1. Section 061000
Rough Carpentry
	1. PART 1 GENERAL
		1. SECTION INCLUDES
			1. Subflooring.
			2. Miscellaneous framing and sheathing.
			3. Miscellaneous wood nailers, furring, and grounds.
		2. RELATED REQUIREMENTS
			1. Section 061219 - Structural Insulated Panels.
			2. Section 061500 - Wood Decking.
			3. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.
			4. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.
		3. REFERENCE STANDARDS
			1. ANSI A208.1 - American National Standard for Particleboard 2009.
			2. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
			3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
			4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2018.
			5. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2013.
			6. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2012, with Editorial Revision (2017).
			7. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
			8. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2018.
			9. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2013.
			10. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2018a.
			11. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
			12. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
			13. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2018a.
			14. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
			15. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2018.
			16. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2018b.
			17. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
			18. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
			19. AWPA U1 - Use Category System: User Specification for Treated Wood 2017.
			20. ICC-ES AC310 - Acceptance Criteria for Water-resistive Membranes Factory-bonded to Wood-based Structural Sheathing, Used as Water-Resistive Barriers 2008, with Editorial Revision (2015).
			21. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).
			22. PS 1 - Structural Plywood 2009.
			23. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
			24. PS 20 - American Softwood Lumber Standard 2015.
			25. SPIB (GR) - Grading Rules 2014.
		4. SUBMITTALS
			1. See Section 013000 - Administrative Requirements, for submittal procedures.
			2. Product Data: Provide technical data on insulated sheathing, wood preservative materials and application instructions.
			3. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.
			4. Samples: For rough carpentry members that will be exposed to view, submit two samples, [\_\_\_\_]by\_\_\_\_ inch ([\_\_\_\_]by\_\_\_\_ mm) in size illustrating wood grain, color, and general appearance.
			5. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
			6. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
			7. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
			8. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.
			9. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
		5. QUALITY ASSURANCE
			1. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
				1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
				2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.
		6. DELIVERY, STORAGE, AND HANDLING
			1. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
			2. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.
		7. WARRANTY
			1. See Section 017800 - Closeout Submittals, for additional warranty requirements.
	2. PART 2 PRODUCTS
		1. GENERAL REQUIREMENTS
			1. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
				1. Species: Douglas Fir-Larch, unless otherwise indicated.
				2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
				3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
				4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
			2. Provide sustainably harvested wood; see Section 016000 - Product Requirements for requirements.
			3. Provide wood harvested within a 500 mile (805 km) radius of the project site.
			4. Lumber salvaged from deconstruction or demolition of existing buildings or structures is permitted in lieu of sustainably harvested lumber provided it is clean, denailed, and free of paint and finish materials, and other contamination; identify source.
				1. Where salvaged lumber is used for structural applications, provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc; www.alsc.org.
			5. Lumber fabricated from recovered timber (abandoned in transit) is permitted in lieu of sustainably harvested lumber, unless otherwise noted, provided it meets the specified requirements for new lumber and is free of contamination; identify source.
		2. DIMENSION LUMBER FOR CONCEALED APPLICATIONS
			1. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
			2. Sizes: Nominal sizes as indicated on drawings, S4S.
			3. Moisture Content: S-dry or MC19.
			4. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm) ):
				1. Grade: No. 2.
			5. Joist, Rafter and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm) ):
				1. Machine stress-rated (MSR) as follows:

Fb-single (minimum extreme fiber stress in bending): 1350 psi (9,300 kPa).

E (minimum modulus of elasticity): 1,300,000 psi (8960 MPa).

