SECTION 061710 - MASS TIMBER

PART 1 - GENERAL

The term “panels” used throughout this Section includes all mass timber structural elements of the project, as all such components are fabricated as wood panels.

Manufacturers’ products listed are considered as basis-of-design.

1.1 SUMMARY

A. Section Includes:

1. Mass timber framing panels composed of:
   a. Cross-laminated timber (CLT)
   b. Dowel-laminated timber (DLT)
   c. Nail-laminated timber (NLT)
   d. Mass plywood panels (MPP)
   e. **[____]**.

2. Connections and hardware for complete panelized timber wall, roof and floor construction.
3. Moisture management systems for wood components during construction.
4. Wood components and connections/hardware finishes and coatings.

B. Products Furnished, but Not Installed, under This Section:

1. <**Add products furnished, but not installed>**.

1.2 RELATED SECTIONS

Retain the following paragraph or the next paragraph depending on where delegated design procedures are specified.

A. Section 013573 - Delegated Design Procedures.

B. Section 014000 - Quality Requirements.

C. Section 017000 – Execution and Closeout Requirements.

D. Section 018113 - Sustainable Design Requirements: For emissions and certification requirements.

E. Section 033XXX - XXXX Concrete: Permanent [**structural composite**] **[topping slab]** concrete deck system applied to wood floor decking.

F. Section 051200 - Structural Steel Framing: Connection of panel supporting hardware to steel framing.

G. Section 061053 - Miscellaneous Rough Carpentry: Wood blocking and nailers.

The following types of mass timber type components are excluded from this Section, as historically they have their own Sections.

H. Section 061300 - Heavy Timber Construction: Solid wood timber construction.

I. Section 061800 - Glued-Laminated Construction: Structural glued-laminated timber.

J. Section 061715 - Engineered Structural Wood: Laminated veneer lumber, parallel-strand lumber, laminated-strand lumber, prefabricated I-joists, engineered rim boards, and other wood composites sections.

Use of Mass Timber is similar to a rainscreen: close coordination with all the other trades involved in the building's permanent weather protection is required. List all Sections that need coordination.

K. Section 072500 - Weather Barriers: Permanent weather barriers applied to wall assemblies.

L. Section 073XXX - XXXX Shingles: Permanent sloped roofing system applied to wood roof decking.

M. Section 0741XX - XXXX Metal Roofing: Permanent sloped roofing system applied to wood roof decking.

N. Section 0742XX - XXXX Wall Panels: Permanent wall panel system applied to wood wall panels.

O. Section 075XXX - XXXX Roofing: Permanent low-slope roofing system applied to wood roof decking.

Verify use of Detec ELD or similar electronic leak detection / moisture monitoring system to be installed in unballasted membrane roofing Section(s). This provides a level protection from small water leaks damaging the wood decking.

P. Section 078XXX – Firestopping: Penetrations and perimeter wall conditions in fire-rated assemblies.

Q. Section 099XXX - XXXX Painting: Painting of exposed hardware and connectors.

R. Section 2131XX - XXXX Sprinkler Systems: Exposed mounting to and access through mass timber components.

S. Section 22111X - XXXX Piping: Exposed mounting to and access through mass timber components.

T. Section 2605XX - Conduits for Electrical Systems: Exposed mounting to and access through mass timber components.

U. Section 313116 - Termite Control: Protection of mass timber components.

1.3 REFERENCES

A. ANSI/APA PRG 320 - Standard for Performance-Rated CLT.

B. ANSI/AWC NDS National Design Specification (NDS) for Wood Construction with Commentary and 2018 NDS Supplement.

C. APA EWS T300 – Glue-Lam Construction Details.

D. APA PR-L325 – Product Report: Freres Mass Ply Panels (MPP) and Mass Ply Lam (MPL) Beams and Columns.

E. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

F. ASTM D5456 – Standard Specification for Evaluation of Structural Composite Lumber Products.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

H. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

1.4 DEFINITIONS

A. Cross-Laminated Timber (CLT): A solid wood structural element, created by placing dimensioned softwood bonded together with adhesives, the grain oriented in accord with manufacturer’s engineered wood specifications, with every other layer set perpendicularly to each other.

