
Simpson Strong-Tie Materials Demonstration Lab Project MAJ 07-0039

ADDENDUM # 1

PROJECT MANAGER:

Perry Judd
Project Manager
Facilities Planning & Capital Projects
pjudd@calpoly.edu

ARCHITECT/ENGINEER:

Omni Design Group
689 Tank Farm Road, Suite 140
San Luis Obispo, CA 93401

DATE: July 24, 2009

Submittal Date: **July 30, 2009**
before 2:00 p.m.

The following additions, deletions, and revisions to the Drawings and Project Manual are a part of the Contract Documents.

Each Bidder shall:

- Submit the information contained in this addendum to their subcontractors and suppliers.
- Acknowledge receipt of addenda on the Bid Form.

Note: Failure to acknowledge addenda in the space provided on the Bid Form may subject the Bidder to disqualification.

Item 1-1 Division 0, Part A, Sample Bid Proposal Forms, Bid Proposal Form

REPLACE IN ITS ENTIRETY

Refer to attached Division 0, Bid Proposal Form (**ADD#1a**).

Item 1-2 Division 1, Section 01010 Summary of Work

REPLACE IN ITS ENTIRETY

Refer to attached Division 1, Section 01010 Summary of Work (**ADD#1b**).

Item 1-3 Division 1, Section 01030 Alternatives

REPLACE IN ITS ENTIRETY

Refer to attached Division 1, Section 01030 Alternatives (**ADD#1c**).

Item 1-4 Division 1, Section 01640 Owner Furnished Products

REPLACE IN ITS ENTIRETY

Refer to attached Division 1, Section 01640 Owner Furnished Products (**ADD#1d**).

Item 1-5 Division 6, Section 06100 Rough Carpentry

REPLACE IN ITS ENTIRETY

Refer to attached Division 6, Section 06100 Rough Carpentry (**ADD#1e**).

Item 1-6 Division 7, Section 07410 Preformed Metal Roof Panels

REPLACE IN ITS ENTIRETY

Refer to attached Division 7, Section 07410 Preformed Metal Roof Panels (**ADD#1f**).

Item 1-7 Division 7, Section 07543 Thermoplastic Membrane Roofing

REPLACE IN ITS ENTIRETY

Refer to attached Division 7, Section 07543 Thermoplastic Membrane Roofing (**ADD#1g**).

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BIDDER'S NAME _____

BID PROPOSAL FORM

**THE TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY
SIMPSON STRONG-TIE MATERIALS DEMONSTRATION LAB
PROJECT
MAJ 07-0039**

**California Polytechnic State University, San Luis Obispo
One Grand Avenue
San Luis Obispo, CA 93407**

To: California Polytechnic State University, San Luis Obispo, CA 93407 for
The Trustees of The California State University, on behalf of the State of California
(hereinafter called The Trustees):

The undersigned bidder hereby offers, in the amount stated below, to furnish all labor, materials, tools, equipment, apparatus, facilities, transportation, and permits for the construction of the **SIMPSON STRONG-TIE MATERIALS DEMONSTRATION LAB PROJECT**, at California Polytechnic State University, San Luis Obispo, and hereby agrees to enter into a contract for Project Number **MAJ 07-0039** if this offer is accepted by The Trustees.

SPECIFY THE NUMBER OF EACH ADDENDUM YOU HAVE RECEIVED ON THE LINE BELOW (write in the number of each and every addendum that you have received)

→ _____ ←

TOTAL AMOUNT OF BASE BID: \$ _____ LUMP SUM
(use figures only)

The above Base Bid amount is to be stated in figures only and is the total amount bid for the entire contract work including all applicable taxes. Any alteration, erasure, or change must be clearly indicated and initialed by the bidder. The bidder agrees that if there are any discrepancies or questions in the figures, the Trustees will use the lower figure despite the bidder's intent. The Trustees reserve the right to reject any and all bids and to waive any irregularities. The construction budget for this project is \$1,880,000. Award of the contract, if awarded, shall be based on the following: The lowest bid shall be determined as the lowest total of the bid prices of the Base Bid plus Additive Alternative No. 1 (PCC 10780.5(b)). This methodology does not preclude the Trustees from adding to or deducting from the contract any of the additive (including Additive Alternative No. 1) or deductive items after the lowest responsible bidder has been determined.

ADDITIVE ALTERNATIVES--The following additive alternatives are an integral part of this proposal, and to be responsive, the bidder shall quote for the Base Bid and also for the following listed additive alternatives.

Additive Alternative No. 1: Add all work related to the Mezzanine and Bridge as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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Additive Alternative No. 2: Add all work related to the Green Roof as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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Additive Alternative No. 3: All work related to supply of materials as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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Additive Alternative No. 4: All work related to supply of materials as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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Additive Alternative No. 5: All work related to supply of materials as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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Additive Alternative No. 6: All work related to supply of materials as depicted in Division 1, Section 01030 Alternatives and on Construction Drawings and Specifications.	\$ _____ (use figures only)	Lump Sum
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The above amounts are to be stated in figures only, and are the total amounts bid for all of the alternatives including all applicable taxes. Any alterations, erasures, or changes must be clearly indicated and initialed by the bidder. The bidder agrees that if there are any discrepancies or questions in the additive alternative figures, the Trustees will use the lower figure despite the bidder's intent.

The bidder shall hold the lump sum prices for all listed alternatives for 90 calendar days after the start date of the Notice to Proceed. The Trustees reserve the right, within 90 calendar days after the start date of the Notice to Proceed, to add into the awarded contract amount by change order, any or all listed alternatives that were not previously awarded, without any delay or impact to the project and with no mark-up or mark-down. The Trustees reserve the right to competitively bid the work contained in the additive alternatives as separate projects, at any time.

The bid is subject to the provisions contained in the Contract General Conditions (note especially Article 2.00 *et seq.*) regarding instructions to bidders, and the bidder agrees that failure to comply with the conditions thereof may be the basis for rejection of this bid. The bid must be submitted on Forms provided by the University, completely filled out and in a sealed envelope, and delivered to Facilities Planning & Capital Projects, Building 70, at California Polytechnic State University, San Luis Obispo, **before 2:00 p.m., on Thursday, July 30, 2009** or it will be disregarded. Only bids from prequalified contractors with a **B (General Building)** license will be accepted.

Bid Security: Bidder shall enclose with this Bid Proposal Form bidder's security in the amount equal to at least ten (10%) percent of the amount of bid (see Article 2.06(c) of the Contract General Conditions). If the bidder is awarded the contract and then fails to execute the contract, this bidder's security shall be forfeited to the State.

Disabled Veteran Business Enterprise: The Trustees require the successful bidder to achieve a minimum goal of 3% DVBE participation in contracting construction projects as established in the bidding documents or to provide acceptable evidence of good faith efforts to do so. Achieving the minimum goal or making the good faith effort must occur prior to the bid opening. Documentation must be submitted within two (2) business days after bid opening. Bidders shall contact the University's DVBE Coordinator, Suzanne LaCaro, Contracts, Procurement and Risk Management at 805/756-5190.

Construction Time: The time period for completion of the work is **330** calendar days from the construction start date specified in the Notice to Proceed.

Liquidated Damages: Liquidated damages shall be **\$500.00** for each calendar day completion is delayed beyond the time prescribed for the project./

[Final page consists of Bid Proposal Form Signature Page (Form 701.06).]

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SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Project Description
 - 2. Work by Trustees
 - 3. Trustees Supplied Products
 - 4. Contractor Use of Premises
 - 5. Trustees Occupancy
 - 6. Special University Requirements and Controls
 - 7. Contractor's Duties
 - 8. Specification Formats and Convention

- B. Related Specification Sections
 - 1. Section 01500 - Temporary Facilities and Controls
 - 2. Section 01749 - Construction Waste Management and Disposal
 - 3. Technical Specifications, Divisions 1 thru 16.

