



JENNIFER BROWN CIVIL ENGINEER
MO PE 202202324

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JENNIFER BROWN ENGINEERING LLC
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CERTIFICATE OF AUTHORITY: 2024046550
PLANNING, SITE DESIGN AND DEVELOPMENT,
STORMWATER MANAGEMENT, WATER QUALITY,
CONSTRUCTION MANAGEMENT



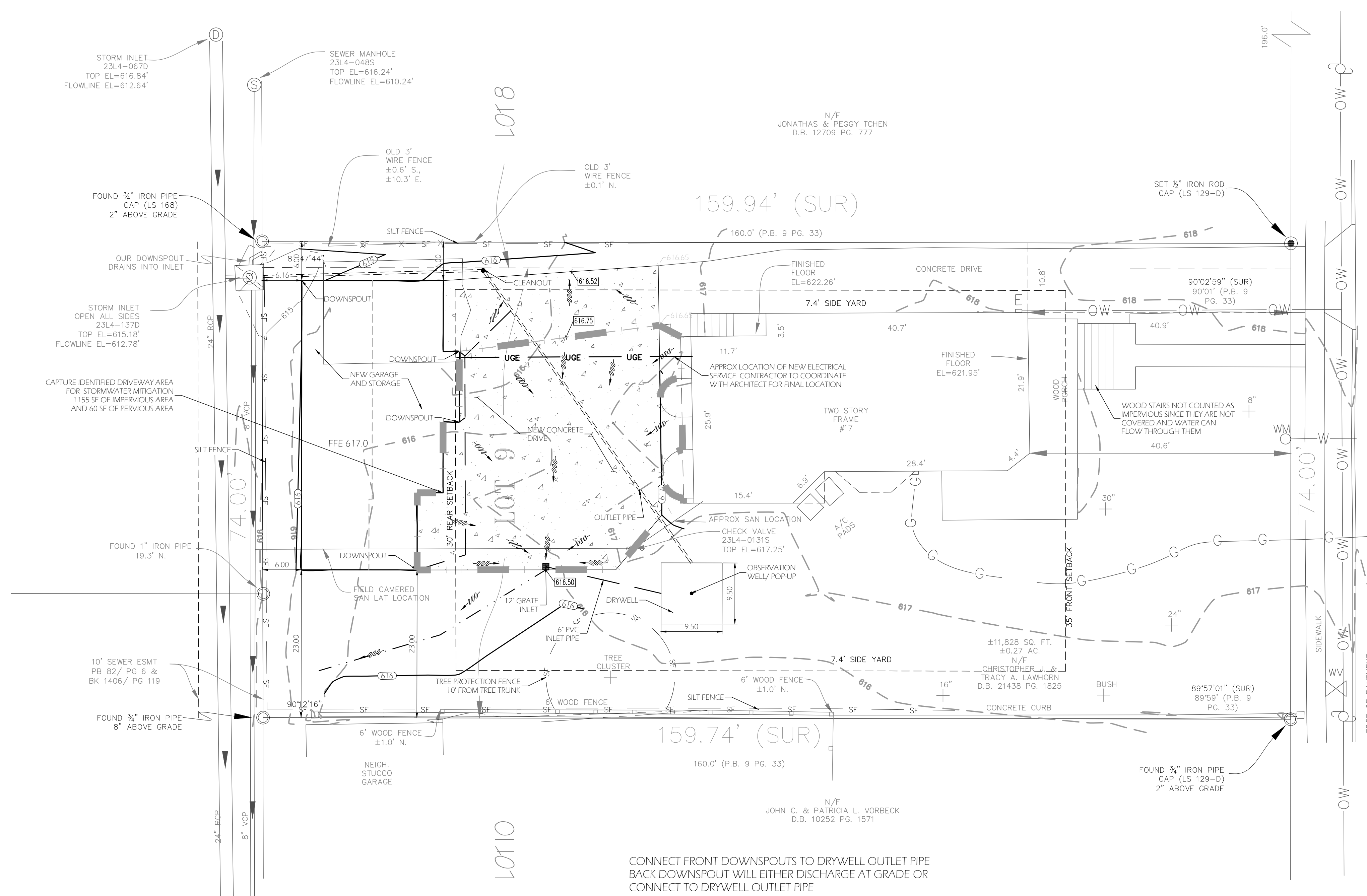
PREPARED BY: JENNIFER BROWN ENGINEERING LLC
ISSUANCE: STORMWATER MITIGATION PLANS

REVISIONS/ISSUANCE:
DATE BY DESCRIPTION
1 05/30/26 JB ADDRESS CITY COMMENTS

SHEET TITLE:
STORMWATER MITIGATION PLAN

DATE: 05/30/2026 DESIGNER: JB CHECKED BY: JB

C2.0



CONNECT FRONT DOWNSPOUTS TO DRYWELL OUTLET PIPE
BACK DOWNSPOUT WILL EITHER DISCHARGE AT GRADE OR
CONNECT TO DRYWELL OUTLET PIPE



SITE IMPERVIOUSNESS
EXISTING = 27.7%
PROPOSED = 38.3%

Lot Area: 11828 SF or 0.27 ac

	EXISTING				PROPOSED			
	SF	AC	PI	Total Run-Off	SF	AC	PI	Total Run-Off
Home	1,412	0.03	4.20	0.14	1,412	0.03	4.20	0.14
Garage	350	0.01	4.20	0.03	1,149	0.03	4.20	0.11
Pvmt/ Porches	1,863	0.04	3.54	0.15	1,114	0.07	3.54	0.25
Pervious	8,203	0.19	1.7	0.32	6,153	0.14	1.7	0.24
TOTAL EXISTING SITE RUNOFF				0.64	TOTAL PROPOSED SITE RUNOFF			0.74

Exist Site % Imperviousness= 27.69%

Prop Site % Imperviousness= 38.27%

DIFFERENTIAL RUNOFF = 0.10 CFS

0.10 CFS X 60 SEC/MIN X 20 MIN = 118.44 CF

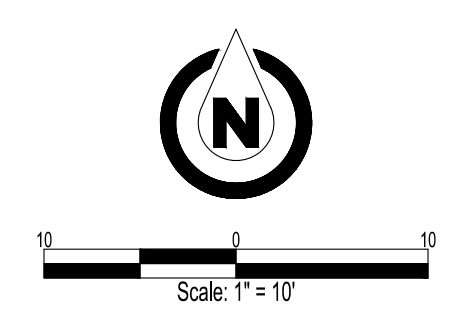
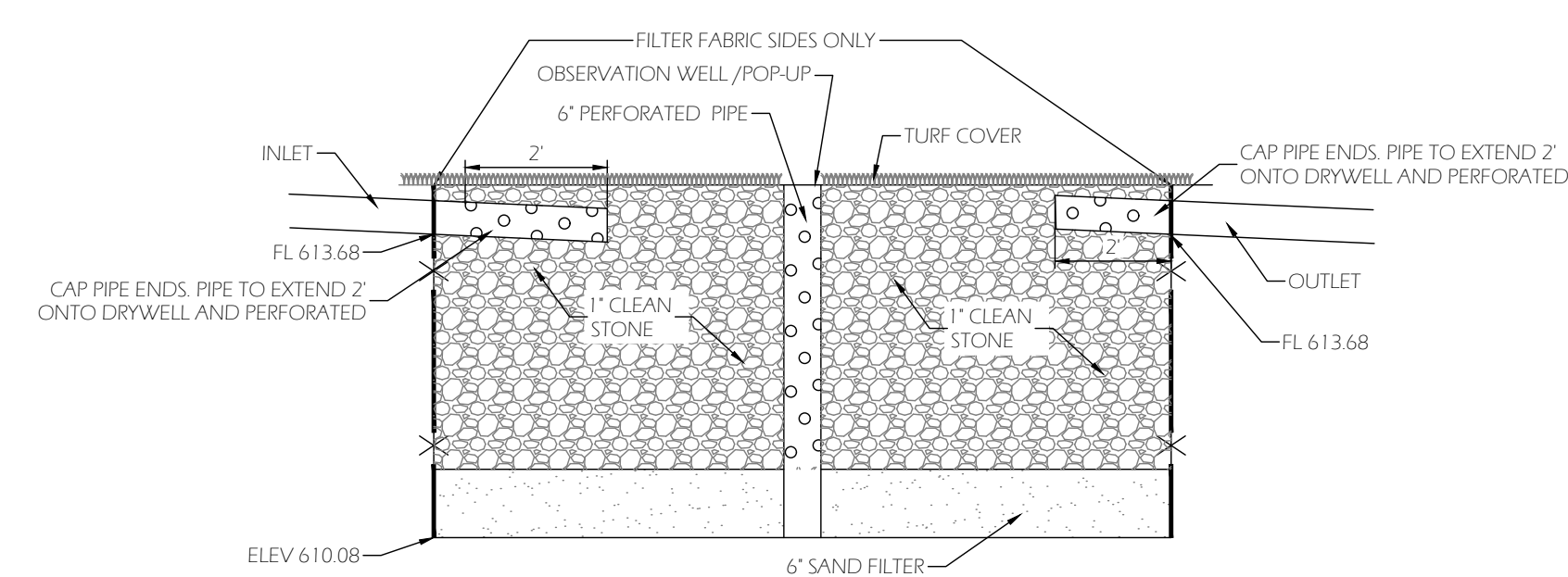
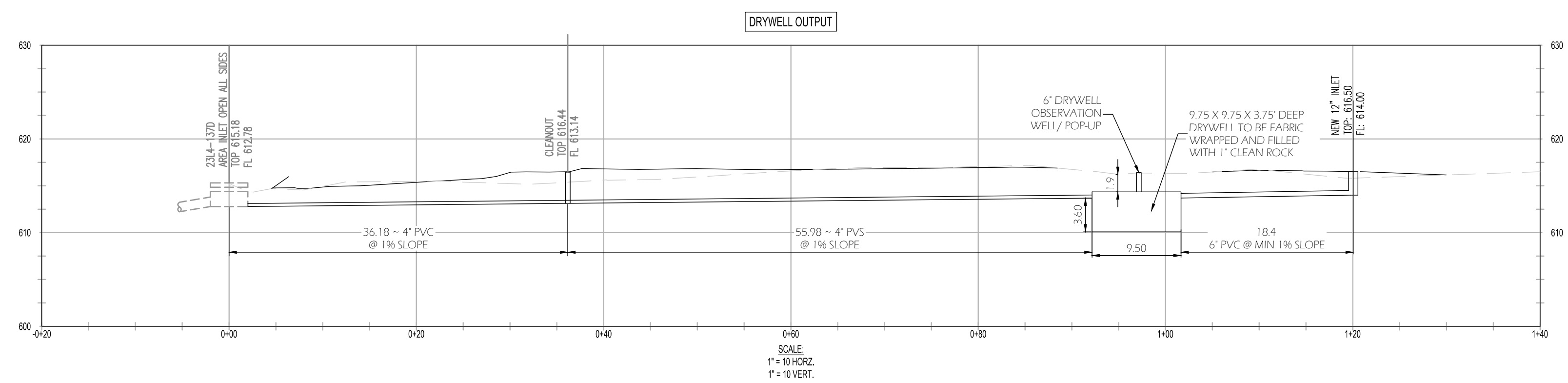
DRYWELL PIT
LENGTH 9.50 SF
WIDTH 9.50 SF
DEPTH 3.60 SF

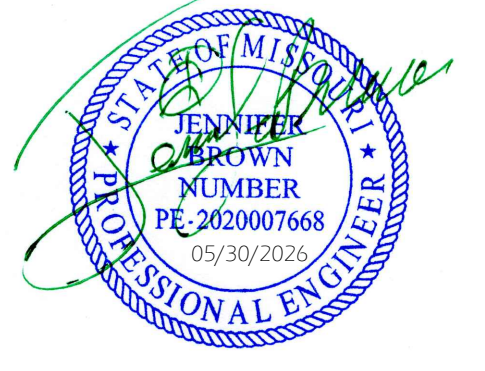
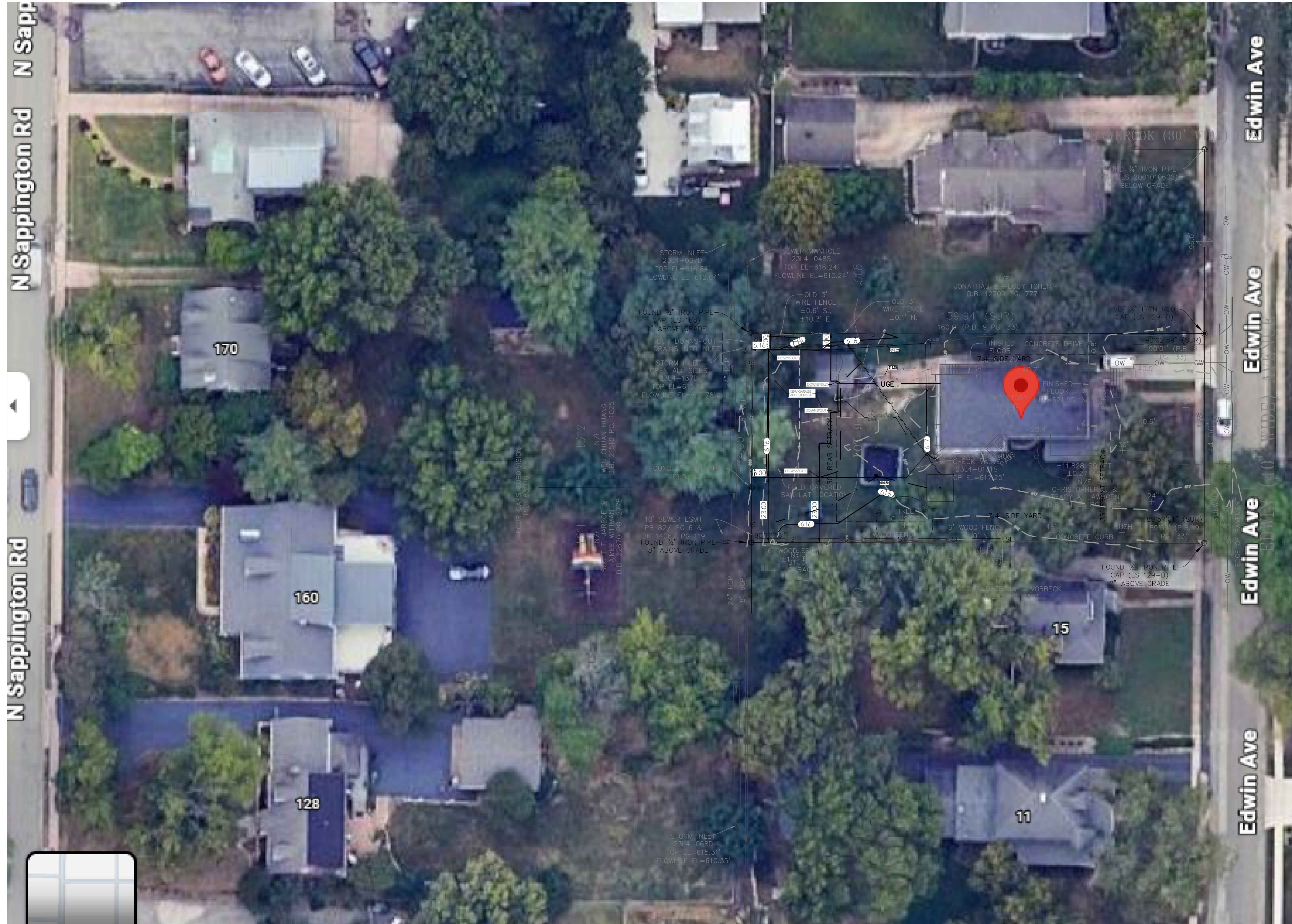
VOLUME PROVIDED= 129.96 CF

