 800-468-1441. Fax: 610-395-9342. Web: http://www.atas.com

B. Or Architect approved equal.

2.2 STERRACORE ALUMINUM-FACED COMPOSITE PANELS

A. SterraCore Composite Panels as provided through ATAS International.

1. Panel Construction: Finished aluminum sheet over a corrugated polyallomer (CPA) core with backer sheet.
2. Panel Facing: Smooth face, minimum 0.032 inch thick, ASTM B209 aluminum sheet.
3. Panel Backing: Random painted aluminum sheet, minimum 0.013 inch (0.33 mm) thick, ASTM B209 aluminum sheet.
4. Panel Thickness: 6 mm (1/4 inch)
5. Fire Test Performance: ASTM E84: Class A.
6. Bond Test Performance: ASTM C481-A Cyclic Aging: Pass.
7. Finish: Kynar 500 - PVDF fluoropolymer paint system meeting AAMA 2605.
8. Finish Colors: Manufacturers Standard

B. Aluminum Composite Panel Installation System:

1. Clip & Seal System.
2. One-Piece Tight fit Extrusions

2.3 ACCESSORIES

A. Manufacturer's Sealants and Accessories: Provide manufacturer's recommended sealants and accessories for product installation.

B. Flashing: Fabricate flashing materials from 0.030 inch (0.76 mm) minimum thickness aluminum sheet painted to match the adjacent curtain wall/panel system where exposed. Provide a 12 inch (305 mm) wide lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bed of non-hardening sealant.

2.4 FABRICATION

A. Panels shall be fabricated and finished as required to provide material construction and performance as specified and as required by manufacturer to comply with warranty provisions.

1. Tolerances: Length and Width: plus or minus 1/16 inch (1.6mm). Squareness (Diagonals): equal within 1/8 inch (3.2mm).

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine substrates, areas, and conditions, with substrate installer present, for compliance with requirements for structural soundness, installation tolerances, metal panel supports, and other conditions affecting performance of work.

1. Examine primary and secondary wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances listed below.

a. 1/4 inch (6 mm) in any 20 feet (6 m) length vertically or horizontally.

b. 1/2 inch (12 mm) in any building elevation.

2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required.

3. For the record, prepare written report, endorsed by panel installer and substrate installer, listing remedy for conditions detrimental to performance of work.

C. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.

D. Proceed with installation only after all unsatisfactory conditions have been corrected.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Comply with manufacturer's installation guides including product technical bulletins, product catalog installation instructions, and product carton instructions for installation type selected.

B. Work shall be done and completed in a thorough and workmanlike manner by mechanics skilled in their various trades.

C. Caulk Installation:

1. Use only approved sealants as described in ATAS International’s Installation Guidelines.

2. The sealant manufacturer’s instructions shall be followed in preparing and installing sealants.

3. Joints to receive sealant shall be clean, dry and free from dust, grit and contaminants.

4. The sealant shall completely fill the glazing pockets.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.4 CLEANING AND PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.

B. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

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

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 50 00

ADHERED FELTBACK PVC THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope

To install an adhered Single Ply Thermoplastic (PVC) Roofing Membrane with flashings and other system components to comprise a roofing system for the Nuview Library, Nuevo, CA. Install new tapered insulation followed by ¼" Dens Deck mechanically fastened over the sloped plywood decking. Adhere single ply roof membrane. Provide details as shown on the roof plan and detail sheet.

B. Related Work: The work includes but is not necessarily limited to the installation of:

1. Substrate Preparation
2. Wood Blocking
3. Separation Board
4. Tapered Insulation
5. Roof Membrane
6. Fasteners
7. Adhesive for Flashings
8. Roof Membrane Flashings
9. Walkways
10. Metal Flashings
11. Sealants
12. Clad Edge Metal

C. Upon successful completion of work the following warranties may be obtained:

1. Manufacturer Warranty
2. Roofing Contractor Warranty

1.02 QUALITY ASSURANCE

A. Membrane Manufacturer must certify that the proposed equal has a membrane thickness equal to the membrane thickness specified 60 mils thick, without ASTM (+/-) mil tolerance, as such tolerance is not acceptable. The felt backing shall not be included when measuring membrane thickness.

B. Membrane must have at least thirty (30) mils of waterproofing polymers above the reinforcement as documented in the Typical Physical Properties section of the Manufacturer's published Product Data Sheet for 60 mil membranes.