* + - * 1. Species: Douglas Fir-Larch.
			1. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
				1. Lumber: S4S, No. 2 or Standard Grade.
				2. Boards: Standard or No. 3.
		1. EXPOSED DIMENSION LUMBER
			1. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
			2. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
			3. Sizes: Nominal sizes as indicated on drawings.
			4. Surfacing: S4S.
			5. Moisture Content: S-dry or MC19.
			6. Stud Framing (2 by 2 through 2 by 6 (50 by 50 through 50 by 150 mm) ):
				1. Species: Western Cedar.
				2. Grade: Clear.
			7. Joist, Rafter and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 through 100 by 400 mm) ):
				1. Species: Redwood.
				2. Grade: Select Heart.
		2. TIMBERS FOR CONCEALED APPLICATIONS
			1. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
			2. Sizes: Nominal sizes as indicated on drawings, S4S.
			3. Moisture Content: S-dry (23 percent maximum).
			4. Beams and Posts 5 inches (125 mm) and over in thickness:
				1. Species: Any allowed under referenced grading rules.
				2. Grade: Select Structural.
		3. EXPOSED TIMBERS
			1. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
			2. Moisture Content: Kiln-dry (20 percent maximum).
			3. Surfacing: S4S.
			4. Species: Redwood.
			5. Grade: Clear Heart Structural.
		4. EXPOSED BOARDS
			1. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
			2. Moisture Content: Kiln-dry (15 percent maximum).
			3. Surfacing: S4S.
			4. Species: Douglas Fir.
			5. Grade: No. 2, 2 Common, or Construction.
		5. CONSTRUCTION PANELS
			1. Subfloor/Underlayment Combination: Any PS 2 type, rated Single Floor.
				1. Bond Classification: Exterior.
				2. Span Rating: 48.
				3. Performance Category: 1-1/8 PERF CAT.
				4. Edges: Tongue and groove.
			2. Subfloor/Underlayment Combination: Oriented strand board wood structural panel; PS 2, rated Single Floor.
				1. Bond Classification: Exterior.
				2. Performance Category: 19/32 PERF CAT.
				3. Span Rating: 20.
				4. Edges: Square.
				5. Surface Finish: Fully sanded face.
				6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 200 days.
				7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm), 19.2 inches (488 mm) and 24 inches (610 mm) on center, respectively.
				8. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
			3. Subflooring: Any PS 2 type, rated Sheathing.
				1. Bond Classification: Exterior.
				2. Span Rating: 48.
				3. Performance Category: 3/4 PERF CAT.
			4. Subflooring: Particleboard, ANSI A208.1, Grade M-2 EXTERIOR GLUE waferboard; 3/4 inch (19 mm) thick, square edge.
			5. Subflooring: Magnesium oxide board.
				1. Classification: PS 2, Exposure 1.
				2. Panel Thickness: 3/4 inch (19 mm), nominal.
				3. Span: 24 inches (610 mm), maximum.
				4. Fire Resistance: ASTM E84, Class A1; zero flame spread and zero smoke developed.
				5. Mold and Mildew Resistance: Zero growth when tested according to ASTM G21.
			6. Underlayment: APA Underlayment; plywood, Exposure 2, 1/2 inch (12.5 mm) thick. Fully sanded faces at resilient flooring.
			7. Underlayment: Particleboard, ANSI A208.1, Grade PBU.
			8. Roof Sheathing: Any PS 2 type, rated Structural I Sheathing.
				1. Bond Classification: Exterior.
				2. Span Rating: 60.
				3. Performance Category: 3/4 PERF CAT.
			9. Roof Sheathing: Particleboard, ANSI A208.1, Grade M-3 EXTERIOR GLUE; square edges, with panel clips.
			10. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
				1. Grade: Structural 1 Sheathing.
				2. Bond Classification: Exposure 1.
				3. Performance Category: 5/8 PERF CAT.
				4. Span Rating: 40/20.
				5. Edges: Square.
				6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
				7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
				8. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
			11. Roof Sheathing: Oriented strand board structural wood panel, PS 2, with factory laminated roofing underlayment layer.
				1. Sheathing Panel:

Grade: Structural 1 Sheathing.

Size: 4 feet (1219 mm) wide by 8 feet (2438 mm) long.

Performance Category: 5/8 PERF CAT.

Span Rating: 40/20.

Edge Profile: Square edge.

* + - * 1. Integral Roofing Underlayment Layer: Medium density, phenolic impregnated kraft paper overlay.
				2. Exposure Time: Sheathing undamaged and integral roofing underlayment layer intact after exposure to weather for up to 180 days.
				3. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center.
				4. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied seam tape consisting of polyolefin film with acrylic adhesive.
				5. Warranty: Manufacturer's standard 30 year limited system warranty of:

Performance: Panel and tape resistance to water penetration; tape adhesion.