AREA TO BE TREATED = 1155 SF 3.54 CFS/AC
58.00 SF 1.7 CFS/AC

0.11 CFS
60 SEC/MIN
20 MIN

VOLUME REQUIRED PER TRIBUTARY AREA TO DRYWELL 128.93 CF





JENNIFER BROWN CIVIL ENGINEER
MO PE 2022002324

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STORMWATER MANAGEMENT, WATER QUALITY,
CONSTRUCTION MANAGEMENT

ISSUANCE:
STORMWATER MITIGATION PLANS

SITE ADDRESS:
CHRISTOPHER J & TRACY A LAWHORN
NEW GARAGE AND STORAGE
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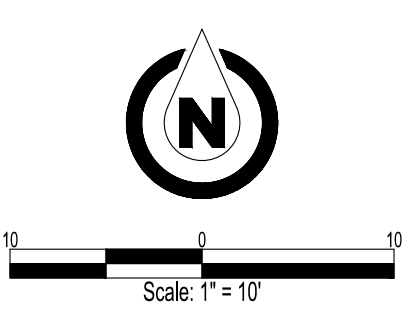
REVISIONS/ISSUANCE:

DATE	BY	DESCRIPTION
05/30/26	JB	ADDRESS CITY COMMENTS

SHEET TITLE:
ADJACENT
PROPERTIES

DATE: 05/30/2026 DESIGNER: JB CHECKED BY: JB

C3.0



DIVISION 1- GENERAL REQUIREMENTS

1.1 CONSTRUCTION MEANS AND METHODS:

- A. Contractor agrees that Contractor shall assume sole and complete responsibility for job site conditions during the course of the work, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that Contractor shall defend, indemnify, and hold Owner and Structural Engineer harmless from any and all liability, real or alleged, in connection with the performance of the Work on this Project, excepting for liability arising from the sole negligence of Owner or Structural Engineer.
- B. The Contract Documents represent the finished structure. They do not include the method of construction. Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to bracing, shoring for loads due to construction equipment, temporary structures, and partially completed work. Observation visits to the site by Structural Engineer shall not include inspection of the above items.
- C. UPRIGHT DESIGN & CONSULTING shall not have control over, or charge of, and shall not be responsible in any way for construction means, methods, techniques, sequences, or procedures, or for safety or safety precautions and programs in connection with any construction activities, since these are solely Contractor's responsibility under the Contract.
- D. UPRIGHT DESIGN & CONSULTING shall not be responsible for contractor's schedule or failures to carry out any construction activities in accordance with the Contract Documents. UPRIGHT DESIGN & CONSULTING shall not have control over or charge of actions of Contractor, Subcontractor, or any of their Agents, or employees, or any other persons performing portions of any construction activities.
- E. The structure is stable only in its completed form. Temporary supports required for stability of the structure during all intermediate stages of construction shall be designed and provided by Contractor.

1.2 SUBMITTALS:

- A. Submittals prepared by Subcontractors shall be reviewed by Contractor prior to submitting to Architect.
- B. Reproduction of the Contract Documents for Shop Drawings is not permitted. Electronic drawing files will not be provided to Contractor.
- C. Contractor shall verify the structurally supported equipment weights, opening sizes, and locations indicated on the Structural Drawings with Documents from other disciplines and notify Architect of any discrepancies.
- D. Contractor shall submit Shop Drawings showing size, method of anchorage, weight, openings, and locations of equipment not indicated on the Structural Drawings prior to ordering for review by Structural Engineer to determine adequacy of the structure.
- E. All submittals reviewed by Structural Engineer are reviewed for general conformance with design concept only and does not relieve the fabricator/vendor of responsibility for conformance with design drawings and Specifications, all of which have priority over submittals.
- F. Submittals shall be reviewed within 10 working days after being received by Structural Engineer.

1.3 QUALITY REQUIREMENTS:

- A. Reference to standard specifications or codes of any technical society, organization, or association or to codes of local or state authorities, shall mean the standards in effect as of date of the Contract Documents, unless otherwise noted.
- B. Contract Documents shall govern in the event of a conflict with standard specifications or codes of any technical society, organization, or association.
- C. No provision of any referenced standard specification or code, whether or not specifically incorporated by reference in the Contract Documents, shall be effective to change the duties and responsibilities of Owner, Architect, Structural Engineer, Contractor, or any of their Consultants, Agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Structural Engineer or any of Structural Engineer's Consultants, Agents, or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibilities contrary to the provisions of the Contract Documents.
- D. Structural Documents are being released prior to Documents of other disciplines. Contractor shall coordinate Structural Documents with other portions of the Contract Documents as they are released. Report any discrepancy or omission to Architect.
- E. All omissions and conflicts within the Contract Documents shall be brought to the attention of Architect prior to proceeding with the Work.
- F. Contractor shall verify dimensions and conditions at the job site. Any discrepancies between the conditions found and those indicated in the Contract Documents shall be brought to the attention of Architect prior to proceeding with the Work.
- G. See Documents by other disciplines for floor, wall, and roof openings, trenches, pits, pipe sleeves, equipment pads, metal pan stairs, miscellaneous iron, etc.
- H. No pipes, ducts, chases, etc. shall be placed in structural beam and column members nor shall any structural member be cut for pipes, ducts, etc., unless noted otherwise. Notify Structural Engineer when Documents by other disciplines show openings, pockets, etc. not indicated in the Structural Drawings, but are located in structural members. Contractor shall obtain prior approval from Structural Engineer for installation of such pipes, ducts, chases, etc.
- I. Details labeled 'Typical' on the Structural Drawings apply to all situations occurring on Project that are the same or similar to those locations specifically indicated. Where a detail is not indicated, the detail shall be the same as for other similar conditions.
- J. Contractor designed elements shall be designed by licensed Professional Engineers registered in the State where Project is located. Contractor shall submit Shop Drawings, design load data, support reactions, and certification that elements were designed for loads specified in the Contract Documents or in the Building Code. All documents noted shall be sealed by the licensed Engineer. If criteria indicated are not sufficient, submit a written request for additional information to Architect. The following elements and their connections shall be Contractor designed:
 - Structural steel connections, if altering design shown on the Structural Drawings
 - Open web steel joists and joist girders
 - Window and curtain wall systems
 - Skylights

1.4 SPECIAL INSPECTIONS:

- A. Special inspections shall be in accordance with the Building Code.
- B. Special inspection reports shall be furnished to Building Official, Owner, Architect, Structural Engineer, and Contractor. Discrepancies shall be brought to the attention of Contractor, and if not corrected, shall be reported to Building Official, Owner, Architect, and Structural Engineer.
- C. The Special Inspector shall submit a final report stating that the structural work was, to the best of the Special Inspector's knowledge, performed in accordance with the Contract Documents.
- D. The following types of work require Special Inspections: (Refer to the Building Code and Specifications for detailed inspection requirements.)
 - Prepared Fill
 - Concrete Construction
 - Steel Construction
 - Sprayed Fire resistive Materials

1.5 DESIGN CRITERIA:

- A. The structure is designed in accordance with the International Residential Code, 2015 Edition.
- B. No Provisions have been made for future building horizontal or vertical expansion.
- C. Gravity Loads:
 - Roof Load:
 - Live = 20 psf
 - Dead = 15 psf
 - Floor Live Load:
 - Sleeping Rooms: 30 psf
 - Rooms Other Than Sleeping Rooms: 40 psf
 - Stairs: 40 psf
 - Decks: 40 psf
 - Balconies Smaller than 100sf: 60 psf
 - Floor Dead Load:
 - 10 psf
 - Ground Snow Load:
 - ps=20 psf
 - Lateral Loads:
 - Wind Load:
 - Basic Wind Speed: 90 MPH
 - Wind Exposure: Category B

- 2. Seismic Load:
 - Seismic Design Category C
 - Site Class D

DIVISION 2- FOUNDATION

2.1 GENERAL:

- A. Construct non-basement floor slabs on the granular fill layer required by the plan notes. Granular fill shall be placed on an 18" layer of non-expansive soil.
- B. Backfill basements and retaining walls with ASTM 448 No. 57 stone or equivalent approved by the Structural Engineer. Extend stone from the base of the walls outward at a 45 degree angle to the vertical and provide toe drain wrapped in filter fabric.
- C. Backfilling:
 - Do not Backfill basement wall and grade beams until bracing floors are in place and adequate temporary bracing is installed.
 - Backfill in even lifts alternating from side to side with 2'-0" maximum difference in lifts
 - Backfill under foundations with concrete or as approved by Soils Engineer
 - Earth Trenches may be used for forming footings only, in accordance with the above referenced soils report.
 - Finish Grades: At building to be min. 8' below top of foundation at frame or frame with brick veneer and 6' min. below full masonry walls. Slope grade away from building min. 1' per foot for a distance of 8'-0" or to a swale.
 - Groundwater: An evaluation of the soil for the presence or absence of ground water is required prior to the pouring of concrete. If groundwater is present provide drain tile inside and outside of foundation and waterproof with an approved 'waterproofing' system. Joints to be lapped and sealed per manufactures installation instructions. All joints in wall and floors to be water tight.
 - Refer to architectural drawings for waterproofing and drainage at foundation.
- D. FOOTINGS:
 - Total load soil bearing pressure used in design: 1500 psf, Assumed
 - Coefficient of horizontal friction between concrete and soil = 0.35, Assumed
 - Minimum depth from exterior ground surface to bottom of foundations = 30 inches.
 - Equiv. fluid pressure of soil against walls connected to supporting floors top and bottom = 100 pcf.
 - Bottom of all footings and pads to be set on virgin soil. Piers to extend a minimum of 30' below grade.

DIVISION 3- CONCRETE

3.1 GENERAL:

- A. SUBMITTALS:
 - Submit a copy of each concrete mixture, including data and submittals to comply with the requirements in ACI 301.
- B. QUALITY ASSURANCES:
 - Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C requirements for production facilities and equipment.
 - Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregates from one source, and obtain admixtures through one source from a single manufacturer.
 - Comply with ACI 301-99, 'Specifications for Structural Concrete.'
 - Comply with ACI 117-90, 'Specifications for Tolerances for Concrete Construction and Materials.'
 - Locate Construction Joints as shown or noted and to least impair strength of structure. Construction Joints not shown on the Structural Drawings are Subject to approval by the Structural Engineer.
- C. Horizontal Joints:
 - Locate in Walls and Columns at the underside of the lowest Slab, Beam, Joist or Girder intersecting each Wall and Column.
 - Unless noted otherwise, roughen entire Joint Surface to 1/2" amplitude using a hand rake before Concrete sets or, if sets, mechanically roughen to expose coarse aggregate and to achieve 1/4" amplitude roughness.
 - At Bentonite waterstops leave a smooth troweled path between roughened areas to the width of the waterstop. Horizontal Joints not permitted within the height of: Footings, Caps, Tie Beams, Grade Beams, Stem Walls, Beams, Girders, Joists, Slabs, or in Columns and Walls between levels.
- D. Vertical Joints:
 - Locate at midspan of Slab, Joists, Beams, and Girders
 - Make Joints perpendicular to main reinforcing.
 - If Members intersect at midspan, Offset Joint by twice the width of the wider member.
 - In Joists, Beams, and Girders use 3 1/2" high horizontal keys across the width of the member spaced 8' vert. leave gap in keys at water stops.
 - At Metal Deck Slabs, Generally layout Joints midway between Beams and 5 feet before Girders. Submit proposed layout for approval by owner.
- E. Floor Slab Control Joints:
 - Maximum joint spacing = 2 x Slab Thickness x 1 ft/12 in.
 - Sawcut or Tool Joints in square pattern in each direction.
 - Extend control joints to corners.

3.2 REINFORCING:

- A. Reinforcing steel shall be ASTM A615 Grade 60, deformed bars, unless noted otherwise. Welding of ASTM A615, grade 60 reinforcing is not allowed.
- B. Reinforcing Steel to be welded shall be ASTM 706, Grade 60, deformed bars.
- C. Welded Wire Fabric shall be ASTM A185 and shall be contact lap spliced two full wire spaces.
- D. All Reinforcing bars shall be detailed, fabricated, supported and placed in accordance with ACI 315 'Details and Detailing of Concrete Reinforcement' and CRSI's 'Manual of Standard Practice'
- E. Reinforcing, including dowels, shall be securely tied and cast with the lower member. Placing reinforcing after concrete has been placed is not permitted.
- F. Field bending of reinforcing partially embedded in concrete is not allowed unless specifically noted in the Structural Documents or approved by the Structural Engineer.
- G. Provide corner bars to match horizontal reinforcing at corners and intersections.
- H. Provide dowels from foundation of the same grade, size, and number as vertical wall or column reinforcing, unless noted otherwise.
- I. Adhesive for reinforcing dowels into existing concrete shall be HILTI HIT 150 or approved equal. Minimum embedment length shall be 12 bar diameter, unless noted otherwise.
- L. All reinforcing shall be contact lap spliced or doweled as follows:

Unless lap length is given, splice #11 and smaller bars with contact laps selected from schedules below, including locations where "A" or "B" laps are noted on Structural Drawings.

