PHSKC - PLAN REVIEW DESIGN GUIDANCE

PLUMBING - GENERAL

Last Updated: 11/03/2023

Plumbing Permit Application

A project permit application is complete when it meets the submission requirements of the Authority Having Jurisdiction (AHJ). It is the duty of the AHJ to inform the applicant, within 28 calendar days:

A. That the application is complete; or
B. The application is incomplete and what is needed to make the application complete.

Please reference the complete RCW 36.70B.070 regulations here

To determine if a project requires Plan Review, please reference our Occupancy and Use document.

To initiate the Plan Review process, submit the following documentation electronically through the online Permit Portal:

☐ **(1) Complete plan set in electronic (PDF) format**

Note: Include any supplemental plan sheets at the end of the plan set or as a separate stand-alone PDF set. Provide a label stating "For Reference Only" on each individual 'For Reference' sheet. Supplemental plan sheets may include any supplemental information required to conduct a thorough Plan Review. Supplemental sheets provided for reference will not be stamped by PHSKC.

Examples of supplemental plan information to provide (as applicable):

- Civil site plans, surveys, bio-retention planter details
- Manufacturer's details for alternate engineered plumbing systems (i.e. Sovent, etc.)
- Kitchen Consultant drawings showing equipment locations and/or schedules

☐ **Designer qualifications (include certificate number or license number)**

Note: Plans shall be stamped by a WA State licensed Professional Engineer (PE).

Exceptions:

1. Detached one- and two-family dwellings and townhomes.
2. Excepting Engineered or Alternate designs, plans developed in accordance with all adopted chapters, sections, and appendices of the Uniform/Seattle Plumbing Code may be submitted without a PE stamp by any individual holding an active Certified in Plumbing Design (CPD) designation issued by the American Society of Plumbing Engineers (ASPE) or by a Washington State Certified Journeyman Plumber (PL01).
3. Design documents provided for reference only.
4. Other work as specified by the Authority Having Jurisdiction.

☐ **Plumbing Permit Application**

Note: Fixture count provided on Plumbing Permit Application must match fixture count on drawing set. If discrepancies are found during Plan Review, an amended Plumbing Permit

Application will be required to be submitted prior to Permit issuance.

☐ **Alternate Material, Method or Modification Request Form(s) – AMMRF (if applicable)**

Note: See section 9 below for specific examples.

☐ **Supplemental Applications and/or Documentation (if applicable)**

Examples:

- Single-Stack Vent Systems – Items noted on Document P20
- Water Reuse Systems – Affidavits, Concept Letters, etc. (see specific guidance)

Plumbing Plan Review Submittal

To expedite the Plan Review process, it is important that a complete set of plans be submitted. The design guidance below is provided to assist the applicant in providing the minimum information required.

Note: Depending on the scope of the project, the minimum requirements outlined below may not be all inclusive. The AHJ may at any time request additional documentation if deemed necessary to adequately review the design of the proposed system(s).

Documentation for the design of new, altered, or repaired plumbing systems must include the following minimum criteria to be considered complete:

1. **GENERAL REQUIREMENTS**
   - A. All PDF plan sets shall include embedded bookmarks indicating sheet number and title.
   - B. All sheets shall include a designated 2.5”x1.5” space labeled “PHSKC Stamp” or “AHJ Stamp” for the PHSKC Approval stamp (locate on right side of sheet to avoid staples or binding). Updated 10/13/23
   - C. All sheets shall include the project address, signed and dated PE stamp (if applicable), designer license or certification number, drawing scale (if applicable), sheet number, sheet title, and issue date.
   - D. All labels denoting system loading shall be designated in Gallons per Minute (GPM) or Water Supply Fixture Units (WSFU) for domestic water systems, Drainage Fixture Units (DFU) for sanitary drainage systems, Square Feet (SF) for rainwater systems, and Cubic Feet per Hour (CFH) or Thousands of BTU per Hour (MBH) for natural gas or propane gas systems.

