

SECTION 7

DESIGN AND CONSTRUCTION STANDARDS

There are five (5) elements of the City of Battle Ground's (City's) procedures for review of distribution facilities design:

- 1) Project Review Procedures
- 2) Policies and Requirements for Outside Parties
- 3) Design Standards (Performance Standards and Sizing Criteria)
- 4) Construction Standards (Materials and Methods)
- 5) Construction Certification and Follow Up Procedures

Project Review Procedures

All projects will be reviewed through approval by an Associate Civil Engineer. The Assistant City Engineer will provide oversight to ensure projects meet all City and State standards. The review will ensure that the project meets the needs of the City's Comprehensive Plans and all City zoning requirements. If a project meets all requirements for approval, then it is forwarded to the City Engineer for signature.

Following approval of the project, but before construction starts, a Pre-Construction Meeting is held between the Associate Civil Engineer, the Project Design Engineer, the Developer, and the Contractor. This meeting will allow the City staff to review the City's Construction Requirements with the Contractor, and to make sure that all necessary permits have been obtained.

Policies and Requirements for Outside Parties

Developers intending to install water lines need to fill out an application and receive approval from the City before beginning construction. Part of the permitting process is a review of the project as described above. Plans and specifications for any distribution system facility need to be stamped and signed by a Professional Engineer registered in the State of Washington who has experience in water system design. All fees need to be received by the City before approval is issued for construction.

Booster pumps, pressure reducing valves (PRVs), and storage tanks need to be submitted to the Washington State Department of Health (DOH) for plan review and approval. Approval from DOH is required for these facilities before the City will approve the project for construction. Projects that consist of waterline extensions only do not need separate approval from DOH.

Design Standards (Performance Standards and Sizing Criteria)

City of Battle Ground design and construction standards are consistent with standards agreed upon in the Clark County Coordinated Water System Plan.

In accordance with the City's Construction Standards, the minimum water main size shall be eight (8) inches in diameter. Mains less than eight (8) inches in diameter, but no smaller than four (4) inches in diameter, may be constructed subject to approval by the City Engineer in cul-de-sacs of not more than 400 feet in length where the water main can't be extended in the future, provided that the main is a minimum of eight (8) inches in diameter to the last hydrant.

In general, where the area is zoned for high-density residential, the minimum pipe diameter is eight (8) inches. Commercial and industrial area distribution systems are sized to meet the appropriate fire flow requirements, but no smaller than eight (8) inches in diameter. The City Engineer may reduce the minimum pipe size requirements only when a hydraulic and demand analysis indicates a smaller size will meet future needs. A larger size may also be required if fire protection requirements dictate. The minimum pressure requirement is 20 pounds per square inch during a fire flow event. Mains will be looped whenever practical. Dead end lines will have fire hydrants or blow-offs to flush out the water line. Water lines will be constructed of NSF (National Sanitation Foundation) approved ductile iron.

Booster pumps are designed to operate no more than 16 hours a day. Pump sizing is based on maximum capacity requirements over the 24-hour peak day period. PRV and pump stations will have redundant pumps and/or PRVs with isolation valves to allow for removal of valves or pumps for maintenance, repairs, or replacement. Facilities requiring electricity to operate shall have an outside electrical connection for a generator hook-up or their own emergency generator.

The maximum fire hydrant separation allowed is 700 feet in residential areas, with no residence more than 500 feet away. Hydrant spacing in commercial areas is a maximum of 300 feet. Valves are installed at all crosses and tees with all branches containing a valve. Auxiliary valves are installed on each hydrant branch.

Storage tank sizing will be based on Water System Plan design demands and accepted engineering practices. The City and the Developer will agree on the storage tank size prior to design of the storage tank.

Construction Standards (Materials and Methods)

American Water Works Association (AWWA) Standards need to be followed for the design and construction of distribution system facilities for the City. These AWWA standards include:

- Standard C104 – C153 (ANSI Standards for ductile iron pipe and fittings)
- Standard C500- C560 (Standards for valves and hydrants for waterworks)
- Standard C600 -99 (Installation of Ductile Iron Water Mains and their Appurtenances)

- Standard C605-94 (Underground Installation of PVC Pressure Pipe and Fittings for Water)
- Standard C606 -97 (Grooved and Shouldered Joints)
- Standard C651-99 (Disinfecting Water Mains)
- Standard C652-02 (Disinfection of Water Storage Facilities)
- Standard C800-01 (Underground Service Line Valves and Fittings)
- Standard C900-950 (Plastic Pipe)

Construction Certification and Follow-Up Procedures

During construction, the City's Engineering Technicians, or other Engineering personnel, will inspect construction on a regular basis to ensure it is meeting the City's Construction Standards. The Contractor is required to keep a record of all pressure and leak tests, disinfection procedures and results, and any changes made during construction from approved drawings.

Upon completion of the project the Contractor is required to submit copies of record drawings for the project, pressure and disinfection test results, and an operation and maintenance manual, if applicable, for the constructed facilities. The record drawings need to be stamped and signed by a Professional Engineer registered in the State of Washington. Along with these drawings and test results, where applicable, a DOH Construction Completion Report Form needs to be filled out, signed, and submitted to the State. This form needs to be stamped and signed by a Professional Engineer registered in the State of Washington.