

-- GENERAL NOTES --

Structural plans comply with the 2021 International Building Code. Red-lines approved by the engineer of record.

-- SUBMITTALS --

- 1 DESIGN BASIS: Designed in accordance with the 2018 International Building Code (IBC).
2 RISK CATEGORY: II (per IBC Table 1604.5)
3 DESIGN DEAD / LIVE LOADS
- Roof Dead Load: 23 PSF Typical (Incl. Framing and 5 PSF solar allowance)
- Roof Live Load: 20 PSF Typical
4 DESIGN SNOW LOADS (ASCE 7-16)
- Ground Snow Load: Pg = 20 PSF
- Flat Roof Snow Load: Pf = 20 PSF
- Uniform Roof Design Snow Load = 20 PSF
- Thermal Factor: Ct = 1.20 (unheated, 1.0 (heated) / Exposure Factor: Ce = 1.0 / Snow Load Importance Factor: Is = 1.0
- Snow Drift: See OWSJ load diagrams
5 DESIGN WIND LOADS (ASCE 7-16)
- V = 98 MPH / V(asd) = 76 MPH
- Exposure: B / Internal Pressure Coefficient: +/- 0.18
- Components & Cladding: Components and cladding-wind pressures to be used for the design of exterior components and cladding (by others) shall be determined in accordance with ASCE 7 and the IBC.
6 DESIGN SEISMIC LOADS (ASCE 7-16)
- Site Class = E
- Seismic Design Category = D / Importance Ie = 1.0
- Ss = 1.277 / S1 = 0.439
- Sds = 1.022 / Sd1 = 0.679
- Building System: Building Frame
- SFRS: Buckling Restrained Braced Frame
- Response Modification Factor Used: R = 8.0
- Seismic Response Coefficient: Cs = 0.128
- Design Base Shear: V = 189 kips
- Analysis Procedure: Equivalent Lateral Force Procedure
7 QUALITY: Contractor shall ensure high standards of workmanship throughout, with strict adherence to the contract documents and all governing codes and standards.
8 DESIGN RESPONSIBILITY: Kingworks is responsible only for the design of the primary structural system as shown in the contract documents. Design of all secondary structure or non-structural elements are by others.
9 DISCREPANCIES: Notify the Architect immediately of any discrepancies between these notes, the contract drawings, the specification, or the governing code. The Architect shall reply in writing. Any related work performed by the Contractor prior to receiving a reply from the Architect is at the Contractor's sole risk. For purposes of bidding, the most stringent of the conflicting documents shall apply.
10 VERIFICATIONS: Verify all existing conditions; verify all dimensions in the field; verify architectural, mechanical and electrical openings for size, location and number; notify the Architect of any discrepancies, substandard existing conditions, or conditions not included in or contrary to the Contract Documents prior to shop drawing submittal or construction.
11 DRAWING COORDINATION: Coordinate the structural drawings with drawings from all other disciplines (including but not limited to Architectural, Civil, Mechanical, and Electrical).
12 COMPLETED FORM: The structure shown in these drawings is designed to be stable and to resist the loads above only in a fully completed form. Contractor shall ensure that the structure is adequately braced and shored during construction for all temporary loads until all elements are in place, and shall ensure that temporary loadings do not exceed the allowable capacity of any structural elements both before and after these elements are in place.
13 MEANS AND METHODS: Contractor is solely responsible for site safety, coordination, procedures, construction methodology, shoring, bracing, sequencing, and all other "means and methods" of construction except where specifically shown in the Contract Documents.
14 PROTECTION AND BRACING: Contractor is solely responsible for the protection of existing buildings, utilities, streets, equipment, etc. during construction. Provide temporary bracing and protection as required.
15 SCALING: Do not scale drawings. See architectural drawings for dimensions, and notify the Architect of any discrepancies.
16 ALTERATIONS: Any holes or other alterations to the structure which are not specifically detailed on the Contract Drawings shall be submitted to the engineer for approval.
17 LOAD COORDINATION: The design of all pre-engineered components shall include provisions for precise locations and weights of all mechanical units and other concentrated loads. Concentrated loads are not necessarily indicated on the Structural Drawings, and must be coordinated by the General Contractor, who shall also inform the Architect of any significant loads not shown in the contract documents. The Contractor shall assume full responsibility for coordination of weights, locations, hanger spacings, methods of attachment and seismic bracing of all mechanical units, sprinklers, pipes, ductwork, and other miscellaneous MEP assemblies.
18 MEP CONNECTIONS TO STRUCTURE: Unless specifically shown otherwise in the Contract Documents, all anchorage, support, and seismic bracing of mechanical and electrical equipment, piping, ceilings, fixtures and other non-structural components shall be designed by a Washington State Licensed Professional Engineer and installed by the Contractor. The engineer shall be retained by the Contractor, and the Contractor is responsible for all associated engineering, component, and installation costs. Design shall be per ASCE 7 Chapter 13.
19 DELIVERY, STORAGE AND HANDLING: All products shall be delivered, stored, and handled according to the Manufacturer's recommendations and installation instructions. Protect all items from damage, moisture, corrosion, or other deterioration before, during and after installation.
20 COPYRIGHT: These drawings, and all designs shown within these drawings, are copyrighted by Kingworks Structural Engineers. Duplication is not permitted without written permission. The designs shown herein are intended for this project only and may not be used on any other project or for any other purpose.

