STRUCTURAL NOTES

1.0 GENERAL

THESE STRUCTURAL NOTES SUPPLEMENT THE SPECIFICATIONS, ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ARCHITECT, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION. THE CONTRACTOR IS RESPONSIBLE FOR ALL BRACING AND SHORING DURING CONSTRUCTION.

1.1 CODES

ALL METHODS, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF TACOMA AND: THE 2018 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED AND ADOPTED BY THE CITY OF TACOMA AND THE STATE OF WASHINGTON; A.C.I. 318-14; A.I.S.C. 13TH EDITION; AWS D1.1-06; A.I.T.C. 2ND EDITION; NDS 2018 WITH 2018 WIND & SEISMIC PROVISIONS AND A.I.S.I 2012 EDITION.

1.2 DESIGN CRITERIA

A. VERTICAL LOADS

1. LIVE LOADS

ROOF (SNOW) Is = 1.0	25	PSF
FLOORS (RESIDENTIAL)	40	PSF
PARKING	40	PSF
DECKS (RESIDENTIAL POST/BM SUPPORT)	60	PSF
BALCONY (CANTILEVERED DECKS)	60	PSF
EXIT FACILITIES	100	PSF
ROOF DECK	100	PSF

2. DEAD LOADS

ROOF	18	PSF
ROOF DECK	45	PSF
FLOORS (RESIDENTIAL)	26	PSF

3. DESIGN LOADS TO PT SLABS: (SEE LOAD DIAGRAMS ON S1.4)

B. LATERAL LOADS:

LATERAL FORCES ARE TRANSMITTED BY DIAPHRAGM ACTION OF THE FLOORS TO SHEAR WALLS. LOADS ARE THEN TRANSFERRED TO THE FOOTINGS, WHERE ULTIMATE DISPLACEMENT IS RESISTED BY PASSIVE PRESSURE OF EARTH AND SLIDING FRICTION OF EARTH. OVERTURNING IS RESISTED BY THE DEAD LOAD OF THE STRUCTURE.

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	CONCRETE PARKING GARAGE	RESIDENTIAL WOOD STRUCTURE
1.	WIND: EXPOSURE D BASIC WIND SPEED = 97 M.P.H. (3 SECOND GUST). IMPORTANCE FACTOR, Iw = 1.0 Kzt = 1.27 SIMPLE DIAPHRAGM BUILDING, ENCLOSED	EXPOSURE D BASIC WIND SPEED = 97 M.P.H. (ULTIMATE). IMPORTANCE FACTOR, Iw = 1.0 SIMPLE DIAPHRAGM BUILDING, ENCLOSED RISK CATEGORY II (SEE WIND PRESSURE TABLE ON SHEET S1.2)
2.	SEISMIC: IMPORTANCE FACTOR, IE = 1.0 OCCUPANCY CATEGORY II SOIL SITE CLASS = D MAPPED SPECTRAL RESPONSE COEFFICIENTS, SS = 1.357 AND S1 = 0.469 SDS = 0.905 AND SD1 = 0.572 SEISMIC DESIGN CATEGORY = D SPECIAL REINFORCED CONCRETE SHEARWALLS (R=5) SEISMIC RESPONSE Cs=0.181 SEISMIC BASE V=2006 KIPS TWO-STAGE VERTICAL COMBINATION PER ASCE 7 12.2.3.2	RISK CATAGORY, I = 1.0 OCCUPANCY CATEGORY II SOIL SITE CLASS = D MAPPED SPECTRAL RESPONSE COEFFICIENTS, SS = 1.357 AND S1 = 0.469 SDS = 0.905 AND SD1 = 0.572 SEISMIC DESIGN CATEGORY = D WOOD SHEATHED SHEARWALLS (R=6.5) SEISMIC RESPONSE Cs=0.139 SEISMIC BASE V=194 KIPS

1.3 SHOP DRAWINGS

SUBMIT SUFFICIENT COPIES OF SHOP DRAWINGS TO ARCHITECT/ENGINEER FOR THE FOLLOWING:

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1. CONCRETE / GROUT MIX DESIGNS (CONCRETE / MASONRY)
2. REINFORCING STEEL (CONCRETE / MASONRY)
3. P.T. TENDONS SHOP DRAWINGS (SEE SECTION 3.8.D)
4. MECHANICAL CONDUIT / PENETRATIONS IN SLABS
5. STRUCTURAL STEEL
6. COMPOSITE FLOOR JOISTS WITH HANGERS/BLOCKING ETC.
7. GLUE-LAMINATED MEMBERS
8. VENEER / PRECAST FINISH ANCHORAGE / CONNECTIONS

DO NOT FABRICATE PRIOR TO ARCHITECT'S/ENGINEER'S APPROVAL. ALL SHOP DRAWINGS SUBMITTED TO THE ENGINEER SHALL BEAR THE STAMPED APPROVAL OF THE CONTRACTOR. SHOP DRAWING APPROVAL BY SOLUTIONS 4 STRUCTURES SHALL NOT IMPLY THAT THE PROJECT MAY BE BUILT FROM THE SHOP DRAWINGS. RATHER, THE PROJECT PLANS SHALL BE USED FOR CONSTRUCTION. ALL PERMANENT BRACING FOR TRUSSES SHALL BE DETAILED AND DESIGNED BY THE TRUSS SUPPLIER. CONTRACTOR SHALL REVIEW SHOP DRAWINGS AND STAMP INDICATING THIS PRIOR TO REVIEW BY ENGINEER OF RECORD.

ITEMS DESIGNED BY OTHERS SHALL INCLUDE CALCULATIONS, CODE CONFORMANCE, SHOP DRAWINGS AND PRODUCT DATA. DESIGN SHALL BE PREPARED, STAMPED AND SIGNED BY THE CSE AND SUBMITTED TO THE ARCHITECT AND SER FOR REVIEW PRIOR TO SUBMISSION TO THE CITY FOR APPROVAL. REVIEW OF THE SHOP DRAWINGS BY THE SER IS FOR COMPLIANCE WITH THE DESIGN CRITERIA AND COMPATIBILITY WITH THE DESIGN OF THE PRIMARY STRUCTURE AND DOES NOT RELIEVE THE CSE OF RESPONSIBILITY FOR THE APPLICABLE COMPONENT DESIGN. THESE ELEMENTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

1.4 DEFERRED SUBMITTALS

TWO COPIES OF EACH DEFERRED SUBMITTAL (SEALED BY THE SSE) SHALL BE SUBMITTED TO THE ARCHITECT / ENGINEER-OF-RECORD. REVIEWED DRAWINGS SHALL BE FORWARDED TO THE BUILDING DEPARTMENT WITH INDICATION OF THE SUBMITTALS CONFORMANCE WITH THE CONSTRUCTION DRAWINGS.

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1. PRE-FABRICATED STEEL STAIR SYSTEMS
2. HANDRAILS\GUARDRAILS
3. TIEDOWN SYSTEMS
4. BIDDER DESIGN BOLT ON DECKS
5. P.E. ROOF TRUSSES

2.0 SITE WORK

2.1 SOIL DATA PER GEOTECHNICAL REPORT DATED MARCH 9TH 2018 PREPARED BY GEOTECH CONSULTANTS INC.

MIXED FOUNDATION SYSTEM
ALL FOUNDATIONS ARE INTENDED TO BE SUPPORTED BY A CONSISTENT MATERIAL OF NATIVE SOIL. THE EXPECTED DEPTH TO NATIVE MATERIAL VARIES ACROSS THE SITE AND WILL BE ACCESSED WITH THREE DIFFERENT FOUNDATION SYSTEMS.

1. SHALLOW FOOTING DIRECTLY ON NATIVE SOILS.

ALLOWABLE BEARING PRESSURE	= 5000 PSF
ACTIVE PRESSURE	= 40 PCF
PASSIVE PRESSURE	= 200 PCF

2. OVEREXCAVATION AND REPLACEMENT

REMOVE SURFACE FILLS TO NATIVE SOIL AND REPLACE WITH MATERIAL AND BACKFILL METHOD PER GEOTECH USING SAME DESIGN VALUES AS SYSTEM 1 ABOVE.

3. DRILLED PILE FOUNDATIONS

MINIMUM PILE DIAMETER	= 18 INCHES
MINIMUM PILE EMBEDMENT	= 10 FEET (INTO NATIVE SOIL)
ALLOWABLE SKIN FRICTION	= 1500 PSF

2.2 EXCAVATION – (PER GEOTECHNICAL ENGINEER)

EXCAVATE FOR FOOTINGS DOWN TO DEPTH SHOWN ON DRAWINGS OR TO FIRM UNDISTURBED MATERIAL. AREAS OVER-EXCAVATED SHALL BE BACKFILLED WITH LEAN CONCRETE (f'c = 2000 PSI), OR BE STRUCTURALLY FILLED PER SECTION 2.3 AND SHALL BE AT THE CONTRACTOR'S EXPENSE.

2.3 BACKFILL AND COMPACTION – (PER GEOTECHNICAL ENGINEER)

BACKFILL SHALL NOT BE PLACED UNTIL AFTER THE REMOVAL OF ALL FORMS, SCREEDS, OTHER WOOD DEBRIS AND MATERIAL SUBJECT TO ROT OR CORROSION. USE ONLY MATERIALS APPROVED FOR BACKFILL. IN AREAS UNDER SLABS OR FOOTINGS, MATERIAL SHOULD BE GRANULAR IN NATURE, PLACED IN 6-INCH LIFTS AND COMPACTED TO AT LEAST 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO COMPACTION TEST, PROCEDURE T-180. THE FILL SHOULD BE LIMITED TO CLEAN, GRANULAR MATERIAL.

2.4 SOUTH PROPERTY LINE SHORING WALL SUBMITTED UNDER SEPARATE PERMIT #BLDCA 19-0469

3.0 CONCRETE

3.1 GENERAL

NORMAL WEIGHT CONCRETE MEETING THE REQUIREMENTS OF ACI 301-02 ESTABLISH PROPORTIONS OF CEMENT, COARSE AND FINE AGGREGATES, WATER, AND ADMIXTURES TO PRODUCE THE PROPERTIES SPECIFIED FOR EACH CONCRETE MIX TYPE PER ACI-301 ON THE BASIS OF PREVIOUS FIELD EXPERIENCE OR TRIAL BATCHES. USE ADMIXTURES IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS. USE AMOUNTS OF WATER-REDUCING ADMIXTURE THAT WILL PERMIT PLACING WITHOUT SEGREGATION, HONEYCOMBING OR ROCK POCKETS. THE SLUMPS SPECIFIED ARE THE SLUMPS REQUIRED AT THE POINT OF PLACEMENT INTO THE STRUCTURE. USE INTERIOR MECHANICAL VIBRATORS WITH 7000 RPM MINIMUM FREQUENCY. DO NOT OVER-VIBRATE. DO NOT MOVE THE CONCRETE HORIZONTALLY USING THE VIBRATOR. CONCRETE SHALL BE POURED MONOLITHICALLY BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE HOT OR COLD TEMPERATURES FOR SEVEN DAYS AFTER POURING. PROVIDE ENGINEER WITH PROPOSED CONSTRUCTION OR CONTROL JOINT LOCATIONS FOR APPROVAL, OR USE JOINTS AS SHOWN ON THE DRAWINGS. ALL REINFORCEMENT TIE WIRES AND FORM ANCHORS SHALL BE CUT OFF FLUSH WITH THE SURFACE; SURFACES WHERE EXPOSED SHALL BE SMOOTH AND FREE FROM IRREGULARITIES.

3.2 STRENGTH

DESIGN MIXES TO PROVIDE NORMAL WEIGHT CONCRETE WITH THE FOLLOWING PROPERTIES:

APPLICATION	STRENGTH F'c (PSI)	MAXIMUM WATER/CEMENT RATIO	MAXIMUM AGGREGATE SIZE	PERCENT AIR ENTRAINMENT
MAT FOOTINGS & SPREAD FOOTINGS	4,000	0.45	1" f	0.0%
OTHER FOOTINGS	3,000	0.50	1" f	0.0%
PILE CAPS & GRADE BEAMS	4,000	0.45	1" f	0.0%
BASEMENT WALLS	4,000	0.45	3/4" f	0.0%
SHEAR WALLS	5,000	0.43	3/4" f	0.0%
COLUMNS	5,000	0.43	1/2" f	0.0%
PT SLABS (8" THICK)	4,000	0.45	3/4" f	0.0%
PT SLABS (9-1/2" & 12" THICK)	5,000	0.43	3/4" f	0.0%
SLABS ON GRADE	3,000	0.50	3/4" f	0.0%
FILLER/TOPPING SLABS	3,000	0.50	3/4" f	0.0%
EXPOSED CONCRETE, SEE NOTE 4	VARIES	VARIES	VARIES	5.0%

SUBNOTES:

1. ANY OF THE ABOVE MIXES CAN BE USED FLOWABLE (8" TO 11" SLUMP) IF THE PROPER ADDITION OF ADMIXTURES IS INCLUDED AND THE W/C RATIO IS NOT INCREASED.
2. SLABS ON GRADE MAY CONTAIN WELDED-WIRE OR FIBER-MESH. EITHER ONE OF THESE MAY BE USED TO ASSIST IN THE MITIGATION OF VARIABLE SHRINKAGE AND CRACKING.
3. THE PROPORTIONS APPROVED SHALL BE CAREFULLY MAINTAINED. NO DEVIATION FROM THESE PROPORTIONS, ESPECIALLY THE ADDITION OF WATER, SHALL BE MADE WITHOUT APPROVAL OF THE ENGINEER.
4. PER SECTION IBC 1904, VERTICAL CONCRETE EXPOSED TO WEATHER AND SLABS ON GRADE SHALL HAVE A MIN f'c = 3000 PSI AND HAVE 5% AIR ENTRAINMENT. PER SECTION 1704.4 EXCEPTION 2.3
5. THE SOILS ENGINEER, UNDER THE DIRECTION OF THE OWNER OR OWNERS DESIGNATED REPRESENTATIVE, SHALL PROVIDE WATER SOLUBLE SULFATE (AS WELL AS CHLORIDE CONTROL DATA) PERTINENT TO THE DETERMINATION OF THE APPROPRIATE MINIMUM CONCRETE STRENGTH REQUIREMENTS OF TABLE 1904.3 OF THE 2015 IBC. INCREASES IN MINIMUM STRENGTH AS WELL AS CEMENT TYPE MAY BE REQUIRED FOR PURPOSES OF ENHANCING THE SULFATE RESISTANCE OF THE CONCRETE IN ACCORDANCE WITH ACI 318. THE TABLED MINIMUM STRENGTH VALUES ABOVE REPRESENT THE MINIMUM STRENGTH REQUIRED FOR STRUCTURAL DESIGN ONLY AND DO NOT REFLECT ADDITIONAL SPECIAL REQUIREMENTS POSSIBLY NEEDED FOR ENHANCED SULFATE OR CHLORIDE RESISTANCE.

3.3 MATERIAL – CEMENT, WATER & AGGREGATES PER ACI 301

A. CEMENT MUST CONFORM TO ASTM C-150, TYPE I OR TYPE II. ENGINEER'S APPROVAL IS REQUIRED FOR USE OF TYPE III CEMENT.

B. WATER TO BE CLEAN AND POTABLE.

C. COARSE AND FINE AGGREGATES TO CONFORM TO ASTM-C33.

3.4 MATERIALS

A. WATER REDUCING ADMIXTURES: CONCRETE USING POZZOLITH ADMIXTURES TO PRODUCE FLOWABLE CONCRETE MAY BE USED WITH THE ENGINEER'S APPROVAL AND MUST CONFORM TO ASTM-C494, POZZOLITH POLYHEED, POZZOLITH 100XR, OR POZZUTECH 20. POZZOLITH SHALL BE INCORPORATED INTO ALL CONCRETE IN EXACT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ADMIXTURES AND DOSAGES WILL VARY DEPENDING ON CLIMATIC CONDITIONS AND THE CONTRACTOR'S JOBSITE REQUIREMENTS. MAXIMUM SLUMP FOR SUCH CONCRETE SHALL NOT EXCEED 8" WITH A MINIMUM OF 10 OUNCES OF POLYHEED PER 100 OUNCES OF CEMENT. USE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

B. AIR ENTRAINMENT: CONFORM TO ASTM-C260 AND ASTM-C494, MBVR OR MICRO-AIR BY MASTER BUILDER.

C. NO ADMIXTURES CONTAINING CHLORIDES ARE PERMITTED.

D. OTHER ADMIXTURE: NO OTHER ADMIXTURES PERMITTED UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER.

3.5 REINFORCING STEEL

DETAIL, FABRICATE AND PLACE PER ACI-315 AND ACI-318. SUPPORT REINFORCEMENT WITH APPROVED CHAIRS, SPACERS, OR TIES.

A. STEEL REINFORCEMENT SHALL BE NEW, DEFORMED BILLET STEEL, MEETING ASTM STANDARD A-615, GRADE 60 FOR #3 AND LARGER BARS UNLESS NOTED OTHERWISE ON THE PLANS. SHOP DRAWINGS SHALL BE MARKED ACCORDINGLY AND SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION. GRADE 60 REBARS SHALL NOT BE BENT IN FIELD AFTER CONCRETE PLACEMENT. ALL BEND SHALL BE PER ACI.

B. REINFORCEMENT IN ALL WALLS, SLABS, AND FOOTINGS SHALL BE CONTINUOUS AROUND CORNERS OR CORNER BARS PROVIDED, BOTH VERTICAL AND HORIZONTAL.

C. MINIMUM LAPS: ALL TENSION SPLICES ARE ACCORDING TO ACI 318, ALL COMPRESSION SPLICES ARE 30 DIAMETERS FOR f'c GREATER THAN 3,000 PSI AND ARE 40 DIAMETERS FOR f'c WHICH IS LESS THAN 3,000 PSI, UNLESS NOTED OTHERWISE. SEE SCHEDULES ON SHEET S3.0.

D. TRIM REINFORCING: AROUND ALL OPENINGS SHALL BE A MINIMUM 1-#5 TOP AND BOTTOM, EXTENDING 2'-6" BEYOND OPENING AT EACH CORNER. SEE TYPICAL DETAILS.

E. WELDING: TACK WELDING OF REBAR IS NOT PERMITTED UNLESS CALLED FOR AND APPROVED BY THE ENGINEER.

F. MINIMUM REINFORCING: WHERE REINFORCEMENT IS NOT SHOWN ON THE DRAWINGS, THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE"(ACI 318) SHALL BE REFERRED TO FOR PROPER REINFORCEMENT.

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G. REBAR COVER: PROVIDE CONCRETE PROTECTION FOR REINFORCEMENT AS FOLLOWS:

COVER	CONDITION
3"	CONCRETE DEPOSITED AGAINST EARTH
2"	CONCRETE DEPOSITED AGAINST FORMS BUT EXPOSED TO EARTH
1-1/2"	MAIN REINFORCING IN BEAMS
1-1/2"	TO TIES IN COLUMNS, AND TIED REBAR IN WALLS
1-1/2"	FOR BARS IN SLABS ON GROUND
3/4"	FOR BARS IN SLABS ON FORMS
1"	FOR BARS IN 3HR RATED SLABS ON FORMS (RESTRAINED CONSTRUCTION)

H. WELDED WIRE FABRIC: ASTM-A185 AND ASTM-A82

I. DEFORMED BAR ANCHORS: ASTM-A496

K. FIBREMESH: PROVIDE FIBREMESH STRANDS WITHIN CONCRETE PER THE MANUFACTURERS SPECIFICATION (1.5#/CU. YARD TYPICALLY) WHERE REQUIRED BY THE OWNER IN LIEU OF UTILIZING WELDED WIRE FABRIC WITHIN SLABS ON GRADE.

3.6 EPOXY DOWELED REINFORCEMENT

A. ALL REINFORCEMENT WHICH IS TO BE DOWELED INTO EXISTING CONCRETE SHALL BE INSTALLED USING THE SIMPSON SET-XP ADHESIVE ANCHORING SYSTEM PER ICC REPORT ESR-2508 OR APPROVED EQUAL. ADHESIVE ANCHORS SHALL BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS AND DETAIL 7/S3.0.

B. EPOXY SHALL BE MIXED, APPLIED, AND CURED IN ACCORDANCE WITH THE MANUFACTURERS GUIDELINES. REINFORCEMENT AND CONCRETE SHALL BE CLEAN AND FREE OF IRREGULARITY. EPOXY SHALL NOT BE MIXED OR CURED IN AIR AND / OR CONCRETE TEMPERATURES BELOW MINIMUM PER MANUFACTURER'S SPECIFICATIONS.

C. EPOXY DOWELING OF REINFORCEMENT IN OVERHEAD APPLICATIONS SHALL NOT BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER OF RECORD.

3.7 SERVICEABILITY/MAINTENANCE REQUIREMENTS

SPECIAL NOTE: CONCRETE IS NOT A MAINTENANCE FREE MATERIAL. CRACKS CAN BE EXPECTED TO OPEN UP WITHIN 3 YEARS OF CONSTRUCTION AND MAY REQUIRE FILLING. UNDER NORMAL CONDITIONS, FOR CONVENTIONAL BUILDINGS, REINFORCED CONCRETE AS WELL AS POST-TENSIONED CONCRETE DEVELOP CRACKS. THE CRACKS ARE DUE TO INHERENT SHRINKAGE OF CONCRETE, CREEP AND RESTRAINING EFFECTS OF VERTICAL AND OTHER STRUCTURAL ELEMENTS TO WHICH THE BEAM/SLABS ARE TIED.

THE CONCRETE IN ELEVATED SLABS REQUIRES STRICT MAINTENANCE IN ORDER TO REMAIN SERVICEABLE AND SAFE. DETAILS OF THE MAINTENANCE PROGRAM APPLICABLE TO THIS PROJECT MUST BE COMPILED BY THE OWNER AND SUBMITTED TO THE FACILITY MAINTENANCE DEPARTMENT.

AS A GUIDE THE FOLLOWING REFERENCE MAY BE CONSULTED AS A MINIMUM REQUIREMENT: PARKING STRUCTURES BY ANTHONY P. CHREST AND SAM BHUTAN (CHAPTER 9, TITLED MAINTENANCE) ISBN 0-442-20655-0.

3.8 POST-TENSIONING NOTES

A. POST-TENSION INSPECTION: TENDON PLACEMENT, INTEGRITY OF PROTECTIVE WRAPPING, AND STRESSING SHALL BE SPECIAL INSPECTED. ALL PRESTRESSING DESIGN, MATERIALS AND CONSTRUCTION SHALL CONFORM TO ACI STANDARD (318) AND THE UBC, 1997 EDITION, AS AMENDED BY LOCAL BUILDING AUTHORITY.

B. POST-TENSIONING QUALITY: POST-TENSIONING TENDONS SHALL BE STRESS-RELIEVED OR LOW RELAXATION STRAND AND SHALL CONFORM TO THE FOLLOWING:

SEVEN WIRE STRAND ASTM DESIGNATION	A416
1/2" DIAMETER TENDON AREA SQ. IN.	0.153 IN^2
TENDON TYPE	LOW RELAXATION
ULTIMATE STRENGTH (fpu)	270 KSI
TEMPORARY STRESS TO OVERCOME FRICTION	216 KSI
ANCHORING STRESS	189 KSI
EFFECTIVE DESIGN STRESS (fse)	175 KSI

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CONDITION	COVERAGE
INTERIOR TOP	1"
EXTERIOR TOP	1"
TYPICAL BOTTOM	1"
END SPAN BOTTOM	1"
ALL CAST IN PLACE CONCRETE CONSTRUCTION IS CONSIDERED RESTRAINED PER UL 263	

C. TENDONS: UNBONDED STRANDS AND ANCHORS SHALL BE COMPLETELY ENCAPSULATED AND PROVIDED WITH CONTINUOUS WATERTIGHT PROTECTION WHICH PROHIBITS DIRECT CONTACT OF CONCRETE AND FERROUS REINFORCING METALS FROM END TO END (ANCHORS INCLUSIVE - USING GTI BLACK ENCAPSULATED ANCHORS OR EQUIVALENT). SLIPPAGE SHEATHING AROUND THE TENDONS SHALL CONSIST OF A DURABLE WATERPROOF POLYETHYLENE PLASTIC TUBING (.04 INCHES THICK, MIN.) WHICH WILL CONTAIN A LITHIUM BASED RUST-INHIBITING GREASE COATING MEETING THE REQUIREMENTS OF CHAPTER 5 OF THE SPECIFICATION FOR UNBONDED SINGLE STRAND TENDONS. TEARS IN THE SHEATHING SHALL BE REPAIRED. SHEATHING REPAIRS SHALL BE RECORDED AND APPROVED BY THE TESTING AGENCY. REPAIR TAPE SHALL BE ADHESIVE HIGH DENSITY POLYETHYLENE, 12 MILS MIN. THICKNESS, 2 INCH MIN WIDTH SUCH AS (PATCH 145 VINYL RUBBER ADHESIVE,3M. ST PAUL, MN.) OR APPROVED EQUIVALENT. USE OF SECONDARY 40 MIL SHEATHING SEGMENT AND DUCT TAPE IS PERMITTED UPON ENGINEERS APPROVAL ONLY. TENDONS SHEATHING SHALL HAVE A BRIGHT COLOR EASILY DISTINGUISHABLE FORM THE MILD REINFORCEMENT. TUBES AND CAPS AT ANCHORAGES SHALL BE CLEAR WHERE THE ENCAPSULATED SYSTEM EMPLOYS THE APPLICATION OF GREASE IN SUCH SYSTEM APPENDAGES. THE SPECIAL INSPECTOR SHALL APPROVE THE GREASE APPLICATION FOR EACH ANCHOR. AND SECUREMENT OF SUCH APPENDAGES PRIOR AND DURING THE CONCRETE PLACEMENT. THE ENCAPSULATED SYSTEM SHALL BE PROVIDED AT ALL LOCATIONS WHERE THE TENDONS ARE SITUATED IN SLABS WHERE THE SURFACE OR EDGES ARE EXPOSED TO THE ELEMENTS

D. SHOP DRAWINGS: SUPPLIER SHALL SUBMIT SHOP DRAWINGS SHOWING TENDON LAYOUT, DEAD-END, AND STRESSING-END LOCATIONS, AND TENDON SUPPORT LAYOUTS WITH DETAILS NECESSARY FOR INSTALLATION FOR THE ENGINEER'S APPROVAL. PROVIDE ELONGATION REPORTS FOR ENGINEERS APPROVAL PRIOR TO BURNING OFF ENDS OF TENDONS.

E. TENDON PLACEMENT: CARE SHALL BE TAKEN SO THAT TENDONS ARE LOCATED AND HELD IN THEIR DESIGNED POSITIONS. TOLERANCES FOR LOCATION OF PRESTRESSING STEEL SHALL NOT BE MORE THAN 1/4" VERTICALLY BETWEEN HIGH AND LOW POINTS, EXCEPT AS NOTED OR APPROVED BY THE ENGINEER. TENDON HIGH & LOW POINTS THEMSELVES SHALL BE PLACED WITH 1/16 INCH TOLERANCE. ACCESS TO STRESSING ENDS SHALL BE MAINTAINED WHERE SHOWN.

F. TENDON ADJUSTMENTS: SLIGHT DEVIATIONS IN THE SPACING OF THE SLAB TENDONS WILL BE PERMITTED WHEN REQUIRED TO AVOID OPENINGS, INSERTS AND DOWELS WHICH ARE SPECIFICALLY LOCATED. WHERE LOCATIONS OF TENDONS SEEM TO INTERFERE WITH EACH OTHER, ONE TENDON MAY BE MOVED HORIZONTALLY IN ORDER TO AVOID THE INTERFERENCE.

G. TENDON STRESSING: TENSION SHALL NOT START UNTIL FIELD CURED CYLINDER TESTS INDICATE THE CONCRETE IN PLACE HAS REACH THE SPECIFIED INITIAL COMPRESSIVE STRENGTH (f'ci)=3,000 PSI. TENSIONING SHALL BE DONE BY JACKING UNDER THE DIRECT SUPERVISION OF A PERSON EXPERIENCED IN THIS TYPE OF WORK. CONTINUOUS INSPECTION AND RECORDING OF ELONGATIONS IS REQUIRED DURING ALL STRESSING OPERATIONS. THE OBSERVED ELONGATION SHALL BE WITHIN (-) 5% OR (+) 7% OF THAT PREDICTED, EXCEPT AS APPROVED BY THE ENGINEER.

H. TENDON ANCHORAGE'S: SHALL BE RECESSED 1-1/2 INCHES (2 INCHES AT ENCAPSULATED ANCHORS) AND TWO #4 BARS PLACED BEHIND ALL ANCHORS CONTINUOUS, U.N.O. STRESSING ANCHORS SHALL BE PAINTED WITH RUST-OLEUM OR EQUAL BEFORE FILLING ALL POCKETS WITH NON-SHRINK GROUT AFTER STRESSING.

I. POWDER DRIVEN FASTENERS OR DRILLED ANCHORS ARE NOT PREFERRED IN POST-TENSIONED SLAB. SEE LIMITATIONS AND NOTES IN DETAIL 20/S3.10

J. PUMPED CONCRETE: IF CONCRETE IS PLACED BY THE PUMP METHOD, HORSES SHALL BE PROVIDED TO SUPPORT THE HOSE. THE HOSE SHALL NOT BE ALLOWED TO RIDE ON THE TENDONS.

K. CONCRETE CONSOLIDATION: CONTRACTOR SHALL TAKE PRECAUTIONS TO ASSURE COMPLETE CONSOLIDATION AND DENSIFICATION OF CONCRETE BEHIND ALL POST-TENSIONING ANCHORAGE'S.

L. CHLORIDES: GROUT OR CONCRETE CONTAINING CHLORIDES SHALL NOT BE USED.

M. DE-SHORING: SLAB OR BEAMS MAY BE DE-SHORED WHEN ALL TENDONS HAVE BEEN STRESSED AND APPROVED BY ENGINEER UNLESS SHORING IS REQUIRED TO CARRY FLOORS ABOVE.

N. DETAILS: TYPICAL DETAILS AND NOTES ON THESE SHEETS SHALL APPLY UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE. CONSTRUCTION DETAILS NOT FULLY SHOWN OR NOTED SHALL BE SIMILAR TO DETAILS SHOWN FOR SIMILAR CONDITIONS. ALL WORK AND CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATION AND SAFETY REQUIREMENTS.

O. DISCREPANCIES: THE CONTRACTOR SHALL INFORM THE ENGINEER, IN WRITING, DURING THE BIDDING PERIOD OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS OR OF ANY VARIATIONS NEEDED IN ORDER TO CONFORM TO CODES, RULES AND REGULATIONS. UPON RECEIPT OF SUCH INFORMATION, THE ENGINEER WILL SEND WRITTEN INSTRUCTIONS TO ALL CONCERNED. ANY SUCH DISCREPANCY, OMISSION OR VARIATION NOT REPORTED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND WORK SHALL BE PERFORMED IN A MANNER AS DIRECTED BY THE ENGINEERS.

P. CONSTRUCTION SHORING: IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE SHORING, BRACING, FORMWORK, ETC., AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION.

Q. OTHER TRADES: SEE ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF PIPE, VENT, DUCT AND OTHER OPENINGS AND DETAILS NOT SHOWN ON THESE DRAWINGS. ALL DIMENSIONS ARE TO BE CHECKED AND VERIFIED WITH THE ARCHITECTURAL DRAWINGS.

R. INSPECTIONS: ANY INSPECTIONS (SPECIAL OR OTHERWISE) THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION AGENCY EMPLOYED BY THE OWNER. JOBSITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION.

S. SHOP DRAWINGS: SHOP DRAWINGS ARE AN AID FOR FIELD PLACEMENT AND ARE SUPERSEDED BY THE STRUCTURAL DRAWINGS. IT SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO MAKE CERTAIN THAT ALL CONSTRUCTION IS IN FULL AGREEMENT WITH THE LATEST STRUCTURAL DRAWINGS.

T. SHOP DRAWING CHECK: THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH ELECTRONIC COPIES OF SHOP DRAWINGS, A MINIMUM OF ONE WEEK PRIOR TO PLACEMENT. OUR REVIEW OF SHOP DRAWINGS IS ONLY FOR GENERAL COMPLIANCE WITH THE STRUCTURAL DRAWINGS AND SPECIFICATIONS.

U. NO CONSTRUCTION ALLOWED ON SLAB PRIOR TO POST TENSIONING OF TENDONS.

4.0 METALS

4.1 WELDING

A. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 "STRUCTURAL WELDING CODE" & D1.3 "STRUCTURAL WELDING CODE - SHEET STEEL."

B. ALL WELDING SHALL BE DONE BY AWS/WABO (WASHINGTON STATE ASSOCIATION OF BUILDING OFFICIALS) CERTIFIED WELDERS.

C. STRUCTURAL STEEL SHOP DRAWINGS SHALL SHOW AWS A2.4 SYMBOLS. WELDS SHOWN ON THE DRAWINGS ARE THE MINIMUM SIZES. INCREASE WELD SIZE TO AWS MINIMUM SIZES, BASED ON THICKNESS OF MEMBERS JOINED TOGETHER.

D. ADDITIONAL FIELD WELDING MAY BE REQUIRED FROM THAT SHOWN ON THE DETAILS, DEPENDING ON THE JOINT CONFIGURATION, SPLICE LOCATIONS, ERECTION SEQUENCES, ETC. THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL FIELD WELDS AND SUBMIT THEM FOR REVIEW. FIELD WELDING SHOULD BE MINIMIZED WHEREVER POSSIBLE.

E. ALL WELDS SHALL BE MADE USING LOW-HYDROGEN ELECTRODES WITH MINIMUM TENSILE STRENGTH = 70 KSI. LOW HYDROGEN SMAW ELECTRODES SHALL BE USED WITHIN FOUR HOURS OF OPENING THEIR HERMETICALLY SEALED CONTAINERS OR SHALL BE REDRIED PER AWS D1.1, SECTION 4.5. ELECTRODES SHALL BE REDRIED NO MORE THAN ONE TIME, AND ELECTRODES THAT HAVE BEEN WET SHALL NOT BE USED.

F. WELDING PROCEDURES SHALL BE SUBMITTED TO THE OWNER'S TESTING AGENCY FOR REVIEW BEFORE STARTING FABRICATION OR ERECTION. ALL COMPLETE-PENETRATION WELDS SHALL BE ULTRASONICALLY TESTED UPON COMPLETION OF THE CONNECTION EXCEPT PLATE LESS THAN OR EQUAL TO 1/4" THICK SHALL BE MAGNETIC PARTICLE TESTED. REDUCTION IN TESTING MAY BE MADE IN ACCORDANCE WITH THE BUILDING CODE WITH APPROVAL OF THE ENGINEER.

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOINT PREPARATIONS AND WELDING PROCEDURES THAT INCLUDE, BUT ARE NOT LIMITED TO: REQUIRED ROOT OPENINGS; ROOT FACE DIMENSIONS; GROVE ANGLES; BACKING BARS; COPES; SURFACE ROUGHNESS VALUES; AND TAPERS OF UNEQUAL PARTS.

H. NO WELDING OF REINFORCING STEEL SHALL BE ALLOWED EXCEPT WHERE SHOWN ON THE DRAWINGS.

I. WELDING MATERIAL IN MOMENT FRAMES SHALL BE OF TOUGHNESS TO MEET CHARPY V-NOTCH (CVN) OF 20 FT-LB AT 0 DEGREES FAHRENHEIT.

5.0 STRUCTURAL STEEL

A. ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION." STEEL SHALL CONFORM TO THE FOLLOWING, UNO:

ALL STEEL, UNO	ASTM A992. ASTM A572, GRADE 50, A447, Fy = 50 KSI OR A588 Fy = 50 KSI ONLY W/ PRIOR APPROVAL OF ENGINEER OF RECORD.
ANGLES	ASTM A36, Fy = 36 ksi
CHANNELS, EMBEDMENTS IN CONCRETE AND MISC. METALS, UNO	ASTM A36, Fy = 36 ksi OR STEEL TYPES LISTED UNDER "ALL STEEL"
SQUARE AND RECTANGULAR STRUCTURAL TUBES	ASTM A500, GRADE B, Fy = 46 ksi
STEEL PIPE DIAMETER LESS THAN OR EQUAL TO 12" NOM	ASTM A53, TYPE E OR S, GRADE B, Fy = 35 ksi

B. ALL WORK SHALL BE IN ACCORDANCE WITH THE AISC SPECIFICATION. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER BEFORE COMMENCING FABRICATION. ALL STEEL ANCHORS AND TIES AND OTHER MEMBERS EMBEDDED IN CONCRETE OR MASONRY SHALL BE LEFT UNPAINTED. DIMENSIONAL TOLERANCE FOR BUILD-UP MEMBERS SHALL BE PER AWS D1.1. GENERAL NOTES FOR STEEL CONNECTIONS SHALL APPLY TO ALL STEEL CONNECTIONS, UNO.

C. STEEL BEAMS ARE EQUALLY SPACED BETWEEN DIMENSIONAL POINTS. ALL HIGH-STRENGTH BOLTS SHALL BE INSTALLED, TIGHTENED AND INPSECTED IN ACCORDANCE WITH THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS. THE CRITERIA FOR SLIP-CRITICAL CONNECTIONS SHALL APPLY TO ALL CONNECTIONS UNLESS SPECIFICALLY NOTED AS SNUG TIGHT ON THE STRUCTURAL DRAWINGS. WHERE CONNECTIONS ARE NOTED SNUG TIGHT THE CONTRACTOR MAY INSTALL PER CRITERIA FOR SNUG TIGHT BOLTS. SLIP CRITICAL CONNECTIONS SHALL USE LOAD INDICATOR WASHERS OR TENSION CONTROL BOLTS. ALL ASTM A307 BOLTS SHALL BE PROVIDED WITH LOCK WASHERS UNDER NUTS OR SELF-LOCKING NUTS. ALL BOLT HOLES SHALL BE STANDARD SIZE, UNO.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ERECTION AIDS THAT INCLUDE, BUT ARE NOT LIMITED TO: ERECTION ANGLES; LIFT HOLES, AND OTHER AIDS.

E. METAL PROTECTION - ALL MISCELLANEOUS STEEL AND HARDWARE EXPOSED TO VIEW OR IN UNHEATED PORTION OF BUILDING SHALL BE GALVANIZED PER ASTM A-123 WITH 1.25 OZ. OF ZINC SPELTER PER SQUARE FOOT OF SURFACE AREA. ALL OTHER STEEL SURFACES TO BE SHOP PAINTED AFTER FABRICATION.

G. ALL STEEL BEAM COPING SHALL CONFORM TO AISC STANDARD PRACTICE.

I. GROUT FOR BEARING PLATES SHALL BE NON-SHRINK EMBECO BY MASTER BUILDERS, INC. OR APPROVED EQUAL.

ABBREVIATIONS

AB.	ANCHOR BOLT
AGGR.	AGGREGATE
ALT.	ALTERNATE
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
BD.	BOARD
BLDG.	BUILDING
BLK	BLOCK
BLK'G.	BLOCKING
BM.	BEAM
BOT.	BOTTOM
BTWN.	BETWEEN
C.J.	CONTROL JT.
CLR.	CLEAR
C.M.U.	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONSTR.	CONSTRUCTION
CONT.	CONTINUOUS
CSE	COMPONENTS STRUCTURAL ENGR
DEG.	DEGREE
DET./DTL.	DETAIL
DIAG.	DIAGONAL
DIA. ø	DIAMETER
DN.	DOWN
DWG.	DRAWING
(E)	EXISTING
EA.	EACH
E.J.	EXPANSION JOINT
E.I.F.S.	EXTERIOR INSULATION AND FINISH SYSTEM
EL. ELEV.	ELEVATION
ELEV.	ELEVATION
EQ.	EQUAL
EQUIP.	EQUIPMENT
E.W.	EACH WAY
EXP.	EXPANSION
EXT.	EXTERIOR
F.D.	FLOOR DRAIN
FDN.	FOUNDATION
F.F.	FINSH FLOOR
FIN.	FINISH
FLR.	FLOOR
FND.	FOUNDATION
F.O.B.	FACE OF BRICK
F.O.C.	FACE OF CONCRETE
F.S.	FULL SIZE
FT.	FOOT OR FEET
FTG.	FOOTING
FURR.	FURRING
GA.	GAUGE
GALV.	GALVINIZED
GR.	GRADE
GYP.	GYPSUM
GYP. BD.	GYPSUM BOARD
HT.	HEIGHT
HVAC	HEATING, VENT AND AIR CONDITIONING
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
JNT.	JOINT
JST.	JOIST
MAX.	MAXIMUM
MFR.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
M.O.	MASONRY OPENING
MTL.	METAL
NO.	NUMBER
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OH.	OVERHEAD
OPG.	OPENING
OPP.	OPPOSITE
PCT.	PRE-CAST
P.L.	PROPERTY LINE
PLYWD.	PLYWOOD
R.D.	ROOF DRAIN
RE:	REFER TO ...
REINF.	REINFORCED
REQ'D.	REQUIRED
RM	ROOM
R.O.	ROUGH OPENING
SCHED.	SCHEDULE
SECT.	SECTION
SER	STRUCTURAL ENGINEER OR RECORD
S.F.	SQUARE FOOT
SHT.	SHEET
SIM.	SIMILAR
SPEC.	SPECIFICATION
SQ.	SQUARE
S.S.	STAINLESS STEEL
STAGG.	STAGGERED
STD.	STANDARD
STIFF	STIFFENER
STL.	STEEL
STRUC.	STRUCTURAL
TR	TREAD
T & B	TOP AND BOTTOM
T & G	TONGUE & GROOVE
THK.	THICK
T/	TOP OF
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VER	VERIFY
VERT.	VERTICAL
W/	WITH
W/O	WITHOUT
℄	CENTERLINE
ℙ	PLATE

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MARTIN RENUS OMAN — STATE OF WASHINGTON — 40752 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:
1 — 4-7-23 — REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 1 4-7-23

PERMIT SUBMITTAL
4-7-23

S1.0

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.0.dwg PLOT DATE/TIME: 4/4/2023 – 3:03pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

STRUCTURAL NOTES

6.0 LIGHT GAUGE STEEL

6.1 THE CONTRACTOR SHALL PREPARE AND SUBMIT SUFFICIENT COPIES OF BOTH SHOP DRAWINGS AND STRUCTURAL CALCULATIONS FOR THE EXTERIOR METAL STUD WALL FRAMING. SUCH SHOP DRAWINGS SHALL INCLUDE ALL WALL FRAMING MEMBER LAYOUT, SIZES, SPACING, CONNECTION, AND CONNECTION HARDWARE. SUCH DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER OF RECORD FOR APPROVAL AS INDICATED IN THE PROJECT SPECIFICATIONS.

6.2 LOADING / DESIGN CRITERIA

A. VERTICAL LOADS:
SELF WEIGHT OF STUDS / FINISH MATERIALS = 15 PSF

1. WIND: SEE SECTION 1.2 B (1)
2. SEISMIC – SEE SECTION 1.2 B (2)
Fp CONNECTION = [(0.4*ap*SDs)/(Rp/Ip)]*(1+2z/h)*Wp

B. STUD DEFLECTIONS: STUD WALLS: L/240 OR 1/4" MAXIMUM
JOISTS: L/240

C. STRUCTURAL DEFLECTIONS:

THE METAL STUD FRAMING SYSTEM SHALL BE DESIGNED TO ALLOW THE SUPER STRUCTURE TO MOVE BOTH VERTICALLY AND LATERALLY SO THAT LOADS WITHIN THE SUPER STRUCTURE ARE NOT TRANSFERRED TO THE STUD FRAMING. SUCH ALLOWANCES SHALL BE PROVIDED WITHIN THE STUD SYSTEM AS FOLLOWS:

1. VERTICAL DEFLECTION ALLOWANCE: 1/2" MINIMUM
2. LATERAL STRUCTURAL STORY DRIFT / THERMAL EXPANSION OR CONTRACTION DEFLECTION ALLOWANCE : 3/4" MINIMUM EACH WAY WITHIN WALL PLANE

6.3 QUALITY ASSURANCE

THE CONTRACTOR IS RESPONSIBLE TO PROVIDE FULL TIME QUALITY CONTROL OVER ALL FABRICATION AND ERECTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN MILL CERTIFICATION FROM THE LIGHT GAUGE STEEL MANUFACTURER OR SHALL BE RESPONSIBLE TO PROVIDE TENSILE TESTS AND GALVANIZATION TESTS TO THE ENGINEER OF RECORD TO VERIFY THE ADEQUACY OF THE LIGHT GAUGE MATERIALS.

6.4 MATERIALS

A. GAUGE MATERIAL SHALL BE FORMED FROM GALVANIZED ASTM A653/A653M (SQ QUALITY), GRADE 50 CLASS I STEEL FOR 12, 14, AND 16 GAUGE MATERIAL WITH A MINIMUM YIELD OF 50 KSI, AND GRADE 33 STEEL FOR 18 GAUGE MATERIAL AND LIGHTER WITH A MINIMUM YIELD OF 33 KSI. MINIMUM THICKNESS SHALL BE PER ICBO ACCEPTANCE CRITERIA AC46.

THICKNESS – STEEL COMPONENTS			MINIMUM
MINIMUM THICKNESS (mils)	DESIGN THICKNESS (in)	GAUGE	YIELD STRESS (ksi)
18	0.0188	25	33
27	0.0283	22	33
33	0.0346	20	33
43	0.0451	18	33
54	0.0566	16	50
68	0.0713	14	50
97	0.1017	12	50

NOTE: MINIMUM THICKNESS IS BASED ON UNCOATED STEEL. THE MINIMUM THICKNESS REPRESENTS 95% OF THE DESIGN THICKNESS AND IS THE MINIMUM ACCEPTABLE UNCOATED THICKNESS DELIVERED TO THE JOB SITE BASED ON SECTION A2.4 OF THE 2007 AISI SPECIFICATION.

ALL MEMBERS SHALL BE GALVANIZED PER ASTM A924/A924M (LATEST EDITION) WITH MINIMUM COATING REQUIREMENTS AS FOLLOWS:

NON-LOAD BEARING STUDS ASTM C645 – G40 COATING
EXPOSED EXTERIOR STUDS ASTM C955 – G90 COATING

B. ACCESSORIES SHALL BE OF THE TYPE, SIZE, AND SPACING SHOWN ON THE DRAWINGS OF A MINIMUM 18 GAUGE MATERIAL UNLESS OTHERWISE SPECIFIED.

C. ALL STRUCTURAL MEMBERS SHALL BE DESIGNED IN ACCORDANCE WITH THE AMERICAN IRON AND STEEL INSTITUTE (AISI) "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS", 2007 EDITION. PRIOR TO FABRICATION OF FRAMING SUBMIT FABRICATION AND ERECTION DRAWINGS TO THE ENGINEER FOR APPROVAL. PREFABRICATED PANELS SHALL BE SQUARE, WITH COMPONENTS ATTACHED IN A MANNER AS TO PREVENT RACKING AND TO MINIMIZE DISTORTION WHILE LIFTING. FASTENING OF COMPONENTS SHALL BE BY WELDING OR SCREWING OR BY OTHER MEANS OF FASTING AS INDICATED ON THE DRAWINGS. WELDS SHALL BE OF SUFFICIENT SIZE TO INSURE THE STRENGTH OF THE CONNECTION (MIN. 1/8" WELD BY 1" LENGTH). WIRE TYING OF COMPONENTS SHALL NOT BE PERMITTED. ALL WELDS SHALL BE TOUCHED UP WITH A ZINC-RICH PAINT. STUDS SHALL BE PLUMBED, ALIGNED AND SECURELY ATTACHED TO FLANGES OF BOTH UPPER AND LOWER TRACK RUNNERS. FRAMING OF WALL OPENINGS SHALL INCLUDE HEADERS AND SUPPORTING STUDS AS SHOWN ON THE DRAWINGS.

D. ALL SCREWS (REFERRED TO AS TEK) SHALL BE SELF TAPPING SELF DRILLING FASTENERS WHICH ARE ZINC COATED AS MANUFACTURED BY ITW BUILDEX TEK / TRAXX, ELCO DRIL-FLEX, HILTI, GRABBER, OR APPROVED EQUAL. THE MINIMUM SCREW SIZE /TYPE / POINT SHALL BE #8-18 (#2 POINT) TEK OR #10-16 (#2 POINT) TEK FOR USE IN 20 GA THROUGH 16 GA, AND #10-16 (#3 POINT) OR #12-14 (#2 OR #3 POINT) TEK FOR HEAVIER THAN 16 GA UNLESS NOTED OTHERWISE. SCREWS FOR SHEATHING CONNECTIONS SHALL BE OF THE PROPER SIZE AND TYPE FOR A POSITIVE SHEATHING TO METAL CONNECTION. ALL SCREW CONNECTIONS SHALL BE MADE FROM THE LIGHTER MATERIAL INTO THE THICKER MATERIAL UNLESS NOTED OTHERWISE. SCREWS SHALL HAVE A MINIMUM PROJECTION OF 3 THREADS THROUGH THE LAST MATERIAL JOINED AND SHALL HAVE MINIMUM EDGE DISTANCES AND CENTER TO CENTER SPACINGS OF 1/2". ALL SCREWS SHALL CONFORM TO SAE J78. SHARP POINT (OR SELF-PIERCING) SCREWS SHALL BE ASTM C1002 AND SELF-DRILLING SCREWS SHALL BE ASTM C954. ALL SCREWS SHALL HAVE A PROTECTIVE COATING PROVIDED IN CONFORMANCE WITH ASTM F1941 (PREVIOUSLY ASTM B633) AND SHALL HAVE A PERFORMANCE RATING OF 500 HOURS OF SALT-FOG PER ASTM B117. WHERE MORE CORROSIVE ENVIRONMENTS OCCUR (I.E. HAWAII) THEN A MINIMUM 1000 HOURS OF SALT-FOG SHALL BE REQUIRED. ALL SCREW CAPACITIES SHALL BE AS INDICATED BELOW AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE SCREW TEST DATA FROM THE SCREW MANUFACTURER'S QUALITY ASSURANCE PROGRAM OR SHALL RETAIN A INDEPENDENT CERTIFIED TESTING AGENCY TO PROVIDE THE LOAD TEST VERIFICATION. THE SCREW MANUFACTURER SHALL PROVIDE VERIFICATION OF THE FASTENERS RESISTANCE TO HYDROGEN EMBRITTLEMENT.

ALLOWABLE VALUES (POUNDS) FOR SCREWS CONNECTING LIGHT GAUGE STEEL LOADS TO BE VERIFIED

THICKNESS	DESIGN THICKNESS	MATERIAL STRENGTH	#8		#10		#12	
			DIA.=0.164" MIN		DIA.=0.190" MIN		DIA.=0.219" MIN	
(MILS)	(INCHES)	Fu (ksi)	SHEAR	PULLOUT	SHEAR	PULLOUT	SHEAR	PULLOUT
33	0.0346	45	164	72	177	84	188	95
43	0.0451	45	244	94	263	109	280	124
54	0.0566	65	300	171	500	198	569	225
68	0.0713	65	–NA–	–NA–	500	249	750	285
97	0.1017	65	–NA–	–NA–	500	356	750	405
Nominal Screw Strength Required =			900	1615	1500	2515	2250	3665

E. FOR FASTENING LIGHT GAUGE MEMBERS TO STRUCTURAL STEEL OR TO CONCRETE, POWDER DRIVEN OR PNEUMATIC FASTENERS SHALL BE ZINC PLATED AND SHALL BE MANUFACTURED BY HILTI OR EQUAL AS INDICATED IN THE DRAWINGS WITH THE CAPACITIES SHOWN TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. FOR PULLOUT APPLICATIONS OF POWDER DRIVEN OR PNEUMATIC FASTENERS, NON-DESTRUCTIVE PULLOUT TESTS SHALL BE PROVIDED TO VERIFY THAT THE TESTED CAPACITY EXCEEDS THREE (3) TIMES THE ALLOWABLE VALUES INDICATED IN THE DRAWINGS. TEST ONE (1) CONNECTION IN EVERY FIFTY (50) FOR PULLOUT CONDITIONS.

F. ALL MATERIALS SHALL BE STORED DRY AND SHALL BE KEPT FREE OF CORROSION. DAMAGED MATERIALS WILL NOT BE ACCEPTABLE.

6.5 FABRICATION

A. PREFABRICATED MEMBERS SHALL BE AS SHOWN IN THE DRAWINGS AND SHALL BE ASSEMBLED SQUARE WITH THE FASTENERS INDICATED IN THE DRAWINGS. ALL FRAMING MEMBERS SHALL BE CUT SQUARELY AND SHALL BE POSITIVELY HELD IN PLACE UNTIL PROPERLY FASTENED.

6.6 ERECTION

A. NON-LOAD BEARING WALLS / EXTERIOR FINISH SYSTEMS

1. STUDS SHALL BE AS INDICATED IN THE DRAWINGS WITH SHEATHING PLACED ON BOTH SIDES OF THE STUDS OR CRC OR OTHER BRIDGING / BRACING SHALL BE PROVIDED AT 48" O.C. PER THE DRAWINGS.
2. POSITIVE CONNECTIONS SHALL BE PROVIDED AT SUPPORTING MEMBERS PER THE DRAWINGS.

7.0 CARPENTRY

7.1 ROUGH CARPENTRY

ALL 2x FRAMING LUMBER SHALL BE STUD GRADE HEM-FIR FOR STUDS AND STANDARD OR BETTER FOR PLATES OR AS SHOWN ON THE DRAWINGS OR BELOW. ALL 2" LUMBER SHALL BE KILN DRIED (KD) OR SURFACE DRIED (SD). EACH PIECE OF LUMBER SHALL BEAR THE STAMP OF THE WEST COAST LUMBER INSPECTION BUREAU (WCLIB) OR WESTERN WOOD PRODUCTS ASSOCIATION (WWPA) SHOWING GRADE MARK OR APPROVED EQUAL. OTHER MATERIALS SHALL BE AS SHOWN BELOW:

MEMBER	SPECIES
2x & 3x STUDS	STUD GRADE HEM FIR
2x JOISTS	#2 HEM FIR
4x HEADERS	#2 HEM FIR
4X COLUMNS	#1 DOUGLAS FIR LARCH
6x HEADERS	#2 DOUGLAS FIR LARCH
6x COLUMNS	#2 DOUGLAS FIR

ALL EXPOSED STRUCTURAL MATERIALS OR MATERIAL IN CONTACT WITH CONCRETE SHALL BE PRESSURE TREATED (SEE SECTION 7.10).

7.2 FLAT AND TAPERED CHORD ENGINEERED WOOD JOISTS

A. DESIGN AND SHOP DRAWINGS:
ALL PREFABRICATED WOOD ROOF AND FLOOR JOISTS SHALL BE DESIGNED BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE STRUCTURE IS LOCATED. THE JOISTS SHOP DRAWINGS SHALL BEAR THE STAMP OF THAT ENGINEER. ALL NECESSARY BRIDGING, BLOCKING, PRE-NOTCHED PLATES, HANGERS, ETC. SHALL BE DETAILED OR SPECIFIED, AND FURNISHED BY THE MANUFACTURER. ALL PERMANENT BRACING FOR TRUSSES SHALL BE DETAILED AND DESIGNED BY THE TRUSS SUPPLIER. THE TRUSS MANUFACTURER SHALL VERIFY ALL SETBACKS, DIMENSIONS, AND BEARING POINTS PRIOR TO FABRICATION. MAXIMUM ALLOWABLE DEFLECTIONS SHALL BE AS FOLLOWS:

FLOOR TOTAL LOAD SPAN/360
FLOOR LIVE LOAD SPAN/480
ROOF TOTAL LOAD SPAN/240
ROOF LIVE LOAD SPAN/360

TRUSSES SHALL BE DESIGNED FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS AND SHALL BE FURNISHED AND INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS. MUTIPLE JOIST CALLED OUT ON THE PLANS SHALL BE INSTALLED WITH LOAD TRANSFER BLOCKS PER JOIST MANUFACTURER ADEQUATE TO SHARE LOADS EQUALLY BETWEEN MEMBERS. ADDITIONAL CONCENTRATED LOADS FROM MECHANICAL UNITS, AND MISCELLANEOUS EQUIPMENT, ETC. SHALL BE ACCOUNTED FOR/COORDINATED WITH THE SUB-CONTRACTORS, ARCHITECT AND TRUSS ENGINEER.

ALTERATION OF THE JOISTS LAYOUT INDICATED ON THE PLANS MAY REQUIRE SUPPORTING STRUCTURAL AND FOUNDATION CHANGES, THEREFORE PRIOR APPROVAL BY THE ARCHITECT AND THE STRUCTURAL ENGINEER IS REQUIRED. TRUSSES SHALL NOT BE FIELD ALTERED PRIOR TO WRITTEN APPROVAL OF THE ENGINEER OF RECORD DESIGNING THE TRUSSES.

B. FABRICATION:
THE TRUSS MANUFACTURER SHALL VERIFY ALL SETBACKS AND DIMENSIONS PRIOR TO FABRICATION. ALTERATION OF THE TRUSS LAYOUT INDICATED ON THE PLANS MAY REQUIRE SUPPORTING STRUCTURAL AND FOUNDATION CHANGES. THEREFORE PRIOR APPROVAL BY THE ARCHITECT AND STRUCTURAL ENGINEER IS REQUIRED. WHERE THE VENDOR REQUIRES 2 SPAN CONTINUOUS FRAMING TO HAVE THE TOP CHORD CUT AT THE INTERMEDIATE SUPPORT THE ENGINEER SHALL BE NOTIFIED.

C. STORAGE AND HANDLING:
THE ENGINEERED WOOD JOIST IF STORED PRIOR TO ERECTION, SHALL BE STORED IN A VERTICAL POSITION AND PROTECTED FROM THE WEATHER. THEY SHALL BE HANDLED WITH CARE SO THEY ARE NOT DAMAGED.