- Top bars are horizontal or sloping bars with more than 12" of fresh concrete cast below them.
- Case 1 may be used when both spacing between bars is not less than 2 bar diameters and clear cover is not less than 1 bar diameter, otherwise use case 2.
- For lightweight concrete, multiply lengths in tables by 1.3
- For epoxy coated reinforcement, multiply lengths in tables by 1.5.

BAR SIZE	SPICE LENGTH (ft-in)		OTHER BARS	
	TOP BARS	CASE 1	CASE 2	CASE 2
#3	2'-4"	3'-6"	1'-10"	2'-9"
#4	3'-2"	4'-8"	2'-5"	3'-7"
#5	3'-11"	5'-10"	3'-0"	4'-6"
#6	4'-8"	7'-0"	3'-7"	5'-5"
#7	6'-9"	10'-2"	5'-3"	7'-10"
#8	7'-9"	11'-7"	6'-9"	8'-11"
#9	8'-9"	13'-1"	6'-9"	10'-1"
#10	9'-10"	14'-9"	7'-7"	11'-4"
#11	10'-11"	16'-4"	8'-5"	12'-7"

For bar embedment and for extension beyond corners use top bar case 1

3.3 CAST-IN-PLACE CONCRETE:

- A. MATERIALS:
 - Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project.
 - Portland Cement: ASTM C 150, Type I. Supplement with the following as necessary:
 - Fly Ash: ASTM C 618, Class C or F.
 - Normal-Weight Aggregate: ASTM C 33, graded, 1-inch nominal maximum aggregate size
 - Lightweight Aggregate: ASTM C 330, 3/4-inch nominal maximum aggregate size.
 - Water: ASTM C 94/C 94M, potable.
 - Air-Entraining Admixture: ASTM C 260.
 - Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - Retarding Admixture: ASTM C 494/C 494M, Type B.
 - Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F, High-Range.
 - Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

- B. RELATED MATERIALS:
 - Vapor Retarder: Multi-ply reinforced polyethylene sheet, ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 MILS thick.
 - Vapor Barrier: 10 mil polyethylene film is required under all interior concrete slabs. Overlap seams a minimum of 6" and seal.
 - Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulose fiber, or ASTM D 1752, cork or self-expanding cork.

- C. CURING MATERIALS:
 - Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
 - Absorbent Covers: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry. 3. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 - Water: Potable.
 - Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B.
- D. Reinforced concrete shall have the following minimum 28-day compressive strengths:
 - 2500 psi - basement slabs and interior slabs except garage slabs.
 - 3000 psi - foundation and basement walls, footings and piers.
 - 3500 psi - porches, walks, patios, steps, garage slabs, and driveways.
- E. All concrete to have the following unit weights (+/- 3pcf):
 - Normal weight concrete: plastic = 145 pcf
 - Lightweight: plastic = 117 pcf, air-dried = 110 pcf
 - Max. slump 4" G. All concrete exposed to freezing and thawing and deicer chemicals shall have 6% (+1/-1.5%) air entrainment. Do not air entrain concrete floors to be trowel finished.
- F. All concrete shall have a maximum water-cement ratio of 0.45 for all concrete cast against or permanently exposed to soil or weather, 0.50 for all other concrete.
- G. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
 - Do not add water to concrete during delivery, at Project site, or during placement.
- H. Provide concrete cover for reinforcing as follows:
 - Concrete cast against and permanently exposed to earth: 2"
 - Concrete exposed to earth or weather: 2"
 - Concrete not exposed to weather or in contact with ground:
 - Slabs and walls: 3/4"
 - Beams and columns: 1-1/2"

- I. Concrete foundation height limits:
 - Max. 8 foot pour height - 8" thick wall.
 - Max. 9 foot pour height - 10" thick wall.
 - Max. 10 foot pour height - 12" thick wall.
- J. Contractor shall not backfill until concrete foundation has cured for a minimum of 10 days.
- K. For concrete cast on metal deck, concrete thickness indicated is nominal. Contractor shall allow for the deflection of the floor assembly due to the wet weight of the concrete when calculating concrete quantity.
- L. Provide construction or control joints in slab-on-grade as indicated in the Structural Drawings. If joint pattern is not indicated, provide joints at 15 feet (+/-) in both directions and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays, etc.).
- M. Interface of construction joints shall be roughened to a full amplitude of 1/4". Surface of construction joints shall be clean and free of laitance. Immediately before new concrete is placed, construction joints shall be wetted and standing water removed.
- N. Provide compressible filler and sealant in slab-on-grade and wall and column interfaces that are not doweled together u.n.a.
- O. All column pockets shall be filled with concrete after column is erected.
- P. Conduit and pipes embedded in walls, beams, or slabs shall be no larger in outside dimension than 1/3 the overall member thickness or 2" maximum, and shall be placed no closer than 3 diameters or widths on center.
- Q. At floor drains, locally slope floor towards drain. See Documents from other disciplines for drain locations.
- R. Provide 3/4" Changers at all Columns, Beams, Walls, and Slab edges that are exposed to view in the finished structure.
- S. See Architectural Drawings for Door and Window openings, Drip Slots, Reglets, Masonry Anchors, Precast Bearing Ledges, and for miscellaneous embedded Plates, Bolts Anchors, Etc.
- T. Refer to Architectural Drawings for concrete Finishes. Where Finish is not specified, Conform to requirements of ACI 301 as modified by the specifications.
- U. Select Formwork to produce the Finish specified. Where Finish is not specified, exposed surfaces shall be ACI 347R class C. A surface is considered exposed if the concrete texture can be seen by anyone in the completed structure.
- V. Unless noted, splice continuous top and bottom bars as follows: Top bars at midspan, Bottom bars over support.

- 4. TESTING AND INSPECTION:
 - Owners will engage a qualified testing agency to perform field test and inspection and to prepare reports. A Special Inspector shall be retained where required by Division 1 and the Building Codes.
 - INSPECTIONS:
 - Steel reinforcement placement.
 - Steel reinforcement welding.
 - Headed bolts and studs.
 - Verification of use of required design mixtures.
 - Concrete placement, including conveying and depositing.
 - Curing procedures and maintenance of curing temperatures.
 - TESTS Performed according to ACI 301
 - Testing frequency: One concrete sample for each day's pours of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

4. REPAIR:

- A. Remove and replace concrete that does not comply with the requirements mentioned above.

DIVISION 4 - CONCRETE MASONRY

4.1 GENERAL:

- A. This section specifies requirements for construction of masonry unit walls.
- B. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcing bars. Comply with ACI 315. Show bar schedules, diagrams of bent bars, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work. Submittal shall also show method of hanging soffit or lintel masonry and reinforcing masonry for embedment of anchors for hung fixtures. Water penetration testing is required.
- C. WATER PENETRATION TESTING IS REQUIRED.
- D. REINFORCING:
 - Reinforcing steel shall be ASTM A615 Grade 60 deformed bars, unless noted otherwise. Welding of ASTM A615 Grade 60 reinforcing is not allowed.
 - Joint reinforcing shall be truss type conforming to ASTM A951, with prefabricated corner and tee units at corners and intersections.
 - Dowels to supporting structure shall be of the same grade, size, and number as vertical reinforcing.
 - Provide corner bars to match horizontal reinforcing at corners and intersections.
 - Vertical reinforcing shall be centered in all Walls (u.n.a.)
 - Reinforce 8" concrete masonry vertically with #5 rebar full height at 32" o.c. unless noted otherwise. Reinforce 12" concrete masonry vertically with #6 rebar full height at 32" o.c. unless noted otherwise.
 - Reinforce 8" bond beams with 2-#5 rebars continuous, unless noted otherwise. Reinforce 12" bond beams with 2-#6 rebars continuous, unless noted otherwise.

4.2 TESTING AND INSPECTION:

- A. Owners will engage a qualified testing agency to perform field test and inspection and to prepare reports. A Special Inspector shall be retained where required by Division 1 and the Building Codes.
 - INSPECTIONS:
 - Steel reinforcement placement.
 - Steel reinforcement welding.
 - Headed bolts and studs.
 - Verification of use of required design mixtures.
 - Concrete placement, including conveying and depositing.
 - Curing procedures and maintenance of curing temperatures.
 - TESTS Performed according to ACI 301
 - Testing frequency: One concrete sample for each day's pours of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

4.3 REPAIR:

- A. Remove and replace concrete that does not comply with the requirements mentioned above.

DIVISION 5 - METALS

5.1 STRUCTURAL STEEL:

- A. GENERAL:
 - Structural steel shall be fabricated and erected in accordance with the AISC 'Load and Resistance Factor Design Specification for Structural Steel Buildings,' 1993 with Supplement No. 1.
 - All steel permanently exposed to view shall be designated as architecturally exposed structural steel.
 - Materials shall conform to the following, unless noted otherwise.
 - W's and WT's: ASTM A992
 - Plates & other shapes: ASTM A36
 - HSS: Sq. & Rect.: ASTM A500, Grade B
 - Pipe: ASTM A53, Type E or S, Grade B
 - Bolts, hex head: ASTM A325, 3/4" diameter (min.)
 - Anchor Rods and heavy hex nuts: ASTM F1554, Grade 36 with A36 washers
 - Threaded Rod: ASTM A36
 - Headed Studs: AWS D1.1, Type B
 - Electrodes: Matching strength, 70 ksi min. (60 ksi min. for welding light gauge)
- B. Detail steel beam connections as simple span beams, unless noted otherwise.
- C. Beam connections not fully detailed shall be designed by Contractor for service forces indicated on the Structural Drawings considering the forces to be acting simultaneously. If no reaction is shown, design connection for minimum reaction.
 - Minimum beam shear reaction is 10 kips.
- D. All bolted connections shall be designed as snug-tight bearing connections with threads included in the shear plane, unless noted otherwise.
- E. Where items are to be anchored to concrete except at column baseplates, use standard sized holes in steel member, unless noted otherwise.
- F. Use pre-qualified welded joints in accordance with AISC and AWS D1.1:2000. Non-prequalified joints shall be qualified prior to fabrication.
 - Shop and Erection Drawings detailing all information necessary for the fabrication and erection of structural steel components.
 - No Contract Document in any form shall be used as a background for a Shop Drawing or erection drawing.
 - Include details of cuts, connections, splices, camber, holes, stiffeners, doubler plates, and other pertinent data, such as surface preparation. Include setting drawings, templates, and directions for installation of embedded items to be installed by others.
 - Indicate welds by standard AWS symbols as given in AWS 2.4 'Standard Symbols for Welding, Brazing, and Nondestructive Testing,' distinguishing between shop and field welds, and show size, length, and type of each weld. Identify welds by WPS number.
 - Include design calculations for all fabricator designed connections. Calculations shall be signed and sealed by a qualified professional engineer responsible for preparation.
 - Calculations are for informational purposes only and will not be reviewed or returned to the fabricator.
 - Welding certificates.
 - Welding procedure specifications (WPS) per AWS D1.1 for each weld.
 - Qualification Data: For fabricator, professional engineer, and testing agency.
 - Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - Structural steel including chemical and physical properties.
 - Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - Shop primers.
 - Nonshrink grout.
- G. QUALIFICATIONS:
 - Erector Qualifications: Engage an experienced Erector who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
 - Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category 3b.
 - Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.
 - Welding: Comply with applicable provisions of AWS D1.1:2000, 'Structural Welding

- H. Space joint reinforcement at 16" o.c. vertically typical and at 8" o.c. vertically at parapets and cantilevered walls, unless noted otherwise.
- I. Coordinate layout of dowels from concrete on Shop Drawings.
- J. Provide bond beams at Base of Wall, Sill Lines, Head Lines bottom edge of openings (extend minimum of 2'-0" past opening), top of walls, floor lines, roof lines, top of parapets and at 10 feet O.C. maximum in between bond beam shall be continuous (u.n.a.)
- K. Provide vertical wall reinforcing, same size as adjacent bars, At Corners, ends, Joints, each side of opening and each side of control and expansion joints.
- L. Continue vertical reinforcing floor to floor (or roof) and extended to top of parapet.
- M. Continue reinforcing through Construction Joints, Control Joints in and around corners unless noted otherwise.
- N. Provide standard hooks on bars terminating into masonry face:
 - In walls at openings, Heads, Joints, expansion joints, ends.
 - In Beams at top, bottom and ends.
- O. Splice continuous top bars at midspan and bottom bars over support. Splice vertical reinforcing at floor and roof lines. Other splice locations subject to approval.
- P. Grout cell solid at Reinforcing, bond beams, inserts, anchors, elevator guide rails, and 24" below bearing points of steel sections and 12" to each side below grade.