C. Roofing Membrane Manufacturer must have a demonstrated performance history of producing thermoplastic membranes no less, in duration of years, than the warranty duration specified.

D. Membrane Manufacturer must provide a list of at least 10 (ten) projects in which the submitted roofing material has been performing for the specified warranty duration. Membranes with modified formulation changes and undocumented proven performance will not be accepted.

E. Membrane Manufacturer must not require the use of membrane cut edge sealant at any location. This is a maintenance item that the Owner does not accept.

F. Manufacturer's warranty must have "No Dollar Limit" for the replacement of defective materials and labor with no exclusions for ponding water.

G. Membrane Manufacturer to confirm in writing that they directly manufacture the roofing membrane; private labeled membranes are not acceptable.

H. Membrane Manufacturer must have an established program for recycling membrane at the end of its useful life. Must provide 3 (three) instances in which they have done so.

I. Membrane Manufacturer must have recycled content certification from UL (Underwriters Laboratories) Environment.

J. Membrane Manufacturer must have ISO 14001 Certification and a Responsible Care program in place.

K. Upon completion of the installation and the delivery to the Manufacturer, by the Applicator of certification, that all work has been done in strict accordance with the contract specifications and Membrane Manufacturer's requirements, a Technical Service Representative will review the installed roof system.

L. There is no deviation made from the project specification or the approved shop drawings without prior written approval by the Architect, the Owner's Representative and Roofing Manufacturer.

M. The installer must have a minimum of 5 years' experience in installing roofing system of this type and nature. Contractor must be certified and approved by the roofing materials Manufacturer.

N. All work pertaining to the installation of PVC membrane and flashings must only be completed by Applicator personnel trained and authorized by roofing Manufacturer in those procedures.

O. Membrane to have no formulation changes in the last fifteen (15) years as certified by the manufacturer.

1.03 SUBMITTALS

A. All submittals which do not conform to the following requirements will be rejected. Submit proposed equals to be considered for use on this project no less than ten (10) days prior to bid date. Proposed roof systems which have been reviewed and accepted will be listed in an addendum prior to bid date; only then will roof systems be accepted at bidding. Submittals shall include the following:

1. Copies of Specification including physical properties.
2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
3. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
4. Sample copy of Manufacturer's warranty including no exclusion for ponding water and no time limit shall be assigned to any such ponding water.
5. Sample copy of Applicator's warranty.
6. Dimensioned shop drawings which shall include:
   a. Outline of roof with roof size and elevations shown.
   b. Profile details of flashing methods for penetrations.
   c. Technical acceptance from Manufacturer.
7. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or

practices and requirements of this specification as stated in Section 2.01, C & D and all requirements listed in Quality Assurance.

8. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
9. Letter from the proposed manufacturer confirming the number of years it has DIRECTLY manufactured the proposed roof system under the trade names and/or trademarks as proposed.
10. Material Safety Data Sheets (MSDS)

1.04 CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

A. Factory Mutual Research Corporation (FM) - Norwood, MA
   1. Class 1-90 (Attachment Criteria)

B. Underwriters Laboratories, Inc. - Northbrook, IL
   1. Class A assembly

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

D. All adhesives shall be stored at temperatures between 40º F (5º C) and 80º F (27º C).

E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

F. All materials which are determined to be damaged by the Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

1.06 JOB CONDITIONS

A. Membrane materials may be installed under certain adverse weather conditions but only after consultation with the Manufacturer, as installation time and system integrity may be affected.

B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to the application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

G. The Applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membranes. The Applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.

H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the general contractor or construction manager shall provide for all necessary protection and barriers as required to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air and/or similar methods.

J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.

M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

O. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.

P. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to the manufacturer) to the Owner's Representative for corrective action prior to installation of the roof system.

Q. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction at the Owner's expense (letter copy to the manufacturer).

R. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.

S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

T. The Applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.

U. The adhered membrane shall not be installed under the following conditions without consulting the manufacturer’s technical department for precautionary steps:

1. The roof assembly permits interior air to pressurize the membrane underside.
2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
3. The wall/deck intersection permits air entry into the wall flashing area.

V. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

1.07 BIDDING REQUIREMENTS

A. Pre-Bid Meeting: A pre-bid meeting shall be held with the Owner's Representative and involved trades to discuss all aspects of the project. The Applicator's field representative or roofing foreman for the work shall be in attendance. Procedures to avoid rooftop damage by other trades shall be determined.

B. Site Visit: Bidders shall visit the site and carefully examine the areas in question as to conditions that may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the contractor. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions unless agreed to in advance with the Owner or Owner's Representative.

1.08 WARRANTIES

A. Manufacturer’s System Warranty (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner’s satisfaction, and receipt of final payment, the twenty-five (25) Year System Warranty shall be issued. The System Warranty shall provide for the roof membrane, all accessories that comprise a roof system, and contractor labor. The Warranty shall be **Non-Prorated** provide for No Dollar Limit (NDL), and **shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the warranty period**. Warranty shall not exclude regular foot traffic or storage on the roof surface, and it shall not obligate the owner to a maintenance schedule of any type as a condition of the warranty.

B. Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner with a separate five-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

C. Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

PART 2 --PRODUCTS

2.01 GENERAL

A. The components of the Adhered roof system are to be products of the membrane manufacturer as indicated on the Detail Drawings and specified in the Contract Documents.

B. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the manufacturer. The manufacturer’s acceptance of any other product is only for a determination of compatibility with membrane products and not for inclusion in the manufacturer’s warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with the manufacturer’s products.

C. Membrane shall be certified by the manufacturer to be the exact thickness as specified, ASTM tolerance does not apply.

D. Membrane shall have a minimum of thirty (30) mils of waterproofing polymers above the reinforcements as documented by a third party source.

2.02 MEMBRANE

A. Sarnafil® G410 Feltback fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity.

B. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.

1. Sarnafil G410-15 feltback, 60 mil (1.5 mm), thermoplastic membrane with fiberglass reinforcement and a factory applied 9 oz. geotextile felt backing.
2. Or Pre-Approved Equal, subject to compliance with all specification requirements herein so stated. KEE and other like-type, non-conforming membrane products will not be approved as equal.

C. Color of Membrane

1. EnergySmart feltback (White), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.

D. Typical Physical Properties

Parameters	ASTM Test Method	Minimum ASTM Requirement
Reinforcing Material	-	Fiberglass

Overall Thickness, min., inches (mm)	D638	[0.060inches)]
Tensile Strength, min., psi (MPa)	D638	1600 (11.1)
Elongation at Break, min. (machine x tranverse)	D638	270% / 250%
Seam strength*, min. (% of tensile strength)	D638	80
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D638	95
Elongation, min., (% of original)	D638	90
Tearing Resistance, min., lbf (N)	D1004	14 (63.0)
Low Temperature Bend, -40º F (-40º C)	D2136	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	10,000 Hours
Cracking (7x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7 x magnification)	-	None
Linear Dimensional Change	D1204	0.02%
Weight Change After Immersion in Water	D570	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass

*Failure occurs through membrane rupture not seam failure.

2.03 FLASHING MATERIALS

A. Wall/Curb/Perimeter Flashing

1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive.
2. Clad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.

B. Miscellaneous Flashing

1. Flash: A prefabricated expansion joint cover made from membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of new and existing expansion gaps from 1 inch to 4½ inches (25 mm to 114 mm) across.
2. Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet has a 2¼ inch (57 mm) deep profile, and is provided in 10 foot (3 m) lengths. Use prefabricated Reglet mitered inside and outside corners where walls intersect.
3. Stack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick G410 membrane.
4. Circle-"G": Circular 0.048 inch (48 mil/1.2 mm) thick G410 membrane patch welded over T-joints formed by overlapping thick membranes.
5. Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Clad base flashings. Corner is available in 2 outside sizes (5 inch and 8½ inch diameter/127 mm and 215 mm) and 1 inside size.
6. Multi-Purpose Sealant: A sealant used at flashing terminations.
7. StaBond Adhesive: A solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.
8. Felt: A non-woven polyester or polypropylene mat cushion layer that is necessary behind G410 or G459 Flashing Membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.
9. Flashing G459 Membrane: An asphalt-resistant, fiberglass reinforced membrane adhered to approved substrate using adhesive.