   Notes:
   - i. When sizing natural gas systems using MBH units, note the MBH to CFH conversion factor used on each riser sheet or within the project natural gas system load calculation.
   - ii. If sizing a domestic water system using both GPM and WSFU, clearly indicate which unit type is being referenced.

2. **COVER SHEET**

   Cover sheet shall include the following:
   - A. Symbols Legend
   - B. List of Abbreviations
   - C. General Notes
   - D. Applicable Codes and Code Cycle(s) Used
   - E. Narrative of Scope
   - F. Water Supply System Disinfection Requirements (if applicable – new or repaired systems only)
   - G. Sheet Index
   - H. Site Address, Vicinity Map, and Parcel Number (include floor or room number if applicable)

Notes:

i. Narrative of Scope should include all system types used (sanitary, domestic water, graywater, grease waste, etc.), primary building occupancy type, number of floor levels involved, and a general description of the work being performed. If other City, County, or State agencies are reviewing plans related to the project (i.e. Building dept, Health dept, etc.), provide confirmation that plans have been submitted to these agencies for review.
ii. Sheet Index should list all sheets provided in drawing set. 'For Reference' sheets may be included within Sheet Index, or as separate stand-alone list on cover sheet.
iii. If applicable codes listed are not the code cycle in effect at the time of application, please include the vested building code application date. If not included, this may be requested by the reviewer.

3. CALCULATIONS & NOTES

Calculations and notes shall include the following:

A. Pipe Material Matrix (include joining methods)
B. Pipe Insulation Table
C. Load Calculations/Fixture Unit Matrix & Sizing Method (provide separate calculation for each utility connection)
D. Basis of Design (if applicable – see sub-note viii below)
E. Domestic Water Pressure Calculation(s)

Notes:

i. Reference Washington State Energy Code or Seattle Energy Code (as applicable) for insulation and equipment requirements not listed within the Plumbing Code.
ii. Pipe materials intended to convey drinking water shall comply with NSF 61 per UPC/SPC 604.1. Please note NSF 61 compliance on Material Matrix where applicable.
iii. If the pipe Material Matrix allows more than one type of material to be used at the discretion of the installing Contractor, plans will be reviewed against the most stringent requirements. For example, if both copper and stainless steel are optional domestic water materials throughout the building, the lower peak velocity rate of copper pipe shall not be exceeded.
iv. Note peak design velocity for each type of water supply piping on Material Matrix.
v. When using Appendix M as a sizing method, provide at a minimum an image or matrix showing the input values used within the Water Demand Calculator, and a sizing matrix showing the total calculated hot and cold water GPM values for each part of the domestic water system sized using Appendix M.
vi. If adding on to an existing system, include existing loads in calculations. If exact loads are not available, provide an estimate.
vii. When connecting to a shell/core system with new tenant improvement work, include the DFU/WSFU/CFH tenant allowance at the shell/core P.O.C. If unavailable, or tenant improvement load is greater than the noted shell/core allowance, provide note stating project engineer of record has evaluated total system capacity and new tenant improvement work will not exceed that capacity at any point in the system. Provide additional note stating plumbing contractor shall report any deviations in existing system configuration to engineer of record for review and approval prior to installation.
viii. A 'Basis of Design' should be included when there is a proposed deviation from a prescriptive design approach. The BOD should explain the rationale behind the proposal. For example, if the Appendix M Water Demand Calculator is being used with fixture flow rates other than the default values, the Basis of Design would explain how the proposed values were established.
Added 11/03/23 → ix. Fabricated stainless steel fittings and assemblies used in potable domestic water systems must be 3rd party listed to both NSF 61 and the applicable fitting standard (i.e. IAPMO PS 53) per UPC/SPC 301.2 and 604.1.