BAR SPlicing TABLES FOR REINFORCED MASONRY:

BAR SIZE	SPICE LENGTH (ft-in) - BAR CENTERED			
	6"	8"	10"	12"
#3	1'-4"	1'-4"	1'-4"	1'-4"
#4	1'-10"	1'-10"	1'-10"	1'-10"
#5	3'-0"	2'-3"	2'-3"	2'-3"
#6	5'-10"	4'-2"	3'-9"	3'-9"
#7	-	5'-9"	4'-5"	4'-5"
#8	-	8'-2"	6'-3"	5'-5"
#9	-	8'-1"	6'-6"	-

BAR SIZE	SPICE LENGTH (ft-in) - BAR OFFSET			
	6"	8"	10"	12"
#3	-	1'-6"	1'-4"	1'-4"
#4	-	2'-7"	2'-5"	2'-5"
#5	-	4'-0"	3'-9"	3'-6"
#6	-	8'-1"	7'-7"	7'-1"
#7	-	-	10'-3"	9'-7"
#8	-	-	-	13'-5"
#9	-	-	-	-

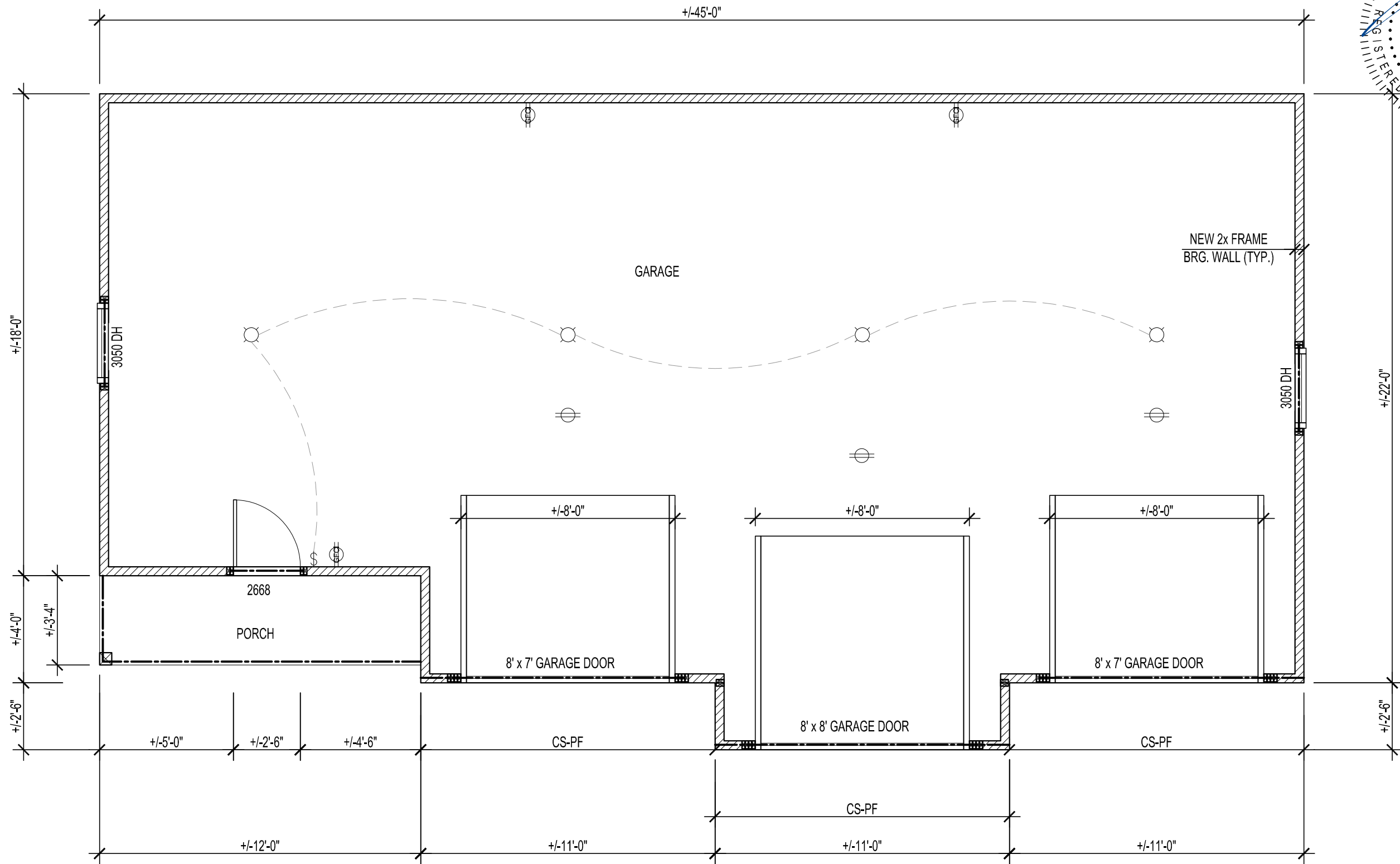
4.3 CONCRETE MASONRY UNIT:

- A. Concrete Masonry units shall be ASTM C90, lightweight (105 pcf), Grade N, Type 1-2 cell units.
- B. Provide concrete masonry that develops the following minimum net-area compressive strength (fa) at 28 days: 2000 psi. Mortar shall be of the following types:
 - Concrete cast against and permanently exposed to earth: 2"
 - Concrete exposed to earth or weather: 2"
 - Concrete not exposed to weather or in contact with ground:
 - Slabs and walls: 3/4"
 - Beams and columns: 1-1/2"
- C. Grout shall conform to ASTM C476. Grout shall be proportioned with a slump of 8" to 11" using 3/8" nominal maximum size course aggregate. Grout strength at 28 days, f'm 2000 psi.
- D. Conduits, pipes, and sleeves shall be no closer than 3 diameters on center.
- E. Maximum area of vertical conduits, pipes, or sleeves placed in columns or pilasters shall not displace more than 2 percent of the net cross section.
- F. Special Inspections Level 2 as defined in the building code.
- G. Prism testing is required.

DIVISION 5 - METALS

5.1 STRUCTURAL STEEL:

- A. GENERAL:
 - Structural steel shall be fabricated and erected in accordance with the AISC 'Load and Resistance Factor Design Specification for Structural Steel Buildings,' 1993 with Supplement No. 1.
 - All steel permanently exposed to view shall be designated as architecturally exposed structural steel.
 - Materials shall conform to the following, unless noted otherwise.
 - W's and WT's: ASTM A992
 - Plates & other shapes: ASTM A36
 - HSS: Sq. & Rect.: ASTM A500, Grade B
 - Pipe: ASTM A53, Type E or S, Grade B
 - Bolts, hex head: ASTM A325, 3/4" diameter (min.)
 - Anchor Rods and heavy hex nuts: ASTM F1554, Grade 36 with A36 washers
 - Threaded Rod: ASTM A36
 - Headed Studs: AWS D1.1, Type B
 - Electrodes: Matching strength, 70 ksi min. (60 ksi min. for welding light gauge)
- B. Detail steel beam connections as simple span beams, unless noted otherwise.
- C. Beam connections not fully detailed shall be designed by Contractor for service forces indicated on the Structural Drawings considering the forces to be acting simultaneously. If no reaction is shown, design connection for minimum reaction.
 - Minimum beam shear reaction is 10 kips.
- D. All bolted connections shall be designed as snug-tight bearing connections with threads included in the shear plane, unless noted otherwise.
- E. Where items are to be anchored to concrete except at column baseplates, use standard sized holes in steel member, unless noted otherwise.
- F. Use pre-qualified welded joints in accordance with AISC and AWS D1.1:2000. Non-prequalified joints shall be qualified prior to fabrication.
 - Shop and Erection Drawings detailing all information necessary for the fabrication and erection of structural steel components.
 - No Contract Document in any form shall be used as a background for a Shop Drawing or erection drawing.
 - Include details of cuts, connections, splices, camber, holes, stiffeners, doubler plates, and other pertinent data, such as surface preparation. Include setting drawings, templates, and directions for installation of embedded items to be installed by others.



GARAGE FLOOR PLAN

SCALE: 1/4"=1'-0"

STATE OF MISSOURI
GEORGE CORY CALKINS
 REGISTERED PROFESSIONAL ENGINEER
 NUMBER PE-2022019812
 3/20/26

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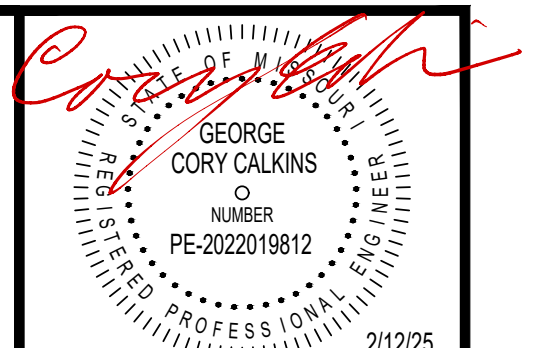


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2015 IRC
 GARAGE FLOOR PLAN
17 EDWIN AVE.
 ST. LOUIS, MO 63122

SHEET NO. **1**
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GEORGE CORY CALKINS
 LICENSE # PE-2022019812
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CORY CALKINS, PROFESSIONAL ENGINEER
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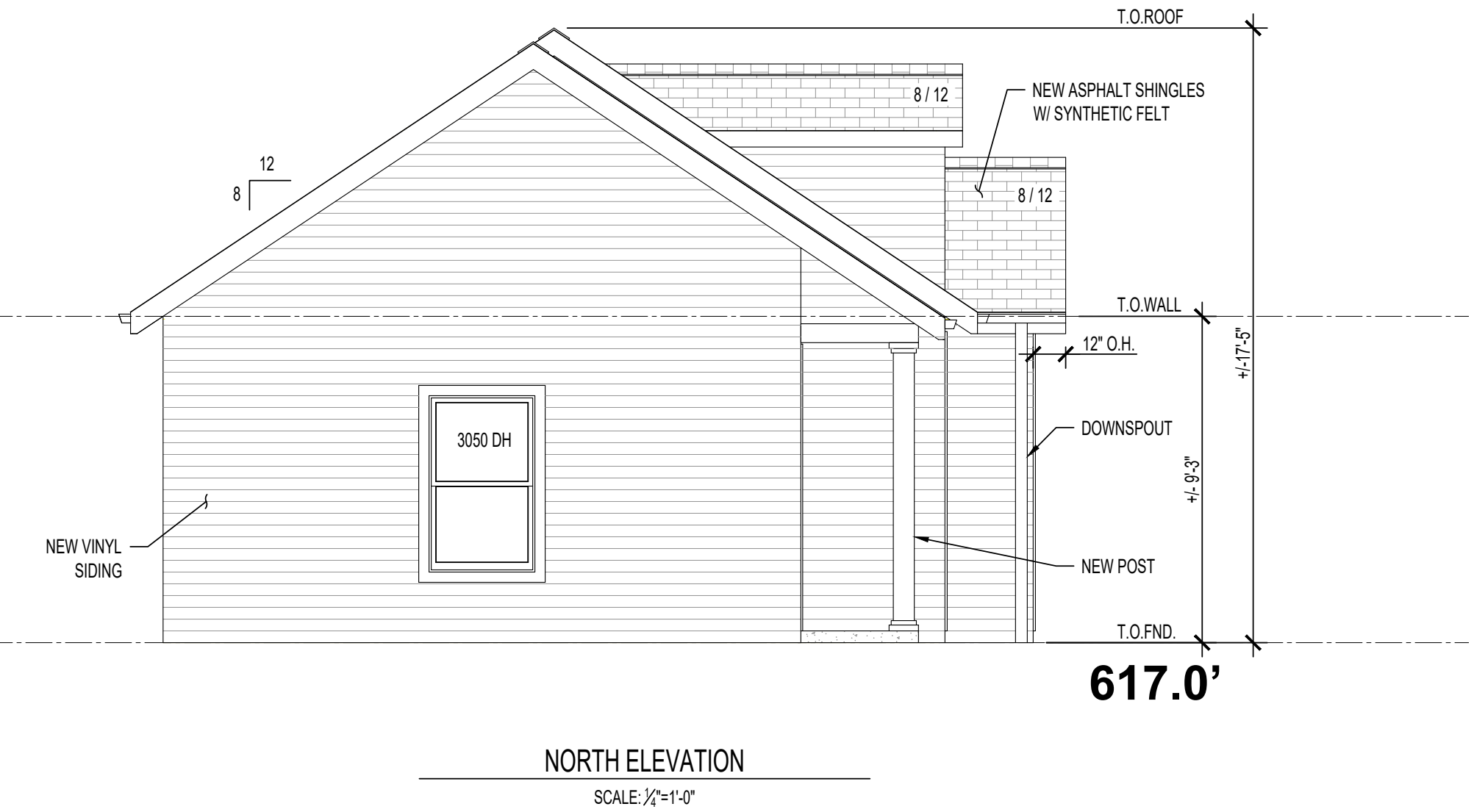
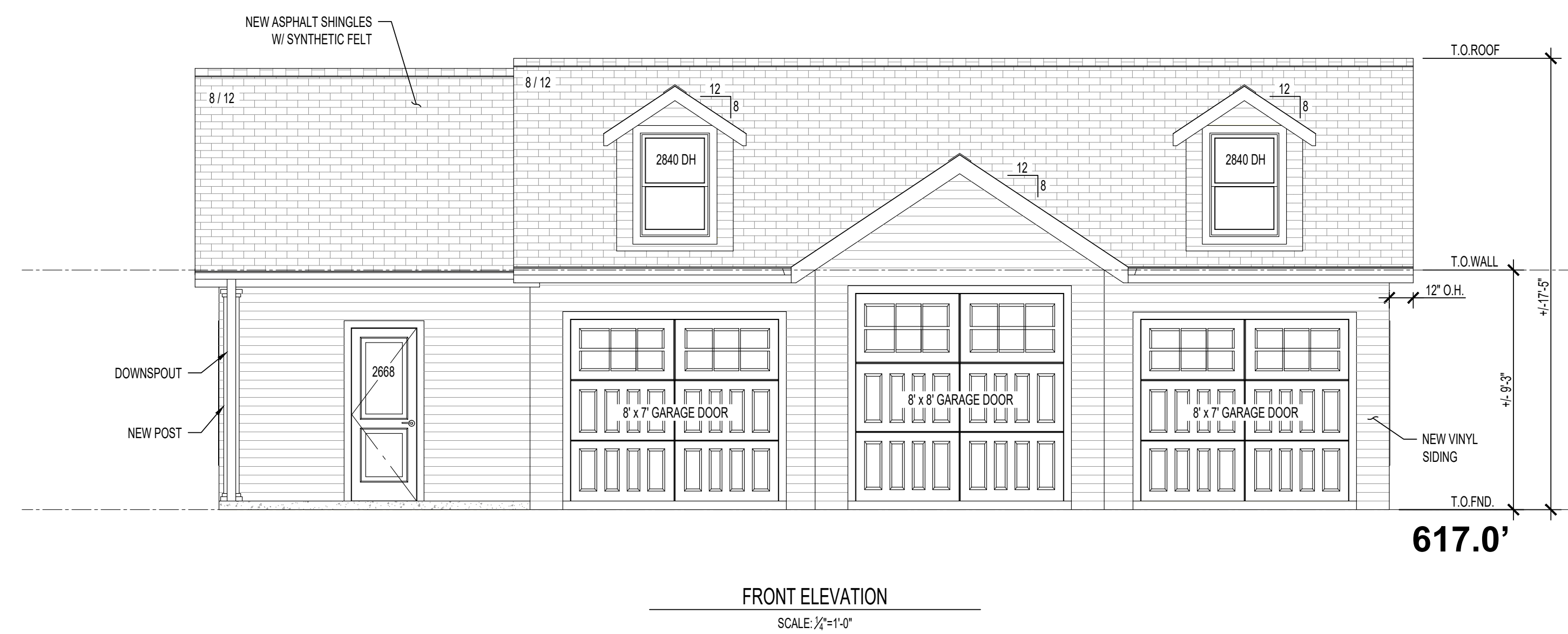


