

## Section 101

### **Plan Preparation**

#### **PART 1: General**

- 1.1 *General Description of Work* - All plans submitted to ECUA for review shall comply with these standards for preparation. The plans shall include sufficient detail to clearly and accurately communicate the design intent. The plans should reflect the anticipation of foreseeable problems with corresponding design solutions. All work shall be planned, designed, and constructed in accordance with the latest edition of ECUA's Engineering Manual.

#### **PART 2: Plan Makeup**

- 2.1 *General* - The plans shall be clean and legible. Any plans which lack sufficient clarity in content or presentation to facilitate their review will be rejected. All gravity sewer and sanitary sewer force main design shall be shown in both plan and profile view.
- 2.1.1 *Sheet Size* -
- 2.1.1.1 ECUA Capital Improvement Projects. Standard Sheet size shall be 22 inch by 34 inch. Alternate sheet sizes including 11 inch by 17 inch, 24 inch by 36 inch, or 30 inch by 42 inch may be allowed with ECUA Project Engineer approval.
  - 2.1.1.2 Developer Sponsored Projects, Standard Sheet size shall be 24 inch by 36 inch, 22 inch by 34 inch, 11 inch by 17 inch with title block. Plan sheets of 30 inch by 42 inch may also be accepted if necessary for coordination of utility plans with other design disciplines.
- 2.1.2 *Text Height* - Text Height shall be of appropriate size but in no case less than 1/8".
- 2.1.3 *Required Documents* - Plan sets shall consist of:
- 2.1.3.1 Cover Sheet
  - 2.1.3.2 Location Map
  - 2.1.3.3 Project Map
  - 2.1.3.4 Design Sheets
  - 2.1.3.5 Detail Sheets
- 2.1.4 *Required Note* - All design and detail sheets shall have the following note in the upper right hand corner: "All work shall be constructed in accordance with the most recent edition of ECUA's Engineering Manual".
- 2.1.5 *Title Block* - The title block is to be shown on all sheets except cover sheet, and shall include:

- 2.1.5.1 Project Name
- 2.1.5.2 Sheet Title
- 2.1.5.3 Engineer
- 2.1.5.4 Date Prepared
- 2.1.5.5 Date Revised
- 2.1.5.6 Sheet Number (sequential)

2.2 *Cover Sheet* - The cover sheet shall include the following items:

- 2.2.1 Project Title
- 2.2.2 Identified ECUA and Board Members at Time of Bidding. (ECUA Capital Improvement Projects only)
- 2.2.3 Developer and Engineer or Engineer
- 2.2.4 Project Number or Identification
- 2.2.5 Type of Project (if not clear in title)
- 2.2.6 Date(s) of Design or Submittal and Subsequent Revisions

2.3 *Location Map* - The location map shall include the following items:

- 2.3.1 Map of Project Area and Area Surrounding in order to easily identify location of project (minimum of ½ mile radius) at a minimum scale of 1 inch = 1000 ft. (min.). Include graphical bar scale.
- 2.3.2 North Arrow (pointing to the top of page or to the right of page)
- 2.3.3 Title Block

2.4 *Project Map* - NOTE: Location map and Project map may be combined on single sheet if project size permits.

- 2.4.1 Project Map shall be at 1 inch = 200 feet or other appropriate scale as approved by ECUA Project Engineer. Include graphical bar scale.
- 2.4.2 Index of Design Sheets
- 2.4.3 North Arrow (pointing to the top of page or to the right of page)
- 2.4.4 General Notes
- 2.4.5 Title Block

2.5 *Design Sheets* – The following items shall be included on each design sheet where applicable

- 2.5.1 North Arrow (pointing to the top of page or to the right of page)
- 2.5.2 Scale shown numerically and graphically.
  - 2.5.2.1 Standard horizontal scales shall be one inch = twenty feet, one inch = thirty feet, or one inch = fifty feet. Alternate scales may be used with the approval of the ECUA Project Engineer.
  - 2.5.2.2 Standard vertical scales shall be one inch = two feet, one inch = three feet, or one inch = five feet. Alternate scales may be used with the approval of the ECUA Project Engineer.
- 2.5.3 Title Block
- 2.5.4 To be shown on both plan and profile:
  - 2.5.4.1 Pipe with size and material, to be installed.
  - 2.5.4.2 All appurtenances, shown and located (bends, T's, X's, valves, hydrants, manholes, services, etc.)
  - 2.5.4.3 At all road or paving crossing show method of crossing, i.e. open cut, jack and bore, or directional drill.
    - 2.5.4.3.1 For all jack and bored or directionally drilled crossings, provide both horizontal and vertical detail of the proposed crossing including material type, length, depth and size of carrier pipe and casing (if applicable).
    - 2.5.4.3.2 Depict horizontal and vertical location of existing utilities along the crossing path. (Note the method by which the existing utility location was determined).
    - 2.5.4.3.3 Depict anticipated temporary construction easements as necessary for completion of the planned crossing.
  - 2.5.4.4 Special notes for construction that are specific to each sheet.
  - 2.5.4.5 Circle and reference items for which a detail is provided. Show on same sheet if possible; otherwise, show on specially designated and appropriately referenced detail sheet.
  - 2.5.4.6 Bench mark – minimum one per sheet.
  - 2.5.4.7 Match line with station for continued sheets.
  - 2.5.4.8 Boring location and results (if available).
  - 2.5.4.9 Stationing along centerline at 100 feet increments. (May use survey baseline stationing if very close to pipeline. Restrict use of station equations.)
  - 2.5.4.10 Location of other utilities within 20 feet of project or that may otherwise conflict with project.

- 2.5.4.11 Poles, trees, structures, roads, etc. that may conflict with project.
- 2.5.4.12 Property lines, ROW lines, easements (both temporary and permanent), which are existing and proposed.
- 2.5.4.13 Topographical features, such as ditches, embankments, etc.

2.5.5 *Other Required Considerations -*

- 2.5.5.1 Water distribution plans shall also clearly identify the intended depth of cover at least twice on each sheet.
- 2.5.5.2 Wastewater Plans shall also clearly identify:
  - 2.5.5.2.1 The invert of each pipe in each manhole.
  - 2.5.5.2.2 The calculated slope of each section.
  - 2.5.5.2.3 The final rim elevation of each manhole and the type rim if other than standard (locking, waterproof, etc.).
  - 2.5.5.2.4 The size (inside diameter) of each manhole and anything special, such as drop (inside or outside), shallow (flat top), etc., if different than standard size.
  - 2.5.5.2.5 Profile Sheets should also include:
    - 2.5.5.2.5.1 Ground surface elevation at intervals of no less than one hundred feet. These should be depicted for existing conditions and as final if different.
    - 2.5.5.2.5.2 Type and depth of underground utilities and other features that will be crossed or that might otherwise cause a problem. Provide Subsurface Utility Engineering (SUE) data, aka potholing, vertical verification, etc. via the use of a SUE contractor.
    - 2.5.5.2.5.3 Ground water elevations if known.
    - 2.5.5.2.5.4 Stream or water crossings with stream bed elevations and the normal and extreme high and low water levels.

2.6 *Detail Sheets -* Detail sheets shall be used when necessary for clarity of work and will include:

- 2.6.1 Appropriate Scale
- 2.6.2 Label
- 2.6.3 Elevations
- 2.6.4 Dimensions
- 2.6.5 Other Information as Appropriate
- 2.6.6 Title Block