D. ERECTION AND INSTALLATION:
THE ENGINEERED WOOD JOISTS ARE TO BE ERECTED AND INSTALLED IN ACCORDANCE WITH THE PLANS AND WITH THE RECOMMENDATIONS IN THE MANUFACTURER'S MANUAL. TEMPORARY CONSTRUCTION LOADS WHICH CAUSE STRESSES BEYOND DESIGN LIMITS ARE NOT PERMITTED. ERECTION BRACING, IN ADDITION TO THAT SPECIFIED IS TO BE PROVIDED TO KEEP THE ENGINEERED WOOD JOISTS STRAIGHT AND PLUMB AS REQUIRED AND TO ASSURE ADEQUATE LATERAL SUPPORT FOR THE INDIVIDUAL ENGINEERED WOOD JOISTS AND THE ENTIRE SYSTEM, UNTIL THE SHEATHING MATERIAL HAS BEEN APPLIED. SEE THE MANUFACTURERS MANUAL FOR ADDITIONAL NOTES REGARDING ERECTION BRACING.

E. WEB STIFFENERS:
WEB STIFFENERS MUST BE INSTALLED AT ALL BEARING POINTS AND AT SPECIFIED CONCENTRATED LOADS AS SHOWN ON THE PLANS AS REQUIRED BY DESIGN. WEB STIFFENERS ARE FIELD INSTALLED AT ENGINEERED WOOD JOIST DEPTHS LESS THAN 22 INCHES AND PLANT INSTALLED THEREAFTER. A GAP BETWEEN THE STIFFENER AND THE TOP CHORD MUST BE PRESENT AT ALL BEARING CONDITIONS. AT CONCENTRATED LOADS THE GAP MUST BE PRESENT BETWEEN THE STIFFENER AND THE BOTTOM CHORD. WEB STIFFENERS SHOULD BE LVL OR OF EQUIVALENT STIFFNESS.

F. HANGERS:
ALL HANGERS SHALL BE AS REQUIRED PER ENGINEERED WOOD VENDOR FOR FLAT AND TAPERED CHORD JOISTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEE THAT ANY DISCREPANCIES BETWEEN VENDOR REQUIREMENTS AND THAT WHICH IS CALLED OUT ON THE PLANS BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD.

G. HOLES IN ENGINEERED WOOD JOISTS:
THE TOP AND BOTTOM FLANGES ARE NEVER TO BE CUT. THE WEB OF THE JOIST SHALL NOT BE CUT WITHIN 4 INCHES OF THE SUPPORT CENTERLINE OTHERWISE A 1-1/2 INCH DIAMETER HOLE CAN BE CUT IN THE WEB ANYWHERE AS LONG AS THE DISTANCE BETWEEN THE HOLES IS EQUAL TO 2 TIMES THE HOLE DIAMETER. A 1-1/2 INCH DIAMETER HOLE CAN ALSO BE MADE WITHIN 6 INCHES OF ANY BEARING SUPPORT. ANY SIZE OR SHAPE HOLE LARGER THAN THAT SHALL BE CUT ONLY IN ACCORDANCE WITH THE HOLE CHARTS IN THE MANUFACTURER'S MANUAL AND AS ON THE PLANS.

H. CEILING CLIPS:
JOIST / TRUSS CONNECTIONS TO NON-LOAD BEARING WALLS SHALL BE PER THE TYPICAL DETAILS. SLIDE CLIPS SHALL NOT BE USED UNLESS APPROVED BY THE ENGINEER.

7.3 PRE-ENGINEERED ROOF AND FLOOR TRUSSES

ALL PREFABRICATED WOOD ROOF AND FLOOR TRUSSES SHALL BE DESIGNED BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE STRUCTURE IS LOCATED. THE TRUSS SHOP DRAWINGS SHALL BEAR THE STAMP OF THAT ENGINEER. ALL NECESSARY BRIDGING, BLOCKING, PRE-NOTCHED PLATES, HANGERS, ETC. SHALL BE DETAILED OR SPECIFIED, AND FURNISHED BY THE MANUFACTURER. ALL PERMANENT BRACING FOR TRUSSES SHALL BE DETAILED AND DESIGNED BY THE TRUSS SUPPLIER. THE TRUSS MANUFACTURER SHALL VERIFY ALL SETBACKS, DIMENSIONS, AND BEARING POINTS PRIOR TO FABRICATION. MAXIMUM ALLOWABLE DEFLECTIONS SHALL BE AS FOLLOWS:

ROOF TOTAL LOAD SPAN/240 OR 1"
ROOF LIVE LOAD SPAN/360 OR 1/2"

TRUSSES SHALL BE DESIGNED FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS AND SHALL BE FURNISHED AND INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS. ADDITIONAL CONCENTRATED LOADS FROM MECHANICAL UNITS, AND MISCELLANEOUS EQUIPMENT, ETC. SHALL BE ACCOUNTED FOR/COORDINATED WITH THE SUB-CONTRACTORS, ARCHITECT AND TRUSS ENGINEER. ALTERATION OF THE TRUSS LAYOUT INDICATED ON THE PLANS MAY REQUIRE SUPPORTING STRUCTURAL AND

AND FOUNDATION CHANGES, THEREFORE PRIOR APPROVAL BY THE ARCHITECT AND THE STRUCTURAL ENGINEER IS REQUIRED. TRUSSES SHALL NOT BE FIELD ALTERED PRIOR TO WRITTEN APPROVAL OF THE ENGINEER OF RECORD DESIGNING THE TRUSSES.

TRUSS CONNECTIONS TO NON-LOAD BEARING WALLS SHALL BE PER THE TYPICAL DETAILS. SLIDE CLIPS SHALL NOT BE USED UNLESS APPROVED BY THE ENGINEER.

7.4 CARPENTRY HARDWARE

A. BOLTS SHALL BE ASTM A-307.

B. WASHERS SHALL BE STANDARD CUT WASHERS OR MALLEABLE IRON WASHERS.

C. ALL NAILS SHALL BE COMMON WIRE NAILS OR EQUIVALENT PNEUMATICALLY DRIVEN NAILS (P-NAILS), AMERICAN OR CANADIAN MANUFACTURER ONLY AS INDICATED BELOW. P-NAILS SHALL BE INSTALLED PER THE MANUFACTURERS GUIDELINES.

COMMON WIRE NAIL	PNEUMATIC NAIL	MINIMUM NAIL LENGTH	NAIL APPLICATION
16d COMMON	0.162" P-NAIL	3-1/2"	FRAMING
12d COMMON	0.148" P-NAIL	3-1/4"	FRAMING
N/A	0.131" P-NAIL	3"	FRAMING
10d COMMON	0.148" P-NAIL	2-1/2"	SHEATHING
8d COMMON	0.131" P-NAIL	2-1/2"	SHEATHING

D. LAG SCREWS, SHEAR PLATES – SEE IBC.

E. ANCHORS AND CONNECTORS SHALL BE SIMPSON, USP, OR OTHER ICBO APPROVED.

F. HARDWARE EXPOSED TO WEATHER OR TO VIEW SHALL BE GALVANIZED OR PROTECTED WITH OTHER APPROVED MEANS OF CORROSION PROTECTION. FOR ADDITIONAL REQUIREMENTS REGARDING HARDWARE IN EXPOSED CONDITIONS SEE SECTION 7.10.

7.5 MINIMUM NAILING – PER IBC TABLE 2304.9.1.

7.6 ANCHOR BOLTS

PER IBC SECTION 2304.3.1 AND SECTION 2308.6 ALL FOUNDATION PLATES OR SILLS SHALL BE BOLTED TO CONCRETE OR MASONRY WITH A WITH MINIMUM 1/2" NOMINAL DIAMETER ANCHOR BOLTS EMBEDDED AT LEAST 7" AND SPACED NOT MORE THAN 6 FEET APART. THERE SHALL BE A MINIMUM OF OF TWO BOLTS PER PIECE WITH ONE BOLT LOCATED WITH IN 12 INCHES OF EACH END OF EACH PIECE. ALL ANCHOR BOLTS SHALL A HAVE A MINUMUM OF 3" x 3" x 1/4" STEEL PLATE WASHER BETWEEN SILL PLATE AND NUT. THE PLATE WASHER EDGE SHALL EXTEND TO WITH IN 1/2" OF SILL PLATE ON SHEATHING SIDE(S).

7.7 PLYWOOD/OSB SHEATHING

EACH SHEET SHALL BEAR THE TRADEMARK OF THE AMERICAN PLYWOOD ASSOCIATION. ALL GRADING AND INSTALLATION SHALL CONFORM TO MOST CURRENT VERSION OF PS2 FOR OSB. USE THICKNESS AND NAILING AS SHOWN ON THE DRAWINGS. SHEATHING SHALL HAVE EXPOSURE RATING AS APPROPRIATE PER THE CONTRACTOR'S CONSTRUCTION AND WEATHER CONDITIONS SPECIFIED BY CONTRACTOR. EXCEPT AS OTHERWISE SHOWN OR NOTED, PROVIDE 0.131" DIA P-NAILS OR 8d COMMON NAILS AT 6" ON CENTER @ SUPPORTED PANEL EDGES AND 0.131" DIA P-NAILS OR 8d COMMON NAILS AT 12" ON CENTER ON OTHER SUPPORTING MEMBERS FOR WALLS AND ROOFS. FOR FLOORS, USE THE SAME SPACING PATTERN AS STATED FOR WALLS OR ROOF EXCEPT USE 0.148" DIA P-NAILS OR 10d COMMON NAILS.

NOTE: EQUIVALENT RATED PLYWOOD MAY BE USED IN LIEU OF OSB CALLED OUT. ALL THICKNESS AND GRADING SHALL CONFORM TO PS1 OR PS2. SHEATHING SHALL HAVE EXPOSURE RATING AS APPROPRIATE PER THE CONTRACTOR'S CONSTRUCTION AND WEATHER CONDITIONS SPECIFIED BY CONTRACTOR.

ROOF DIAPHRAGM (BLOCKED): 7/16" OSB (MIN PANEL INDEX = 24/16), WITH 0.131" DIA P-NAILS OR 8d COMMON NAILS AT 6" O.C. AT ALL PANEL EDGES AND AT 12" O.C. AT FIELD TYPICAL UNLESS NOTED OTHERWISE ON PLAN. WHERE REQUIRED, USE PLY-CLIPS INSTALLED PER MANUFACTURER'S GUIDELINES AND APA GUIDELINES.

FLOOR DIAPHRAGM (BLOCKED): 3/4" TONGUE AND GROOVE OSB (MIN PANEL INDEX = 32/16), WITH 0.148" DIA P-NAILS OR 10d COMMON NAILS AT 6" O.C. AT ALL PANEL EDGES AND AT 12" O.C. AT FIELD TYPICAL UNLESS NOTED OTHERWISE ON PLAN. SHEATHING SHALL BE GLUE-NAILED TO FRAMING WITH APPROVED ADHESIVE PER THE ARCHITECT. FIELD NAILING SHALL BE 6" O.C. AT ALL INTERIOR SHEARWALL LOCATIONS INSTEAD OF TYPICAL 12" O.C. SPACING.

7.8 MANUFACTURED TIMBER BEAMS

A. GLULAMINATED TIMBER BEAMS (GLULAM BEAMS)

ALL STRUCTURAL GLUE-LAMINATED TIMBER, MATERIALS, MANUFACTURE AND QUALITY CONTROL SHALL BE IN CONFORMANCE WITH VOLUNTARY PRODUCT STANDARD P.S.56 "STRUCTURAL GLUED LAMINATED TIMBER", AND ALL MEMBERS SHALL BE MARKED WITH A QUALITY MARK THEREOF. ALL PLY LAYOUTS SHALL BE PER P.S. 56. CAMBERS ARE AS SHOWN ON THE DRAWINGS. ALL MEMBERS SHALL BE EITHER COMBINATION 24F-V4 (SIMPLE SPAN) OR 24F-V8 (CANTILEVERED OR CONTINUOUS SPAN) AS APPLICABLE. ALL MEMBERS SHALL BE ARCHITECTURAL APPEARANCE AND SHALL BE GLUED WITH WATERPROOF ADHESIVE PER P.S. 56. ARCHES SHALL BE COMBINATION 24F-V8 AND HAVE EXTERIOR GLUE, ARCHITECTURAL GRADE.

B. PARALLAM BEAMS

BEAMS SHALL BE 2.0E PARALLAM PSL AS MANUFACTURED BY iLEVEL. MATERIALS, MANUFACTURE, AND QUALITY CONTROL SHALL BE PER THE MANUFACTURER WHO SHALL ULTIMATELY BE RESPONSIBLE FOR THE MANUFACTURE OF THE PRODUCT. ALL BRIDGING AND BRACING SHALL BE PER THE MANUFACTURER.

C. MICROLLAM BEAMS

BEAMS SHALL BE 1.9 MICROLLAM LVL AS MANUFACTURED BY iLEVEL. MATERIALS, MANUFACTURE, AND QUALITY CONTROL SHALL BE PER THE MANUFACTURER WHO SHALL ULTIMATELY BE RESPONSIBLE FOR THE MANUFACTURE OF THE PRODUCT. ALL BRIDGING AND BRACING SHALL BE PER THE MANUFACTURER.

D. TIMBERSTRAND BEAMS

BEAMS SHALL BE 1.55E TIMBERSTRAND LSL AS MANUFACTURED BY iLEVEL. MATERIALS, MANUFACTURE, AND QUALITY CONTROL SHALL BE PER THE MANUFACTURER WHO SHALL ULTIMATELY BE RESPONSIBLE FOR THE MANUFACTURE OF THE PRODUCT. ALL BRIDGING AND BRACING SHALL BE PER THE MANUFACTURER.

7.9 SHRINKAGE

WOOD MEMBERS WERE EVALUATED USING KILN DRIED (KD) OR SURFACE DRIED (SD) LUMBER (HEM-FIR WITH MOISTURE CONTENT = 19% OR LESS). THE FLOOR TO FLOOR COMPRESSION OF SUCH WOOD MEMBERS (PLATES AND JOISTS TOTALING 15.25") DUE TO A MOISTURE CONTENT CHANGE OF 10% WILL BE APPROXIMATELY 3/8 INCHES PER FLOOR. ADDITIONAL FLOOR TO FLOOR COMPRESSION OF WOOD STUDS DUE TO FULL COMPRESSIVE LOAD WILL BE APPROXIMATELY 1/32 INCHES PER FLOOR. ADDITIONAL COMPRESSION OF WOOD FRAMING MAY OCCUR DUE TO FRAMING TECHNIQUES AND LOCAL STRESS CONCENTRATIONS. ALL FULL BUILDING HEIGHT ELECTRICAL, MECHANICAL, AND PLUMBING SYSTEMS AS WELL AS EXTERIOR FINISHES SHOULD BE DESIGNED TO ACCOMMODATE THESE MOVEMENTS. USE OF WOOD STUDS, PLATES & JOISTS WHICH WILL HAVE MOISTURE CONTENT CHANGES GREATER THAN 10% WILL EXPERIENCE GREATER MOVEMENT. FLOOR ASSEMBLIES UTILIZING DEPTHS GREATER THAN THOSE ASSUMED ABOVE MAY EXPERIENCE GREATER MOVEMENTS. LOCALIZED HEADERS MAY EXPERIENCE SIMILAR SHRINKAGE AS DESCRIBED ABOVE.

7.10 PRESERVATIVE TREATMENT

A. PRESERVATIVE TREATMENTS

SEE ARCH FOR ALL PRESERVATIVE TREATED REQUIREMENTS AND FINISHES OF EXPOSED TIMBER MEMBERS AND AT EXTERIOR CONDITIONS.

ALL EXPOSED FRAMING LUMBER, PLYWOOD AND DECK MATERIALS SHALL BE PRESSURE TREATED PER AWPA SPECIFICATION P-5 OR OTHER APPROVED TREATMENT. ALL CUTTING AND BORING AFTER PRESSURE TREATMENT SHALL BE CARED FOR IN ACCORDANCE WITH AWPA SPECIFICATION M-4.

ACZA PRESERVATIVE TREATMENT SHALL NOT BE PERMITTED EXCEPT WHERE HARDWARE (INCLUDING NAILS) IN CONTACT WITH THE TREATED PRODUCT IS COMPOSED ENTIRELY OF STAINLESS STEEL MATERIAL.STAINLESS STEEL HARDWARE SUBSTITUTED FOR HDG PRODUCTS SHALL MEET OR EXCEED THE STRENGTH AND PREFORMANCE OF THE SUBSTITUTED HDG PRODUCT ORIGINALLY SPECIFIED.

B. GALVANIZATION OF HARDWARE (EXPOSED OR IN CONTACT WITH PRESERVATIVE TREATED WOOD)

1. PROTECTED ENVIRONMENT

ALL HARDWARE (HANGERS, NAILS, BOLTS, LAG SCREWS, FLASHING ETC) SHALL BE HOT-DIP GALVANIZED (HDG) TO A MINIMUM COATING LEVEL OF G185 (1.85 oz/ft2 OF ZINC) WHEN IN CONTACT WITH PRESERVATIVE TREATED WOOD CONTAINING PRODUCTS SUCH AS, BUT NOT LIMITED TO; CCA, ACQ, OR CBA. HDG PRODUCTS SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS AS APPLICABLE; ASTM A653, ASTM A123, AND ASTM A153. WHEN USING STAINLESS STEEL OR HOT-DIP GLAVANIZED CONNECTORS, THE CONNECTORS AND FASTENERS SHALL BE OF THE SAME MATERIAL.

2. EXPOSED ENVIRONMENT

ALL HARDWARE (INCLUDING CONNECTORS) IN CONTACT WITH PRESSURE TREATED WOOD IN AN EXPOSED OR POTENTIAL TO BE EXPOSED ENVIRONMENT (HAVING POTENTIAL FOR WIND BLOWN RAIN TO REACH) SHALL BE STAINLESS STEEL.

7.11 PRE-ENGINEERED STRESSED SKIN PANELS

ROOF STRESSED SKIN PANELS SHALL BE DESIGNED MANUFACTURED AND DETAILED PER APA PLYWOOD DESIGN SPECIFICATION SUPPLEMENT FOUR -"DESIGN AND FABRICATION OF PLYWOOD SANDWICH PANELS" AND UBC SECTION AND APA TECHNICAL NOTE N375A – "DESIGN CAPACITIES OF APA PERFORMANCE RATED STRUCTURAL USE PANELS". SHOP DRAWINGS SHALL BE PROVIDED BY THE SUPPLIER WHICH SHALL INCLUDE ALL MANUFACTURING DETAILS AND CONNECTION HARDWARE AND SHALL BE REVIEWED AND APPROVED BY THE OWNER, ARCHITECT AND STRUCTURAL ENGINEER OF RECORD PRIOR TO MANUFACTURING. THE SHOP DRAWING EXPENSE SHALL BE PART OF THE PANEL MANUFACTURING TOTAL COST TO THE OWNER.

8.0 REINFORCED MASONRY

8.1 MATERIALS

A. MORTAR SHALL CONFORM TO ASTM C-270 TYPE S, F'c = 1800 PSI @ 28 DAYS BUT NOT LESS THAN THE MINIMUM F'm SPECIFIED BELOW.

B. GROUT SHALL CONFORM TO ASTM C-476, F'c = 2000 PSI @ 28 DAYS BUT NOT LESS THAN THE MINIMUM F'm SPECIFIED BELOW, 5" TO 8" SLUMP, 5-1/2 SACK MIX, MINIMUM. MAXIMUM AGGREGATE SIZE IS 3/8".

C. REINFORCEMENT SHALL BE GRADE ASTM A615, GRADE 60 AS PER CONCRETE NOTES.

D. WATER USED IN MORTAR OR GROUT SHALL BE CLEAN AND FREE OF DELETERIOUS AMOUNTS OF ACID, ALKALINES OR ORGANIC MATERIAL OR OTHER HARMFUL SUBSTANCES.

E. HOLLOW CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90, NORMAL WEIGHT CONCRETE UNLESS NOTED OTHERWISE. MINIMUM COMPRESSIVE STRENGTH SHALL BE 1900 PSI UNLESS NOTED OTHERWISE ON THE PLANS. HOLLOW BRICK MASONRY UNITS SHALL CONFORM TO ASTM C652, TYPE HBX, GRADE SW AND MW.

F. MASONRY ASSEMBLIES SHALL BE SOLID GROUTED UNLESS NOTED OTHERWISE, BOND SHALL BE RUNNING BOND AND MASONRY SHALL BE CONSTRUCTED IN COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 21 OF THE IBC. TESTING SHALL BE PROVIDED PER IBC SECTION 2105.2 IN ORDER TO VERIFY COMPLIANCE WITH A MINIMUM COMPRESSIVE STRENGTH, F'm = 1500 PSI FOR CONCRETE MASONRY ASSEMBLIES.

8.2 REINFORCEMENT

REINFORCING BARS IN BOND BEAMS SHALL BE LAPPED 48 BAR DIAMETERS OR 24 INCHES, WHICHEVER IS GREATER, AT SPLICES, INTERSECTIONS AND CORNERS. HORIZONTAL REINFORCING IN STRUCTURAL BOND BEAMS AT ROOF LEVEL AND TOP OF PARAPET SHALL BE CONTINUOUS AND UNINTERRUPTED. HORIZONTAL REINFORCING IN INTERMEDIATE NON-STRUCTURAL BOND BEAMS LOCATED AT 4'-0" SPACING SHALL BE INTERRUPTED AT THE CONTROL JOINTS.

WHEN ADJACENT SPLICES ON GROUTED MASONRY ARE SEPARATED BY 3 INCHES OR LESS, THE LAP LENGTH SHALL BE INCREASED BY 1.3 TIMES OR THE SPLICE MAY BE VERTICALLY STAGGERED AT LEAST 24 BAR DIAMETERS WITH NO INCREASE IN LAP LENGTH.

8.3 TIES AND ANCHORS

ALL METAL TIES AND ANCHORS NOT FULLY EMBEDDED IN MORTAR OR GROUT SHALL BE COATED WITH COPPER, CADMIUM, ZINC, OR A METAL HAVING AT LEAST EQUIVALENT CORROSION-RESISTANT PROPERTIES.

8.4 CONTROL JOINTS

VERTICAL CONTROL JOINTS IN MASONRY WALLS SHALL BE CONTINUOUS FROM TOP OF FOUNDATION WALL TO TOP OF WALL, INTERRUPTED ONLY BY THE STRUCTURAL BOND BEAM AS NOTED ABOVE. THE CONTROL JOINTS IN THE STRUCTURAL BOND BEAMS SHALL BE SIMULATED BY A RAKED HEAD JOINT IN THE OUTER FACE OF THE BOND BEAM.

9.0 MASONRY / STONE VENEER

PER IBC VENEER TIES SHALL CONFORM TO CHAPTER 6 OF THE ACI 530/ASCE 5. ANCHOR TIES SHALL BE CORROSION RESISTANT. ANCHOR TIES AND JOINT REINFORCEMENT SHALL BE MANUFACTURED BY DUR-O-WALL, INC. OR PRE-APPROVED EQUAL. ANCHOR TIES SHALL BE SPACED 16" O.C. EACH WAY MAXIMUM. ANCHOR TIES SHALL HAVE A LIP OR HOOK ON THE EXTENDED LEG THAT WILL ENGAGE OR ENCLOSE A HORIZONTAL JOINT REINFORCEMENT WIRE OF NO. 9 GAUGE OR EQUIVALENT. THE JOINT REINFORCEMENT SHALL BE CONTINUOUS WITH BUTT SPLICES BETWEEN TIES PERMITTED. ATTACHMENT OF TIES TO BACKING IS AS FOLLOWS:

BACKING	VENEER TIE	ATTACHMENT TO BACKING
WOOD STUDS	STANDARD D/A 213 W\ SEISMIC PINTEL	(2) 1-1/2" LONG COPOLYMER COATED D/A 808 SCREWS
CONCRETE	STANDARD D/A 5213 W\ SEISMIC PINTEL	(1) 7/16" EXPANSION ANCHOR WITH MINIMUM EMBED OF 2"

MAXIMUM HEIGHT OF VENEER FROM FOUNDATION SHALL BE PER TABLE 6.2.2.3.1 AND IF HEIGHT EXCEEDED THEN WEIGHT OF VENEER SHALL BE SUPPORTED BY NON-COMBUSTIBLE CONSTRUCTION FOR EACH STORY ABOVE THE HEIGHT LIMIT.

ALL BRICK VENEER AND PRECAST SHALL BE VERTICALLY SUPPORTED AT THE FOUNDATION OR BY OTHER VENEER / PRECAST MEMBERS WHICH ARE SUPPORTED AT THE FOUNDATION. TYPICAL PRECAST MEMBERS SHALL BE VERTICALLY SUPPORTED PER THE TYPICAL DETAILS AND THE PRECAST MANUFACTURER SHALL SUBMIT SHOP DRAWINGS FOR ALL ATTACHMENTS WHERE DIRECT VERTICAL LOAD BEARING DOES NOT OCCUR.

SHOTCRETE (VERIFY W/ CONTRACTOR IF DESIRED)

10.0 MECHANICAL / EPOXY / POWDER DRIVEN FASTENERS

A. MECHANICAL FASTENERS (PRE-DRILLED ANCHORS)

1. TYPICAL MECHANICAL ANCHORS WHICH ARE INSTALLED IN CONCRETE SHALL BE AS MANUFACTURED BY THE SIMPSON, INC. AND SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUFACTURERS GUIDELINES AND PER ICC REPORT ESR-1771 FOR WEDGE ANCHORS OR PER ICC REPORT ESR-2713 FOR SCREW TYPE ANCHORS OR APPROVED EQUALS.
2. SPECIAL CARE SHALL BE TAKEN DURING THE DRILLING / INSTALLATION OF FASTENERS WITHIN POST-TENSIONED CONCRETE. ANCHORS SHALL BE INSTALLED IN SUCH A MANNER SO AS NOT TO INTERFERE WITH / DAMAGE POST-TENSIONING TENDONS / REINFORCEMENT.

B. EPOXY CONNECTIONS (PRE-DRILLED ANCHORS)

1. ADHESIVE ANCHORS SHALL BE OF THE SIZE AND LENGTH AS CALLED OUT ON THE PLANS USING THE SIMPSON SET-XP ADHESIVE ANCHORING SYSTEM PER ICC REPORT ESR-2508 OR APPROVED EQUAL. ADHESIVE ANCHORS SHALL BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.
2. ALL EPOXY ANCHORS OR FASTENERS REQUIRE SPECIAL INSPECTION.
3. SPECIAL CARE SHALL BE TAKEN DURING THE DRILLING / INSTALLATION OF FASTENERS WITHIN POST-TENSIONED CONCRETE. ANCHORS SHALL BE INSTALLED IN SUCH A MANNER SO AS NOT TO INTERFERE WITH / DAMAGE POST-TENSIONING TENDONS / REINFORCEMENT.

C. POWDER DRIVEN FASTENERS

1. TYPICAL POWDER DRIVEN FASTENERS WHICH ARE INSTALLED IN CONCRETE OR STEEL SHALL BE AS MANUFACTURE BY HILTI, INC. AND SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUFACTURERS GUIDELINES AND PER ICC REPORT ESR-1663 OR APPROVED EQUAL.
2. ALL FASTENERS SHALL BE OF THE TYPE AND SIZE REQUIRED TO MAINTAIN THE REQUIRED PENETRATIONS. FASTENERS INSTALLED IN CONCRETE SHALL BE INSTALLED WHEN THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH OF THE CONCRETE HAS BEEN OBTAINED.
3. FASTENERS WHICH ARE USED IN PULLOUT CONDITIONS SHALL BE NON-DESTRUCTIVE LOAD TESTED IN TENSION TO (2) TIMES THE ALLOWABLE LOAD EVERY (50) FASTENERS.
4. MAXIMUM EMBEDMENT DEPTH = 3/4" FOR USE WITH ATTACHMENTS TO POST-TENSIONED SLABS.

11.0 MISCELLANEOUS

VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO PROCEEDING. PROVIDE ERECTION BRACING AS NECESSARY UNTIL PERMANENT SUPPORT AND STIFFNESS ARE INSTALLED. REFER TO ARCHITECTURAL PLANS FOR WALL OPENING, ARCHITECTURAL TREATMENT AND DIMENSIONS NOT SHOWN. REFER TO MECHANICAL AND ELECTRICAL PLANS FOR SIZE AND LOCATION OF ALL OPENINGS FOR DUCTS, PIPES, CONDUITS, ETC., NOT SHOWN.

MARTIN RENUS OMAN
STATE OF WASHINGTON
40752
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 1 4-7-23

PERMIT SUBMITTAL
4-7-23

S1.1

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.1.dwg PLOT DATE/TIME: 4/4/2023 – 3:04pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

2015 International Building Code – Statement of Special Inspection

STEEL CONSTRUCTION

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Fabrication – Inspection of Fabricator's Quality Control Procedures	1705.2.1	AISC 360, Section N2	–	X	YES	Certificate from Independent Agency and current agreement for periodic (minimum 6 month intervals) in–plant quality assurance inspections.
High–strength bolts, nuts, washers – material verification	1705.2.1	Applicable ASTM material spec.; AISC 360, Section J3	–	X	N/A	Inspection of materials (identification markings; Conformance to ASTM material specification specified by designer); Manufacturer's designation (Certificates of Compliance) are required.
Erection – Installation of High Strength Bolts: Snug–tight joints	1705.2.1	AISC 360, Section N5.6	–	X	YES	
Erection – Installation of High Strength Bolts: Slip–Critical joints	1705.2.1	AISC 360, Section N5.6	X	X	N/A	
Structural Steel Materials	1705.2.1	Applicable ASTM material standards AISC 360, Section A3.1	–	X	YES	Inspection of material identification markings; Manufacturer's Certified Test Reports per ASTM A 6 and/or ASTM A 568 indicating conformance to design requirements. Manufactures' certified mill test reports are required.
Weld Filler Materials	1705.2.1	AISC 360, section A3.5 and applicable AWS A5 documents	–	X	YES	Conformance to AWS Specifications as specified by the designer. Manufacturer's designation (certificate of compliance) is required.
Structural Steel Welding Inspection – Complete and Partial penetration grove welds, Multipass fillet welds, Single–pass fillet welds > 5/16", and plug and slot welds	1705.2.1	AWS D1.1, AISC 341	X	–	N/A	Inspections shall be in compliance with AWS D 1.1, section 6. Weld inspectors certification per AWS D 1.1, Chapter 35 required.
Structural Steel Welding Inspection – Single–pass fillet welds < 5/16"	1705.2.1	AWS D1.1, AISC 341	–	X	YES	Inspections shall be in compliance with AWS D 1.1, section 6. Weld inspectors certification per AWS D 1.1, Chapter 35 required.
Welding Inspection – Steel floor and roof deck welds.	1705.2.1	AWS D1.3, AISC 341	–	X	N/A	Inspection shall be in compliance with AWS D1.3, section 6.
Reinforcing Steel Welding Inspection – Verification of weldability of reinforcing steel other than ASTM A706.	1705.2.1	AWS D1.4,ACI 318:26.6.4	–	X	N/A	Inspections shall be in compliance with AWS D 1.4, section 6 and ACI 318.26.6.4.
Reinforcing Steel Welding Inspection – Reinforcing steel moment frames, and boundary elements of shear walls and shear reinforcement.	1705.2.1	AWS D1.4,ACI 318:26.6.4	X	–	N/A	Inspections shall be in compliance with AWS D 1.4, section 6 and ACI 318.26.6.4.
Reinforcing Steel Welding Inspection – Shear reinforcement.	1705.2.1	AWS D1.4,ACI 318:26.6.4	X	–	N/A	Inspections shall be in compliance with AWS D 1.4, section 6 and ACI 318.26.6.4.
Reinforcing Steel Welding Inspection – Other reinforcing steel.	1705.2.1	AWS D1.4, ACI 318:26.6.4	–	X	N/A	Inspections shall be in compliance with AWS D 1.4, section 6 and ACI 318.26.6.4.
Erection – Steel Frame Details	1705.2.1	AISC 341	–	X	N/A	Inspection to confirm compliance with details shown on approved Construction Documents and Shop Drawings.

WIND PRESSURE TABLE FOR COMPONENTS & CLADDING (ASD)

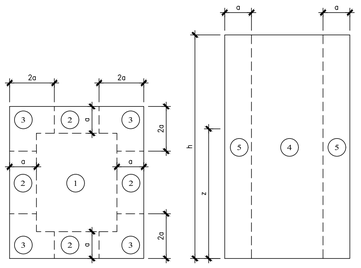
ROOF SURFACES[1]

EFFECTIVE WIND AREA	POSITIVE PRESSURE (PSF) ZONE[2]			NEGATIVE PRESSURE (PSF) ZONE[2]		
	1	2	3	1	2	3
10 SF	8.09	8.09	8.09	–26.62	–25.36	–41.78
20 SF	7.57	7.57	7.57	–24.93	–22.37	–39.42
50 SF	6.89	6.89	6.89	–23.25	–19.38	–37.07
100 SF	6.40	6.40	6.40	–21.57	–16.39	–34.71
500 SF	6.40	6.40	6.40	–18.20	–16.31	–29.99

WALL SURFACES

EFFECTIVE WIND AREA	POSITIVE PRESSURE (PSF) ZONE[2]		NEGATIVE PRESSURE (PSF) ZONE[2]	
	4	5	4	5
10 SF	18.20	18.20	–18.20	–33.36
20 SF	18.20	18.20	–18.20	–33.36
50 SF	16.93	16.93	–17.35	–29.99
100 SF	15.67	15.67	–16.51	–26.62
500 SF	13.14	13.14	–14.83	–19.88

1. NET WIND PRESSURES AT ROOF SURFACES = VALUE FROM TABLE ABOVE +2/3 DEAD LOAD (DEAD LOAD REDUCES NEGATIVE PRESSURE + ADDS TO POSITIVE PRESSURES)
2. ZONES ARE DEFINED BY FIGURE 30.5–1 BELOW ASCE/SEI 07–16 FOR ROOF AND WALL ELEMENTS a=12'



ROOF PLAN WALL ELEVATION

TABLE 2304.9.1 - FASTENING SCHEDULE

Connection	Fastening	Location
1. Joist to sill or girder	3–8d common	toenail
2. Bridging to joist	2–8d common	toenail ea end
3. 1" x 6" subfloor or less to ea joist	2–8d common	face nail
4. Wider than 1" x 6" subloor to ea joist	3–8d common	face nail
5. 2" subfloor to joist or girder	2–16d common	blind and face nail
6. Sole plate to joist or blocking	16d common @ 16" o.c.	typical face nail
Sole plate to joist or blocking at braced wall panels	3–16d common per 16"	braced wall panels
7. Top plate to stud	2–16d common	end nail
8. Stud to sole plate	4–8d common or 2–16d common	toenail end nail
9. Double studs	16d common @ 24" o.c.	face nail
10. Double top plates	16d common @ 16" o.c. 8–16d common	typical face nail lap splice
11. Blocking between joists or rafters to top plate	3–8d common	toenail
12. Rim joist to top plate	8d common @ 6" o.c.	toenail
13. Top plates, laps and intersections	2–16d common	face nail
14. Continuous header, two pieces	16d common @ 16" o.c.	along edge
15. Ceiling joists to plate	3–8d common	toenail
16. Continuous header to stud	4–8d common	toenail
17. Ceiling joists, laps over partitions(g)	3–16d common min	face nail
18. Ceiling joists to parallel rafters(g)	3–16d common min	face nail
19. Rafter to plate(g)	3–8d common	toe nail
20. 1" diagonal brace to each stud and plate	2–8d common	face nail
21. 1" x 8" sheathing to each bearing wall	2–8d common	face nail
22. Wider than 1" x 8" sheathing to each bearing	3–8d common	face nail
23. Built–up corner studs	16d common	24" o.c.
24. Built–up girder beams	20d common @ 32" o.c. 2–20d common	face nail top & bottom staggered on opposite sides face nail at ends and at each splice
25. 2" planks	16d common	at each bearing
26. Collar tie to rafter	3–10d common	face nail
27. Jack rafter to hip	3–10d common 2–16d common	toe nail face nail
28. Roof rafter to 2–by ridge beam	2–16d common 2–16d common	toe nail face nail
29. Joist to band joist	3–16d common	face nail
30. Ledger strip	3–16d common	face nail
31. Wood structural panels and particle board:(a)		
Subfloor, roof and wall sheathing (to framing):		
1/2" and less	6d common(b), (f)	
19/32" to 3/4"	8d common or 6d(c)	
7/8" to 1"	8d(b)	
Single floor (combo subfloor–underlament to framing):		
1 1/8" to 1 1/4"	10d common or 8d(c)	
3/4" and less	6d(c)	
7/8" to 1"	8d(c)	
32. Panel siding (to framing)		
1/2" and less	6d(d)	
5/8"	8d(d)	
33. Fiberboard sheathing(e)		
1/2"	6d common	
25/32"	8d common	

a. Nails spaced at 6" o.c. at edges, 12" o.c. at intermediate supports except 6" o.c. at supports where spans are 48 inches or more.
b. Common or deformed shank
c. Deformed shank
d. Corrosion resistant siding or casing nail.
e. Fasteners spaced 3" o.c. at exterior edges and 6" o.c. at intermediate supports
f. For roof sheathing applications, 8d nails are the minimum required for wood structural panels.
g. See section 2308.10.4.1, Table 2308.10.4.1 of the International Building Code.

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SOIL & FOUNDATIONS

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Site Preparation	Table 1705.6 Item 5	–	–	X	N/A	Inspection to determine that the site has been prepared in accordance with the approved soils or geotechnical report.
Prepared Fill – During Fill Preparation	Table 1705.6 Item 4	–	X	–	YES	Inspection to determine that the materials being used and maximum lift thicknesses comply with the approved report as specified in Section 1804.2.
Evaluation of in–place Density	Table 1705.6 Item 3	–		X	YES	Tests to determine, at the approved frequency, that the in–place dry density of the compacted fill complies with the approved report.
Footings and Foundations	1805.1 – 1805.9 Table 1705.6 Item 1	–	–	X	YES	Confirm soils suitable for the design allowable soil bearing pressure are present at bearing grade. Confirm the footing dimensions are as specified on the project plans.
Foundation Depth	Table 1705.6 Table 1705.6 Item 2	–	–	X	YES	Confirm excavation are extended to proper depth and have reached proper materials.

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CONCRETE CONSTRUCTION

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Materials	1705.3.1, Table 1705.3 Item 1	Applicable ASTM material spec.; AISC 360, Section A3.3	–	X	YES	Manufacturer's Certificates of Compliance or Tests per Chapter 3 of ACI 318, per ASTM A 706, and per 1705.3.1
Installation of Reinforcing Steel	1910.4 Table 1705.3 Item 1	ACI 318: 25.2, 25.3, 26.5.1–26.5.3	–	X	YES	Inspection to confirm compliance with details shown on approved Construction Documents, Shop Drawings, ACI 318 and Code Section 1910.4
Welding of Reinforcing Steel	Table 1705.3 Item 2	AWS D1.4, ACI 318: 26.5.4	–	–	N/A	Observation of reinforcing steel welding in accordance with Table 1705.2.2, Item 2, (see attached steel construction table).
Bolt Installation	1908.5, 1901.1 Table 1705.3 Item 3	ACI 318: 17.8.2	X	–	YES	Observation of anchor bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased.
Formwork	Table 1705.3 Item 12	ACI 318: 26.10.1(b)	–	X	YES	Inspection for compliance with ACI 318, for shape, location and dimensions of concrete member being formed.
Concrete Strength	1910.10, Table 1705.3 Item 6	ASTM C 172, ASTM C 31, ACI 318: 26.4.5, 26.1.2	–	X	YES	Evaluation of Concrete strength in accordance with ACI 318, and in accordance with the requirements of IBC 1905.6.
Concrete Mixes	1904.2, 1910.2, 1910.3 Table 1705.3 Item 5	ACI 318: 19, 26.4.3–26.4.4	–	X	YES	Inspection for use of proper mix proportions and techniques, ACI 318
–	–		–	–	–	
Concrete Sampling	1910.10 Table 1705.3 Item 6	ASTM C 172, ASTM C 31, ACI 318: 26.4.5, 26.12	X	–	YES	
Concrete Placement	1910.6, 1910.7, 1910.8, Table 1705.3 Item 7	ACI 318: 26.4.5	X	–	YES	Inspection for proper application techniques; ACI 318
Curing Temperatures and Techniques	1910.9 Table 1705.3 Item 8	ACI 318: 26.4.7–26.4.9	–	X	YES	Inspection for maintenance of curing temperatures and techniques; ACI 318
Prestressed Concrete: Application Prestressing Forces	Table 1705.3 Item 9a	ACI 318: 26.9.2.1	X	–	N/A	Field inspections of prestressed/post–tensioned concrete members in accordance with ACI 318
Prestressed Concrete: Grouting of unbonded prestressing tendons in seismic–force–resisting system	Table 1705.3 Item 9b	ACI 318: 26.9.2.3	X	–	N/A	Field inspections of prestressed/post–tensioned concrete members in accordance with ACI 318
Erection of Precast Concrete	Table 1705.3 Item 10	ACI 318: 26.8	–	X	N/A	Field inspections of precast concrete members in accordance with ACI 318
Post Tensioning	Table 1705.3 Item 11	ACI 318: 26.10.2	–	X	YES	Verification of in–situ concrete strength, prior to stressing of tendons in post–tensioned concrete and prior to removal of shores and forms for beams and structural slabs in accordance with ACI 318
Post Installed Anchors	1909.1, Table 1705.3 Item 4	ACI 318: 17.8.2, 17.8.2.4	–	X	YES	Verification of anchors post installed in hardened concrete members.

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WOOD CONSTRUCTION

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Fabrication – Inspection of Fabricator's Quality Control Procedures	1704.2.5	–	–	X	YES	Certificate from Independent Agency and current agreement for periodic (minimum 6 month intervals) in–plant quality assurance inspections.

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SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Structural Steel	1705.11.1	AISC 341	X	–	N/A	Observation of structural welding in accordance with AISC Seismic. Not required for 5/16" single pass fillet welds or welding of metal deck.
Structural Wood: Inspection of field gluing operations of elements of the seismic force resisting system.	1705.11.2	–	X	–	N/A	Inspection of field gluing operations of elements of the seismic force resisting system.
Structural Wood: Inspection of nailing, bolting, anchoring and other fastening components the seismic force resisting system, including drag struts, braces and hold–downs.	1705.11.2	–	–	X	YES	Inspection of nailing, bolting, anchoring and other fastening components within the seismic force resisting system, including drag struts, braces and hold–downs. Not required for nailing o.c. spacing greater that 4" o.c.
Cold–formed Steel Framing	1705.11.3	–	–	X	N/A	Inspection of welding operations of elements of the seismic force resisting system.
Cold–formed Steel Framing	1705.11.3	–	–	X	N/A	Inspection of screw attachments, bolting, anchoring and other fastening components within the seismic force resisting system, including struts, braces and hold–downs.

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STRUCTURAL: OBSERVATIONS

MATERIAL/ TYPE INSPECTION	IBC CODE REFERENCE	REFERENCE STANDARD	FREQUENCY APPLICABLE TO THIS PROJECT			SCOPE OF SERVICE
			CONT.	PERIODIC	REQUIRED	
Strucutral Observations	1704.5	–	–	X	YES	Structural observations to be preformed to observe general conformance to the construction documents.

4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

Limited Use Drawing

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

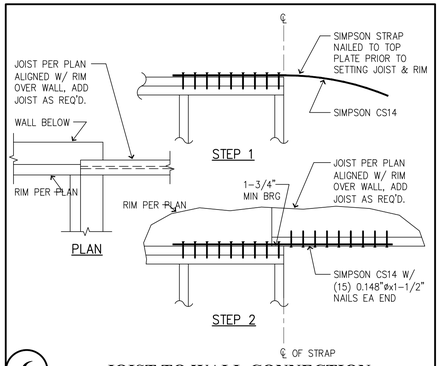
Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. : 4-7-23
OF DWG. SET :

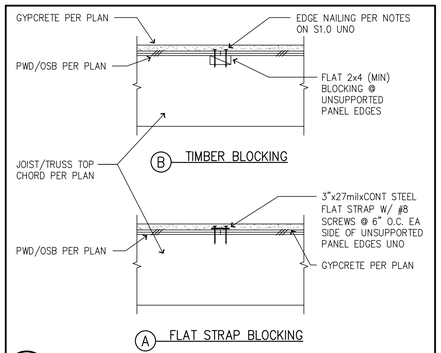
PERMIT SUBMITTAL
4-7-23

S1.2

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.2.dwg PLOT DATE/TIME: 4/4/2023 - 3:04pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



6 **JOIST TO WALL CONNECTION**



5 **BLOCKING OF DIAPHRAGMS**

Threaded Rod Holdown Systems - Load Capacities

MARK / LEVEL	2A T/C (KIPS)	4A T/C (KIPS)	5A T/C (KIPS)	5B T/C (KIPS)					VERTICAL [9] DISPLACEMENTS (IN)
5TH	–		2.0/3.5	2.5/4.5					0.2
4TH	–	2.0/6.0	5.0/6.5	6.0/7.5					0.2
3RD	–	4.5/11.0	8.0/10.5	10.0/12.0					0.2
2ND	2.5/9.0	7.0/16.0	12.0/17.0	15.0/18.0					0.15
1ST	5.0/12.0	9.0/22.0	18.0/24.0	24.0/26.0					0.15
BASE CONNECTION	1/S3.8	1/S3.8	1/S3.8	1/S3.8					–

NOTES:
1. LEVEL INDICATES WALL TO BE CONNECTED TO THE FLOOR BELOW. HOLDOWNS ARE TYPICALLY SHOWN ON THE FRAMING PLAN SHEET ABOVE THE WALLS TO BE CONNECTED TO THE STRUCTURE BELOW. FOR EXAMPLE, HOLDOWNS SHOWN AT THE FIFTH FLOOR PLAN ARE FOR CONNECTION OF FOURTH FLOOR WALLS TO THE STRUCTURE BELOW. HOLDOWNS FOR FIRST FLOOR WALLS ARE ALSO SHOWN AT THE FOUNDATION PLAN TO INDICATE LOCATIONS OF ANCHOR PLACEMENT.
2. THREADED ROD HOLDOWNS INDICATED IN THIS TABLE ARE TO BE MULTI-STORY THREADED ROD SYSTEMS FULLY SELF TIGHTENING FOR WOOD SHRINKAGE AND SHALL HAVE AN ICC EVALUATION REPORT. THE SYSTEM SHALL BE DESIGNED AND SUPPLIED BY THE HOLDOWN SUPPLIER.
3. THE SYSTEM SHALL BE DESIGNED FOR THE ALLOWABLE LOADS (WIND/EARTHQUAKE) INDICATED ABOVE. **T** REPRESENTS TENSION, **C** REPRESENTS COMPRESSION TOTAL AT LEVEL INDICATED.
4. PROVIDE EDGE NAILING PER SHEARWALL TABLE THROUGH SHEATHING TO EACH COMPRESSION MEMBER PER PLAN.

Threaded Rod Holdown Systems - Concrete Anchorage

MARK	2A	4A	5A	5B					
ROD TYPE	F1554/GRADE 55	F1554/GRADE 55	F1554/GRADE 55	F1554/GRADE 55					
DIAMETER	3/4"	7/8"	1"	3/4"					
EMBEDMENT	10"	10"	8"	10"					
STEEL ▱ SIZE	2"x3/8"	2-3/4"x1/2"	3-1/4"x5/8"	3-1/2"x3/8"					

NOTES:
5. CONCRETE ANCHORAGE REQUIREMENTS ARE FOR THREADED RODS AND ANCHORAGE EMBEDDED INTO CONCRETE. COUPLERS AND RODS ABOVE CONCRETE ARE PER THE THREADED ROD HOLDOWN SUPPLIER.
6. ROD TYPE INDICATES ASTM MINIMUM STEEL REQUIREMENTS: A193B7 INDICATES Fu = 125 ksi, Fy = 105 ksi; A36/A307 INDICATES Fu = 58 ksi, Fy = 36 ksi.
7. STEEL ▱ SIZE INDICATES MINIMUM LENGTH AND THICKNESS OF A36 SQUARE PLATE WASHER, eg. – 3.4"x1" = 3.4" x 3.4" x 1" ▱. MULTIPLE THINNER PLATES NOT EQUAL.
8. CONNECTION AND/OR BEARING OF THREADED ROD SYSTEM AT WOOD BEAMS IS PER THE THREADED ROD SUPPLIER. INDICATE THE SIZE OF ANY PROPOSED BEAM PENETRATIONS ON THE SHOP DRAWINGS.
9. TOTAL VERTICAL DISPLACEMENT OF ROD ELONGATION AND SHRINKAGE DEVICE SHALL NOT EXCEED 0.2IN MAX UNO FOR EACH STORY, OR BETWEEN RESTRAINTS, WHICH EVER IS MORE RESTRICTIVE.

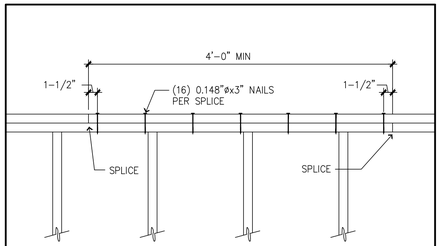
2 **THREADED ROD HOLDOWN TABLE**

CEILING FRAMING SPAN TABLE

SIZE	24" O.C.	16" O.C.	12" O.C.	HANGER
2x4	6'-4"	7'-3"	8'-0"	LUS24
2x6	10'-0"	11'-6"	12'-7"	LUS26
2x8	13'-3"	15'-1"	16'-7"	LUS28

NOTES:
1. SPANS SHOWN IN TABLE ARE MAXIMUM CLEAR SPANS BASED ON 10 PSF DEAD LOAD, 20 PSF LIVE LOAD, L/240 TOTAL LOAD & L/360 LIVE LOAD DEFLECTIONS.
2. HANGER COLUMN SHOWS ALLOWABLE SIMPSON HANGER WHERE REQUIRED.

8



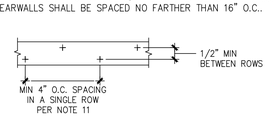
NOTE:
WHERE PLATE DISCONTINUITIES ARE CREATED BY BEAMS & PIPES, ETC. STRAP W/ (1)-SIMPSON CS16 x 28" W/ (13)-8d NAILS EA END AT EACH PLATE NOT ACHIEVING 4'-0" LAP UNLESS NOTED OTHERWISE

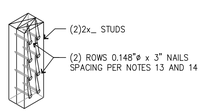
4 **TYPICAL TOP CHORD SPLICE AT FLOOR**

Shearwall Component Table

MARK	COMPONENTS	1/2" A.B. PL TO CONCRETE SPACING (IN)	5/8" A.B. PL TO CONCRETE SPACING (IN)	10d COMMON PL TO PL SPACING (IN)	1/4" SDS x 5" PL TO RIM / BM SPACING (IN)	SIMPSON A35 CLIP ANGLE SPACING (IN)	SIMPSON LTP4 CLIP ANGLE SPACING (IN)
W1	15/23" PWD OR OSB, BLOCKED, W/ 8d NAILS @ 6" O.C. @ PANEL EDGES AND @ 12" O.C. @ FIELD.	44" O.C.	63" O.C.	8.1" O.C.	21" O.C.	29" O.C.	28" O.C.
W2	15/32" PWD OR OSB, BLOCKED, W/ 8d NAILS @ 4" O.C. @ PANEL EDGES AND @ 12" O.C. @ FIELD.	30" O.C.	43" O.C.	5.5" O.C.	14" O.C.	20" O.C.	20" O.C.
W3	15/32" PWD OR OSB, BLOCKED, W/ 8d NAILS @ 3" O.C. @ PANEL EDGES AND @ 12" O.C. @ FIELD. SEE NOTES 2 AND 3.	23" O.C.	33" O.C.	4.3" O.C.	11" O.C.	15" O.C.	15" O.C.
W4	15/32" PWD OR OSB, BLOCKED, W/ 8d NAILS @ 2" O.C. @ PANEL EDGES AND @ 12" O.C. @ FIELD. SEE NOTES 2 AND 3.	18" O.C.	25" O.C.	(2) ROWS 6.8" O.C. EA ROW	8" O.C.	12" O.C.	11" O.C.
W5	15/32" PWD OR OSB, BLOCKED, W/ **10d NAILS** @ 2" O.C. @ PANEL EDGES AND @ 12" O.C. @ FIELD. SEE NOTE 2.	15" O.C.	21" O.C.	(2) ROWS 5.6" O.C. EA ROW	7" O.C.	10" O.C.	9" O.C.

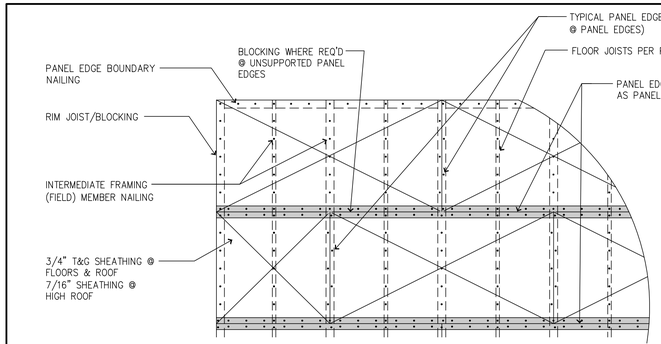
NOTES:
1. ALL NAILING PER ANSI/AF & PA SDPWS – 2018 TABLE 4.3A
2. WHERE INDICATED ABOVE, USE 3x_ STUDS AT ALL ABUTTING PANEL EDGES. NAILS SHALL BE STAGGERED WHERE NAILS ARE SPACED AT 2" O.C..
3. WHERE INDICATED ABOVE, SEE NOTE 2, SEE NOTES 13 & 14 FOR (2)2x_ OPTION.
4. IF CALLOUT REQUIRES BLOCKING, SHEATHING MAY BE PLACED WITH THE LONGITUDINAL DIRECTION VERTICAL. STUDS AND PLATES WILL BE CONSIDERED TO ACT AS BLOCKING.
5. WALL SHEATHING CALLED OUT SHALL EXTEND FOR ENTIRE WALL LENGTH AT THAT ELEVATION AND SHALL BE CONTINUOUS AROUND OPENINGS TYPICALLY.
6. 8d NAILS ARE TO BE .131"ø AND 2-1/2" IN LENGTH. 10d NAILS ARE TO BE .148"ø AND A MINIMUM OF 3" IN LENGTH. 16d NAILS ARE TO BE .162"ø AND 3-1/4" IN LENGTH. NAILS SHALL BE INSTALLED SO AS TO NOT SPLIT THE TIMBER FRAMING.
7. SIMPSON A35 OR LTP4 CLIP ANGLES SHALL BE INSTALLED WITH THE APPROPRIATE FASTENERS PER THE MANUFACTURER'S SPECIFICATIONS.
8. USE 3"x3"x0.229" PLATE WASHERS AT 2x4 WALL AND 3"x4-1/2"x0.229" AT 2x6 WALLS AT ALL ANCHOR BOLTS PER ANSI/AF & PA WPDWS – 2008 SECTION 4.3.6.4.3 . NOTE: FOR W3-W5 PLATE WASHER SHALL EXTEND TO WITH IN 1/2" OF THE EDGE OF BOTTOM PLATE ON SIDES WITH SHEATHING.
9. SPACING SHOWN ABOVE FOR ANCHOR BOLTS, NAILING AND CLIPS IS MAXIMUM AMOUNT ALLOWED.
10. FRAMING AT SHEARWALLS SHALL BE SPACED NO FARTHER THAN 16" O.C..





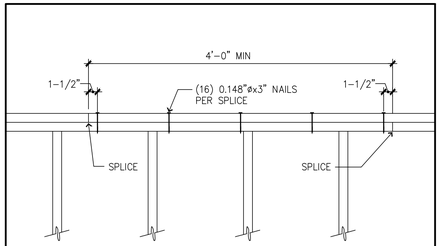
11. MINIMUM NAIL SPACING IN A SINGLE ROW SHALL BE 4 INCHES ON CENTER. USE (2) ROWS IF SPACING LESS THAN THIS. USE 2ND RIM BOARD, RIM JOIST OR BLOCKING WHERE THREE ROWS OF NAILING CALLED OUT.
12. EXTEND SHEATHING UP TO DOUBLE TOP PLATES AND INSTALL NAILS THROUGH SHEATHING INTO UPPER TOP PLATE PER TYPICAL DETAILS. NO PLATE TO PLATE NAILING REQUIRED IN DOUBLE TOP PLATES WITH THIS CONFIGURATION.
13. OPTIONAL TO USE (2) 2x's IN PLACE OF SINGLE 3x IN SHEARWALLS W3, W4, W5 AND W6 W/ STITCH NAILING.
14. (2) ROWS OF 0.148" x 3" STITCH NAILING (2)2x_ STUDS TOGETHER @ 10" O.C. FOR W3 SHW, 8" O.C. FOR W4 SHW, 6" O.C. FOR W5 SHW & 4" O.C. FOR W6 SHW.
15. WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEARWALL AND NAIL SPACING IS LESS THAN 6" O.C. ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS.
16. SHEARWALL CALLOUTS MARKED WITH AN "*" SHALL BE OSB SHEATHING.

1



NOTES:
1) PROVIDE APA APPROVED GLUE, NAIL ALL OSB TO JOISTS AS SHOWN.
2) STAGGER PANELS TO OFFSET JOINTS AS SHOWN.
3) AT BLOCKED DIAPHRAGM, PROVIDE TIMBER BLOCKING 2x4 FLAT (MIN) BELOW SHEATHING @ UNSUPPORTED EDGES W/ EDGE NAILING OR PROVIDE 3" x 27mil (22GA) x CONT STEEL STRAP W/ #8 SCREWS @ 6" O.C. TO EA UNSUPPORTED PANEL EDGE PER DETAIL 5/S1.2.
4) ROOF & FLOOR SHEATHING IS UNBLOCKED U.N.O.