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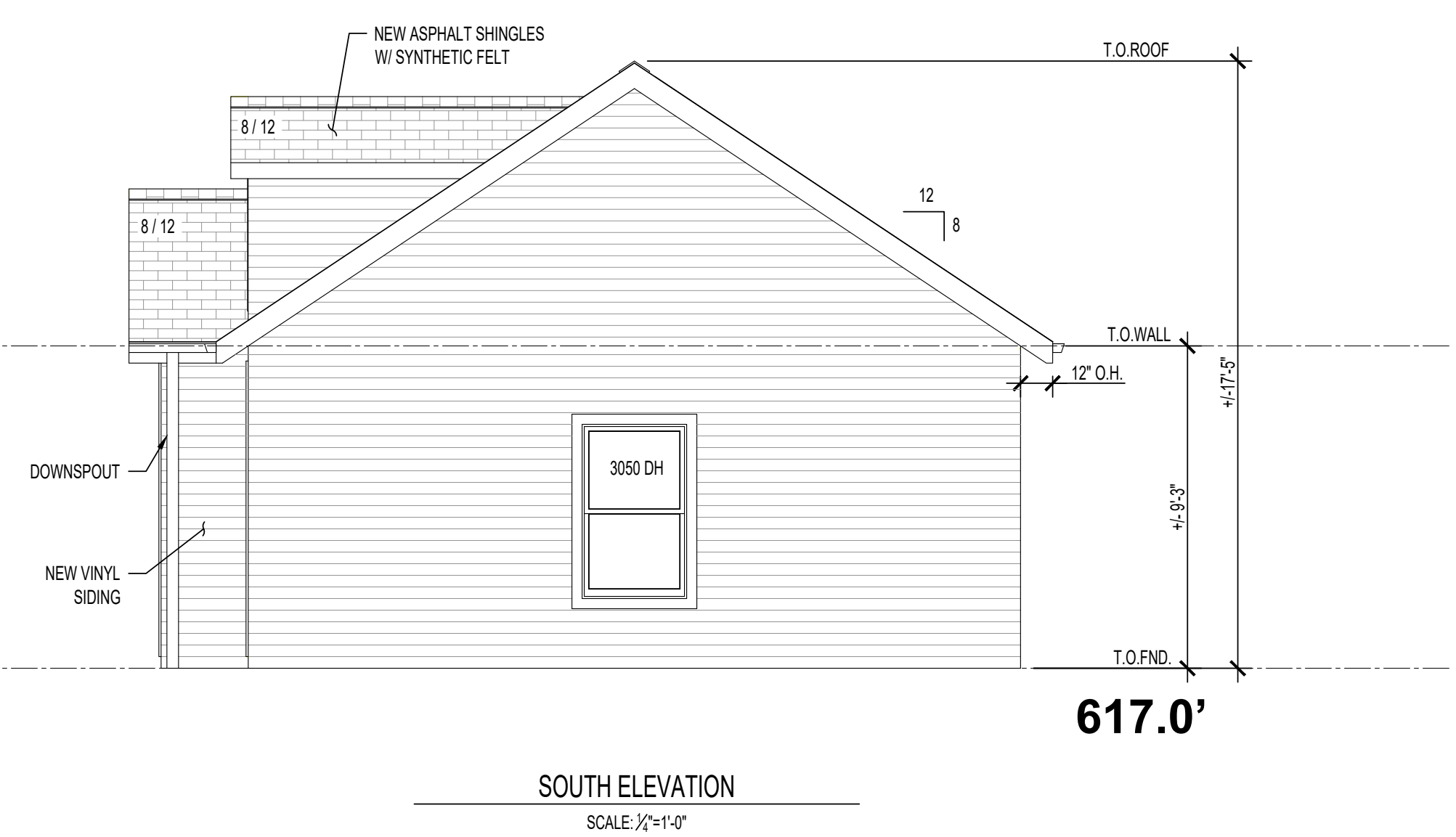
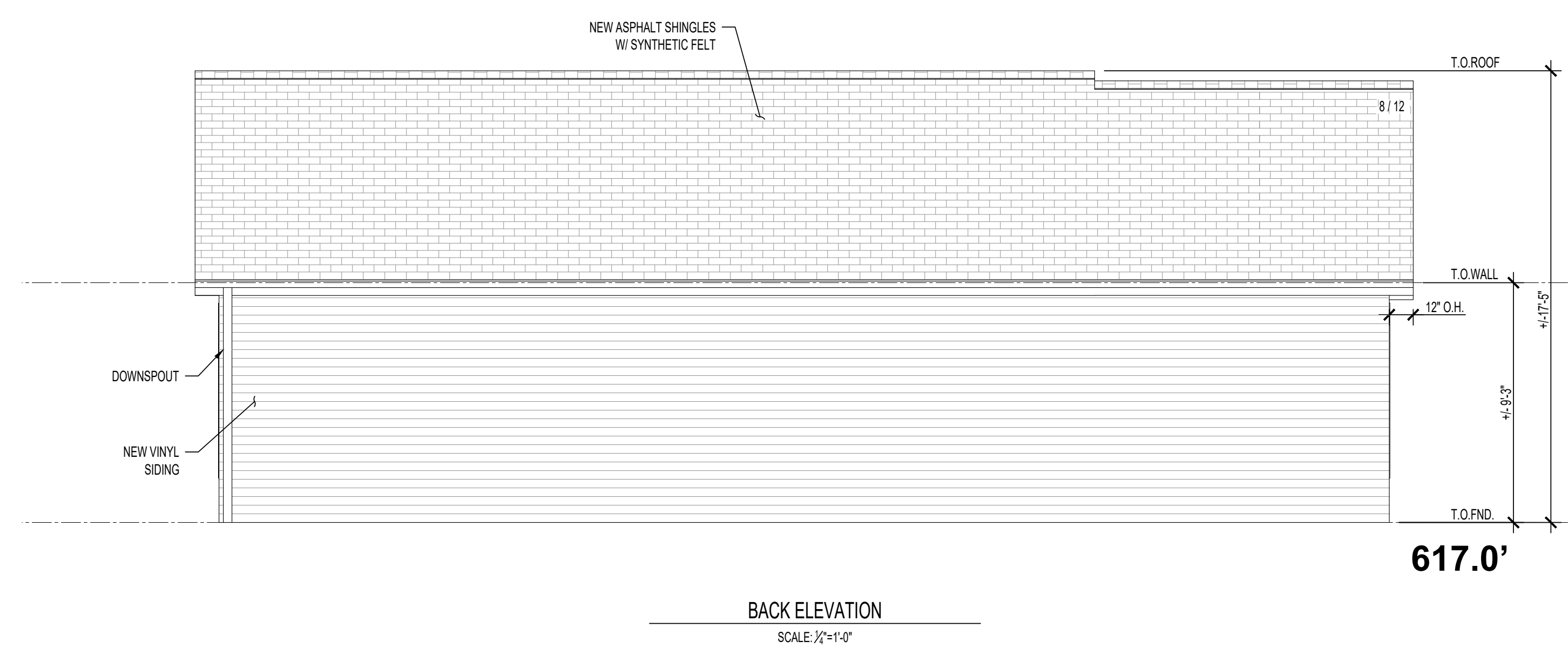
ELEVATIONS
17 EDWIN AVE.
 ST. LOUIS, MO 63122

2015 IRC

SHEET NO. **S6**
 6 OF 8



WINDOW & DOOR KEY
 DIMENSIONS 3 | 0 | 5 | 0 | TYPE
 FEET INCHES TENTH INCHES
 *ADD FOR ROUGH PER MANUFACTURE
 *VERIFY EXACT SIZES ON SITE BEFORE ORDER



2015 I.R.C. TABLE R602.3(1) FASTENER SCHEDULE FOR STRUCTURAL MEMBERS			
ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENERS ^{1,2}	SPACING OF FASTENERS
ROOF			
1	BLOCKING BETWEEN CEILING JOISTS OR RAFTERS TO TOP PLATE	4-8d BOX (2 1/2" x 0.131") OR 3-8d COMMON (2 1/2" x 0.131") OR 3-10d BOX (3" x 0.128") OR 3-3" x 0.131" NAILS	TOE NAIL
2	CEILING JOISTS TO PLATE	4-8d BOX (2 1/2" x 0.131") OR 3-8d COMMON (2 1/2" x 0.131") OR 3-10d BOX (3" x 0.128") OR 3-3" x 0.131" NAILS	PER JOIST, TOE NAIL
3	CEILING JOISTS NOT ATTACHED TO PARALLEL RAFTERS, LAPS OVER PARTITIONS (SEE SECTION R602.3.1, R602.3.2 AND TABLE R602.3.1 (9))	4-10d BOX (3" x 0.128") OR 3-16d COMMON (3 1/2" x 0.167") OR 4-3" x 0.131" NAILS	FACE NAIL
4	CEILING JOIST ATTACHED TO PARALLEL RAFTER (HEL JOIST) PARTITIONS (SEE SECTION R602.3.1, R602.3.2 AND TABLE R602.3.1 (9))	4-10d BOX (3" x 0.128") OR 3-10d COMMON (3 1/2" x 0.167") OR 4-3" x 0.131" NAILS	FACE NAIL
5	COLLAR TIE RAFTER, FACE NAIL OR 1 1/2" x 2 1/2" GAGE RIDGE STRAP TO RAFTER	4-10d BOX (3" x 0.128") OR 3-10d COMMON (3 1/2" x 0.167") OR 4-3" x 0.131" NAILS	FACE NAIL EACH RAFTER
6	RAFTER OR ROOF TRUSS TO PLATE	3-16d COMMON (3 1/2" x 0.167") OR 3-10d COMMON (3 1/2" x 0.167") OR 4-10d BOX (3" x 0.128") OR 4-3" x 0.131" NAILS	2 TOE NAILS ON ONE SIDE & 1 TOE NAIL ON OPPOSITE SIDE OF EACH RAFTER OR TRUSS
7	ROOF RAFTERS TO RIDGE, VALLEY OR HIP RAFTERS OR RAFTER TO MINIMUM 2" RIDGE BEAM	4-16d (3" x 0.131") OR 3-10d COMMON (3 1/2" x 0.167") OR 4-10d BOX (3" x 0.128") OR 4-3" x 0.131" NAILS	TOE NAIL
		3-16d COMMON (3 1/2" x 0.167") OR 2-16d COMMON (3 1/2" x 0.167") OR 3-10d COMMON (3 1/2" x 0.167") OR 3-3" x 0.131" NAILS	END NAIL
WALL			
8	STUD TO STUD (NOT AT BRACED WALL PANELS)	16d COMMON (3" x 0.167") 10d BOX (3" x 0.128") OR 3" x 0.131" NAILS	24" o.c. FACE NAIL
9	STUD TO STUD AND BUTTING STUDS AT INTERSECTION WALL CORNERS (AT BRACED WALL PANELS)	16d COMMON (3" x 0.167") OR 3" x 0.131" NAILS 16d COMMON (3" x 0.167")	12" o.c. FACE NAIL
10	BUILT-UP HEADER (2" TO 2" WITH 1/2" SPACER)	16d COMMON (3" x 0.167")	16" o.c. EACH EDGE FACE NAIL
11	CONTINUED HEADER TO STUD	5-8d BOX (2 1/2" x 0.131") OR 4-8d COMMON (2 1/2" x 0.131") OR 4-10d BOX (3" x 0.128")	TOE NAIL
12	TOP PLATE TO TOP PLATE	16d COMMON (3" x 0.167")	16" o.c. FACE NAIL
13	DOUBLE TOP PLATE SLICE FOR SDCs A-D WITH SEISMIC BRACED WALL LINE SPACING LESS THAN 25'	8-16d COMMON (3 1/2" x 0.167") OR 12-16d COMMON (3 1/2" x 0.167") OR 12-10d BOX (3" x 0.128") OR 12-3" x 0.131" NAILS	FACE NAIL ON EACH SIDE OF END JOIST (MINIMUM 24" LAP SPICE- NAILS)
	DOUBLE TOP PLATE SLICE FOR SDCs D, DD, OR D3 WITH SEISMIC BRACED WALL LINE SPACING GREATER THAN OR EQUAL TO 25'	12-16d (3 1/2" x 0.167")	LENGTH EACH SIDE OF END JOIST
14	BOTTOM PLATE TO JOIST, RIM JOIST, BAND JOIST OR BLOCKING (NOT AT BRACED WALL PANELS)	16d COMMON (3" x 0.167")	16" o.c. FACE NAIL
		16d BOX (3 1/2" x 0.167") OR 3" x 0.131" NAILS	12" o.c. FACE NAIL
15	BOTTOM PLATE TO JOIST, RIM JOIST, BAND JOIST OR BLOCKING (AT BRACED WALL PANELS)	3-16d COMMON (3 1/2" x 0.167") OR 2-16d COMMON (3 1/2" x 0.167") OR 4-3" x 0.131" NAILS	3 EACH 16" o.c. FACE NAIL 2 EACH 16" o.c. FACE NAIL
16	TOP OR BOTTOM PLATE TO STUD	4-8d BOX (2 1/2" x 0.131") OR 3-16d BOX (3 1/2" x 0.167") OR 4-8d COMMON (2 1/2" x 0.131") OR 4-10d BOX (3" x 0.128") OR 4-3" x 0.131" NAILS	TOE NAIL
		3-16d BOX (3 1/2" x 0.167") OR 2-16d COMMON (3 1/2" x 0.167") OR 3-10d BOX (3" x 0.128") OR 3-3" x 0.131" NAILS	END NAIL
17	TOP PLATES, LAP AT CORNERS AND INTERSECTIONS	3-10d BOX (3" x 0.128") OR 2-16d COMMON (3 1/2" x 0.167") OR 3-3" x 0.131" NAILS	FACE NAIL
18	1" BRACE TO EACH STUD AND PLATE	3-8d BOX (2 1/2" x 0.131") OR 2-8d COMMON (2 1/2" x 0.131") OR 2-10d BOX (3" x 0.128") NAILS	FACE NAIL
19	1" x 6" SHEATHING TO EACH BEARING	3-8d BOX (2 1/2" x 0.131") OR 2-8d COMMON (2 1/2" x 0.131") OR 2-10d BOX (3" x 0.128") NAILS	FACE NAIL
20	1" x 8" & WIDER SHEATHING TO EACH BEARING	4-8d BOX (2 1/2" x 0.131") OR 3-8d COMMON (2 1/2" x 0.131") OR 3-10d BOX (3" x 0.128") NAILS	FACE NAIL
FLOOR			
21	JOISTS TO SILL, TOP PLATE, OR GIRDER	4-8d BOX (2 1/2" x 0.131") OR 3-8d COMMON (2 1/2" x 0.131") OR 3-10d BOX (3" x 0.128") OR 3-3" x 0.131" NAILS	TOE NAIL
22	RIM JOISTS, BAND JOIST OR BLOCKING TO SILL OR TOP PLATE (ROOF APPLICATION ALSO)	8d BOX (2 1/2" x 0.131") OR 10d BOX (3" x 0.128") OR 3" x 0.131" NAILS	4" o.c. TOE NAIL
23	1" x 6" SUBFLOOR OR LESS TO EACH JOIST	3-8d BOX (2 1/2" x 0.131") OR 2-8d COMMON (2 1/2" x 0.131") OR 3-10d BOX (3" x 0.128") NAILS	FACE NAIL
24	2" SUBFLOOR TO JOIST OR GIRDER	3-16d BOX (3 1/2" x 0.167") OR 2-16d COMMON (3 1/2" x 0.167") NAILS	BLIND AND FACE NAIL
25	2" PLANKS (PLAIN & BEAM FLOOR & ROOF)	3-16d BOX (3 1/2" x 0.167") OR 2-16d COMMON (3 1/2" x 0.167") NAILS	AT EACH BEARING, FACE NAIL
26	BAND OR RIM JOIST TO JOIST	3-16d COMMON (3 1/2" x 0.167") OR 4-10d BOX (3" x 0.128") OR 4-3" x 0.131" NAILS	END NAIL
27	BUILT-UP GIRDERS AND BEAMS, 2-INCH LUMBER LAYERS	20d COMMON (4" x 0.192") OR 10d BOX (3" x 0.128") OR 3" x 0.131" NAILS	24" o.c. FACE NAIL AT TOP & BOTTOM STAGGERED ON OPPOSITE SIDES
		AND: 2-20d COMMON (4" x 0.192") OR 10d BOX (3" x 0.128") OR 3-3" x 0.131" NAILS	FACE NAIL AT END AND AT EACH SPICE
28	LEDGER STRIP SUPPORTING JOISTS OR RAFTERS	4-16d BOX (3" x 0.128") OR 3-16d COMMON (3 1/2" x 0.167") OR 4-10d BOX (3" x 0.128") OR 4-3" x 0.131" NAILS	FACE NAIL AT EACH JOIST OR RAFTER
29	BRIDGING TO JOIST	2-10d BOX (3" x 0.128")	TOE NAIL AT EACH END