1.02 PROJECT DESCRIPTION

- A. General Description of the Work
 - 1. The work shall conform to the contract drawings listed on Sheet G 1.0 and to the specifications, which form a part of this package.
 - 2. Work of this contract includes, but is not limited to, construction of the Simpson Materials Demonstration Lab and associated site work.
 - 3. Project Name and Location: Simpson Materials Demonstration Lab, California Polytechnic State University, San Luis Obispo, California.
 - 4. Project Summary:
 - a. Work under this section is described per these specifications, on drawings labeled "Simpson Materials Demonstration Lab".
 - b. Reference Documents: Record drawings for existing utilities are available in the Cal Poly Plan Room, 70-200. Call the Project Manager, Perry Judd, (805) 756-5765, for an appointment.

1.03 CONTRACTOR USE OF PREMISES

- A. General:
 - 1. Refer to Contract General Conditions, Article 4.00.
 - 2. Do not cause unreasonable delay or hindrance, or impose hardship on the public, students, University, or others engaged in University work.
 - 3. Schedule construction activities to minimize disruption to the University and to University users.
 - 4. Do not interrupt University utilities without prior written permission from the Trustees.
 - 5. Confine operations at sites to areas permitted Contract Documents.
 - 6. Do not unreasonably encumber site with materials or equipment.

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7. Protect Contractor's and Trustees' material stored on premises. Keep site and building secure.
8. Obtain and pay for use of additional storage or Work areas that may be required for operations.
9. Limit use of site for Contract Work and storage.
10. Do not overload structure.

1.04 TRUSTEES OCCUPANCY

- A. Trustees will use and occupy the following during entire period of construction for conduct of normal business operations:
 1. Buildings and roadways, including:
 - a. Building 14 Frank E. Pilling Building
 - b. Building 21 Engineering West
 - c. Building 26 Graphic Arts
 - d. Building 46 The Old Natatorium
 - e. Building 60 Crandall Gym
 - f. Building 186 Construction Innovations Center
 - g. South Polyview Drive
 - h. South Perimeter Drive
 - i. Cuesta Avenue
- B. Cooperate with Trustees to minimize conflict and to facilitate University operations.
- C. Schedule Work to accommodate Trustees' occupancy.

1.05 SPECIAL UNIVERSITY REQUIREMENTS AND CONTROLS

- A. Preservation: Existing buildings, slabs, walks, paving, landscaping and other improvements, which are to remain, either adjacent to new construction or elsewhere on the University, shall be protected from damage or defacement. Damage or defacement caused by the Contractor shall be repaired or replaced to the satisfaction of the Trustees. Repairs to damaged asphalt paving shall be made with hot asphalt. Repairs to other damaged surfaces shall be made with in kind material to a like new condition regardless of its existing condition.
- B. Salvage: The Trustees shall have first rights of salvage for items. Salvage items removed in connection with this work are to remain the property of the Trustees and shall be delivered to the campus location designated by the Trustees Representative. If the Trustees waive salvage rights for an item, the item becomes the property and responsibility of the Contractor. Comply with Section 01749 - Construction Waste Management and Disposal.
- C. Issuance of University Keys: Keys to work areas, if required, must be obtained from the Trustees Representative. The Contractor or an authorized representative shall sign for receipt of keys. Upon completion of the work, keys shall be returned to the Trustees Representative. If the Contractor fails to return keys issued, the Contractor shall be liable for the total cost of labor and materials to re-key areas accessible with the lost keys. Final payment shall not be authorized until keys have been accounted for.

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- D. Contract Work Limits: Areas affected by this project.
1. Exception: Unless noted on the drawings.
- E. Existing University Utilities:
1. Notify Trustees seven (7) calendar days minimum in advance of intended interruption of utility services.
 - a. Required interruptions: Incorporate into Contractor's construction schedule.
 - b. Times and dates for interruptions: At the discretion of the Trustees, and may be on a Saturday, Sunday, holiday during quarter break, or after normal working hours and beyond seven (7) calendar days after notifications.
 2. Identify and locate known underground utilities.
 - a. Trustees will provide access to known documentation before bid and during construction.
 - b. Contact Facilities Planning and Capital Projects for existing utility atlas.
 - i. Most underground utilities at Cal Poly are not "Public" and cannot be located by calling Underground Service Alert (800) 642-2444.
 3. Undocumented utilities: Refer to Part B - Contract General Conditions, Article 4.08.e Utilities.
 4. Show utility interruptions on the Contractor's monthly schedule update and 3-week look-ahead schedule.
- F. Holidays, Quarter Breaks, Weekends:
1. Prior to start of construction: Obtain a calendar from the Trustees showing major campus events, study and examination periods, holidays and quarter breaks.
 2. Disruptive work: Discouraged during study and exam times, and major campus events.
 3. The Contractor may be asked to suspend work and/or deliveries during the following, or similar University events:

Commencement:	Generally the third Saturday in June Generally the third Saturday in December
Open House:	Generally the third Friday and Saturday in April
Week of Welcome:	Generally the week before Fall Quarter
Residence Hall Move-in:	Generally weekend before Fall Quarter
Finals Weeks:	Generally the third week in March The week before June commencement The week before December commencement
Residence Hall Move-in and -out:	Generally the third week in September; Second week in December First week in January Week before June commencement

4. For scheduling purposes, anticipate five (5) University event related non-work days in each calendar year. Extension of the contract time shall not be allowed for these non-work days.

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5. For noise control, refer to Section 01500 – Temporary Facilities and Controls.

1.06 WEATHER DELAYS

- A. Anticipate and include rain days in the critical path schedule.
- B. Contract extension for adverse weather conditions (rain days exceeding those shown in the Rain Days by Month Table) may be granted as an uncompensated Contract extension.
 1. Submit written request substantiating that weather conditions were:
 - a. Abnormal for the time period.
 - b. Could not have been reasonably anticipated.
 - c. Had an adverse effect on the scheduled construction.
- C. The Rain Days by Month Table shall be used by the Trustees in evaluating Contractor claims for additional time. The Trustees shall determine if a day qualifies as a rain day, and if the claim is approved.
 1. Rainfall, measured by the Weather Station on the University Campus, exceeding 0.25 inches shall be the basis in determining a rain day.
 2. Number of rain days by month, which are included in the time period for completion of the overall project are illustrated in the table below:

Table Rain Days by Month												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days	7	7	9	4	2	1	1	1	2	3	6	6

1.07 CONTRACTOR'S DUTIES

- A. Provide and pay for:
 1. Labor, material and equipment.
 2. Tools, construction equipment and machinery.
 3. Telephone, fax, computer and communication services. See Section 01500 – Temporary Facilities and Controls.
 - a. Telephone: pay for the connection to University system and pay for services.
 - b. Make arrangements with University to activate telephone and communication services.
 - c. Make connections and provide labor, materials and equipment for site distribution of Contractor's phone and communication services.
 4. Water and Utilities: See Specification Section 01500 – Temporary Facilities and Controls.
 - a. Pay for and make connections and provide labor, materials and equipment for site distribution of temporary utilities from the Campus' point of connection.
 - b. Remove temporary utilities from the site when the work is completed.
 - c. Pay for water and electricity for construction.

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5. Other facilities and services necessary for proper execution and completion of Work.
- B. Pay legally required sales, consumer and use taxes.
 - C. Secure and pay for site-specific costs for proper execution and completion of Work, and as applicable at time of receipt of bids.
 1. Licenses
 2. Permits and Fees
 3. Governmental Fees
 4. Royalties
 - D. Give required notices.
 - E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, which bear on performance of Work.
 1. The Contractor shall certify in writing that no materials containing Asbestos are incorporated in the work, the Asbestos Hazard Emergency Regulations Act.
 - F. Promptly submit written notice to Trustees Representative of observed variance of Contract Documents from legal requirements.
 1. Architect will prepare modifications to Contract Documents for required changes.
 2. If Contractor observes work known to be contrary to requirements, and does not notify the Trustees Representative, then Contractor assumes responsibility for work not meeting the requirements.
 - G. Enforce strict discipline and good order among employees. Do not employ on Work:
 1. Unfit persons.
 2. Persons not skilled in assigned task.
 - H. Comply with Cal Poly Sexual Harassment Policy. Advise sub-contractors in writing and post policy in prominent place. Cal Poly Sexual Harassment Policy website is http://www.employequity.calpoly.edu/sexual_harassment_prevention.html

1.08 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "1995 MasterFormat" numbering system.
 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 2. Division 01: Sections in Division 01 shall apply to the execution of the Work of all Sections in the Specifications.

