

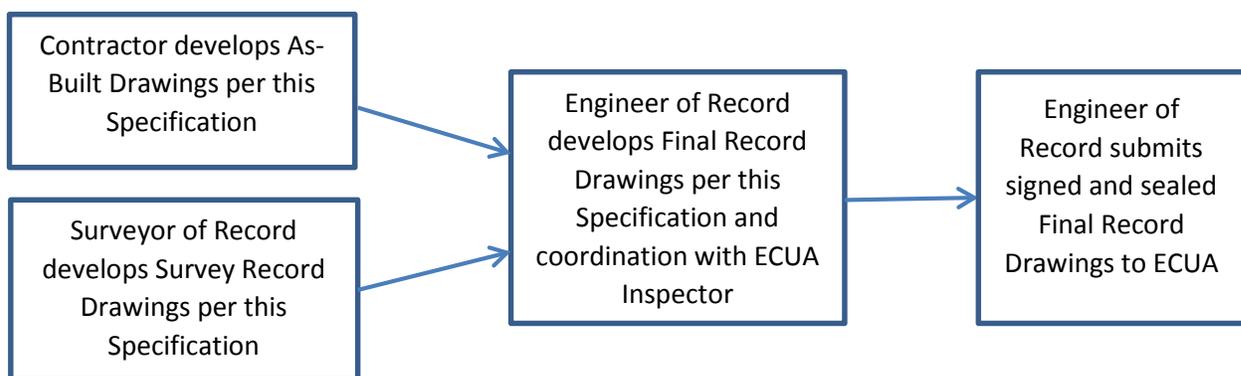
Section 4000

Record Drawing Requirements

PART 1: General

- 1.1 *Applicability* – These requirements apply to ECUA Capital Improvement Projects (CIP) and System Extension Projects (aka developer-sponsored projects) based on the following criteria:
 - 1.1.1 All ECUA CIP projects and System Extension Projects that include a new ECUA lift station or an existing ECUA lift station receiving major upgrades.
 - 1.1.2 All ECUA CIP projects and System Extension Projects that contain a combined 500' or more of new ECUA mains shall follow this entire specification. For projects with less than 500' of mains, the Survey Record Drawings portion of this specification becomes optional.
 - 1.1.3 If there is a question regarding the applicability of these requirements to a certain project, then the ECUA Project Engineer assigned to that project shall make the determination as early as possible in the project.
 - 1.1.4 For CIP projects, ECUA Project Engineer will require Engineer of Record to include a specific task/fee line item for Survey Record Drawings and a specific task/fee line item for Final Record Drawings, and will provide pay item for Contractor As-Built in the project's bid proposal form.
 - 1.1.5 For System Extension Projects, these requirements are represented via paragraphs 7 and 8 of the Utility Service Agreement (USA).

- 1.2 *Overview* – The following chart represents an overview of the process required in order to develop Final Record Drawings for ECUA:



- 1.3 *Terms Defined* – The Record Drawing process requires various drawings to be developed by multiple parties along the way, with the following terms being defined and used as part of these requirements:

- 1.3.1 *Surveyor of Record* – The Florida registered PSM that performs the required surveying and then creates the Survey Record Drawings.