Material: Free from manufacturing defects and panel delamination.

* + - 1. Roof Sheathing: Oriented strand board wood structural panel; PS 2, with factory-applied fire-retardant treatment and fire-resistant cementitious facer.
				1. Grade: Structural 1 Sheathing.
				2. Bond Classification: Exposure 1.
				3. Performance Category: 5/8 PERF CAT.
				4. Span Rating: 40/20.
				5. Edges: Square.
				6. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
			2. Roof Sheathing: Wood construction panel laminated to insulation board.
				1. Construction Panel: 7/16 inch (11 mm) oriented strand board (OSB).
				2. Insulation Board: Polyisocyanurate foam plastic with cellulosic felt facer or glass fiber mat facer on major surface opposite construction panel.
				3. Finished Panel: Comply with ASTM C1289, Type V.
			3. Roof Sheathing, Vented: Wood construction panel and 1 inch (25 mm) solid wood spacers attached to insulation board.
				1. Construction Panel: 7/16 inch (11 mm) oriented strand board (OSB).
				2. Insulation Board: Rigid polyisocyanurate (ISO) insulation board, ASTM C1289, Type II, Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of the core foam.
			4. Roof Sheathing: Magnesium oxide board.
				1. Classification: PS 2, Exposure 1.
				2. Panel Thickness: [\_\_\_\_\_] inch ([\_\_\_\_\_] mm), nominal.
				3. Span: 24 inches (610 mm), maximum.
				4. Fire Resistance: ASTM E84, Class A1; zero flame spread and zero smoke developed.
				5. Mold and Mildew Resistance: Zero growth when tested according to ASTM G21.
			5. Wall Sheathing: Any PS 2 type.
				1. Bond Classification: Exterior.
				2. Grade: Structural I Sheathing.
				3. Span Rating: 24.
				4. Performance Category: 5/16 PERF CAT.
				5. Edge Profile: Square edge.
			6. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
			7. Wall Sheathing: Particleboard, ANSI A208.1, Grade M-3 EXTERIOR GLUE.
			8. Wall Sheathing: Fiberboard, ASTM C208, Type IV, Grade 1 regular, square edges.
			9. Wall Sheathing: See Section 092116.
			10. Wall Sheathing: Gypsum, complying with requirements of ASTM C1396/C1396M for gypsum sheathing, V-shaped long edges, 5/8 inch Type X fire resistant (16 mm Type X fire resistant).
			11. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant (16 mm Type X fire resistant).
				1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
				2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
				3. Edges: Square.
			12. Wall Sheathing: Glass mat faced gypsum with integral water-resistive and air barrier, ASTM C1177/C1177M, 5/8 inch (15.9 mm) thick.
				1. Edges: Square.
				2. Water Vapor Permeance: 1 perm (57.5 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M.
				3. Air Permeance, Sheathing: 0.001 cfm per square foot (0.005 L/s per sq m), maximum, when tested in accordance with ASTM E2178.
				4. Air Permeance, Assembly: 0.04 cfm per square foot (0.2 L/s per sq m), maximum, when tested in accordance with ASTM E2357.
				5. Fluid-Applied Flashing: Approved by sheathing manufacturer.
				6. Warranty:

Exposure: Manufacturer's standard; 12 months, against exposure damage, and dated from installation of product.

Defect: Manufacturer's standard; 5 years, against manufacturing defects, and dated from purchase of product.

Material: Manufacturer's standard; 5 years, dated from Date of Substantial Completion.

Effective Drainage Warranty: 12 years, dated from installation of product, when sheathing is used as substrate under approved, water-managed exterior insulation finish system (EIFS).

* + - 1. Wall Sheathing: Oriented strand board wood structural panel; PS 2.
				1. Grade: Structural 1 Sheathing.
				2. Bond Classification: Exposure 1.
				3. Performance Category: 5/8 PERF CAT.
				4. Span Rating: 40/20.
				5. Edges: Square.
				6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
				7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
				8. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
			2. Wall Sheathing: Oriented strand board structural wood panel with factory laminated water-resistive and air barrier layer.
				1. Sheathing Panel: PS 2, Exposure 1.