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- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Drawing Keynotes: Throughout the drawings, specification keynotes are used to reference work and indicate the general section of the specifications in which the noted work is addressed. The keynotes do not define or limit the scope to a particular trade or section. Coordinate a complete scope of work.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

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**SECTION 01030
ALTERNATIVES**

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Quality Assurance
 - 2. Alternatives
 - 3. Lump Sum Price
- B. Related Sections
 - 1. Section 01010 - Summary of Work
 - 2. Divisions 1 thru 16
- C. Related Documents
 - 1. Part A – Notice to Contractors, Invitation to Bid, Bid Proposal
 - 2. Part B – Contract General Conditions

1.02 QUALITY ASSURANCE

- A. The Base Bid specifications shall govern work of Alternatives.

1.03 ALTERNATIVES

- A. General: Should the Trustees decide to add or deduct portions of work (including material, labor, equipment and services necessary to do this portion of work as shown on the drawings and called for in the specifications), the following alternative bids shall be considered. The Trustees reserve the right to award a contract on the basis of base bid alone. The Trustees reserve the right to award a contract with any or all additive alternatives. Provide itemized cost for each bid alternative.
- B. Coordinate related work and modify surrounding work.
- C. Schedule of Alternatives:

Additive Alternative No. 1: Add all work related to the **Mezzanine and Bridge** as depicted on Construction Drawings and Specifications.

Additive Alternative No. 2: Add all work related to the **Green Roof** as depicted on Construction Drawings and Specifications

Additive Alternative No. 3: All work related to the **supply of the following materials;**

MATERIALS	QTY	EST LENGTH
<u>Columns</u>		
7x7 WS Parallam PSL Column 1.8E	14	19.5'
7x7 WS Parallam PSL Column 1.8E	13	12.5'
<u>Braces</u>		
7x7 WS Parallam PSL Brace 1.8E	10	17'
7x7 WS Parallam PSL Brace 1.8E	10	22'
<u>Rim Beams</u>		
7.0x20 Parallam PSL 2.05	20	12'
7.0x20 Parallam PSL 2.05	2	44'

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Fascias

3.5x11.875 WS Parallam PSL 2.0E	2	24'
3.5x11.875 WS Parallam PSL 2.0E	2	20'
3.5x11.875 WS Parallam PSL 2.0E	2	6'
3.5x11.875 WS Parallam PSL 2.0E	2	4'

Additive Alternative No. 4: All work related to the **supply of the following materials;**

MATERIALS	QTY	EST LENGTH
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Girders

6.75x30SSI 32F-2.1E/DF Gluman	9	44'
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(Girders are tapered both ways from 30" at centerline to 20" at both ends)

(Fb=3200 psi, E=2100ksi, camber=2.25")

Additive Alternative No. 5: All work related to the **supply of the following materials;**

MATERIALS	QTY	EST LENGTH
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Roof Purlins

6x10 Douglas Fir #1	80	12'
6x10 Douglas Fir #1	10	18'
6x10 Douglas Fir #1	10	16'
6x10 Douglas Fir #1	16	4'

Blocking

4x6 DF-L #2	48	4'
4x10 DF	22	4'

Additive Alternative No. 6: All work related to the **supply of the following materials;**

MATERIALS	QTY	EST AREA
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Sheathing

3x6 T&G DF Continues Decking	1	5,764sf
15/32" Structural 1 Plywood	1	5,764sf

Sheathing in Doors

3x6 T&G DF Continues Decking	1	144sf
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PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

1.01 LUMP SUM PRICE

- A. Provide Lump Sum Price for construction of the BASE BID and each ALTERNATIVE on the BID FORM.

END OF SECTION

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**SECTION 01640
OWNER FURNISHED PRODUCTS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Owner Furnished Products.
- B. Related Specification Sections:
 - 1. Section 01600 - Product Requirements: General product requirements related to all products.

1.02 DEFINITIONS

- A. Owner: Defined in Document 00800 - Supplementary Conditions.
- B. Owner Furnished Products: Products furnished to the site and paid for by Owner as specified hereinafter as "Supplied by Owner".
- C. Owner Furnished Products: Products furnished to the site and paid for by Trustees as specified hereinafter as "Supplied by Owner".

1.03 RESPONSIBILITIES FOR OWNER FURNISHED PRODUCTS

- A. Product Delivery: Product supplier will deliver products to jobsite for Contractor to receive on delivery date established by Contractor. Contractor will contact Supplier after Award of Contract to establish a product delivery and installation date, quantities of materials, and a coordination procedure.
- B. Owner Responsibilities:
 - 1. University shall correspond to the party furnishing the product as specified hereinafter.
 - 2. Arrange for delivery of supplier furnished shop drawings, product data, samples, and installation instructions to Contractor.
 - 3. Arrange and pay for product delivery to site.
 - 4. Submit claims for transportation damage.
 - 5. Arrange for the replacement of damaged, defective, or missing items a result of shipping errors.
 - 6. Arrange for manufacturers' warranties, bonds, services, and inspections, as required.
- C. Contractor Responsibilities:
 - 1. Upon award of contract Contractor shall generate a materials list for the ordering of Owner supplied materials identified in the plans and specifications as "Supplied by Owner".
 - 2. Contractor's materials list shall include dimensional data necessary for supplier to properly size and manufacture said materials. Contractor shall coordinate with supplier to confirm dimensional allowances required for proper fitting and final field installation. Materials supplied by Owner improperly sized due to negligence of the Contractor shall be replaced at the Contractor's expense.

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3. Review supplier furnished shop drawings, product data, and samples under provisions of Section 01330. Submit to supplier with notification to Architect, Owner, of any discrepancies or problems anticipated in the use the products.
4. Receive and unload products at the Site when specified.
5. Verify quantity of products furnished with shop drawings, Final Field Use Drawings, or Bills of Lading as applicable.
6. Promptly inspect products upon receipt for shortages, damaged, or defective items; report to Owner and Architect. Upon notification, University will arrange for delivery of replacement products.
7. Handle products at site, including uncrating, storage, and protection unless otherwise specified.
8. Install products when specified.
9. Provide for installation at time of delivery of Owner supplied materials.
10. Owner supplied materials received in acceptable condition shall be covered by Owner's Builder's Risk Insurance against theft, fire, flood or other acts of God. Insurance deductible required for any claim shall be paid by Contractor.
11. Owner supplied materials received in acceptable condition shall be covered by Owner's Builder's Risk Insurance until the project is complete and accepted by the Trustees. Insurance deductible required for any claim shall be paid by Contractor.
12. Protect installed products from damage.
13. Replace items damaged by Contractor.
14. Remove trash, debris, and rubbish.
15. Manufacturing Defects: Report suspected product manufacturing defects to University and Architect and Product Supplier. Upon notification, University will arrange for repair of product manufacturing defects.

1.04 CONTRACTOR INSTALLATION OF OWNER FURNISHED PRODUCTS

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate installation of Owner installed products and equipment.
- C. Work in harmony with all subcontractors, suppliers and manufacturers. Unpack and set in place, plumb, level, and secure.
- D. Connect to mechanical, plumbing and electrical systems as required.
- E. Test and adjust as required.

