SECTION 061300 - HEAVY TIMBER CONSTRUCTION

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section Includes:

Framing using timbers[**and round wood poles**].

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 061000 "Rough Carpentry" for dimension lumber items associated with heavy timber framing.

Section 061800 "Glued-Laminated Construction."

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

Note that "Timbers" Paragraph below is the DOC PS 20 definition of timber. Definitions below are not the IBC requirements for structural members used in Type IV construction (Heavy Timber, HT).

* + - * 1. Timbers: Lumber of 5 inches nominal or greater in least dimension.
				2. Poles: Round wood members, called either "poles" or "posts" in the referenced standards.
				3. Inspection agencies, and the abbreviations used to reference them, include the following:

Coordinate list below with product lists and delete those not referenced. Insert others to suit Project.

NeLMA: Northeastern Lumber Manufacturers' Association.

NHLA: National Hardwood Lumber Association.

NLGA: National Lumber Grades Authority.

SPIB: Southern Pine Inspection Bureau (The).

WCLIB: West Coast Lumber Inspection Bureau.

WWPA: Western Wood Products Association.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For [**preservative-treated wood products**] [**and**] [**timber connectors**].

For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

For timber connectors. Include installation instructions.

* + - * 1. Sustainable Design Submittals:

Usually delete "Shop Drawings" Paragraph below except for high-quality exposed work or historic restoration projects.

* + - * 1. Shop Drawings: For heavy timber framing. Show layout, dimensions of each member, and details of connections.

Usually delete "Samples" Paragraph below except for high-quality exposed work or historic restoration projects. Note that if retaining paragraph and the submitted Samples are considered unacceptable, a substantial cost increase may be generated by asking for material that exceeds what was specified. Retain last option if using penetrating sealer.

* + - * 1. Samples: Not less than [**5 inches**] [**7 inches**] [**9 inches**] wide by 24 inches long, showing the range of variation to be expected in appearance, including surface texture, of wood products.[**Apply a coat of penetrating sealer to Samples.**]
				2. Material Certificates:

Delete first subparagraph below if species and grade are indicated for each use.

For timbers specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.

For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.[**For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.**]

* + - * 1. Certificates of Inspection: Issued by lumber-grading agency for exposed timber not marked with grade stamp.
			1. QUALITY ASSURANCE
			2. DELIVERY, STORAGE, AND HANDLING
				1. Schedule delivery of materials to avoid extended on-site storage and to avoid delaying the Work.
				2. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications

* + - 1. WOOD MATERIALS, GENERAL
			2. TIMBER
				1. Comply with DOC PS 20 and with grading rules of lumber-grading agencies certified by ALSC's Board of Review as applicable.

Factory mark each item of timber with stamp of grading agency.

For exposed timber indicated to receive a stained or natural finish, apply grade stamps to surfaces that are not exposed to view, or omit grade stamps and provide certificates of grade compliance issued by grading agency.

Seven "Timber Species and Grade" paragraphs below are examples of species and grade requirements. Retain one or delete all and retain "Structural Properties" Paragraph. If retaining one of seven "Timber Species and Grade" paragraphs, verify availability of species selected.

* + - * 1. Timber Species and Grade: Balsam fir, Douglas fir-larch, Douglas fir-larch (North), eastern hemlock tamarack (North), hem-fir, southern pine, western hemlock, or western hemlock (North); [**Select Structural**] [**No. 1**] [**No. 2**], NeLMA, NLGA, SPIB, WCLIB, or WWPA.

"Alaska cedar" is sometimes called "Alaska yellow cedar," but "Alaska cedar" is the official name per DOC PS 20 and WCLIB.

* + - * 1. Timber Species and Grade: Alaska cedar; [**Select Structural**] [**No. 1**] [**No. 2**], WCLIB.
				2. Timber Species and Grade: Douglas fir-larch or Douglas fir-larch (North); [**Dense Select Structural**] [**Select Structural**] [**No. 1 Dense**] [**No. 1**] [**No. 2**], NLGA, WCLIB, or WWPA.
				3. Timber Species and Grade: Hem-fir or hem-fir (North); [**Select Structural**] [**No. 1**] [**No. 2**], NLGA, WCLIB, or WWPA.
				4. Timber Species and Grade: Southern pine; [**Dense Select Structural**] [**Select Structural**] [**No. 1 Dense**] [**No. 1**] [**No. 2 Dense**] [**No. 2**], SPIB.

Two "Timber Species and Grade" paragraphs below are examples that may be useful for historic restoration or other applications where hardwood timber is required. See Evaluations.