Size: 4 feet (1219 mm) wide by 8 feet (2438 mm) long.

Grade: Sheathing.

Performance Category: 7/16 PERF CAT.

Span Rating: 24/16.

Edge Profile: Square edge.

* + - * 1. Integral Water-Resistive and Air Barrier: Sheet material qualifying as a Grade D water resistive barrier; complying with ICC-ES AC310.
				2. Water Vapor Permeance of Water Resistive and Air Barrier: 12 to 16 perms (689 to 918 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure B.
				3. Maximum Allowable Air Leakage of Assembly, complying with ASTM E2357:

Infiltration: 0.0072 cfm per square foot (0.037 L/s per sq m), maximum, at a pressure differential of 1.57 pounds per square foot (75 Pa).

Exfiltration: 0.0023 cfm per square foot (0.012 L/s per sq m), maximum, at a pressure differential of 1.57 pounds per square foot (75 Pa).

* + - * 1. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
				2. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied, seam tape.
				3. Warranty: Manufacturer's standard 30 year limited system warranty of:

Performance: Panel and tape resistance to water penetration; tape adhesion.

Material: Free from manufacturing defects and panel delamination.

* + - 1. Wall Sheathing: Oriented strand board wood structural panel; PS 2, with factory-applied fire-retardant treatment and fire-resistant cementitious facer.
				1. Grade: Structural 1 Sheathing.
				2. Bond Classification: Exposure 1.
				3. Performance Category: 5/8 PERF CAT.
				4. Span Rating: 40/20.
				5. Edges: Square.
				6. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
			2. Wall Sheathing: Wood construction panel laminated to insulation board.
				1. Construction Panel: 7/16 inch (11 mm) oriented strand board (OSB).
				2. Insulation Board: Polyisocyanurate foam plastic with cellulosic felt facer or glass fiber mat facer on major surface opposite construction panel.
				3. Finished Panel: Comply with ASTM C1289, Type V.
			3. Wall Sheathing: High pressure laminated cellulose fiber construction panel laminated to insulation board.
				1. Construction Panel with Insulation Board: Laminated cellulose fiberboard and polyisocyanurate foam plastic with coated, laminated paper facer on major surface opposite fiberboard.
				2. Panel Thickness: 1 inch (25.4 mm).
			4. Wall Sheathing: Oriented strand board structural wood panel with factory laminated rigid plastic insulation board, and water-resistive and air barrier layer.
				1. Sheathing Panel: PS 2, Exposure 1.
				2. Insulation Board: Polyisocyanurate (ISO) insulation board; comply with ASTM C1289, Type II, Class 2 - Faced with coated polymer-bonded glass fiber mat facers on both major surfaces of the core foam.
				3. Integral Water-Resistive and Air Barrier: Sheet material qualifying as a Grade D water resistive barrier; complying with ICC-ES AC310.
				4. Water Vapor Permeance of Water Resistive and Air Barrier: 12 to 16 perms (689 to 918 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure B.
				5. Maximum Allowable Air Leakage of Assembly, complying with ASTM E2357: 0.04 cubic foot per minute per square foot (0.2 L/s sq m) at a pressure differential of 1.57 pounds per square foot (75 Pa).
				6. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
				7. Edge Profile: Square.
				8. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied, seam tape.
				9. Warranty: Manufacturer's standard 30 year limited system warranty of:

Performance: Panel and tape resistance to water penetration; tape adhesion.

Material: Free from manufacturing defects and panel delamination.

* + - 1. Wall Sheathing: Extruded Polystyrene (XPS) board insulation, ASTM C578.
				1. Board Size: 48 by 96 inch (1220 by 2440 mm).
				2. Board Thickness: 3/4 inch (19 mm).
				3. Board Edges: Tongue-and-groove.
				4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88) per 1 inch (25.4 mm) at 75 degrees F (24 degrees C) mean temperature using ASTM C177 test method.
				5. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
				6. Type and Board Density: Type IV, 1.45 pcf (23 kg/cu m), minimum.
				7. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
			2. Wall Sheathing: Polyisocyanurate (ISO) thermal board insulation with Classification indicated, in compliance with ASTM C1289.
				1. Thickness: 3/4 inch (19 mm) minimum thickness.
				2. Classifications:

Type I: Faced with aluminum foil on both major surfaces of core foam.

