

PWSB PROCEDURES and STANDARDS for

“As-Built” RECORD DRAWINGS

General: As-Built Drawings are a final accurate record of what was actually installed during improvement projects such as watermain, sanitary distribution collection systems, storm drainage systems, other underground utilities or structures. These drawings should include all deviations or changes from the approved design plans. This includes changes in materials, distances, lengths, locations, elevations, slopes, etc. All deviations from the design plans shall be clearly shown, labeled and accurately located on the As-Built Drawing using the scale indicated on the original design plans.

In addition, RI General Laws, Title 39, Section 39-1.2.7 titled, “Marking of Underground Utilities”, mandates that owners of “underground facilities” be able to locate those facilities within 18 inches on either side of underground facilities.

As-Built Guidelines:

1. All relevant improvement sizes, diameters, elevations, depths, and materials specified on the approved plans must be checked by the preparer in the field during and/or after construction. Note that critical pipe or invert elevations and pipe lengths must be checked by the preparer and approved by the PWSB prior to paving any portion of the site.
2. **As-Built INFORMATION REQUIREMENTS** for Watermain, Sanitary Sewers, Storm Drainage Systems and other Underground Utilities:

A. Watermain

1. Linear distance along watermain or services from appurtenance to appurtenance (i.e. valve to tee, tee to bend, bend to valve, valve to hydrant, corporation to curbstop, etc.), including pipe material and size. Measurements shall be from the geometric center of one appurtenance to the geometric center of the other appurtenance.
2. Pipe cover measurements at all vertical bends and at any locations where the watermain or services may change elevation such as at connection “tie-in” points to existing watermains.
3. Horizontal ties to all valves, pipe fittings, corporations, curbboxes and hydrants from two above ground permanent structures. Location of service connections along main, or service lines into structures. Horizontal ties to stub terminals.

B. Sanitary Sewer

1. Rim elevation on manholes.
2. Invert elevation for all pipes in manholes.

3. Linear distance along sewer from structure to structure, including pipe size and material.
4. Recalculated pipe slopes based on invert to invert elevation along the linear distance between manholes.
5. Location of service connections along main and service lines into structures. Horizontal ties to stub terminals.
6. Complete record drawings of lift stations, including all piping, electrical elements, and pumping elements.

C. Storm Drainage Systems

1. Rim elevations on inlets, catch basins, manholes, and other special structures.
2. Invert elevation of all pipes within inlets, catch basins, manholes, end sections, headwalls, culverts and other special structures.
3. Linear distance along drainage line from structure to structure, pipe size and material.
4. Recalculated pipe slopes based on invert to invert elevations along the linear distance between structures.
5. Location of service connections along main, and service lines into structures. Horizontal ties to stub terminals.

D. Underground Site Utilities (Electrical, Gas, Telephone, Cable)

1. Linear distance along conduits/pipes/direct burial cable lines or service runs from appurtenance to appurtenance (i.e. valve to tee, tee to bend, bend to valve, bend to vault/handhole, bend to conduit riser, etc.), including pipe/conduit material and size. Measurements shall be from the geometric center of one appurtenance to the geometric center of the other appurtenance.
2. Pipe/conduit cover measurements at all vertical bends and at any locations where the pipe/conduit or service runs may change elevation such as at connection "tie-in" points to the existing utility.
3. Horizontal ties to all valves, pipe/conduit fittings, shutoffs, vault/handholes and conduit risers from two above ground permanent structures. Location of service connections along pipe/conduit, or service lines into structures. Horizontal ties to stub terminals.

All pipe/conduit, pipe/conduit fittings and invert/rim elevations and all pipe/conduit lengths shall be clearly marked As-Built in some way on the approved As-Built Drawings. The preferred format for As-Built Drawings is to draw a line through design elevations, lengths, sizes, etc., and to show the As-Built value within an "As-Built cloud." Where the As-Built information is exactly the same as the design information, the design information shall be enclosed in an "As-Built cloud" to show that it was checked, but that it did not change.

3. To facilitate the completion of a detailed As-Built Drawing, the preparer may add a note that “Unless otherwise shown on these As-Built drawings, all improvements shown herein are the same diameter, length, and/or size, and/or constructed of the same materials as shown on the approved plans.”
4. The As-Built Drawing shall be either the original approved plan mylar marked as an As-Built Drawing, or a photo-mylar of the approved plans marked as an As-Built Drawing. Unless otherwise approved by the PWSB, all accepted As-Built Drawings shall be original mylars or photo-mylars 24 X 36 inches or 30 X 42 inches.
5. When the design plans have been prepared with a CAD program, the design professional is required to provide the PWSB with a digital copy of the approved As-Built Drawing(s) in DWG file format (AutoCAD) and in TIFF file format where all the drawings shall be identified with the words “As-Built”.
6. The horizontal datum for all design and As-Built coordinates shall be the Rhode Island State Plane Coordinate System NAD 1983. The vertical datum for all design and As-Built elevations shall be NGVD 1929 MSL. An assumed coordinate system is not permitted.
7. Regardless of whether plans are prepared by CAD or by hand, all plan sheets, including approved As-Built Drawings, must include at least four coordinate tics spaced across the extents of the plan view. The tics must be labeled with Rhode Island State Plane Coordinate System values, which will be used to facilitate registration into the PWSB’s GIS.
8. The final as-built record drawings shall be completed, plotted and returned together with the marked-up as-built drawings to the PWSB Engineering Section for review. These drawings will be reviewed for accuracy and conformance to the above requirements.

PWSB “Field Measurement” Accuracy Standard: When taking physical measurements to create, update or verify as-built drawing records, a “Margin of Error” of 12 inches on either side of underground facilities for any single, one dimensional field measurement shall be considered an acceptable accuracy standard for the purposes of “as-built” record drawing measurements.

The drawings shall be returned to the preparer if corrections are necessary. Based on the PWSB review comments, the preparer shall make all appropriate corrections and return the drawings for final review.

9. Approval and acceptance of the final as-built record drawings shall be accomplished before final payment.

Rev8/09