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER ^{1,2}	SPACING OF FASTENERS	
			EDGES (INCHES)	INTERMEDIATE SUPPORTS (INCHES)
WOOD STRUCTURAL PANELS, SUBFLOOR, ROOF AND INTERIOR WALL SHEATHING TO FRAMING, AND PARTICLEBOARD WALL SHEATHING TO FRAMING				
30	3/4" - 1/2"	6d COMMON (2" x 0.131") NAIL (SUBFLOOR, WALL) OR 8d COMMON (2 1/2" x 0.131") NAIL (ROOF)	8d	6
31	3/4" - 1"	8d COMMON (2 1/2" x 0.131") NAIL	6	12'
32	1 1/2" - 1 3/4"	10d COMMON (3" x 0.148") NAIL OR 1 1/2" x 0.131" DEFORMED NAIL	8d (2)	6
OTHER WALL SHEATHING³				
33	1/2" STRUCTURAL CELLULOSIC FIBERBOARD SHEATHING	1 1/2" GALVANIZED ROOFING NAIL, 1/2" HEAD DIAMETER OR 1" CROWN STAPLE 16ga., 1 1/2" LONG	3	6
34	3/4" STRUCTURAL CELLULOSIC FIBERBOARD SHEATHING	1 1/2" GALVANIZED ROOFING NAIL, 1/2" HEAD DIAMETER OR 1" CROWN STAPLE 16ga., 1 1/2" LONG	3	6
35	1/2" GYPSUM SHEATHING	1 1/2" GALVANIZED ROOFING NAIL, STAPLE GALVANIZED, 1 1/2" LONG, 1 1/4" SCREWS, TYPE W OR S	7	7
36	3/4" GYPSUM SHEATHING	1 1/2" GALVANIZED ROOFING NAIL, STAPLE GALVANIZED, 1 1/2" LONG, 1 1/4" SCREWS, TYPE W OR S	7	7
WOOD STRUCTURAL PANELS, COMBINATION SUBFLOOR UNDERLAMENT TO FRAMING				
37	3/4" AND LESS	6d DEFORMED (2" x 0.120") NAIL OR 8d COMMON (2 1/2" x 0.131") NAIL	6d	12
38	3/4" - 1"	8d COMMON (2 1/2" x 0.131") NAIL OR DEFORMED (2 1/2" x 0.120") NAIL	8d	6
39	1 1/2" - 1 3/4"	10d COMMON (3" x 0.148") NAIL OR 1 1/2" x 0.131" DEFORMED NAIL	8d DEFORMED (2 1/2" x 0.120")	6

- For S1: 1 inch = 25.4 mm, 1 foot=304.8mm, 1 mile per hour=0.893 MPa
- All nails are smooth-shank, box or deformed shank except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strength as shown: 80ksi for shank diameter of 0.192 inch (20d common nail), 100ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100ksi for shank diameters of 0.142 inch or less.
 - Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.
 - Four-foot-by-8-foot or 4-foot-by-9-foot panels shall be applied vertically.
 - Spacing of fasteners not included in this table shall be based on Table R602.3(2).
 - Where the ultimate design wind speed is 130 mph or less, nails for attaching wood structural panel sheathing to gable end framing shall be spaced 6 inches on center. Where the ultimate design wind speed is greater than 130 mph, nails for attaching panel sheathing to intermediate supports shall be spaced 8 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls, and 4 inches on center to gable end wall framing.
 - Gypsum sheathing shall conform to ASTM C 1096 and be installed in accordance with CA 253. Fiberglass sheathing shall conform to ASTM C 208.
 - Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor partitions only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor girders shall be supported by framing members or solid blocking.
 - Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and one toe nail on the top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

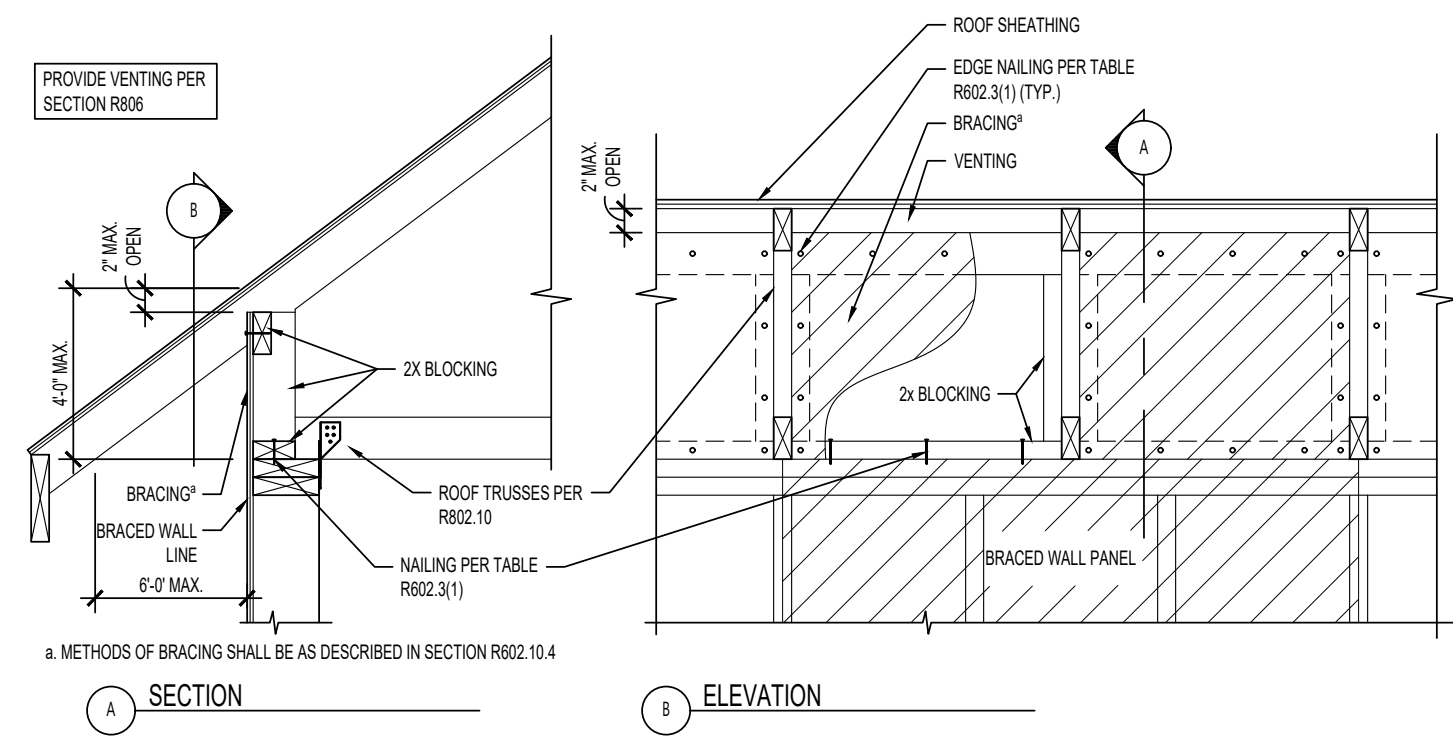
2015 I.R.C. TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES ^{1,2,3}									
MINIMUM NAIL SIZE	MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (INCHES)	MAXIMUM WALL STUD SPACING (INCHES)	PANEL NAIL SPACING			ULTIMATE DESIGN WIND SPEED (mph)		
				EDGES (INCHES O.C.)	FIELD (INCHES O.C.)	B	C	D	
6d COMMON (2" x 0.113")	1.5	2/8	38	16	6	12	140	115	110
8d COMMON (2 1/2" x 0.131")	1.75	24/16	716	16	6	12	170	140	135
				24	6	12	140	115	110

- For S1: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s
- Panel strength spans parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength spans perpendicular to supports.
 - Table is based on wind pressures acting leeward and away from building surfaces per section R301.2. Lateral bracing requirements shall be in accordance with R602.10.
 - Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternative to panels with a 24d span rating. Plywood siding rated 16oc or 24oc shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and Plywood siding 16oc shall be used with studs spaced a maximum of 16 inches on center.