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PART 2 - PRODUCTS

Description & Supplier	Quantity	Est Length
Columns - iLevel by Weyerhaeuser		
7x7 WS Parallam PSL Column 1.8E	14	19.5'
7x7 WS Parallam PSL Column 1.8E	13	12.5'
Braces - iLevel by Weyerhaeuser		
7x7 WS Parallam PSL Brace 1.8E	10	17'
7x7 WS Parallam PSL Brace 1.8E	10	22'
Rim Beams - iLevel by Weyerhaeuser		
7.0x20 Parallam PSL 2.0E	20	12'
7.0x20 Parallam PSL 2.0E	2	44'
Fascias - iLevel by Weyerhaeuser		
3.5x11.875 WS Parallam PSL 2.0E	2	24'
3.5x11.875 WS Parallam PSL 2.0E	2	20'
3.5x11.875 WS Parallam PSL 2.0E	2	6'
3.5x11.875 WS Parallam PSL 2.0E	2	4'
Girders - Standard Structures		
6.75x30 SSI 32F-2.1E/DF Glulam	9	44'
(Girders are tapered both ways from 30" at centerline to 20" at both ends)		
(Fb=3200 psi, E=2100ksi, camber = 2.25")		
Roof Purlins - Sierra Pacific Industries		
6x10 Douglas Fir #1	80	12'
6x10 Douglas Fir #1	10	18'
6x10 Douglas Fir #1	10	16'
6x10 Douglas Fir #1	16	4'
Blocking - Sierra Pacific Industries		
4x6 DF-L #2	48	4'
4x10 DF	22	4'
Roof Sheathing – Ganahl Lumber		Est Area
3x6 T&G DF Continuous Decking	1	5764sf
15/32" Structural I Plywood	1	5764sf
Sheathing in Doors – Ganahl Lumber		
3x6 T&G DF Continuous Decking	1	144sf
Connectors and Hardware for all the above(excluding decking screws and nails)		

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Materials Take Off
 Simpson Strong Tie
 Materials
 Demonstration Lab

Building Section	Sheet #	Detail #	Simpson Model #	Qty.	# Bldgs.	Total Qty
Foundation	S6.1	15	SB1X30	80	1	80
Mezzanine	S3.0	Note 4 Column Schedule	CB7 1/8-7	7	1	7
Mezzanine	S6.0	21, 22, 23	THD62600	100	1	100
Roof	S4.0	Note 3A	WNP610	32	1	32
Roof	S4.0	Note 13	MSTA30	90	1	90
Roof	S6.0	52	MSTA30	32	1	32
Roof	S6.0	41	HU610	180	1	180
Roof	S6.0	42	HGA10	48	1	48
Roof	S4.0	Note 19	WNP610	16	1	16
Roof	S4.0	Note 21	HUC412TF	8	1	8
Roof	S4.0	Note 22, 24, 25	MSTI26	28	1	28
Roof	S4.0	Note 28, 55/S5.1	HDAQ8	18	1	18
Roof	S6.1	24	HUCQ610	20	1	20
Roof	S7.1	Note 20	CC 7 1/8X 7 1/8	1	1	1
HTBF	S6.1	23/S6.1	ES-090047A (Int)	8	1	8
HTBF	S6.1	13/S6.1	ES-090047B (31)	4	1	4
HTBF	S6.1	13/S6.1	ES-090047C (42)	4	1	4
HTBF	S7.0	43/S5.1	ES-090047D (End 31)	2	1	2
HTBF	S7.0	43/S5.1	ES-090047E (End 42)	2	1	2
HTBF	S6.1	15/S6.1	ES-090047F (31)	10	1	10
HTBF	S6.1	15/S6.1	ES-090047G (42)	10	1	10
HTBF	S6.1	21/S6.1	ES-090047H (63)	2	1	2
HTBF	S6.1	21/S6.1	ES-090047I (88)	2	1	2
HTBF	S7.1	53/S6.1	ES-090047J (Int)	2	1	2
HTBF	S7.1	45/S5.1	ES-090047K (31)	2	1	2
HTBF	S7.1	45/S5.1	ES-090047K (42)	2	1	2
Roof	S4.0	Note 12B	HUCQ46	96	1	96
Mezzanine	S5.1	62	PHSD34S0818	2500	1	2500
Mezzanine	S6.0	45,55,54,34	SDS1/4x3	250	1	250
Mezzanine	S6.0	65	TTN25134H	100	1	100
Mezzanine	S6.0	14	PDP-100	100	1	100
Stair	S6.1	64,54,43	THD62400	12	1	12
Mezzanine	S6.1	33	TTN25214PFSS	100	1	100
Mezzanine	S6.1	44,43	THD62600H	20	1	20
HTBF	S6.1	21	SDS1/4X2 1/2	50	1	50
Roof	S6.1	24	MSTI26	20	1	20

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Roof	S6.1	24	HUCQ610	20	1	20
Foundation	S5.1	35,23	SET	10	1	10
Foundation	S5.1	33	THD50600H	20	1	20
Mezzanine	S5.1	32	SDS1/4X3	100	1	100
Deck Edge	S5.1	15	STB50334	25	1	25
Mezzanine	S5.1	55	Hdq8	20	1	20
Mezzanine	S5.1	55,53	SDS1/4x6	50	1	50
Mezzanine	S5.1	63	PDP-125	100	1	100
Roof	S4.0	Diaphragm Nailing Key	WSNTL2S	2000	1	2000

PART 3 - EXECUTION

3.01 PRODUCTS FURNISHED BY OTHERS SCHEDULE

- A. Equipment may be furnished by the University for installation by either the Contractor or by others as specified in the Products Furnished by Others Schedule included hereinafter.
- B. The Products Furnished by Others Schedule includes a listing of Owner furnished products as required in the listed specifications sections or drawings. Refer to the applicable drawings or individual sections for specific details regarding Owner furnished products therein. The Schedule provides summary information only and does not preclude or supersede requirements contained in the individual sections.
- C. Schedule: Contractor shall anticipate 60 days from the time of submission of the materials list called out in Section 1.03, C, 1, until delivery of said materials to construction site. Contractor shall coordinate delivery date of Owner furnished equipment.

3.02 CONTACTS

- A. Contact information for vendors of Owner Furnished Equipment will be made available to the Contractor at the Pre-Construction Conference or upon request by the Contractor to the Construction Manager. A limited list of contacts are as follows:
 1. Simpson Strong Tie – Alan Hanson (714) 738-2160
 2. Sierra Pacific Industries – Mark Pawlicki (530) 378-8104
 3. Standard Structures – Chuck Young (877) 980-7732
 4. iLevel by Weyerhaeuser – Alan Patton (559) 486-6221
 5. Ganahl Lumber – Jim Taft (714) 239-2275

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Framing with timber.
 - 3. Framing with engineered wood products.
 - 4. Rooftop equipment bases and support curbs.
 - 5. Plywood backing panels.
- B. Related Sections include the following:
 - 1. Division 06 Section "Glued- Laminated Construction"
 - 2. Division 06 Section "Sheathing."
 - 3. Division 06 Section "Wood Decking."
 - 4. Division 01 section related to "Donated Materials"

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWSA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

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1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 3. For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Fastener Patterns: Full-size templates for fasteners in exposed framing.
- C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Wood-preservative-treated wood.
 2. Fire-retardant-treated wood.
 3. Engineered wood products.
 4. Power-driven fasteners.
 5. Powder-actuated fasteners.
 6. Expansion anchors.
 7. Metal framing anchors.
- 1.5 QUALITY ASSURANCE
- A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.
- B. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":
1. Dimension lumber framing.
 2. Timber.
 3. Laminated veneer lumber.
 4. Parallel-strand lumber.
 5. Prefabricated wood I-joists.
 6. Miscellaneous lumber.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX)].
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

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1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

D. Application: Treat items indicated on Drawings, and the following:

1. Framing for raised platforms.
2. Concealed blocking.
3. Framing for non-load-bearing partitions.
4. Framing for non-load-bearing exterior walls.
5. Roof construction.
6. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 15 percent

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2.5 TIMBER FRAMING

- A. Provide timber framing complying with the following requirements, according to grading rules of grading agency indicated:
1. Species and Grade: Douglas fir-larch, Select Structural grade; NLGA, WCLIB, or WWP.
 2. Maximum Moisture Content: 20 percent.
 3. Additional Restriction: Free of heart centers.