* + - * 1. Timber Species and Grade: [**Beech-birch-hickory**] [**Mixed maple**] [**Mixed oak**] [**Northern red oak**] [**Red maple**] [**Red oak**] [**White oak**]; [**Select Structural**] [**No. 1**] [**No. 2**], NeLMA.

Three NHLA grades in "Timber Species and Grade" Paragraph below may be used where allowable stress ratings are not required.

* + - * 1. Timber Species and Grade: [**Mixed hardwoods**] [**Mixed oak**] [**Red oak**] [**White oak**] <**Insert species**>; [**Select Dimension**] [**Common Dimension**] [**Sound Square Edge**], NHLA.

If appearance is not critical, "Structural Properties" Paragraph below may be used instead of one of seven "Timber Species and Grade" paragraphs above for maximum competition.

* + - * 1. Structural Properties: Provide any species and grade that, for moisture content provided, complies with required structural properties.

Retain one of first two options in subparagraph below, insert other values, or retain third option and indicate properties on Drawings. First option allows use of beech-birch-hickory, Douglas fir-larch, red maple, and southern pine; second allows use of many species. Insert other structural properties if critical.

Allowable Stress Ratings for 12-Inch Nominal Depth: [**Fb 1500 psi and E 1,500,000 psi**] [**Fb 1300 psi and E 1,300,000 psi**] [**As indicated on Drawings**].

Retain or delete option in "Moisture Content" Paragraph below, or delete paragraph. Normally, structural timber is surfaced green. Option is difficult to enforce; delete it if treatment is required.

* + - * 1. Moisture Content: Provide timber with 19 percent maximum moisture content at time of dressing[**or provide timber that is unseasoned at time of dressing but with 19 percent maximum moisture content at time of installation**].

Retain one of two options in "Dressing" Paragraph below. Rough sawn is slightly larger than dressed timber but is not full size.

* + - * 1. Dressing: Provide [**dressed timber (S4S)**] [**timber that is rough sawn (Rgh)**] unless otherwise indicated.
			1. ROUND WOOD POLES

Standard in "Round Wood Poles" Paragraph below is a specification for round timber construction poles that is based on a specification for wood piles.

* + - * 1. Round Wood Poles: Clean-peeled wood poles complying with ASTM D3200; with at least 80 percent of inner bark removed and with knots and limbs cut flush with the surface.
				2. Species: <**Insert species required**>.
			1. PRESERVATIVE TREATMENT
				1. Pressure treat materials with waterborne preservative according to AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

See Evaluations for information about treatment chemicals.

* + - * 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

Retain subparagraph below for exposed framing if considered necessary.

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

Usually retain one of first two paragraphs below. Consider retaining first paragraph for work that will remain unfinished. Usually retain second paragraph if work is to receive an applied finish.

* + - * 1. Use process that includes water-repellent treatment.
				2. Use process that does not include water repellents or other substances that might interfere with application of indicated finishes.

Retain first paragraph below if kiln-dried wood is required.

* + - * 1. After treatment, redry materials to 19 percent maximum moisture content.
				2. Mark treated materials with treatment quality mark of an inspection agency approved by ALSC's Board of Review.

Retain only first option in subparagraph below if authorities having jurisdiction require quality mark on all materials.

For exposed items indicated to receive a stained or natural finish, [**mark each piece on surface that is not exposed**] [**or**] [**omit marking and provide certificates of treatment compliance issued by inspection agency**].

* + - * 1. Application: [**Treat all heavy timber framing unless otherwise indicated.**] [**Treat items indicated on Drawings and the following:**]

Sills and similar members in contact with masonry or concrete.

Timber framing members less than 18 inches above grade.

Insert additional paragraphs indicating where treatment is required or show on Drawings.

* + - 1. TIMBER CONNECTORS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=7574) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cleveland Steel Specialty Co](http://www.specagent.com/Lookup?uid=123457137914).

[Simpson Strong-Tie Co., Inc](http://www.specagent.com/Lookup?uid=123457137916).

[USP Structural Connectors](http://www.specagent.com/Lookup?uid=123457137917).

Approved equivalent.

First eight paragraphs below are example descriptions of typical timber connectors. Retain types required and revise descriptions to suit products.