B. Dowel-laminated Timber (DLT): A solid wood structural element, created by placing dimension softwood lumber on edge, friction-fastening together with hardwood dowels.

C. Nail Laminated Timber (NLT): A solid wood structural element created by placing dimension lumber on edge and fastening the individual laminations together with nails.

D. Mass Plywood Panels (MPP): constructed with density-graded softwood veneers, which are glued with resin and pressed together in an alternating grain direction pattern, creating large-format structural wood platforms, beams, and columns, manufactured in thickness of 1” increments to depths up to 24 inches.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at Project site.

1. Required Attendance: Erector, **[Architect,] [Engineer,]** manufacturer's designated field representative, and installers of work that interfaces with or affects the Project’s moisture control.
2. Review Moisture Management Plan, including protection membrane manufacturer's installation instructions, taping of joints, tenting, and sealing and wrapping of adjacent materials to protect wood component for the duration of the Project, and scheduling and

installation of subsequent permanent weather barrier, air barrier, and roofing systems' materials.

3. Review and finalize construction, and verify availability of materials, Erector's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate conditions and exposed finishes for compliance with requirements.
5. Review protection membrane details, penetrations, and condition of other construction that affects the wood components' moisture content.

1.6 ACTION SUBMITTALS

A. Product Data:

1. Include data on lumber species, adhesives, sealants and backer rods, fabrications, coatings, and moisture protection products.
2. For connectors and hardware. Include installation instructions.

B. Shop Drawings:

1. Manufacturer to provide a complete and accurate three-dimensional (3D) model of the interfaces (supports, abutments, etc.), panels, secondary timber and steel members, plus all openings and connections. Provide installation drawings for panels showing sequence of placement, location, sizes, overall dimensions, reinforcement, screw and attachment locations, safe handling directions and any special erection instructions. Include any reinforcement necessary for safe handling and erection of panels. Identify each panel and the corresponding sequence and procedure followed during installation, and location and details of anchorage devices that are embedded in other construction on layout drawings. Include locations of joints, openings, columns, decking protrusions, and other locations requiring moisture management
    a. When component thicknesses dimensions vary from those shown on contract documents, align components with top level of floors and roofs, and exterior faces of wall panels.
2. PDF Shop Drawings: Clearly indicate stress grade, service grade, appearance grade, connection details, shop applied finishes, shop and erection details, including cuts, holes, fastenings and connection hardware. Shop drawings shall be accompanied by a certificate of conformance to ANSI/APAPRG 320 manufacturing standard including required grade and actual minimum characteristic test values, allowable design properties, allowable bending capacities, specified strength and modulus of elasticity; all in both the major direction and minor strength direction. direction and minor strength direction.

C. Delegated Design Submittal: Analysis data, shop drawings and design calculations to be signed by a Registered Professional Structural Engineer, registered in the State of **[_____]** for items designed by mass timber manufacturer.

D. Samples for Initial Finish Selections: Manufacturer's standard samples, showing full range of available connections, **[wood stains,] [topcoats,]** and hardware finishes.

E. Wood Finish Samples for Verification: Submit three samples, 4 inches minimum square by three laminate thickness for industrial grade faced product and 12 inches square by three laminate thickness sample for visual/architectural grade panels to illustrate the quality, surface finish, and

color of exposed-to-view surfaces. Coat half of each sample's exposed face with shop coating and other half with field coatings.

F. Moisture Management Plan.

G. Sustainable Design Submittals:

1. Procurement of Low Carbon Construction Materials
   a. Submit Product-Specific Type III Environmental Product Declaration (EPD) where required. If unavailable provide industry-wide EPD.
   b. Submit updated Environmental Impact Calculator with each submittal coversheet which includes the following:
      1) Declared unit material quantity.
      2) Required baseline or project threshold as indicated in applicable Section.
      3) Realized carbon emissions (declared unit quantity x KgCO2e/declared unit)
      4) Verification that product GWP does not exceed the project GWP threshold as stated in the applicable specification Section.
2. Sourcing of Raw Materials
   a. Certified Wood: Provide documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates for manufacturer and vendor indicating compliance with forest certification requirements.
3. Low-Emitting Materials: Provide documentation demonstrating compliance with applicable standard for mass timber products.