4. SCHEDULES

Schedules shall be provided for any of the following:

A. Water Heaters/Boilers

B. Pumps
C. Specialty Valves (Pressure Reducing Valves, Thermostatic Mixing Valves, Balancing Valves, etc.)
D. Plumbing Fixtures (Including Pet Wash, Other Specialty Fixtures)
E. Drains & Hydrants
F. Interceptors (Grease, Solids, Oil/Water, etc.)
G. Heat Trace (Type of heat trace and control method only – length/voltage not required)
H. Pressure Vessels (Storage Tanks, Expansion Tanks, Hydro-pneumatic Tanks, etc.)
I. Cisterns
J. Backflow Prevention Assemblies
K. Gas Pressure Regulators
L. Natural Gas Appliances (only general description and MBH/CFH input rating required)
M. Meters
N. Backwater Valves (note normally open or normally closed type)
O. Water Treatment Units
P. Waste Neutralization Units
Q. Heat Exchangers
R. Precast Sumps/Vaults
S. Any equipment requiring a wired electrical connection and connected to the plumbing system

Notes:

i. All equipment weighing more than 50lbs shall have operating weight listed on schedule.
ii. Valves, assemblies, fixtures, and equipment required by SPC/UPC to comply with NSF 61 shall indicate NSF 61 compliance.
iii. Backflow prevention assemblies shall meet the requirements of WAC 246-290-490.
iv. Pumps installed within a below grade sump in an open area of a covered parking garage shall be 'explosion proof' per SEC Article 500.5 (does not apply to elevator hoistway pumps).
v. Plumbing fixture schedule(s) shall include fixture flow rate or gallons-per-flush for fixtures where flow or flush volume is regulated by the Plumbing Code or other applicable legislation.
vi. Plumbing fixture schedule(s) shall indicate which fixture(s) are considered 'accessible' or 'ADA compliant'.
vii. Equipment required to comply with provisions of the Washington State Energy Code or Seattle Energy Code shall include equipment make/model and any other information required to determine compliance.
viii. Precast structures shall be designed and engineered for the use and installation type indicated on plans and details.
ix. All food service projects require a connection matrix showing which fixtures or equipment discharge directly or indirectly, and to grease waste or sanitary waste.
x. Division 22 Specifications are not an acceptable substitute for Schedules.

5. PLAN SHEETS

Plan Sheets shall include the following **architectural information** as applicable (screened/grayscale). This information is typically provided by the project architect as part of the architectural background:

A. Room Names
B. Floor Elevations
C. Walls, Doors, Windows
D. Elevators/Stairs/Corridors
E. Label Rooms Requiring 2 hr or Greater Fire Rating (Generator, Fire Pump, Transformer, etc)
F. Label Special Purpose Rooms (Mechanical Rm, Water Entry Rm, etc)
G. Planting Areas, Courtyards, Green Roof Areas
H. Exterior Decks/Roof Areas
I. Amenity Areas
J. Kitchen/Kitchenette/Cafeteria Areas
K. Parking Areas

L. Water Features/Pools/Spas
M. Central Laundry
N. Pet Wash Areas
O. Car/Truck/Bike Wash Areas
P. Pet/Dog Run Areas (dog run areas over 200 S.F. require approval from City of Seattle ,contact: sidesewerinfo@seattle.gov)
Q. Dwelling Units
R. Any Appliance or Piece of Equipment with Plumbing Connections

Plan Sheets shall include the following **plumbing design** information as applicable (solid black/bold)

S. Horizontal Main and Branch Piping for all Plumbing & Gas Systems
T. Vertical Risers for all Plumbing & Gas Systems
U. Pipe Sizes, Slopes, and Loading (at each horizontal pipe segment and all vertical risers except as noted below)
V. Plumbing Fixture Tags
W. All Drains (floor drains, garage drains, hub drains, trench drains, roof drains, etc - w/Tags)
X. All Scheduled Plumbing Equipment & Scheduled Valves (w/Tags)
Y. Notation Indicating Which Specific Drains are (or are not) Being Served by a Trap Primer (notation via Fixture Tag sub-text, Keyed Note, or sim.)
Z. Scupper, Gutter, & Downspout Sizes/Dimensions
AA. Square Foot loading at Each Roof Drain (include sidewall and/or downspout tributary area)
BB. Label or Equipment Tag for Any Appliance or Piece of Equipment with Plumbing Connections
CC. Hoistway Water Infiltration Protection Method (per SBC 403.6.1.1)
DD. Hoistway Drains or Sump Pumps (per ASME A17.1 2.2.2.5)
EE. Suds Relief Labels at Vertical to Horizontal Changes of Direction
FF. Backwater Valves (see explanatory note below)
GG. Protection of Rain Leaders (per UPC/SPC 1101.16.1)
HH. Code Specific Dimensional Requirements (i.e., UPC/SPC 1101.16.2 - include labels and dimensions as needed)
II. North Arrow
JJ. Key Plan/Control Lines (for large projects where a floor level does not fit on a single sheet)