- 1 GENERAL: Provide PDF of all submittals to the Architect. Allow two weeks for review. Submittals will be reviewed for general conformance to the contract documents. Responsibility for adherence to the contract documents lies solely with the Contractor, including but not limited to dimensions, sizes, connections, and quantities.
2 CONTRACTOR REVIEW: Contractor shall review, mark, and stamp all submittals before submittal to the Architect. Unreviewed or unstamped submittals will be returned to the Contractor without review.
3 RESUBMITTALS: Resubmittals shall have all revisions clearly identified with "drawing clouds" and revision dates. KW shall not be responsible for review of any unmarked revisions.
4 SHOP DRAWINGS: To include typical and unique conditions and all connections, shall be submitted to the Structural Engineer of Record for the following products prior to fabrication. Shop drawings shall clearly demonstrate the Contractor's understanding of the contract documents. The following shall be considered minimum structural submittals for this project.
- Concrete / Masonry Reinforcing Steel (incl. wall elevations)
- Concrete / Grout Mix Designs (confirm Fc & f'm prior to construction)
- Slab-on-Grade Jointing Plan
- Structural Steel
- Metal Roof Deck (Layout and Material Specification)
- Metal Roof Deck Fasteners (Plan and Material Specification)
- Fiberglass Trench Grate
- Non-Shrink Grout Material Specification and MFR Installation Recommendations
5 DEFERRED SUBMITTALS: Shall be designed by a Specialty Component Engineer (SCE) retained by the Contractor. SCE shall be a licensed Professional Engineer in the State of Washington, with 5-years minimum experience in design of the components included in the deferred submittal. Submittals shall clearly indicate all loads and reactions to be imposed on the primary structure. Submittals shall include all components and connections required to perform the work. Where the Contract Documents indicate member or connection qualities and/or quantities, these shall be considered a minimum and remain the design responsibility of the SCE to increase as required to satisfy load and deflection requirements. Deferred submittals shall include calculation set. Both the calculation set and all related shop drawings of the deferred submittal shall be sealed prior to submission. The Architect shall forward deferred submittals to the Building Official where required. The following shall be considered Deferred Submittals on this project.
- Buckling Restrained Braces
- Open Web Steel Joists (OWSJ)
- Cold Formed Steel Framing - Interior and Exterior
- Metal Plate Connected Wood Trusses (MPCWTS)
6 SUBMITTAL REVIEW COMMENTS: Engineer marks and comments on shop drawings and other submittals are a normal and expected part of the submittal process, and are not to be used as a basis for change orders except in cases where these marks result in or derive from substantial changes to the Contract Drawings. Time required to revise and resubmit any submittal shall be considered inherent to the submittal review process and shall not be deemed a change order. If discrepancies are discovered between the submittals and the Contract Documents (either before, during, or after submittal review), the Contract Documents shall govern and be implemented unless specifically directed otherwise.