1.7 INFORMATIONAL SUBMITTALS

These submittals require review, but no responsive action and return to Contractor, provided submittals comply with requirements. If rejected, submittals with notes and reasons are returned to Contractor.

A. Coordination Drawings: Manufacturer to provide a fully accurate three-dimensional (3D) model of the interfaces (supports, abutments, etc.), panels, secondary timber and steel members, plus all connections to other structural members.

B. Certificates:

1. Manufacturer’s certificate.
2. Panel certificates.
3. Welding certificates.
4. Forest certificates.

C. Test and Evaluation Reports:

1. Material Test Reports: For each sealant and **[_____]**, by a qualified testing agency.
2. Product Test Reports: For each sealant for tests performed by qualified testing agency or manufacturer and witnessed by a qualified testing agency.
3. Research Reports: For **[Add products, assemblies, or systems],** from [**an agency acceptable to authorities having jurisdiction**] [**ICC-ES**] [**Add evaluation agency]** showing compliance with [**Add requirement]**.
4. Preconstruction Test Reports: For **[Add item].**

D. Source Quality-Control Submittals:

1. Source quality-control reports.

E. Qualification Statements: From manufacturer and erector.

F. Delegated design engineer qualifications.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Refer to Section 017700 "Closeout Procedures" for submission of maintenance material items.

Retain the following paragraph if topcoat is specified.

B. Extra Stock Material: Furnish extra five gallons of topcoat finish materials [**, from the same production run,**] to Owner that match products installed and that are packaged for storage and identified with labels describing contents.

C. Provide product data of maintenance material items:

1. Manufacturer’s recommended stain cleaners.
2. Panel joint sealants and backer rods.

1.9 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturers: Licensed by the American Institute of Timber Construction (AITC) or APA - The Engineered Wood Association (APA).
   a. Certification: Manufacturer shall be certified in accordance with the ANSI/APA PRG 320 “Standard for Performance-Rated Cross-Laminated Timber”.
   b. Design Standards: Manufacturer shall comply with the National Design Specification for Wood Construction – NDS 2015, applicable to types of panels indicated for design and installation of lifting adds and char-rate calculations of fire-rated panels.

Retain the following paragraph if the following paragraph is required due to project's financing.

   c. Wood components to be harvested and fabricated within the United States of America.
2. Certifications: For mass timber panels, include a product report or laboratory report issued by a U.S. product certification agency accredited under ISO/IEC 17065 or a U.S. product inspection agency accredited under ISO/IEC 17020. Include the following information in the certification:
   a. Manufacturer's Standards.
   b. Stress grade and appearance classification.
   c. Lay-up of wood, species and grades used.
   d. Connection Hardware Standards in accordance with manufacturer's specifications.
   e. Manufacturer's panel durability tests and testing results.

f. Provide adhesive products in compliance with ANSI 405 and ANSI/APA PRG 320, to grade of service required in accordance with the National Design Specification for Wood Construction (NDS).

3. Erector: Company with documented experience of installing similar mass timber framing components for a similar sized, conditioned-space facility, trained and approved by the panel manufacturer.

B. Erector's Moisture Management Plan: Review design conditions and prepare a detailed plan identifying procedures for moisture protection of wood components from shop-fabrication to permanent building occupation, in accordance with version 2.1 of "Moisture Risk Management Strategies for Mass Timber Buildings" by RDH Building Science. Include erector's handling, erection, sequencing, and remedial repair procedures.

Retain "Welding Qualifications" Subparagraph below if shop or field welding is required. If retaining, also keep "Welding certificates" Subparagraph in "Informational Submittals" Article.

C. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:

Retain subparagraph below for structural welding of steel.

1. AWS D1.1/D1.1M.

Retain subparagraph below for structural welding of reinforcing steel.

2. AWS D1.4/D1.4M.

Retain subparagraph below for structural welding of stainless steel.