Notes:

i. For the purposes of this guidance document, Plumbing & Gas systems include: Sanitary Waste & Vent, Rainwater Conductors, Domestic (potable) Water, Non-Potable Water, Irrigation (within building, if installed by PC), Graywater, Indirect Waste, Pumped Waste, Pumped Storm, Mechanical Condensate (if installed by PC), Natural Gas, Medical Gas, Lab Waste, Acid Waste, Grease Waste, Garage Drainage, and any other piping system installed by the Plumbing Contractor within the building or above an occupied portion of the building.
ii. Pipe slope may be noted on each pipe segment or as a General or Keyed note on each sheet. A General note only on the cover sheet (or any individual sheet) will not be accepted. If a General Note is provided, clearly label the slope of any horizontal pipe sloping at a rate that differs from what is stated in the General Note.
iii. Vertical risers shall be labeled with both size and loading *or* provided with a distinct riser tag correlating to a riser diagram included within the drawing set being reviewed.
iv. System loading (DFU/WSFU/CFH/GPM/SF) may be omitted on plan sheets on all but the lowest floor of gravity drainage (building drain), provided all loading information is clearly shown on riser diagram(s).
v. Runouts to individual fixtures from a central distribution manifold are not required to be shown on plans.
vi. Condensate piping shall be shown on plans only when installed by the Plumbing Contractor as part of the plumbing scope of work.
vii. Informational note - Trap primers shall be listed to ASSE 1018 or ASSE 1044. Trap Seal Protection Devices listed to ASSE 1072 may be provided in addition to, but not in lieu of, an

ASSE 1018 or ASSE 1044 listed device.

viii. Unless a structural conflict exists, or there is not a vertical wall within the maximum vent takeoff distance from a fixture trap, vent takeoffs must be vertical per UPC/SPC 905.3. Rolled horizontal vent lines below the flood level rim will not be accepted during field inspection unless specifically noted (with Keyed Note or Flag Note) on Approved plans at each location where this occurs, and the applicant has confirmed a structural conflict exists at each of these locations.

ix. Where a combined building sewer is used, or a building storm sewer connects to a combined public sewer in the street, any drain connected to the building storm drainage system (roof drain, area drain, planter drain, etc.) and located below the elevation of the next upstream manhole cover of the combined public sewer, shall be protected from sewage backflow in accordance with UPC/SPC 710.1.

x. 'Typical' plans may be submitted where horizontal mains and branch piping are identical to other floors. These sheets must be clearly labeled as 'Typical' and include a title or note indicating which floors are represented.

6. RISER DIAGRAMS

Riser diagrams shall be provided for <u>all</u> plumbing & gas systems and shall include the following (as applicable):