2.6 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Weyerhaeuser Company.
 3. Extreme Fiber Stress in Bending, Edgewise: 2600 psi (17.9 MPa for 12-inch nominal and greater (286-mm actual-) depth members.
 4. Modulus of Elasticity, Edgewise: 1,900,000 psi (12 400 MPa)
- B. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Weyerhaeuser Company.
 3. Extreme Fiber Stress in Bending, Edgewise:
 - a. Beams: 2900 psi for 18-inch nominal and greater- depth members.
 - b. Columns/Braces: 2400 psi for 7-inch nominal and under- depth members.
 4. Modulus of Elasticity, Edgewise:
 - a. Beams: 2,200,000 psi
 - b. Columns/Braces: 1,800,000 psi

2.7 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

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1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.
- B. For items of dimension lumber size, provide No. 2 grade lumber with 15 percent maximum moisture content and any of the following species:
1. Western woods; WCLIB or WWPA.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
 2. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
 3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 4. Eastern softwoods, No. 2 Common grade; NeLMA.
 5. Northern species, No. 2 Common grade; NLGA.
 6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.8 PLYWOOD BACKING PANELS

- A. Provide Telephone and Electrical Equipment Backing Panels where occurs: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 5/8-inch (13-mm) nominal thickness.

2.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.
- B. Nails: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

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- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.10 METAL FRAMING ANCHORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, and are limited to, the following:
 - 1. Simpson Strong-Tie Co., Inc.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Simpson Strong-Tie Co., Inc.
- C. Basis-of-Design Products: Subject to compliance with requirements, provide Simpson Strong-Tie or comparable products by one of the following:
 - 1. Simpson Strong-Tie Co., Inc.
- D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products . Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- E. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations where stainless steel is not indicated.
- F. Stainless-Steel Sheet: ASTM A 666, Type 304 .
 - 1. Use for exterior locations and where indicated.
- G. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.050 inch (1.3 mm)
- H. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 1-1/2 inches (38 mm)
 - 2. Thickness: 0.050 inch (1.3 mm)

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- I. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 3/4 inch (19 mm)
 - 2. Thickness: 0.050 inch (1.3 mm)
 - 3. Length: As indicated.

2.11 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
 - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

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- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- J. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with indicated fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.

3.2 TIMBER FRAMING INSTALLATION

- A. Install timber with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports as indicated if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) air space at sides and ends of wood members.
- C. Install wood posts using metal anchors indicated.
- D. **End-Cut Sealing: Immediately after end-cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.**

3.3 ENGINEERED WOOD PRODUCTS INSTALLATION

- A. Treat ends of all engineered wood product beams, braces and posts by dipping in water-repellent preservative for 15 minutes.

3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06100

SECTION 07410
PREFORMED METAL ROOF PANELS (EXTERIOR SOFFITS)

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. Furnish all labor, material, tools, equipment and services for all preformed, soffit as indicated, in accord with provisions of Contract Documents.
2. Completely coordinate with work of all other trades.
3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
4. See Division 1 for General Requirements.

B. Related work specified elsewhere:

1. Structural steel: Section 05100.
2. Flashing and sheet metal: Section 07600.

1.2 QUALITY ASSURANCE

A. Applicable standards:

1. SMACNA: "Architectural Sheet Metal Manual" Sheet Metal and Air Conditioning Contractors National Association, Inc.
2. AISC: "Steel Construction Manual" American Institute of Steel Construction.
3. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute.
4. ASTM A792-83-AZ50: Specifications for steel sheet, aluminum-zinc alloy coated (galvanized) by the hot dip process, general requirements (Galvalume).

B. Manufacturer's qualifications:

1. Manufacturer has a minimum of three years experience in manufacturing metal panel systems of this nature. Panels specified in this section shall be produced in a factory environment (not job site roll formed) with fixed-base roll forming equipment assuring the highest level of quality control. A letter from the manufacturer certifying compliance will accompany the product material submittals.

C. Installation contractor's qualifications:

1. Installation of panels and accessories by installation contractor with a minimum of two years' experience in panel projects of this nature.

1.3 SUBMITTALS

A. Shop drawings:

1. Submit complete shop drawings and erection details to the architect for review. Do not proceed with manufacture prior to review of shop drawings. Do not use drawings prepared by the architect for shop or erection drawings.
2. Shop drawings show methods of erection, elevations and plans of roof and wall panels, sections and details, anticipated loads, flashings, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.

B. Samples for initial selection

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1. Submit color and finish index of manufactures full range of option for initial selection by architect.
 - C. Samples For Verification
 1. Submit samples and color chips for all selected finishes.
 - a. Submit (3) 8-inch long sample of panel.
 - b. Submit (6) 3-inch x 5-inch color chip samples in color selected by the architect
 - D. Warranty(s):
 1. Metal panel system manufacturer, upon final acceptance for project, furnish a warranty covering bare metal against rupture, structural failure and perforation due to normal atmospheric corrosion exposure for a period of 20-years.
 2. Covering paint finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading for a period of [# choose one: twenty (20) years for roof panels (premium thermoset silicone polyester) or twenty (20) years for wall panels and twenty (20) years for roof panels (premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin)].
 - E. Metal panel system fabrication certification:
 1. Submit a letter from the metal roof system manufacturer certifying the QwikLok panels have been produced in a factory environment (not job site roll formed) with fixed-base roll forming equipment.
 - F. Installation contractor's qualifications:
 1. Submit certificate from manufacturer certifying that installer of the metal roof system has met all of the criteria outlined in "1.02 C. Installation contractor's qualifications" and is an authorized installer certified by the manufacturer.
 2. Submit five references from five different architects or building owners for projects that have been in service for a minimum of two years, stating satisfactory performance by the installation contractor.
- 1.4 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Delivery:
 1. Deliver metal roof system to job site properly packaged to provide protection against transportation damage.
 - B. Handling:
 1. Exercise extreme care in unloading, storing and erecting metal panel system to prevent bending, warping, twisting and surface damage.
 - C. Storage:
 1. Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation of metal roof system to prevent condensation build-up between each panel or trim/flashing component.

PART 2 - PRODUCTS -

- 2.1 MANUFACTURERS:
- A. **Preformed Metal Roof Panels (Exterior Soffits)**

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1. MBCI Metal Roof and Wall Systems, 550 Industry Way, Atwater, CA 95301, Phone 800-829-9324, Fax: 209-357-2111, E-mail: cgarner@nclip.com, Web Site: <http://www.mbc.com>
2. Metal Sales Manufacturing Corp., 14213 Whittram Ave., Fontana, CA 92335, Phone: 800-572-6565, Fax: 800-433-7869, E-mail: tlarson@metalsales.us.com, Web Site: <http://www.mtsales.com>, Product: Metal Sales Soffit Panel, 22 gauge, 12" Wide, 1" deep, concealed fastener panel with flush face as specified.
3. Or approved equal

B. Basis of design is MBCI Preformed Metal Roof and wall systems QWIKLOK Artisan L2; for soffit

2.2 MATERIALS

A. Metal panel profile:

1. 12-inch wide x 1"inch deep.

B. Metal panel style:

1. Flush face.
2. Concealed fastener.
3. Structural strength.

C. Gauge

1. 22 gauge.

D. Substrate:

1. Galvalume steel sheet, 0.5-ounces/square foot, minimum yield of 50,000 PSI.

E. Texture:

1. As selected by Architect from manufactures full range of options.

F. Finish:

1. Base of design finish to be MBCI Signature 300 Metallic series (silver metallic)
2. Final approval to be selected by architect from metal panel system manufacturer's full range of products.