7 REVISED **TYPICAL HORIZONTAL SHEATHING DIAPHRAGM LAYOUT**



NOTE:
WHERE PLATE DISCONTINUITIES ARE CREATED BY BEAMS & PIPES, ETC. STRAP W/ (1)-SIMPSON CS16 x 28" W/ (13)-8d NAILS EA END AT EACH PLATE NOT ACHIEVING 4'-0" LAP UNLESS NOTED OTHERWISE

3 **TYPICAL TOP CHORD SPLICE AT ROOF**

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : △ 4-7-23

PERMIT SUBMITTAL
4-7-23

S1.3

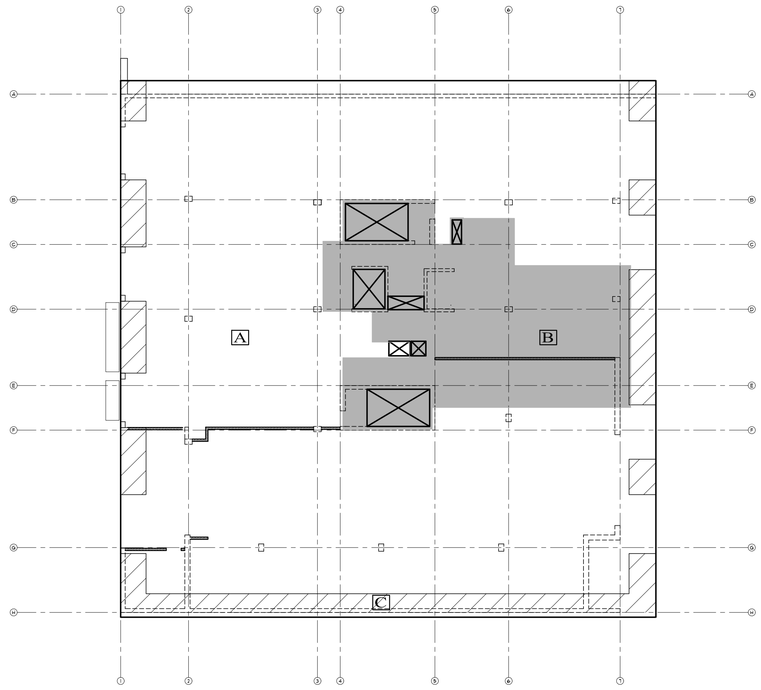
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.3.dwg PLOT DATE/TIME: 4/4/2023 - 3:05pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

P.T. Slab Loading Plan - 1st Level (podium)
(maximum weights of slab supported materials)

REGION	SDL	LL	RELL	DESCRIPTION
A	185	225	125	5 STORY RESIDENTIAL UNITS
B	200	300	150	5 STORY RESIDENTIAL UNITS + ROOF TOP DECK
C	185	325	175	5 STORY DECKS

NOTES:

1. TABLED LOADS ARE SERVICE LEVEL LOADS (UN-FACTORED). VALUES ARE IN PSF (POUNDS PER SQUARE FOOT) U.N.O.
2. SDL = MAXIMUM PERMITTED SUPERIMPOSED DEAD LOAD
3. LL = MAXIMUM PERMITTED LIVE LOAD (UN-REDUCED)
4. RLL = MAXIMUM PERMITTED
5. PSF = POUNDS PER SQUARE FOOT
6. k = KIPS (1 KIP = 1,000 POUNDS)
7. MATERIALS AND ASSEMBLIES SHALL NOT EXCEED THE NOTED LOAD LIMITS
8. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE WEIGHT OF MATERIALS PRIOR TO CONSTRUCTION FOR THE ENGINEER'S REVIEW FOR CONFORMANCE WITH THE DESIGN LOADS. ASSEMBLIES WITH WEIGHTS THAT EXCEED THE TABLED LIMITS WILL REQUIRE ADDITIONAL DESIGN WHICH COULD INFLUENCE SLAB, COLUMN, AND/OR FOUNDATION ELEMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT FINAL WORK IS IN CONFORMANCE WITH THE NOTED WEIGHT LIMITS



Post-Tensioned Slab Loading Plan - 1st Level (podium)
SCALE 1/16"=1'-0"

P.T. Slab Loading Plan - Ground Level
(maximum weights of slab supported materials)

REGION	SDL	LL	RELL	DESCRIPTION
A	5	100	–	INTERIOR RETAIL
B	50	100	–	EXTERIOR RETAIL
C	15	50	–	OFFICE
D	5	40	–	PARKING

NOTES:

1. TABLED LOADS ARE SERVICE LEVEL LOADS (UN-FACTORED). VALUES ARE IN PSF (POUNDS PER SQUARE FOOT) U.N.O.
2. SDL = MAXIMUM PERMITTED SUPERIMPOSED DEAD LOAD
3. LL = MAXIMUM PERMITTED LIVE LOAD (UN-REDUCED)
4. RLL = MAXIMUM PERMITTED
5. PSF = POUNDS PER SQUARE FOOT
6. k = KIPS (1 KIP = 1,000 POUNDS)
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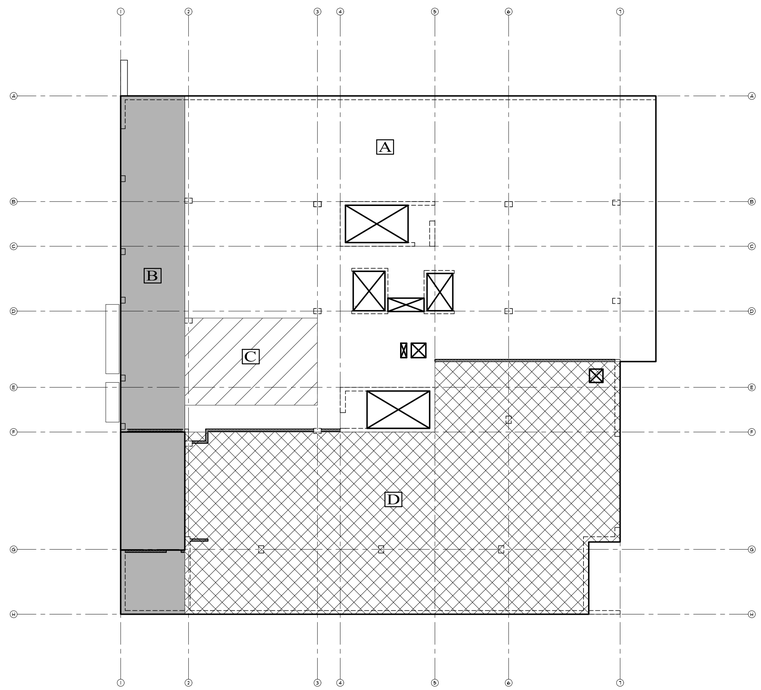
8. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE WEIGHT OF MATERIALS PRIOR TO CONSTRUCTION FOR THE ENGINEER'S REVIEW FOR CONFORMANCE WITH THE DESIGN LOADS. ASSEMBLIES WITH WEIGHTS THAT EXCEED THE TABLED LIMITS WILL REQUIRE ADDITIONAL DESIGN WHICH COULD INFLUENCE SLAB, COLUMN, AND/OR FOUNDATION ELEMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT FINAL WORK IS IN CONFORMANCE WITH THE NOTED WEIGHT LIMITS



Post-Tensioned Slab Loading Plan - Ground Level
SCALE 1/16"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : △ 4-7-23

PERMIT SUBMITTAL
4-7-23

S1.4

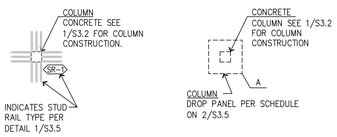
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.4.dwg PLOT DATE/TIME: 4/4/2023 - 3:03pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Post-Tensioned Slab Notes

1. REFER TO S3.10 & S3.11 FOR TYPICAL POST-TENSIONED SLAB DETAILS.
2. TOP REINFORCEMENT SHALL BE LOCATED 1" CLEAR FROM TOP OF SLAB. BOTTOM REINFORCEMENT SHALL BE LOCATED 1" CLEAR FROM BOTTOM OF SLAB U.N.O.
3. LIMITATIONS FOR DRILL IN / POWDER ACTUATED FASTENERS ARE PER DETAIL 12/S3.11
4. TYPICAL P.T. STRAND HIGH POINT SHALL BE LOCATED 1" CLEAR FROM TOP OF SLAB U.N.O. SEE PLAN FOR LOW POINT CGS.
5. SPECIFIC HIGH PROFILES CALLED OUT OVER DROP CAPS ARE MEASURED FROM SLAB SOFFIT AND NOT DROP CAP SOFFIT
6. TRANSITION PROFILES AT SLAB STEPS ARE MEASURED FROM TOP OF SLAB PER DET 3/S3.6.
7. ADDITIONAL CONSTRUCTION JOINTS SHALL BE PER DETAIL 3 & 4/S3.11
8. PLUMBING PENETRATIONS SHALL BE LOCATED 10" MIN. FROM THE FACE OF COLUMN. CONTACT STRUCTURAL ENGINEER IMMEDIATELY WHERE PLUMBING CONFLICTS OCCUR.
9. FIELD BENDING OF REINFORCEMENT IS NOT PERMITTED UNLESS APPROVED BY THE STRUCTURAL ENGINEER.
10. REFER TO STRUCTURAL NOTES ON S1.0 FOR ADDITIONAL POST-TENSIONED CONCRETE REQUIREMENTS.
11. ALL PENETRATIONS OF POST-TENSIONED CONCRETE SLAB AND TENDON PLACEMENT TO BE COORDINATED. PRIOR TO CONCRETE PLACEMENT.
12. SEE DETAIL 13/S3.11 FOR CAST-IN-PLACE CONDUIT LIMITATIONS
13. TOS ELEVATIONS ARE AT TOP OF STRUCTURAL SLABS. SEE ARCHITECTURAL DRAWINGS AND DETAILS ON SHEET S3.7 FOR ADDITIONAL INFORMATION.
14. ⊖ DENOTES LOCATION OF THREADED ROD HOLDOWN SEE 2/S1.3 & MANUFACTURER FOR ADDITIONAL INFO.
15. △ DENOTES THE SHERAWALL TYPE, SEE STRUCTURAL SHEARWALL TABLE ON SHEET S1.3. ▬▬ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THEY LENGTH OF WALL SHOWN SHADED. WALLS SHOWN ON THIS PLAN OCCUR ABOVE P.T. SLAB

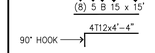
Legend

- FULL HT BRG WALL OR COL BELOW GIVEN SLAB LEVEL
- FULL HT BRG WALL OR COL ABOVE GIVEN SLAB LEVEL
- FULL HT CMU INFILL WALL
- PARTIAL HEIGHT VEHICLE BARRIER WALL
- STRESSING END OF P.T. STRAND
- 4.0 TENDON CGS FROM BOTTOM OF SLAB
- 4.0* TENDON CGS FROM BOTTOM OF LOW SOFFIT
- ANCHOR END OF P.T. STRAND



BAR LEGEND: (NON-SCHEDULED REINF)

QUANTITLY (WHERE SPECIFIED)
BAR SIZE
"T" TOP, "M" MIDDLE, OR "B" BOTTOM
@ SPACING o.c. (6" O.C. IF NOT SPECIFIED)
BAR LENGTH WHEN SPECIFIED



#4 TOP REINF @ 12" O.C. W/ 4'-4" HORIZ LEG LENGTH AND A 90° HOOK. USE STD HOOK LENGTH FOR SLAB BARS WHERE 90° HOOK IS INDICATED – U.N.O.

10T — (10)-1/2"ø UNBONDED POST-TENSIONED CABLES, 7 WIRE STRAND (A416) PER SECTION 3.8 OF THE OF THE GENERAL NOTES ON SHEET S1.0

HP — HIGH-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)

LP — LOW-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)

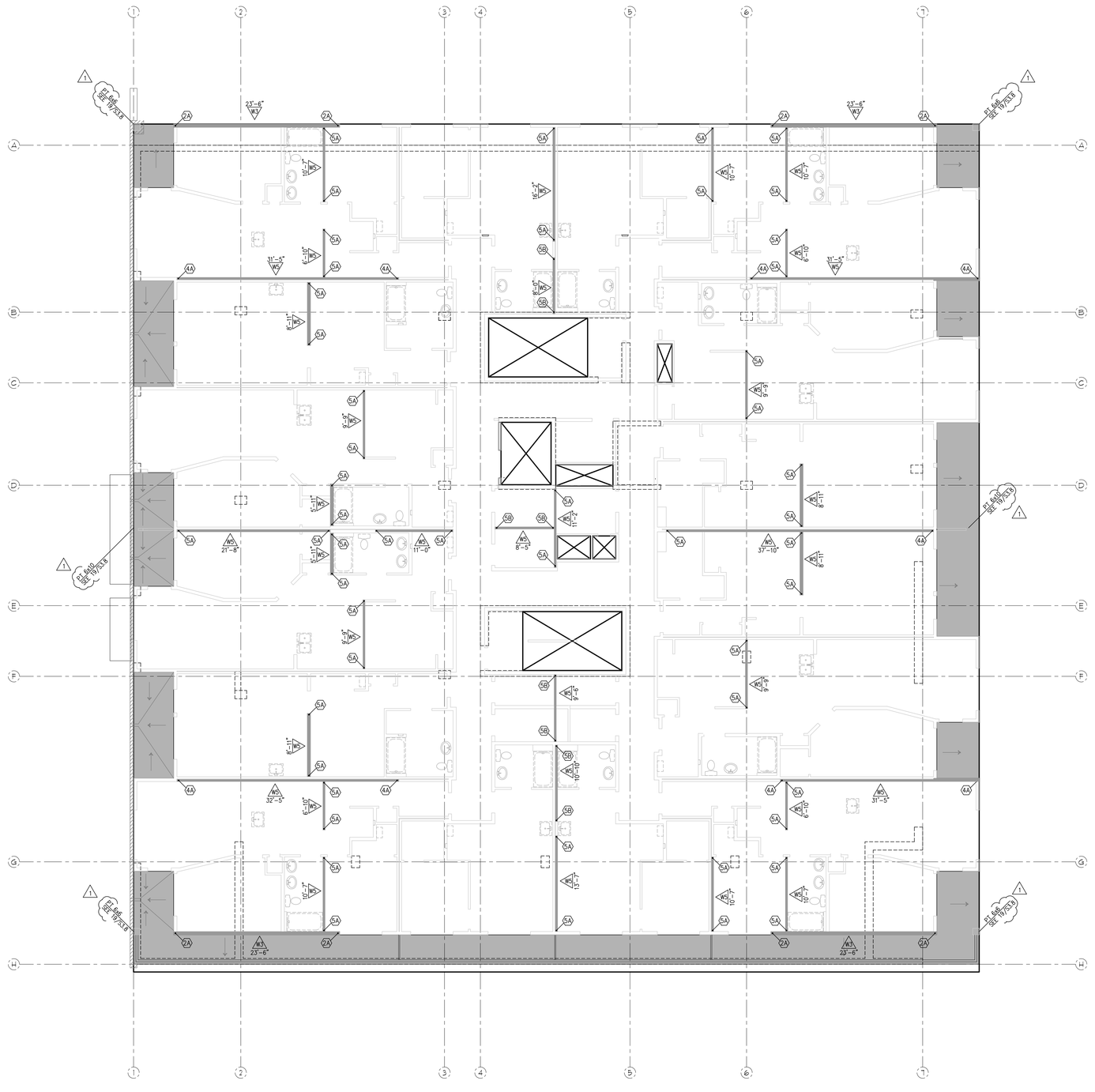
MD — MID-DEPTH

-SP- — STRAIGHT PROFILE

-TP- — TRANSITION PROFILE

267k / 10T — 267 KIPS FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER. (10) TENDONS APPROXIMATED PENDING SUPPLIER'S CALCULATIONS.

32k/FT — 32 KIPS PER FOOT FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER IN THE DISTRIBUTED DIRECTION.



Holdown Location Plan - 1st Floor

SCALE 1/8"=1'-0"

Solutions 4 Structures
A Structural Engineering Corporation

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

△ 4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : △ 4-7-23

PERMIT SUBMITTAL
4-7-23

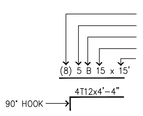
S1.5

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S1.5.dwg PLOT DATE/TIME 4/4/2023 - 3:06pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Foundation Notes

1. TOS ELEVATIONS = TOP OF STRUCTURAL SLAB (NOT INCLUDING TOPPING)
2. TYPICAL DIMENSIONS ARE TO FACE OF WALL OR TO CENTERLINE OF COLUMN OR FOOTING. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH THE ARCHITECT.
3. PROVIDE FOOTING AND SLAB SUBSTRATE PREPARATION PER THE SOILS REPORT.
4. TYPICAL ISOLATED FOOTINGS F-X SHALL BE CONSTRUCTED PER FOOTING SCHEDULE THIS SHEET.
5. CONCRETE COLUMNS C-X SHALL BE CONSTRUCTED PER 1/S3.6
6. CONTINUOUS WALL FOOTING PER PLAN WITH REINFORCING PER SCHEDULE THIS SHEET.
7. TYPICAL WALL REINFORCMENT VARIES SEE 1/S3.4
8. TYPICALLY MATCH FOOTING DOWELS WITH WALL VERTS UNLESS NOTED OTHERWISE.
9. FLOOR SLABS – 4" CONC. SLAB ON GRADE W/ #4 @ 18" O/C EA. WAY @ CENTER-LINE OVER SUBSTRATE PER SOILS ENGINEER. PROVIDE CONTROL JOINTS PER DETAIL 5/S3.0 AT THE DIRECTION OF THE ARCHITECT.
10. PROVIDE 36"x36" CORNER BARS AT ALL WALL/FOOTING INTERSECTIONS AND CORNERS TO MATCH ALL HORIZONTAL REINFORCEMENT.
11. DO NOT FULLY BACKFILL PERIMETER CONC WALLS UNTIL PT SLAB ABOVE HAS BEEN POURED AND STRESSED PER 3&4/S3.4
12. EXTEND WALL FTG 6" BEYOND END OF WALL U.N.O.
13. VERIFY ALL ELEVATOR DIMENSIONS AND CLEARANCES REQUIRED WITH MFR PRIOR TO CONSTRUCTION
14. STAIRS ON GRADE SHALL BE CONSTRUCTED PER DETAIL 8/S3.0
15. SEE THE GENERAL STRUCTURAL NOTES ON SHEET S1.0 FOR ADDITIONAL INFORMATION.
16. SEE ARCHITECTURAL PLANS FOR ROUGH OPENING HEIGHTS. COORDINATE SLOPED SLAB ON GRADE WITH ARCH AT DOOR THRESHOLDS.

BAR LEGEND: (NON-SCHEDULED REINF)



QUANTITLY (WHERE SPECIFIED)
BAR SIZE
"T" TOP, "M" MIDDLE, OR "B" BOTTOM
@ SPACING o.c. (6" O.C. IF NOT SPECIFIED)
BAR LENGTH WHEN SPECIFIED

#4 TOP REINF @ 12" O.C. W/ 4'-4" HORIZ LEG LENGTH AND A 90° HOOK. USE STD HOOK LENGTH FOR SLAB BARS WHERE 90° HOOK IS INDICATED – U.N.O.

Continuous Wall Footings

"W"	"D"	REINFORCMENT	
		LONGITUDINAL	TRANSVERSE
1'-6"	12"	(2)-#4 BOT	–
2'-8"	12"	(3)-#5 BOT	#4 @ 16" O.C. BOT
3'-0"	14"	(3)-#5 BOT	INTEGRATED W\WALL DOWELS
3'-6"	14"	(4)-#5 BOT	INTEGRATED W\WALL DOWELS

NOTES:

1. FOOTING SHALL BEAR ON UNDISTURBED OR COMPACTED MATERIAL.
2. WALL FOOTING DESIGN BEARING CAPACITY = 5,000 ALLOWABLE SOIL BEARING PRESSURE.
3. CENTER FOOTINGS UNDER COLUMNS OR WALLLS U.N.O.
4. SEE PLAN FOR LOCATIONS OF ADD'L REINF
5. LONGITUDINAL REINF RUNS CONTINUOUS THROUGH SPREAD FTGS WHERE OCCURS
6. SEE PLAN FOR LOCATIONS WITH ADDITIONAL REINFORCEMENT

Spread Footings

MARK	FOOTING DIMENSIONS "W"	FOOTING DIMENSIONS "D"	REINFORCEMENT	ALLOWABLE AXIAL LOAD (KIPS)
F9.0	9'-0" x 9'-0"	22"	(10)-#7 x 8'-6" BOT EA WAY	400
F10.0	10'-0" x 10'-0"	24"	(12)-#7 x 9'-6" BOT EA WAY	500
F11.0	11'-0" x 11'-0"	26"	(12)-#8 x 10'-6" BOT EA WAY	600

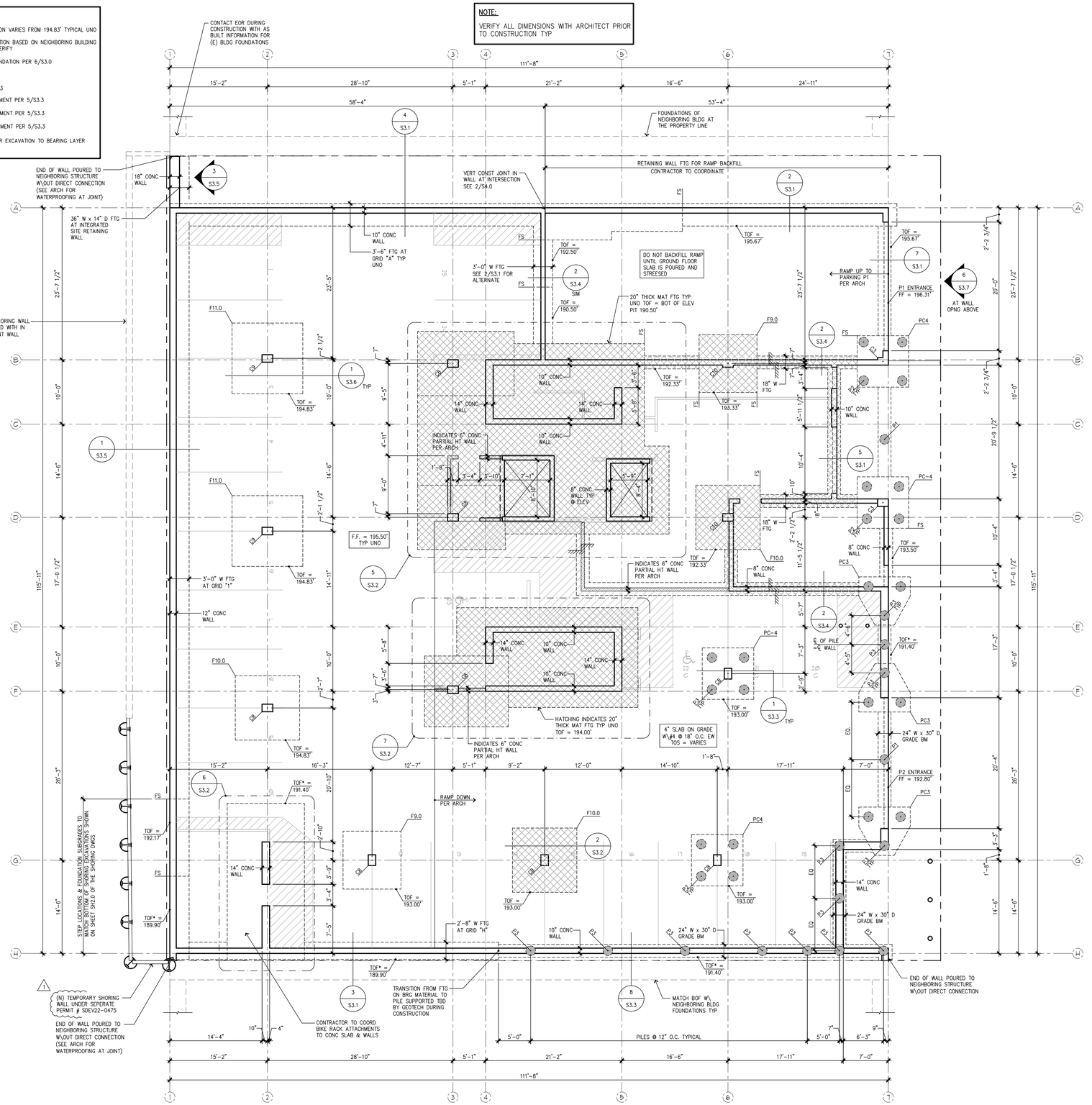
NOTES:

1. SPREAD FOOTINGS FOUNDED ON UNDISTURBED OR COMPACTED MATERIAL WITH A DESIGN BEARING CAPACITY = 5,000 PSF
2. SOILS ENGINEER SHALL DETERMINE THE APPLICABLE ALLOWABLE SOIL BEARING PRESSURE FOR EACH FOOTING BASED ON FIELD OBSERVATION(S) WHICH SHALL BE COORDINATED BY THE CONTRACTOR
3. SEE DETAIL 1/S3.1 FOR TYPICAL SPREAD FOOTING SECTION

LEGEND:

TOF = TOP OF FOUNDATION ELEVATION VARIES FROM 194.83' TYPICAL UNO
TOF* = INDICATES ESTIMATED ELEVATION BASED ON NEIGHBORING BUILDING FOOTING. CONTRACTOR TO VERIFY
FS = INDICATES STEP IN THE FOUNDATION PER 6/S3.0
C1 = COLUMN TYPE PER 3/S3.6
PC4 = PILE CAP PER DET 2&3/S3.3
P1 = PILE WITH 10'-0" OF EMBEDMENT PER 5/S3.3
P2 = PILE WITH 15'-0" OF EMBEDMENT PER 5/S3.3
P3 = PILE WITH 20'-0" OF EMBEDMENT PER 5/S3.3
INDICATES ANTICIPATED OVER EXCAVATION TO BEARING LAYER PER 2/S3.2

NOTE:
VERIFY ALL DIMENSIONS WITH ARCHITECT PRIOR TO CONSTRUCTION TYP



Foundation Plan - Garage Level P2

SCALE 1/8"=1'-0"

NORTH

PLS
STATE OF WASHINGTON
THOMAS L. CHASE
22752
REGISTERED
PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.0

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

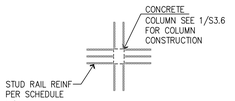
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.0.dwg PLOT DATE/TIME: 4/5/2023 – 7:11am THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Post-Tensioned Slab Notes

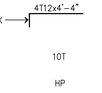
1. REFER TO S3.10 & S3.11 FOR TYPICAL POST-TENSIONED SLAB DETAILS.
2. TOP REINFORCEMENT SHALL BE LOCATED 1" CLEAR FROM TOP OF SLAB. BOTTOM REINFORCEMENT SHALL BE LOCATED 1" CLEAR FROM BOTTOM OF SLAB U.N.O.
3. LIMITATIONS FOR DRILL IN / POWDER ACTUATED FASTENERS ARE PER DETAIL 12/S3.10
4. TYPICAL P.T. STRAND HIGH POINT SHALL BE LOCATED 1" CLEAR FROM TOP OF SLAB U.N.O. SEE PLAN FOR LOW POINT CGS.
5. ADDITIONAL CONSTRUCTION JOINTS SHALL BE PER DETAIL 3 & 4/S3.11
6. PLUMBING PENETRATIONS SHALL BE LOCATED 8" MIN. FROM THE FACE OF COLUMN. CONTACT STRUCTURAL ENGINEER IMMEDIATELY WHERE PLUMBING CONFLICTS OCCUR.
7. FIELD BENDING OF REINFORCEMENT IS NOT PERMITTED UNLESS APPROVED BY THE STRUCTURAL ENGINEER.
8. REFER TO STRUCTURAL NOTES ON S1.0 FOR ADDITIONAL POST-TENSIONED CONCRETE REQUIREMENTS.
9. ALL PENETRATIONS OF POST-TENSIONED CONCRETE SLAB AND TENDON PLACEMENT TO BE COORDINATED, PRIOR TO CONCRETE PLACEMENT.
10. SEE DETAIL 13/S3.11 FOR CAST-IN-PLACE CONDUIT LIMITATIONS
11. TOPPING SLAB BUILD UP: 4" CONC SLAB OVER 4-1/2" HIGH DENSITY FOAM W\#4 @ 18" O.C. EA WAY OR 1.5 LBS/YARD OF FIBERMESH AT CONTRACTORS OPTION CONTACT EOR FOR ADD'L REINF IF VOIDS IN FOAM FILL GREATER THAN 2"-0" ARE REQUIRED FOR UTILITIES ETC.
12. TOS ELEVATIONS ARE AT TOP OF STRUCTURAL SLABS. SEE ARCHITECTURAL DRAWINGS AND DETAILS ON SHEET S3.8 FOR ADDITIONAL INFORMATION.

Legend

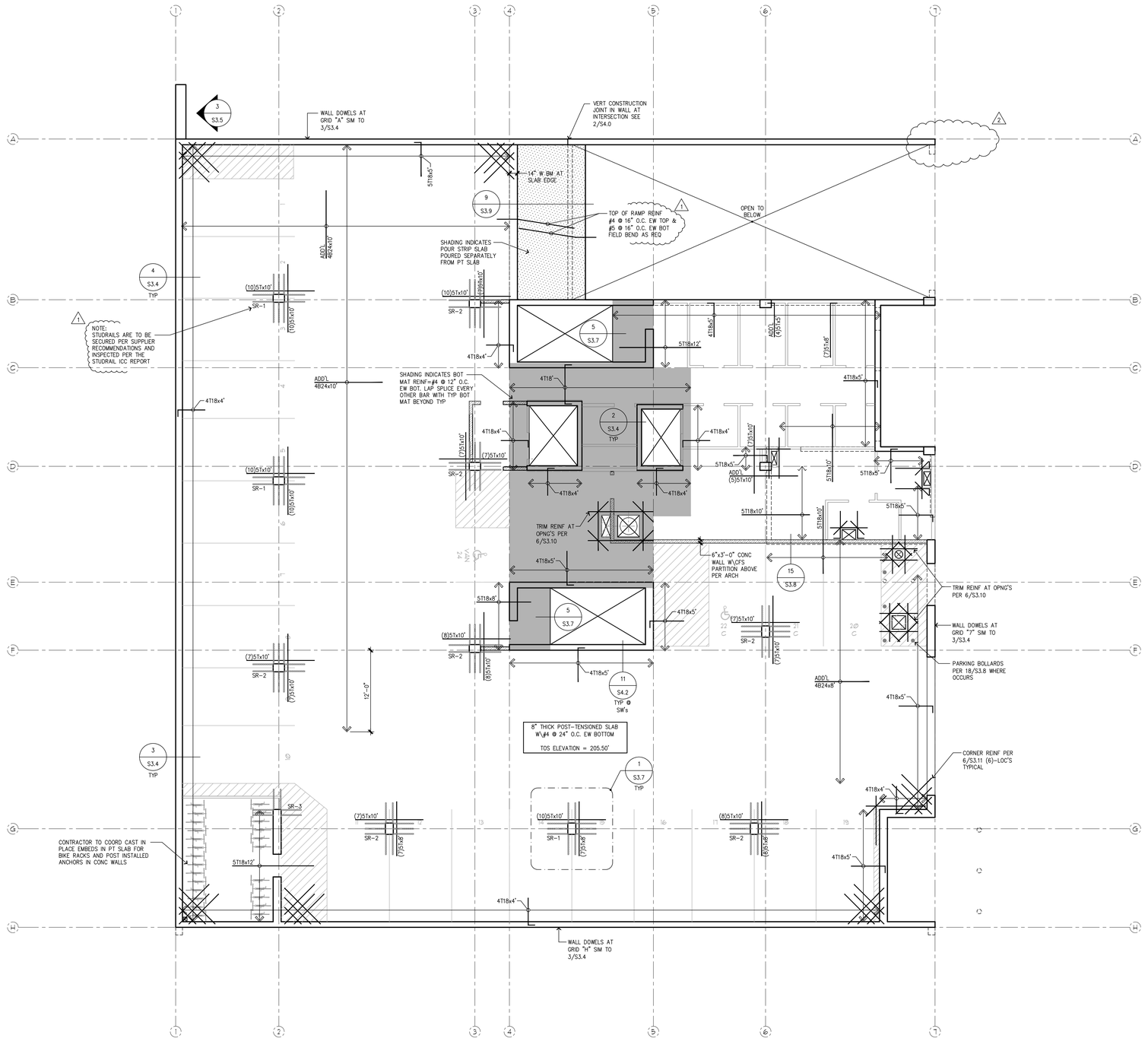
- FULL HT BRG WALL OR COL BELOW GIVEN SLAB LEVEL
- FULL HT BRG WALL OR COL ABOVE GIVEN SLAB LEVEL
- PARTIAL HEIGHT CONCRETE VEHICLE BARRIER WALL
- STRESSING END OF P.T. STRAND
- 4.0 TENDON CGS FROM BOTTOM OF SLAB
- 4.0* TENDON CGS FROM BOTTOM OF LOW SOFFIT
- ANCHOR END OF P.T. STRAND



BAR LEGEND: (NON-SCHEDULED REINF)



- (8) 5 B 15 x 15' — QUANTITY (WHERE SPECIFIED) / BAR SIZE / "T" TOP, "M" MIDDLE, OR "B" BOTTOM / @ SPACING o.c. (6" O.C. IF NOT SPECIFIED) / BAR LENGTH WHEN SPECIFIED
- 4T12x4'-4" 90° HOOK — #4 TOP REINF @ 12" O.C. W/ 4'-4" HORIZ LEG LENGTH AND A 90° HOOK. USE STD HOOK LENGTH FOR SLAB BARS WHERE 90° HOOK IS INDICATED - U.N.O.
- 10T — (10)-1/2"ø UNBONDED POST-TENSIONED CABLES, 7 WIRE STRAND (A416) PER SECTION 3.8 OF THE OF THE GENERAL NOTES ON SHEET S1.0
- HP — HIGH-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)
- LP — LOW-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)
- MD — MID-DEPTH
- -SP- — STRAIGHT PROFILE
- -TP- — TRANSITION PROFILE
- 267k / 10T — 267 KIPS FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER. (10) TENDONS APPROXIMATED PENDING SUPPLIER'S CALCULATIONS.
- 32k/FT — 32 KIPS PER FOOT FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER IN THE DISTRIBUTED DIRECTION.



Post-Tensioned Slab (mild) Plan - Garage Level P1

SCALE 1/8"=1'-0"

NORTH

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:

- 1 4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS
- 2 8-15-23 CODE REVISIONS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
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Ph 253.314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 2 8-15-23

PERMIT SUBMITTAL
4-7-23

S2.1

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.1.dwg PLOT DATE/TIME: 8/23/2023 - 7:36am THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Post-Tensioned Slab Notes

1. REFER TO S3.10 & S3.11 FOR TYPICAL POST-TENSIONED SLAB DETAILS.
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12. TOS ELEVATIONS ARE AT TOP OF STRUCTURAL SLABS. SEE ARCHITECTURAL DRAWINGS AND DETAILS ON SHEET S3.8 FOR ADDITIONAL INFORMATION.

Legend

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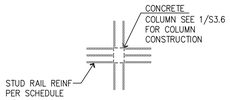
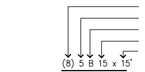
- FULL HT BRG WALL OR COL ABOVE GIVEN SLAB LEVEL
- PARTIAL HEIGHT CONCRETE VEHICLE BARRIER WALL
- STRESSING END OF P.T. STRAND
- 4.0 — TENDON CGS FROM BOTTOM OF SLAB
- 4.0* — TENDON CGS FROM BOTTOM OF LOW SOFFIT
- ANCHOR END OF P.T. STRAND

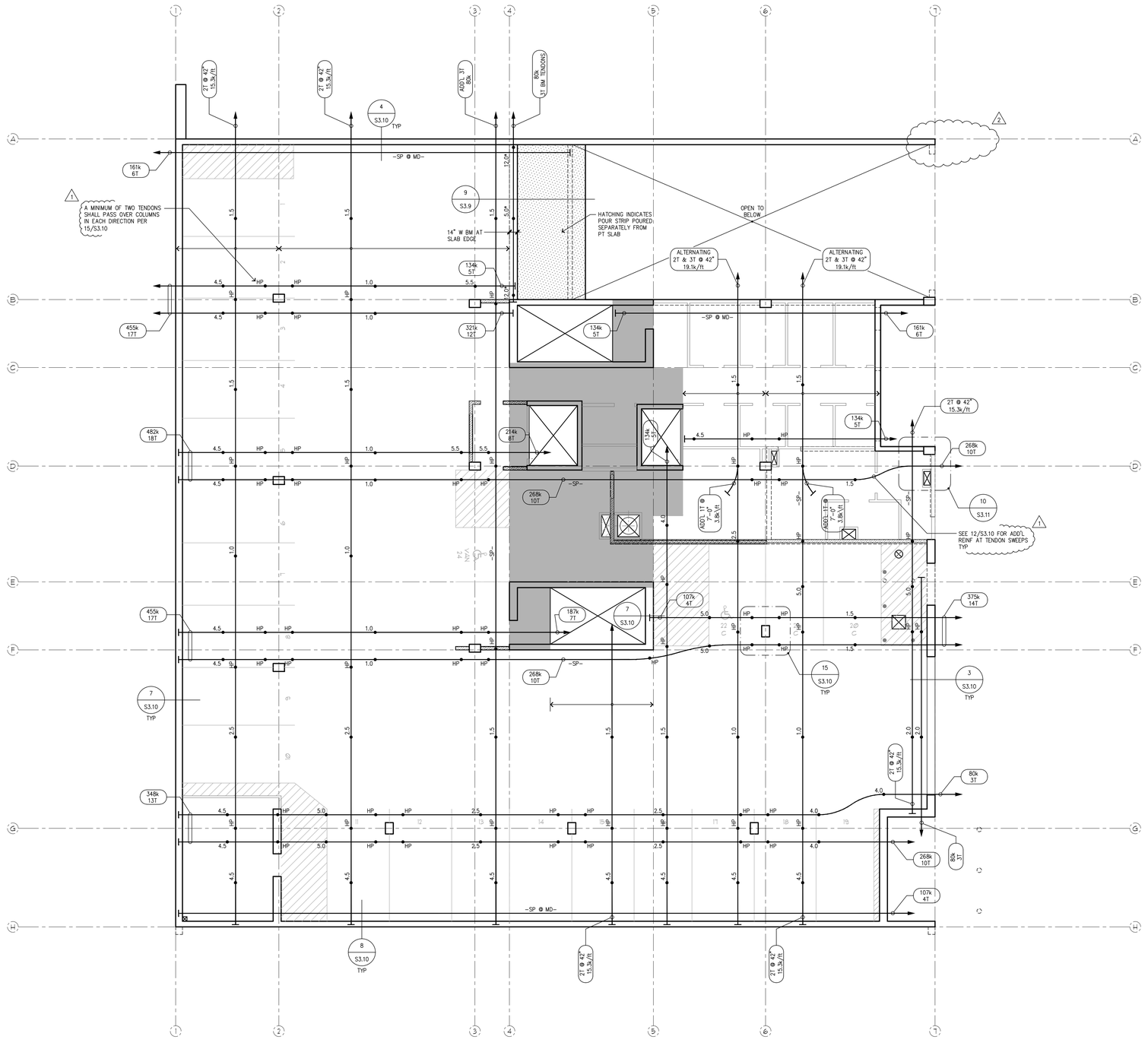


BAR LEGEND: (NON-SCHEDULED REINF)



QUANTITY (WHERE SPECIFIED)
BAR SIZE
"T" TOP, "M" MIDDLE, OR "B" BOTTOM
@ SPACING o.c. (6" O.C. IF NOT SPECIFIED)
BAR LENGTH WHEN SPECIFIED

90° HOOK — 4T12x4'-4"	#4 TOP REINF @ 12" O.C. W/ 4'-4" HORIZ LEG LENGTH AND A 90° HOOK. USE STD HOOK LENGTH FOR SLAB BARS WHERE 90° HOOK IS INDICATED – U.N.O.
10T	(10)-1/2"ø UNBONDED POST-TENSIONED CABLES, 7 WIRE STRAND (A416) PER SECTION 3.8 OF THE OF THE GENERAL NOTES ON SHEET S1.0
HP	HIGH-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)
LP	LOW-POINT OF TENDON PROFILE (SEE 1 & 2/S3.11)
MD	MID-DEPTH
-SP-	STRAIGHT PROFILE
-TP-	TRANSITION PROFILE
267k / 10T	267 KIPS FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER. (10) TENDONS APPROXIMATED PENDING SUPPLIER'S CALCULATIONS.
32k/FT	32 KIPS PER FOOT FINAL EFFECTIVE TENDON FORCE TO BE PROVIDED BY TENDON SUPPLIER IN THE DISTRIBUTED DIRECTION.



Post-Tensioned Slab (tendon) Plan - Garage Level P1

SCALE 1/8"=1'-0"

NORTH

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.1a.dwg PLOT DATE/TIME: 8/23/2023 - 7:37am THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

1 4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS
2 8-15-23 CODE REVISIONS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 2 8-15-23

PERMIT SUBMITTAL
4-7-23

S2.1a

Post-Tensioned Slab Notes

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5. ADDITIONAL CONSTRUCTION JOINTS SHALL BE PER DETAIL 3 & 4/S3.11
6. PLUMBING PENETRATIONS SHALL BE LOCATED 8" MIN. FROM THE FACE OF COLUMN. CONTACT STRUCTURAL ENGINEER IMMEDIATELY WHERE PLUMBING CONFLICTS OCCUR.
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12. TOS ELEVATIONS ARE AT TOP OF STRUCTURAL SLABS. SEE ARCHITECTURAL DRAWINGS AND DETAILS ON SHEET S3.8 FOR ADDITIONAL INFORMATION.

Legend

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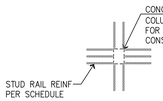

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"T" TOP, "M" MIDDLE, OR "B" BOTTOM
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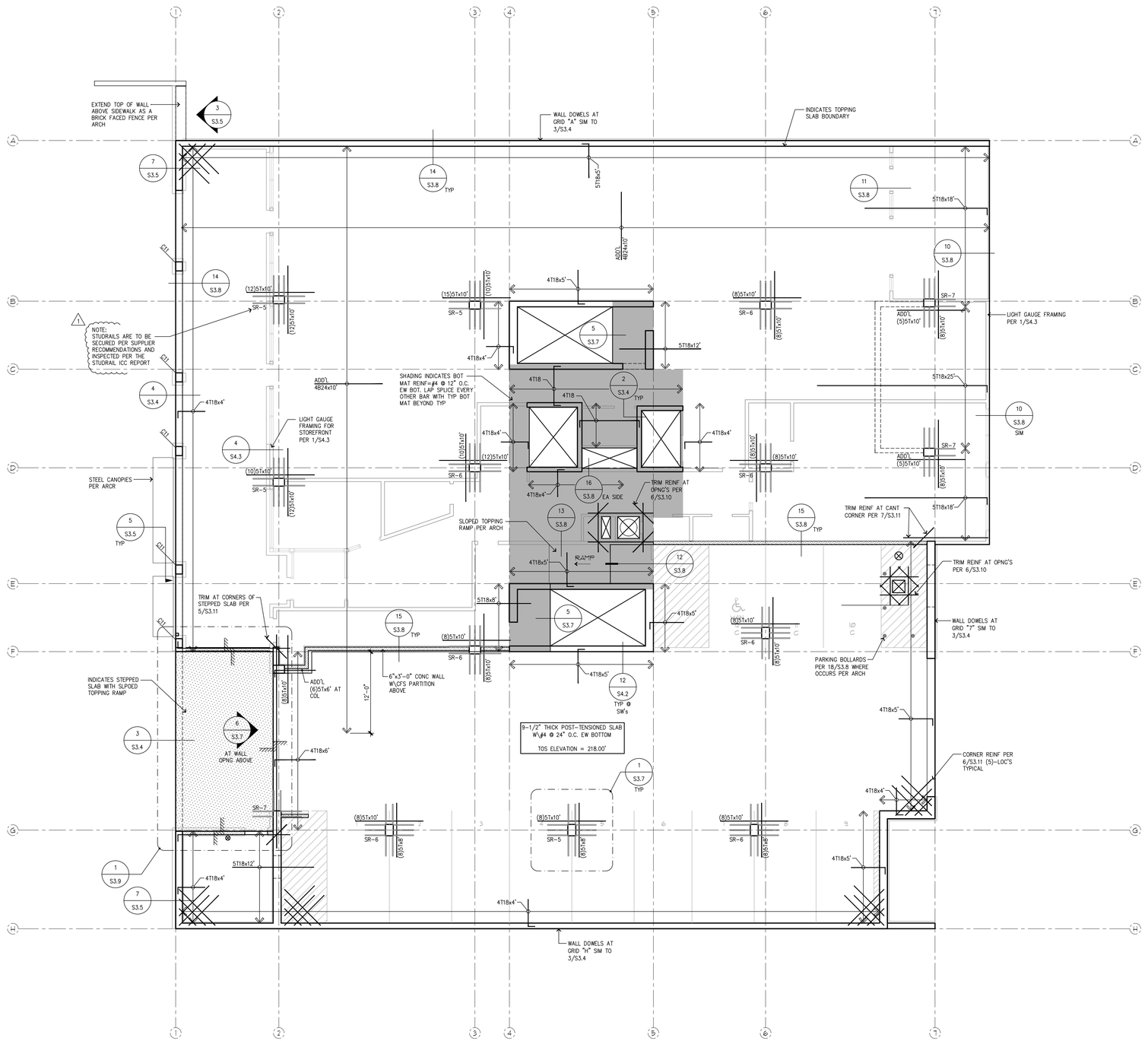

Post-Tensioned Slab (mild) Plan - Garage Ground Level

SCALE 1/8"=1'-0"

NORTH

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

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PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.2

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.2.dwg PLOT DATE/TIME: 4/4/2023 - 3:51pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

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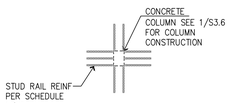

BAR LEGEND: (NON-SCHEDULED REINF)

QUANTITLY (WHERE SPECIFIED)
BAR SIZE
"T" TOP, "M" MIDDLE, OR "B" BOTTOM
@ SPACING o.c. (6" O.C. IF NOT SPECIFIED)
BAR LENGTH WHEN SPECIFIED

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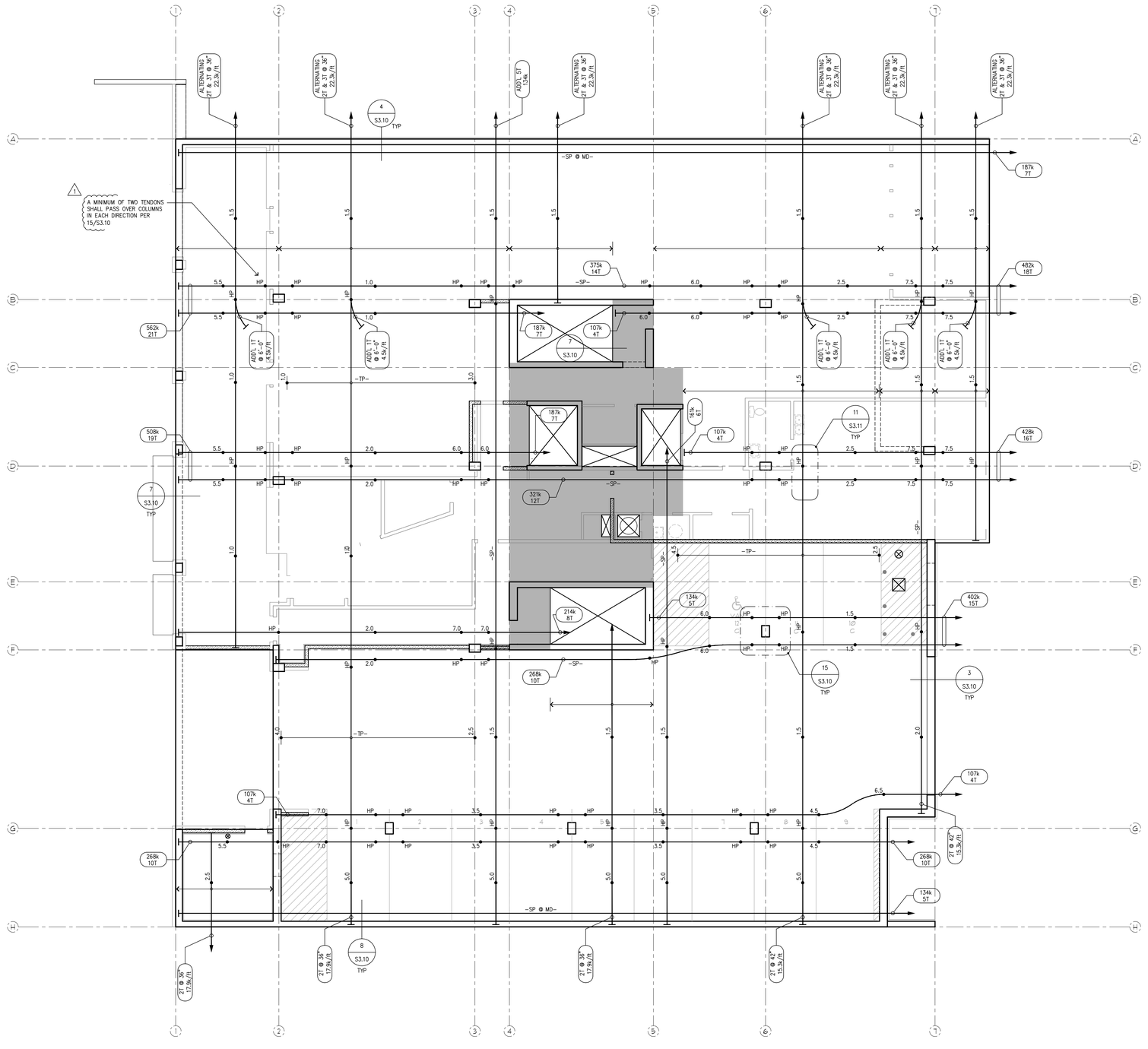

Post-Tensioned Slab (tendon) Plan - Garage Ground Level

SCALE 1/8"=1'-0"

NORTH

Solutions 4 Inc. Structures *A Structural Engineering Corporation*

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.2a.dwg PLOT DATE/TIME: 4/4/2023 - 3:52pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

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PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.2a

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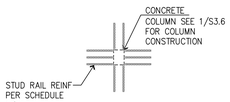

BAR LEGEND: (NON-SCHEDULED REINF)

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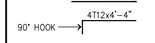

#4 TOP REINF @ 12" O.C. W/ 4'-4" HORIZ LEG LENGTH AND A 90° HOOK. USE STD HOOK LENGTH FOR SLAB BARS WHERE 90° HOOK IS INDICATED - U.N.O.

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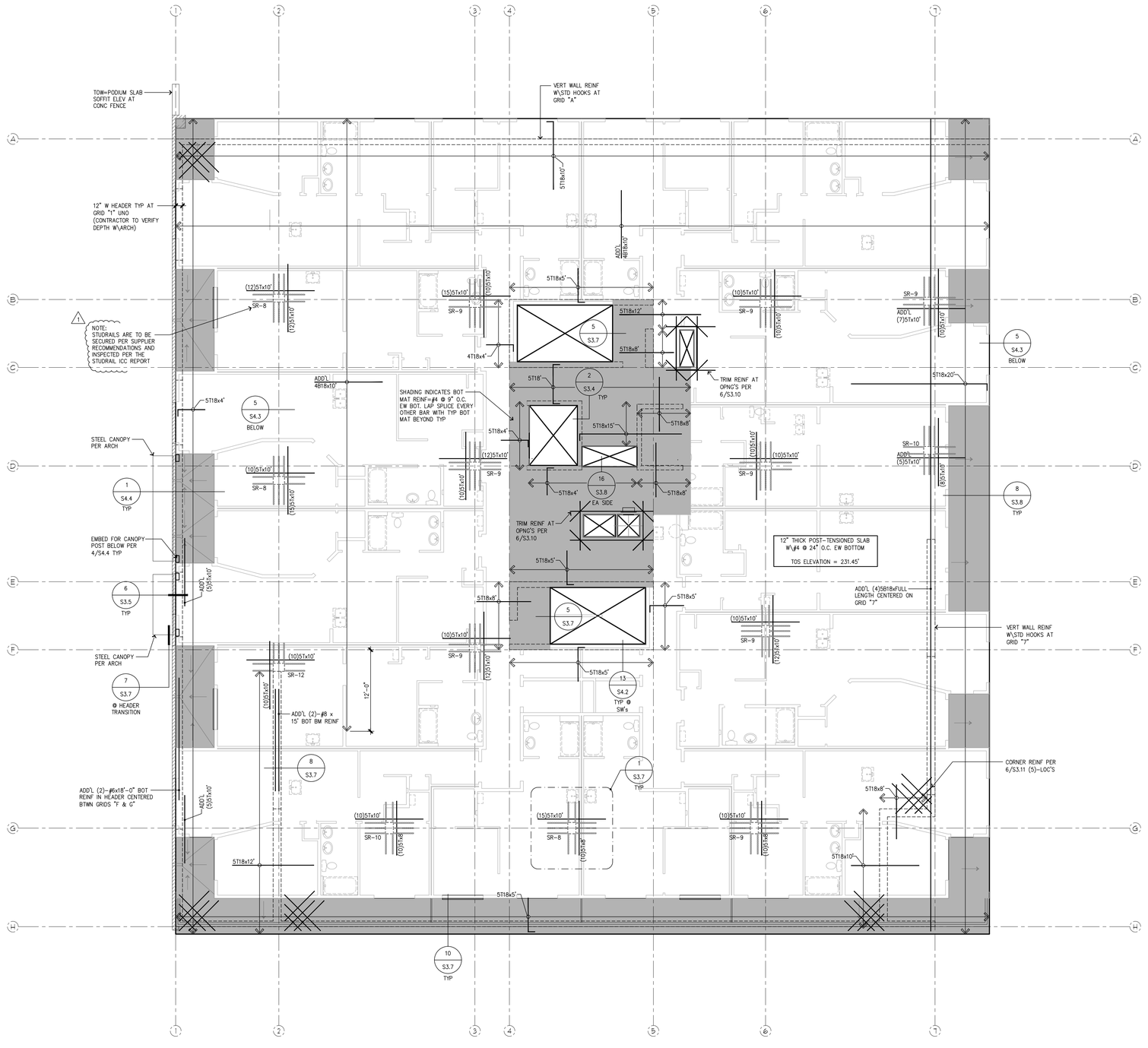

Post-Tensioned Slab (mild) Plan - 1st Level

SCALE 1/8"=1'-0"

NORTH

4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

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PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
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PERMIT SUBMITTAL
4-7-23

S2.3

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.3.dwg PLOT DATE/TIME: 4/4/2023 - 3:53pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

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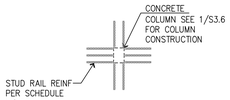

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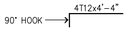

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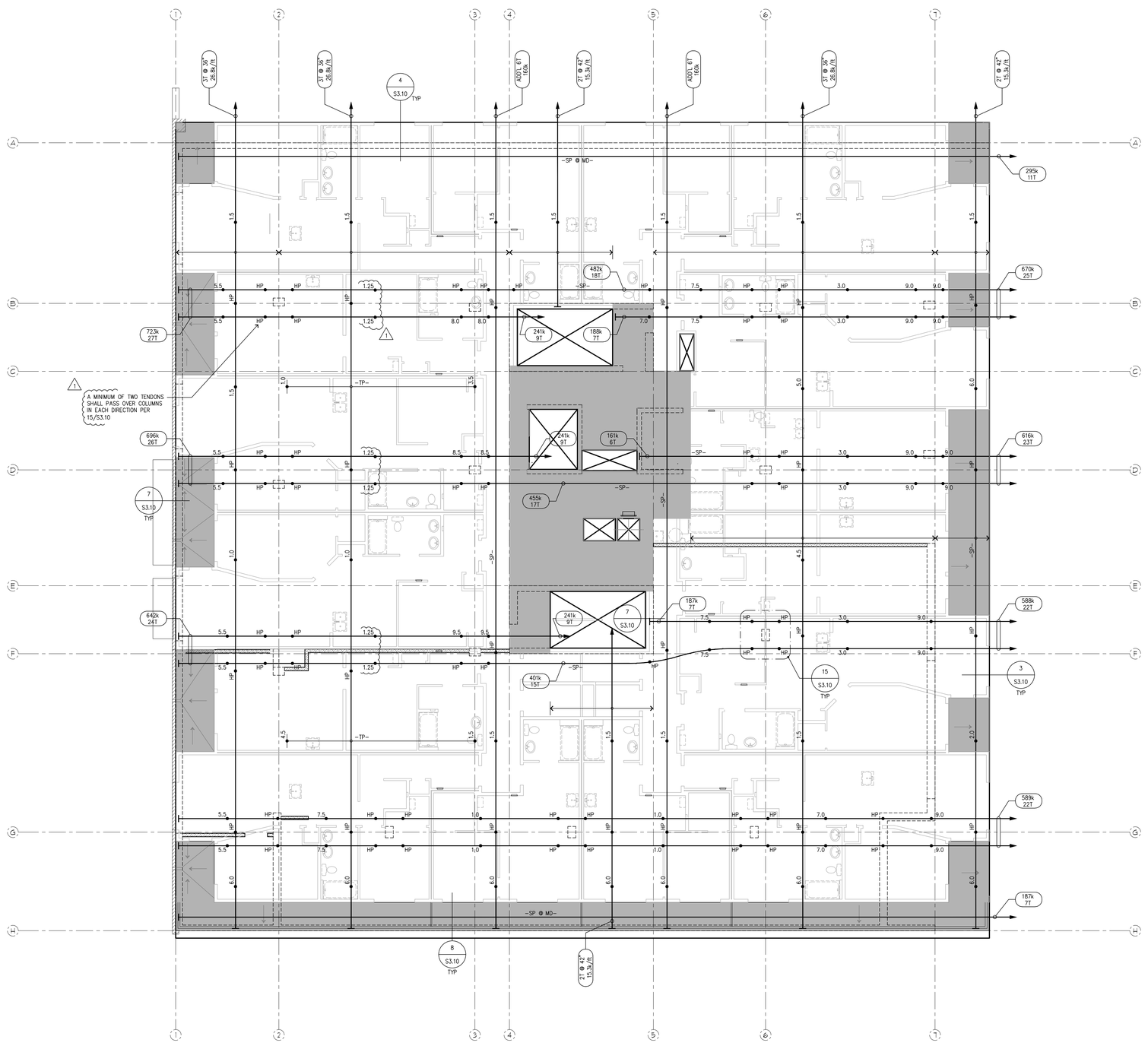

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Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.3a

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.3a.dwg PLOT DATE/TIME: 4/4/2023 - 3:55pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Floor and Roof Framing Notes

1. ROOF AND FLOOR JOIST LOCATIONS ARE SCHEMATICALLY SHOWN ON THE PLANS. IT IS NOT THE INTENT OF THE STRUCTURAL PLANS TO GRAPHICALLY LOCATE ALL FRAMING MEMBERS. THE ARCHITECT SHALL VERIFY THE COMPATIBILITY OF JOIST LAYOUT AND FRAMING W/ MECHANICAL, ELECTRICAL & PLUMBING AND ARCHITECTURAL PLANS. THE CONTRACTOR IS RESPONSIBLE FOR SPACING FRAMING MEMBERS AS NOTED ON THE PLANS AND GENERATING MEMBER LAYOUT FOR SHOP DRAWINGS AND QUANTITY TAKEOFFS.