Class 1 - Non-reinforced core foam.

Compressive Strength: 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.0 (1.59) at 75 degrees F (24 degrees C).

Type II:

Class 1 - Faced with glass fiber reinforced cellulistic felt facers on both major surfaces of core foam.

Compressive Strength: Classes 1-2-3, Grade 1 - 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1 inch (25.4 mm) thick; Class 1, Grades 1-2-3 - 5.6 (0.97) at 75 degrees F (24 degrees C).

Type III: Faced with perlite insulation board on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.

Compressive Strength: 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 7.0 (1.23) at 75 degrees F (24 degrees C).

Type IV: Faced with cellulosic fiber insulating board on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.

Compressive Strength: 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 6.9 (1.22) at 75 degrees F (24 degrees C).

Type V: Faced with oriented strand board (OSB) or plywood on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.

Compressive Strength: 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 6.2 (1.09) at 75 degrees F (24 degrees C).

Type VII: Faced with glass mat faced gypsum board on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.

Compressive Strength: 16 psi (110 kPa), minimum.

Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 7.0 (1.23) at 75 degrees F (24 degrees C).

* + - 1. Wall Sheathing: Magnesium oxide board.
				1. Classification: PS 2, Exposure 1.
				2. Panel Thickness: [\_\_\_\_\_] inch ([\_\_\_\_\_] mm), nominal.
				3. Span: 24 inches (610 mm), maximum.
				4. Fire Resistance: ASTM E84, Class A1; zero flame spread and zero smoke developed.
				5. Mold and Mildew Resistance: Zero growth when tested according to ASTM G21.
			2. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
			3. Other Applications:
				1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
				2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
				3. Other Locations: PS 1, C-D Plugged or better.
		1. ACCESSORIES
			1. Fasteners and Anchors:
				1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
				2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
				3. Anchors: Toggle bolt type for anchorage to hollow masonry.
			2. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
				1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
				2. Provide [\_\_\_\_\_\_\_\_\_\_] manufactured by [\_\_\_\_\_\_\_\_\_\_].
			3. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
				1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
				2. Provide [\_\_\_\_\_\_\_\_\_\_] manufactured by [\_\_\_\_\_\_\_\_\_\_].
			4. Sill Gasket on Top of Foundation Wall: 1/4 inch (6 mm) thick, plate width, closed cell plastic foam from continuous rolls.
			5. Termite-Resistant Sill Plate Barrier: Self-adhesive, film-backed barrier with release sheet; adheres to concrete substrates and blocks termite access.
				1. Thickness: 68 mils (0.068 inch) (1.7 mm).
				2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
				3. Water Vapor Permeance: 0.035 perm (2 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
			6. Termite-Resistant Sill Flashing: Self-adhesive membrane; polyethylene film bonded to sealant.
				1. Thickness: 40 mils (0.040 inch) (1 mm).
				2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
				3. Water Vapor Permeance: 0.035 perm (2 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
			7. Sill Flashing: As specified in Section 076200.
			8. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.
			9. General Purpose Construction Adhesives:
				1. Manufacturers:

ADFAST ; ADBOND EX 5690: [www.adfastcorp.com/en](http://www.adfastcorp.com/en)

* + 1. FACTORY WOOD TREATMENT
			1. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
				1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
				2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
	1. PART 3 EXECUTION
		1. PREPARATION
			1. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.
			2. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
			3. Coordinate installation of rough carpentry members specified in other sections.
		2. INSTALLATION - GENERAL
			1. Select material sizes to minimize waste.
			2. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
			3. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
		3. FRAMING INSTALLATION
			1. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
			2. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
			3. Install structural members full length without splices unless otherwise specifically detailed.
			4. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual and [\_\_\_\_\_\_\_\_\_\_\_\_].
			5. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches (38 mm) of bearing at each end.
			6. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
			7. Provide bridging at joists in excess of 8 feet (2.3 m) span as detailed. Fit solid blocking at ends of members.
			8. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
			9. Advanced framing techniques for LEED v4 for Homes Credit:
				1. In exterior walls and common walls:

Install no more than one horizontal 2x top plate on walls by aligning studs with joists and roof rafters.