3. AWS D1.6/D1.6M.

D. Forest Stewardship Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.

1.10 MOCKUPS

A. Build mockups [**to demonstrate aesthetic effects**] [**to set quality standards for materials and execution**] [**to set quality standards for fabrication and installation**].

1. Build mockup [**as indicated on Drawings**] [**Add mockup requirements**].
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.11 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: In accordance with Section 014000 “Quality Requirements’, [**Owner will engage**] [**Engage**] a qualified testing agency to perform the following preconstruction testing.

1. Joint Sealants:
    a. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing of same wood species, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
    b. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
    c. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
    d. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with exposed-to-view wood surfaces.
    e. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
    f. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
    g. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
    h. Provide test specimens and assemblies representative of proposed materials and construction.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver the panels to the Project site in covered or protected systems in accordance with manufacturer's standards and the Moisture Management Plan for proper handling and storage. Label and deliver in sequence of construction for the project, equipped with loading straps by the manufacturer, erected by certified crane operators and fabrication handlers and protected for prolonged inclement weather conditions after erected. Replace damaged or deteriorated panels.

B. Provide manufacturer's instructions for handling, erection procedures, sequencing, administration of screws and attachments and recommended tools and tolerances. Note applicable safety precautions and standards. Have a copy of all instructions present on the project site.

C. Storage and Protection:

1. Store mass timber panels blocked off ground and separated with striping, so air may circulate around all faces of the panels.
2. Cover top and sides of panels with opaque moisture resistant membrane if outside.
3. Maintain protection of panels during construction, with special care taken of panels permanently exposed to view.

1.13 CORRECTIVE PERIOD INSPECTION

A. Perform a field inspection of exposed-to-view mass timber panel and joints 11 months after Substantial Completion.

1. Perform inspection with representatives of Erector, Manufacturer, and Owner.
2. Perform visual review of the panel undersides for identification of staining and other signs of leakage, any checking or splitting, excessive movements at joints and supports beyond designed range, condition of panels and beams after settling and other panel movements which trended toward equilibrium, and other visible apparent deleterious conditions. Visual review to include all accessible surfaces not covered by permanent enclosures. Document with photographs all unacceptable conditions and note locations on building plans.
3. If visible signs of wetting are observed, extend inspection to include moisture content measurements and other applicable forensic work for determining condition and development of a recommended solution.

B. Provide **[Architect] [Engineer]** and Owner with written report, including necessary proposed repairs, within 7 days of inspection.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain mass timber wood products from a single manufacturer.

B. Obtain each color, grade, finish, type, and variety of products from single source with resources to provide finished products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in **[Section 013573 "Delegated Design Procedures"] [Section 014000 “Quality Requirements”]** to design panels, connectors, and hardware in this Section:

1. Super Imposed Load: Refer to Structural Design Criteria on the Structural Drawings for all live loads, including flat snow. **[Refer to Structural Loading Plans for snow drift locations.]**
2. Mass timber panels shall meet or exceed minimum design values listed on the Structural Drawings.

Retain subparagraph above, or delete and replace with values below

3. Allowable Total Load Deflection: [**Span / 240] [ ]**.
4. Allowable Wind Diaphragm Shear (CD = 1.6) = [**1,350 plf] [ ]**

B. Provide mass timber panels that meet ANSI/APA PRG 320 standards. Factory mark every panel with AITC Quality Mark or APA-EWS trademark and provide a certificate of conformance. Marks must not be visible in final assemblies exposed to view. Manufacture of the panels must conform to AWC NDS and SP-529E.

C. Fire-Test-Response Characteristics: Provide mass timber panels and system components with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

Subparagraphs below are examples only; revise to suit Project after verifying requirements of authorities having jurisdiction.

Retain "Fire-Resistance Characteristics" Subparagraph below only where fire-resistance-rated construction is required, and testing has demonstrated that panels does not reduce fire resistance. Verify acceptability of such assemblies with authorities having jurisdiction.