2. THE TRUSS AND JOIST MANUFACTURER SHALL VERIFY BEARING COMPATIBILITY (CRUSHING) WITH THE PLATE MATERIAL. TYPICALLY, COMPOSITE BEAMS SHALL BE FULLY BEARING ON 2x6 WALLS. I.E. BREAK RIM OR BLOCKING TO ALLOW FULL BEARING OVER WIDTH OF PLATES.

3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

4. W DENOTES THE SHEARWALL TYPE, SEE THE SHEARWALL TABLE ON SHEET S1.3 ▬▬ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THE LENGTH OF WALL SHOWN SHADED. PROVIDE SOLID BLOCKING IN FLOOR SPACE BELOW PERPENDICULAR SHEARWALLS.

5. THE DOUBLE TOP PLATE IS TO BE CONTINUOUS ALONG ALL EXTERIOR WALLS AND AT ALL WALL LINES CONTAINING SHEARWALLS. TYPICAL WALL TOP PLATE SPLICES SHALL BE PER DETAIL 3/S1.3 TYP @ EXTERIOR WALLS AT ROOF & PER 4/S1.3 @ EXTERIOR WALLS AT FLOORS TYP

6. WHERE COMPOSITE JOISTS AND BEAMS ARE USED AS DRAG STRUTS THE MANUFACTURER SHALL PROVIDE THE FRAMING MEMBERS WITH THE CAPACITY CALLED OUT ON THE PLANS.

7. TYPICAL FLOOR JOISTS SHALL BE 11-7/8" TJI/110 @ 16" O.C. [J1] TYP UNO W/ 1-1/4" GYPCRETE TOPPING. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. [J-] INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

8. TYPICAL ROOF JOIST SHALL P.E. TRUSSES @ 24" O.C. TYPICAL UNO. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. [J-] INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

9. ALL NON BEARING BEAMS SHALL BE A MIN OF 1-1/2"x11-7/8" LSL 1.55E RIM U.N.O. ALL OTHER BEAMS ARE AS MARKED ON PLANS. FOR TYP FRAMING @ HEADER SEE 1/S5.4 & 2/S5.4 U.N.O. B- INDICATES BEAM CALLOUT SEE BEAM SCHEDULE THIS SHEET.

10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

    2-2x6 DF#1 / 1-2x6 DF#1

    INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. [SC] INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

14. SEE CIVIL AND ARCHITECTURAL PLANS FOR TOP OF WALL HEIGHTS. SEE ARCHITECTURAL PLANS FOR DIMENSIONS. WHERE DIMENSIONS ARE SHOWN ON THE STRUCTURAL PLANS, CONTRACTOR SHALL VERIFY COMPATIBILITY W/ ARCHITECTURAL PLANS. WHERE DISCREPANCY EXISTS, CONTRACTOR SHALL NOTIFY BOTH THE ENGINEER AND ARCHITECT FOR CLARIFICATION.

15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0–S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:

    INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS

    INDICATES HANGER PER MANUFACTURER

    GT INDICATES GIRDER TRUSS PER PLAN

    INDICATES JOIST / TRUSS BEARING @ WALL / BEAM

    INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM

    INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. H INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

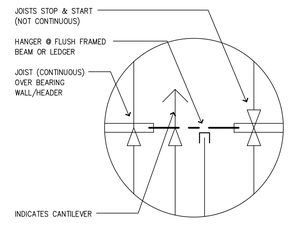
23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O. USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O. @ DECKS. P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1 P.T. HEM–FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3–1/2x11–7/8 LSL
B5	5–1/4x11–7/8 PSL OR LVL
B6	3–1/8x7–1/2 GLB
B7	5–1/8x7–1/2 GLB
B8	3–1/8x9 GLB
B9	5–1/8x9 GLB
B10	5–1/8x10–1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5–1/2x10–1/2 GLB
B14	1–1/4x11–7/8 LSL 1.3E

Joist Schedule

MARK	JOIST TYPE & SPACING
J1	11–7/8 TJI/110 @ 16" O.C.
J2	11–7/8 TJI/110 @ 12" O.C.
J3	(2) 11–7/8 TJI/110 @ 16" O.C.
J4	(2) 2x6 DF#2 @ 16" O.C.
J5	PT 2x10 @ 16" O.C. (SLOPED SEE ARCH)
J6	PT 2x10 @ 12" O.C. (SLOPED SEE ARCH)

2nd Floor Framing / 1st Floor Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 DF#2 GRADE @ 16" O.C.	DF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 DF#2 GRADE @ 16" O.C. (2)2x4 DF#2 GRADE @ 16" O.C.	DF STANDARD OR BETTER
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 DF#2 GRADE @ 16" O.C. 2x4 DF#2 GRADE @ 12" O.C.	DF STANDARD OR BETTER
PARTY WALL BEARING (EACH SIDE)	2x6 DF#2 GRADE @ 16" O.C. 2x4 DF #2 GRADE @ 12" O.C.	DF STANDARD OR BETTER
PARTY WALLS NON BEARING (EACH SIDE)	2x6 DF#2 GRADE @ 16" O.C. 2x4 DF#2 GRADE @ 12" O.C.	DF STANDARD OR BETTER
INTERIOR NON BEARING NON SHEARWALLS	2x6 DF#2 GRADE @ 16" O.C. 2x4 DF#2 GRADE @ 16" O.C.	DF STANDARD OR BETTER

NOTES:
1. THE BEARING WALLS (SHOWN —H—) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

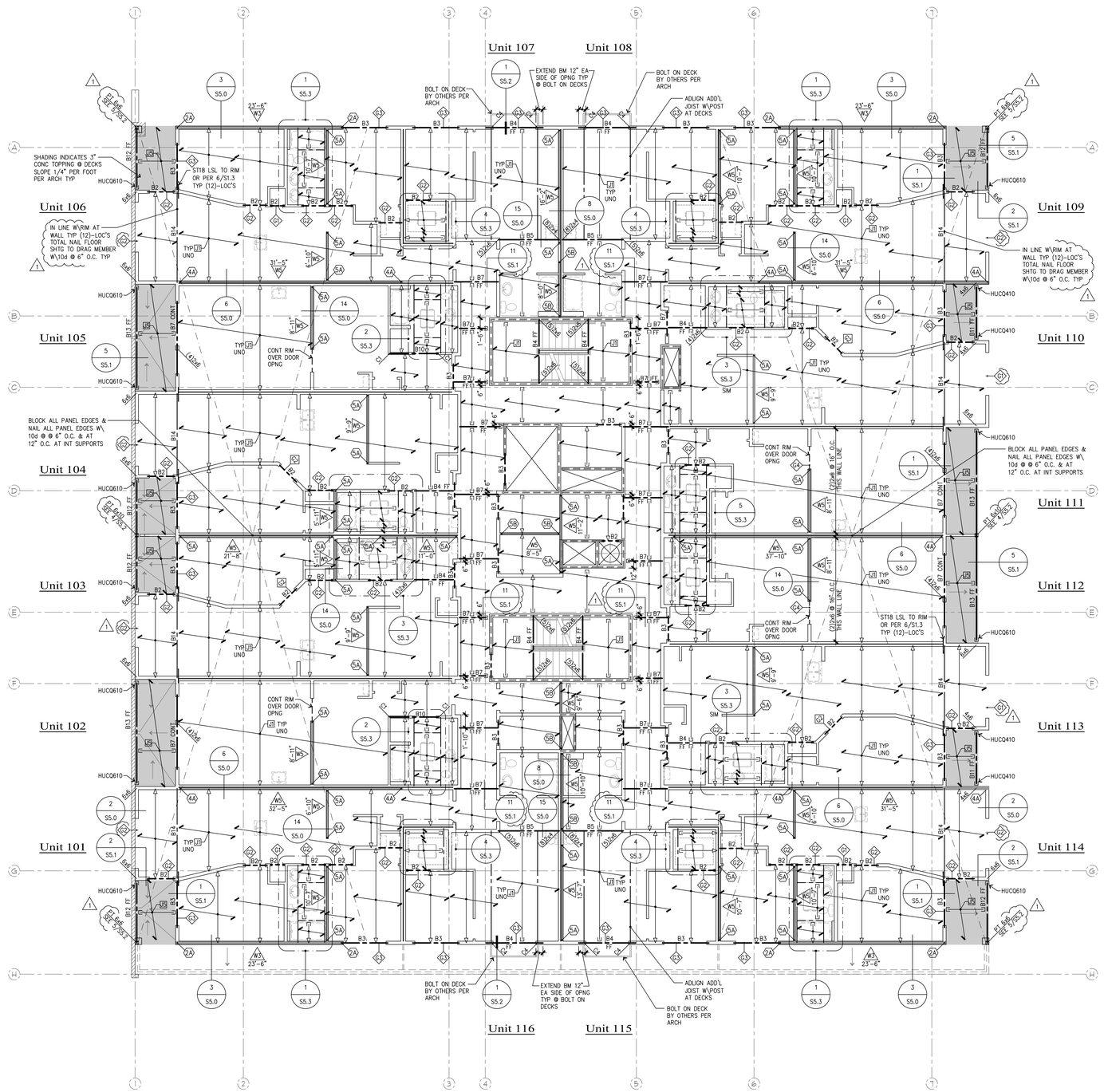
Jamb Stud Schedule

TYPE	G1	G2	G3	G4	G5	G6	G7	G8
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	G9	G10	G11					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)–BRG AND (1)–FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)2x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5–1/8x10–1/2 GLB	5–1/8x12 GLB		



2nd Floor Framing Plan
SCALE 1/8"=1'–0"

Solutions 4 Structures A Structural Engineering Corporation

4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

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DRAWN BY : RSO
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PERMIT SUBMITTAL
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S2.4

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.4.dwg PLOT DATE/TIME: 4/4/2023 – 4:07pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

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3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

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10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

    2/S5.2 — INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. [S—] INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

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15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0–S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:
    - ═══ INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS
    - ⊏═══ INDICATES HANGER PER MANUFACTURER
    - GT INDICATES GIRDER TRUSS PER PLAN
    - ⊩ INDICATES JOIST / TRUSS BEARING @ WALL / BEAM
    - ⊩ INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM
    - INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. ⊏ INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

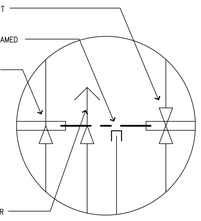
23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O.
USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O.
@ DECKS, P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1
P.T. HEM–FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3–1/2x11–7/8 LSL
B5	5–1/4x11–7/8 PSL OR LVL
B6	3–1/8x7–1/2 GLB
B7	5–1/8x7–1/2 GLB
B8	3–1/8x9 GLB
B9	5–1/8x9 GLB
B10	5–1/8x10–1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5–1/2x10–1/2 GLB
B14	1–1/4x11–7/8 LSL 1.3E

Joist Schedule

MARK	JOIST TYPE & SPACING
J1	11–7/8 TJI/110 @ 16" O.C.
J2	11–7/8 TJI/110 @ 12" O.C.
J3	(2) 11–7/8 TJI/110 @ 16" O.C.
J4	(2) 2x6 DF#2 @ 16" O.C.
J5	PT 2x10 @ 16" O.C. (SLOPED SEE ARCH)
J6	PT 2x10 @ 12" O.C. (SLOPED SEE ARCH)

3rd Floor Framing / 2nd Floor Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 HF#2 GRADE @ 16" O.C. (2)2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALL BEARING (EACH SIDE)	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 12" O.C.	HF STANDARD OR BETTER
PARTY WALLS NON BEARING (EACH SIDE)	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING NON SHEARWALLS	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER HF STANDARD OR BETTER

NOTES:
1. THE BEARING WALLS (SHOWN ——C&S——) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

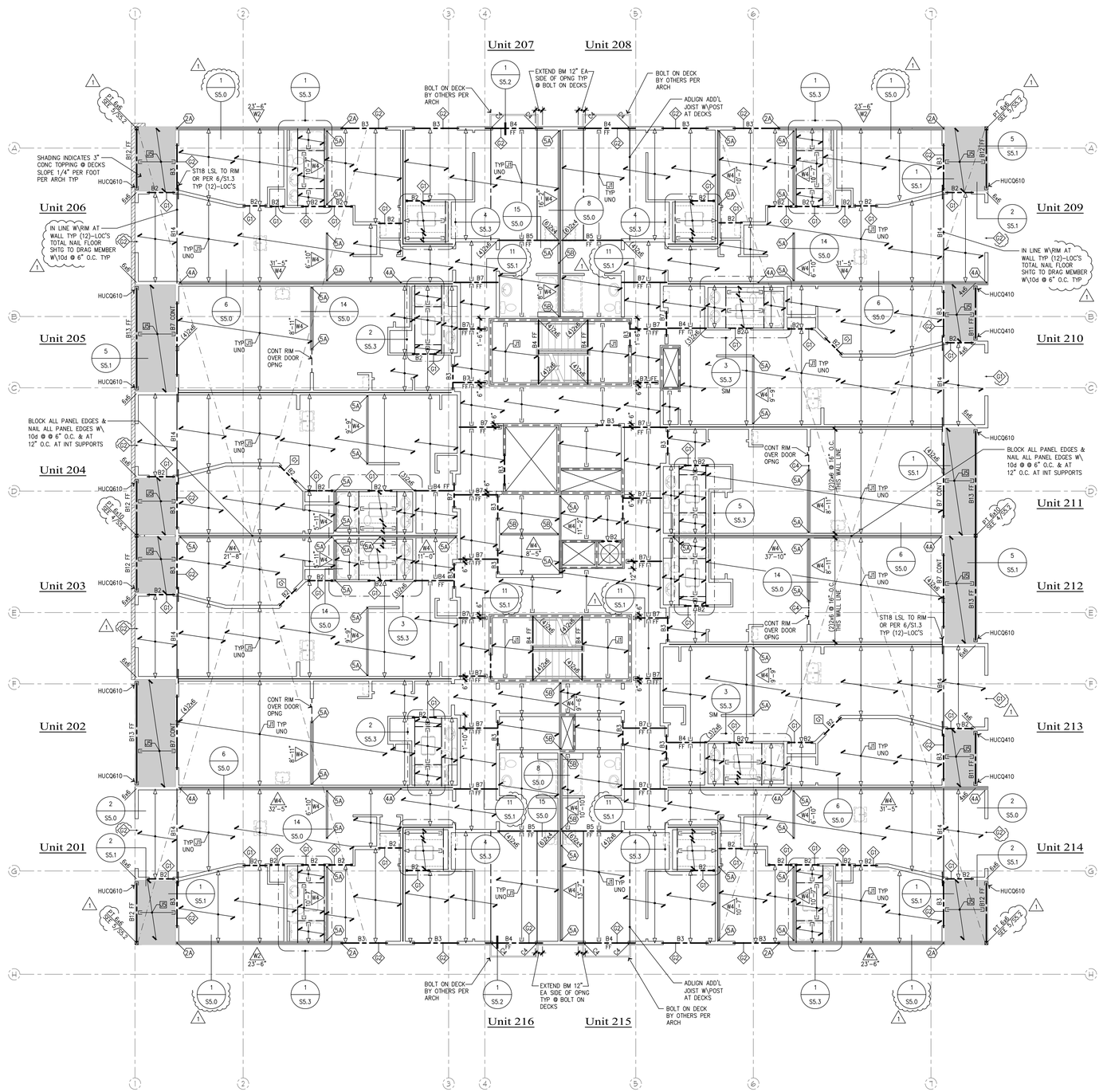
Jamb Stud Schedule

TYPE	◇1	◇2	◇3	◇4	◇5	◇6	◇7	◇8
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	◇9	◇10	◇11					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)–BRG AND (1)–FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)2x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5–1/8x10–1/2 GLB	5–1/8x12 GLB		



3rd Floor Framing Plan
SCALE 1/8"=1'–0"

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314-9822
www.solutions4structures.com

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:
4–7–23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11–7–22
LATEST REV. OF DWG. SET : 4–7–23

PERMIT SUBMITTAL
4-7-23

S2.5

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.5.dwg PLOT DATE/TIME: 4/4/2023 – 4:10pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Floor and Roof Framing Notes

1. ROOF AND FLOOR JOIST LOCATIONS ARE SCHEMATICALLY SHOWN ON THE PLANS. IT IS NOT THE INTENT OF THE STRUCTURAL PLANS TO GRAPHICALLY LOCATE ALL FRAMING MEMBERS. THE ARCHITECT SHALL VERIFY THE COMPATIBILITY OF JOIST LAYOUT AND FRAMING W/ MECHANICAL, ELECTRICAL & PLUMBING AND ARCHITECTURAL PLANS. THE CONTRACTOR IS RESPONSIBLE FOR SPACING FRAMING MEMBERS AS NOTED ON THE PLANS AND GENERATING MEMBER LAYOUT FOR SHOP DRAWINGS AND QUANTITY TAKEOFFS.

2. THE TRUSS AND JOIST MANUFACTURER SHALL VERIFY BEARING COMPATIBILITY (CRUSHING) WITH THE PLATE MATERIAL. TYPICALLY, COMPOSITE BEAMS SHALL BE FULLY BEARING ON 2x6 WALLS. I.E. BREAK RIM OR BLOCKING TO ALLOW FULL BEARING OVER WIDTH OF PLATES.

3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

4. W## DENOTES THE SHEARWALL TYPE, SEE THE SHEARWALL TABLE ON SHEET S1.3 ═══ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THE LENGTH OF WALL SHOWN SHADED. PROVIDE SOLID BLOCKING IN FLOOR SPACE BELOW PERPENDICULAR SHEARWALLS.

5. THE DOUBLE TOP PLATE IS TO BE CONTINUOUS ALONG ALL EXTERIOR WALLS AND AT ALL WALL LINES CONTAINING SHEARWALLS. TYPICAL WALL TOP PLATE SPLICES SHALL BE PER DETAIL 3/S1.3 TYP @ EXTERIOR WALLS AT ROOF & PER 4/S1.3 @ EXTERIOR WALLS AT FLOORS TYP

6. WHERE COMPOSITE JOISTS AND BEAMS ARE USED AS DRAG STRUTS THE MANUFACTURER SHALL PROVIDE THE FRAMING MEMBERS WITH THE CAPACITY CALLED OUT ON THE PLANS.

7. TYPICAL FLOOR JOISTS SHALL BE 11-7/8" TJI/110 @ 16" O.C. [J1] TYP UNO W/ 1-1/4" GYPCRETE TOPPING. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. [J—] INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

8. TYPICAL ROOF JOIST SHALL P.E. TRUSSES @ 24" O.C. TYPICAL UNO. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. [J—] INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

9. ALL NON BEARING BEAMS SHALL BE A MIN OF 1-1/2"x11-7/8" LSL 1.55E RIM U.N.O. ALL OTHER BEAMS ARE AS MARKED ON PLANS. FOR TYP FRAMING @ HEADER SEE 1/S5.4 & 2/S5.4 U.N.O. B— INDICATES BEAM CALLOUT SEE BEAM SCHEDULE THIS SHEET.

10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

    2(T2-2x6) 2(K-2x6) INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. [S—] INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

14. SEE CIVIL AND ARCHITECTURAL PLANS FOR TOP OF WALL HEIGHTS. SEE ARCHITECTURAL PLANS FOR DIMENSIONS. WHERE DIMENSIONS ARE SHOWN ON THE STRUCTURAL PLANS, CONTRACTOR SHALL VERIFY COMPATIBILITY W/ ARCHITECTURAL PLANS. WHERE DISCREPANCY EXISTS, CONTRACTOR SHALL NOTIFY BOTH THE ENGINEER AND ARCHITECT FOR CLARIFICATION.

15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0–S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:
    - ═══ INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS
    - ⊏═══ INDICATES HANGER PER MANUFACTURER
    - GT INDICATES GIRDER TRUSS PER PLAN
    - ═▷ INDICATES JOIST / TRUSS BEARING @ WALL / BEAM
    - ═▷═ INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM
    - INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. (S) INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

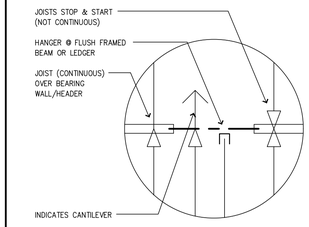
23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O.
USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O.
@ DECKS, P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1
P.T. HEM-FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3-1/2x11-7/8 LSL
B5	5-1/4x11-7/8 PSL OR LVL
B6	3-1/8x7-1/2 GLB
B7	5-1/8x7-1/2 GLB
B8	3-1/8x9 GLB
B9	5-1/8x9 GLB
B10	5-1/8x10-1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5-1/2x10-1/2 GLB
B14	1-1/4x11-7/8 LSL 1.3E

Joist Schedule

MARK	JOIST TYPE & SPACING
J1	11-7/8 TJI/110 @ 16" O.C.
J2	11-7/8 TJI/110 @ 12" O.C.
J3	(2) 11-7/8 TJI/110 @ 16" O.C.
J4	(2) 2x6 DF#2 @ 16" O.C.
J5	PT 2x10 @ 16" O.C. (SLOPED SEE ARCH)
J6	PT 2x10 @ 12" O.C. (SLOPED SEE ARCH)

4th Floor Framing / 3rd Floor Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 12" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALL BEARING (EACH SIDE)	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALLS NON BEARING (EACH SIDE)	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING NON SHEARWALLS	2x6 HF#2 GRADE @ 16" O.C. 2x4 HF#2 GRADE @ 16" O.C.	HF STANDARD OR BETTER

NOTES:
1. THE BEARING WALLS (SHOWN ——C&S——) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

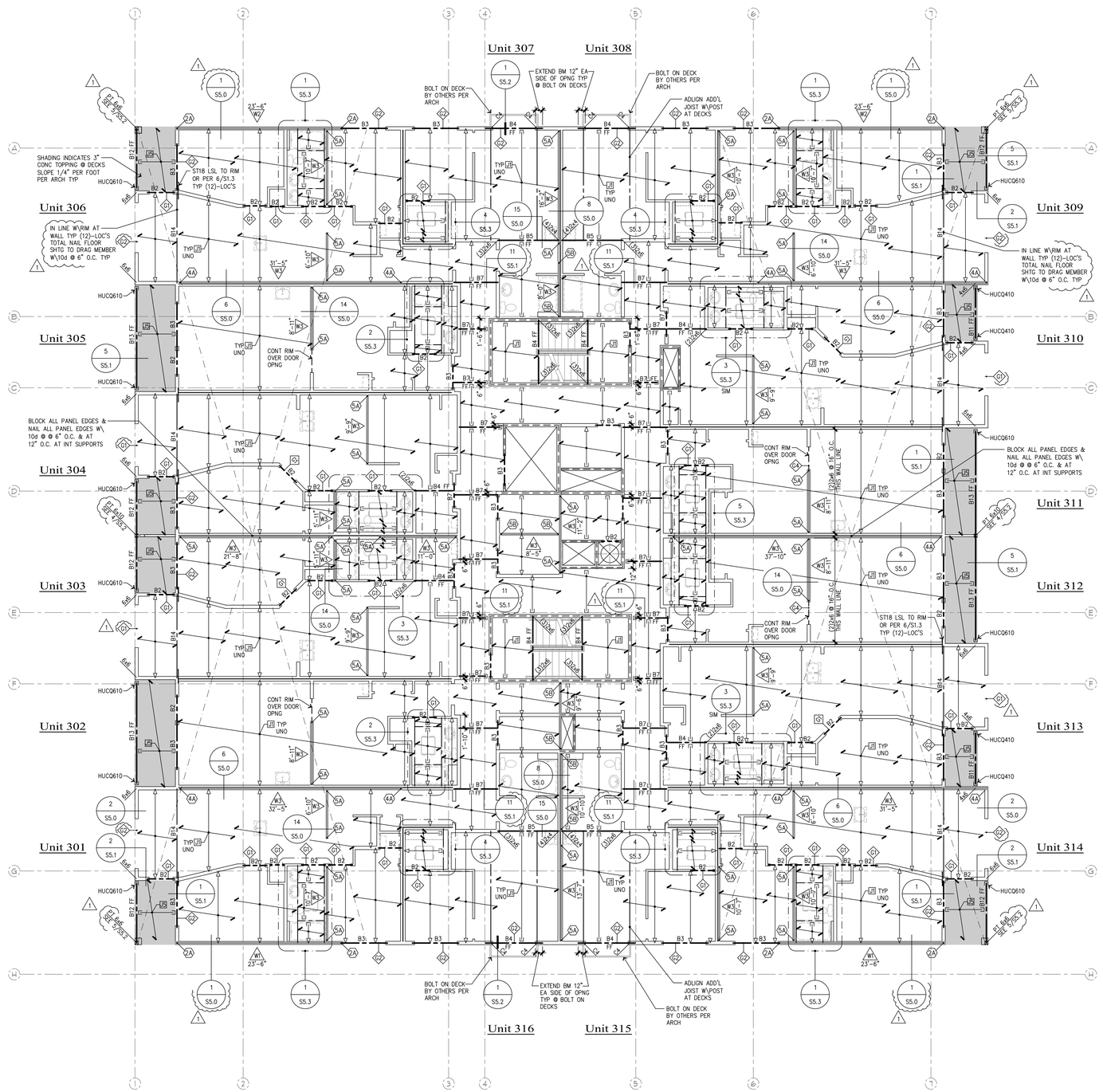
Jamb Stud Schedule

TYPE	◇1	◇2	◇3	◇4	◇5	◇6	◇7	◇8
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	◇9	◇10	◇11					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)–BRG AND (1)–FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)2x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5-1/8x10-1/2 GLB	5-1/8x12 GLB		



4th Floor Framing Plan
SCALE 1/8"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.6

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.6.dwg PLOT DATE/TIME: 4/4/2023 – 4:13pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Floor and Roof Framing Notes

1. ROOF AND FLOOR JOIST LOCATIONS ARE SCHEMATICALLY SHOWN ON THE PLANS. IT IS NOT THE INTENT OF THE STRUCTURAL PLANS TO GRAPHICALLY LOCATE ALL FRAMING MEMBERS. THE ARCHITECT SHALL VERIFY THE COMPATIBILITY OF JOIST LAYOUT AND FRAMING W/ MECHANICAL, ELECTRICAL & PLUMBING AND ARCHITECTURAL PLANS. THE CONTRACTOR IS RESPONSIBLE FOR SPACING FRAMING MEMBERS AS NOTED ON THE PLANS AND GENERATING MEMBER LAYOUT FOR SHOP DRAWINGS AND QUANTITY TAKEOFFS.

2. THE TRUSS AND JOIST MANUFACTURER SHALL VERIFY BEARING COMPATIBILITY (CRUSHING) WITH THE PLATE MATERIAL. TYPICALLY, COMPOSITE BEAMS SHALL BE FULLY BEARING ON 2x6 WALLS. I.E. BREAK RIM OR BLOCKING TO ALLOW FULL BEARING OVER WIDTH OF PLATES.

3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

4. W DENOTES THE SHEARWALL TYPE, SEE THE SHEARWALL TABLE ON SHEET S1.3 ═══ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THE LENGTH OF WALL SHOWN SHADED. PROVIDE SOLID BLOCKING IN FLOOR SPACE BELOW PERPENDICULAR SHEARWALLS.

5. THE DOUBLE TOP PLATE IS TO BE CONTINUOUS ALONG ALL EXTERIOR WALLS AND AT ALL WALL LINES CONTAINING SHEARWALLS. TYPICAL WALL TOP PLATE SPLICES SHALL BE PER DETAIL 3/S1.3 TYP @ EXTERIOR WALLS AT ROOF & PER 4/S1.3 @ EXTERIOR WALLS AT FLOORS TYP

6. WHERE COMPOSITE JOISTS AND BEAMS ARE USED AS DRAG STRUTS THE MANUFACTURER SHALL PROVIDE THE FRAMING MEMBERS WITH THE CAPACITY CALLED OUT ON THE PLANS.

7. TYPICAL FLOOR JOISTS SHALL BE 11-7/8" TJI/110 @ 16" O.C. J1 TYP UNO W/ 1-1/4" GYPCRETE TOPPING. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. J— INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

8. TYPICAL ROOF JOIST SHALL P.E. TRUSSES @ 24" O.C. TYPICAL UNO. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. J— INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

9. ALL NON BEARING BEAMS SHALL BE A MIN OF 1-1/2"x11-7/8" LSL 1.55E RIM U.N.O. ALL OTHER BEAMS ARE AS MARKED ON PLANS. FOR TYP FRAMING @ HEADER SEE 1/S5.4 & 2/S5.4 U.N.O. B— INDICATES BEAM CALLOUT SEE BEAM SCHEDULE THIS SHEET.

10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

    2-2x6 DF#1 — INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. S— INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

14. SEE CIVIL AND ARCHITECTURAL PLANS FOR TOP OF WALL HEIGHTS. SEE ARCHITECTURAL PLANS FOR DIMENSIONS. WHERE DIMENSIONS ARE SHOWN ON THE STRUCTURAL PLANS, CONTRACTOR SHALL VERIFY COMPATIBILITY W/ ARCHITECTURAL PLANS. WHERE DISCREPANCY EXISTS, CONTRACTOR SHALL NOTIFY BOTH THE ENGINEER AND ARCHITECT FOR CLARIFICATION.

15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0–S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:
    - ═══ INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS
    - ⊏═══ INDICATES HANGER PER MANUFACTURER
    - GT INDICATES GIRDER TRUSS PER PLAN
    - ═╦═ INDICATES JOIST / TRUSS BEARING @ WALL / BEAM
    - ═╩═ INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM
    - INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. ⬡ INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

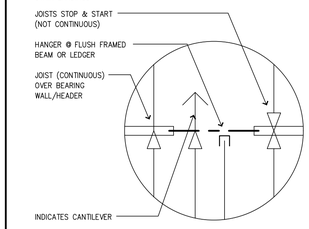
23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O.
USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O. @ DECKS. P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1
P.T. HEM-FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3-1/2x11-7/8 LSL
B5	5-1/4x11-7/8 PSL OR LVL
B6	3-1/8x7-1/2 GLB
B7	5-1/8x7-1/2 GLB
B8	3-1/8x9 GLB
B9	5-1/8x9 GLB
B10	5-1/8x10-1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5-1/2x10-1/2 GLB
B14	1-1/4x11-7/8 LSL 1.3E

Joist Schedule

MARK	JOIST TYPE & SPACING
J1	11-7/8 TJI/110 @ 16" O.C.
J2	11-7/8 TJI/110 @ 12" O.C.
J3	(2) 11-7/8 TJI/110 @ 16" O.C.
J4	(2) 2x6 DF#2 @ 16" O.C.
J5	PT 2x10 @ 16" O.C. (SLOPED SEE ARCH)
J6	PT 2x10 @ 12" O.C. (SLOPED SEE ARCH)

5th Floor Framing / 4th Floor Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALL BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALLS NON BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING NON SHEARWALLS	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER

NOTES:
1. THE BEARING WALLS (SHOWN ——C&S——) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

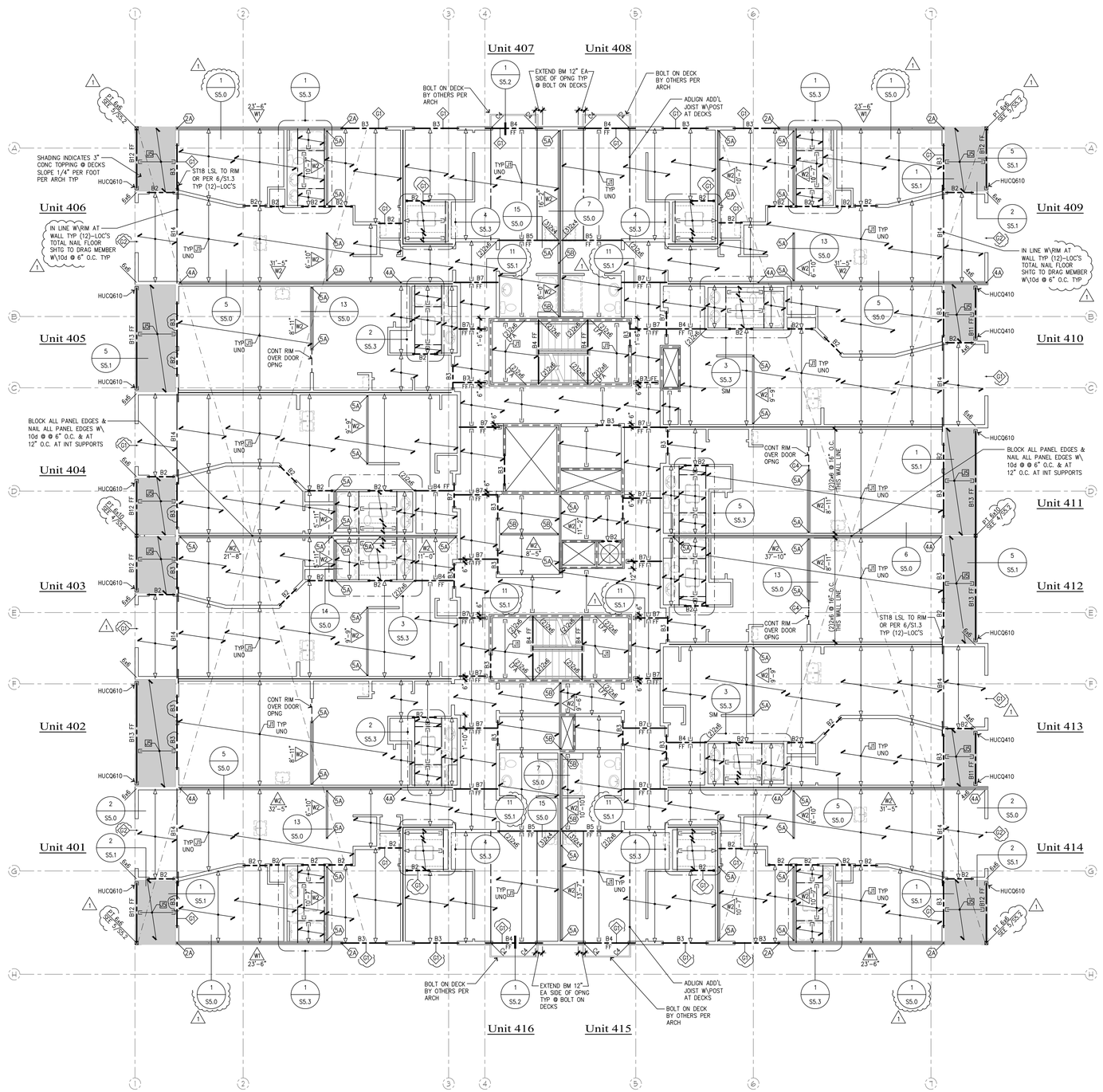
Jamb Stud Schedule

TYPE	◇01	◇02	◇03	◇04	◇05	◇06	◇07	◇08
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	◇09	◇010	◇011					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)–BRG AND (1)–FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)2x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5-1/8x10-1/2 GLB	5-1/8x12 GLB		



5th Floor Framing Plan
SCALE 1/8"=1'-0"

Solutions 4 Structures
A Structural Engineering Corporation

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.7

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.7.dwg PLOT DATE/TIME: 4/4/2023 – 4:15pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Floor and Roof Framing Notes

1. ROOF AND FLOOR JOIST LOCATIONS ARE SCHEMATICALLY SHOWN ON THE PLANS. IT IS NOT THE INTENT OF THE STRUCTURAL PLANS TO GRAPHICALLY LOCATE ALL FRAMING MEMBERS. THE ARCHITECT SHALL VERIFY THE COMPATIBILITY OF JOIST LAYOUT AND FRAMING W/ MECHANICAL, ELECTRICAL & PLUMBING AND ARCHITECTURAL PLANS. THE CONTRACTOR IS RESPONSIBLE FOR SPACING FRAMING MEMBERS AS NOTED ON THE PLANS AND GENERATING MEMBER LAYOUT FOR SHOP DRAWINGS AND QUANTITY TAKEOFFS.

2. THE TRUSS AND JOIST MANUFACTURER SHALL VERIFY BEARING COMPATIBILITY (CRUSHING) WITH THE PLATE MATERIAL. TYPICALLY, COMPOSITE BEAMS SHALL BE FULLY BEARING ON 2x6 WALLS. I.E. BREAK RIM OR BLOCKING TO ALLOW FULL BEARING OVER WIDTH OF PLATES.

3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

4. (W) DENOTES THE SHEARWALL TYPE, SEE THE SHEARWALL TABLE ON SHEET S1.3 ═══ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THE LENGTH OF WALL SHOWN SHADED. PROVIDE SOLID BLOCKING IN FLOOR SPACE BELOW PERPENDICULAR SHEARWALLS.

5. THE DOUBLE TOP PLATE IS TO BE CONTINUOUS ALONG ALL EXTERIOR WALLS AND AT ALL WALL LINES CONTAINING SHEARWALLS. TYPICAL WALL TOP PLATE SPLICES SHALL BE PER DETAIL 3/S1.3 TYP @ EXTERIOR WALLS AT ROOF & PER 4/S1.3 @ EXTERIOR WALLS AT FLOORS TYP

6. WHERE COMPOSITE JOISTS AND BEAMS ARE USED AS DRAG STRUTS THE MANUFACTURER SHALL PROVIDE THE FRAMING MEMBERS WITH THE CAPACITY CALLED OUT ON THE PLANS.

7. TYPICAL FLOOR JOISTS SHALL BE 11-7/8" TJI/110 @ 16" O.C. (J1) TYP UNO W/ 1-1/4" GYPCRETE TOPPING. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. (J-) INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

8. TYPICAL ROOF JOIST SHALL P.E. TRUSSES @ 24" O.C. TYPICAL UNO. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. (J-) INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

9. ALL NON BEARING BEAMS SHALL BE A MIN OF 1-1/2"x11-7/8" LSL 1.55E RIM U.N.O. ALL OTHER BEAMS ARE AS MARKED ON PLANS. FOR TYP FRAMING @ HEADER SEE 1/S5.4 & 2/S5.4 U.N.O. B- INDICATES BEAM CALLOUT SEE BEAM SCHEDULE THIS SHEET.

10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

   (2)2x6 DF#2 — INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. (S-) INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

14. SEE CIVIL AND ARCHITECTURAL PLANS FOR TOP OF WALL HEIGHTS. SEE ARCHITECTURAL PLANS FOR DIMENSIONS. WHERE DIMENSIONS ARE SHOWN ON THE STRUCTURAL PLANS, CONTRACTOR SHALL VERIFY COMPATIBILITY W/ ARCHITECTURAL PLANS. WHERE DISCREPANCY EXISTS, CONTRACTOR SHALL NOTIFY BOTH THE ENGINEER AND ARCHITECT FOR CLARIFICATION.

15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0–S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:
   - ═══ INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS
   - ⊏═══ INDICATES HANGER PER MANUFACTURER
   - GT INDICATES GIRDER TRUSS PER PLAN
   - ⊢ INDICATES JOIST / TRUSS BEARING @ WALL / BEAM
   - ⊢ INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM
   - INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. ⬡ INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

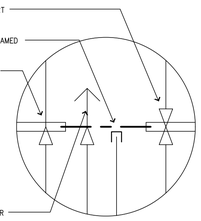
Roof Truss Loading Table

MARK	DESCRIPTION	DL	LL
⬚	ROOF TOP DECK	45 PSF	100 PSF
▨	ELEVATOR FOYER / MECHANICAL ROOM	26 PSF	100 PSF

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O. USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O. @ DECKS. P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1 P.T. HEM-FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3-1/2x11-7/8 LSL
B5	5-1/4x11-7/8 PSL OR LVL
B6	3-1/8x7-1/2 GLB
B7	5-1/8x7-1/2 GLB
B8	3-1/8x9 GLB
B9	5-1/8x9 GLB
B10	5-1/8x10-1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5-1/2x10-1/2 GLB
B14	1-1/4x11-7/8 LSL 1.3E

Roof Truss Schedule

MARK	JOIST TYPE & SPACING
R1	P.E. ROOF TRUSSES @ 24" O.C.
R2	P.E. ROOF TRUSSES @ 16" O.C.
R3	2x6 DF#2 @ 24" O.C.
R4	(2)-2x6 DF#2 @ 16" O.C.

Roof Framing / 5th Floor Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALL BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
PARTY WALLS NON BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR NON BEARING NON SHEARWALLS	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER HF STANDARD OR BETTER

NOTES:
1. THE BEARING WALLS (SHOWN ──┤├──) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

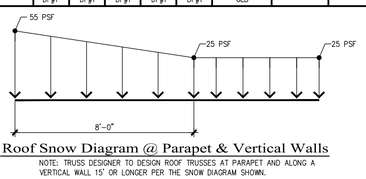
Jamb Stud Schedule

TYPE	D1	D2	D3	D4	D5	D6	D7	D8
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	D9	D10	D11					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)-BRG AND (1)-FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)2x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

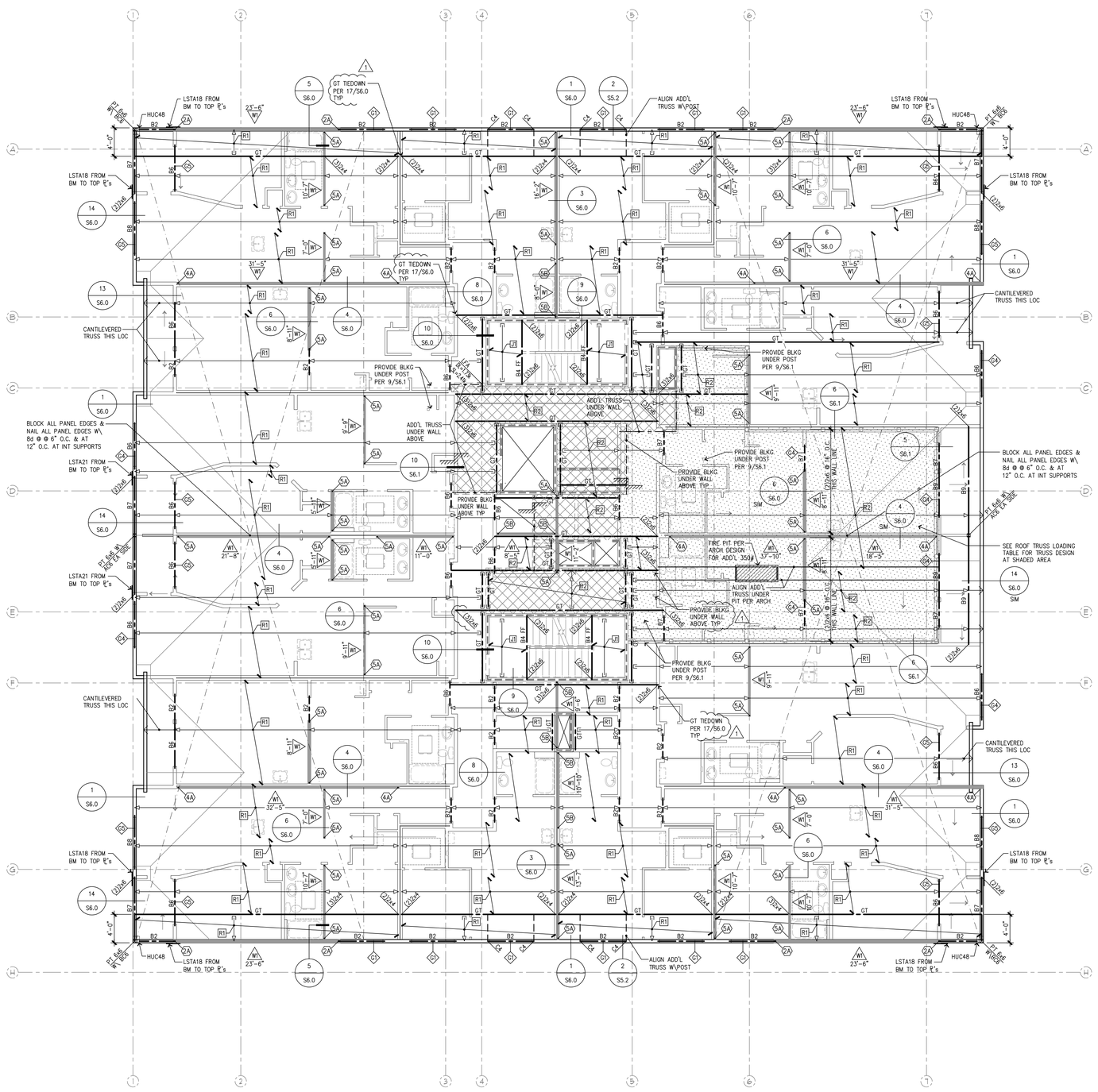
Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5-1/8x10-1/2 GLB	5-1/8x12 GLB		



Roof Snow Diagram @ Parapet & Vertical Walls

NOTE: TRUSS DESIGNER TO DESIGN ROOF TRUSSES AT PARAPET AND ALONG A VERTICAL WALL 15' OR LONGER PER THE SNOW DIAGRAM SHOWN.



Roof Framing Plan

SCALE 1/8"=1'-0"

Solutions 4 Structures
A Structural Engineering Corporation

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE
4-7-23

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314-9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S2.8

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.8.dwg PLOT DATE/TIME: 4/4/2023 - 4:02pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Floor and Roof Framing Notes

1. ROOF AND FLOOR JOIST LOCATIONS ARE SCHEMATICALLY SHOWN ON THE PLANS. IT IS NOT THE INTENT OF THE STRUCTURAL PLANS TO GRAPHICALLY LOCATE ALL FRAMING MEMBERS. THE ARCHITECT SHALL VERIFY THE COMPATIBILITY OF JOIST LAYOUT AND FRAMING W/ MECHANICAL, ELECTRICAL & PLUMBING AND ARCHITECTURAL PLANS. THE CONTRACTOR IS RESPONSIBLE FOR SPACING FRAMING MEMBERS AS NOTED ON THE PLANS AND GENERATING MEMBER LAYOUT FOR SHOP DRAWINGS AND QUANTITY TAKEOFFS.

2. THE TRUSS AND JOIST MANUFACTURER SHALL VERIFY BEARING COMPATIBILITY (CRUSHING) WITH THE PLATE MATERIAL. TYPICALLY, COMPOSITE BEAMS SHALL BE FULLY BEARING ON 2x6 WALLS. I.E. BREAK RIM OR BLOCKING TO ALLOW FULL BEARING OVER WIDTH OF PLATES.

3. PLACE LONG DIRECTION OF ALL SHEATHING SHEETS PERPENDICULAR TO TRUSS/RAFTER OR JOIST DIRECTION, SEE DETAIL 7/S1.3 U.N.O.. FLOOR SHEATHING IS TO BE CONTINUOUS FROM UNIT TO UNIT. TYPICAL NAILING AT FLOOR AND ROOF DIAPHRAGMS IS PROVIDED IN THE GENERAL STRUCTURAL NOTES ON S1.0 & S1.1 OR PER PLAN.

4. W/A DENOTES THE SHEARWALL TYPE, SEE THE SHEARWALL TABLE ON SHEET S1.3 ▬▬▬ INDICATES SHEARWALL LOCATION, THE CALLOUTS ON THE SHEARWALL TABLE APPLY ONLY ALONG THE LENGTH OF WALL SHOWN SHADED. PROVIDE SOLID BLOCKING IN FLOOR SPACE BELOW PERPENDICULAR SHEARWALLS.

5. THE DOUBLE TOP PLATE IS TO BE CONTINUOUS ALONG ALL EXTERIOR WALLS AND AT ALL WALL LINES CONTAINING SHEARWALLS. TYPICAL WALL TOP PLATE SPLICES SHALL BE PER DETAIL 3/S1.3 TYP @ EXTERIOR WALLS AT ROOF & PER 4/S1.3 @ EXTERIOR WALLS AT FLOORS TYP

6. WHERE COMPOSITE JOISTS AND BEAMS ARE USED AS DRAG STRUTS THE MANUFACTURER SHALL PROVIDE THE FRAMING MEMBERS WITH THE CAPACITY CALLED OUT ON THE PLANS.

7. TYPICAL FLOOR JOISTS SHALL BE 11-7/8" TJI/110 @ 16" O.C. (J1) TYP UNO W/ 1-1/4" GYPCRETE TOPPING. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. (J-) INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

8. TYPICAL ROOF JOIST SHALL P.E. TRUSSES @ 24" O.C. TYPICAL UNO. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ALL JOIST AND BEAM HANGERS, WEB STIFFENERS, SOLID BLOCKING, AND ADDITIONAL RIM OR JOIST MATERIAL TO ACCOMMODATE FLUSH-FRAMED CONDITIONS (F.F.), CANTILEVERED CONDITIONS, CONCENTRATED BEARING LOADS AND NAILING FROM SHEARWALLS ABOVE AND BELOW. (J-) INDICATES JOIST CALLOUT SEE JOIST SCHEDULE ON FRAMING PLANS.

9. ALL NON BEARING BEAMS SHALL BE A MIN OF 1-1/2"x11-7/8" LSL 1.55E RIM U.N.O. ALL OTHER BEAMS ARE AS MARKED ON PLANS. FOR TYP FRAMING @ HEADER SEE 1/S5.4 & 2/S5.4 U.N.O. B- INDICATES BEAM CALLOUT SEE BEAM SCHEDULE THIS SHEET.

10. AT ALL BEAM BEARING/JAMB LOCATIONS, AT MINIMUM PROVIDE BEARING (TRIMMER) STUDS AND FULL HEIGHT (KING) STUDS PER THE JAMB STUD SCHEDULE THIS SHEET FOR EACH PLAN LEVEL WHERE MORE STUDS THAN THE MINIMUM ARE REQUIRED AT A JAMB,

   2-2x6 DF#2 "B" "F"

   INDICATES THE NUMBER OF STUDS REQUIRED WHERE **"B"** INDICATES BEARING STUD AND **"F"** INDICATES FULL HEIGHT STUD **IF NO BEARING OR FULL HEIGHT STUD IS CALLED OUT PER PLAN, USE AT LEAST THE MINIMUM PER THE JAMB SCHEDULE.** ALL JAMB STUDS ARE TO BE THE SAME SIZE AND GRADE AS THE TYPICAL BEARING WALL STUDS UNLESS NOTED OTHERWISE. PROVIDE SIMPSON A35 CLIP FROM BEARING STUD TO HEADER AT EXTERIOR OPENINGS OVER 4' WIDE TYPICALLY. BEAMS AND GIRDER TRUSSES LOADING PERPENDICULAR WALLS SHALL BE SUPPORTED AT A MINIMUM BY SOLID STUDS BELOW BEAM/TRUSS. JAMB STUDS CALLED OUT ON UPPER LEVELS SHALL BE CONTINUED TO FOUNDATION OR BEAM BELOW AND REQUIRE SOLID BLOCKING BETWEEN FLOORS. SEE DETAILS 1/S5.4 AND 2/S5.4 FOR TYPICAL HEADER CONDITIONS.

11. FOR WALL FRAMING SEE WALL FRAMING SCHEDULE THIS SHEET TYPICAL FOR EACH LEVEL. (SC) INDICATES SPECIAL STUD WALL FRAMING PER WALL STUD SCHEDULE THIS SHEET.

12. EXPOSED FRAMING SHALL BE PRESSURE TREATED (P.T.) VERTICAL & HORIZONTAL FRAMING @ WATERPROOFED WALKWAYS AND PRIVATE DECKS. ALL EXPOSED BEAM HANGERS SHALL BE STAINLESS STEEL AND HAVE CONCEALED FLANGES, VERIFY W/ ARCHITECT. SEE NOTE ON SHEETS S1.0 AND S1.1.

13. SEE ARCHITECTURAL PLANS FOR STAIR FRAMING DETAILS AND NOTES. METAL CONTROL JOINTS AT DOORWAY OPENINGS IN CONCRETE FLOORING AND ROOF VENTILATION REQUIREMENTS AND DETAILS.

14. SEE CIVIL AND ARCHITECTURAL PLANS FOR TOP OF WALL HEIGHTS. SEE ARCHITECTURAL PLANS FOR DIMENSIONS. WHERE DIMENSIONS ARE SHOWN ON THE STRUCTURAL PLANS, CONTRACTOR SHALL VERIFY COMPATIBILITY W/ ARCHITECTURAL PLANS. WHERE DISCREPANCY EXISTS, CONTRACTOR SHALL NOTIFY BOTH THE ENGINEER AND ARCHITECT FOR CLARIFICATION.

15. WINDOW SUPPLIER TO VERIFY THAT WINDOW AND WINDOW FRAMES TRANSFER WIND LOADS EVENLY TO STRUCTURAL FRAMING ON ALL 4 SIDES OF WINDOW. WINDOW SUPPLIER TO VERIFY MINIMUM .005*H STORY DRIFT TOLERANCE IN PLANE OF ALL WINDOWS AND ALLOW FOR /240 DEFLECTION (PERPENDICULAR) AT WINDOW MULLIONS.

16. SEE GENERAL STRUCTURAL NOTES ON S1.0-S1.3 FOR ADDITIONAL INFORMATION.

17. LEGEND:
   - ▬ ▬ ▬ INDICATES BEAM / GIRDER TRUSS PER PLAN SEE FRAMING PLANS
   - ⊏▬ INDICATES HANGER PER MANUFACTURER
   - GT INDICATES GIRDER TRUSS PER PLAN
   - ⊢▬ INDICATES JOIST / TRUSS BEARING @ WALL / BEAM
   - ⊢▬ INDICATES JOIST / TRUSS INTERMEDIATE BEARING @ WALL / BEAM
   - INDICATES TYPICAL TOILET, BATHTUB & SHOWER LAYOUT. CONTRACTOR TO COORDINATE JOIST LAYOUT WITH FIXTURE LOCATIONS TO AVOID PLUMBING & FRAMING CONFLICTS.

18. PROVIDE WALL FIREBLOCKING @ DROPPED SOFFITS SHOWN ON ARCH.

19. PROVIDE WALL BLOCKING FOR ALL WALL MOUNTED EQUIPMENT (SUCH AS TOWEL BARS, GRAB BARS, TOILET PAPER HOLDERS, DOOR STOPS, ETC.).

20. LFA INDICATES – LOAD FROM ABOVE

21. FF INDICATES FLUSH FRAMED BEAM

22. ⬡ INDICATES THREADED ROD HOLDOWN SYSTEM BY OTHERS. SEE THREADED ROD HOLDOWN SYSTEM TABLE ON 2/S1.3 FOR REQUIREMENTS.

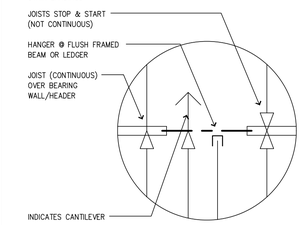
23. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FLOOR ELEVATIONS.

24. FOR PLUMBING INTERRUPTION AT SHEARWALL SEE 17/S5.1

NOTE:
ALL JOISTS 11-7/8" TJI/110 @ 16" O.C. TYPICAL U.N.O.
USE FACE MOUNT HANGER @ F.F. COND U.N.O.

NOTE:
P.T. 2x10 JOISTS @ 16" O.C. TYP U.N.O. @ DECKS. P.T. 2x10 @ 16" O.C. AT STAIR LANDINGS

NOTE:
ALL MULTIPLE 2x HEADERS HF #2 U.N.O.
ALL 4x HEADERS HF #2 U.N.O.
ALL 6x HEADERS/BEAMS D.F.#2 U.N.O.
ALL EXPOSED 6x BEAM / POSTS H.F. #1
P.T. HEM-FIR TREATED PER ARCH. U.N.O.



FRAMING KEY

Beam Schedule

MARK	BEAM SIZE
B1	4x6 HF#2
B2	4x8 HF#2
B3	4x10 HF#2
B4	3-1/2x11-7/8 LSL
B5	5-1/4x11-7/8 PSL OR LVL
B6	3-1/8x7-1/2 GLB
B7	5-1/8x7-1/2 GLB
B8	3-1/8x9 GLB
B9	5-1/8x9 GLB
B10	5-1/8x10-1/2 GLB
B11	PT 4x10
B12	PT 6x10
B13	PT 5-1/2x10-1/2 GLB
B14	1-1/4x11-7/8 LSL 1.3E

Roof Truss Schedule

MARK	JOIST TYPE & SPACING
R1	P.E. ROOF TRUSSES @ 24" O.C.
R2	P.E. ROOF TRUSSES @ 16" O.C.
R3	2x6 DF#2 @ 24" O.C.
R4	(2)-2x6 DF#2 @ 16" O.C.