2.3 2.02 FABRICATION

A. A. Material shall be in-line tension leveled prior to roll forming finished panel profile.

B. B. Roll form panels in continuous lengths, full length of detailed runs.

C. C. Standard panel length shall be no more than 45 feet long (for longer length availability, contact manufacturer).

D. D. Fabricate trim/flashing and accessories to detailed profiles.

E. E. Fabricate trim/flashing from same material as panel.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examination:

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1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.

B. Discrepancies:

1. In event of discrepancy, notify the architect (owner).
2. Do not proceed with installation until discrepancies have been resolved.

3.2 INSTALLATION

- A. Install metal panel system so that it is weathertight, without waves, warps, buckles, fastening stresses or distortion.
- B. Install metal panel system in accordance with manufacturer's instructions and shop drawings.
- C. Provide concealed anchors at all panel attachment locations.
- D. Install panels plumb, level and straight with seams parallel, conforming to design as indicated.

3.3 CLEANING, PROTECTION

- A. Dispose of excess materials and remove debris from site.
- B. Clean work in accordance with manufacturer's recommendations.
- C. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the architect (owner), any work that becomes damaged prior to final acceptance.
- D. Touch up minor scratches and abrasions.

END OF SECTION 07410

SECTION 07543
THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide a Thermoplastic Membrane Roofing System based on "IB Roofing Systems" (IBRS) MA and FA PVC membrane roofing system over an approved wood plank roof deck, complete with related insulation, separator sheets, flashings, and accessories and performing such incidental or other work as may be necessitated by these operations.
- B. Preparation of substrate to receive roofing materials.
- C. Installation of separator sheets/ thermal insulation.
- D. Roof membrane application.
- E. Roof flashings application.
- F. Incorporation of sheet metal flashing components and roofing accessories into the roof system.

1.2 RELATED SECTIONS

- A. Division 6 "Decking", "Sheathing"
- B. Division 7 "Sheet Metal Flashing and Trim"

1.3 REFERENCES

- A. FM 4470- Corrosion Resistance Testing for Insulation Fasteners.
- B. American Society for Testing and Materials (ASTM)- Annual Book of ASTM Standards.
- C. ASTM C 208,209- Standard Specification for Cellulosic Fiber Insulating Board.
- D. ASTM C 165 Test Method for Measuring Compressive Properties of Thermal Insulation
- E. ASTM C 1289 -Faced Rigid Cellular Polysocyanurate Thermal Insulation Board
- F. ASTM D 1079- Standard Terminology Relating to Roofing, Waterproofing, and bituminous Materials.
- G. ASTM E 108 - Fire Resistance Testing
- H. Underwriters Laboratory (UL) - Roofing Systems and Materials Guide (TGFU-R15546)
- I. CAN/CGSB 37.54-95
- J. ASTM E 2430-05 - Standard Specification for Expanded Polystyrene Insulation.

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- K. ASTM D 4434- Standard Specification for Poly-Vinyl-Chloride (PVC) Sheet Roofing.
- L. Sheet Metal and Air Conditioning National Association, Inc. (SMACNA)- Architectural Sheet
- M. American Society of Civil Engineers (ASCE)- ASCE 7- Minimum Design Loads for Building and Other Structures.

1.4 SUBMITTALS

- A. Submit product data, samples, shop drawings, and installer certification under provisions of Division 1.
- B. Submit product data indicating membrane materials, base flashing materials, insulation, separator/ thermal insulation, accessories and manufacturer's installation instructions and details.
- C. Samples: Submit 8"x 11" samples of specified color of PVC membrane for approval.
- D. Shop Drawings: Submit shop drawings of tapered insulation system for approval; show direction and amount of slope, cricket locations, lengths and details.
- E. Installer Certification: Submit certification from manufacture certifying that installer is approved by manufacture for installation of specified roofing system.
- F. Submit manufacture certificate under provisions of Division 1 that products and installed system meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 20 years documented experience.
- B. Applicator: Company specializing in applying thermoplastic roofing with minimum five years documented experience and approved by manufacture.
- C. Work of this Section to conform to NRCA Roofing and Waterproofing Manual and manufacturer's instructions. It is the responsibility of the applicator to address any conflicts or disparities between NRCA requirements and manufacturer's requirements.
- D. Materials: All materials shall be provided or recommended by single source manufacture and in compliance with specification.
- E. Contractor will be responsible for coordinating pre-roofing conference at least one week prior to initiation of roofing work. Manufacturer representative, foreman for roofing contractor, estimator for roofing contractor, architect, owner representative, sheet metal contractor, general contractor and other required parties must be present to discuss the execution of the work.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable requirements of the Local Building Code for roof assembly fire hazard requirements.

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- B. Fire Hazard Classification: ASTM E 108, UL Class A Fire Hazard Classification.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacture original containers, dry, undamaged, with seals and labels intact. Store products in weather protected environment, clear of ground and moisture. Cover material so as to prevent condensation beneath covering.
- B. Adhesives shall be stored at temperatures above 40 degrees F.
- C. Store materials and equipment in a manner to avoid significant and/or permanent deflection of deck. Spread loads of roofing materials on roof

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Precautions: Install roofing only when adequate application temperatures that result in a satisfactory roofing system application can be maintained; apply no insulation or membrane adhesives to the substrate or roofing membranes when deck surface temperatures are less than the recommended application temperature range stated on the products labels, or printed literature. Install no roofing material when water in any form is present on roof deck surface, or when materials are damp or wet. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.
- B. Temporary Roofing: When adverse job conditions or weather conditions prevent permanent roofing and associated work from being installed in accordance with requirements, and it is determined by Contractor that roofing cannot be delayed because of need for job progress or protection of other work, proceed with installation of temporary roofing, per requirements of the roofing manufacturer.

1.9 WARRANTY

- A. Water tightness: Membrane roofing system, including membrane base flashing, roof insulation, and roofing accessories, is part of the watertight integrity of the project and as such shall be warranted for Five years (or other time period as required by the state/ local contractors licensing board) by the Roofing Contractor.
- B. Manufacturer's Warranty: Submit executed copy of manufacture 25 yr Labor & Materials Warranty agreement from the date of final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. **Thermoplastic Membrane Roofing**

1. IB Roofing Systems, 2877 Chad Dr., Eugene, OR 97408: Phone: 800-426-1626, Fax 541-610-1726, E-mail: technical@ibroof.com, Web Site: www.ibroof.com
2. Sika Sarnafil, 3192 W. La Costa, Fresno, CA 93711: Phone: 559-240-7576, E-mail: corey.sean@us.sika.com, Web Site: <http://www.sarnafilus.com>, Products: Sika Sarnafil

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80 mil S327EnergySmart Roof Membrane or Sika Sarnafil 80 mil G410 EnergySmart Roof Membrane.

3. Or approved equal

B. Basis of design is MBCI Preformed Metal Roof and wall systems QWIKLOK Artisan L2; for soffit

2.2 ROOF INSULATION/COVERBOARD/SEPARATORS SHEETS AND MEMBRANE MATERIALS

A. 4' x 8' Rigid polyisocyanurate board with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 IB ISO Energy Board, LTTR: 15.3; Thickness: 2.5" (63.50mm).

B. 4' x 8' Rigid polyisocyanurate board with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 IB ISO Energy Board, LTTR: 18.5; Thickness: 3.0" (76.20mm).