1. Fire-Resistance Characteristics: Provide materials and construction assemblies tested for required fire resistance hourly rating of building elements listed on Drawings per ASTM E119 or UL 263.
   a. Fire-resistive ratings shall meet Code requirements.
   b. Fire resistance of exposed wood members shall be in accordance with Chapter 16 of ANSI/AWC NDS National Design Specification (NDS) for Wood Construction with Commentary, 2018 NDS Supplement, and 2022 ANSI/AWC Fire Design Specification for Wood Construction (FDS).
2. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which wall panel is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies.
3. Surface-Burning Characteristics: Provide wall and floor/ceiling panels with a spread of flame and smoke develop index rating based on occupancy and location per Building Code, as tested per ASTM E84 or UL 723.
   a. Compliance with NFPA 286 allowed where Class A wall and ceiling finishes are required.
   b. Compliance not required where wood assembly meets the requirements of “Heavy Timber” per IBC Chapter 6 and 23, except where wood finishes are exposed in Interior Exit Stairways, Interior Exit Ramps and Exit Passageways, as defined by the Building Code.

2.3 PANEL MATERIALS

A. Provide mass timber panels fabricated in accordance with ANSI/APA PRG 320.

1. Stress Grade: As required for structural design criteria, graded in accordance with ANSI/APA PRG 320.
2. Appearance Classification:
   a. Exposed-To-View Wood Species: **[Spruce Pine Fir] [Douglas Fir-Larch] [_____]** combination. Provide all exposed-to-view portions of components from same species.
   b. Panels exposed to view: Architectural appearance classification.
   c. Panels not exposed to view: Industrial appearance classification of any compatible species.
3. Except for MPP panels, fabricate all panels from a single species of wood.
4. Moisture Content: Comply with ANSI/APA PRG 320 for moisture content, up to a maximum of 15 percent, and compatible with the criteria of the certified adhesive applied.

B. Adhesive: Adhesives must be certified by test for use with the species to which it is applied in accordance with ANSI/APA PRG 320. Apply and allow set times as required by the adhesive manufacturer's instructions. Apply pressure on the panels and for the duration during manufacture as required by the adhesive manufacturer's instructions.

C. Timber Hardware: Design connections to AWC NDS, and AISC 360 unless specifically detailed by the Engineer of Record, to resist shears, moments and forces indicated. Fabricate connective hardware in accordance with AISC 360.Clean oil, dirt, rust, and foreign matter from all metal surfaces.

1. Structural Steel: Provide structural steel shapes, plates, and flat bars as indicated for assembly and connection of members conforming to ASTM A36.
2. Hot-Rolled Steel Sheet: Provide hot-rolled steel sheet complying with ASTM A1011, structural steel, Type SS, Grade 33.

2.4 ACCESSORIES

A. Steel Connectors: Hot dipped galvanized steel.

Retain the following paragraph for project locations with minimal yearly precipitation and low humidity. Also consider if project's mass timber construction will occur and be permanently weather protected during dry months of the year.

B. Protection Coating: Aliphatic hydrocarbon solvent & paraffin oil wood coating (hydrophobic, permeable), equal to Thompson's Water Seal (TWS) Clear Wood Sealer.

Retain the following three paragraphs for project locations with typical or higher yearly precipitation with higher humidity during construction.

C. Protection Membrane: Weatherproof yet vapor permeable, lightproof, primerless self-adhering where indicated, zero VOC, stain-free membrane, specifically fabricated for protection of mass timber fabrications, leaving no residue or marks on wood when removed.

D. Protection Membrane Seam Tape: Waterproof self-adhering fabric, capable of weathertight sealing of joints in wood components and protection membrane, for duration and type of exposure to weather, leaving no residue or marks on wood when removed.

E. Temporary Drainage System: Provide temporary roof and floor drains connected to suspended flexible watertight piping as required to drain accumulated water from pooling on roof and floor areas.

F. Sealants: **[Dow Corning 790,]** Nonstaining Silicone; ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.
2. Nonstaining to light-colored softwood when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
5. Color: As selected by **[Architect] [Engineer]** to match adjacent finished surfaces.

G. Shop Applied Panel Face Coating: Clear, penetrating aqueous low-VOC protective undercoating with enhanced water repellency and long-term UV protection., equal to KP-12UVW Protective Undercoat as manufactured by Sansin.

