

1 DESIGN DRAWING STANDARDS FOR WATER SYSTEM IMPROVEMENTS AND EXTENSIONS

The benefited party pays for water system extensions. Skagit PUD approval of all plans for extensions, improvements, or additions to water facilities is required prior to their construction. This standard provides civil engineers and developers guidance when submitting plans to PUD for review.

1.1 Electronic Plan Submittals

Plans shall be submitted electronically. In the case of a project that includes the design of multiple utilities, the PUD requires that the design of the water distribution facilities be provided separately from the other utilities.

1.1.1 Native PDF Files

As part of the plan review process, plans shall be electronically submitted in a “flattened native” PDF file format (created directly from an electronic version, rather than from print),

1.2 Drawing Requirements

1.2.1 General Drawing Requirements

- A. Drawings shall contain the stamp and signature of a registered professional engineer on each sheet. The electronic stamp and signature shall be locked and not be removable or changed. A signature and date are not required for submission of plan review but is required for final approval. If the plans are submitted for review only, then mark across engineer’s stamp as “PRELIMINARY.”
- B. Provide the PUD approval stamp with the job identity listed (“Job ID: CP_____”) on the cover sheet only. It is the responsibility of the developer and the contractor to construct the project from the most currently approved plans. The PUD will assign the job identity during the initial plan review.
- C. PUD drawing standards are encouraged for use on all content that will carry over into record drawing requirements, including layer names, line types, line weight, and symbols.
- D. Final drawings shall be submitted electronically and shall include signatures from the fire marshal and any other local officials. The cover sheet will be stamped and signed by the PUD Engineering Manager. Upon final approval by PUD, the applicant shall provide one fully signed electronic copy and three full-size paper copies to the PUD prior to construction.
- E. Skagit PUD may reduce drawing requirements depending on the complexity of the water system improvement.

1.2.2 Cover Sheet

All plan sets must have a cover sheet, followed by the plan and profile sheets, followed by the detail sheets. The cover sheet shall be the first sheet of the plan set and must contain the following:

- A. Project Title: Project titles shall be unique to each project.
- B. Vicinity Map: Show the location of the project within Skagit County.
- C. Provide a sheet index and legend.
- D. List the horizontal and vertical datum on the cover sheet as NAD 83 and NAVD 88. If necessary, show the conversion from the listed datum to NAD 83 (horizontal) and NAVD 88 (vertical).
- E. Provide a signature block for fire marshal to approve the fire hydrant locations.

1.2.3 Plan and Profile Sheet

Design drawings for all proposed waterline projects are required to have a plan view and profile view.

- A. Show all existing waterlines, meters, fire hydrants, valves, appurtenance, and the nearest set of shutoff valves in either direction. List the current waterline size, type, CO# or CP#, and date/year installed (e.g., 8" C-900 CO3133 1986) along the waterline.
- B. Show PUD easements, other exclusive and non-exclusive easements, property lines, right-of-way, addresses, and county parcel numbers.
- C. The drawing(s) shall contain a north arrow on each plan/profile sheet. The horizontal scale is recommended to be 1"= 20'. All dimensions shall be shown in feet, tenths, and hundredths of a foot.
- D. All existing underground utilities shown on the plan view that crosses the proposed waterline must be shown on the profile at the surveyed depth. If the depth is unknown, the utility shall be shown at an assumed depth of three feet with a note of "DEPTH UNKNOWN."
- E. Profiles of the waterline drawings shall show the proposed waterline in relation to other existing and proposed utilities. The profile must include the rim elevations of all structures and manholes, invert elevations of all pipes connecting to structures and manholes, length of proposed waterline between structures or pipe grade breaks, pipe grade, and utility crossings.
- F. All waterline callouts shall list valves, fittings, connections, and appurtenances such as air vacuum assemblies, blow-offs, flushing assemblies, fire hydrants, and double check detector assemblies (DCDA), Reduce Pressure Backflow Assemblies (RPBA), and service connections.
- G. All proposed PUD pipelines shall be shown in bold and referenced to and stationed along the centerline of the street or right of way (ROW). Stationing for points of curve, points of tangent, and intersections shall be shown. For pipelines located within easements, stationing shall be along the pipeline centerline.

1.2.4 Drawing Callout

PUD drawing standards are encouraged for use on all content that will carry over into record drawings.