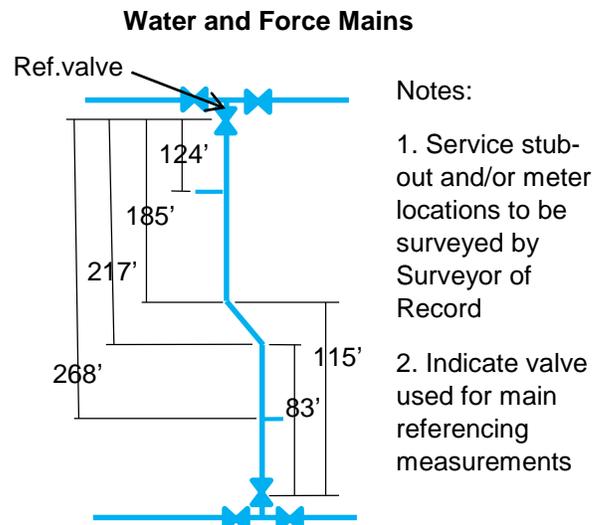
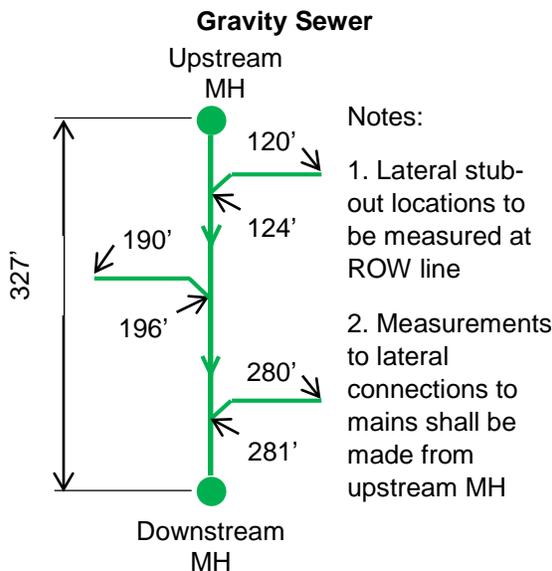
- 1.3.2 *Engineer of Record (EOR)* – The Florida registered PE that collects information from the Contractor As-BUILTs and Survey Record Drawings and creates the Final Record Drawings.
- 1.3.3 *Contractor As-BUILTs* – Drawings prepared by the Contractor and submitted to the EOR.
- 1.3.4 *Survey Record Drawings* – Drawings prepared by the Surveyor of Record and submitted to the EOR.
- 1.3.5 *Final Record Drawings* – Drawings prepared by the EOR and submitted to ECUA.

PART 2: Contractor’s As-Built Drawings Requirements

- 2.1 Prior to backfilling, the Contractor shall make and record measurements (recorded to nearest 1” or 0.1’) to all underground features (connections to mains, fittings, etc) that the Surveyor of Record will not have access to with his post-construction survey of surface features (i.e. manhole lids, valve boxes, etc). Contractor shall assemble all of the required information in a legible format on a clean set of plans. As-BUILTs that are illegible will be rejected by the EOR
- 2.2 The following underground features shall be measured with measurements being clearly annotated on plans:

Water System	Sewer System
Service taps	Service taps, stubouts (gravity and pressure)
FH taps	ARV taps
WM fittings (tees, bends, elbows, etc)	FM fittings (tees, bends, elbows, etc)
WM every 100’ if WM alignment meanders	FM every 100’ if FM alignment meanders

- 2.3 Contractor shall take one measurement, referenced to valves, for features on straight sections of mains that are in-line with above-ground termination features such as valves. Contractor shall take two measurements, referenced to at least two above-ground features, for features on meandering sections of mains. Examples include:



2.4

- 2.5 Contractor shall provide detailed description of the feature (i.e. 6"x1" saddle tap for water service, 8" 45-degree bend for WM, 4" sewer lateral wye connection to main, etc).
- 2.6 Title sheet of As-Builts shall include:
 - 2.6.1 Title "*Contractor's As-Builts*".
 - 2.6.2 Name of the project, and ECUA CIP project number or System Extension number.
 - 2.6.3 Contractor's company name, address, and phone number.
 - 2.6.4 Statement: "*These As-Built Drawings have been prepared per the ECUA Engineering Manual.*", under which shall be signature and printed name of person that prepared drawings, along with phone number and e-mail address.
- 2.7 Provide as separate document all available photographs, clearly labeled, that show connections to existing mains, critical utility crossings, or other pertinent areas.
- 2.8 Contractor shall submit As-Built Drawings to the EOR, and shall be available to answer questions related to the drawings as well as supply additional information should there be missing/incorrect information. Insufficient As-Built Drawings as determined by either the EOR or ECUA will delay ECUA payments on CIP projects, and will delay Final Acceptance on System Extension Projects.