High Roof Framing / Roof Wall Schedule

WALL TYPE LOCATION	STUDS	PLATES
EXTERIOR	2x6 HF STUD GRADE @ 16" O.C.	HF STANDARD OR BETTER
INTERIOR BEARING / CORRIDOR BEARING	2x6 HF STUD GRADE @ 16" O.C.	N/A
INTERIOR NON BEARING / CORRIDOR NON BEARING	2x6 HF STUD GRADE @ 16" O.C.	N/A
PARTY WALL BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C.	N/A
PARTY WALLS NON BEARING (EACH SIDE)	2x6 HF STUD GRADE @ 16" O.C.	N/A
INTERIOR NON BEARING NON SHEARWALLS	2x6 HF STUD GRADE @ 16" O.C. 2x4 HF STUD GRADE @ 16" O.C.	

NOTES:
1. THE BEARING WALLS (SHOWN —(H)—) ON PLANS SHALL HAVE THE STUD SIZE SPACING, GRADE AND PLATES INDICATED IN THE ABOVE TABLE UNLESS NOTED OTHERWISE ON PLAN.
2. VERIFY WHERE 3x FRAMING IS REQUIRED PER SHEARWALL TABLE.
3. SHEARWALLS AT PARTY WALLS SHALL STOP SHORT OF THE CORRIDOR SHEARWALLS, DO NOT BREAK CORRIDOR SHEARWALL SHEATHING AT INTERSECTING WALLS.

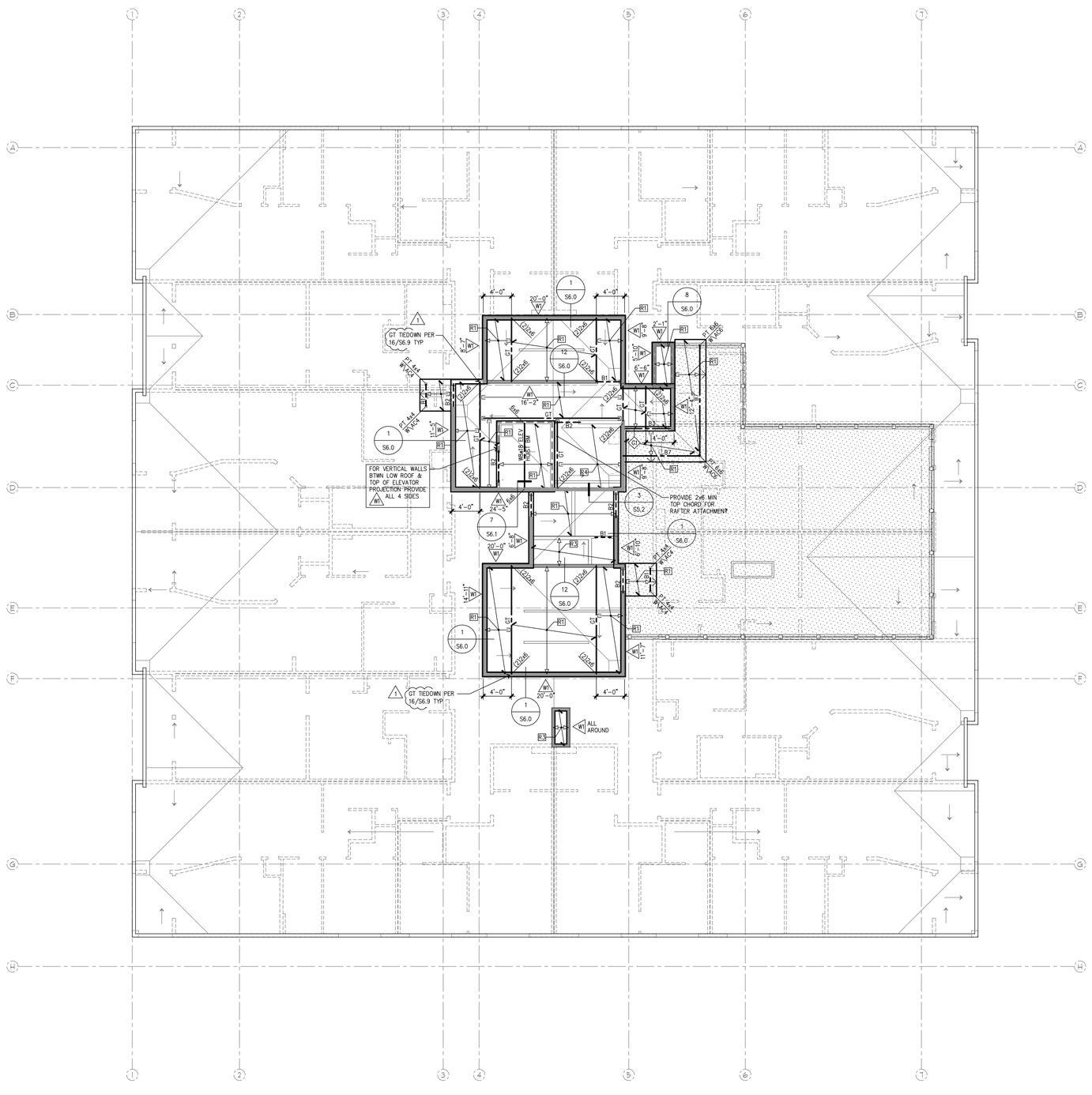
Jamb Stud Schedule

TYPE	G1	G2	G3	G4	G5	G6	G7	G8
BEARING/FULL HT STUDS	1/2	1/3	1/4	2/1	2/2	2/3	2/4	3/1
TYPE	G9	G10	G11					
BEARING/FULL HT STUDS	3/2	3/3	3/4					

NOTES:
1. STUD SIZE & GRADE (2x6 MIN) SHOULD MATCH STUD WALL SCHEDULE PER PLAN AT EACH LEVEL.
2. PROVIDE (1)-BRG AND (1)-FULL HT STUD MIN UNO
3. AT LOCATIONS WHERE BEAM BEARS ON TOP OF WALL, PROVIDE TOTAL NUMBERS OF BEARING & FULL HEIGHT STUDS AS FULL HEIGHT STUDS. SEE DETAIL 2/S6.0
4. AT ALL EXTERIOR OPENINGS PROVIDE (2)x6 MIN FULL HEIGHT JAMBS U.N.O.
5. AT IN WALL HEADERS/BEAMS FRAME PER 1/S6.0

Column Schedule - Wood

TYPE	C1	C2	C3	C4	C5	C6	C7		
COLUMN	4x8 DF#1	4x10 DF#1	6x6 DF#1	6x8 DF#1	6x10 DF#1	5-1/8x10-1/2 GLB	5-1/8x12 GLB		



Upper Roof Framing Plan
SCALE 1/8"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures Inc.
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

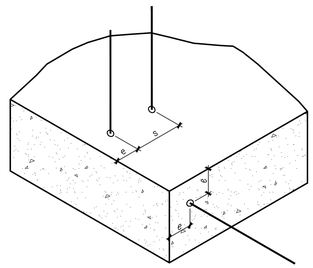
S2.9

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S2.9.dwg PLOT DATE/TIME: 4/4/2023 - 4:03pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

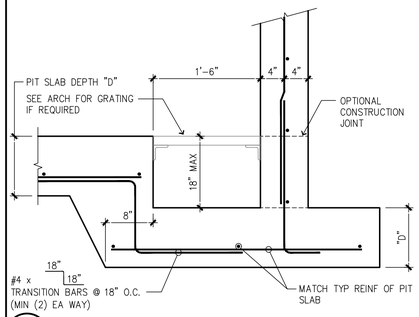
EPOXY DOWEL SUBSTITUTION			
BAR SIZE	MIN EDGE "e"	MIN SPACING "s"	MIN EMBEDMENT
#4	6"	4"	4 1/2"
#5	7"	4 1/2"	5"
#6	9"	6"	7"
#7	10"	7"	8"
#8	12"	8"	9"

NOTES:

1. THIS DETAIL MAY NOT BE USED FOR CHANGES TO THE STRUCTURAL DWGS WITHOUT APPROVAL IN ADVANCE OF INSTALLATION.
2. EPOXY DOWELS MAY BE SUBSTITUTED FOR CAST IN PLACE REINFORCEMENT PROVIDED MIN EDGE DISTANCES, SPACING & EMBEDMENT ARE MAINTAINED.
3. DRILLING INTO POST-TENSIONED SLABS SHOULD BE AVOIDED WHENEVER POSSIBLE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO AVOID TENDONS WITH ANY DRILLING OPERATION IN POST-TENSIONED SLABS AND SHALL DEMONSTRATE KNOWLEDGE OF TENDON LOCATIONS & PROFILES PRIOR TO DRILLING.

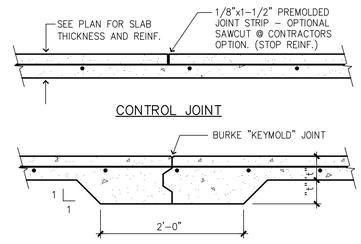


12 EPOXY DOWEL SCHEDULE

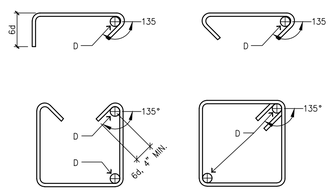


9 ELEVATOR PIT SUMP

PROVIDE CONTROL OR CONSTRUCTION JOINTS IN SLAB ON GRADE AS SHOWN ON PLANS OR AS APPROVED BY THE ARCHITECT. JOINTS SHALL BREAK SLAB INTO RECTANGULAR AREAS OF 625 S.F. OR LESS. AREAS TO BE LESS THAN 2:1 (LENGTH/WIDTH) RATIO AND HAVE NO ACUTE ANGLES.



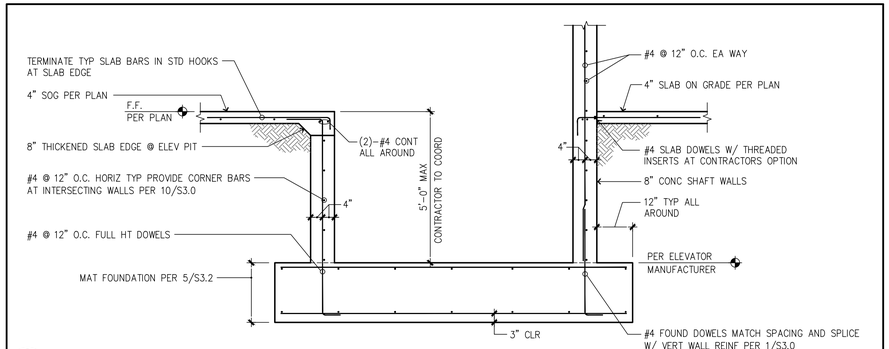
5 TYP CONSTRUCTION & CONTROL JOINTS



BAR	D
#3	1 1/2"
#4	2"
#5	2 1/2"

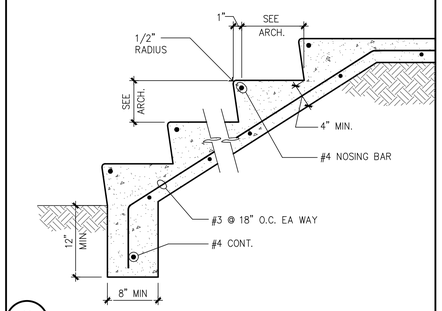
d = BAR DIAMETER

3 STIRRUP AND TIE DETAIL

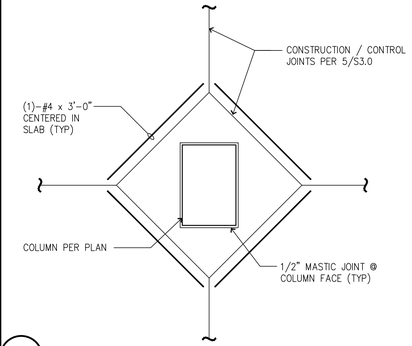


11 TYPICAL ELEVATOR PIT

SCALE: 1/2"=1'-0"



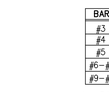
8 TYPICAL SLAB ON GRADE STAIRS

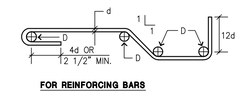


4 TYP SLAB ISOLATION JOINT

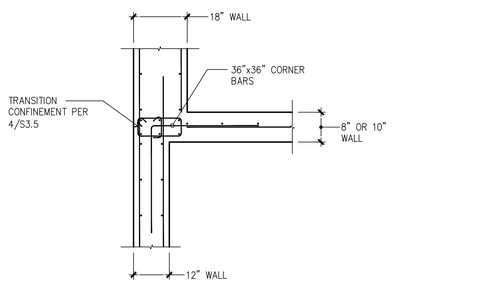
BAR	D
#3	6d
#4	6d
#5	6d
#6-#8	6d
#9-#11	8d

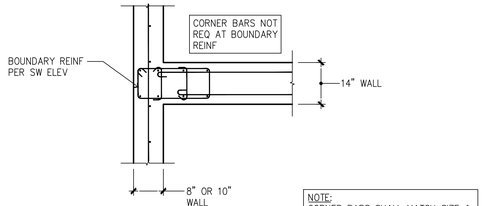
d = BAR DIAMETER



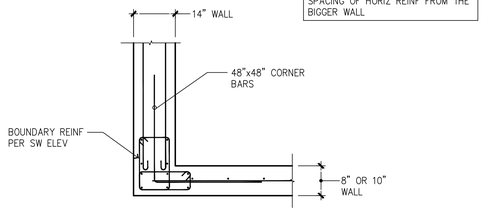


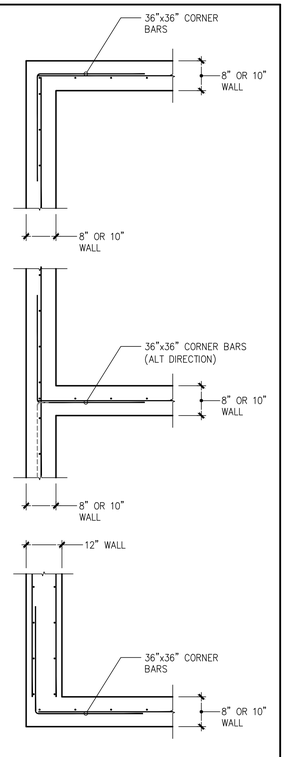
2 BAR BENDING DETAIL





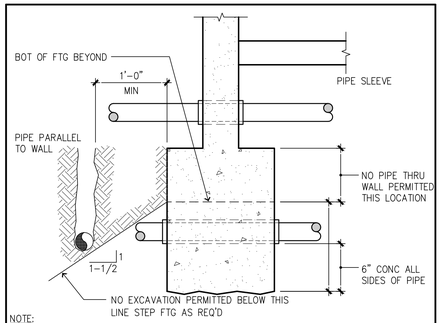
NOTE:
CORNER BARS SHALL MATCH SIZE & SPACING OF HORIZ REINF FROM THE BIGGER WALL





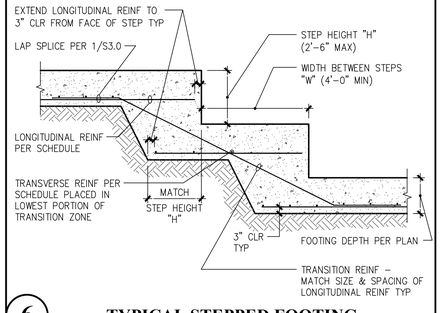
10 DETAIL

SCALE: 1/2"=1'-0"



NOTE:
1. THIS DETAIL SHOWS PERMISSABLE LOCATION OF PIPE OR EXCAVATIONS
2. FOR PIPES GREATER THAN 3'-0" BELOW FTG BACKFILL TRENCH W/ STRUCTURAL BACKFILL

7 TYP DETAIL OF PIPE @ CONC FOOTINGS



6 TYPICAL STEPPED FOOTING

REINFORCEMENT DEVELOPMENT AND SPLICE LENGTHS
IN ACCORDANCE WITH ACI 318

Ld = TENSION DEVELOPMENT LENGTH
Lt = DEVELOPMENT LENGTH OF TOP BARS IN TENSION
Lsb = TENSION LAP SPLICE LENGTH FOR BARS OTHER THAN TOP BARS
Lsbt = TENSION LAP SPLICE LENGTH FOR TOP BARS

IF THE REINF. DOES NOT SATISFY THE REQUIREMENTS ABOVE, THEN ALL VALUES NOTED IN THE TABLE SHALL BE MULTIPLIED BY 1.5

3000 psi conc, Fy=60 ksi Rebar				
BAR SIZE	Ld (inches)	Lt (inches)	Lsb (inches)	Lsbt (inches)
#3	17	22	22	28
#4	22	29	29	38
#5	28	36	36	47
#6	33	43	43	56
#7	48	63	63	81
#8	55	72	72	93
#9	62	81	81	105
#10	70	91	91	118
#11	78	101	101	131
#14	94	121	COUPLER REQ.	

4000 psi conc, Fy=60 ksi Rebar				
BAR SIZE	Ld (inches)	Lt (inches)	Lsb (inches)	Lsbt (inches)
#3	15	19	19	25
#4	19	25	25	33
#5	24	31	31	41
#6	29	37	37	49
#7	42	54	54	71
#8	48	62	62	81
#9	54	70	70	91
#10	61	79	79	102
#11	67	87	87	114
#14	80	104	COUPLER REQ.	

5000 psi conc, Fy=60 ksi Rebar				
BAR SIZE	Ld (inches)	Lt (inches)	Lsb (inches)	Lsbt (inches)
#3	13	17	17	22
#4	17	23	23	29
#5	22	28	28	36
#6	26	34	34	44
#7	38	49	49	63
#8	43	56	56	72
#9	48	63	63	81
#10	54	71	71	92
#11	60	78	78	102
#14	72	94	COUPLER REQ.	

6000 psi conc, Fy=60 ksi Rebar				
BAR SIZE	Ld (inches)	Lt (inches)	Lsb (inches)	Lsbt (inches)
#3	12	16	16	20
#4	16	21	21	27
#5	20	26	26	33
#6	24	31	31	40
#7	34	45	45	58
#8	39	51	51	66
#9	44	57	57	74
#10	50	64	64	84
#11	55	71	71	93
#14	66	85	COUPLER REQ.	

HORIZONTAL REINF. SHALL BE PROVIDED WITH Lsbt LAP SPLICES AT THE FOLLOWING LOCATIONS U.N.O:

A) AT ALL CONCRETE WALLS
B) BEAMS OR WALLS IN GENERAL WITH MORE THAN 12" OF FRESH CONCRETE CAST IN THE MEMBER BELOW THE HORIZONTAL REINF. BEING SPLICED.

VERTICAL REINF. SHALL BE PROVIDED WITH Lsb LAP SPLICES U.N.O.

MECHANICAL COUPLER SPLICES REQUIRED FOR #14 REINFORCING BARS

1 REINFORCING SPLICE & DEVELOPMENT LENGTH SCHEDULE

STATE OF WASHINGTON
THOMAS L. CHASE
20019
REGISTERED PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

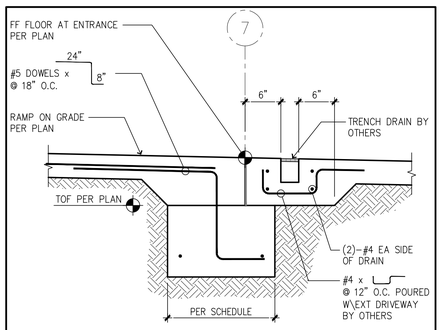
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

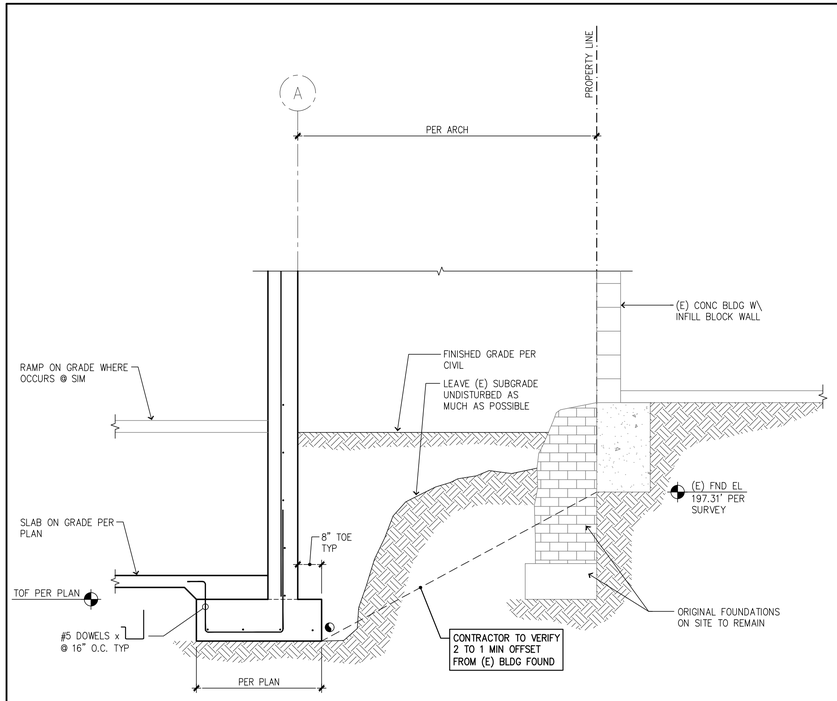
PERMIT SUBMITTAL
4-7-23

S3.0

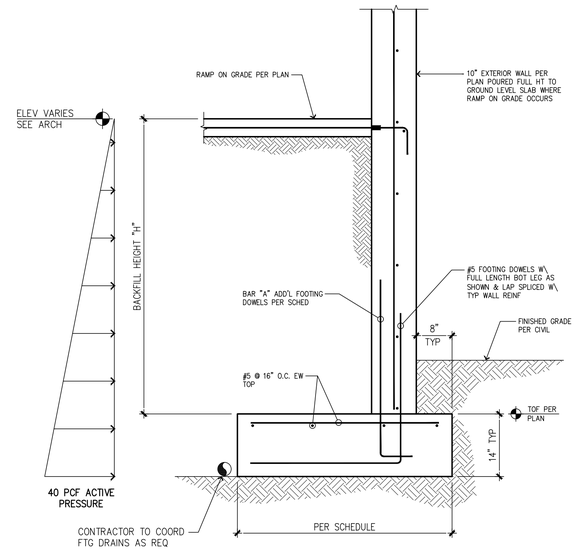
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.0.dwg PLOT DATE/TIME: 4/4/2023 - 3:07pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



7 GARAGE FOUNDATION AT ENTRANCE



4 FOOTING OFFSET AT EXISTING BULDING



DESIGN PARAMETERS

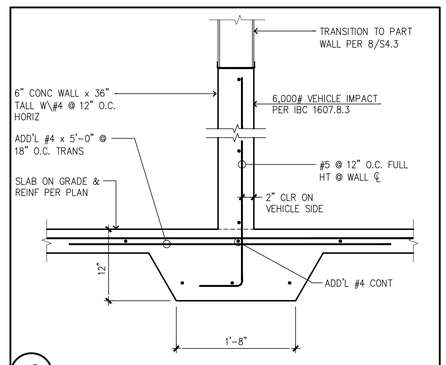
1. SOIL BRG. = 5,000 PSF
2. ACTIVE FLUID PRESSURE = 40 PCF
3. PASSIVE FLUID PRESSURE = 0 PCF
4. SOIL FRICTION COEF. = 0.45
5. SOIL UNIT WEIGHT = 120 PCF

NOTES:

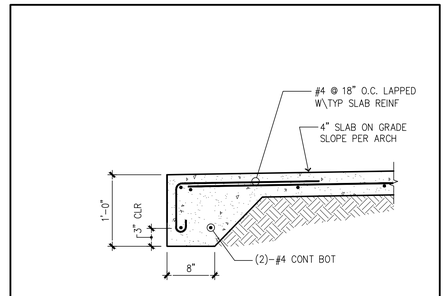
1. PROVIDE CORNER STEEL @ FTG. CORNERS & INTERSECTIONS. USE #4x24"x24" ELBOW STEEL TO LAP HORIZ. REINF.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND HEIGHTS PRIOR TO CONSTRUCTION. NOTIFY ENGR./ARCH OF ANY DISCREPANCIES.
3. PLACE SLAB ON GRADE PRIOR TO BACKFILLING, DO NOT PLACE WOOD FLOOR SYSTEM ABOVE UNTILL BACKFILLING IS COMPLETE
4. REINFORCEMENT GRADES SHALL TYPICALLY BE: GRADE 60 FOR ALL BARS
5. PROVIDE FREE DRAINING BACKFILL
6. DESIGN ASSUMES NO SURCHARGE LOADS FROM ABOVE, ADD 1" TO "W" WHERE WALL IS ADJACENT TO GARAGE.
7. HAND COMPACT ONLY WITHIN A DISTANCE EQUAL TO THE HEIGHT OF THE CONCRETE STEM.

WALL HEIGHT	FOOTING DIMENSIONS					BAR "A"			BAR "B"
	TOE	STEM	HEEL	TOTAL	"T" THKNS	"H" HORIZ.	"V" VERT.	SIZE & SPACING	SIZE & SPACING
10'-0"	8"	10"	3'-10"	5'-4"	14"	1'-0"	5'-6"	#5 @ 16" O.C.	#5 @ 16" O.C.
8'-0"	8"	10"	2'-6"	4'-0"	14"	1'-0"	4'-6"	#4 @ 16" O.C.	#5 @ 16" O.C.
6'-0"	8"	10"	2'-0"	3'-6"	14"	–	–	–	#5 @ 16" O.C.

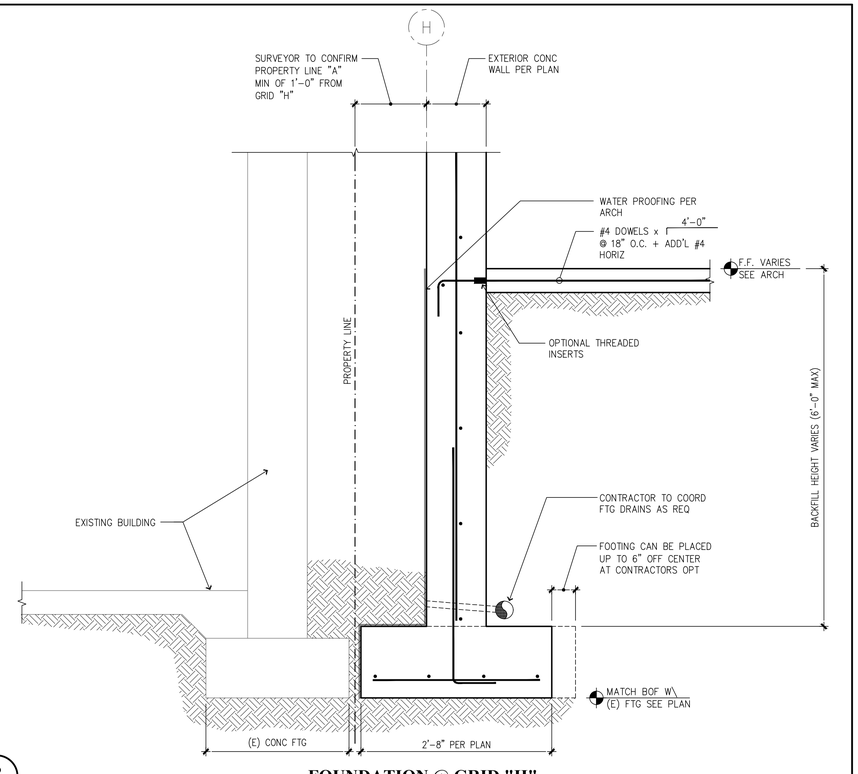
2 RETAINING WALL AT RAMP



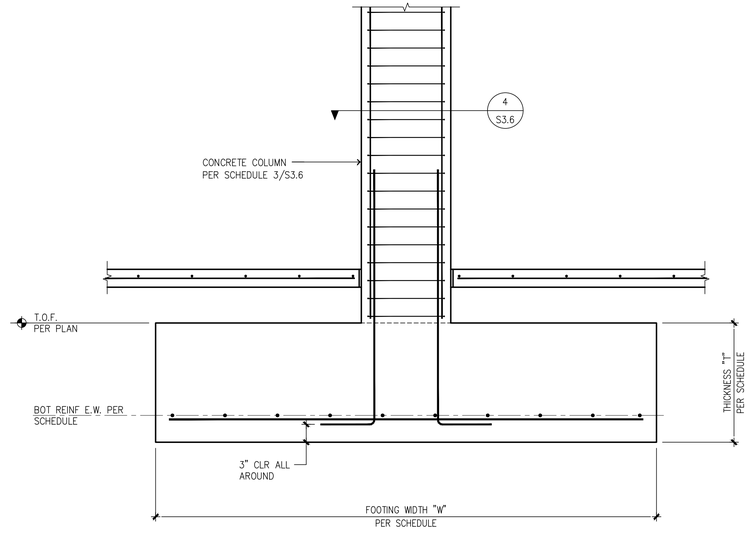
6 PARTIAL HT GARAGE WALLS



5 THICKENED SLAB EDGE



3 FOUNDATION @ GRID "H"



1 TYPICAL CONCRETE SPREAD FOOTING

4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

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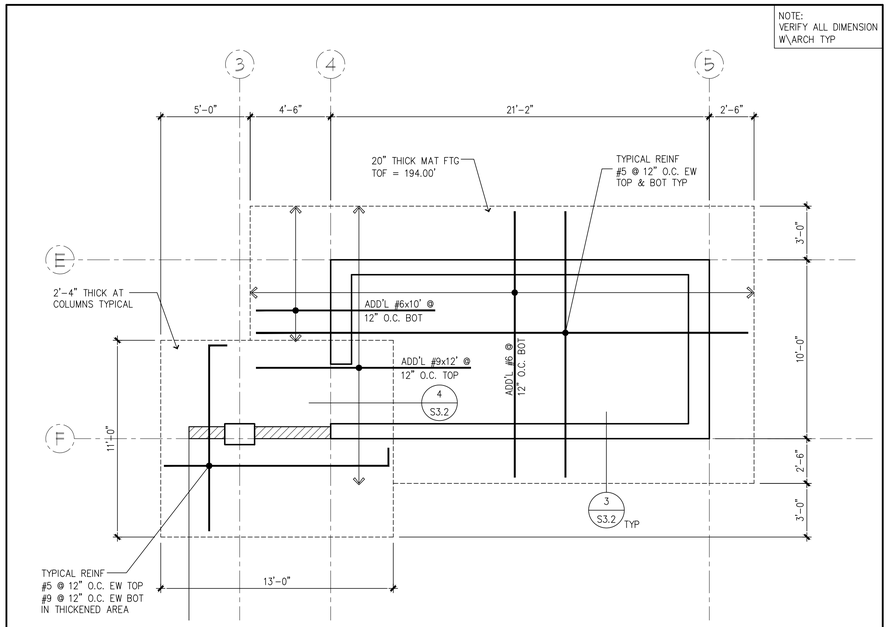
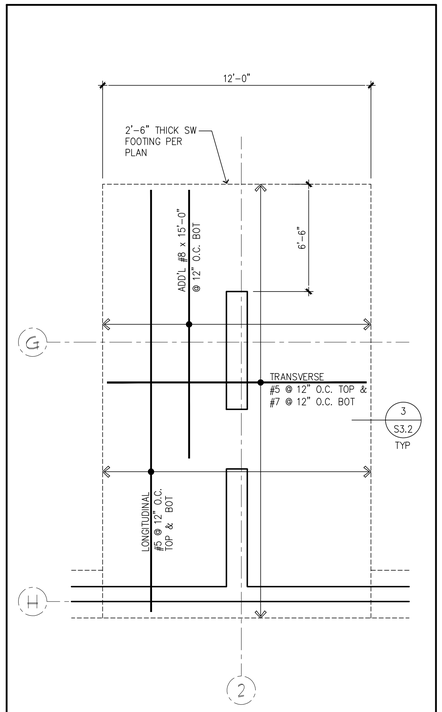
PERMIT SUBMITTAL
4-7-23

S3.1

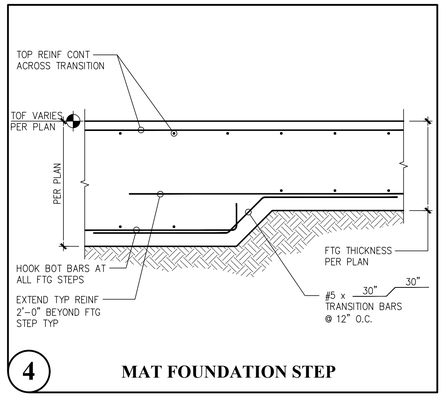
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.1.dwg PLOT DATE/TIME: 4/4/2023 - 3:19pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



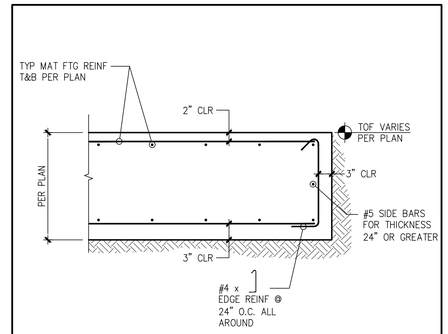
7 **MAT FOUNDATION (PARTIAL PLAN)**



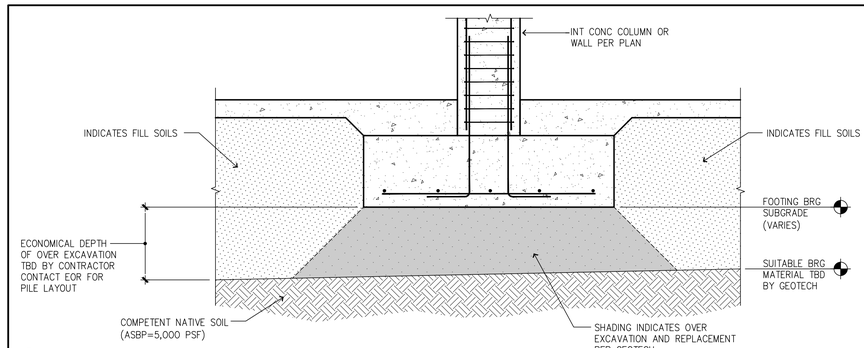
6 **SHEARWALL FOOTING**



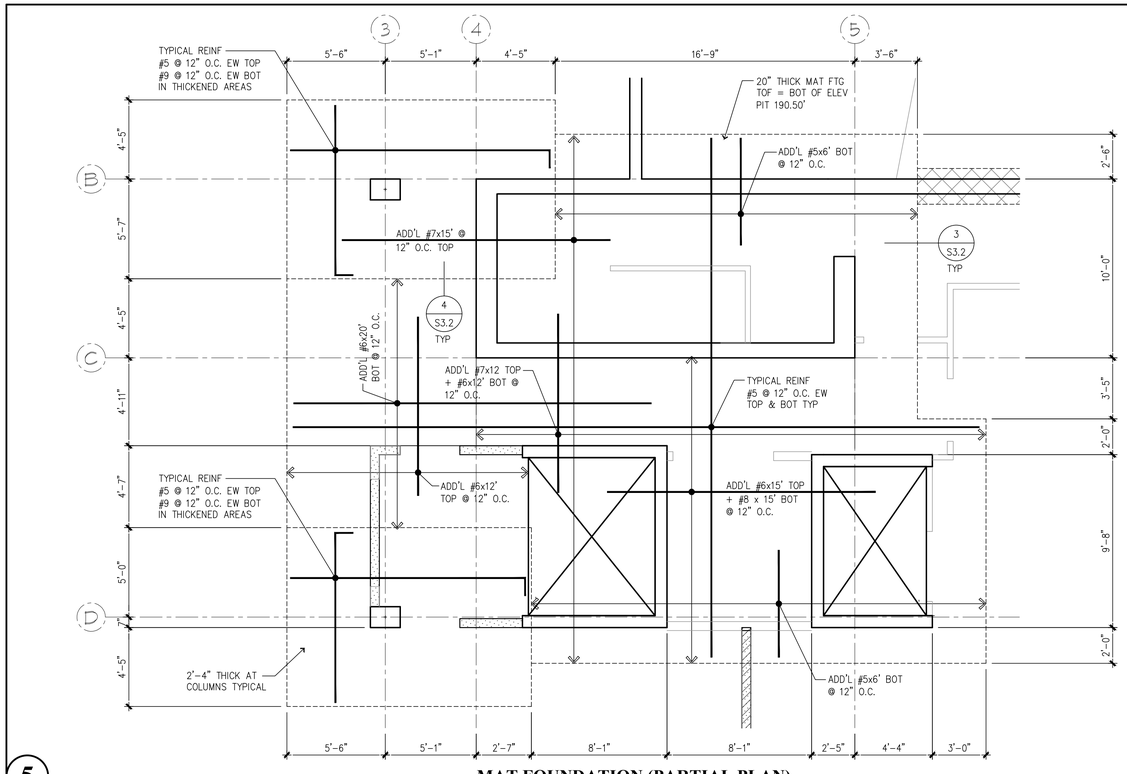
4 **MAT FOUNDATION STEP**



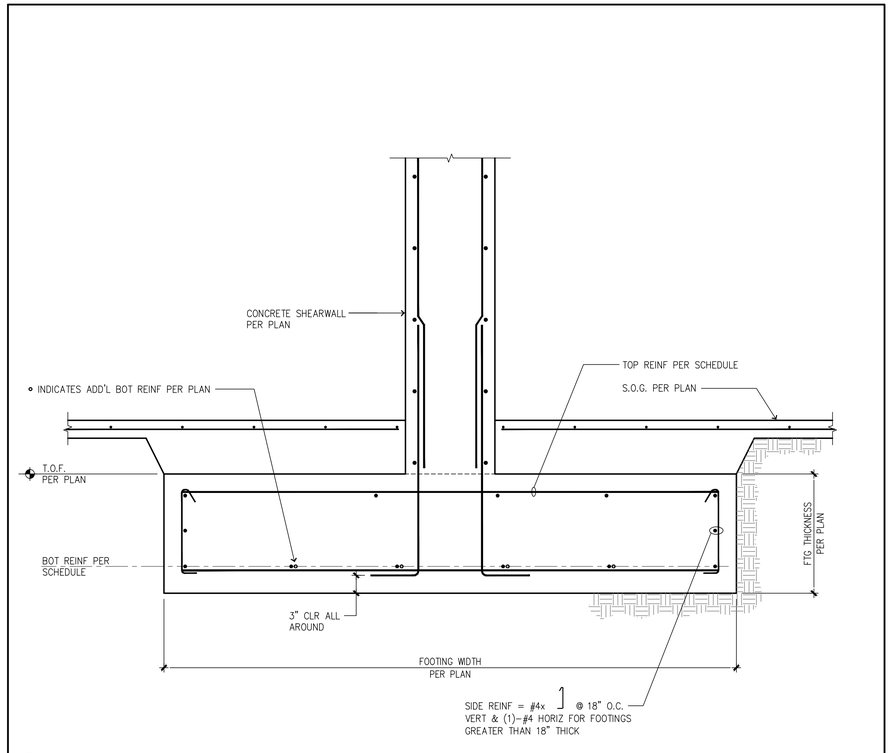
3 **MAT FOUNDATION EDGE REINF**



2 **INTERIOR FOUNDATION AT FILL SOILS (OVER EXCAVATION OPT)**



5 **MAT FOUNDATION (PARTIAL PLAN)**



1 **TYPICAL SHEARWALL FOOTING**

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

STATE OF WASHINGTON
THOMAS L. CHASE
40752
REGISTERED PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO.	21.043
DESIGNED BY	MRO, TLC, OGK
DRAWN BY	RSO
ISSUE DATE	11-7-22
LATEST REV. OF DWG. SET	4-7-23

PERMIT SUBMITTAL
4-7-23

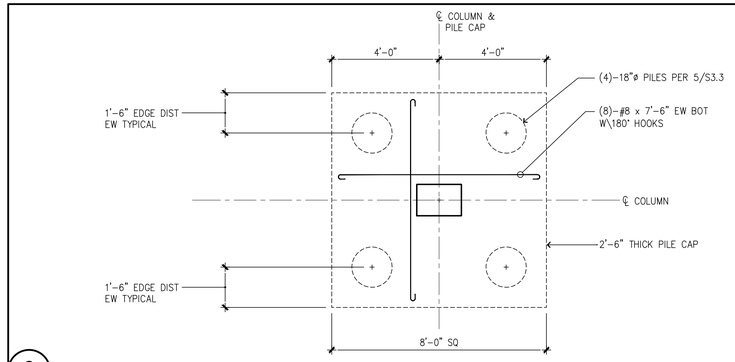
S3.2

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.2.dwg PLOT DATE/TIME: 4/4/2023 - 3:20pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.3.dwg
PLOT DATE/TIME 4/4/2023 - 3:22pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

6

TITLE



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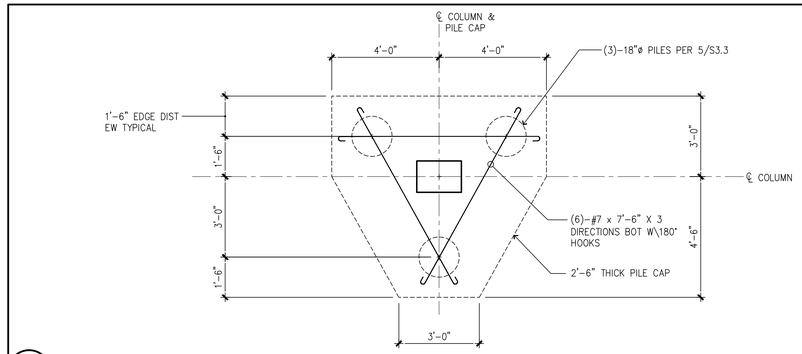
TYPICAL PILE CAP (PC4)



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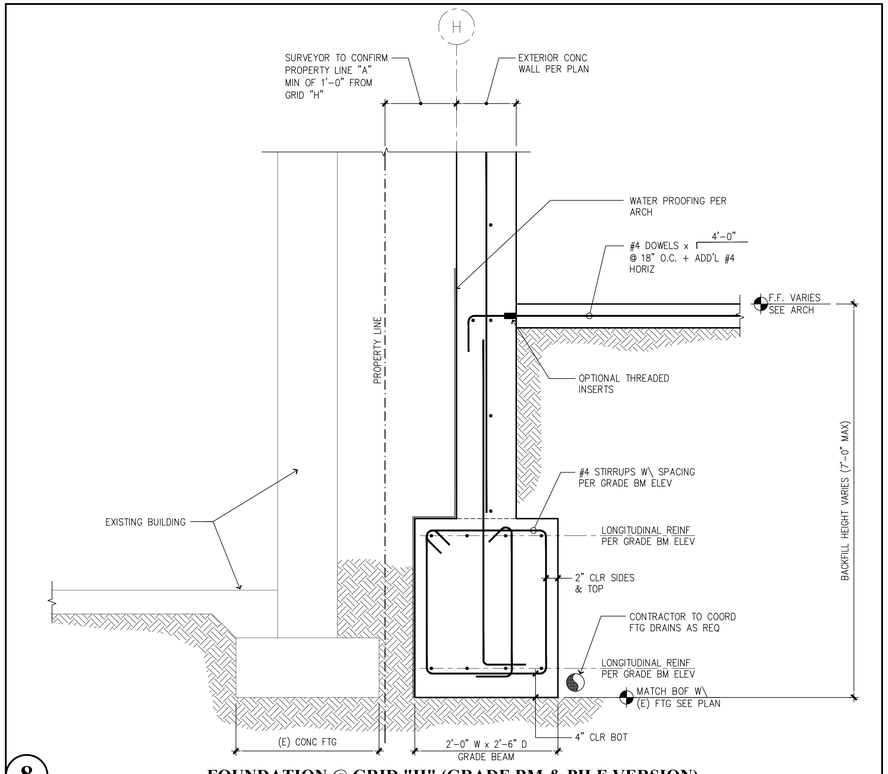

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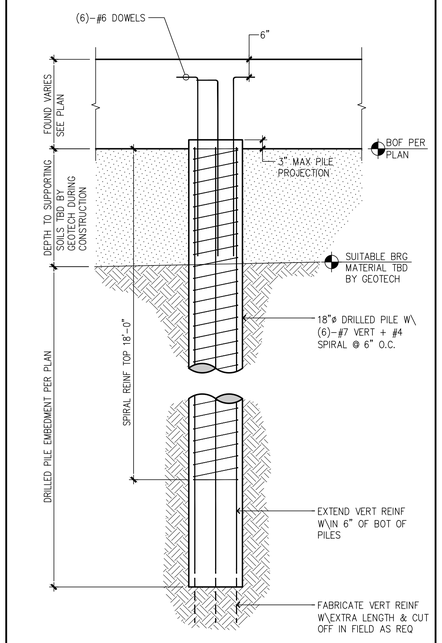
FOUNDATION @ GRID "H" (GRADE BM & PILE VERSION)



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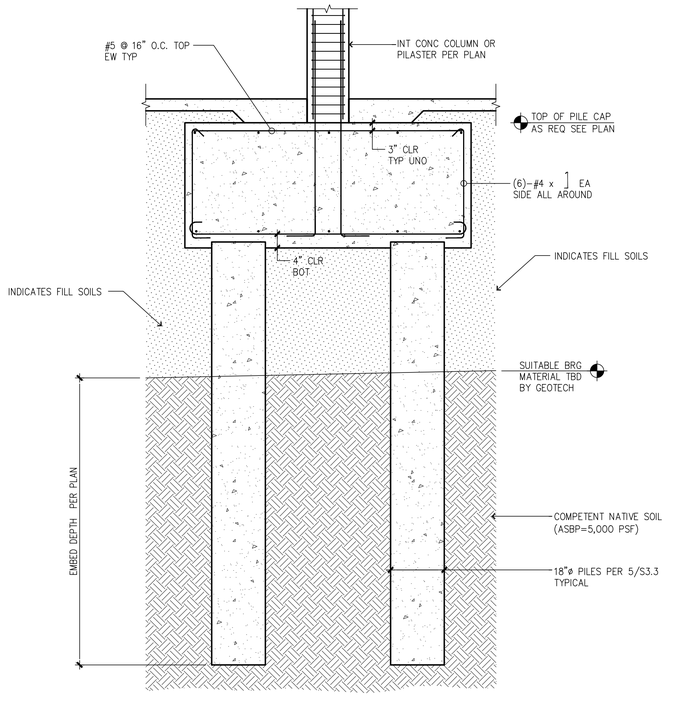
TYPICAL CONCRETE PILE



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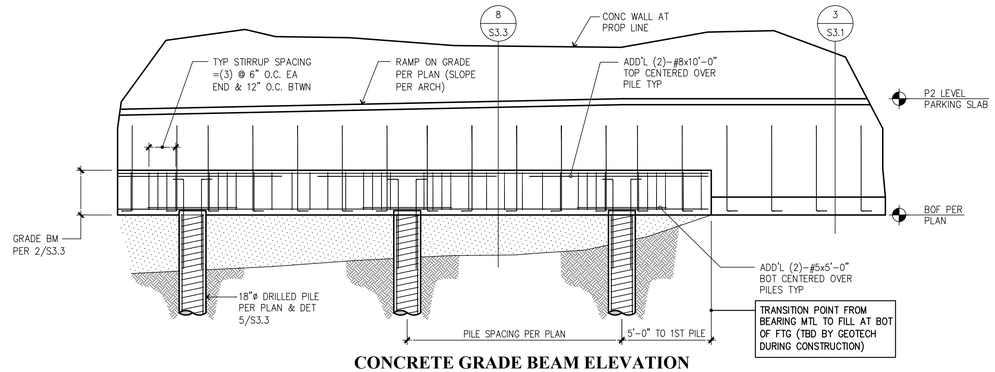
INTERIOR FOUNDATION IN FILL SOILS (PILE OPTION)



4

CONCRETE GRADE BEAM ELEVATION

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

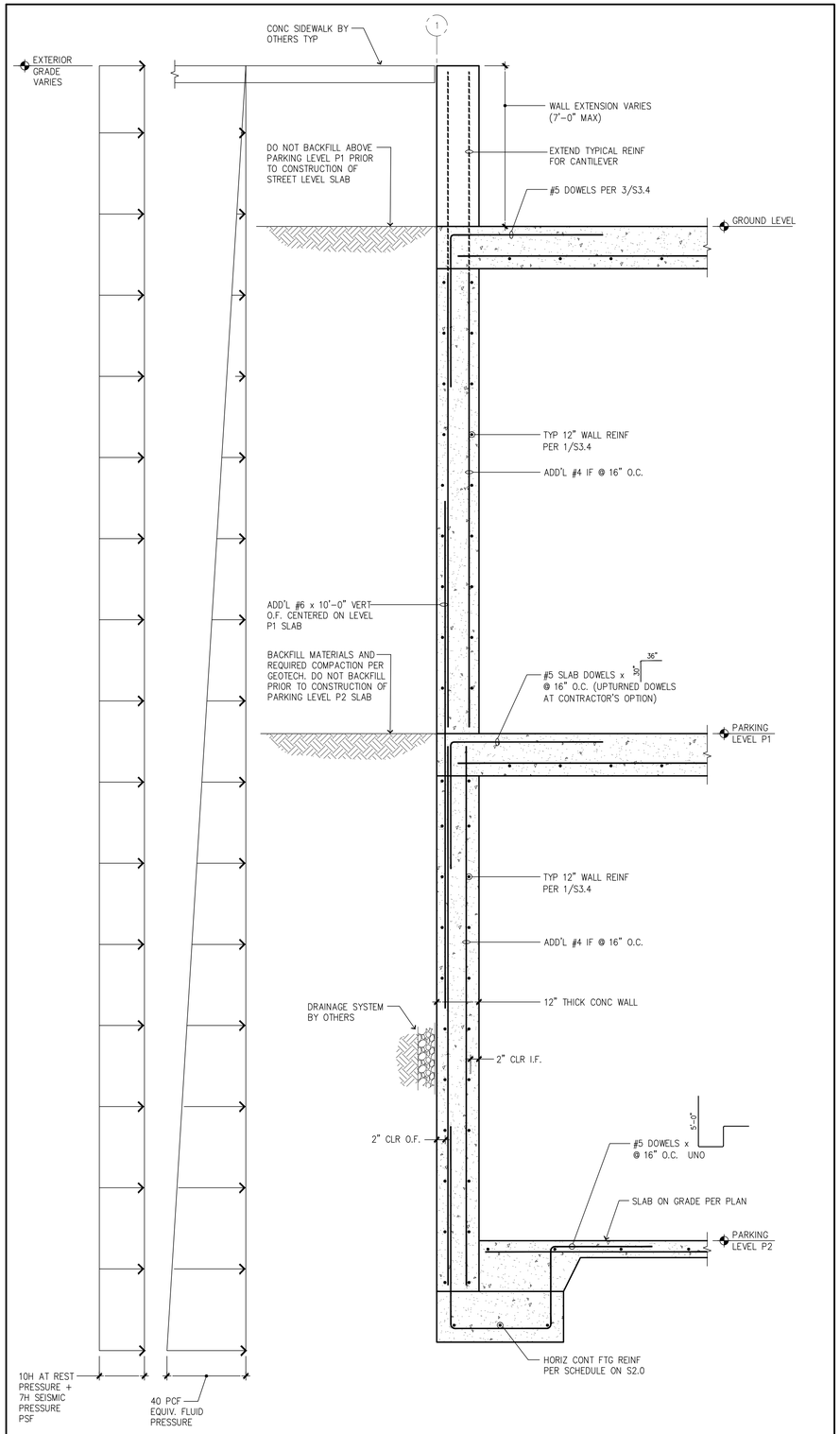
St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

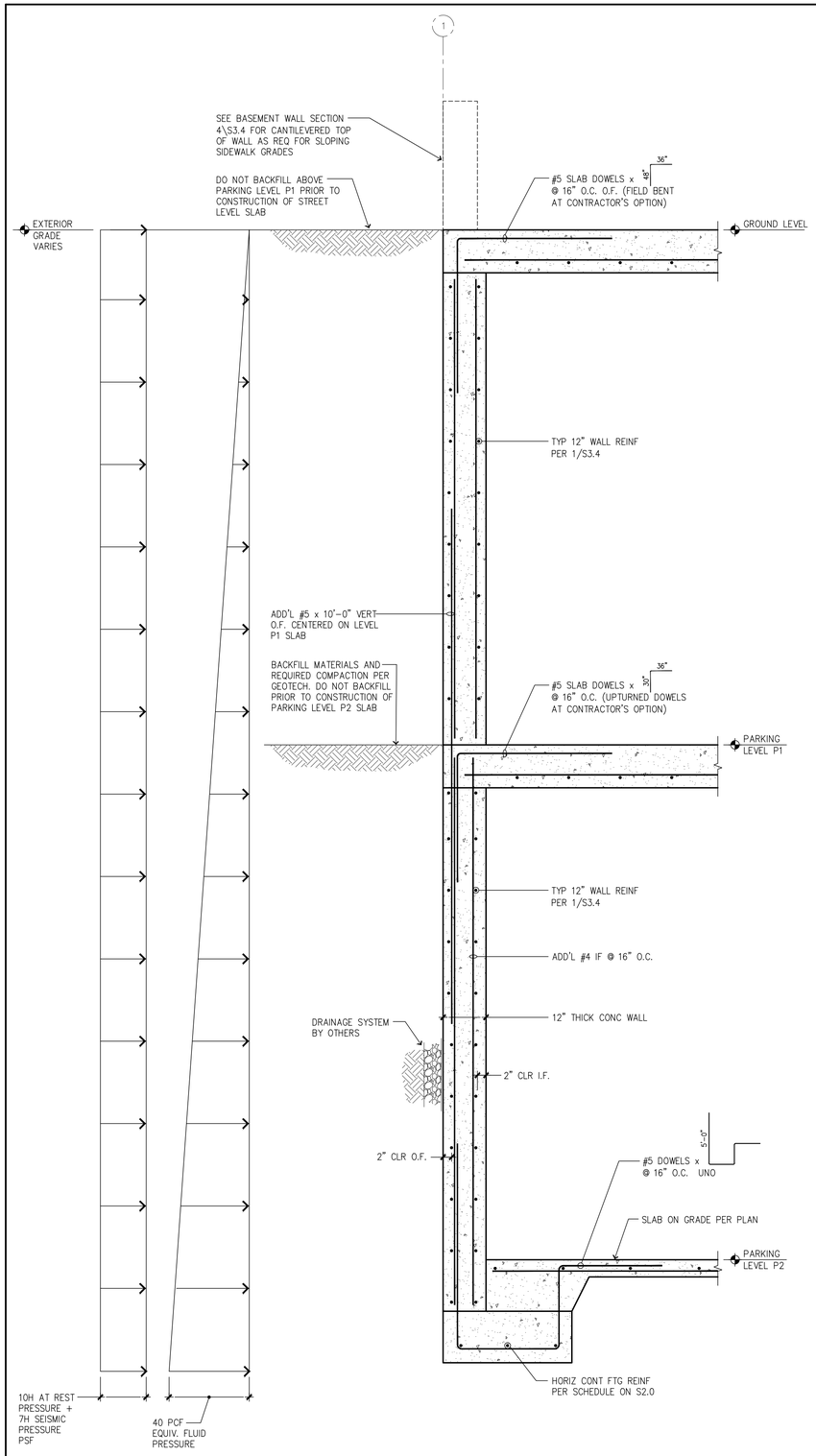
PERMIT SUBMITTAL
4-7-23

S3.3



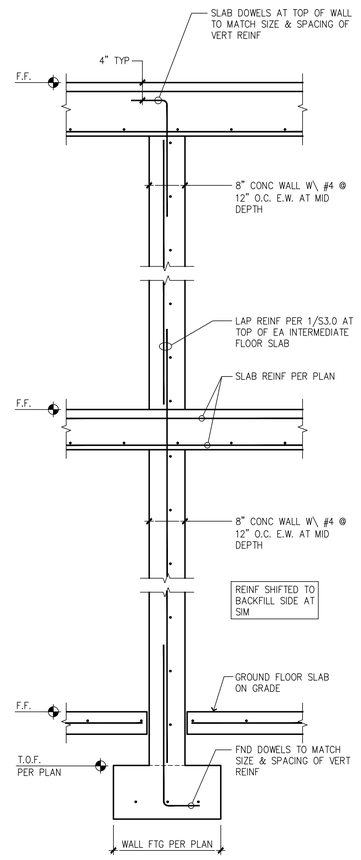
4 **BASEMENT WALL + CANTILEVERED SIDEWALK SECTION**

SCALE: 3/4"=1-0"



3 **TYPICAL BASEMENT WALL SECTION**

SCALE: 3/4"=1-0"



2 **TYPICAL 8" CONC WALL**

CONCRETE WALL REINF SCHEDULE		
THICKNESS	VERT REINF	HORIZ REINF
8"	#4 @ 12" O.C. MID	#4 @ 12" O.C. MID
10"	#5 @ 16" O.C. MID	#5 @ 16" O.C. MID
12"	#5 @ 16" O.C. EF	#4 @ 16" O.C. EF
14"	#5 @ 12" O.C. EF	#5 @ 16" O.C. EF

NOTES:

1. REINFORCING LISTED IS THE BASELINE REINF FOR EACH WALL THICKNESS.
2. SEE 10/S3.0 FOR CORNER BARS AT WALL INTERSECTIONS.
3. SEE SHEETS S4.1 & S4.2 FOR ADD'L REINFORCEMENT AT SHEARWALLS.
4. SEE SECTION 3/S3.4 & 4/S3.4 FOR ADD'L REINFORCEMENT AT BASEMENT WALLS ON GRID "1"
5. SEE PLANS FOR ADD'L NOTES ON SLAB DOWELS

1 **TYPICAL REINF IN CONC WALLS**

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

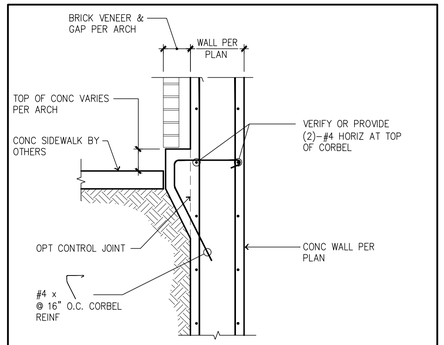
Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 1 4-7-23