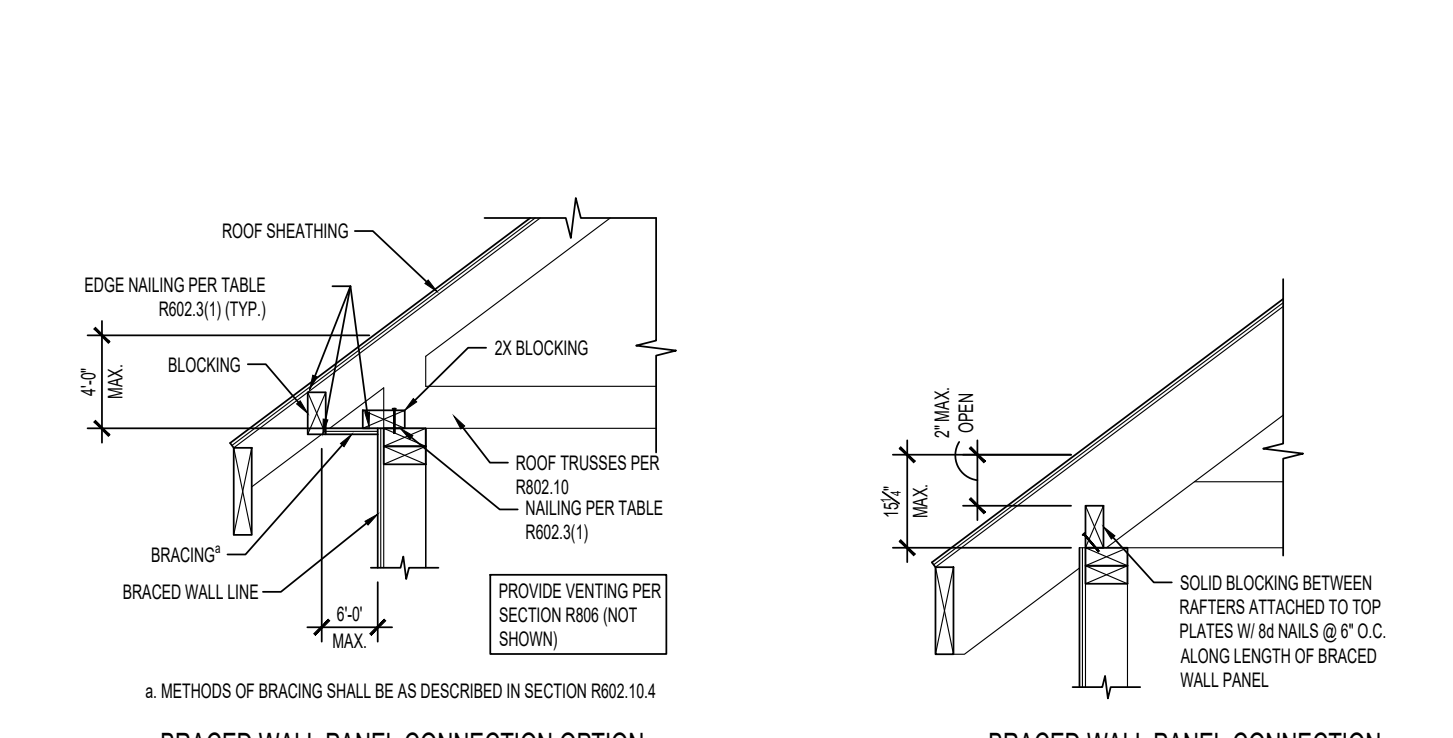
2015 I.R.C. TABLE R702.3.5 MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD

THICKNESS OF GYPSUM BOARD OR GYPSUM PRODUCTS (INCHES)	APPLICATION	ORIENTATION OF GYPSUM BOARD OR GYPSUM PRODUCTS TO FRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (INCHES)	MAXIMUM SPACING OF FASTENERS (INCHES)	SIZE OF NAIL FOR APPLICATION TO WOOD FRAMING ²		
					NAIL ¹	SCREW ¹	SCREW ¹
APPLICATION WITHOUT ADHESIVE							
1/2"	CEILING ³	PERPENDICULAR	16	7	12	13 GAGE, 1 1/2" LONG, 3/4" HEAD, 0.089" DIAMETER, 1 1/2" LONG, ANNUAL-RINGED, 60 COOLER NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD, OR GYPSUM BOARD NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD.	
	WALL	EITHER DIRECTION	16	8	16		
	CEILING	EITHER DIRECTION	16	7	12		
	CEILING ³	PERPENDICULAR	24	7	12		
	WALL	EITHER DIRECTION	24	8	12		
	WALL	EITHER DIRECTION	16	8	16		
3/8"	CEILING	EITHER DIRECTION	16	7	12	13 GAGE, 1 1/2" LONG, 3/4" HEAD, 0.089" DIAMETER, 1 1/2" LONG, ANNUAL-RINGED, 60 COOLER NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD, OR GYPSUM BOARD NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD.	
	CEILING	PERPENDICULAR	24	7	12		
1/2"	TYPE X AT GARAGE CEILING BENCH/STABLE ROOMS	PERPENDICULAR	24	6	6	1 1/2" LONG, 6d COATED NAILS OR EQUIVALENT OPTIMAL SCREWS. SCREWS SHALL COMPLY WITH SECTION R702.3.5.1	
	WALL	EITHER DIRECTION	24	8	12	13 GAGE, 1 1/2" LONG, 3/4" HEAD, 0.089" DIAMETER, 1 1/2" LONG, ANNUAL-RINGED, 60 COOLER NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD, OR GYPSUM BOARD NAIL, 0.089" DIAMETER, 1 1/2" LONG, 3/4" HEAD.	
APPLICATION WITH ADHESIVE							
1/2"	CEILING ³	PERPENDICULAR	16	16	16	SAME AS ABOVE FOR 3/8" GYPSUM BOARD AND GYPSUM PANEL PRODUCTS.	
	WALL	EITHER DIRECTION	16	16	24		
	CEILING	EITHER DIRECTION	16	16	16		
3/8" or 5/8"	CEILING ³	PERPENDICULAR	24	12	16	SAME AS ABOVE FOR 1/2" AND 3/4" GYPSUM BOARD AND GYPSUM PANEL PRODUCTS, RESPECTIVELY.	
	WALL	EITHER DIRECTION	24	16	24		
	CEILING	PERPENDICULAR	16	16	16		
Two 1/2" layers	WALL	EITHER DIRECTION	24	24	24	BASE PLY NAILS AS ABOVE FOR 1/2" GYPSUM BOARD AND GYPSUM PANEL PRODUCTS, EACH PLY INSTALLED WITH ADHESIVE.	

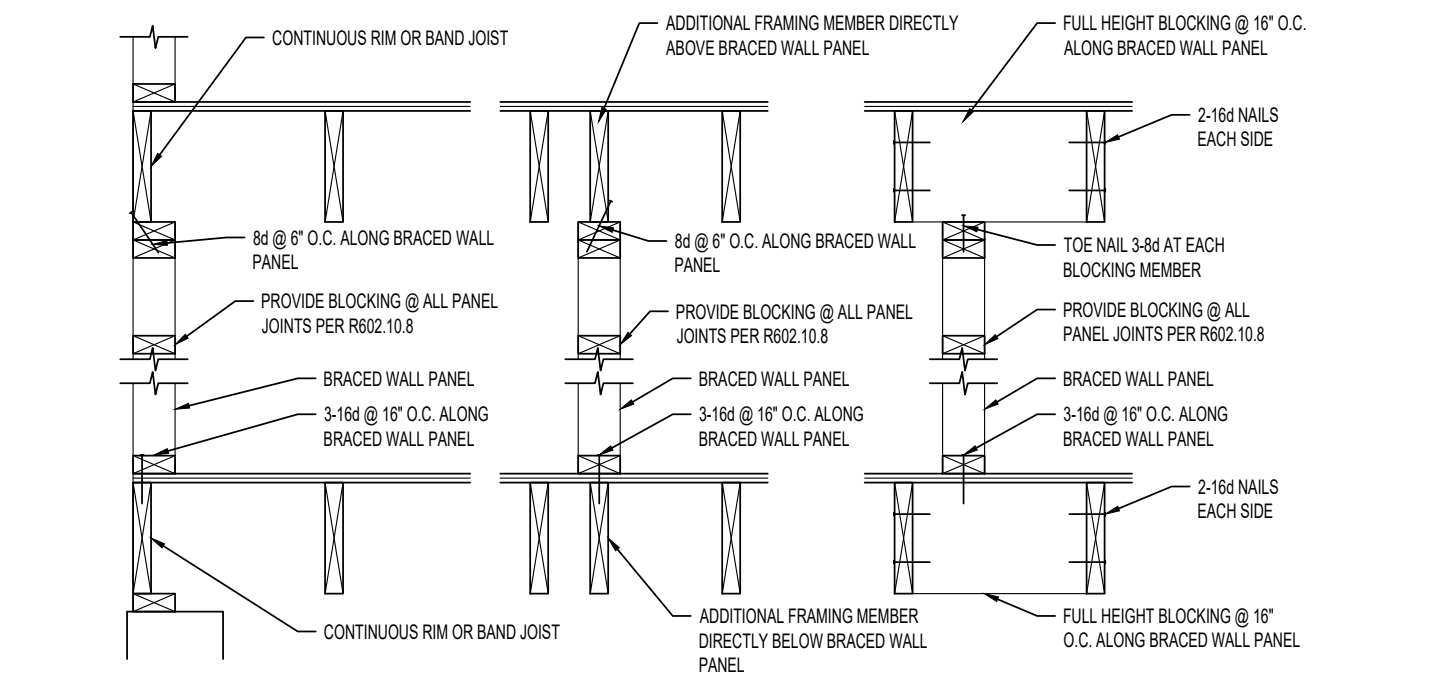
- For S1: 1 inch = 25.4 mm
- For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than 2 1/2 inches apart shall be permitted to be used with the pair of nails spaced 12 inches on center.
 - Screws shall be in accordance with Section R702.3.6. Screws for attaching gypsum board or gypsum panel products to structural framing members shall penetrate the wood structural panel facing not less than 3/8 inch.
 - Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall not be less than 1/4 inch longer than the gypsum board or gypsum panel thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d, 13d gage, 1 1/2" long, with 18d-48 inch heads for 1/2" and gypsum board or gypsum panel product, and 16d, 13 gage, 1 1/2" long, 3/4" inch head for 3/8" and gypsum board or gypsum panel product.
 - Three-eighths-inch-thick single-ply gypsum board shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, the minimum gypsum board thickness shall be increased from 1/2 inch to 5/8 inch for 16 inches on center framing, and from 5/8 inch to 3/4 inch for 24 inches on center framing on each non-adjacent gypsum ceiling board to be used.



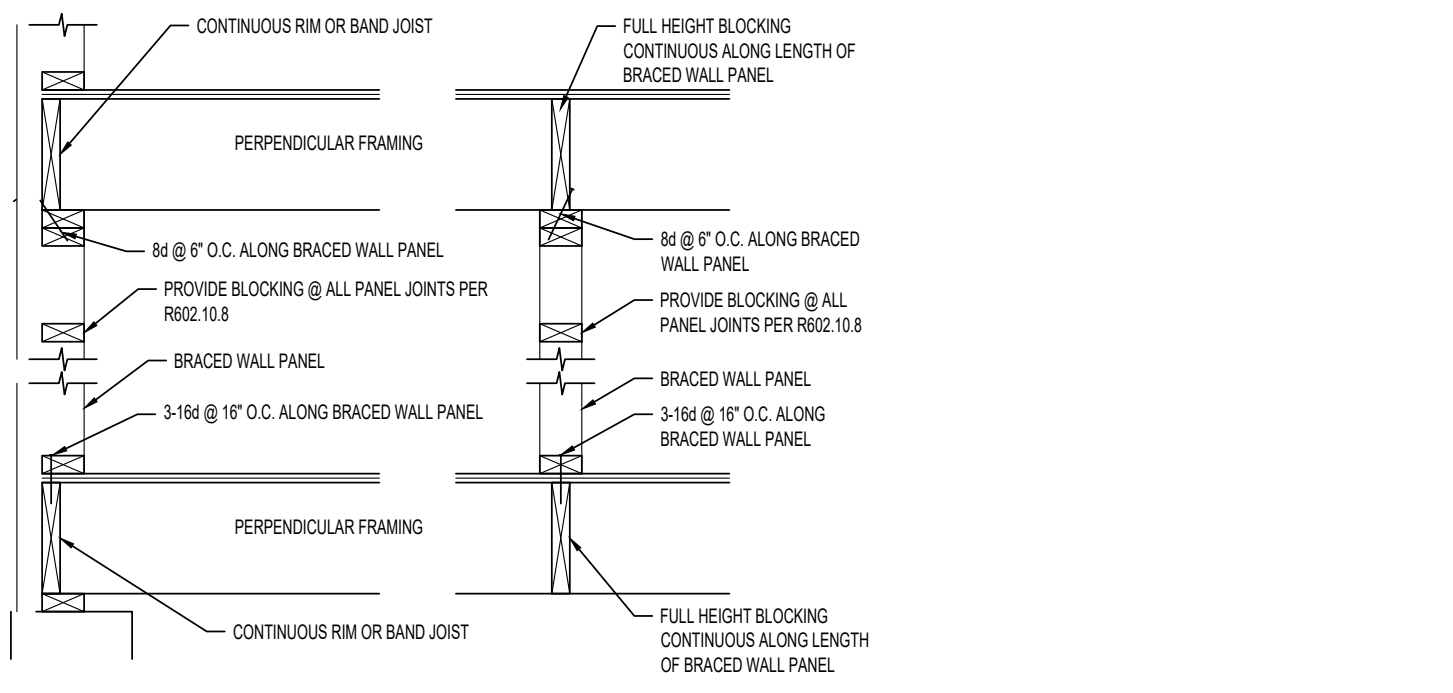
1 BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES SCALE: N.T.S. FIGURE R602.10.8 (2)



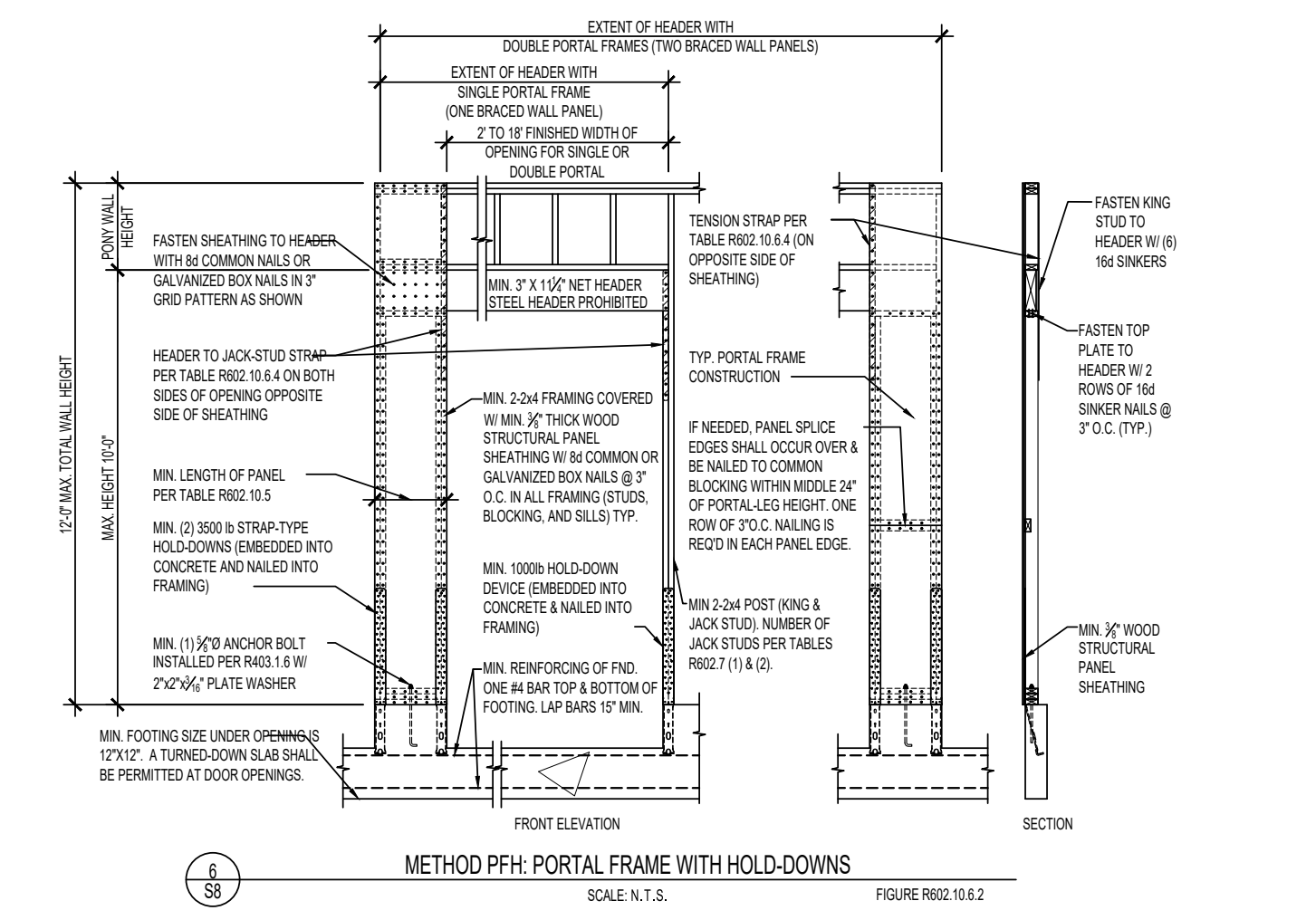
2 BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES SCALE: N.T.S. FIGURE R602.10.8 (2)