* + - * 1. Fabricate beam seats from [**steel**] [**stainless steel**] with [**0.239-inch**] [**3/16-inch**] [**3/8-inch**] bearing plates, 3/4-inch- diameter-by-12-inch- long deformed bar anchors, and 0.239-inch side plates.
				2. Fabricate beam hangers from [**steel**] [**stainless steel**] with 0.179-inch stirrups and 0.239-inch top plates.
				3. Fabricate strap ties from [**steel**] [**stainless steel**], [**2-1/2 inches wide by 0.179 inch**] [**3 inches wide by 0.239 inch**] thick.
				4. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A668.
				5. Provide bolts, 3/4 inch unless otherwise indicated, complying with ASTM A307, Grade A; provide nuts complying with ASTM A563; and, where indicated, provide flat washers.
				6. Provide stainless steel bolts, 3/4 inch unless otherwise indicated, complying with ASTM F593, Alloy Group 1 or 2; provide nuts complying with ASTM F594, Alloy Group 1 or 2; and, where indicated, provide flat washers.
				7. Provide shear plates, [**2-5/8 inches**] [**4 inches**] in diameter, complying with ASTM D5933.
				8. Materials: Unless otherwise indicated, fabricate from the following materials:

Structural-steel shapes, plates, and flat bars complying with ASTM A36.

Round steel bars complying with ASTM A575, Grade M 1020.

Hot-rolled steel sheet complying with ASTM A1011, Structural Steel, Type SS, Grade 33.

Type 304 stainless steel is usually standard; Type 316 should be used where subject to salt spray or immersion in salt water. Type 316 is more expensive and cannot be distinguished from Type 304 except by chemical tests.

Stainless steel plate, sheet, and strip complying with ASTM 240 or ASTM A666, [**Type 304**] [**Type 316**].

Stainless steel flat bars complying with ASTM A666, [**Type 304**] [**Type 316**].

Stainless steel bars and shapes complying with ASTM A276, [**Type 304**] [**Type 316**].

* + - * 1. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.

Usually retain last paragraph above for dry use and mild moisture exposure. Delete above and retain paragraph below for more severe wet use.

* + - * 1. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123 or ASTM A153.
			1. MISCELLANEOUS MATERIALS
				1. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
				2. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
			2. FABRICATION

Delete this article if cutting and fitting are done at Project site.

* + - * 1. Camber: Fabricate horizontal members and inclined members with a slope of less than 1:1, with natural convex bow (crown) up, to provide camber.

Delete first paragraph below for rough, unfinished work.

* + - * 1. Shop fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Finish exposed surfaces to remove planing or surfacing marks, and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
				2. Predrill for fasteners and assembly of units.

Retain first paragraph below if treated timber is required.

* + - * 1. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWPA M4.

If retaining last paragraph above, usually retain one or both subparagraphs below; standard referenced above also allows creosote. Treatment in first subparagraph below is waterborne and does not discolor wood; treatment in second is oil borne and discolors wood.

Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.

Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

* + - * 1. Coat crosscuts with end sealer.

Consider retaining "Seal Coat" Paragraph below to keep timber clean during erection and for a more uniform finish. Note: Timber is usually not factory finished but could be. Insert requirements if applicable.

* + - * 1. Seal Coat: After fabricating and surfacing each unit, apply a saturation coat of penetrating sealer on surfaces of each unit except for treated wood where the treatment included a water repellent.
1. EXECUTION
	* + 1. INSTALLATION
				1. General: Erect heavy timber framing true and plumb. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

Install horizontal and sloping members with crown edge up, and provide not less than 4 inches of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports with metal strap ties if not continuous.

Retain subparagraph below for heavy timber framing that is exposed to view.

Handle and temporarily support heavy timber framing to prevent surface damage, compression, and other effects that might interfere with indicated finish.

* + - * 1. Framing Built into Masonry: Provide 1/2-inch clearance at tops, sides, and ends of members built into masonry, and bevel cut ends 3 inches; do not embed more than 4 inches unless otherwise indicated.

Retain "Cutting" Paragraph below if timber is shop fabricated.

* + - * 1. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

Retain "Fitting" Paragraph below if timber is field fabricated.

* + - * 1. Fitting: Fit members by cutting and restoring exposed surfaces to match specified surfacing.

Predrill for fasteners using timber connectors as templates.

Retain first subparagraph below for heavy timber framing that is exposed to view.

Finish exposed surfaces to remove planing or surfacing marks, and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

Coat crosscuts with end sealer.

Retain subparagraph below if using treated wood.

Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.

If retaining last subparagraph above, usually retain one or both subparagraphs below; standard referenced above also allows creosote. Treatment in first subparagraph below is waterborne and does not discolor wood; treatment in second is oil borne and discolors wood.

Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.

Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

* + - * 1. Install timber connectors as indicated.

Usually retain one or both subparagraphs below if using bolts.

Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.

Install bolts with orientation as indicated or, if not indicated, as directed by Director’s Representative.

Insert specific erection tolerances and procedures to suit Project.

* + - 1. ADJUSTING
				1. Repair damaged surfaces and finishes after completing erection. Replace damaged heavy timber framing if repairs are not approved by Director’s Representative.

END OF SECTION 061300