PART 3: Survey Record Drawings Requirements:

- 3.1 The Surveyor of Record is responsible for surveying property and easement boundaries as well as all at-grade and above-grade facilities per the following table:

Water System	Sewer System
Valve boxes	Manholes
Fire hydrants	Lateral stub-outs
Water meters/boxes	Valve boxes
Well and tank site fence and building corners, fence gates, SCADA tower, generator pad, driveway, power service pole, aerial power lines, etc	Lift station fence corners, fence gates, SCADA tower, control panel, hatches, concrete slab corners, water service/BFP, generator pad, driveway, influent piping, power service pole, aerial power lines, etc
All other at- or above- grade facilities	All other at- or above- grade facilities
Parcels and easements	
Property corners, edge of driveways, easement boundaries, encroachments, etc	

- 3.2 Survey shall be prepared utilizing the Florida North Zone of the Florida State Plane Coordinate System, with horizontal measurements and coordinates accurate to within a tenth of a foot (0.1'). All elevations (i.e. manhole rims, inverts of every gravity wastewater pipe and force main connections to manholes, lift station top of slab, bottom of wet well, influent pipe invert and control set points) will be based on the North American Vertical Datum of 1988 (NAVD88), and shall be accurate to within a hundredth of a foot (0.01').

- 3.3 Show and dimension all rights-of-ways, ECUA parcels, and easements. Label easements based on type (i.e. public utility, ECUA, etc) and their origination (i.e. per plat named _____ located at book ___ and page ___).
- 3.4 Provide ample measurements from right-of-way lines, parcel boundaries, and easement boundaries to surveyed facilities such that it is clearly known if a facility is in its correct location or installed outside of ECUA's property interests.
- 3.5 Surveyor of Record shall provide detailed description of the surveyed facility (i.e. valve box, 4" sewer lateral stub-out, etc.).
- 3.6 Title sheet of Survey Record Drawings shall include:
 - 3.6.1 Title "*Survey Record Drawings*".
 - 3.6.2 Name of the project, and ECUA CIP project number or System Extension number.
 - 3.6.3 Surveyor's company name, address, and phone number.
 - 3.6.4 Statement: "*These Survey Record Drawings have been prepared per the ECUA Engineering Manual. I certify that the surveyed location information of the water and sewer facilities shown on these drawings conforms to the minimum technical standards for land surveying in the State of Florida and that said Record Drawings are true and correct to the best of my knowledge and belief.*" under which shall be signature, date, and seal of Survey of Record, and printed name of Surveyor of Record, along with phone number and e-mail address.
- 3.7 Surveyor of Record shall submit Survey Record Drawings to the EOR, and shall be available to answer questions related to the drawings as well as supply additional information should there be missing/incorrect information. Insufficient Survey Record Drawings as determined by either the EOR or ECUA will delay ECUA payments on CIP projects, and will delay Final Acceptance on System Extension Projects.

PART 4: Final Record Drawings Requirements

- 4.1 The EOR shall assemble the information as provided by the Contractor's As-Built Drawings and the Surveyor's Record Survey Drawings, supplement with additional information provided by the EOR and the ECUA Project Inspector, and prepare a set of *draft* Final Record Drawings. The EOR shall retain the Contractor's As-Built Drawings, the Survey Record Drawings, and a copy of the signed and sealed Final Record Drawings, all for future review by ECUA upon request.
- 4.2 Final Record Drawings shall be new drawings that show facilities as they are constructed, with drawings of new mains, appurtenances, labels and notes as needed. Design/construction plans with clouding, mark-outs, and strike-throughs that attempt to simply illustrate changes between design plans and record drawings will not be allowed. Any information, notes, or measurements from the design/construction plans that are no longer relevant from a Final Record Drawing perspective shall be deleted. Only installed facility information, notes, and measurements shall remain visible.
- 4.3 All water and sewer mains and services shall be labeled with the appropriate size, material, color, AWWA designation, pipe thickness, etc. Gravity mains shall be labeled with their diameter, pipe

thickness, length, and slope. Each fitting shall be labeled with its material and size. Valves shall be labeled with their size and type. All service lines and sewer laterals shall be labeled with their diameter, material, etc.