-- SPECIAL INSPECTIONS, TESTING, AND STRUCTURAL OBSERVATION --

- 1 GENERAL: A special inspection agency shall be retained by the owner to perform inspections according to IBC Chapter 17. The following scheduled structural special inspection and testing regimen shall be cross-referenced with the IBC and its referenced standards for more specific requirements and exceptions. Special inspection and test reports shall be submitted to the Building Official, Architect and Structural Engineer in accordance with IBC 1704.2.4.
2 NONSTRUCTURAL COMPONENTS: Nonstructural components are also subject to special inspection for conformance to the Seismic Design Requirements of ASCE 7-16 Chapter 13. The support and seismic bracing of nonstructural components shall be designed by a Washington State Licensed Engineer, who shall be retained by the Contractor. Nonstructural components subject to seismic design and periodic special inspection requirements of ASCE 7-16 and IBC Chapter 17 include (but are not limited to) the following:
- Architectural components (IBC 1705.12.5)
- Nonstructural components (IBC 1705.13.2)
- MEP Components (IBC 1705.12.6)
- Reference the architectural, electrical, and mechanical drawings and/or specifications for additional special inspection and testing requirements.
3 STRUCTURAL OBSERVATION: Kingworks will perform Structural Observations in accordance with IBC Section 1704.6 if/as required. These observations provide intermittent checks of general conformance to the design intent and are in addition to (not replacing) the third-party special inspection regimen. It shall be the Contractor's responsibility to keep the Structural Engineer apprised of the general schedule of construction, such that observations may be made at appropriate stages before significant structural components (such as reinforcing bars, framing members, or wall holdowns) are obscured.

-- STRUCTURAL SPECIAL INSPECTION SCHEDULE --

Table with 3 columns: STRUCTURAL ITEM, FREQUENCY (C=continuous, P=periodic), REFERENCE (2018 IBC Section, uon). Rows include STEEL (Material Verification, High Strength Bolting, Weld Filler Material, etc.), CONCRETE (Reinf Welding, Reinf Placement, Anchor Placement, etc.), MASONRY (Mortar Proportions, Reinf Placement), and SOILS & FOUNDATIONS (Subgrade Adequacy, Excavation Depth, etc.).

-- FOUNDATIONS & SUBGRADE --

- 1 SOIL ALLOWABLE BEARING PRESSURE: 2500 PSF (x 1.33 when subjected to wind or seismic loadings).
2 GEOTECHNICAL REPORT: Reference Terra Associates geotechnical report dated April 6, 2023 for subgrade preparation, backfill, surcharge program, compaction, wet weather work, and other recommendations. All provisions of the geotechnical report shall be enacted by the Contractor.
3 GEOTECHNICAL VERIFICATION: The Owner shall retain a geotechnical inspection agency to inspect the excavations and confirm that the provisions of the Geotechnical Report are followed. All recommendations of the geotechnical inspector shall be followed and communicated with the design team via inspection report. Contractor shall coordinate this inspection effort with the Owner.
4 UTILITIES: Utilities are not to pass through or beneath footings, stemwalls, and other concrete work on grade except as shown in specific details.
5 MISCELLANEOUS VERIFICATIONS: Verify sizes, slopes and locations of tunnels, electrical cells, pits, pipes, floor drains, trenches and floor recesses with architectural, mechanical and electrical contractors.
6 ALIGNMENT: All footings shall be centered below columns and walls, unless dimensioned otherwise.
7 BACKFILL: Do not backfill against below-grade walls until strength has been achieved and floor framing is in place.
8 FROST PROTECTION: Maintain minimum 1'-6" soil cover, measured from finished grade to the bottom of the footing, for perimeter wall foundations and isolated exterior foundations.
9 EXCAVATION SLOPE: Excavation slope shall not exceed that permitted by local regulation, except as specifically approved by the geotechnical engineer.