A. All Horizontal and Vertical Piping (see explanatory notes below)
B. Pipe Sizes, Slopes, and Loading (at each pipe segment except as noted below)
C. Square Foot loading at Each Roof Drain (include sidewall and/or downspout tributary area)
D. System Trap and Vent for Combined Sewer (UPC/SPC 1101.15)
E. Sum of Total Loading at Each Utility Connection and Vent Termination
F. Plumbing Fixture Types (Lavatory, Water Closet, Clothes Washer, etc)
G. Drain and Hydrant Types (Floor Drain, Roof Drain, Hub Drain, Wall Hydrant, Roof Hydrant, etc)
H. All Scheduled Plumbing Equipment & Valves (w/Tags)
I. Any Appliance or Piece of Equipment with Plumbing Connections
J. Floor Elevations (from sea level)
K. Elevation of Next Upstream Manhole Rim (shown dashed, sanitary riser diagrams only)
L. Design Rainfall Rate (Normal = 1"/hour, Double = 2"/hour)
M. Domestic Water System Sizing Methodology (Chapter 6, Appendix A, Appendix M, etc)
N. Natural Gas System Sizing Methodology (per IFGC 402.4 – note specific sizing table or equation used, include pipe length(s), design pressure loss, and diversity factor if applicable)
O. Non-Conventional or Engineered Piping Configurations (Circuit Vents, Wet Vents, etc)
P. Backwater Valves
Q. Indirect Connections & Receptors (note Air Break or Air Gap)
R. Bio-Retention Planters (include downstream piping if installed by Plumbing Contractor)
S. Stormwater Detention Vaults (include downstream piping if installed by Plumbing Contractor – if not, note "downstream piping by others")
T. Sumps/Vaults/Interceptors (include pressure piping & vents)
U. Hoistway Drains or Sump Pumps (ASME A17.1-2016 2.2.2.5)
V. Suds Relief Labels at Vertical to Horizontal Changes of Direction
W. Future Tenant Connection Design Allotment (DFU/WSFU/GPM/CFH)
X. Yoke Vents and Relief Vents (if required)

<u>Notes:</u>

i. All piping within the project scope of work shall be shown on the riser diagram. For tenant improvements, this includes all piping from the tenant point of connection to the furthest fixture. For new construction projects, this includes all piping from the utility point of connection at the building to the furthest fixture (or through roof for vent piping).

ii. Pipe slope may be noted on each pipe segment or as a General or Keyed note on each sheet. A General note only on the cover sheet (or any individual sheet) will not be accepted. If a General Note is provided, clearly label the slope of any horizontal pipe sloping at a rate that differs from

what is stated in the General Note.

iii. Design rainfall rate may be indicated on each pipe segment, or as a General or Keyed note on each sheet.

iv. Runouts to individual fixtures from a central distribution manifold are not required to be shown on riser diagrams.

v. When a riser diagram extends to multiple drawing sheets, provide a clear and distinct label at each continuation so the reviewer can easily find the continuation on the next sheet.

vi. For commercial kitchens and similar occupancies where fixtures or appliances are draining to an indirect receptor, indicate which fixtures or appliances are draining into each receptor.

vii. Sizing methodology for all system types shall be noted on each riser diagram sheet unless clearly indicated within a sizing calculation provided under Section 2 'Calculations & Notes'. Include reference to any specific sizing Tables used (i.e. IFGC Table 402.4(1)).

viii. For non-gravity systems, include flow direction arrows or directional symbols indicating direction of flow.

ix. Where mixed materials are used within the same piping system, note different material types and line of delineation between materials unless clearly defined in the project Material Matrix.

x. Due to the specific dimensional properties and installation requirements of PEX tubing, clearly label or note all pipe segments that are intended to be installed as PEX (excluding PEX installed downstream of distribution manifolds per sub-note iv) unless this is well defined within the project Material Matrix. Any field installation of PEX tubing that is not noted on the Approved plans will result in an inspection correction comment.

xi. Isometric (3D) or Flat (2D) riser diagrams may be provided. All riser diagram requirements must be met regardless of presentation type. Note: if an isometric riser diagram is submitted and the Plan Reviewer has difficulty reading or interpreting what has been provided, a correction comment may be issued asking for the isometric to be split into multiple smaller parts, or a flat (2D) riser diagram be provided (at the discretion of the reviewer) if the isometric version cannot be made legible.

xii. Where submitted riser diagrams are generated using a 3D design model (Revit or sim), the resulting riser diagram must be clearly readable, fully labeled, and show all branch connections, sizes, floor elevations, etc. as noted above.