- 4.4 Coordinates shall be provided for all surveyed facilities as well as measured locations of underground facilities from Contractor's As-Builts.
- 4.5 Incorporate project photographs per paragraph 2.6.
- 4.6 Show all abandoned in-place facilities including the extent and method of abandonment (i.e. capping ends of mains, grouting, etc).
- 4.7 Title sheet of Final Record Drawings shall include:
 - 4.7.1 Title "*Final Record Drawings*".
 - 4.7.2 Name of the project, and ECUA CIP project number or System Extension number.
 - 4.7.3 EOR's company name, address, phone number, and Certificate of Authorization number.
 - 4.7.4 Statement: "*These Final Record Drawings have been prepared per the ECUA Engineering Manual. I certify these Final Record Drawings have been reviewed by me or by individual(s) under my direct supervision and to the best of my knowledge and belief these drawings substantially reflect the water and/or sewer facilities as constructed. Contractor's As-Builts were provided by _____, dated _____; Survey Record Drawings were provided by _____, dated _____.*" under which shall be signature, date, and seal of EOR, and printed name of EOR, along with phone number and e-mail address.
 - 4.7.5 Contractor's name and related information as listed on the Contractor's As-Builts.
 - 4.7.6 Surveyor of Record's name and related information as listed on the Survey Record Drawings.
 - 4.7.7 ECUA Project Inspector's name and location for his signature granting approval of the Final Record Drawings.
 - 4.7.8 ECUA Project Engineer's name.
- 4.8 Upon development of a set of *draft* Record Drawings, the EOR shall:
 - 4.8.1 Coordinate and hold mandatory meeting at EOR's office with EOR and ECUA Project Inspector and together review the *draft* Record Drawings for completeness, accuracy, and conformance to this specification. Attendance by the Contractor or the Surveyor of Record is optional and at the discretion of the EOR.
 - 4.8.2 Make corrections to all erroneous items as determined in meeting.
- 4.9 Final Record Drawings package shall include:
 - 4.9.1 Two sets of Final Record Drawings (22" x 34" or 24" x 36" sheets), signed, dated, and sealed by the EOR
 - 4.9.2 CD labeled with project info, containing:

- ACAD version of the Final Record Drawings
- PDF version of the Final Record Drawings (full sheet size)
- PDF version of the Contractor's As-Builts (full sheet size)
- PDF version of the Record Survey (full sheet size)

4.10 EOR shall submit Final Record Drawings package to ECUA Project Inspector per the following:

4.10.1 For CIP projects, Final Record Drawings package shall be submitted with or prior to Contractor's Final Pay Application. Final Pay Application shall not be processed without proper project closeout paperwork, to include Final Record Drawings acceptable to ECUA.

4.10.2 For System Extension projects, Final Record Drawings shall be submitted at Project Closeout along with other required documents. Final Acceptance shall not be granted without proper project closeout paperwork, to include Final Record Drawings acceptable to ECUA.

4.11 ECUA Project Inspector will perform final review and if acceptable, sign the title sheet thereby approving the documents. Insufficient Final Record Drawings as determined by either the ECUA Project Inspector or ECUA Project Engineer will delay ECUA payments on CIP projects, and will delay Final Acceptance on System Extension Projects.

PART 5: Miscellaneous

5.1 On CIP projects, ECUA's Standard General Conditions require Record Drawings to be submitted with each monthly pay request. ECUA Project Engineer may waive this requirement based on project needs.

5.2 Occasionally, portions of partially completed projects may be required to be placed into service prior to project's end. As part of the Certification of Completion of Construction for these portions, Contractor shall submit draft As-Builts prior to placing any mains into service.