C. Field & Base Flashing Membrane: 80 mil Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane, conforming to the following standards:

**IB Roof Systems 80 mil PVC Roofing Membrane
 Typical Properties**

Property	Method	Requirement	80 mil
Thickness [in]	ASTM D751	0.045	0.080 (+/- 10%)
Breaking Strength [lb/in.]	MD	ASTM D751	200
	XMD	A-Grab Method	200
Elongation @ Break [%]	MD	ASTM D751	15 ^A
	XMD	A-Grab Method	15 ^A
Retention of Properties after Heat Ageing:			
Breaking Strength [%]	ASTM D3045	90%	Pass
Elongation @ Break [%]	80°C for 56 days	Original	Pass
Tearing Strength [%]			Pass
Tearing Strength [lb]	MD	ASTM D751 B-Tongue Tear Method	45
	XMD		45
Low Temperature Bend [°C]	ASTM D2136 -40°C	Pass	Pass
Accelerated Weathering			
Cracking (7x Magnification)	ASTM G53	None	None
Crazing (7x Magnification)	5,000 h min	None	None
Discoloration (Visual)		Negligible	Negligible
Linear Dimensional Change [%]	MD	ASTM D1204 80°C for 56 days for 6 hours	0.5
	XMD		0.5
Change in Weight After Immersion in Water [%]	ASTM D570 70°C for 168 hours	3	1.2
Static Puncture Resistance	ASTM D5602 33 lbf @ 23°C	Pass	Pass
Dynamic Puncture Resistance	ASTM 5635 20J @ 23°C	Pass	Pass
Seam Strength	D751	75%	100%
Weight (per 360sq. ft.)			195 lbs.
Solar Reflective			0.87
Thermal Emittance			0.88
Warranty (years non-prorated)			25 Years

2.3 ROOF INSULATION/COVERBOARD/SEPARATORS SHEETS AND MEMBRANE MATERIALS (FOR TAPERED ASSEMBLIES)

- A. 4' x 4' rigid polyisocyanurate board with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 IB ISO Energy Board.
- B. Field & Base Flashing Membrane: 80 mil Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane, conforming to the following standards:

IB Roof Systems 80 mil PVC Roofing Membrane Typical Properties

Property	Method	Requirement	80 mil
Thickness [in]	ASTM D751	0.045	0.080 (+/- 10%)
Breaking Strength [lb/in.]	MD	ASTM D751	540
	XMD	A-Grab Method	480
Elongation @ Break [%]	MD	ASTM D751	40
	XMD	A-Grab Method	38
Retention of Properties after Heat Ageing:			
Breaking Strength [%]	ASTM D3045	90%	Pass
Elongation @ Break [%]	80°C for 56 days	Original	Pass
Tearing Strength [%]			Pass
Tearing Strength [lb]	MD	ASTM D751 B-Tongue Tear Method	74
	XMD		70
Low Temperature Bend [°C]	ASTM D2136 -40°C	Pass	Pass
Accelerated Weathering			
Cracking (7x Magnification)	ASTM G53	None	None
Crazing (7x Magnification)	5,000 h min	None	None
Discoloration (Visual)		Negligible	Negligible
Linear Dimensional Change [%]	MD	ASTM D1204 80°C for 56 days for 6 hours	-0.4
	XMD		0.0
Change in Weight After Immersion in Water [%]	ASTM D570 70°C for 168 hours	3	1.2
Static Puncture Resistance	ASTM D5602 33 lbf @ 23°C	Pass	Pass
Dynamic Puncture Resistance	ASTM 5635 20J @ 23°C	Pass	Pass
Seam Strength	D751	75%	100%
Weight (per 360sq. ft.)			195 lbs.
Solar Reflective			0.87
Thermal Emittance			0.88
Warranty (years non-prorated)			25 Years

2.4 MEMBRANE ADHESIVE AND SEALANT MATERIALS

- A. Membrane Adhesive: IB Vertibond Contact Adhesive.
- B. Sealant: IB Water-Stop.
- C. Sealant: IB Polyurethane Caulk.
- D. Pitch Pan Filler: IB Pitch Pan Filler

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2.5 MISCELLANEOUS MATERIALS

- A. IBRS Insulation Fasteners: Fasteners used to secure rigid insulation shall be FM approved, corrosion resistance, coated #12 insulation fastener and used with 3" steal insulation plates.
- B. Insulation Adhesive: Insulation Adhesive used to secure rigid insulation or cover board.
- C. IBRS Separator Sheet Fasteners: Fasteners used to secure separator sheet shall be FM approved, corrosion resistance, coated #14 with 3" galvalume insulation plates.
- D. IBRS Membrane Fasteners: Fasteners used to secure IBRS PVC membrane shall be FM approved, corrosion resistance, coated #14 with barbed membrane plates.
- E. Termination Fasteners: Per IBRS Details.
- F. Wood Nailers: Wood nailers are to be # 2 or better, Creosote and asphalt free lumber with a maximum moisture content of 19% by weight on a dry weight basis.

2.6 ROOFING ASSEMBLY SUMMARIES:

- A. Roof Deck: Plywood over 2 ½" wood plank.
- B. Substrate: Roof deck must be clean, dry, smooth, and structurally sound to receive the new roofing system. Drainage must be incorporated in the design to prevent ponding water.
- C. IB ISO Energy Board is to be attached to the roof deck per the uplift design pressures determined by the Authority Having Jurisdiction (AHJ)/Design Professional as outlined by the 'International Building Code' (IBC) and ASCE-07.
 - 1. Fasten insulation according to the Local Building Code.
 - 2. Fasten insulation to resist uplift pressures at the corners, perimeters, and field of roof per manufacturer's and ASCE 7-05.
- D. Field Membrane, Mechanically Attached over the surface of the specified components per the Roofing Manufacturers IBRS attachment requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).

2.7 ROOFING ASSEMBLY SUMMARIES: TAPERED ASSEMBLIES (Gutters)

- A. Roof Deck: Plywood over 2 ½" wood plank.
- B. Substrate: Roof deck must be clean, dry, smooth, and structurally sound to receive the new roofing system. Drainage must be incorporated in the design to prevent ponding water.
- C. IB Taper ISO Energy Board is to be attached to the roof deck per the uplift design pressures determined by the Authority Having Jurisdiction (AHJ)/Design Professional as outlined by the 'International Building Code' (IBC) and ASCE-07.
 - 1. Fasten insulation according to the Local Building Code.
 - 2. Fasten insulation to resist uplift pressures at the corners, perimeters, and field of roof per manufacturer's and ASCE 7-05.

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- D. Field Membrane, Fully Adhered over the surface of the specified components per the Roofing Manufacturers IBRS attachment requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify that deck is supported and secured.
- C. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set.
- D. Verify that attachment capabilities of the roof deck and fasteners by conducting pull-out tests per ANSI-SPRI FX-1 -2003.
- E. Beginning of installation means installer accepts substrate.

3.2 PROTECTION

- A. Protect building surfaces against damage from roofing work. Provide safety barriers and other protection devices as needed to protect property and people.

3.3 PREPARATION

- A. Accurately layout work surfaces for materials application. Verify acceptability of substrate for roofing. Lay IBRS PVC Field Membrane perpendicular to the incline starting at the low point of the roof.
- B. Provide material to substrate as required to produce an even substrate that will maintain the required slope for drainage.

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. All drains, projections and edges shall be installed in strict accordance with practices set forth in the NRCA Roofing Manual or IBRS Specification Manual. All mechanical equipment requiring fastening shall be fastened with hex head screws with neoprene washers.
- B. Cooperate with inspection and testing agencies engaged or required to perform services in connection with roofing system installation.
- C. Provide cut-offs at end of each day's work, to cover exposed partially installed membrane and insulation. Remove cut-offs before resuming work.
- D. In finished areas, storing, walking, wheeling, or trucking will not be permitted. Provide smooth, clean boards or plank walkways, runways, and platforms near supports, as needed to distribute weight to conform to indicated live load limits and transient loads imposed during roofing installation and construction.

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- E. Membrane overlaps shall be shingled with the flow of water whenever possible.