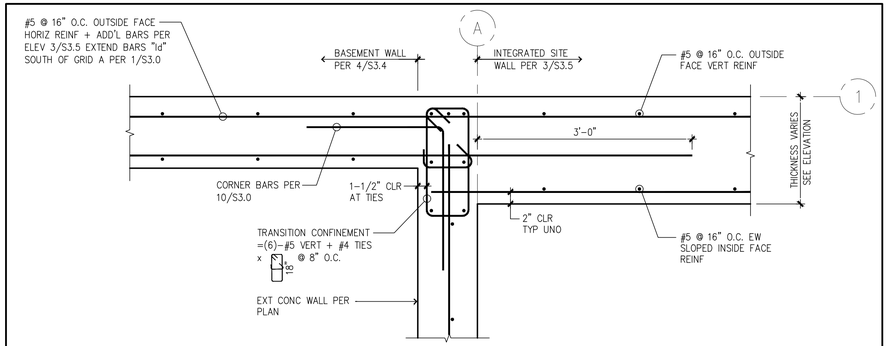
PERMIT SUBMITTAL
4-7-23

S3.4

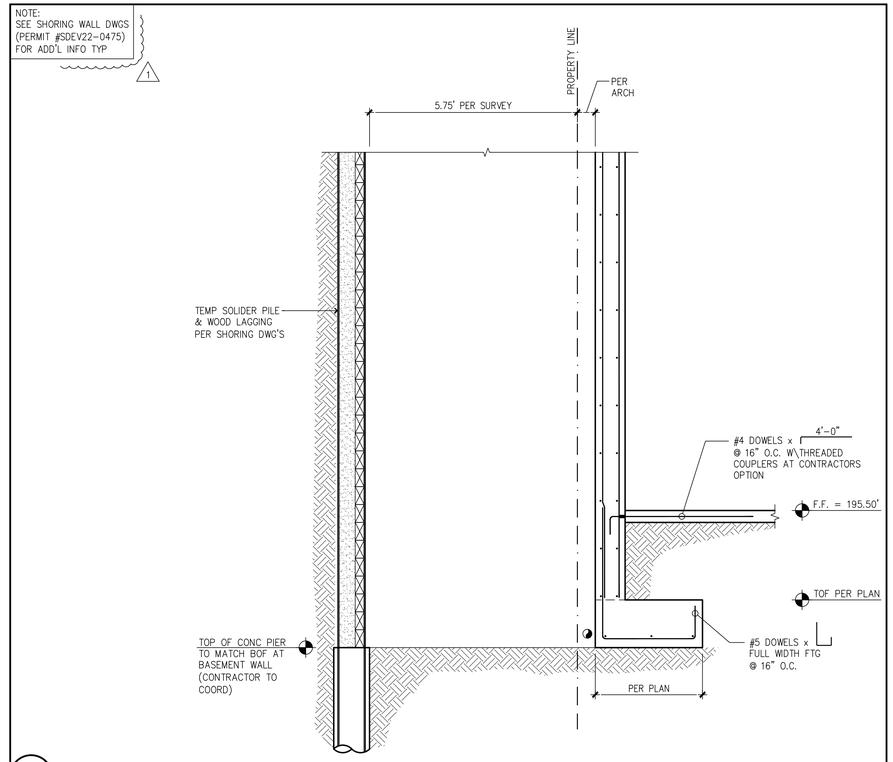
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.4.dwg PLOT DATE/TIME: 4/4/2023 - 3:23pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



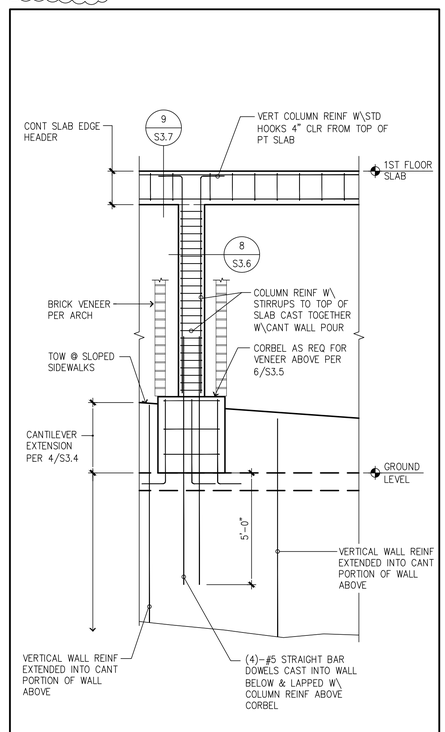
7 VENEER CORBEL AT CONCRETE WALL
SCALE: 3/4"=1'-0"



4 BASEMENT WALL TRANSITION

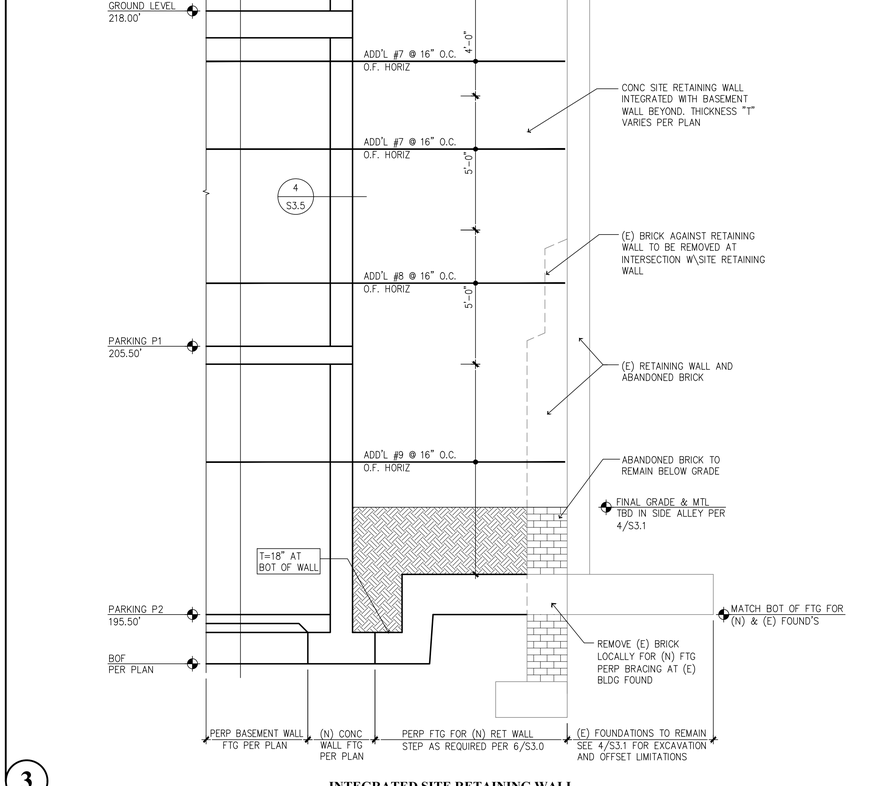


2 FOOTING OFFSET AT EXISTING TEMPORARY SHORING

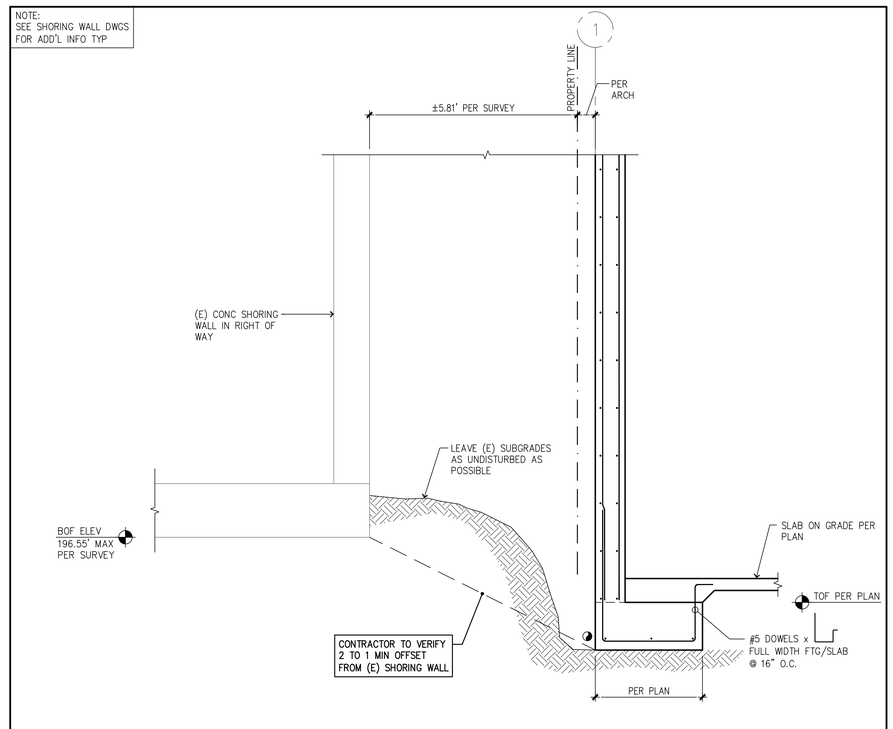


6 VENEER CORBEL AT CONCRETE WALL
SCALE: 3/4"=1'-0"

5 EXTERIOR COLUMN ELEVATION @ GRID 1



3 INTEGRATED SITE RETAINING WALL



1 FOOTING OFFSET AT EXISTING CONCRETE WALL

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.5.dwg PLOT DATE/TIME 4/5/2023 - 7:12am THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

STATE OF WASHINGTON 40752 REGISTERED PROFESSIONAL ENGINEER
4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:
4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

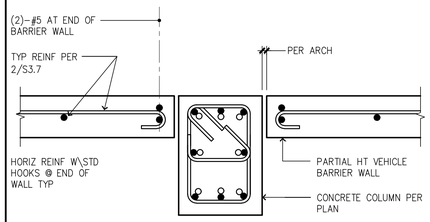
St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S3.5



PLAN DETAIL

6 VEHICLE BARRIER AT CONC COLUMN

Concrete Column Schedule

LEVEL	C–8	C–9	C–10	C–11
1ST FLOOR				
GROUND LEVEL	(6)–#7	(6)–#7	(6)–#7	(6)–#6
PARKING P1	(6)–#7	(6)–#7	(6)–#7	DOWELS TO WALL BELOW PER 5/S3.5
PARKING P2	(6)–#7	(6)–#8	(6)–#7	
FOUNDATION				
SIZE	14x20	14x24	14x20	12x16
DETAIL	4/S3.6	4/S3.6	5/S3.6	8/S3.6

NOTE:
COLUMNS ARE CALLED OUT AT THE FLOOR THAT THEY ORIGINATE

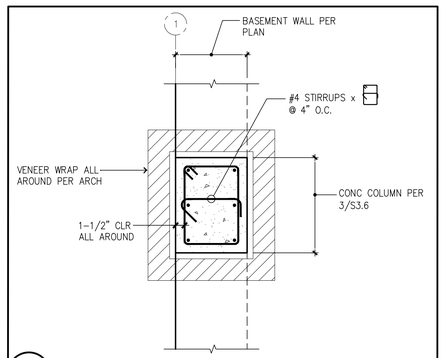
3 CONCRETE COLUMN SCHEDULE

Column Reinf Splice Schedule

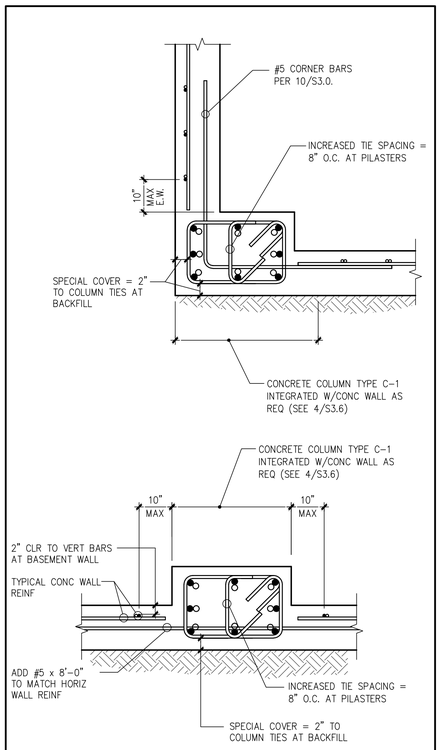
BAR SIZE	SPLICE LENGTH
#6	2'–4"
#7	2'–8"
#8	3'–0"
#9	3'–4"

NOTE:
THESE SPLICES ARE FOR VERTICAL COLUMN REINF ONLY SEE 1/S3.0 FOR ALL OTHER SPLICES

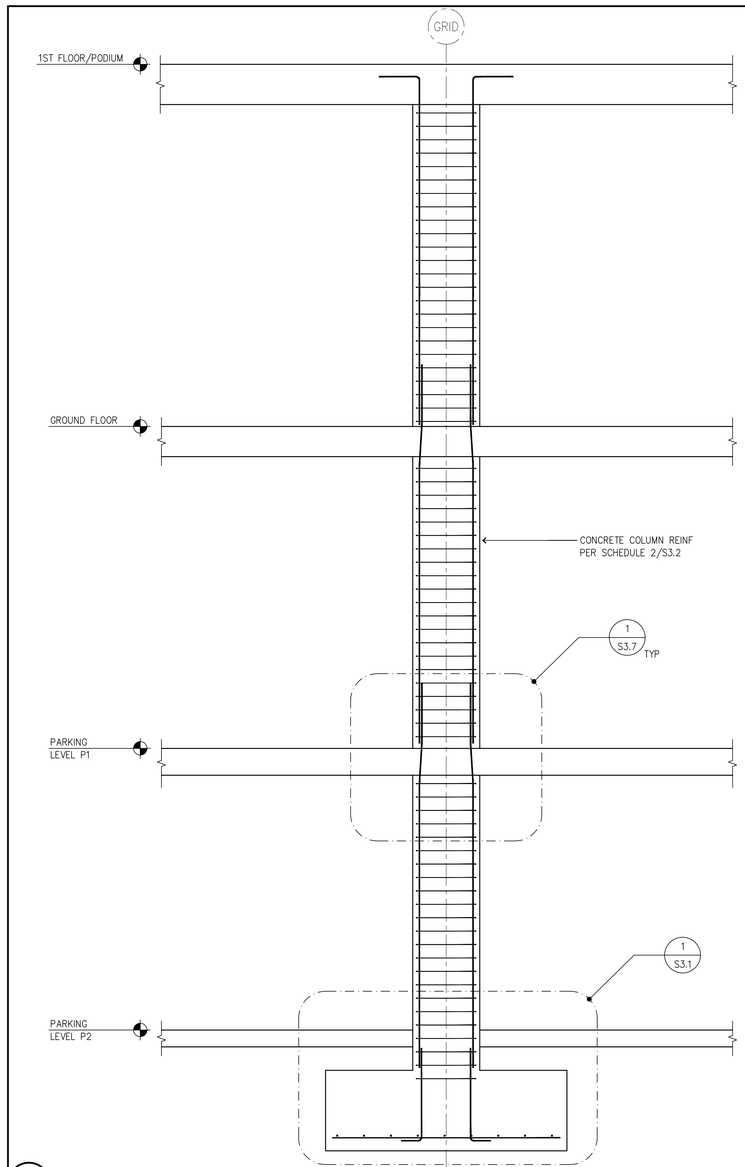
2 CONCRETE COLUMN SPLICE



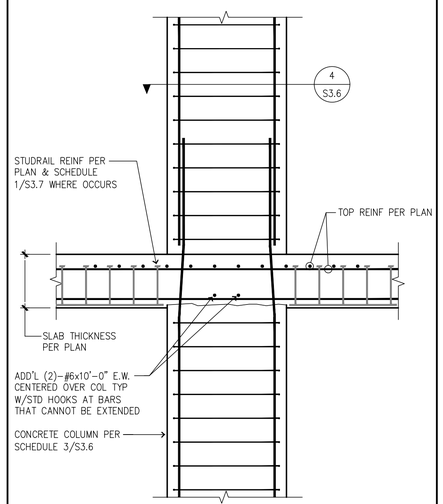
8 EXT COLUMN ABOVE BASEMENT WALL



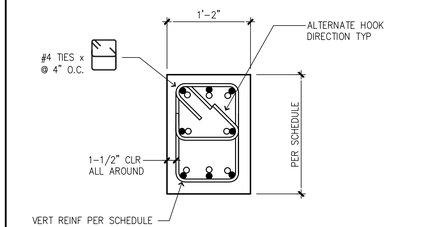
5 CONCRETE PILASTERS AT BASEMENT



1 TYPICAL CONCRETE COLUMN



7 TYPICAL COLUMN WITHOUT DROP CAP



4 TYPICAL CONCRETE COLUMN

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

St Helens Mixed Use
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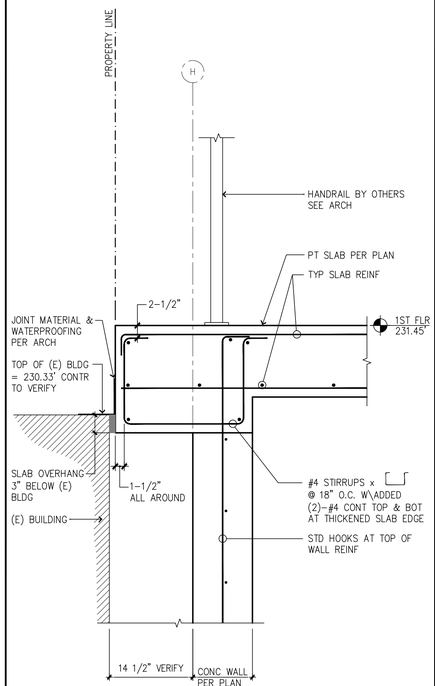
PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : △ 4-7-23

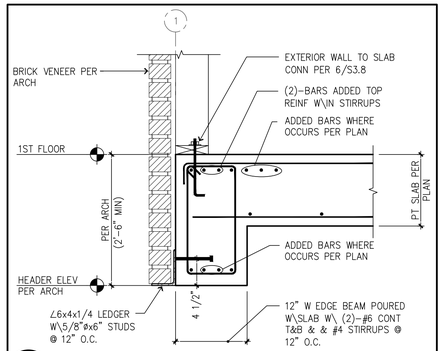
PERMIT SUBMITTAL
4-7-23

S3.6

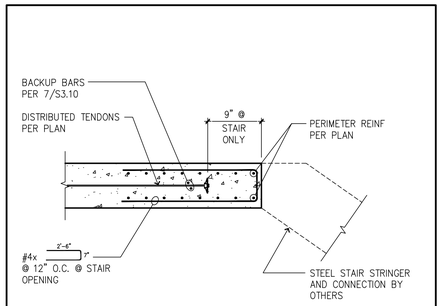
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.6.dwg PLOT DATE/TIME: 4/4/2023 – 3:25pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



10 **TYPICAL CANOPY STANCHION**

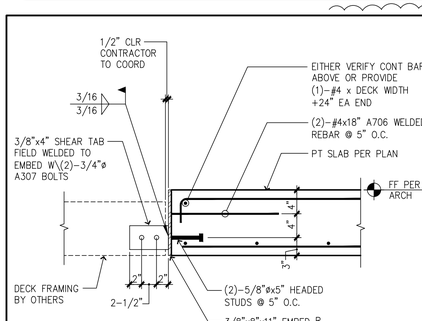


9 **BRICK VENEER @ CONC HEADER**



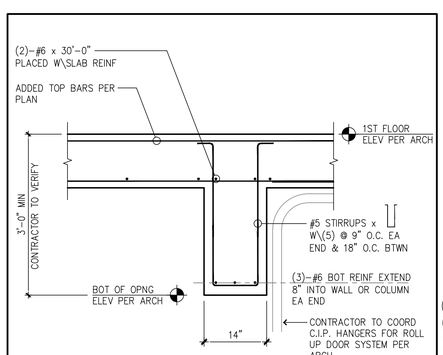
5 **SLAB EDGE @ STAIR**

7 **CONCRETE HEADER TRANSITION**



3 **GARAGE ENTRY HEADER**

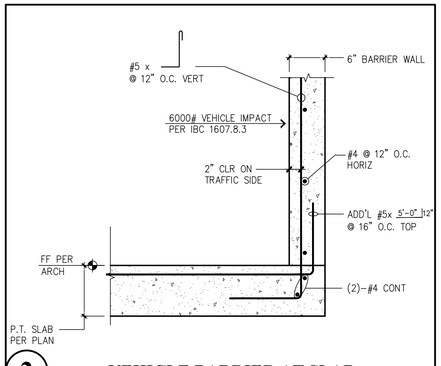
SCALE: 3/4"=1'-0"



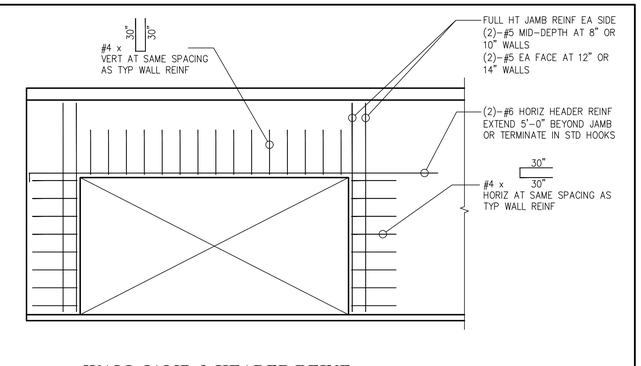
8 **GARAGE ENTRY HEADER**

1

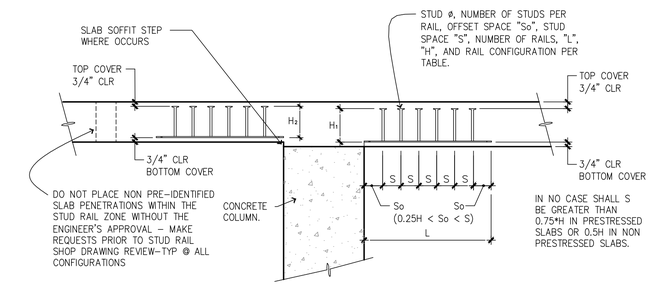
4 **DECK CONNECTION @ PT SLAB**

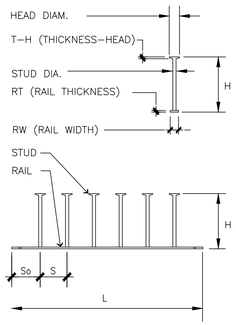


2 **VEHICLE BARRIER AT SLAB**



6 **WALL JAMB & HEADER REINF**



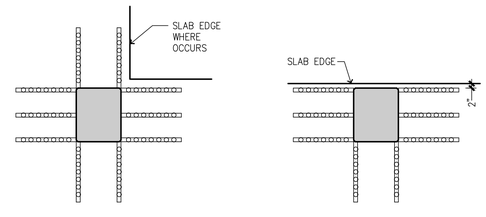


Stud Rail Callout Schedule				
CALLOUT	CONFIGURTION	NO. RAILS	STUDRIAL(1) TYPE	
SR-1	A	10	SR-A	PARKING P1
SR-2	A	10	SR-B	
SR-3	C	6	SR-B	
SR-4	B	8	SR-B	
SR-5	A	10	SR-C	GROUND
SR-6	A	10	SR-D	
SR-7	C	6	SR-D	
SR-8	A	10	SR-E	1ST FLOOR/PODIUM
SR-9	A	10	SR-F	
SR-10	A	10	SR-G	
SR-11	A	6	SR-G	
SR-12	B	8	SR-E	

Stud Geometry				
STUD DIAM	HEAD DIAM	T-H THICKNESS OF HEAD	RW RAIL WIDTH	RT RAIL THICKNESS
3/8"	1.19"	0.21"	1"	3/16"
1/2"	**1.58"**	**0.28"**	**1.25"**	**1/4"**
5/8"	1.98"	0.35"	1.75"	5/16"
3/4"	**2.37"**	**0.42"**	**2"**	**3/8"**

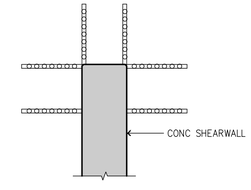
Stud Rail Type Schedule							
STUDRAIL TYPE	STUD DIA.	H RAIL HEIGHT	RAIL LENGTH (INCHES)	# STUDS PER RAIL	So (INCHES)	S (INCHES)	LEVEL
SR-A	1/2"	6-1/2"	31"	7	3.5	4	PARKING P1
SR-B	1/2"	6-1/2"	27"	5	3.5	5	
SR-C	1/2"	8"	41"	9	3.5	4.25	GROUND
SR-D	1/2"	8"	31"	5	3.5	6	
SR-E	3/4"	10-1/2"	58-1/2"	10	4.5	5.5	1ST FLOOR/PODIUM
SR-F	3/4"	10-1/2"	47-1/2"	8	4.5	5.5	
SR-G	3/4"	10-1/2"	49"	6	4.5	8	

1. STUDRAILS MANUFACTURED BY DECON OR APPROVED EQUIV. - TYP
2. WHERE NOTE (3) IS REFERENCED, "H" MAY DIFFER FROM THE TABULATED VALUE AND SHALL BE DETERMINED BASED ON SLAB THICKNESSES PER PLAN AND CLEAR COVERS AS NOTED ABOVE.



CONFIGURATION A

CONFIGURATION B



CONFIGURATION C

1 **STUD RAIL TYPES AND TABLES**

4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

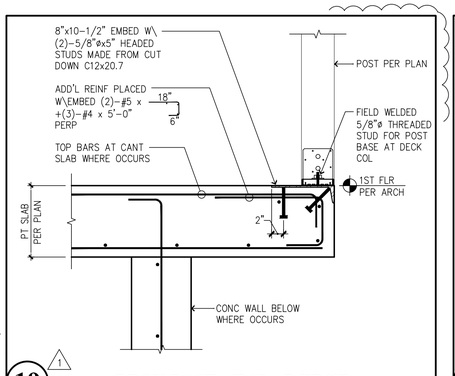
St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

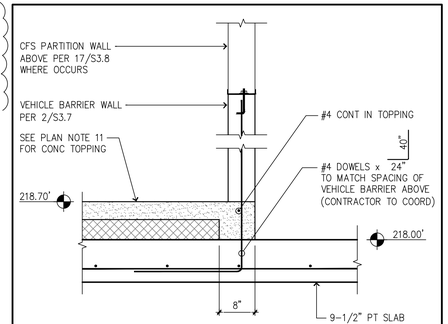
PERMIT SUBMITTAL
4-7-23

S3.7

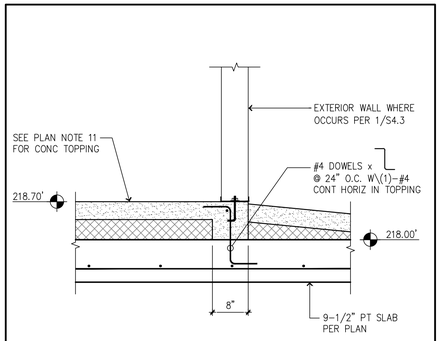
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.7.dwg
PLOT DATE/TIME 4/4/2023 - 3:26pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



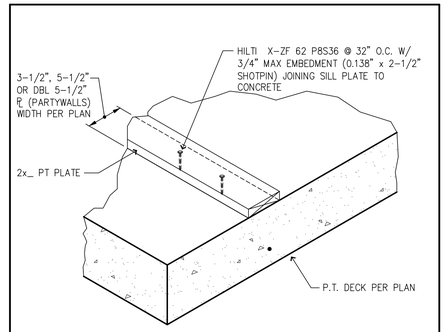
19 **DECK POST AT SLAB EDGE**



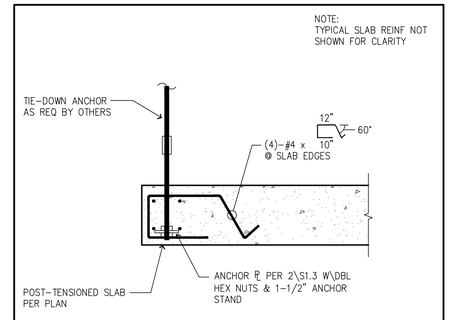
15 **TOPPING TRANSITION AT CONC WALL**



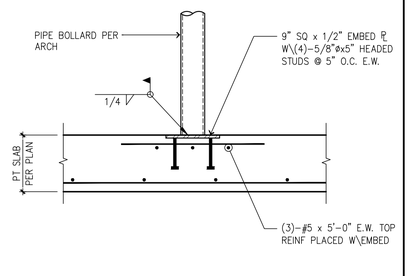
11 **TOPPING AT EXTERIOR TRANSITION**



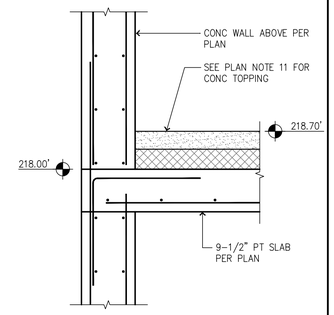
7 **INTERIOR NON-BEARING/ NON-SHEARWALL ATTACHMENT**



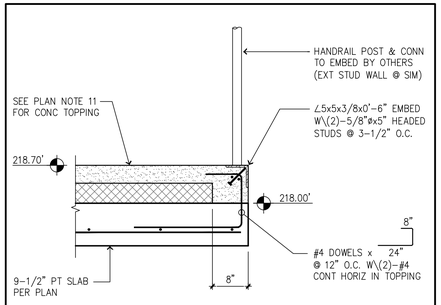
3 **TIEDOWN STIRRUP - TYPE B**



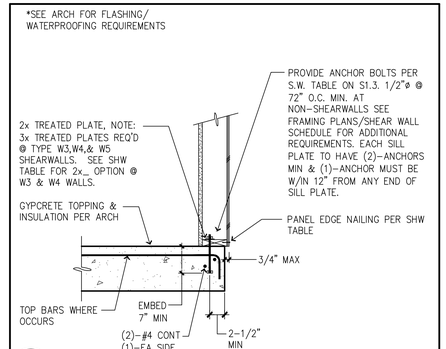
18 **TYPICAL PIPE BOLLARD**



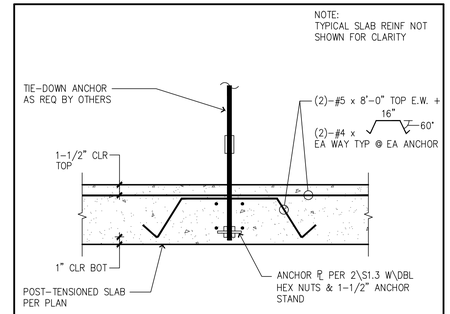
14 **TOPPING AT CONC WALL**



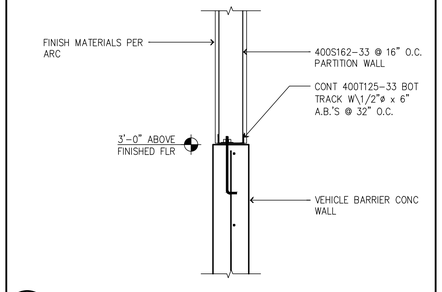
10 **TOPPING AT SLAB EDGE**



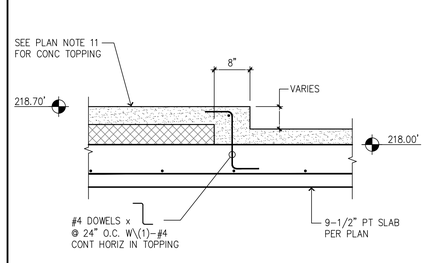
6 **TYPICAL EXTERIOR WALL ATTACHMENT**



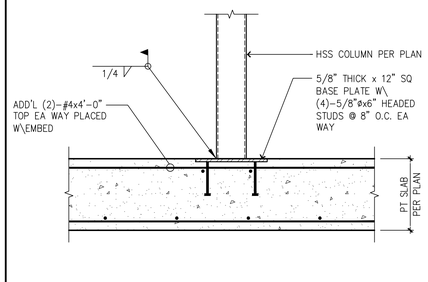
2 **TIEDOWN STIRRUP - TYPE A**



17 **PARTITION ABOVE CONC WALL**



13 **TOPPING TRANSITION AT RAMP**



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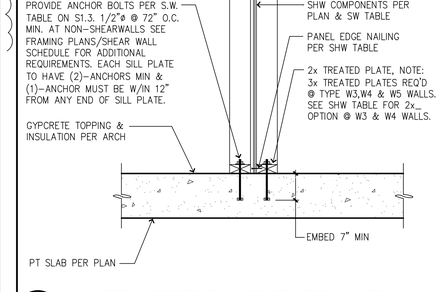
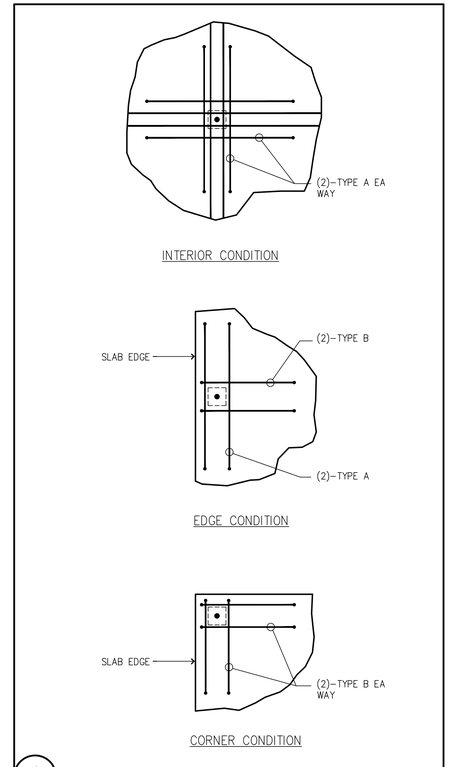
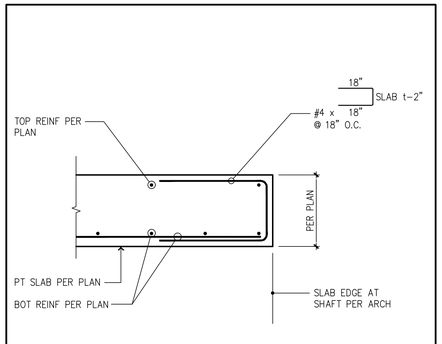
9 **HSS COLUMN AT PODIUM SLAB**



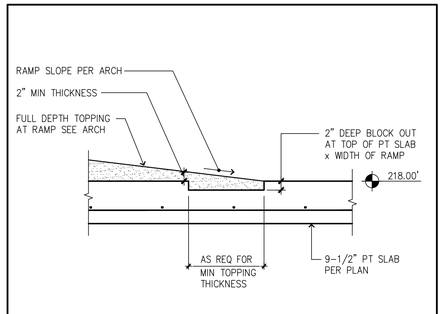
5 **ATTACHMENT @ UNIT SEPARATION WALLS**



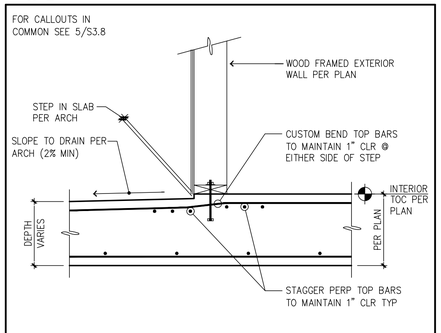
1 **HOLDOWN STIRRUPS - PLAN LAYOUTS**



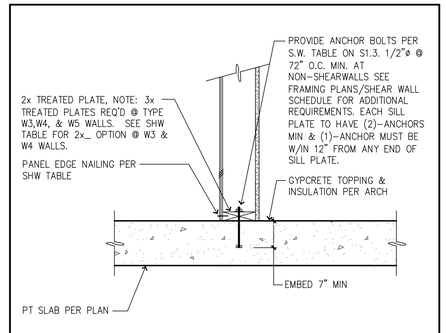
16 **SLAB EDGE AT SHAFT**



12 **BOTTOM OF TOPPING RAMP**



8 **TYPICAL SLAB STEP @ EXTERIOR WALL**



4 **TYPICAL INTERIOR BEARING WALL / SHEARWALL ATTACHMENT**

4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

1 4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

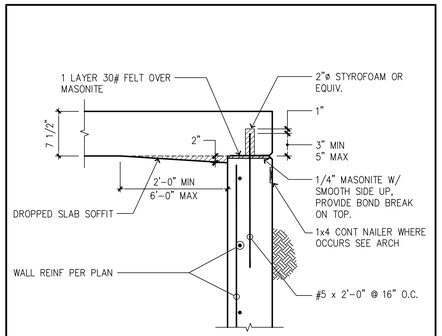
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 1 4-7-23

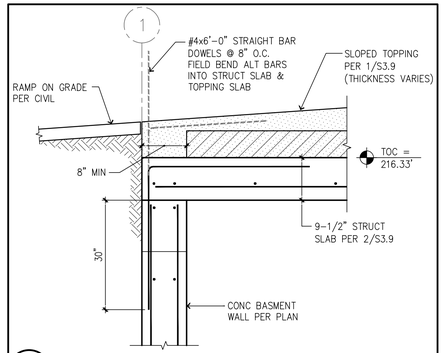
PERMIT SUBMITTAL
4-7-23

S3.8

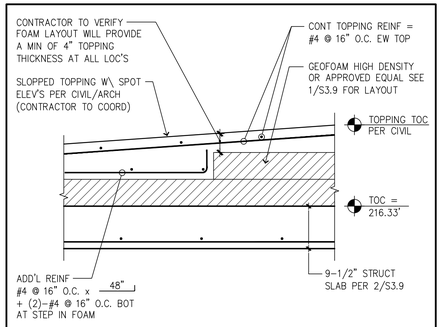
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.8.dwg
PLOT DATE/TIME: 4/4/2023 - 3:27pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



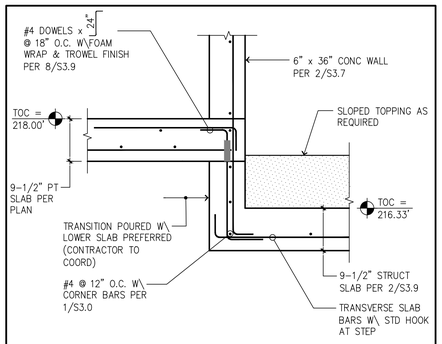
8 PERMANENT WALL RELEASE



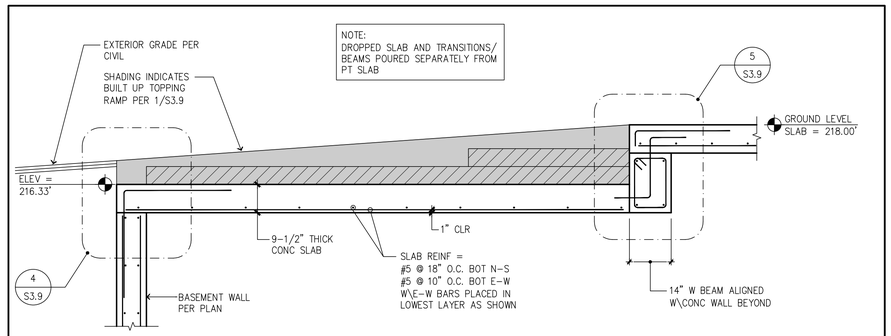
4 ENTRANCE RAMP SLAB TRANSITION



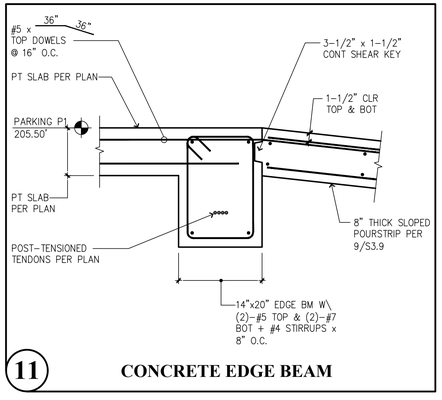
3 SLOPPED TOPPING SLAB



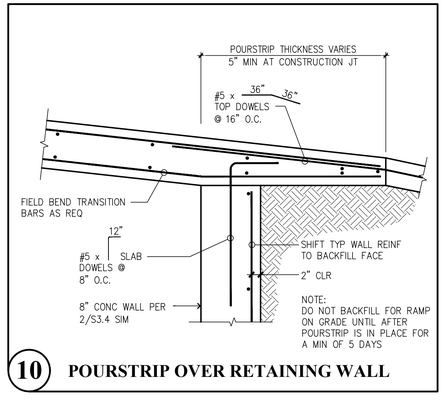
7 RAMP SLAB TRANSITION



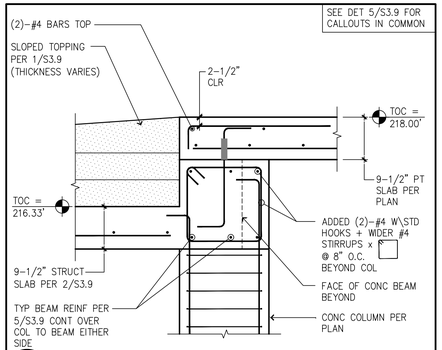
2 DROPPED SLAB AT ENTRY RAMP



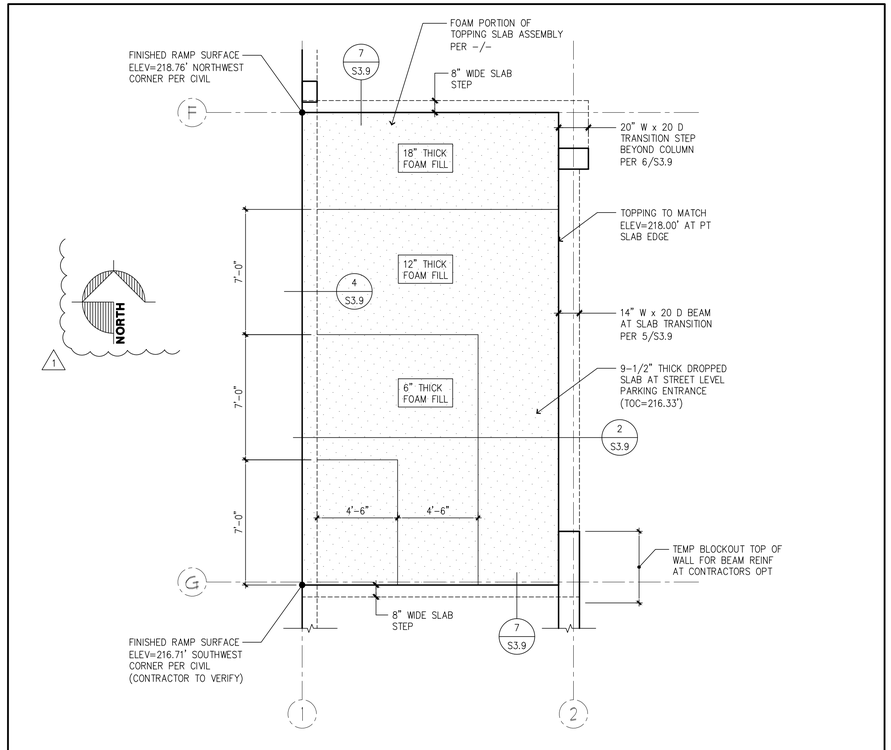
11 CONCRETE EDGE BEAM



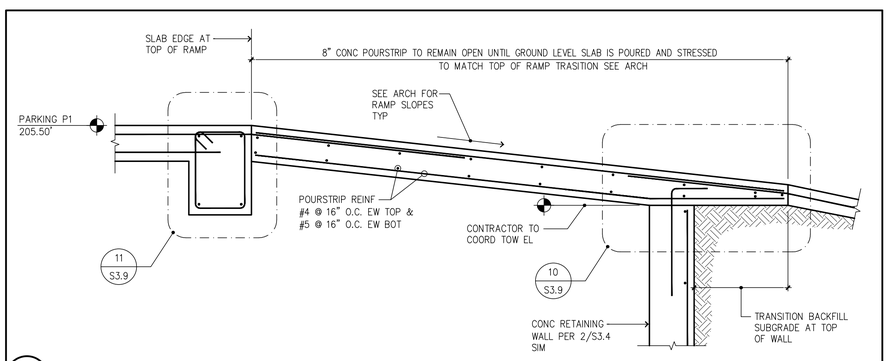
10 POURSTRIP OVER RETAINING WALL



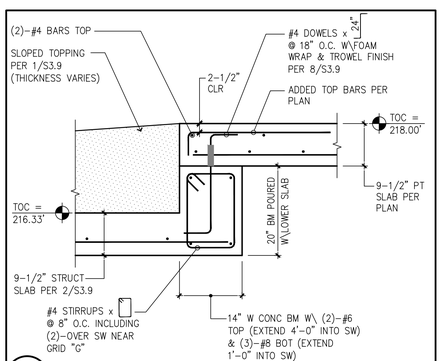
6 RAMP BEAM AT COLUMN



1 STEPPED SLAB AT ENTRANCE (PARTIAL PLAN)



9 RAMP TO PT SLAB POURSTRIP



5 RAMP BEAM AT TRANSITION

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

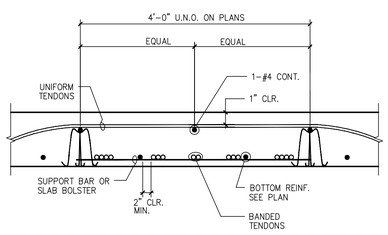
St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO.	:	21.043	
DESIGNED BY	:	MRO, TLC, OGK	
DRAWN BY	:	RSO	
ISSUE DATE	:	11-7-22	
LATEST REV. OF DWG. SET	:	4-7-23	

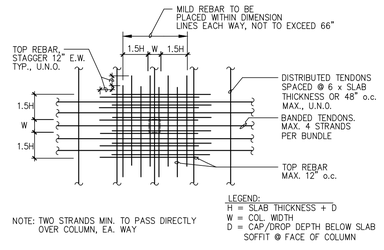
PERMIT SUBMITTAL
4-7-23

S3.9

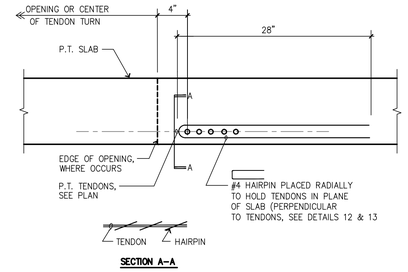
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.9.dwg
PLOT DATE/TIME: 4/4/2023 - 3:28pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



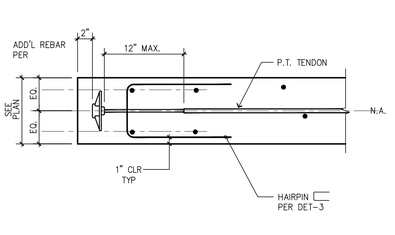
19 SECTION: BANDED TENDONS AT MID-SPAN



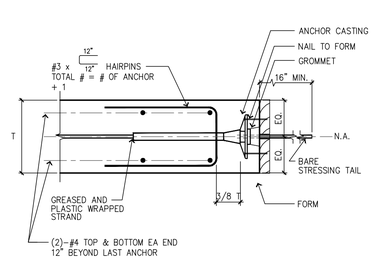
15 TOP REINF AT INTERIOR COLUMNS



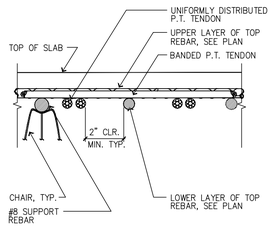
11 TYP HAIRPIN AT TENDON CURVATURE



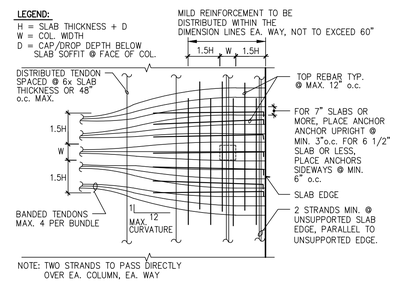
7 DEAD END AT BANDED TENDONS



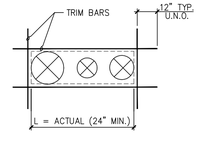
3 STRESSING END ANCHOR FOR BANDED



18 SECTION THRU DISTRIBUTED TENDON AT COLUMN



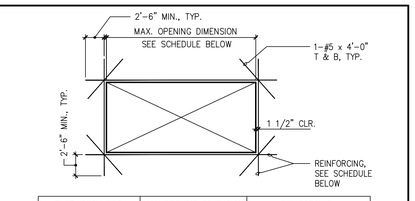
14 TOP REINF AT EXTERIOR COLUMNS



INSERTS WHICH ARE CLOSER TO ONE ANOTHER THAN THE DIAMETER OF THE LARGER OF THE TWO ARE CONSIDERED TO FORM A COMBINED OPENING

MAX. OPENING DIMENSION, L	REINFORCING
LESS THAN 12"	NO TRIM BARS
12" TO 24"	1-#5 T & B
24" & LARGER	REFER TO

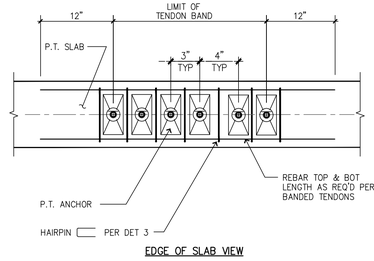
10 ARRANGEMENT OF TOP & BOT TRIM BARS FOR MULTIPLE OPENING PENETRATIONS REINFORCEMENT IN SLAB



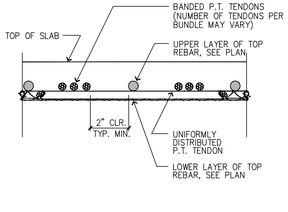
SLAB THICKNESS	MAX OPENING DIMENSION	REINFORCING
10" OR LESS	2'-0" TO 2'-6"	1-#5 T & B, EA. SIDE UNO
	2'-6" & LARGER	2-#5 T & B, EA. SIDE UNO
GREATER THAN 10"	2'-0" TO 2'-6"	1-#6 T & B, EA. SIDE UNO
	2'-6" & LARGER	2-#6 T & B, EA. SIDE UNO

NOTES:
1- ALL OPENINGS LARGER THAN 24" SHALL BE TRIMMED AS SHOWN
2- THESE BARS ARE IN ADDITION TO REBAR SHOWN ON PLANS
3- FOR MULTIPLE OPENINGS SEE

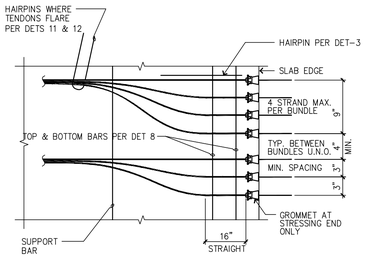
6 TRIM BARS FOR INTERIOR OPENINGS IN SLAB



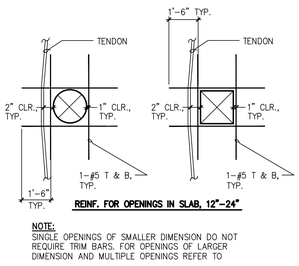
2 TYP. REINF. OF TENDON BAND @ SLAB EDGE OR INTER. STRESSING



17 SECTION THRU BANDED TENDON @ COLUMN

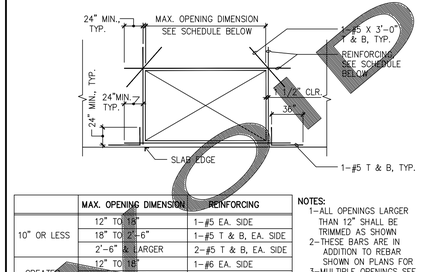


13 FLARING OF BANDED TENDONS AT SLAB EDGE



NOTE:
SINGLE OPENINGS OF SMALLER DIMENSION DO NOT REQUIRE TRIM BARS. FOR OPENINGS OF LARGER DIMENSION AND MULTIPLE OPENINGS REFER TO

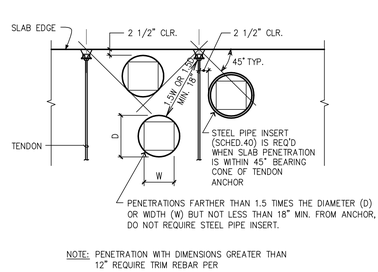
9 TRIM BARS AT SLAB PENETRATIONS



	MAX. OPENING DIMENSION	REINFORCING
10" OR LESS	12" TO 18"	1-#5 EA. SIDE
	18" TO 2'-6"	1-#5 T & B, EA. SIDE
	2'-6" & LARGER	2-#5 T & B, EA. SIDE
GREATER THAN 10"	12" TO 18"	1-#6 EA. SIDE
	18" TO 2'-6"	1-#6 T & B, EA. SIDE
	2'-6" & LARGER	2-#6 T & B, EA. SIDE

NOTES:
1- ALL OPENINGS LARGER THAN 12" SHALL BE TRIMMED AS SHOWN
2- THESE BARS ARE IN ADDITION TO REBAR SHOWN ON PLANS FOR
3- MULTIPLE OPENINGS SEE

5 TRIM BARS FOR OPENINGS AT SLAB EDGE



NOTE: PENETRATION WITH DIMENSIONS GREATER THAN 12" REQUIRE TRIM REBAR PER

1 OPENINGS IN PROXIMITY OF PT ANCHORAGE OPENINGS FOR PT ANCHORAGE

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

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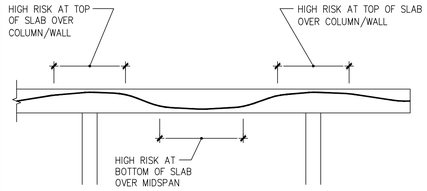
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

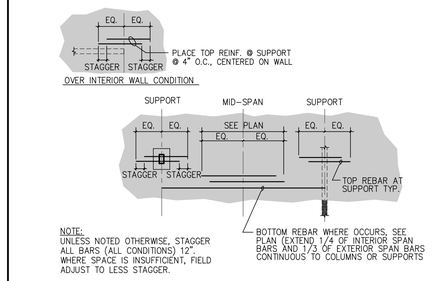
S3.10

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.10.dwg PLOT DATE/TIME: 4/4/2023 - 3:29pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



NOTES:
1. DRILLING INTO P.T. SLABS IS GENERALLY TO BE AVOIDED WITH ALL ANCHORS CAST INTO SLAB WHENEVER POSSIBLE.
2. POST-INSTALLED ANCHORS/PINS ARE PERMITTED WITH A MAXIMUM PENETRATION OF 3/4".
3. IF THE NEED FOR DEEPER PENETRATION OCCURS, THE CONTRACTOR SHALL LOCATE AND AVOID ALL TENDONS WITH INCREASED PRECAUTIONS RECOMMENDED IN THE HIGH RISK AREAS OUTLINED ABOVE.

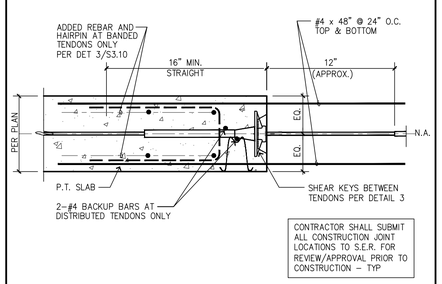
12 DRILLING LIMITS IN P.T. SLABS



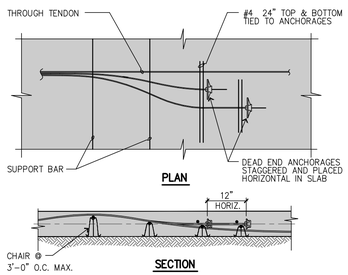
NOTE:
UNLESS NOTED OTHERWISE, STAGGER ALL BARS (ALL CONDITIONS) 12". WHERE SPACE IS INSUFFICIENT, FIELD ADJUST TO LESS STAGGER.