H. Shop Applied Panel Edge Coating: Clear, thick build, permeable, low-VOC, fungal resistant wax emulsion water repellent end sealer., solvent free, equal to Broda Pro-Tek-Tor Check Stop Wax.

Retain the following paragraph for exterior locations and interior exposed to view locations desiring a clear coating.

I. Field Applied Topcoat Finish Material: Transparent, low VOC, water soluble, permeable, **[satin] [high]** gloss, protective topcoat, equal to SDF Enviro Stain, as manufactured by Sansin.

2.5 FABRICATION

A. Prior to fabrication, verify critical field dimensions, report discrepancies to **[Architect] [Engineer].** Begin fabrication when three-dimensional model has been coordinated between trades, and shop drawings approved.

B. Panels to be joined at edges using a continuous spline as indicated on shop drawings. All required fastener and spline geometry by manufacturer if alternative spline assembly is preferred.

C. Mark panels for identification during erection, ensure that marks will be concealed in final assembly for appearance grade panels exposed-to-view. Clearly mark top surface. Do not use stickers or other markings on exposed-to-view surfaces.

D. All structural steel connecting panels to each other and to supporting panels shall be detailed, supplied and test fitted in the shop by the panel manufacturer.

E. Appearance Classifications:

1. Non-Exposed Applications: Industrial Appearance; locations where panels are concealed from direct view in final construction.
   a. Shake and checks allowed, shall not exceed 36 inches or 1/4 of the panel length.
   b. Heart or Blue Stain allowed, not limited.
   c. Knots shall be well-spaced, quantity not limited.
   d. Minimal wane on face is permitted.
   e. Side pressure on exposed face is not required.
   f. Final sanding finish: Minimum 80 grit.
2. Exposed Applications: Architectural Appearance; locations where panels are exposed to view in final construction. Exposed face to utilize “J” grade of SPF lumber.
   a. Shake and checks allowed, shall not exceed 24 inches long, none through.
   b. Heart or Blue Stain: **[Not allowed] [Maximum 5% of area]**.
   c. Knots shall meet NLGA Select Structural limitation; Select Tight Knot.
   d. Pitch Streaks are not permitted.
   e. Wane on face is not permitted.
   f. Side pressure on exposed faces required.
   g. Final sanding finish: Minimum 100 grit.

h. Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

3. Chamfers: Visual grade panels to be fabricated with 1/4-inch chamfers on long sides, Non-visual grade panels can be supplied without chamfers (90 degree corners).
4. Tolerances:
   a. Length (between outside bearing edges): within 0.25 inches.
   b. Width: within 0.125 inches.

F. Joints: Panels to be joined at edges using a continuous spline as indicated on shop drawings.

G. Connectors: All structural steel connecting panels to each other and to supporting panels shall be detailed, supplied and test fitted in the shop, as recommended by the panel manufacturer. All connector materials shall be manufactured and fabricated in the USA or Canada.

Retain the following paragraph for project locations with minimal yearly precipitation and low humidity. Also consider if project's mass timber construction will occur and be permanently weather protected during dry months of the year.

H. Shop Applied Panel Face Coatings:

1. Apply a single flood coat of panel face coating on top surfaces of wood decking components, in accordance with coating manufacturer's instructions.
2. Shop apply a loose layer of unadhered protection membrane wrap around all wood beams and columns, sealed weathertight.
3. Provide top surfaces of roof and floor decking with adhered protection membrane to protect wood components from weather.
4. Coordinate edge conditions with decking joint and opening locations to permit field-applied weathertight installation of protection membrane seam tape.

Retain the following paragraph for project locations with typical or higher yearly precipitation with higher humidity during construction.

I. Shop Applied Protection Membrane:

1. Shop apply a loose layer of unadhered protection membrane wrap around all wood beams and columns, sealed weathertight, in accordance with membrane manufacturer's instructions.
2. Provide top surfaces of roof and floor decking with adhered protection membrane to protect wood components from weather.
3. Coordinate edge conditions with decking joint and opening locations to permit field-applied weathertight installation of protection membrane seam tape.

J. When tested moisture content in wood components is below 16 percent, shop apply an undiluted flood coat of panel edge coating on end grains.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to panel erection, examine all site conditions and ensure acceptable conditions per the Moisture Management Plan.