-- REINFORCED CONCRETE --

- 1 REFERENCED STANDARDS: Reinforced concrete shall conform to the requirements of the following documents, except as modified in these drawings.
- ACI 301-16 "Standards Specifications for Structural Concrete"
- ACI 318-14 "Building Code Requirements for Structural Concrete"

-- CONCRETE MATERIAL SCHEDULE --

Table with 7 columns: Item, Fc (PSI), W/C (MAX), COARSE AGG (MAX), AIR ENT, MIN FLY ASH AND/OR SLAG, MAX FLY ASH AND/OR SLAG. Rows include CONTROLLED DENSITY FILL, FOUNDATIONS / STEM WALLS (1'-7" OR MORE BELOW GRADE), FOUNDATIONS / STEM WALLS (1'-6" OR LESS BELOW GRADE), SLAB ON GRADE (EXTERIOR), SLAB ON GRADE (INTERIOR - 6+ INCHES), SLAB ON GRADE (INTERIOR - 4-5 INCHES), PILASTERS/PIERS.

-- REINFORCED CONCRETE --

- 2 MATERIALS
- Required concrete strength "fc" shall be evaluated at 28 days (56 days OK for fly ash or slag concrete).
- Conform to following concrete material schedule requirements.
- Cementitious Materials: Provide Type I or II Cement per ASTM C150 (Type III OK for Precast) or Type II Blended Hydraulic Cement per ASTM C595. Cementitious materials for use in concrete exposed to soil or weather must meet or exceed the S1 exposure class per ACI 318-14 Table 19.3.2.1.
- Fly Ash: Class F per ASTM C618.
- Slag: GGBF Slag per ASTM C989, Grade 100 minimum.
- Air Entrainment: Provide air entrainment per concrete mix table +/- 1.5%, all other locations exposed to weather shall have air entrainment of 6% (+/- 1.5%).
- All 8-inch thick slabs shall have 28-day maximum shrinkage of 0.050%. Submit test data for a minimum of 3 specimens of the proposed mix in conformance with ASTM C157 for review.
- Typical Reinforcing Steel: ASTM A615, Grade 60
- Weldable Reinforcing Steel: ASTM A706, Grade 60
- Welded Wire Fabric: ASTM A185
3 SPLICES: All reinforcing steel lap splices are to be per typical schedule unless noted otherwise. All welded wire reinforcement lap slices shall be the greater of one space plus 2 inches or 6 inches, unless otherwise noted.
4 CONTINUITY: Horizontal reinforcing steel in walls and wall footings shall be continuous around corners, same size and spacing. At intersections of walls or footings, extend all bars as far as possible into continuous element and terminate with standard hook.
5 CLEAR COVER: Provide clear cover from outermost reinforcing to surface of concrete in accordance with the following:
- Elements cast against and permanently exposed to earth: 3" clr
- Elements formed and exposed to earth or weather: 2" clr (#6-#18), 1 1/2" clr (#3-#5)
- Slabs, Walls, Joists NOT exposed to weather or in contact w/ ground: 3/4" clr (#3-#11)
- Columns, Pilasters, Piers (longitudinal, hoops, ties, stirrups, spirals): 1 1/2" clr
6 INTEGRAL COLUMN & WALL FOOTINGS: Where column footings are shown integral with wall strip footings, transverse wall footing bars need not continue through width of column footing. Longitudinal wall footing bars shall extend continuous through column footing, in addition to column footing bars per typical detail.
7 ACCESSORIES: Provide all accessories, chairs, spacer bars and supports necessary to secure steel in accordance with ACI Code of Standard Practice.
8 CHAMFER: Chamfer all exposed corners and edges above grade per the Architect.
9 FORM STRIPPING: Do not strip forms until concrete has reached adequate strength.
10 SLEEVES / OPENINGS: Furnish and place all sleeves and openings as shown on the drawings or as specified.
11 REINFORCING FABRICATION: All reinforcing shall be shop fabricated. Exception: #3 or #4 bars may be field bent one time in any location, do not rebend or restraighten.
12 HOOKS: All hooked bars shall be a standard shop fabricated hook with bend radii and length per ACI 318, UON.
13 TESTING: Test cylinders shall be taken by qualified personnel according to ACI 318-14 Section 28.12
14 MEMBRANE: Provide vapor barrier (per spec) directly below slab-on-grade (above compacted fill), reinforce all seams and repair tears as necessary.
15 WEATHER PROVISIONS: Observe all ACI recommendations for hot or cold weather concreting cure slabs using an approved curing compound or wet cure system per ACI recommendations, with special consideration for slag and fly ash concrete as appropriate.
16 CONSTRUCTION JOINTS: All construction joint locations shall be submitted to the Architect for approval. Roughen joints to 1/4-inch minimum amplitude, remove all laitance. Soak joint continuously for 2 hours minimum, then remove all standing water, immediately prior to second pour. Unless noted otherwise, all reinforcing shall be spliced/continuous across the construction joints.
17 FIBER REINFORCEMENT: See spec for requirements.