8 ARRANGEMENT OF TOP AND BOTTOM REINF IN SLAB

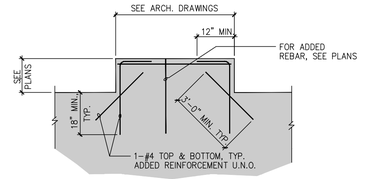
PTS 127



4 CONSTRUCTION JOINT WITH INTERMEDIATE STRESSING

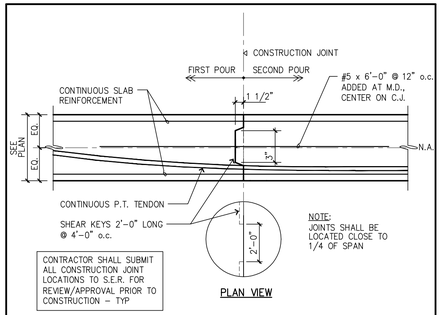


11 PLACEMENT OF ADDED TENDON

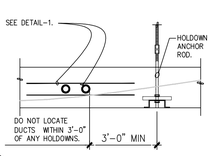


7 TRIM BARS AT CANTILEVERED SLAB

PTS 135



3 CONSTRUCTION JOINT WITH NO INTERMEDIATE STRESSING

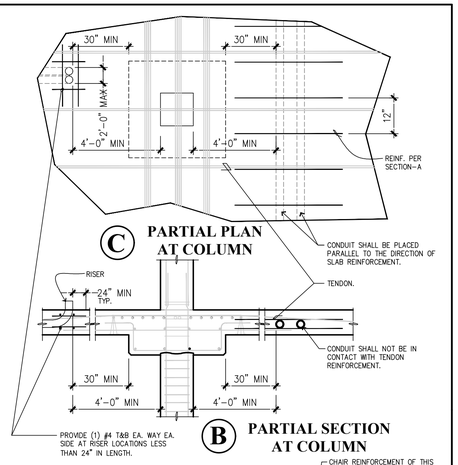


D SECTION @ HOLDOWN

IT IS STRUCTURALLY PREFERRED TO RUN CONDUIT OUTSIDE OF THE SLABS RATHER THAN WITHIN THE SLABS. HOWEVER, WHERE THE CONTRACTOR INTENDS (FOR CONSTRUCTION PURPOSES) TO PLACE RUNS OF ELECTRICAL CONDUIT HORIZONTALLY WITHIN THE POST-TENSIONED SLAB AS INTER-SLAB CONDUIT, RATHER THAN PLACING THE CONDUIT LINES BELOW THE SLAB OR ELSWHERE, SUCH INTER-SLAB CONDUIT CAN OFTEN BE ACCOMMODATED STRUCTURALLY PROVIDED THE FOLLOWING GENERAL CRITERIA ARE MAINTAINED AS A MINIMUM:

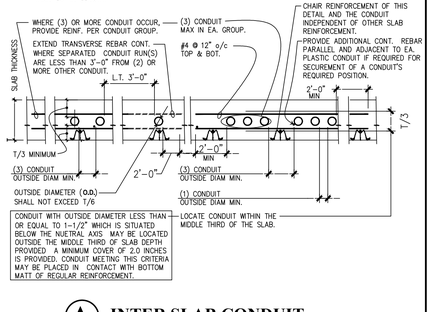
1. ● THE CONTRACTOR SHALL RECEIVE PERMISSION/AGREEMENT FROM THE OWNER OR OWNERS DESIGNATED AGENT TO PLACE THE CONDUIT WITHIN THE SLAB.
2. ● SUBMIT SHOP DRAWINGS (TO SCALE) INDICATING THE PROPOSED PLACEMENT OF CONDUIT IN POST-TENDIONED SLAB. IDENTIFY OUTSIDE DIAMETER OF ALL PROPOSED DUCTS.
3. ● THE CONDUIT SHALL NOT IMPAIR SIGNIFICANTLY THE STRENGTH OF THE CONSTRUCTION
4. ● THE CONDUIT SHALL MEET THE STIPULATIONS OF SECTION 6.3 OF ACI 318.
5. ● THE CONDUIT SHALL BE SECURED WITHIN THE MIDDLE THIRD OF THE SLAB PRIOR, DURING, AND AFTER THE PLACEMENT OF CONCRETE. THE CONDUIT SHALL BE SECURED INTO POSITION WITH ITS OWN CHAIRING/SUPPORT BAR SYSTEM THAT IS INDEPENDENT OF THE OTHER STRUCTURAL SLAB REINFORCEMNT. THE REINFORCEMENT SHOWN IN THE TYPICAL SECTION ABOVE IS FOR STRUCTURAL PURPOSES TO ACCOMODATE THE PLACEMENT OF INTER-SLAB CONDUIT. IT WOULD NOT BE REQUIRED IN THE ABSENSE OF THE INTER-SLAB CONDUIT AND THEREFORE MAY BE USED IN CONJUNCTION WITH ADDITIONAL CHAIRING/SUPPORT REINFORCEMENT AS MAY BE NECESSARY TO SECURE THE CONDUIT. THE TYPE OF CONDUIT CHOSEN AND THE STIFFNESS OF THE DUCT MAY INFLUENCE THE AMOUNT OF CHAIRING REQUIRED.
6. ● THE CONDUIT SHALL NOT BE IN CONTACT WITH TENDON OR REGULAR REINFORCEMENT AND SHALL NOT CAUSE DEVIATION TO ANY TENDON'S PROFILE OR REQUIRED POSITION OF REINFORCEMENT WITHIN THE SLAB. THE TENDONS AND REINFORCEMENT BOTH HAVE PRECEDENCE OVER THE CONDUIT.
7. ● THE CONDUIT SHALL NOT BE PLACED CLOSER THAN 36" IN ANY DIRECTION FROM ANY HOLDOWN BOLT, ROD, OR EMBEDMENT PLATE USED IN THE LATERAL SYSTEM OF THE WOOD STRUCTURE ABOVE THE PODIUM SLAB. SIMILARLY, THE CONDUIT SHALL NOT BE PLACED CLOSER THAN 12" FROM ANY ANCHOR BOLT USED TO ATTACH THE WOOD SILL PLATES TO THE PODIUM SLAB.
8. ● THE CONDUIT SHALL NOT BE PLACED CLOSER THAN 48 INCHES FROM ANY COLUMN, NOR CLOSER THAN 30" FROM ANY COLUMN CAP, COLUMN DROP PANEL, STUD RAIL COMPONENT, BEARING WALL, SHEAR WALL, BEAM, OR ANY OTHER SLAB SUPPROTING ELEMENT.
9. ● THE CONDUIT SHALL NOT BE PLACED IN CROSSING TIERS.
10. ● THE CONDUIT SHALL BE PLACED IN STRAIGHT AND PARALLEL RUNS WITH THE MINUMUM 3 DIAMETER SPACING BETWEEN DUCTS AS NOTED ABOVE.
11. ● WHERE THE CONDUIT SPACING AND PLACEMENT LIMITS AS NOTED ABOVE CAN NOT BE SATISFIED, SUBMIT DIMENSIONALLY ACCURATE AND TO SCALE PLANS OF THE NOTED REGION TO THE ENGINEER OF RECORD. ADDITIONAL SLAB REINFORCEMENT AND/OR DESIGN CHANGES MAY BE NECESSARY TO ACCOMODATE THE NON CONFORMING CONDUIT.
12. ● THE ENGINEER OF RECORD SHALL BE RETAINED TO OBSERVE THE FINAL LAYOUT FOR GENERAL PLAN CONFORMANCE AND THE SPECIAL INSPECTOR RETAINED BY THE OWNER SHALL INSPECT AND CONFIRM THAT THE CONDUIT IS IN CONFORMANCE WITH THE ABOVE CRITERIA AND ANY APPLICABLE FIELD CONDITION DERIVED CRITERIA – PRIOR TO AND DURING THE PLACEMENT OF CONCRETE.

13 CRITERIA FOR USE OF INTER SLAB CONDUIT



C PARTIAL PLAN AT COLUMN

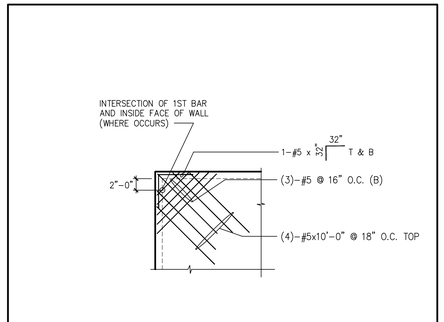
B PARTIAL SECTION AT COLUMN



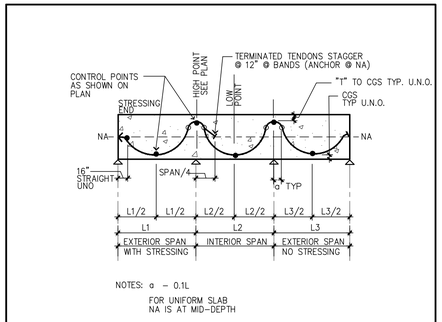
A INTER SLAB CONDUIT

*WHERE TENDON CURVATURE EXCEEDS 1:12 SEE DETAIL 12/S3.10

10 TENDON PLACEMENT AT OPENINGS 24" OR LARGER

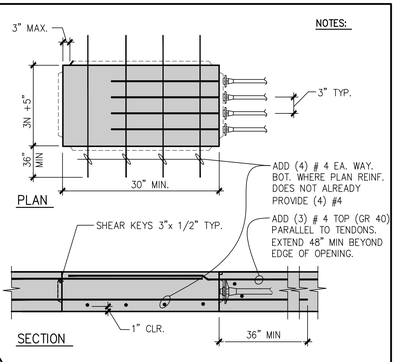


6 TRIM BARS AT SUPPORTED SLAB CORNERS

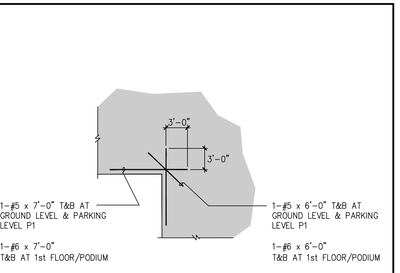


NOTES: a – 0.1L
FOR UNIFORM SLAB NA IS AT MID-DEPTH

2 PROFILE FOR REVERSED PARABOLA TENDONS TYPICAL @ DISTRIBUTED TENDONS

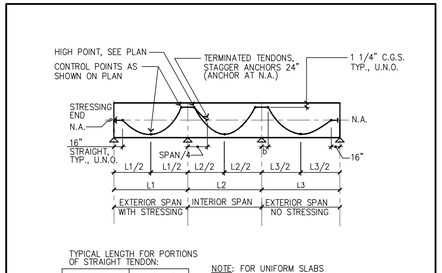


9 STRESSING BLOCKOUT



5 TRIM BARS AT RE-ENTRANT CORNERS

PTS 133



TYPICAL LENGTH FOR PORTIONS OF STRAIGHT TENDON:

LOCATION	b (FEET)
OVER COLUMNS	2'-0"

NOTE: FOR UNIFORM SLABS N.A. IS AT MID-DEPTH

N.A. = NEUTRAL AXIS

1 PROFILE FOR PARTIAL PARABOLA TYPICAL @ BANDED TENDONS

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CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S3.11.dwg PLOT DATE/TIME: 4/4/2023 – 3:30pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

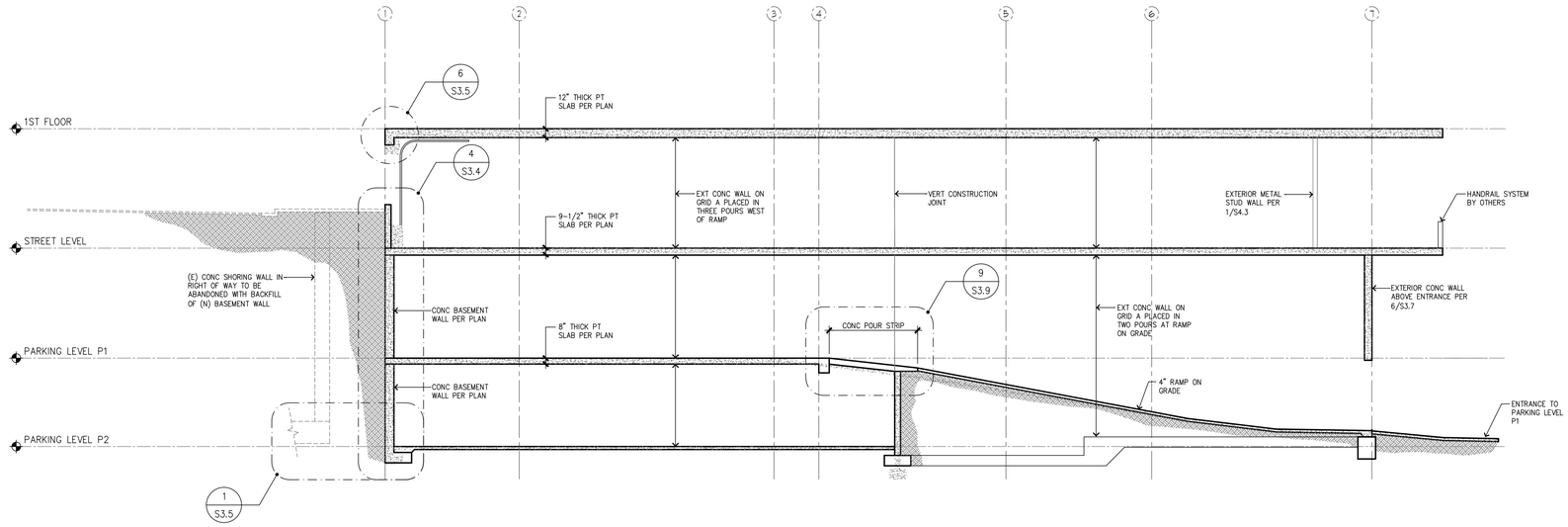
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : △ 4-7-23

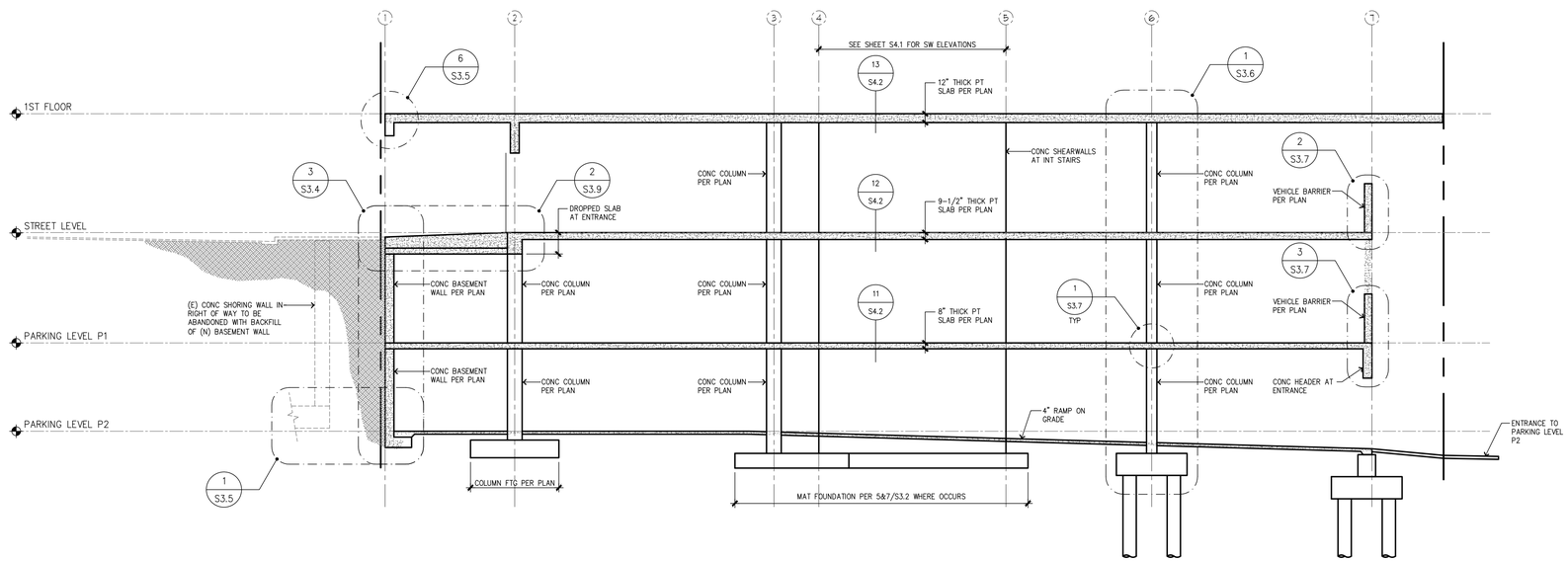
PERMIT SUBMITTAL
4-7-23

S3.11



2 S4.0 Typical Building Section Thru Concrete Levels

SCALE 1/8"=1'-0"



1 S4.0 Typical Building Section Thru Concrete Levels

SCALE 1/8"=1'-0"

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THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

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St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

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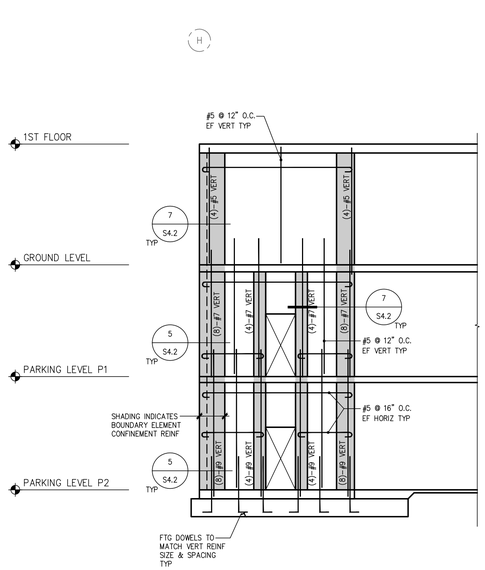
S4.0

CONCRETE SHEARWALL VERTICAL REINFORCING LAP SPLICE TABLE

BAR SIZE	Ld	Lt	Lsb	Lsbt	
#4	22	29	29	37	
#5	28	35	35	45	
#6	33	43	43	55	
#7	48	62	62	79	
#8	54	70	70	90	

NOTES:

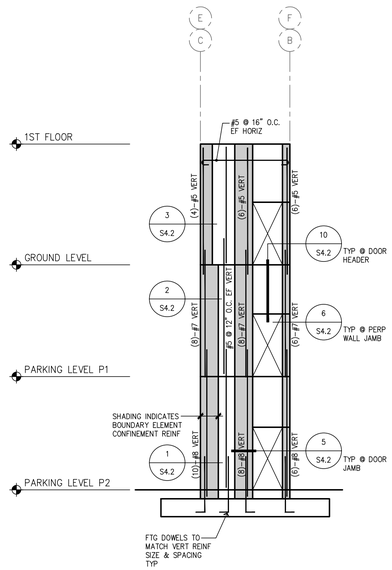
1. LAP LENGTHS IN THIS SCHEDULE ARE AT VERTICAL REINFORCING OF CONCRETE SHEARWALLS.
2. HORIZONTAL REINFORCING LAP LENGTHS ARE PER TYPICAL SCHEDULE 1/S3.0.



14" THICK

6 S4.1 Shearwall Elevation - Grid 2

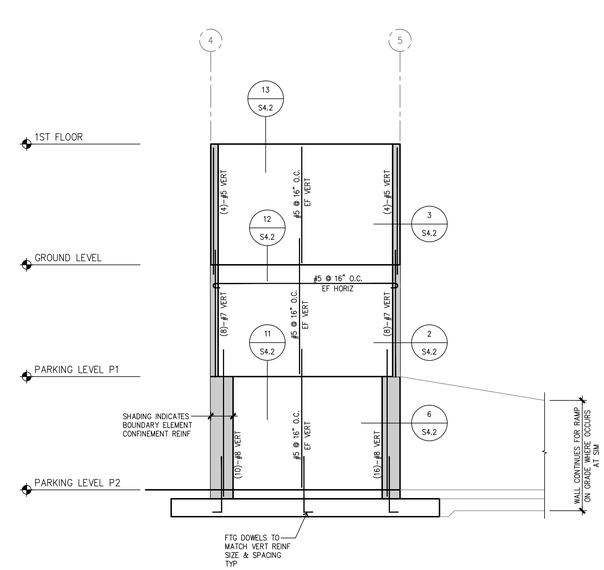
SCALE 1/8"=1'-0"



14" THICK

4 S4.1 Shearwall Elevation - Grids B & C

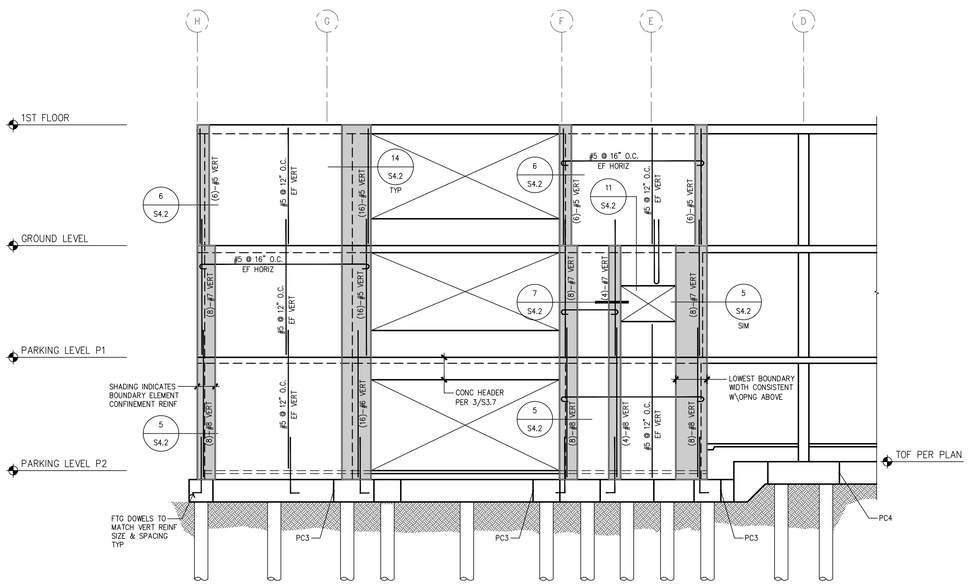
SCALE 1/8"=1'-0"



10" THICK

2 S4.1 Shearwall Elevation - Grids 4 & 5

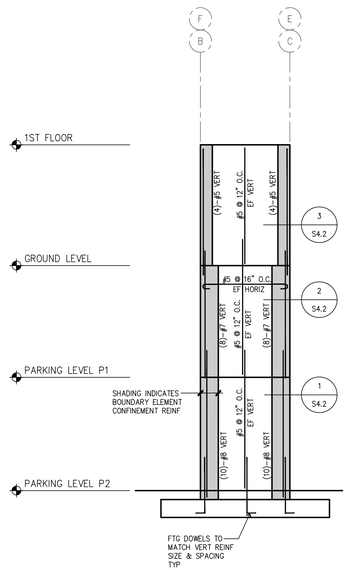
SCALE 1/8"=1'-0"



14" THICK

5 S4.1 Shearwall Elevation - ± Grid 7

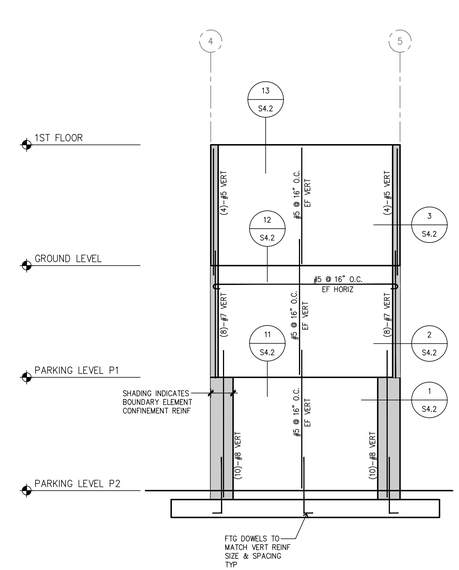
SCALE 1/8"=1'-0"



14" THICK

3 S4.1 Shearwall Elevation - Grids B & C

SCALE 1/8"=1'-0"



10" THICK

1 S4.1 Shearwall Elevation - Grids 4 & 5

SCALE 1/8"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
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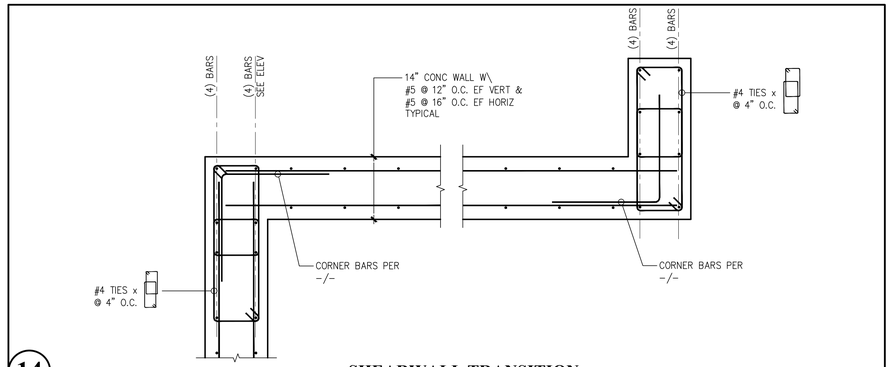
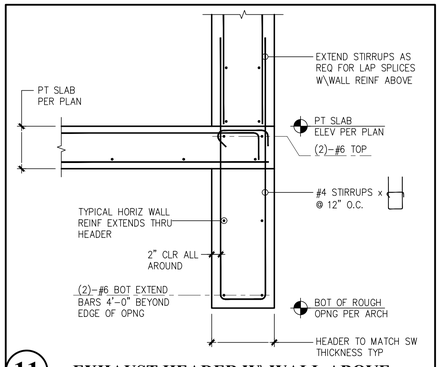
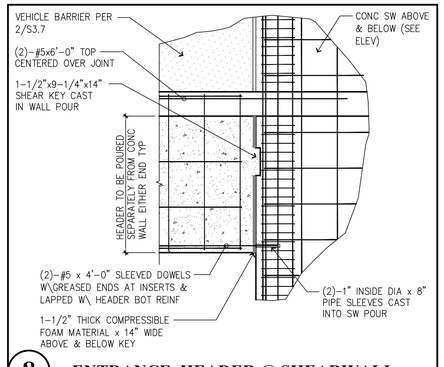


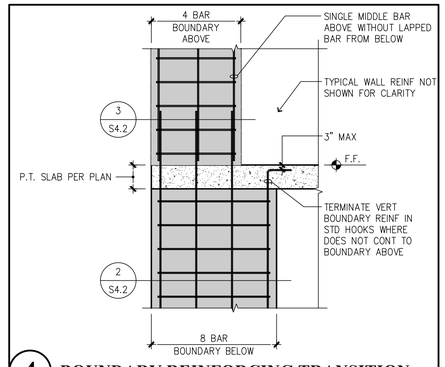
14 **SHEARWALL TRANSITION**



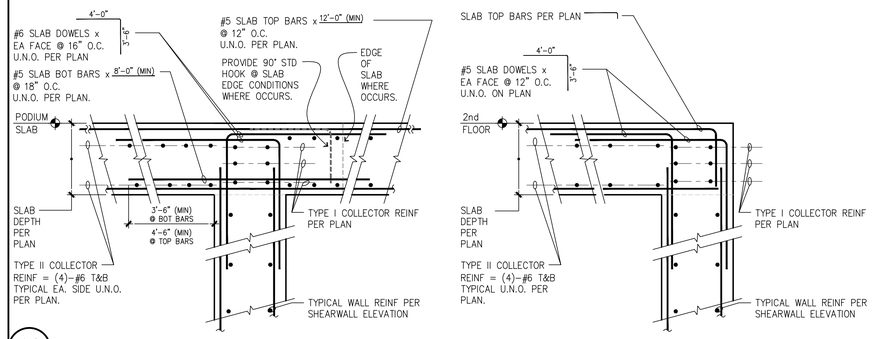
11 **EXHAUST HEADER W\ WALL ABOVE**
SCALE: 3/4"=1'-0"



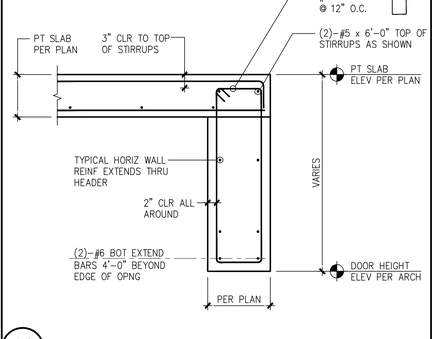
8 **ENTRANCE HEADER @ SHEARWALL**
SCALE: 1/2"=1'-0"



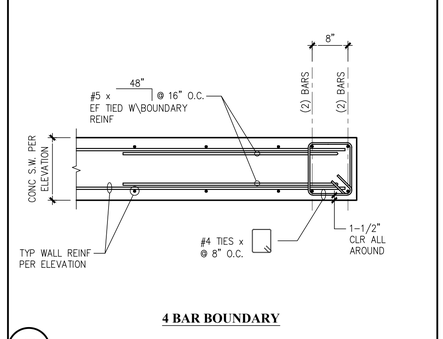
4 **BOUNDARY REINFORCING TRANSITION**
SCALE: 1/2"=1'-0"



13 **TYPICAL S.W. CONNECTIONS AT 1st FLOOR SLAB**

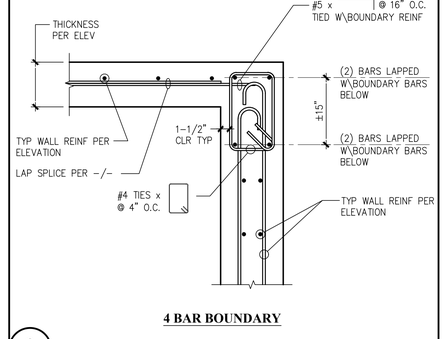


10 **SHEARWALL DOOR HEADER**
SCALE: 3/4"=1'-0"



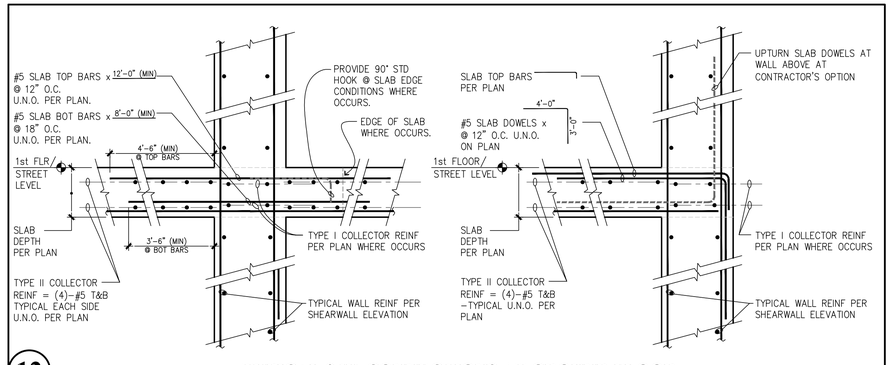
4 BAR BOUNDARY

7 **SHEARWALL JAMB REINFORCING**
SCALE: 3/4"=1'-0"

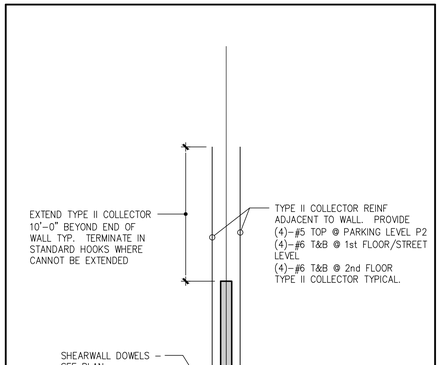


4 BAR BOUNDARY

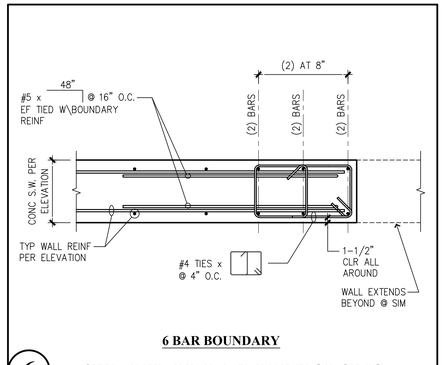
3 **SHEARWALL CORNER**
SCALE: 3/4"=1'-0"



12 **TYPICAL S.W. CONNECTIONS AT GROUND FLOOR**

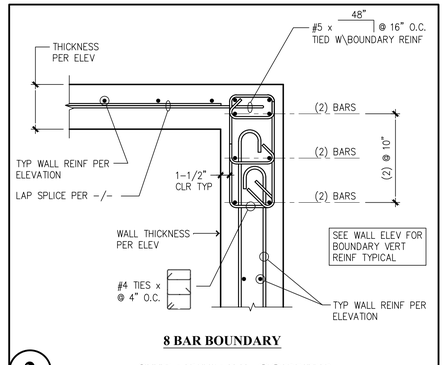


9 **COLLECTOR PLAN DETAIL**
SCALE: 3/16"=1'-0"



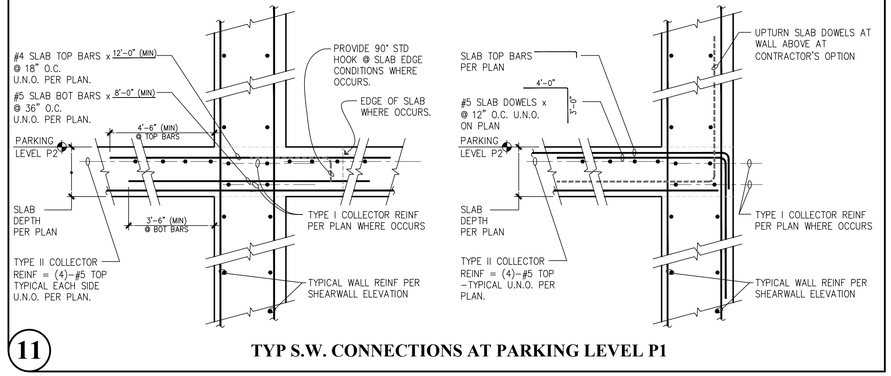
6 BAR BOUNDARY

6 **SHEARWALL JAMB REINFORCING**
SCALE: 3/4"=1'-0"

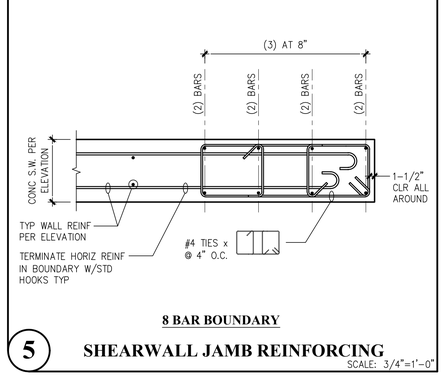


8 BAR BOUNDARY

2 **SHEARWALL CORNER**
SCALE: 3/4"=1'-0"

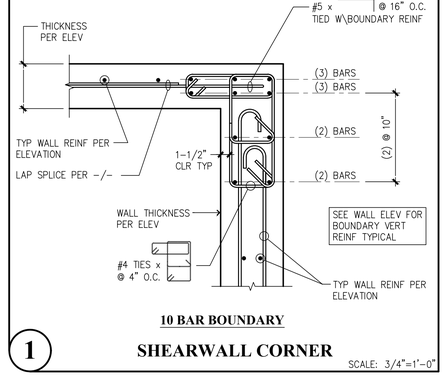


11 **TYP S.W. CONNECTIONS AT PARKING LEVEL P1**



8 BAR BOUNDARY

5 **SHEARWALL JAMB REINFORCING**
SCALE: 3/4"=1'-0"



10 BAR BOUNDARY

1 **SHEARWALL CORNER**
SCALE: 3/4"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

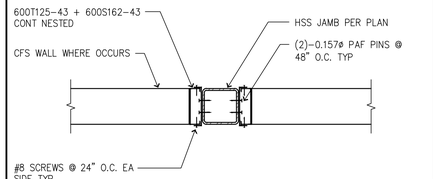
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. : 4-7-23
OF DWG. SET :

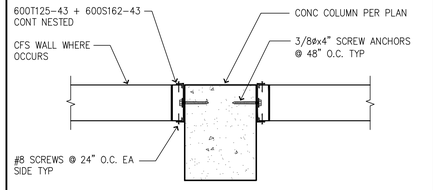
PERMIT SUBMITTAL
4-7-23

S4.2

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S4.2.dwg
PLOT DATE/TIME: 4/4/2023 - 3:34pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

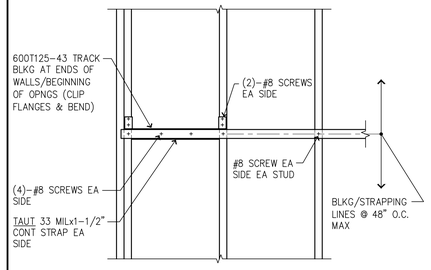


AT HSS JAMB

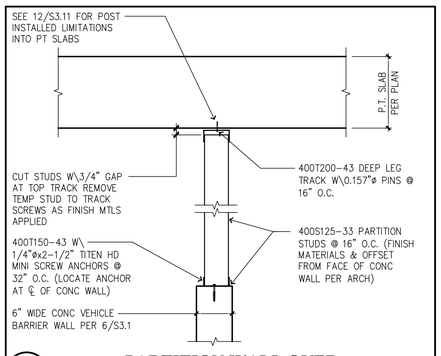


AT CONCRETE COLUMN

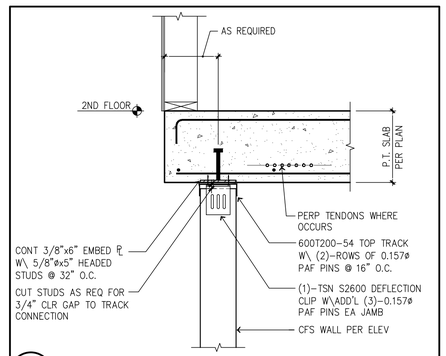
12 SIDE STUDS TO COLUMN



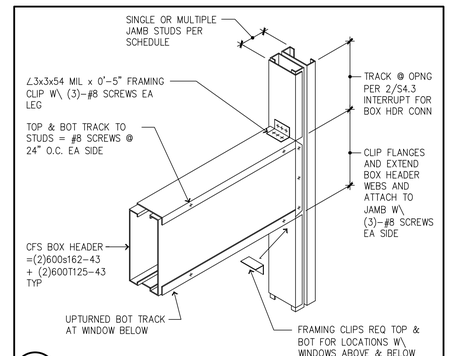
11 HORIZONTAL BRIDGING



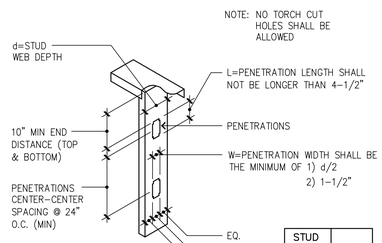
8 PARTITION WALL OVER VEHICLE BARRIER



5 SLIP TRACK TO CONC SLAB



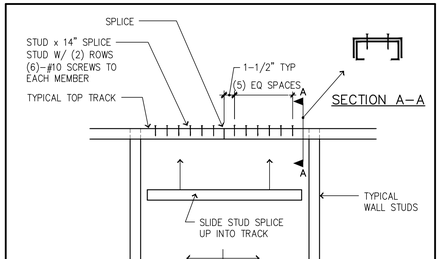
3 BOX HEADER TO JAMB



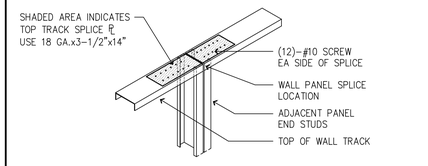
AXIAL STUDS

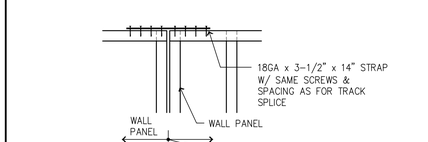
STUD WEB SIZE	W
4"	1-1/2"
6"	1-1/2"

10 TYPICAL STUD PENETRATIONS



A TYPICAL SPLICE @ TOP TRACK WEB*

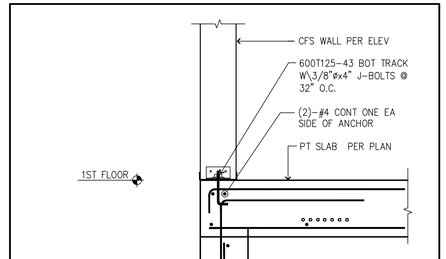




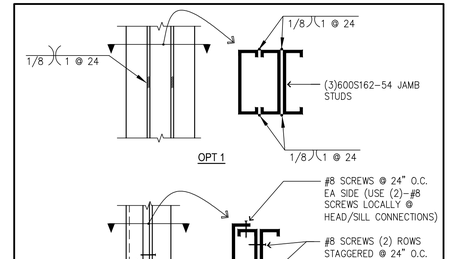
PANEL TO PANEL TOP TRACK SPLICE

TYPICAL PANEL TO PANEL SPLICE @ TOP TRACK WEB*

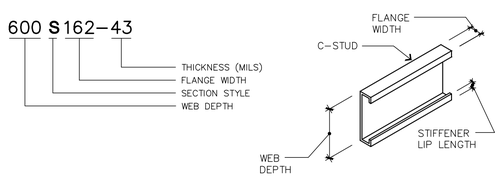
7 TYPICAL WALL TOP TRACK SPLICE



4 BOT TRACK TO CONCRETE



2 MULTIPLE STUD JAMB OPTIONS



SECTION IDENTIFICATION - EXAMPLES

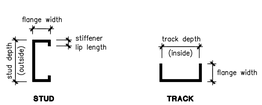
EXAMPLE SECTION DESIGNATOR	MEMBER DEPTH	STYLE	FLANGE WIDTH	MATERIAL THICKNESS
600S162-43	600 = 6"	S = STUD	162 = 1-5/8"	-43 = 18 GA
600T125-33	600 = 6"	T = TRACK	125 = 1-1/4"	-33 = 20 GA
400S162-54	400 = 4"	S = STUD	162 = 1-5/8"	-54 = 16 GA
400T125-43	400 = 4"	T = TRACK	125 = 1-1/4"	-43 = 18 GA

* four part identification code per SSMA

STUD DEPTH	STYLE	FLANGE WIDTH	MATERIAL THICKNESS (1 mil = 1/1000 in.)	STUD LIP LENGTHS
250 = 2.500" = 2-1/2"	S = STUD	125 = 1.250" = 1-1/4"	33 = 33 mils ~ 0.033" = 20 GA	S125 = 0.188"
350 = 3.500" = 3-1/2"	T = TRACK	137 = 1.375" = 1-3/8"	43 = 43 mils ~ 0.043" = 18 GA	S137 = 0.375"
362 = 3.625" = 3-5/8"	U = CHANNEL	150 = 1.500" = 1-1/2"	54 = 54 mils ~ 0.054" = 16 GA	S162 = 0.500"
400 = 4.000" = 4"	F = FURRING	162 = 1.625" = 1-5/8"	68 = 68 mils ~ 0.068" = 14 GA	S200 = 0.625"
550 = 5.500" = 5-1/2"		200 = 2.000" = 2"	97 = 97 mils ~ 0.097" = 12 GA	S250 = 0.625"
600 = 6.000" = 6"		250 = 2.500" = 2-1/2"		
800 = 8.000" = 8"				
1000 = 10.00" = 10"				
1200 = 12.00" = 12"				

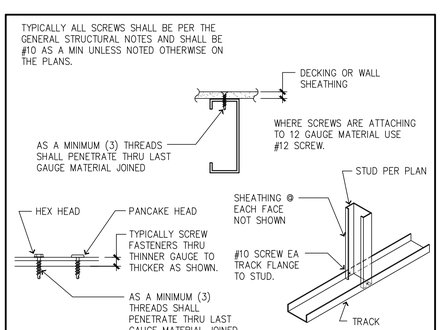
Thickness - Steel Components[1]

Thickness (mils)[2]	Gauge	Maximum Design Thickness (in)	Minimum Yield Stress[3] (ksi)
18	25	0.0188	33
27	22	0.0283	33
33	20	0.0346	33
43	18	0.0451	33
54	16	0.0566	50
68	14	0.0713	50
97	12	0.1017	50

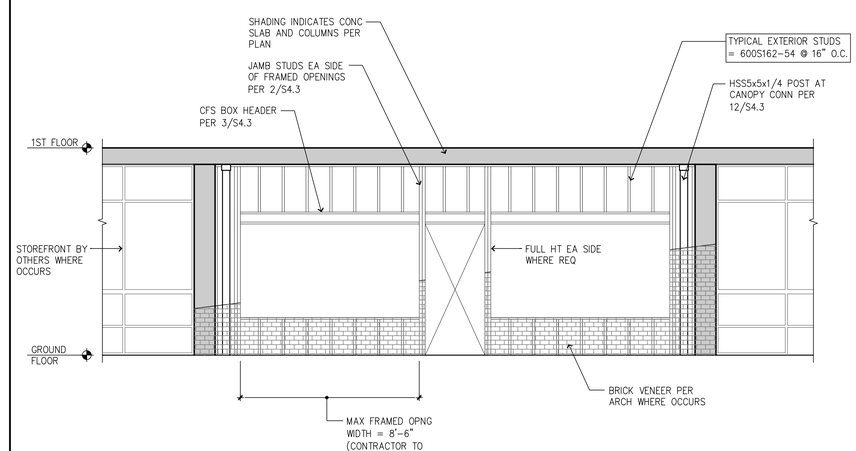


1) Uncoated Steel Thickness.
2) Minimum Thickness represents 95% of the design thickness and is the minimum acceptable uncoated thickness delivered to the job site based on Section A3.4 of the 1996 AISI Code.
3) Gauge material shall be formed from galvanized ASTM A653/A653M (S2 Quality), Grade 33 Steel for 18, 27, 33, and 43 mil (25, 22, 20, and 18 GA) thicknesses; and Grade 50 Class I Steel for 54, 68, and 97 mil (16, 14, and 12 GA) thicknesses; and conform to the latest revision of ASTM A924/A924M.
4) All designations are per SSMA ICBO #4943 with the exception that the 162S162-43 is a section out of MSMA ICBO #4943 which is designated as 158XC18 per MSMA.

9 UNIVERSAL STUD DESIGNATOR SYSTEM ALL PER SSMA ICBO 4943



6 TYPICAL SCREW ATTACHMENT



1 TYPICAL EXTERIOR LIGHT GAUGE WALL FRAMING

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

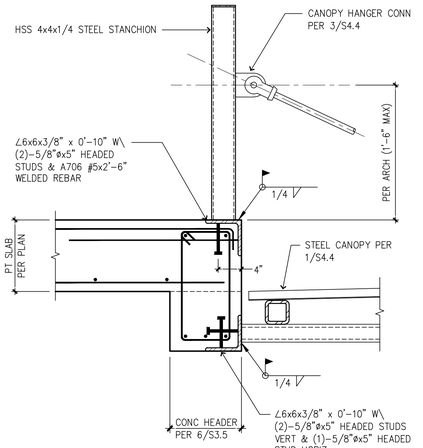
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

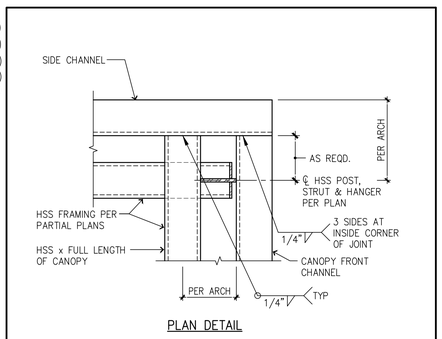
S4.3

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S4.3.dwg PLOT DATE/TIME: 4/4/2023 - 3:35pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



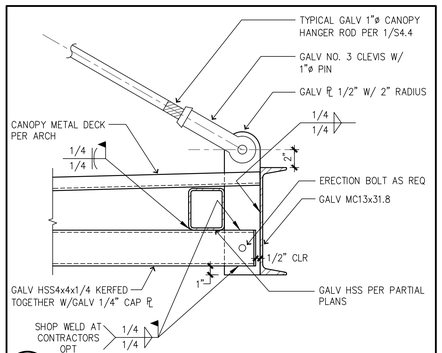
1

9 **TYPICAL CANOPY STANCHION**



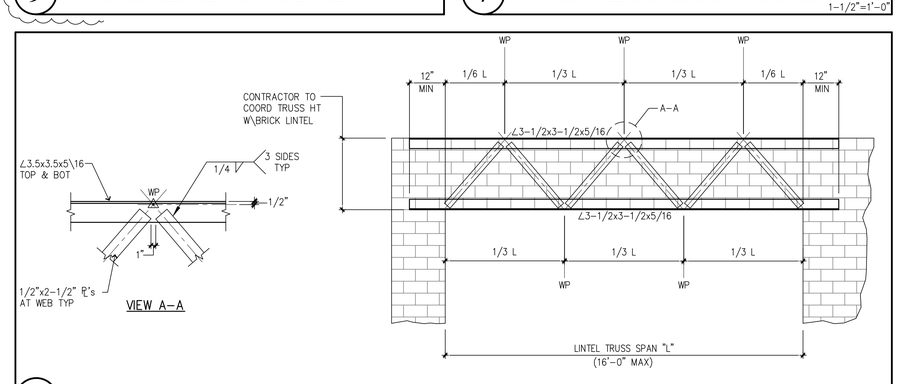
8 **TYPICAL CANOPY CORNER**

1-1/2"=1'-0"

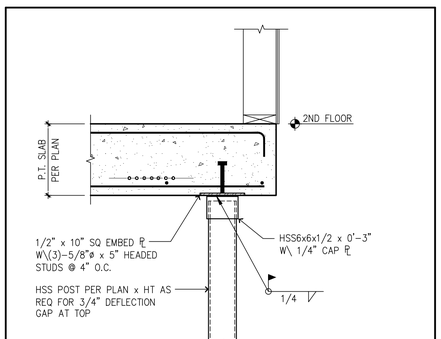


7 **TYPICAL CANOPY CONNECTION**

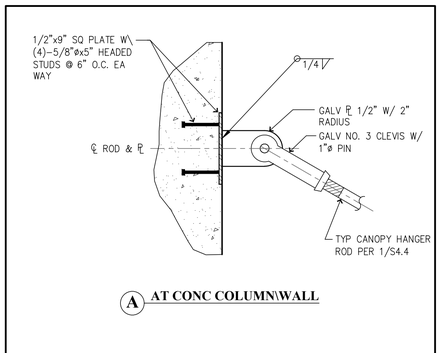
1-1/2"=1'-0"



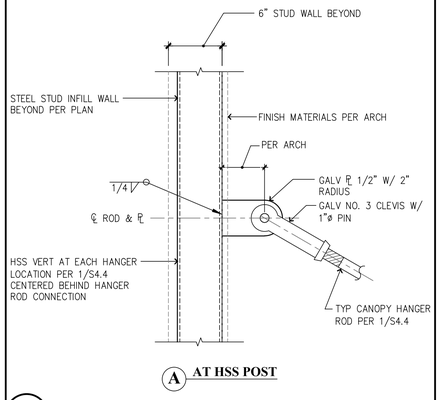
6 **BRICK LINTEL TRUSS**



4 **HSS JAMB TO PT SLAB**



A **AT CONC COLUMN\WALL**

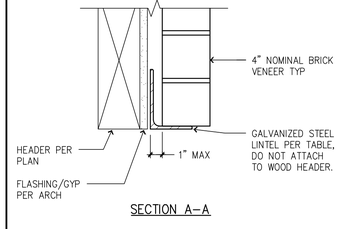


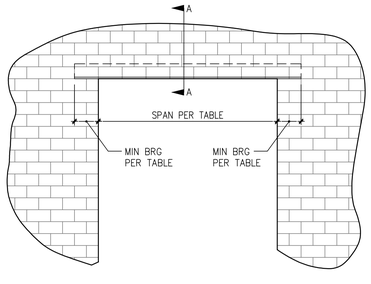
A **AT HSS POST**

3 **TYPICAL CANOPY CONNECTION**

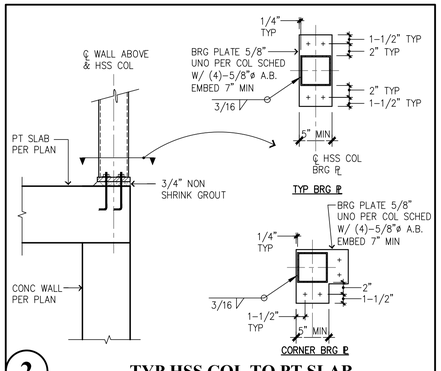
1-1/2"=1'-0"

SPAN	BRICK LINTEL	BRG WIDTH
6'-0" MAX	∠3-1/2x3-1/2x1/4	6"
8'-0" MAX	∠5x3-1/2x1/4	6"
10'-6" MAX	∠6x4x3/8	8"
16'-0" MAX	DET 11/S4.4	12"

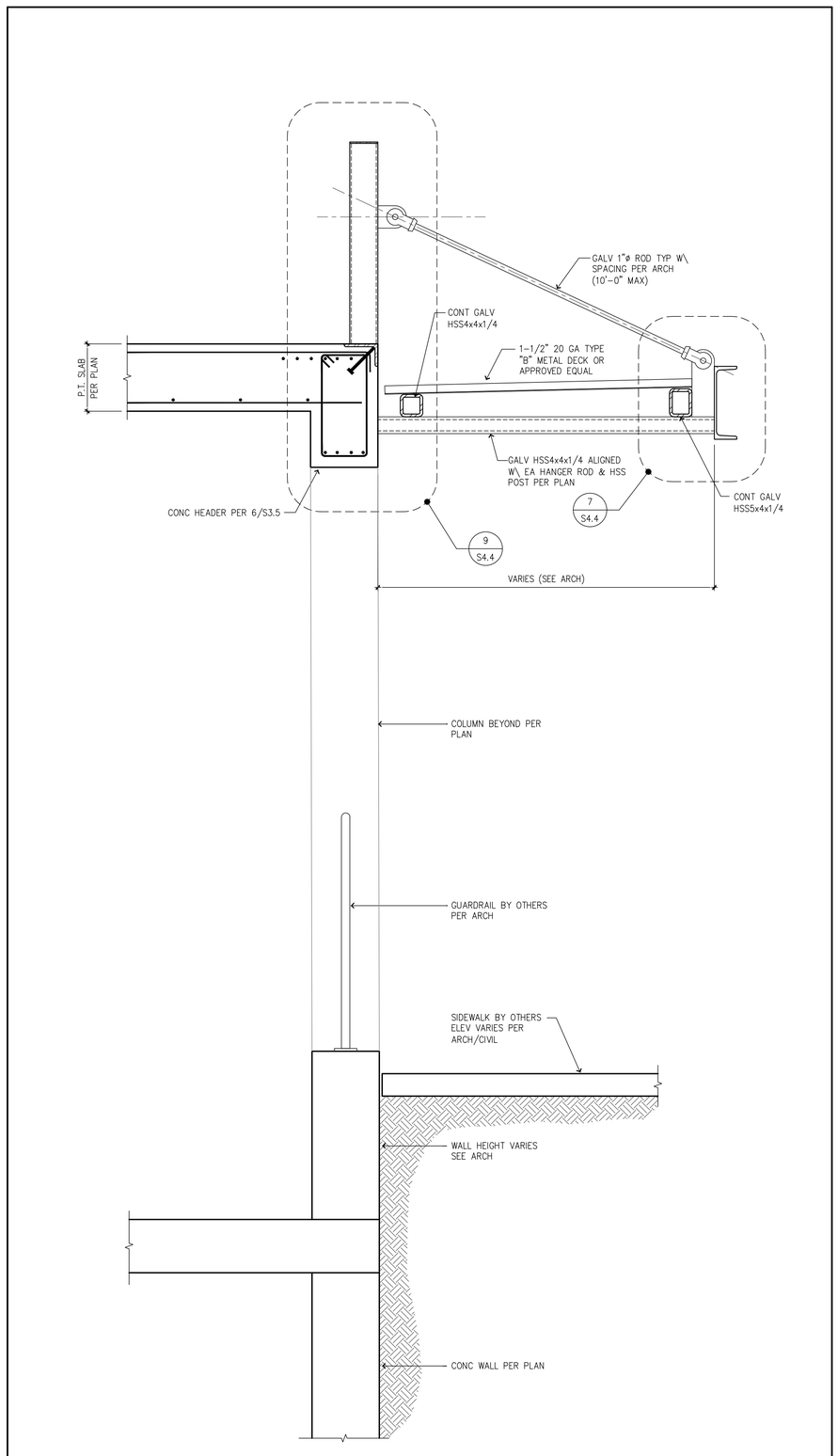




5 **BRICK LINTEL**



2 **TYP HSS COL TO PT SLAB**



1 **TYPICAL CANOPY SECTION**

4-7-23
THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
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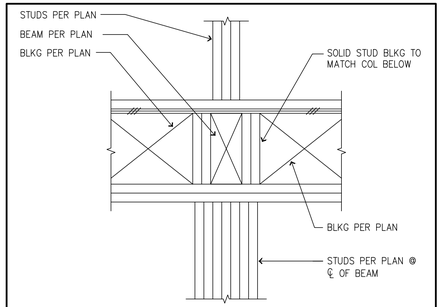
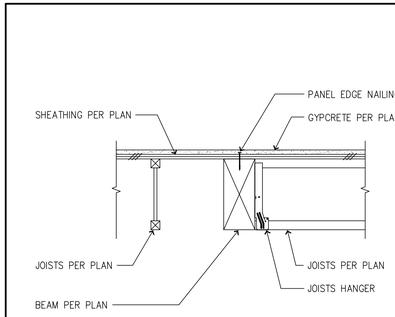
PERMIT SUBMITTAL
4-7-23

S4.4

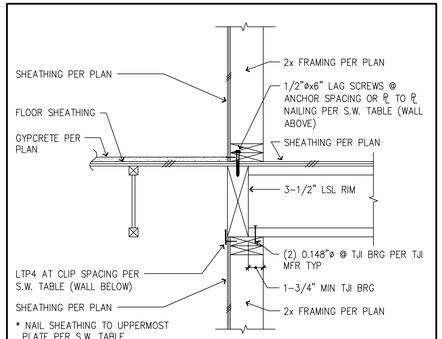
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S4.4.dwg
PLOT DATE/TIME: 4/4/2023 - 3:36pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



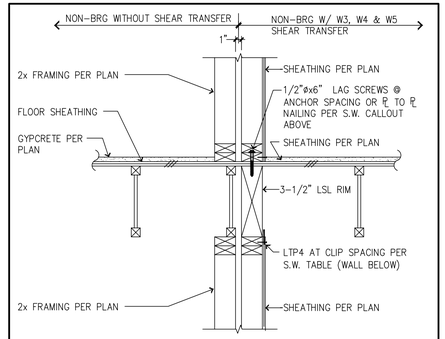
20 TYP STACKED BEAM PERP TO WALL



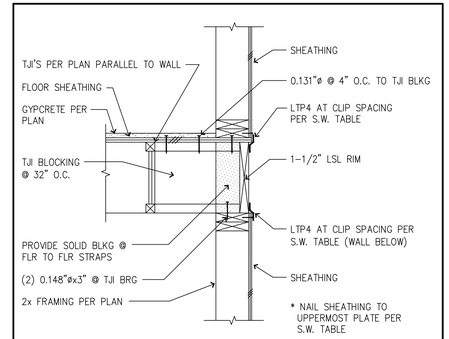
16 TYP BEAM AT INTERIOR ONE SIDE



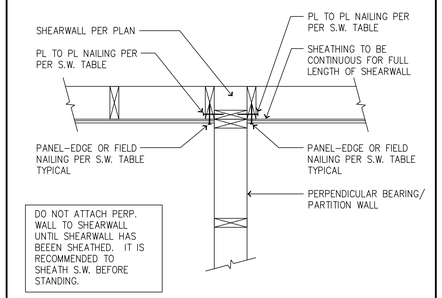
12 INTERIOR WALL BEARING ONE SIDE (W3 ,W4 & W5 SHEAR TRANSFER)