7. CONSTRUCTION DETAILS

Construction details shall be provided for any of the following:

A. Pipe Insulation (through hangers and floor penetrations – per WSEC or SEC 404.6)
B. Interceptors (grease, oil/water, solids)
C. Sumps w/Pumps - Precast or Cast-in-Place (include pressure line & vents)
D. Specialty Valves (backflow preventers, pressure reducing valves, balancing valves, etc.)
E. Plumbing Equipment (water heaters, pumps, expansion tanks, etc.)
F. Unique or Complex Installations (pet wash, dog run with automatic washdown, combined space heating/service water heating plant, central water heating plant, etc.)
G. Lab sinks with point-of-use neutralization and/or eye wash
H. Trash Chute Washdown Connections (backflow device, soap injections, etc.)
I. Medium Pressure Gas Regulators (upstream/downstream test ports, valves, etc.)
J. 3-Compartment sinks in commercial kitchens (traps, vents, direct connection)
K. Combi ovens or steamers in commercial kitchens (backflow devices, etc. upstream of equipment P.O.C.)

<u>Notes:</u>

i. Construction details may be generic or universal, provided all pipe sizes and loading are shown on Plans and Riser Diagrams and all relevant equipment information is provided in Schedules.

ii. Copies of manufacturer's installation details or submittals with no additional design information are not acceptable. Each submitted Construction Detail must be relevant and specific to the project and include upstream/downstream piping, cleanouts, valves, etc.

iii. Do not include Construction Details that are not relevant to the project plumbing or gas

system(s). Sheets with unrelated Construction Details will not be stamped as Approved.

8. **ADDITIONAL PERMITS (Informational Only)**

Depending on project scope, the following permits may be required in addition to the Plumbing Permit:

A. Mechanical Permit (heat pump systems or combined space heating/water heating)
B. Electrical Permit (line voltage equipment)
C. Refrigeration Permit (field-installed refrigerant piping connections)
D. Boiler/Pressure Vessel Permit (see Boiler & Pressure Vessel Code for exemptions)
E. Backflow Preventer Permit
F. Natural Gas Piping Permit
G. Medical Gas Piping Permit
H. Gray Water Permit (dedicated plan set and SR# required)
I. Water Reuse / Rainwater Harvesting Permit (dedicated plan set and SR# required)
J. Food Service Permit (Food Service Program – King County)
K. Pool or Spa Permit (Water Recreation Program – King County)
L. Pet Related Business Permit (Pet Business Regulations – King County)

9. **ALTERNATE MATERIALS, METHODS, or MODIFICATIONS REQUEST FORMS**

Depending on project design methods and/or products used, an approved AMMRF may be required prior to installation. Examples:

A. Any Alternative Engineered Design (UPC/SPC 301.5)
B. Non-Adopted Appendices (Appendix C)
C. Single Stack/Sovent Systems (Document P-20 and Inspection Matrix also required)
D. Code Cycles Prior to Adoption (i.e. provisions within 2021 UPC/SPC prior to adoption date)
E. Water Reuse Systems Not Within Scope of UPC/SPC Ch 15 & 16
F. Solar Water Heating Systems
G. Vacuum Waste Systems
H. Composting Toilets
I. Siphonic Roof Drains
J. Waste Heat Recovery Systems
K. Non-Listed Plumbing Fixtures

Note: Once plans are Approved, the installation must generally conform to the Approved plans. Minor re-routing to avoid structural or inter-trade conflicts, changing the make/model of non-critical equipment, or using a different (code compliant) installation method is acceptable without submitting a drawing revision. Any change of fixture count, material, or design approach (i.e. changing from Copper to PEX or from Conventional venting to Wet venting), is considered a design change and will require a Plan Revision to be submitted. Any significant difference in design approach between the Approved plans and the installed work may result in a failed inspection and the permit may be placed into a Hold status until revised drawings are submitted and Approved.

Plan Revisions must be prepared and submitted by the Designer or Engineer of Record, not the installing Contractor (if different). When submitting a Plan Revision, provide a written narrative including a list of which sheets have been revised along with a complete set of drawings. Drawing sheets with revisions should have all revisions clouded. If clouds would overly obscure drawing content, note which revisions have *not* been clouded. Sheets that have no revisions should be exact copies of the most recently Approved and stamped drawings issued by PHSKC.

For additional information regarding any policy outlined within this document, please send an inquiry to: planreviewinfo@kingcounty.gov