Place window and door headers in the rim joist.

Install raised (directly beneath the top plate), single-ply headers not more than 2 inches nominal thickness in a 2x4 wall or 4 inches nominal thickness in a 2x6 wall, in accordance with International Residential Code 2012.

Install structural insulated panels (SIPs) for walls.

* + - * 1. For interior and exterior walls:

Size headers for actual loads.

Use ladder blocking or drywall clips.

Use two-stud corners or California corners.

* + - * 1. Space interior wall studs greater than 16 inches o.c. (400 mm o.c.).
				2. Space floor joists greater than 16 inches o.c. (400 mm o.c.) or SIPs.
				3. Space roof rafters greater than 16 inches o.c. (400 mm o.c.) or SIPs.
		1. BLOCKING, NAILERS, AND SUPPORTS
			1. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
			2. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
			3. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
			4. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
			5. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
			6. Provide the following specific non-structural framing and blocking:
				1. Cabinets and shelf supports.
				2. Wall brackets.
				3. Handrails.
				4. Grab bars.
				5. Towel and bath accessories.
				6. Wall-mounted door stops.
				7. Chalkboards and marker boards.
				8. Wall paneling and trim.
				9. Joints of rigid wall coverings that occur between studs.
		2. ROOF-RELATED CARPENTRY
			1. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
			2. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.
		3. INSTALLATION OF CONSTRUCTION PANELS
			1. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.
			2. Subflooring: Glue and nail to framing; staples are not permitted.
			3. Underlayment: Secure to subflooring with nails and glue.
				1. At locations where resilient flooring will be installed, fill and sand splits, gaps, and rough areas.
				2. Place building paper between floor underlayment and subflooring.
			4. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
				1. At long edges use sheathing clips where joints occur between roof framing members.
				2. Nail panels to framing; staples are not permitted.
			5. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws or staples.
				1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches (2440 mm), measured horizontally.
				2. Provide inlet diagonal bracing at corners.
				3. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
			6. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
				1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
				2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
				3. Install adjacent boards without gaps.
				4. Size: 48 by 96 inches (2440 by 4880 mm), installed horizontally at ceiling height.
			7. Wall Sheathing and Roof Sheathing with Laminated Water-Resistive Barrier and Air Barrier: Secure to studs as recommended by manufacturer.
				1. Install with laminated water-resistive and air barrier on exterior side of sheathing.
				2. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
				3. Use only mechanically attached and drainable EIFS and exterior insulation with wall sheathing with laminated water-resistive and air barrier.
				4. Apply manufacturer's standard seam tape to joints between sheathing panels. Use tape gun or hard rubber roller as recommended by manufacturer.
		4. TOLERANCES
			1. Framing Members: 1/4 inch (6 mm) from true position, maximum.
			2. Surface Flatness of Floor: 1/8 inch in 10 feet (1 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.
			3. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.
		5. FIELD QUALITY CONTROL
			1. See Section 014000 - Quality Requirements, for additional requirements.
			2. Coordination of ABAA Tests and Inspections:
				1. Provide testing and inspection required by ABAA QAP.
				2. Notify in ABAA writing of schedule for air barrier work. Allow adequate time for testing and inspection.
				3. Cooperate with ABAA testing agency.
				4. Allow access to air barrier work areas and staging.
				5. Do not cover air barrier work until tested, inspected, and accepted.
		6. CLEANING
			1. Waste Disposal: Comply with the requirements of Section 017419 - Construction Waste Management and Disposal.
				1. Comply with applicable regulations.
				2. Do not burn scrap on project site.
				3. Do not burn scraps that have been pressure treated.
				4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.
			2. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
			3. Prevent sawdust and wood shavings from entering the storm drainage system.
		7. SCHEDULES
			1. Lower Level Floor Joists: MSR Lumber.
			2. Upper Level Floor and Ceiling Joists, Rafters: Spruce-Pine-Fir, No. 2 Grade.
			3. Exposed Beams: Western Cedar, Select Structural Grade.
	1. END OF SECTION