2.04 SEPARATION BOARD

A. Dens-Deck®: A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thickness of 1/4".

2.05 INSULATION

A. Insulation: A rigid isocyanurate foam insulation with black mat facers. Insulation is available in 4 ft x 4 ft (1.2 m x 1.2 m) or 4 ft x 8 ft (1.2 m x 2.4 m) sizes and various thicknesses. Provide tapered insulation, refer to roof plan.

2.06 ATTACHMENT COMPONENTS

A. Membrane adhesive: 2121 Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Application rates are as follows:

APPLICATION RATES FOR FELTBACK MEMBRANE						
	Adhesive Rates - Gallons/100 Ft² *(Liters/Meter²)*					**Approximate Sq. Ft./Pail** *(meter²)*
	Substrate		**Membrane**		**Total**	
GP Dens-Deck®	1.75 *(0.71)*	+	0	=	1.75 *(0.71)*	285 *(26.48)*

Notes:

a) There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40º F (5º C).
b) Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane.
c) Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

B. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch (75 mm) square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.

C. Fastener No. 12: Number 12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener No. 12 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

D. Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

E. Fastener-XPS: A specially designed, heavy-duty, corrosion-resistant fastener used with Stop or Bar to attach G410 roof membrane to steel roof decks. Fastener-XPS has a shank diameter of approximately 0.21 inch (5.3mm) and a thread diameter of approximately 0.26 inch (6.6). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement and simplicity of application.

F. Fastener-King Con: A nail-in, corrosion-resistant fastener used with Plate to attach insulation or with Bar to attach membrane to poured structural concrete roof decks.

G. Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes every 6 inches (152 mm) on center.

H. Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.

I. Cord: A 5/32 inch (4 mm) diameter, red-colored, flexible thermoplastic extrusion that is welded to the top surface of the membrane and against the side of the Bar, used to hold the membrane in position.

2.07 WALKWAY PROTECTION

A. Tread: A polyester reinforced, 0.096 inch (96 mil/2.4 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Tread is supplied in rolls of 39.3 inches (1.0 m) wide and 32.8 feet (10 m) long.

2.08 MISCELLANEOUS ACCESSORIES

A. Aluminum Tape: a 2-inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at Clad joints.

B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.

C. Multi-Purpose Tape: A high performance sealant tape with used with metal flashings as a preventive measure against air and wind blown moisture entry.

D. Seam Welder 641mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of membrane seams.

E. Perimat Welder: 120 volt, self-propelled, hot-air welding machine used to seal long-lengths of membrane seams along perimeter details.

F. Solvent: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled. Consult Product Data Sheet for additional information.

2.09 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2.10 RELATED MATERIALS

A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

B. Plywood: When bonding directly to plywood, a minimum ½ inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of Felt behind the flashing membrane. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis.

PART 3 --EXECUTION

3.01 PRE-CONSTRUCTION CONFERENCE

A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.

B. The meeting shall discuss all aspects of the project including but not limited to:

1. Safety
2. Set up
3. Construction schedule
4. Contract conditions
5. Coordination of the work

3.02 SUBSTRATE CONDITION

A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.

B. Applicator shall verify that the work done under related sections meets the following conditions:

1. Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
3. All surfaces are smooth and free of dirt, debris and incompatible materials.
4. All roof surfaces shall be free of water, ice and snow.

3.03 SUBSTRATE PREPARATION

The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

A. New Construction

1. Wood Deck:

   a) FM approved wood deck - The roof deck shall be minimum 2 inch (50 mm) thick lumber or ¾ inch (19 mm) thick treated plywood. The deck shall conform to FM requirements for Class 1 fire-retardant and rot-resistant wood decks. Deck shall be installed according to FM and local code requirements.
   b) Non-FM approved wood deck - The roof deck shall be minimum 1½ inch (25 mm) thick lumber or 15/32 inch (12 mm) thick plywood. Deck shall be installed according to local code requirements. Contact Manufacturer's Technical for fastening patterns and methods.

3.04 SUBSTRATE INSPECTION

A. A dry, clean and smooth substrate shall be prepared to receive the Adhered roof system.

B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free of water, ice and snow.

E. The membrane shall be applied over compatible and accepted substrates only.

3.05 WOOD NAILER INSTALLATION

A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.

B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.