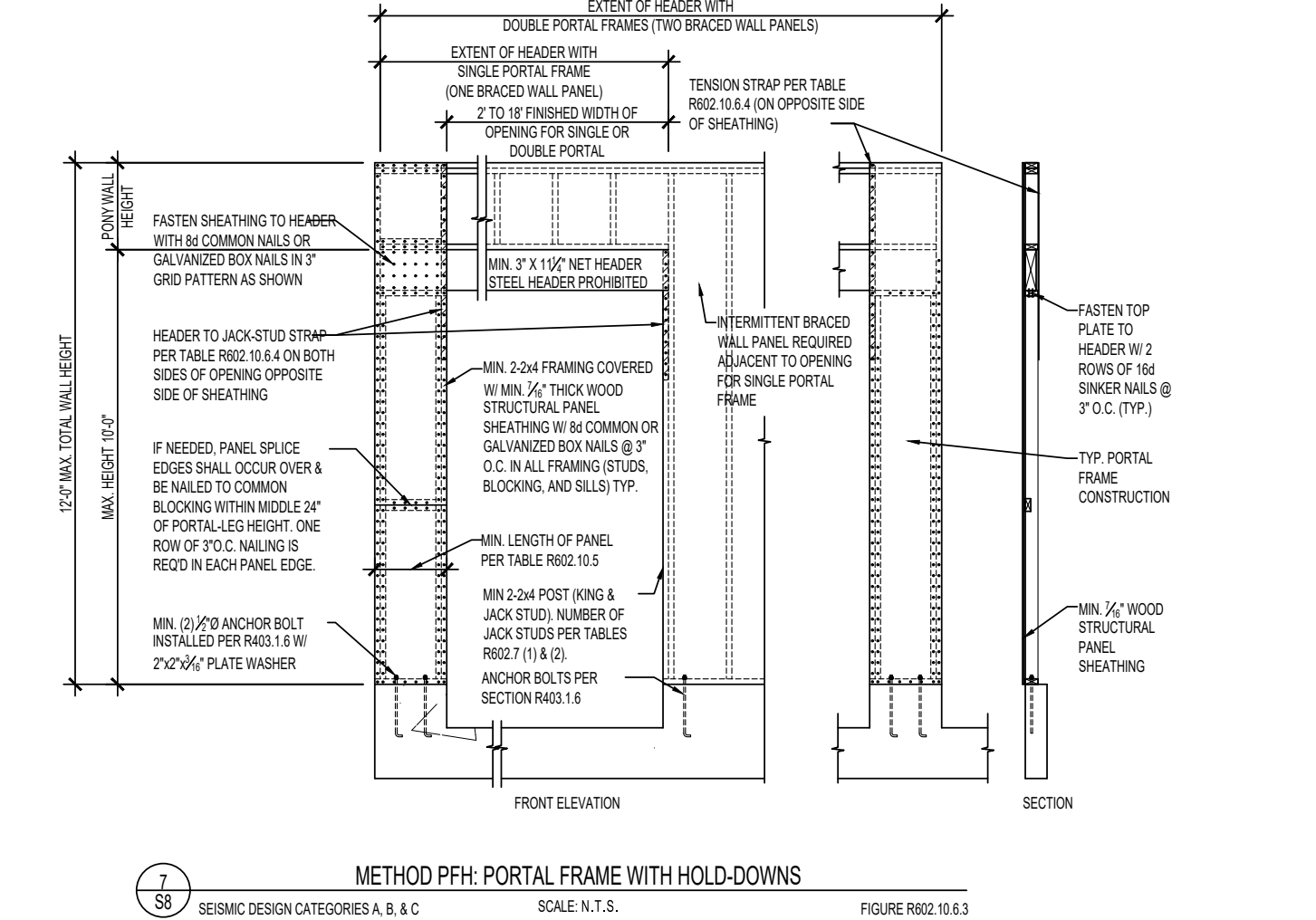
3 BRACED WALL PANEL CONNECTION WHEN PARALLEL TO FLOOR/CEILING FRAMING SCALE: N.T.S. FIGURE R602.10.8 (2)



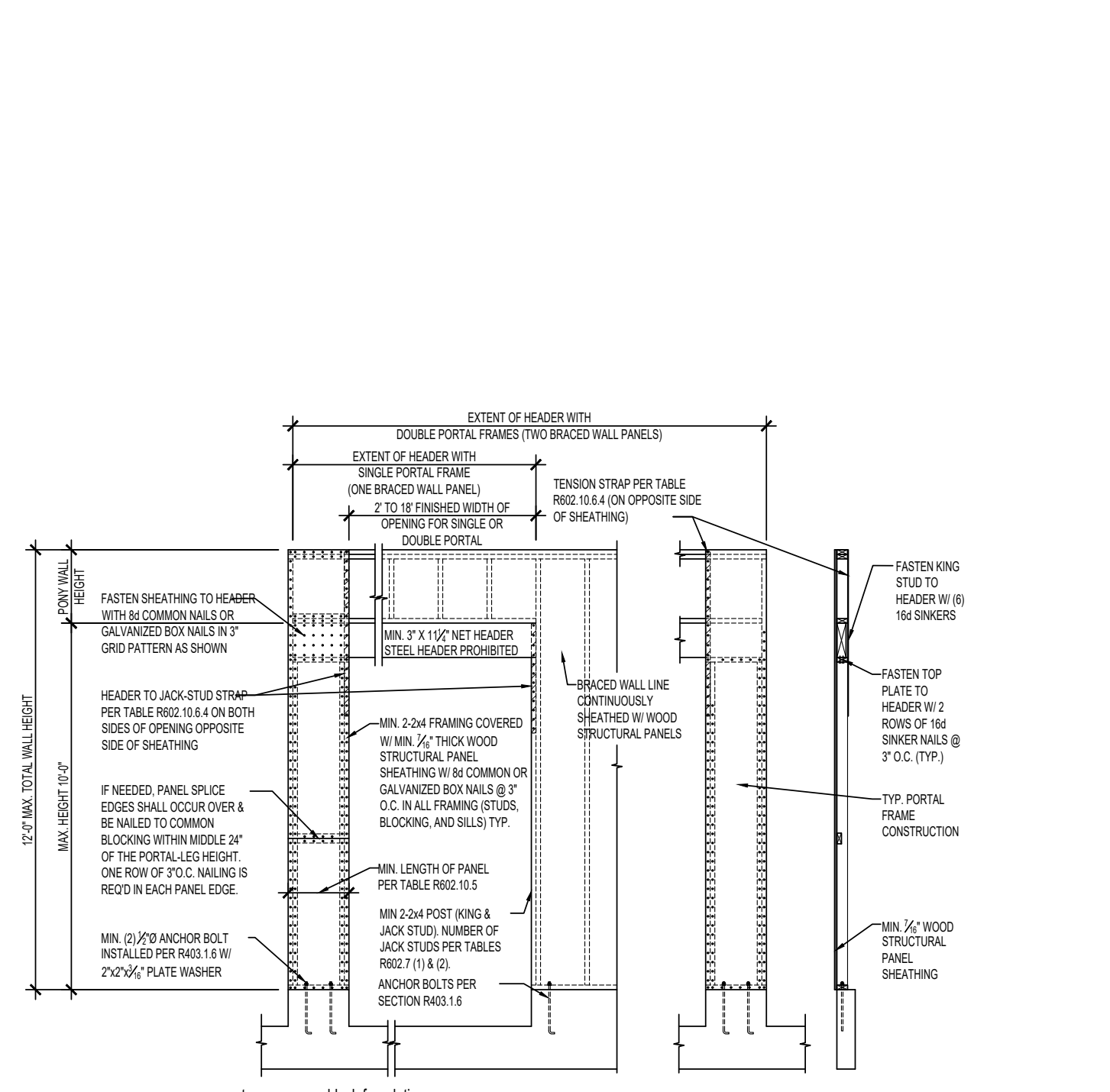
4 BRACED WALL PANEL CONNECTION WHEN PERPENDICULAR TO FLOOR/CEILING FRAMING SCALE: N.T.S. FIGURE R602.10.8 (1)



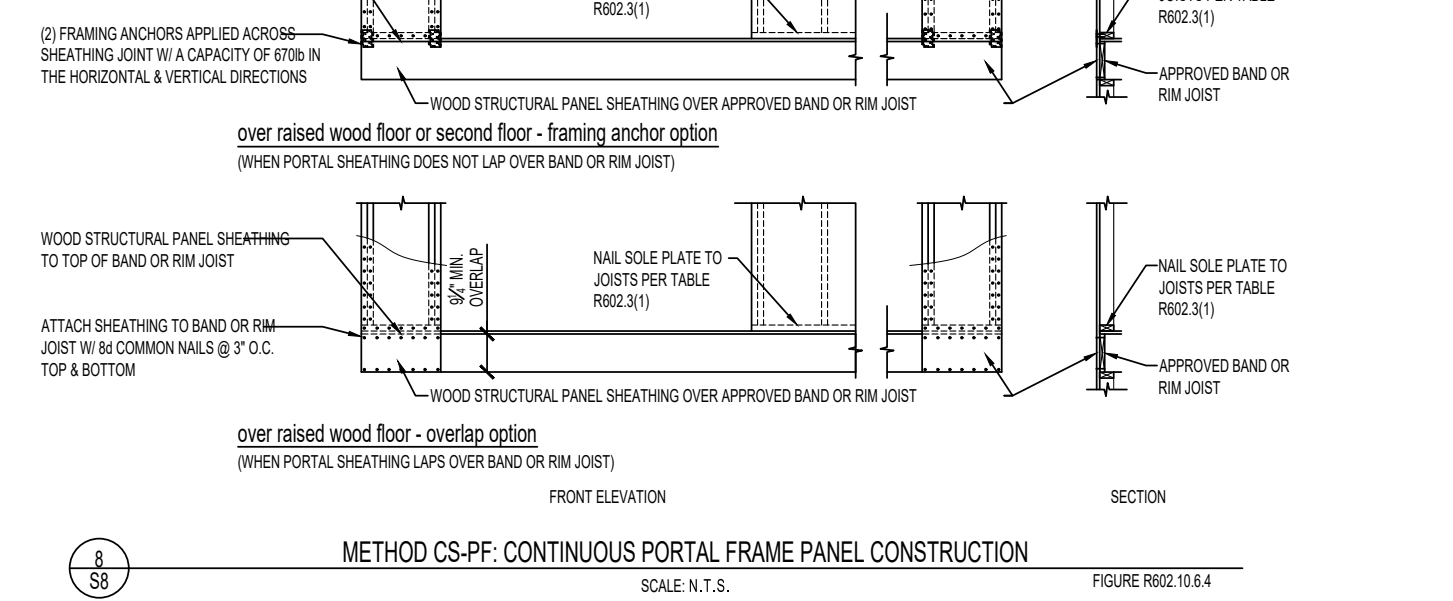
5 METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS SCALE: N.T.S. FIGURE R602.10.8 (2)



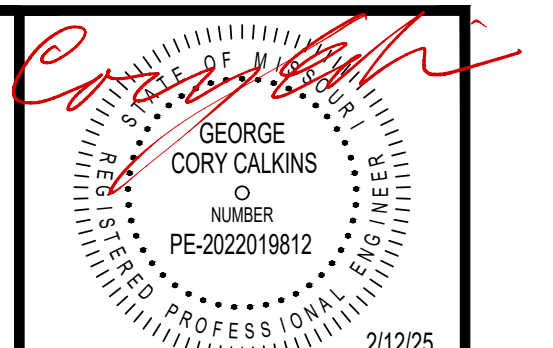
6 METHOD PFH: PORTAL FRAME WITH HOLD-DOWNS SCALE: N.T.S. FIGURE R602.10.8 (2)



7 METHOD CS-PF: CONTINUOUS PORTAL FRAME PANEL CONSTRUCTION SCALE: N.T.S. FIGURE R602.10.8 (4)



8 METHOD CS-PF: CONTINUOUS PORTAL FRAME PANEL CONSTRUCTION SCALE: N.T.S. FIGURE R602.10.8 (4)



2/12/25
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NOTES & FRAMING DETAILS
17 EDWIN AVE.
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SHEET NO. S8
8 OF 8



17 EDWIN AVENUE, 63122