A. Plan View

- a. Drawings shall have callouts for the size and length of pipe on each sheet, type of pipe material, class of pipe (thickness of the pipe), type of joints, and restraints if applicable.
- b. Drawings shall have callouts for fittings and deflections that affect horizontal alignment.
- c. Use the following format on leader lines or reference lists for fitting callouts:

STA XX+XX' RT or LT

[number of fittings] – [size] [material] [fitting] [connection type] [direction if applicable]

Example:

STA 125+75, 30' RT

1-8" x 6" DI TEE FLxFL

2-8" DI GATE VALVES FLxMJ

1-6" DI GATE VALVE FLxMJ

1-FIRE HYDRANT ASSEMBLY

RESTRAIN ALL JOINTS

- d. For waterline fittings in intersections that cross two sets of centerline stationing callouts, list the current road stationing to equal the crossroad stationing, such as, STA 125+75, 30' RT = STA 1+00, 15' LT

B. Profile View

- a. Show restrained joint pipe and length. A minimum of 60-feet or three lengths of pipe, whichever is greater, is required from each fitting in both directions.
- b. Show all hydrants, flushing assemblies, and air valves extended above ground.
- c. For storm and sanitary callouts in profile view, see below example:

SSMH[size] or CB[type] [size]

RIM= XX.XX

IE[size] [material] [In or OUT] [direction] [elevation XX.XX]

Example:

SSMH 60" STA X+XX RT or LT X.XX'

RIM = 60.75

IE 12" PVC IN (W) = 49.95

IE 12" PVC OUT (E) = 49.85

CB Type 1 48" STA X+XX RT or LT X.XX'

Rim = 31.75

IE 8" PVC IN (N) = 30.00

IE 8" PVC OUT (W) = 30.00

1.2.5 Detail Sheets

- A. Standard details and other project specific details should be consolidated and placed on sheets at the end of the plan set. Plan/profile sheets and detail sheets shall be cross referenced with the sheet and detail numbers of appropriate details.
- B. All connections to the PUD's system and vault connections shall be shown at 1"=10' detail
- C. The PUD Standard General Notes shall be included, and the PUD standard details shall be used unless a specific detail has not been developed and the PUD has approved an alternative. All standard details can be located on the PUD website at <https://www.skagitpud.org/resources/engineering-standards/engineering-standard-details/>

1.2.6 Record Drawings

Upon completion of construction, the original drawings shall be revised as record drawings to reflect the project's actual construction.

- A. It is the responsibility of the contractor/developer to record all changes to design or materials made during construction and provide that information to the Engineer of Record. The PUD inspector will also note all changes in design or materials made during construction and collect GPS location information related to pipe locations valuable to the PUD.
- B. The PUD inspector will record all materials used for connections to the PUD water system. The PUD inspector and contractor will compare notes to ensure all changes have been noted on the plans and provide their comments to the Engineer of Record.
- C. GPS information will be provided to the Engineer of Record upon request, but the PUD does not guarantee the accuracy of the GPS information and the Engineer of Record should verify all data.
- D. The Engineer of Record will make any changes or corrections to the design drawings based on the notes provided by the contractor and the PUD inspector, and other relevant information.
- E. Record drawings will be a clean set of plans depicting the constructed waterline's actual location in vertical and horizontal alignments. At a minimum, all other utility crossings shall be shown in the profile drawing. All utilities shall be included in the plan view record drawing, depicted with a faded grayscale line type, and not interfere with the waterline callouts and changes. Drawing sheets not related to the water system shall be removed from the record drawings.
- F. Auditor's file number for new easements shall be noted.
- G. The developer's Engineer of Record shall submit a completed set of record drawings to the PUD for review and final approval. The final approved record drawings will be provided electronically to the PUD, with each sheet bearing the stamp and signature of the Engineer of Record and the words "RECORD DRAWINGS".

1.3 Design Requirements

Depending on the complexity of the proposed water system, specific design criteria may be added. The following basic design requirements apply to many new water pipelines:

- A. Any new pipelines shall be offset a minimum of 5 feet center to center from existing or retired water pipelines. Department of Health guidelines require a 10-foot horizontal separation and an 18-inch vertical separation between water pipelines and sanitary sewer mains. The PUD requires a minimum 12-inch vertical separation between water pipelines and other utilities, and the waterline shall be located above the sanitary sewer.
- B. Include a 1-inch combination air valve assembly for 8-inch waterlines and a 2-inch combination air valve assembly for a 12-inch waterlines at any high points as determined by the profile.
- C. Include a hydrant or flushing assembly at the end of all proposed waterlines. Flushing assemblies on 8-inch and smaller waterlines shall be two inches in size. Flushing assemblies on 12-inch waterlines shall be three inches in size. For waterlines larger than 12-inch diameter, contact the PUD for requirements.
- D. Landscaping plans shall not include trees near existing or proposed PUD waterlines; such waterlines shall not be located within the dripline of a proposed or existing tree.
- E. A minimum easement width of twenty feet is required for waterlines on private property. Gates and fences shall not block easement access unless pre-approved by the PUD and depicted on design drawings.
- F. The maximum ductile iron pipe deflection allowed by PUD is 2.5 degrees.