C. Thickness shall be as required to match substrate or insulation height to allow a smooth transition.

D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

3.06 SEPARATION BOARD AND INSULATION INSTALLATION

A. Separation board and insulation shall be installed according to insulation manufacturer's instructions.

B. Separation board and insulation shall be neatly cut to fit around penetrations and projections.

C. Install tapered insulation in accordance with insulation manufacturer's shop drawings.

D. Install tapered insulation around drains creating a drain sump.
E. Do not install more insulation board than can be covered with the membrane by the end of the day or the onset of inclement weather.

F. Use at least 2 layers of insulation when the total insulation thickness exceeds 2½ inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

G. Mechanical Attachment

1. Separation board and insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the separation board and insulation manufacturer's, FM's and the manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation or separation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.
2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and the membrane manufacturer.
3. Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

3.07 INSTALLATION OF ROOF MEMBRANE

The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

A. 2121 Adhesive:

1. Over the properly installed and prepared substrate, 2121 adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to the manufacturer's requirements. No adhesive is applied to the back of the G410 feltback membrane. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
2. The G410 feltback roof membrane is unrolled immediately into the wet 2121 adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
3. Weld G410 coverstrips at all G410 feltback seams that do not have a factory selvage edge. Notes:

    a. 2121 adhesive shall not be used if temperatures below 40º F (5º C) are expected during application or subsequent drying time.
    b. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

3.08 HOT-AIR WELDING OF SEAM OVERLAPS

A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

B. Hand-Welding

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

C. Machine Welding

1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, the manufacturer’s instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

D. Quality Control of Welded Seams

1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or a manufacturer’s representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

3.09 MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

A. Adhesive for Membrane Flashings

1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be

applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.

2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

B. Install Stop/Bar/Cord according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stop is required by the manufacturer at the base of all tapered edge strips and at transitions, peaks, and valleys according to the manufacturer's details.

C. The manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the manufacturer prior to installation.

D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and the Technical Department.

E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.

F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Stop at 6-8 inches (0.15-0.20 m) on center.

G. Flashings shall be terminated according to the manufacturer's recommended details.

H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Technical Department for securement methods.

3.10 METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.

B. Metal, other than that provided by the manufacturer, is not covered under the warranty.

C. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

D. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

E. Metal joints shall be watertight.

F. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).

G. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.

H. Counter flashings shall overlap base flashings at least 4 inches (100 mm).

I. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

3.11 CLAD METAL BASE FLASHINGS / EDGE METAL

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

A. Clad metal flashings shall be formed and installed per the Detail Drawings.

1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

B. Adjacent sheets of Clad shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint. Each flashed joint shall be covered by a clad metal facia plate to match the color of the clad edge metal. Install the clad facia plate per Sarnafil standards.

3.12 WALKWAY INSTALLATION

A. Tread Walkway

1. Roofing membrane to receive the Tread Walkway shall be clean and dry. Place chalk lines on deck sheet to indicate location of Walkway. Apply a continuous coat of 2170 adhesive to the deck sheet and the back of Walkway in accordance with manufacturer’s technical requirements and press Walkway into place with a water-filled, foam-covered lawn roller. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the Walkway to the membrane deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. **Important:** Check all existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and re-weld any inconsistencies before Walkway installation. Do not run Walkway over Bars.

3.14 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

3.15 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and the manufacturer prior to demobilization.

B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

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

SECTION 07 57 37

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 {REMOVED}

:

1. .

2. .

1.04 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.

1.05 SUBSTITUTIONS

Substitutions will be considered per the Instructions to Bidders, Section 3.3 Substitutions.

1.06 SUBMITTALS

A. In accordance with Article 3 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.)

1.07 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.

1.08 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00.

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*****

THIS PAGE IS INTENTIONALLY BLANK

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions 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:

1. All metal wall flashings, related flashing, coping and caps.
2. Flashing at curbed openings, and other miscellaneous areas where indicated on the drawings.
3. Flashing flanges for roof drains and overflows.
4. Flashing at parapet walls that receive roofing membrane.
5. Flashing and metal covers at mechanical equipment platforms.
6. Gutters and downspouts.
7. Shop and field priming, shop painting, galvanizing, screening, caulking, anchors and anchor straps, clips, etc.
8. 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 the Instructions to Bidders, Section 3.3 Substitutions.

1.05 SUBMITTALS

A. In accordance with Article 3 of the General Conditions.

B. Shop Drawings: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit: all information required for fabrication, finishing and installation of this work in complete details.

1.06 GUARANTEE

Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) 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. 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 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.