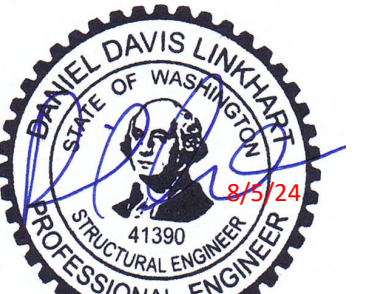
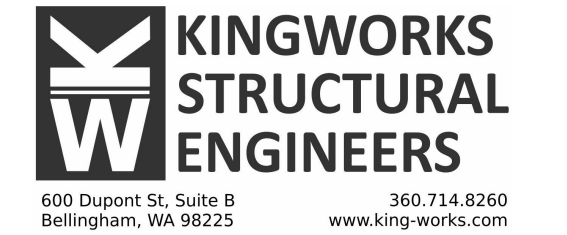
-- STRUCTURAL MASONRY --

- 1 SPECIFICATION: Masonry construction and materials shall conform to all requirements of "Specification for Masonry Structures" (TMS 602-16), unless noted otherwise.
2 UNIT STRENGTH: The concrete masonry design is based on a specified compressive strength of masonry (fm) of 1500 psi at 28 days. The compressive strength of masonry shall be determined by the unit strength method in accordance with TMS 602-16.
3 MATERIALS
- Hollow concrete masonry units: ASTM C90, Grade N, Type I, normal weight units, net area compressive strength of masonry units = 2150 psi
- Mortar: ASTM C270, Type S portland cement/lime mortar
- Grout: maximum aggregate size of 3/8", compressive strength equal or greater than the strength of masonry units at 28 days (AND not less than 2000 psi in any case)
- Reinforcing Steel: ASTM A615, Grade 60 typical (A706 for weldable bars)
- Portland Cement: Cement in mortar and grout shall contain 0.6% or less alkali by weight
4 BELOW GRADE: All masonry below grade shall be grouted solid.
5 DEVELOPMENT: All masonry reinforcing shall be developed and lapped in solid grout per typical schedule.
6 WALL GROUTTING: Walls indicated as partially grouted on the structural drawings may not be fully grouted without written approval from the Structural Engineer.
7 POUR AND LIFT HEIGHTS: Maximum "pour height" shall not exceed 12'-0". Each "pour height" shall be divided into separate "lift heights" not to exceed 5'-4" each. Each "lift height" shall be individually consolidated (vibrated), including consolidation penetrating into the lower uncurd lifts.
8 CLEANOUTS: Cleanouts are required in the bottom course of masonry for each grout pour when the "pour height" exceeds 5'-4". Cleanouts shall meet the criteria of TMS 602-16 Section 3.2F.
9 REINFORCEMENT ALIGNMENT: Vertical reinforcement shall be centered within cells unless noted otherwise. Use approved spacers to ensure alignment within cells. See details for other bar alignment criteria.