3.5 INSULATION APPLICATION, INSULATED ROOF ASSEMBLIES

- A. IB ISO Energy Board is to be attached to the roof deck per the fastening requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the insulation manufacturer.
- B. First Course: Start by installing a cut layer of insulation, achieving a minimum end-lap and side-lap offset of the underlying insulation courses of insulation by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of insulation, achieving a minimum end-lap offset of the first Thermal Barrier course of insulation by 12", at the low side of the roof (directly above the first course of Thermal Barrier) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described in the section above, until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- D. Subsequent Courses: Continue installing additional courses, alternating sections B, and C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage insulation during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Insulation must be installed with the correct facer side up (as written on the insulations face).
- H. Insulation must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied insulation with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. **INSULATION MAY NOT BE LEFT UNCOVERED OVERNIGHT.**

3.6 INSULATION APPLICATION, INSULATED ROOF ASSEMBLIES

- A. IB Taper ISO Energy Board is to be attached to the roof deck per the fastening requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the insulation manufacturer.

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- B. First Course: Start by installing a cut layer of insulation, achieving a minimum end-lap and side-lap offset of the underlying insulation courses of insulation by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of insulation, achieving a minimum end-lap offset of the first Thermal Barrier course of insulation by 12", at the low side of the roof (directly above the first course of Thermal Barrier) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described in the section above, until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- D. Subsequent Courses: Continue installing additional courses, alternating sections B, and C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage insulation during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Insulation must be installed with the correct facer side up (as written on the insulations face).
- H. Insulation must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied insulation with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. INSULATION MAY NOT BE LEFT UNCOVERED OVERNIGHT.

3.7 IB FIRE SHEET APPLICATION

- A. IB Fire Sheet is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), and the local building code.
- B. First Course: Start by installing a full width layer at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) lay perpendicular to the roof slope. Place approved fasteners over the face of the IB Fire Sheet per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of IB Fire Sheet as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. All courses shall be installed with 2" side-laps and 4" end caps.

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- D. IB Fire Sheet must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).

3.8 FIELD MEMBRANE APPLICATION

- A. Mechanically Attached Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), and the local building code.
- B. Zone 2 & 3 (perimeter & corner): Start by installing a 36" (half rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Place approved fasteners at the ink markings of the Field Membrane per the lap spacing density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing 36" (half rolls) wide Sheets as described until reaching the end of the perimeter zone that is being roofed that work day or onset of inclement weather.
- C. Welding Start-Up (start of every welding cycle: morning, after break, after lunch, ECT): Before starting any finish welding, operators are to conduct several test welds using the same membrane at the same ambient temperature as the just installed courses and cut 1" wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled, is torn away, exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1" wide and 1-1/2" wide for hand welds. Automatic Welder temperature and speed is to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).
- D. All courses shall be installed with 5" side-laps, and 4" end-laps.
- E. IBRS Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- F. Zone 1 (field): Start by installing a 72" (full rolls) wide sheets lapping onto the last course of the perimeter and corner sheets, so that the water flows over, but never against the side laps. Place IBRS fasteners at the ink markings of the Field Membrane per the lap spacing density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing 72" (full rolls) wide Sheets as described until reaching the end of the field zone that is being roofed that work day or onset of inclement weather.
- G. Zone 3 (corner): install perimeter sheets as described in section B. install additional rows of fasteners and plates over the top surface of the installed sheets in a straight line at 3' intervals at the fastener spacing required by the designer of record or authority having jurisdiction. Install a cover-strip of re enforced 50 mil. IB membrane that is heat-welded around the perimeter of the cover-strip.

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3.9 FIELD MEMBRANE APPLICATION: TAPERED ASSEMBLIES (Gutters)

- A. Fully Adhered Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), and the local building code.
- B. All Zones (1 field, 2 perimeter, & 3 corner): Start by installing a 72" (full rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Apply adhesive to the top surface of the substrate, and the bottom surface of the sheet at the nominal rate of 1 gallon per 120 sq.ft per surface per square. Allow the adhesive to dry to the touch . Carefully roll the sheets in and avoid wrinkles or buckles. Use a weighted roller and run over the entire surface of the adhered membrane to ensure a bond between the bottom surface of the membrane, and the adhesive applied to the surface of the substrate.
- C. Welding Start-Up (start of every welding cycle: morning, after break, after lunch, ECT): Before starting any finish welding, operators are to conduct several test welds using the same membrane at the same ambient temperature as the just installed courses and cut 1" wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled, is torn away, exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1" wide and 1-1/2" wide for hand welds. Automatic Welder temperature and speed is to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).
- D. All courses shall be installed with 3" side-laps, and 4" end-laps.
- E. IBRS Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).

3.10 ROOF FLASHINGS

- A. Install the field, perimeter, and corners as described in sections above.
- B. IBRS Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/ penetrations (larger than 6" diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark ½" above height of penetrations and install a continuous 1/8" bead of IB water stop around penetration. Slide IBRS cone flashing over penetration and center. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.
- C. IBRS Cone Flashing (split flashings): Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/ penetrations (larger than 6" diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark ½" above height of penetrations and install a continuous 1/8" bead of water stop around penetration. Wrap cone flashing around penetration and center. Tack weld in several spots to prevent flashing from becoming

misaligned. Heat weld around the perimeter of the target sheet and up the vertical lap of the split cone. Probe and repair all non-welded areas.

- D. Install stainless steel draw band 1/8" below the top of the cone to penetration connection and tool in a 1/4" continuous bead of Urethane sealant at the top of the flashing.

3.11 BASE FLASHINGS

- A. Install the field, perimeter, and corners as described in sections above.
- B. Install IBRS membrane plates and fasteners evenly distributed around the base of all roof to wall (curbs, parapet walls, roof top equipment, ECT) per IBRS specification details. Cut base flashing membrane to size and either adhere using IB Vertibond adhesive applied to both the substrate and the back of the base flashing membrane, or loose laid per the IB specifications manual. Heat weld around the perimeter of the base flashing sheet. Heat weld the appropriate inside or outside corner. Probe and repair all non-welded areas. Terminate the top of the membrane by installing a continuous bead of IB water stop between the top of the sheet and the top edge of the vertical substrate and nail off using the appropriate fastener at 6" on center. Counter flash as specified.

3.12 ROOF EDGES

- A. Install the perimeter, and corner membranes as described in sections above.
- B. Start by laying the IB Clad Metal tightly to the interior edge of the roof edge and secure to the wood nailer/ blocking using approved fasteners that meet the withdrawal requirements for perimeter securement by the local building code. Gap all end joints a minimum of 1/4" and install 2" wide IB foil tape starting at the bottom edge of the crimp and to the interior outer edge of the deck flange. Next, heat weld an IB 5" wide non-reinforced patch centered over the metal join. Then install a 6" metal cover strip by welding the cover strip starting at the top edge of the deck flange and to the field membrane. Over-lap and heat weld all end laps a minimum of 3".

3.13 ROOF DRAINS

- A. Install the field, perimeter, and corner membranes as described in sections above.
- B. Install a membrane plates and fasteners evenly distributed around the base of the roof drain 6" on center. Cut drain flashing membrane to size and heat weld around the perimeter. Probe and repair all non-welded areas. Make a small hole to allow water to enter drain. Using a sharp knife, cut small x where the drain bolt can be inserted to the drain bowls threaded hole. Lift target and apply a heavy bead of IB water stop between the drain and the target sheet. Lay clamping ring and strainer basket over the target sheet, thread in the drain bolts, than tighten to provide compression seal at the drain.

3.14 ROOF SCUPPERS

- A. Install the perimeter, and corner membranes as described in sections above, and the base flashings of the perimeter walls as described in section above.

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- B. Position IB Scupper over the scupper opening. Fasten the scupper at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

3.15 ROOF VENTS

- A. Install the perimeter, and corner membranes as described in sections above, and the base flashings of the perimeter walls as described in section above.
- B. Position IB Vent over the opening. Fasten the vent at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

3.16 CLEAN UP

- A. Remove all dirt, debris and construction debris. Remove any scuffs, stains or noticeable marks per manufacturer's requirements.

END OF SECTION