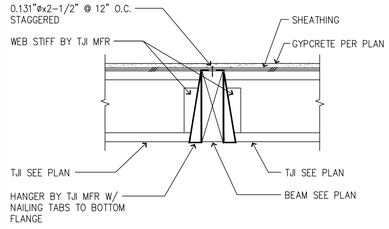
8 PARTY WALL NON-BEARING (W3 ,W4 & W5 SHEAR TRANSFER)



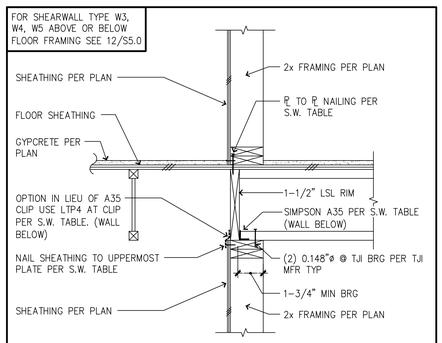
4 TJI FLOOR JOIST PARALLEL TO WALL (W3 ,W4 & W5 SHEAR TRANSFER)



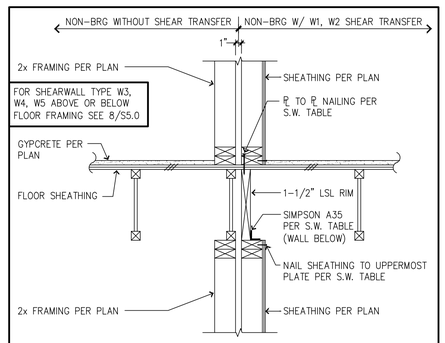
19 CONTINUOUS SHEATHING @ SHEARWALL



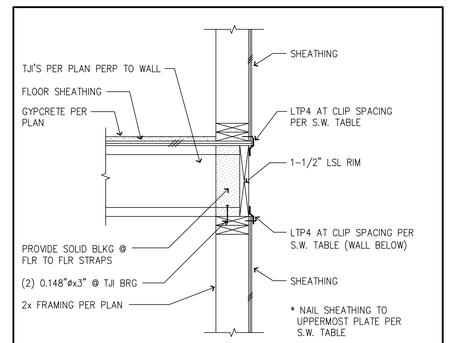
15 TYP TJI AT FLUSH FRAMED BM SUPPORT



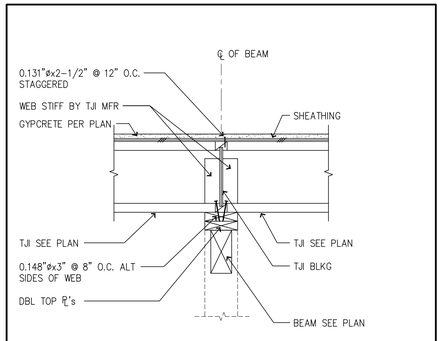
11 INTERIOR WALL BEARING ONE SIDE (W1 ,W2 SHEAR TRANSFER)



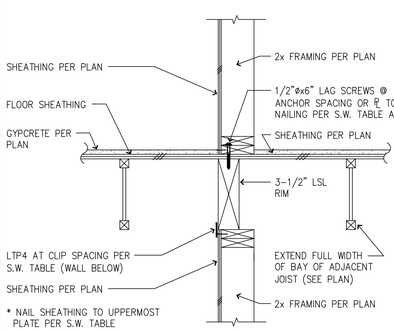
7 TYP PARTY WALL NON-BEARING (W1 ,W2 SHEAR TRANSFER)



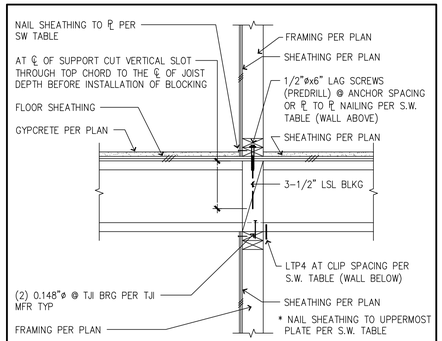
3 TJI FLOOR JOIST PERPENDICULAR TO WALL (W3 ,W4 & W5 SHEAR TRANSFER)



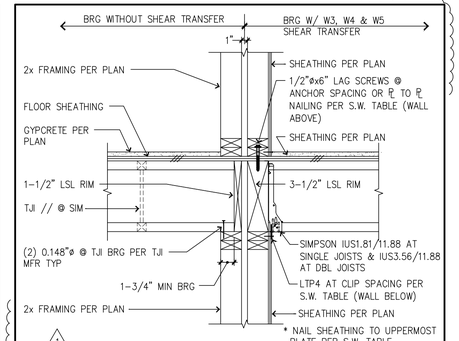
18 TYP CONTINUOUS TJI AT DROPPED BM SUPPORT



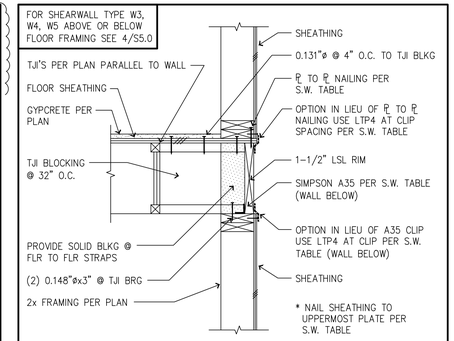
14 INTERIOR WALL NON-BEARING (W3 ,W4 & W5 SHEAR TRANSFER)



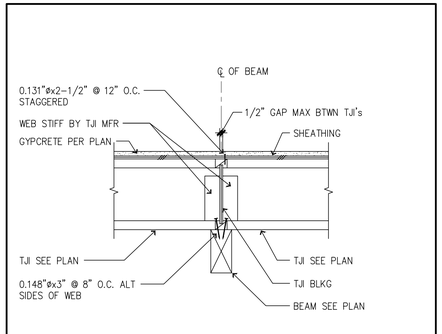
10 INTERIOR BEARING EA SIDE (W3 ,W4 & W5 SHEAR TRANSFER)



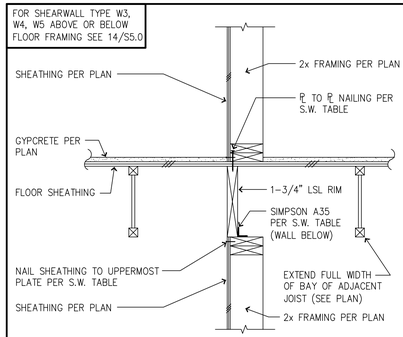
6 PARTY WALL BEARING EA SIDE (W3 ,W4 & W5 SHEAR TRANSFER)



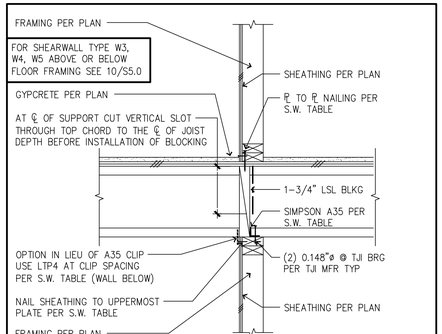
2 TYP TJI FLOOR JOIST PARALLEL TO WALL (W1 ,W2 SHEAR TRANSFER)



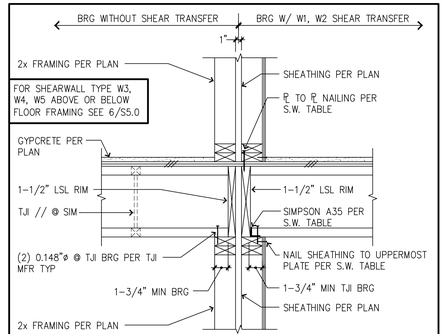
17 TYP NON CONTINUOUS TJI AT DROPPED BM SUPPORT



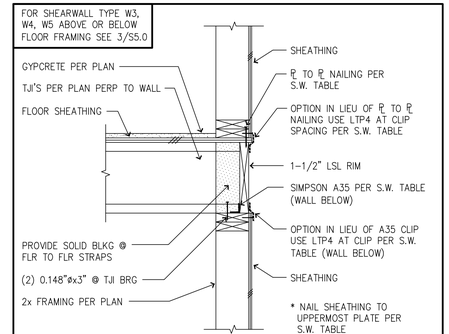
13 TYP INTERIOR WALL NON-BEARING (W1 ,W2 SHEAR TRANSFER)



9 TYP INTERIOR BEARING EA SIDE (W1 ,W2 SHEAR TRANSFER)



5 TYP PARTY WALL BEARING EA SIDE (W1 ,W2 SHEAR TRANSFER)



1 TYP TJI FLOOR JOIST PERPENDICULAR TO WALL (W1 ,W2 SHEAR TRANSFER)

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314-9822
www.solutions4structures.com

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:
1 7-28-21 REVISIONS PER CITY REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

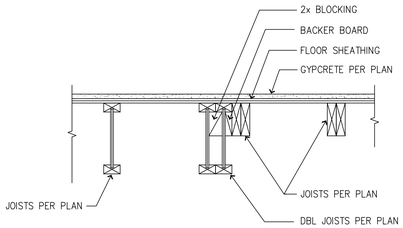
PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 1 4-7-23

PERMIT SUBMITTAL
4-7-23

S5.0

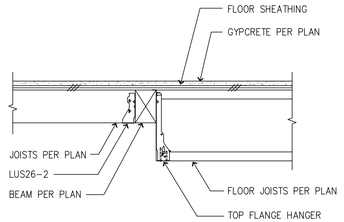
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S5.0.dwg
PLOT DATE/TIME: 4/4/2023 - 3:37pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

FOR CALLOUTS IN COMMON SEE 13/S5.1



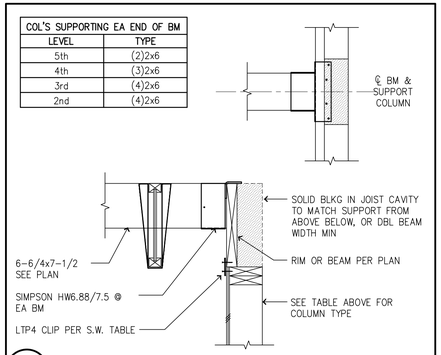
18 ERV BEAM TO DBL JOISTS CONNECTION

FOR CALLOUTS IN COMMON SEE 13/S5.1

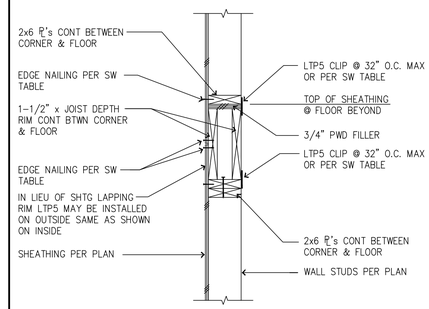


15 ERV JOISTS TO BEAM CONNECTION

COL'S SUPPORTING EA END OF BM	
LEVEL	TYPE
5th	(2)2x6
4th	(3)2x6
3rd	(4)2x6
2nd	(4)2x6

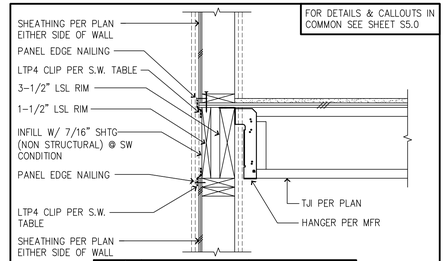


11 CORRIDOR BEAM TO WALL



8 TYP WALL @ FLOOR LEVEL W\O FLOOR SUPPORT

FOR DETAILS & CALLOUTS IN COMMON SEE SHEET S5.0

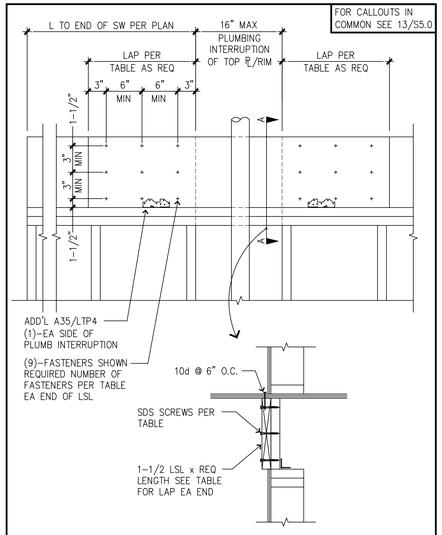


JOIST/BM CALLOUT	JOIST/BM	HANGER
J1 J2	11-7/8" TJI/110	DGT.81/11.88
J4	(2)11-7/8" TJI/360	DGB5.37/11.88
B6	3-1/2x11-7/8" LSL	DGB3.62/11.88*

*TO BE INSTALLED OVER STUDS (DF REQUIRED AT LOWER LEVEL)

4 2HR SHAFT W\JOIST PERPENDICULAR

FOR CALLOUTS IN COMMON SEE 13/S5.0



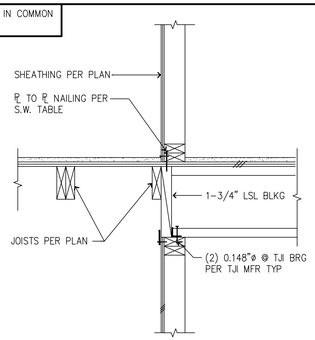
SECTION A–A

MAX 'L' (FT)	# OF 1/4"øx3" SDS SCREWS EA END	LSL LAP TO RIM (IN)
5'	4	12"
8'	6	12"
12'	9	18"
16'	12	24"
20'	15	30"

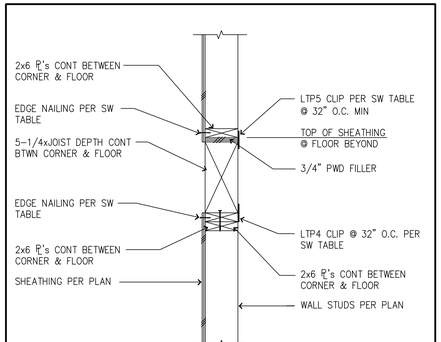
- SPACING OF SCREWS VERT=3" MIN
  EDGE DISTANCE SCREWS VERT=1-1/2" MIN
- SPACING OF SCREWS HORIZ = 6" MIN
  EDGE DISTANCE OF SCREWS HORIZ = 3" MIN

17 PLUMBING INTERRUPTION OF PLATE/RIM @ SHEARWALLS

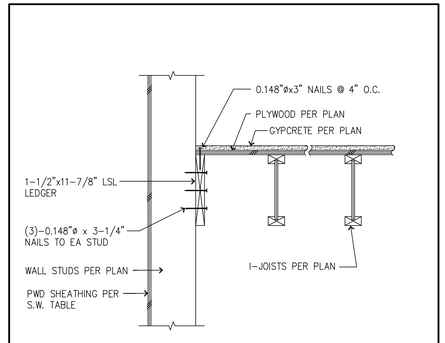
FOR CALLOUTS IN COMMON SEE 11/S5.0



14 ERV JOISTS TO WALL CONNECTION

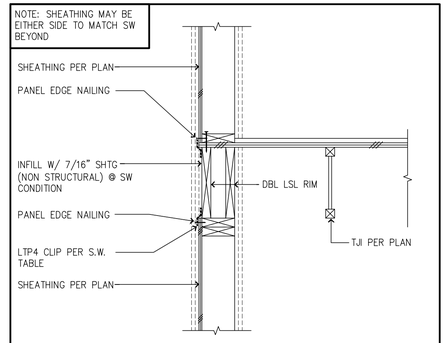


10 EXTERIOR WALL @ STAIRS



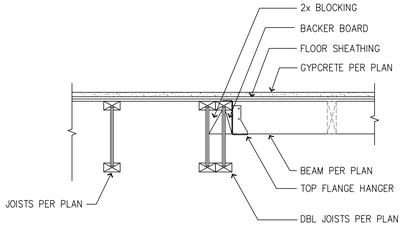
7 I-JOISTS PARALLEL TO WALL @ STAIRS

NOTE: SHEATHING MAY BE EITHER SIDE TO MATCH SW BEYOND

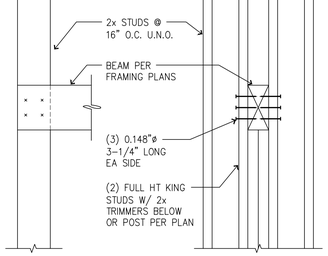


3 2 HOUR SHAFT W/ JOIST PARALLEL

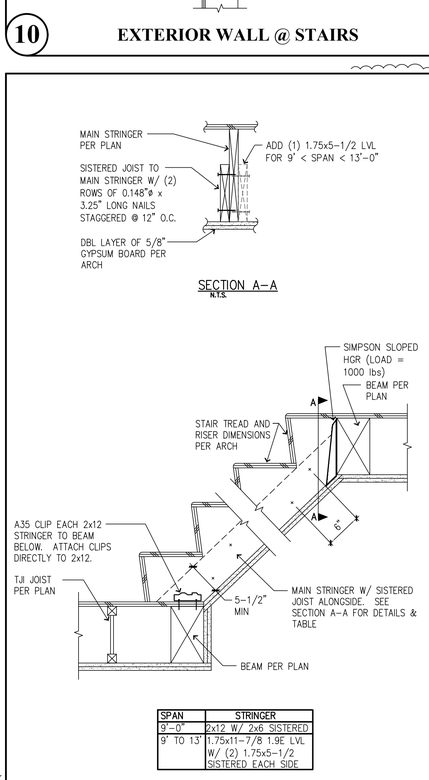
FOR CALLOUTS IN COMMON SEE 13/S5.1



16 ERV BEAM TO DBL JOISTS CONNECTION



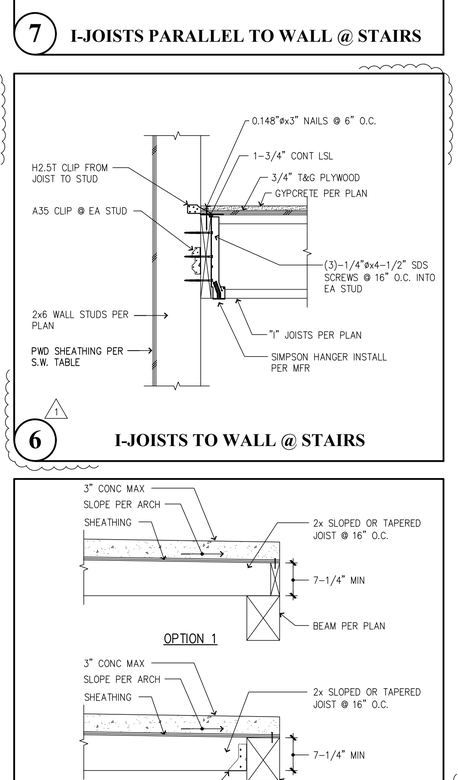
12 BEAM POCKET



SPAN	STRINGER
9'-0"	2x12 W/ 2x6 SISTERED
9' TO 13'	1.75x11-7/8 1.9E LVL W/ (2) 1.75x5-1/2 SISTERED EACH SIDE

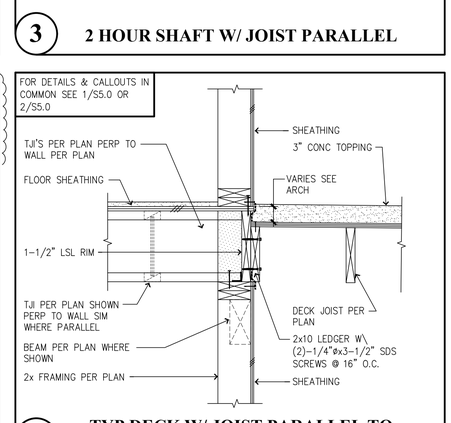
STAIR SECTION ELEVATION

9 STAIR STRINGER TO BEAM CONNECTION DETAIL



6 I-JOISTS TO WALL @ STAIRS

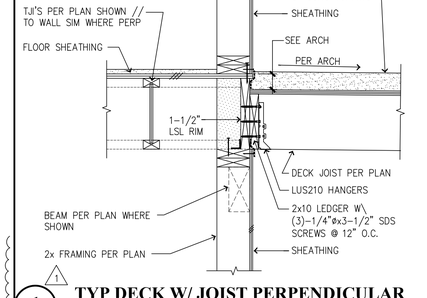
FOR DETAILS & CALLOUTS IN COMMON SEE 1/S5.0 OR 2/S5.0



2 TYP DECK W/ JOIST PARALLEL TO LEDGER @ EXT WALLS

5 DECK OUTSIDE EDGE

FOR DETAILS & CALLOUTS IN COMMON SEE 1/S5.0 OR 2/S5.0



1 TYP DECK W/ JOIST PERPENDICULAR TO LEDGER @ EXT WALLS

PLOT DATE/TIME 4/4/2023 - 3:38pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S5.1.dwg

STRUCTURAL ENGINEER
THOMAS L. CHASE
WASHINGTON
40752
REGISTERED PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

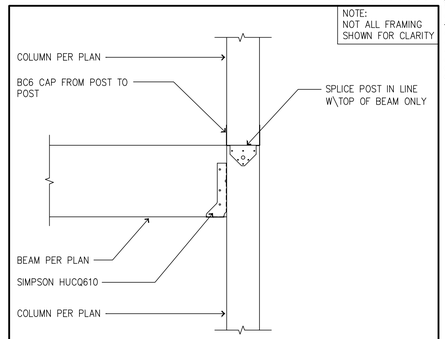
St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Inc. Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

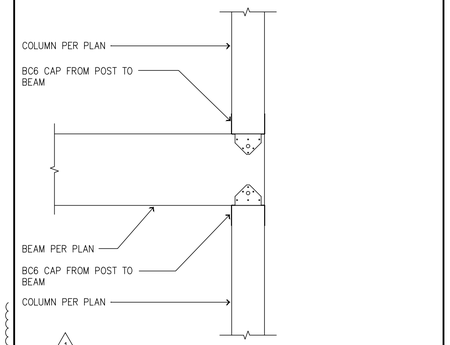
PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

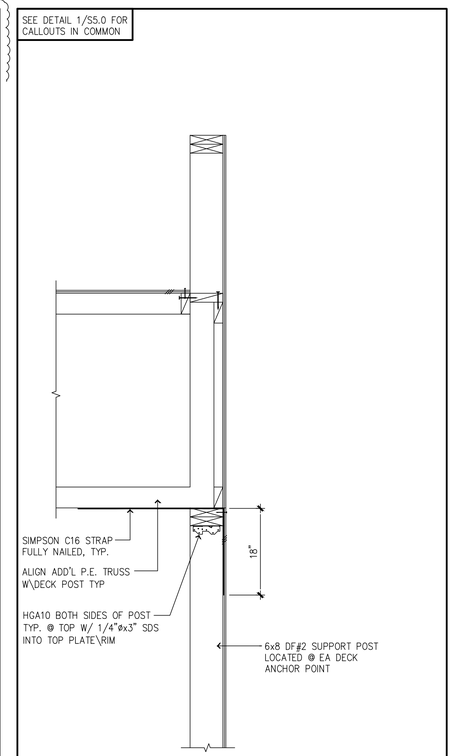
S5.1



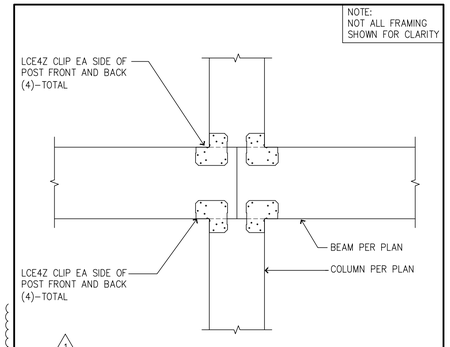
OPTIONAL CONNECTION



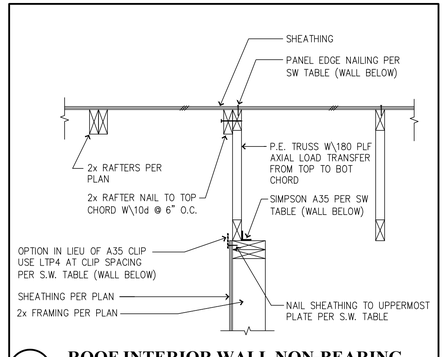
5 COLUMN/BEAM CONNECTION



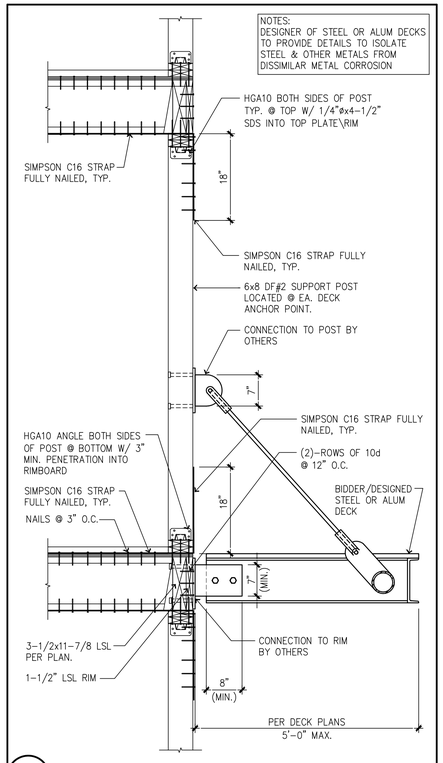
2 METAL DECK COVER AT ROOF



4 COLUMN/BEAM 2 SIDES CONNECTION



3 ROOF INTERIOR WALL NON-BEARING (W1-W5 SHEAR TRANSFER)



1 DECK ATTACHMENT W\HANGER ROD

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253-314-9822
www.solutions4structures.com

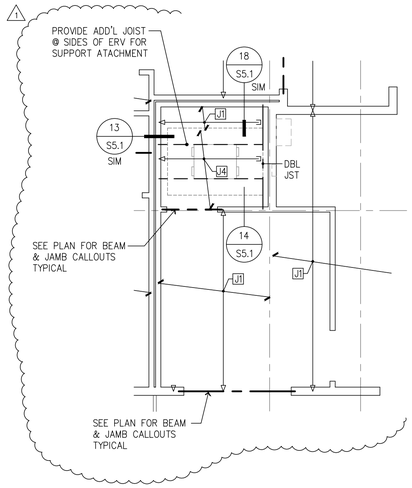
PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

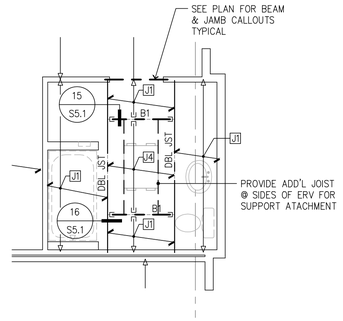
S5.2

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S5.2.dwg PLOT DATE/TIME 4/4/2023 - 3:40pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES

Joist Schedule	
MARK	JOIST TYPE & SPACING
J1	11-7/8 TJI/110 @ 16" O.C.
J2	11-7/8 TJI/110 @ 12" O.C.
J3	(2) 11-7/8 TJI/110 @ 16" O.C.
J4	(2) 2x6 DF#2 @ 16" O.C.
J5	PT 2x10 @ 16" O.C. (SLOPED SEE ARCH)
J6	PT 2x10 @ 12" O.C. (SLOPED SEE ARCH)



4 ERV - Framing - Bldg Units
SCALE 1/4"=1'-0"



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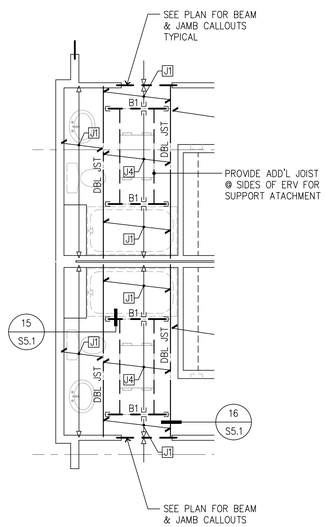

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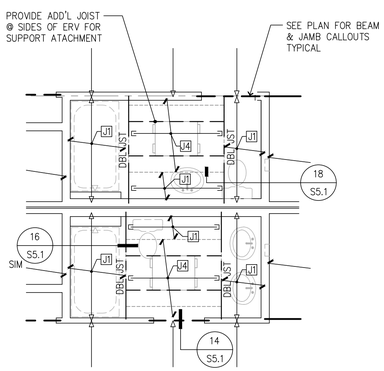

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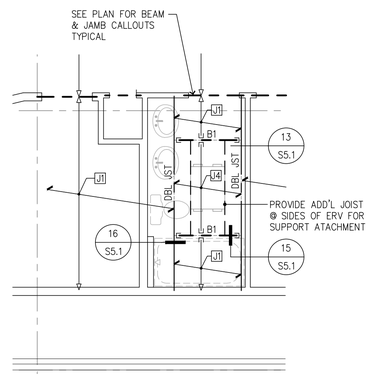


1 ERV - Framing - Bldg Units
SCALE 1/4"=1'-0"

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

4-7-23 REVISIONS PER JURISDICTIONAL REVIEW COMMENTS

St Helens Mixed Use
613 St Helens Ave
Tacoma, Washington

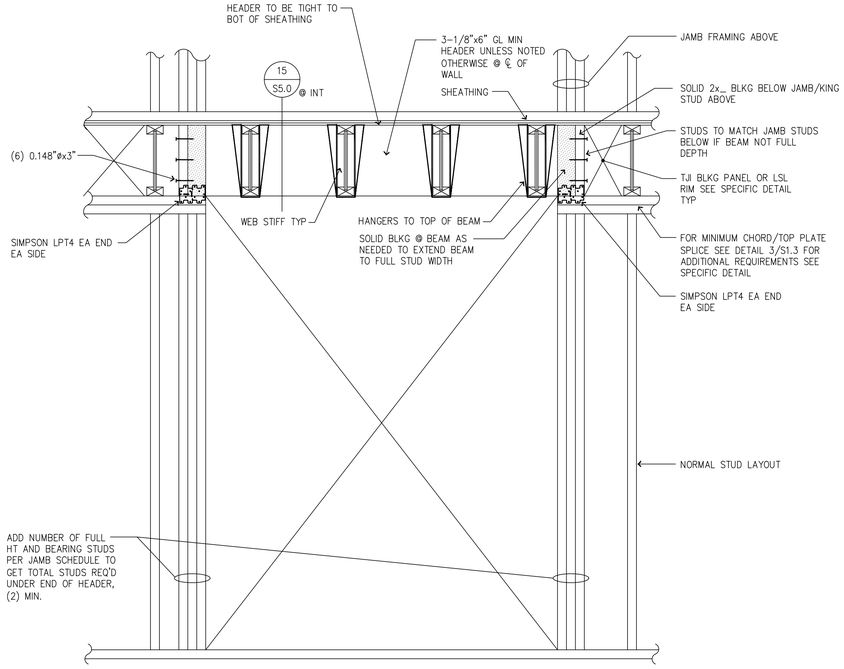
Solutions 4 Structures
A Structural Engineering Corporation
Puyallup, Washington 98374
Ph 253.314.9822
www.solutions4structures.com

PROJECT NO. : 21.043
DESIGNED BY : MRO, TLC, OGK
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

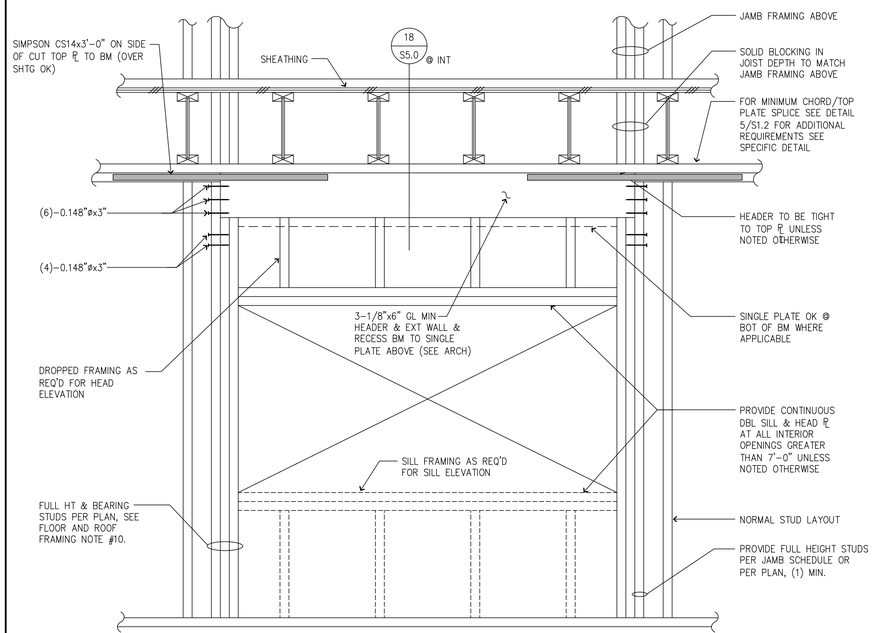
PERMIT SUBMITTAL
4-7-23

S5.3

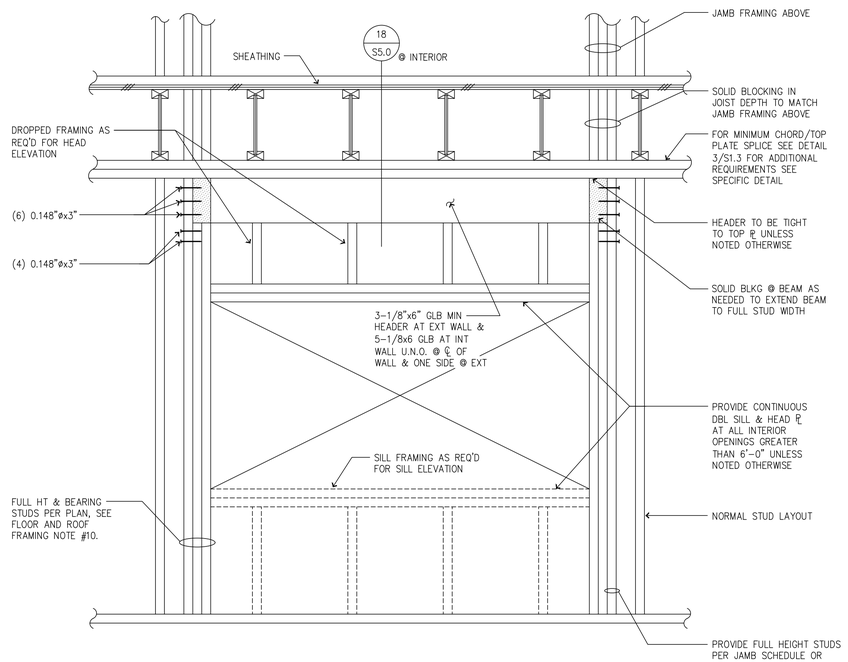
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S5.3.dwg PLOT DATE/TIME: 4/4/2023 - 3:42pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



2 **TYPICAL STUD WALL CONSTRUCTION AT FLUSH FRAMED HEADER ELEVATION**



3 **TYPICAL EXTERIOR STUD WALL CONSTRUCTION AT DROPPED HEADER ELEVATION**



1 **TYPICAL INTERIOR / EXTERIOR STUD WALL CONSTRUCTION AT HEADER ELEVATION**

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

4-7-23

Revisions to this sheet:

Solutions 4 Structures
A Structural Engineering Corporation
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Ph 253-314-9822
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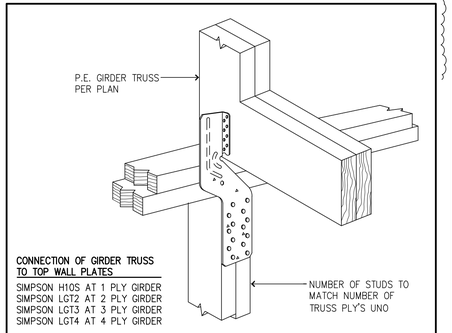
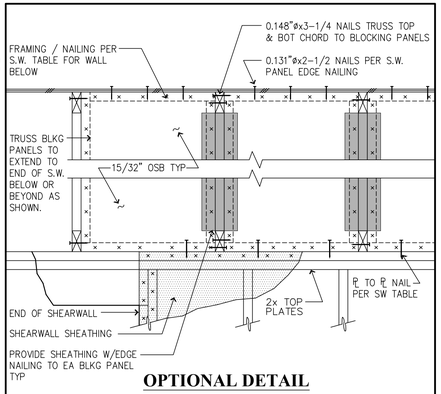
PERMIT SUBMITTAL
4-7-23

S5.4

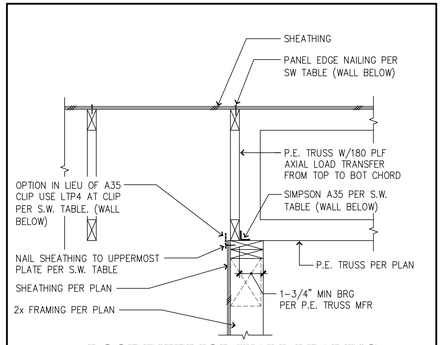
CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S5.4.dwg PLOT DATE/TIME: 4/4/2023 - 3:43pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



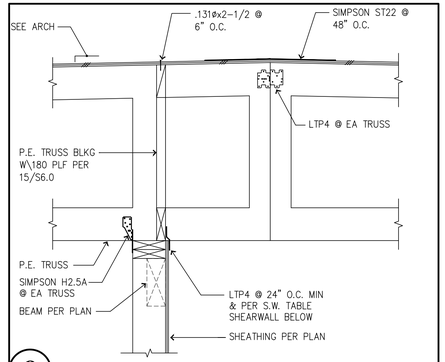
17 GIRDER TRUSS TO WALL CONNECTION



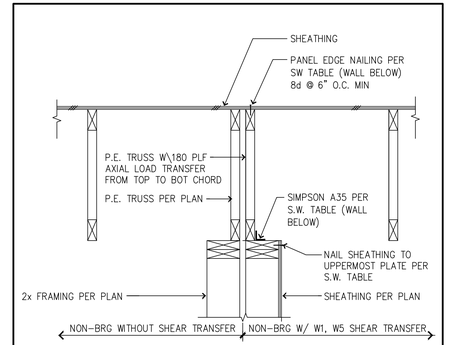
OPTIONAL DETAIL



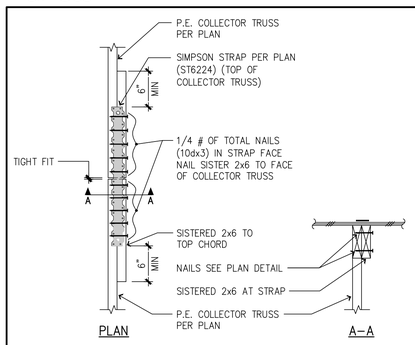
12 ROOF INTERIOR WALL BEARING ONE SIDE (W1-W7 SHEAR TRANSFER)



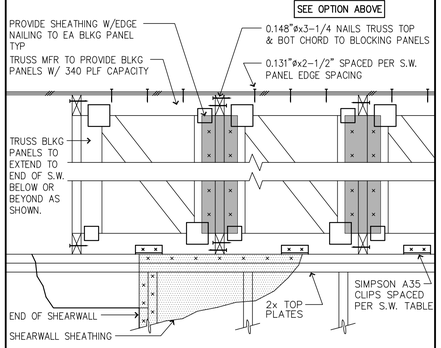
8 PE TRUSS @ CORRIDOR



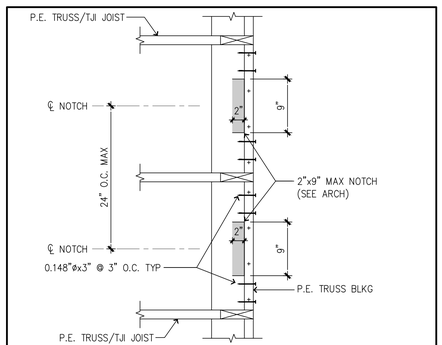
4 ROOF PARTY WALL NON-BEARING (W1 ,W5 SHEAR TRANSFER)



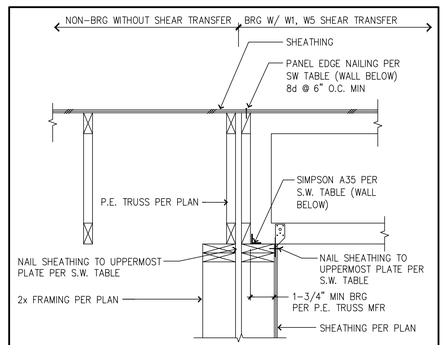
16 SPECIAL SIMPSON STRAP WIDER THAN P.E. COLLECTOR TRUSS



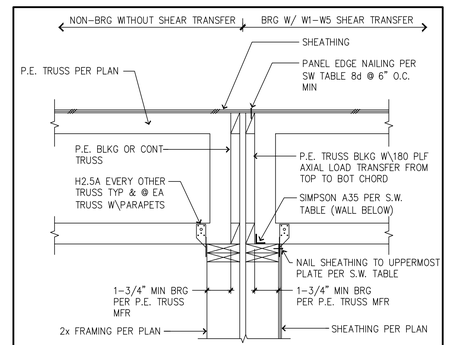
15 ROOF SHEAR TRANSFER W/ TRUSSES PERPENDICULAR



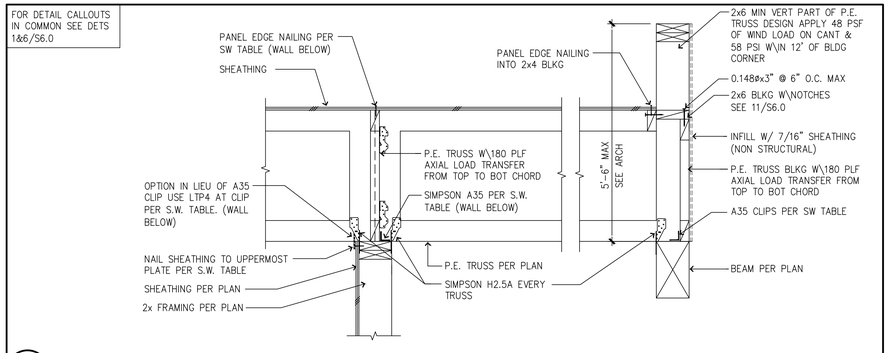
11 NOTCH VENT PLATE PLAN DETAIL AT PARAPET



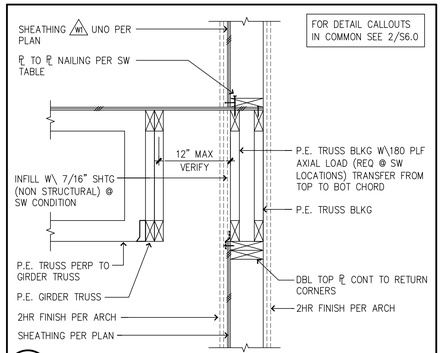
7 ROOF PARTY WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



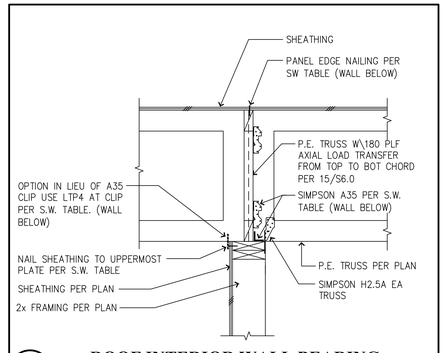
3 ROOF PARTY WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



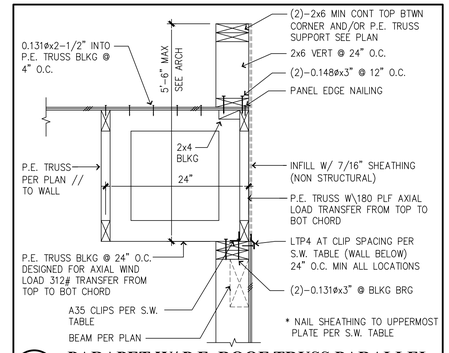
14 PARAPET W/ PE ROOF TRUSS PERP TO WALL (W1-W5 SHEAR TRANSFER)



10 2 HOUR SHAFT @ ROOF TRUSS PERP



6 ROOF INTERIOR WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



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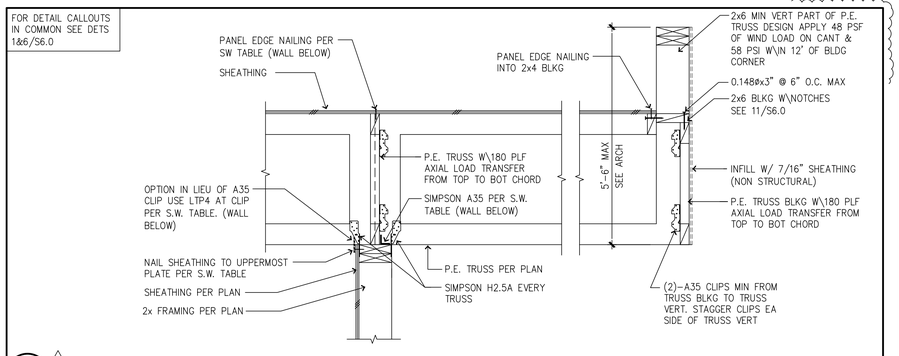
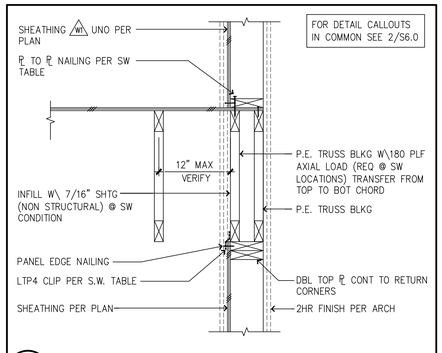
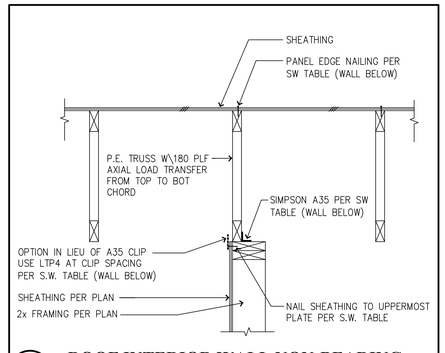


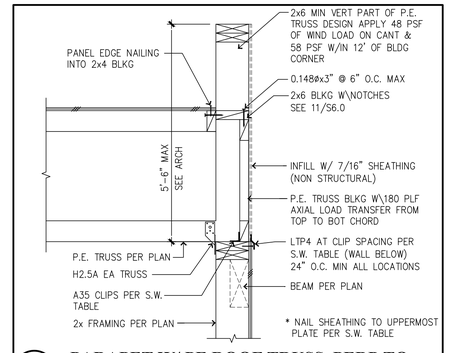
13 PARAPET W/ PE ROOF TRUSS PERP TO WALL (W1-W5 SHEAR TRANSFER)



9 2 HOUR SHAFT @ ROOF TRUSSES //



5 ROOF INTERIOR WALL NON-BEARING (W1-W5 SHEAR TRANSFER)



1 PARAPET W/ PE ROOF TRUSS PERP TO WALL (W1-W5 SHEAR TRANSFER)

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

Revisions to this sheet:

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PROJECT NO. : 21.043
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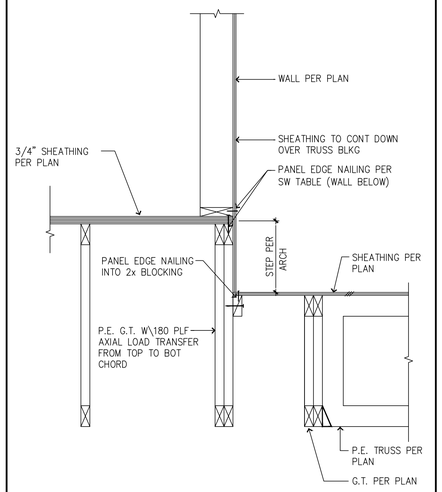
DRAWN BY : RSO
ISSUE DATE : 11-7-22
LATEST REV. OF DWG. SET : 4-7-23

PERMIT SUBMITTAL
4-7-23

S6.0

CAD FILE: F:\Projects\2021 Projects\21.043 St Helens Mixed Use\Drawings\S6.0.dwg
PLOT DATE/TIME: 4/4/2023 - 3:44pm THANK YOU FOR USING SOLUTIONS 4 STRUCTURES



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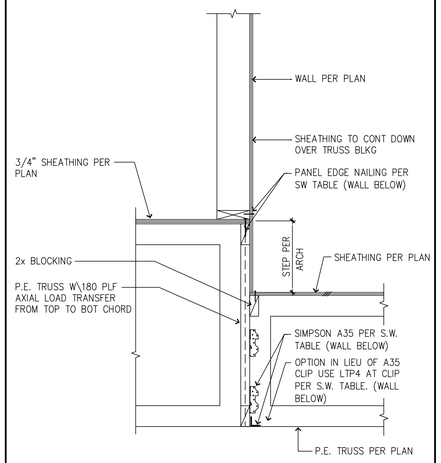
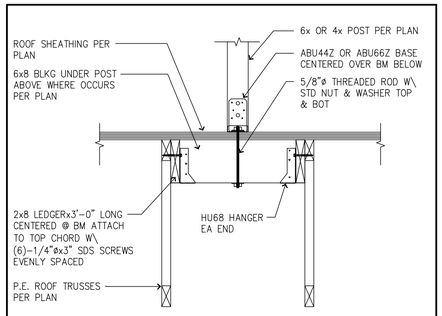


11 ROOF STEP @ WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



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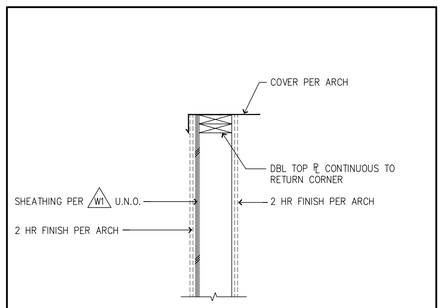
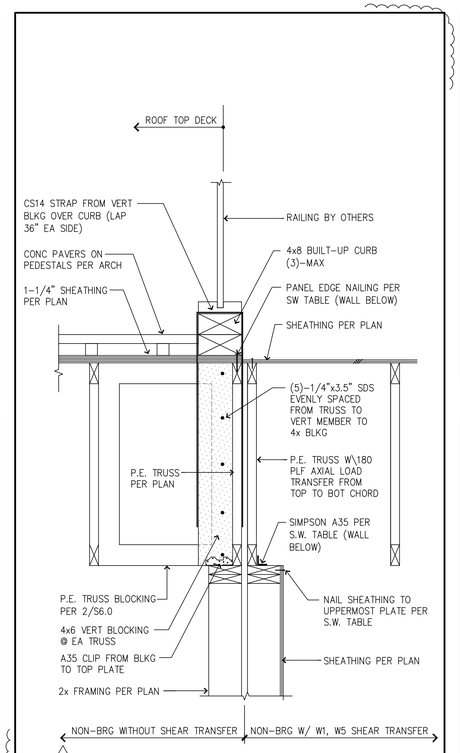


8 TYP 2HR SHAFT AT ROOF



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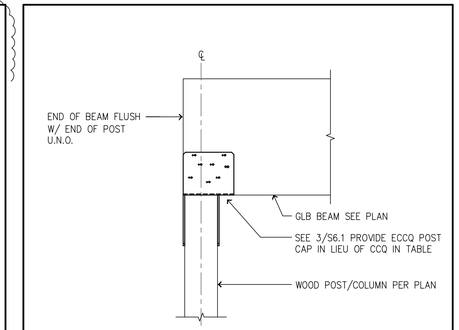
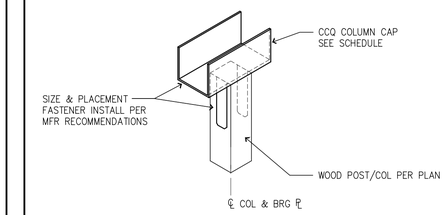
6 ROOF PARTY WALL NON-BEARING (W1 ,W5 SHEAR TRANSFER)

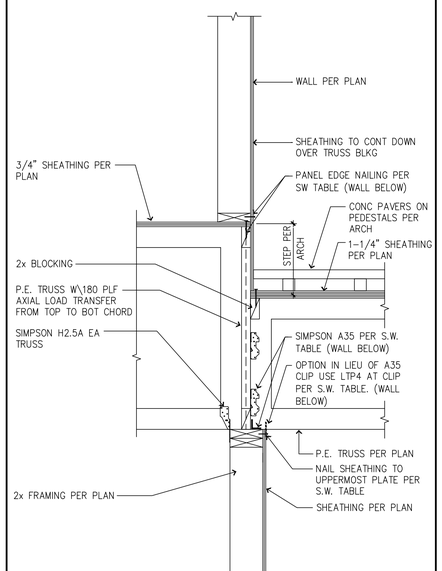


4 TYP END BM CONNECTION TO WOOD POST/COLUMN

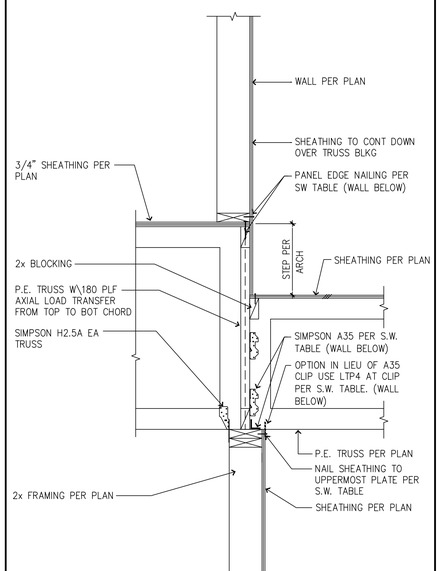


SCHEDULE		
BEAM SIZE	4x COL	6x COL
3-1/8x	CCQ3-4SDS2.5	CCQ3-6SDS2.5
5-1/8x	CCQ5-4SDS2.5	CCQ5-6SDS2.5
6-3/4x	CCQ7-4SDS2.5	CCQ7-6SDS2.5
8-3/4x	–	CCQ9-6SDS2.5

3 TYP BM CONNECTION TO WOOD POST/COL



12 ROOF STEP @ WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



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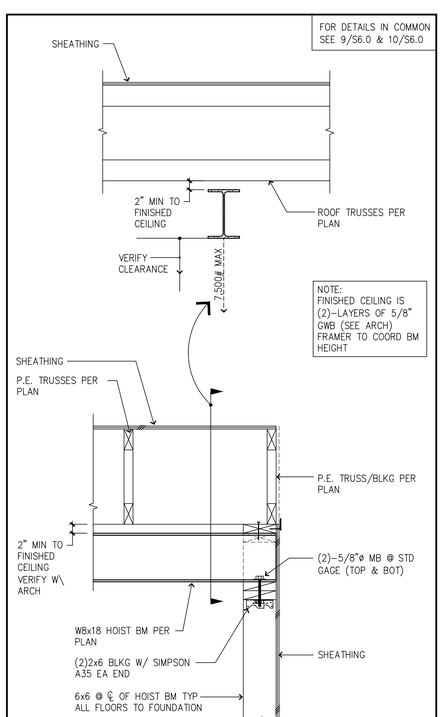
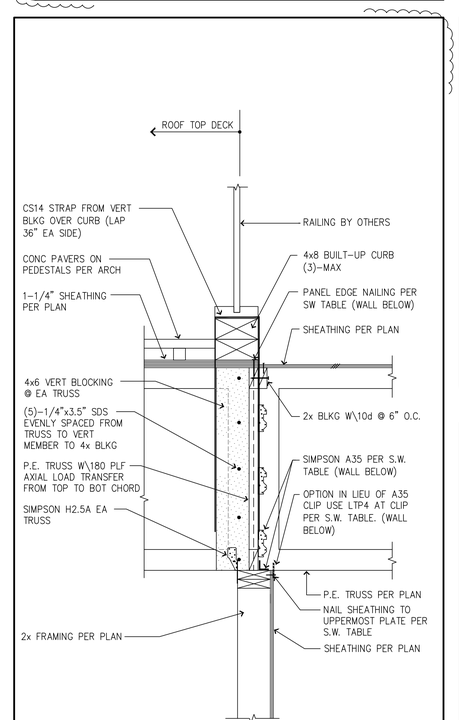


7 HOIST BEAM DETAIL



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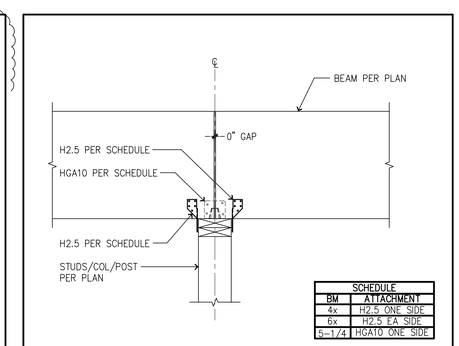
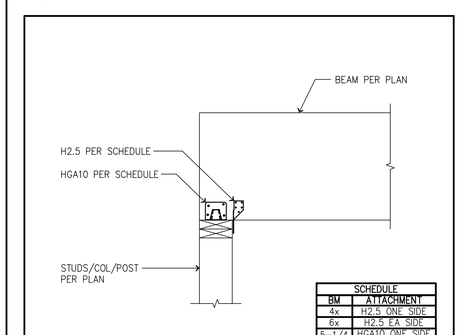
5 ROOF INTERIOR WALL BEARING EA SIDE (W1-W5 SHEAR TRANSFER)



SCHEDULE	
BM	ATTACHMENT
4x	H2.5 ONE SIDE
6x	H2.5 EA SIDE
5-1/4	HGA10 ONE SIDE

2 TYPICAL FLUSH FRAME BEAM TO WALL EA SIDE



SCHEDULE	
BM	ATTACHMENT
4x	H2.5 ONE SIDE
6x	H2.5 EA SIDE
5-1/4	HGA10 ONE SIDE

1 TYPICAL FLUSH FRAME BEAM TO WALL CONNECTION

STATE OF WASHINGTON · THOMAS L. CHASE · 40752 · REGISTERED PROFESSIONAL ENGINEER
4-7-23

THOMAS L. CHASE, PE
MARTIN R. OMAN, PE, SE
OLEG G. KONDRATYUK, PE

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DRAWN BY	:	RSO
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PERMIT SUBMITTAL
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S6.1

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