10 HORIZONTAL REINFORCEMENT: Horizontal reinforcement shall be tied to vertical reinforcement, continuous, and terminate with standard 180-degree hook around vertical bar at wall ends or jamps, or 90-degree bends extending one lap length at wall corners. Where CMU wall intersects with concrete wall, dowel all horizontal bars similar to typical corner or tee details.
11 STOPPAGE KEYS: When the grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the grout pour 1-1/2" below the top of the uppermost unit.
12 BOND BEAM MINIMUM REINFORCEMENT: Reinforce all bond beams with #2 #4 continuous bars, unless noted otherwise.
13 CLEAR COVER: Minimum clear cover from face of masonry to face of reinforcing shall be 1-1/2" minimum for #5 bars or smaller, and 2" minimum for #6 bars or larger. See details for typical reinforcement alignment.
14 CONTROL JOINTS: Refer to architectural and structural drawings for locations and details of vertical control joints. Verify all joint locations with Architect.
15 HOOKS: All hooked bars shall be a standard shop fabricated hook with bend radii and extension per TMS 402-16 Table 6.1.8

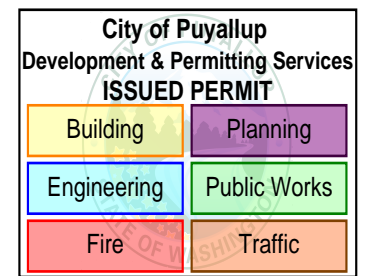
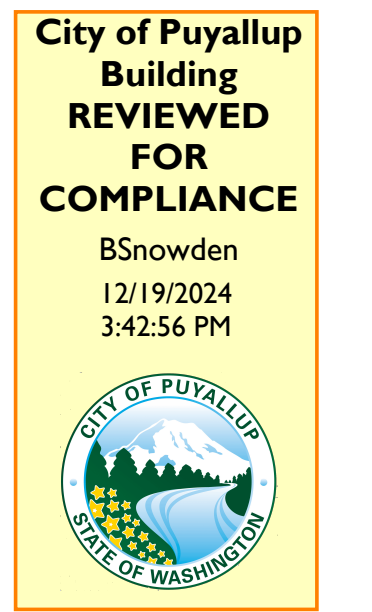
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DIGITAL SEAL ON PDF FILE



Welding to be completed by an individual or fabricator who is WABO certified or approved by the Building Official to perform the work. All welds must be inspected and approved by a WABO certified special inspector.

100% CD SET

Table with 3 columns: REV, ISSUED FOR, Date. Row 1: 1, 100% CD REVS, 8/5/24

Table with 2 columns: PLAN NORTH, SCALE:

PSE - OPERATIONAL TRAINING CENTER

STRUCTURAL NOTES

Table with 2 columns: PROJECT#, DRAWN BY, CHECKED BY, DATE ISSUED. Values: 21239, GK, DL, 1/26/24

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The approved construction plans, documents, and all engineering must be posted on the job at all inspections in a visible and readily accessible location.

Full sized legible color plans are required to be provided by the permittee on site for inspection.

Approval of submitted plans is not an approval of omissions or oversights by this office or non-compliance with any applicable regulations of local government. The contractor is responsible for making sure that the building complies with all applicable codes and regulations of the local government.