3.2 PREPARATION

A. Clean oil, dirt, rust, and foreign matter from all metal surfaces.

3.3 INSTALLATION

A. Do not install panels during periods of, nor prior to, expected precipitation events for which weather protection of panels required by the Moisture Management Plan cannot be accomplished.

Retain the following paragraph for high-rise buildings.

B. Provide and maintain active and passive fire-resistance features required by Code and authorities having jurisdiction.

Note: Fire flow requirements required by Chapter 5 of the International Fire Code (IFC) should be based on Appendix B of the IFC for a Type IV building. Tall Mass-Timber buildings, Type IV-A, may use provisions for Type I and II buildings with approval of the authorities having jurisdiction.

Retain the following subparagraph for Owner-occupied Construction:

1. Coordinate with Owner’s site safety director for operation of active fire-resistance systems during installation.

C. Conform to spacing and placement of panels and installation methods in accordance with the manufacturer's instruction and APA EWS T300. Provide close fits and neat appearance of joints without binding or adding additional stresses to the panel. Hoist panels in place in accordance with the manufacturer's instructions using non-marring straps and connectors. Brace erected members to maintain a stable structure.

D. Fit panels closely and accurately, without trimming, cutting or other modifications, unless approved in writing by **[Architect] [Engineer].**

E. Openings: Provide all holes and openings required and be coordinate with the shop drawings, specifications, and all other trades.

1. Frame and reinforce openings through the deck (if required) by the delegated designer. Install reinforcement on concealed top side at panels exposed to view. Install reinforcement on top or bottom side at panels above finished ceilings. Frames and reinforcement to be provided by panel manufacturer.

F. Avoid on-site cuts; however, if necessary, only with the written approval of the **[Architect]** [**Engineer].** and panel manufacturer, except for fastener drilling and other minor cutting. Coat all cuts and inside surfaces of drilled holes with end sealer.

G. Site cutting or boring of panels, other than shown on shop drawings not permitted without written consent of **[Architect]** [**Engineer] and panel manufacturer.**

3.4 PROTECTION

A. Protect panels and accessories from weather in accordance with the Moisture Management Plan.

1. Seal joints in decking weathertight with tape.
2. Provide temporary drainage system as necessary to prevent buildup of water and to maintain the low moisture content of the wood.
3. Wrap weather protection membrane over parapets and seal to weather barriers on walls. Coordinate installation with permanent weather barrier system installation.
4. Install sealed weather protection membrane tents around columns and other protrusions in decking.
5. Protect panels against excessive and repeated water exposures and standing water at all times. Physically remove standing water from protection membranes immediately after precipitation events.

B. Take precautions to closely maintain the panel manufacturer's standard for moisture content.

C. Maintain protection until members are completely weather protected within the building.

D. Maintain wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades. Coordinate wrapping removal with finishing work specified in Division 09. Slit underside of shop-applied column and beam wrapping to prevent accumulation of moisture inside the wrapping.

E. Elevate initial building heating/cooling gradually to the desired level. Do not reduce the relative humidity of the building rapidly. Do not allow subsequent application of materials until wood has reached its required moisture content.

F. Protect exposed-to-view wood components from weather-related stains, and other damage by other trades. Repair damaged components to match undamaged surfaces.

G. Remove and replace with new, wood components exhibiting mold, mildew, rot, warping, unrepairable staining, or other conditions which affect the structural capacities or longevity of the components.

3.5 FIELD FINISHING

A. Remove stains on exposed-to-view panels as recommended by panel manufacturer. Replace panels, or exposed portions of panels, stained beyond repair, with material to match adjacent non-stained wood surfaces.

B. Perform field finishing of interior wood components after building's interiors are fully conditioned and wood components' tested moisture content has stabilized below 16 percent.

C. Apply single topcoat finish on exposed-to-view wood surfaces not in normal contact with building's occupants. Apply three coats of topcoat finish on surfaces in normal contact with building occupants, and at all exterior conditions. Apply finishes in accordance with manufacturer's written instructions.

END OF SECTION 061710