# Water and Sanitary Sewer Design Manual

CITY OF WACO

## SECTION 6 – CONSTRUCTION DRAWING REQUIREMENTS

### 6.1 General

The following are the minimum construction drawing requirements that must be shown for all proposed water line and sanitary sewer main connections to, and improvements and extensions of the City's system.

A. Sheet Size: All sheets shall be on 22"x34" paper (full-size).

B. Border: Each sheet in the plan set shall have a consistent overall border, title block, plan view area and profile view/grid lines, where applicable.

C. Title Block: Each sheet (with the exception of the cover sheet) shall have a standard title block located along the bottom right side that identifies the following information:

1. City of Waco logo (Flying W) in upper right-hand corner. Only required for public improvement projects.
2. Project Name: Project name, including City project number, if applicable. Shall match cover sheet.
3. Sheet Title: Description of sheet contents (e.g. Prop. 12" Water Line "A")
4. Sheet Limits: Description of sheet limits (e.g. Sta. 0+00 to Sta. 3+57.56)
5. Revision Block: Include revision number, description and date.
6. Firm Name: Identify registered engineering firm name/logo and registration number in accordance with TBPE Board Rule §1001.405 and §137.33.
7. Engineer's Seal: Include either a preliminary or final engineering seal identifying the Engineer of Record in accordance with TBPE Board Rule §137.33.
8. Personnel: Identify the initials of the Engineer's personnel who the project or specific sheet was designed by, drawn by, and checked by.
9. Project Number: Identify the Engineer's project number.
10. Date: Identify the month and year the plan is sealed.
11. Sheet Number: Identify the plan sheet number.

D. Font: The minimum font size shall be 0.11".

E. North arrows and drawing scales (both numerically and graphically) shall be shown in the same general location on all applicable sheets.

F. Refer to Appendix E for Construction Plan Sheet Examples.

### 6.2 Cover Sheet

A cover sheet must be provided for all public improvement projects. Cover sheet will also be required for improvement projects that exceed three or more design drawings, or as otherwise requested by the City.

A. Project Name: Identify the name of the project (and phase(s) if applicable) in the upper, center of the sheet and along the right edge.

B. Project Description:

1. Public Improvement Projects: Identify the type of project (e.g. Water and/or Sanitary Sewer) and applicable street names and limits. Include City project number and City logo (Flying W).

2. Private Improvement Projects: Identify the property address or location description.

C. Location Map: Provide an appropriately sized location map in the center of the sheet that identifies the limits of the project and the surrounding area. Location map shall include a north arrow (pointing up) and corresponding scale.

D. Contact Information:

1. Public Improvement Projects: Identify current Mayor, City Council, City Manager, City Engineer, and the WUSD Director to the left of the location map. Identify other affected departments (e.g. Public Works, Parks, etc.), if applicable.

2. Private Improvement Projects: Identify the owner/developer's name, address, phone number and e-mail address to the left of the location map.

E. Signature Lines:

1. Public Improvement Projects: Include signature and date lines for approval from the City Project Engineer, City Engineer, Water Utility Services Department Director and other affected departments (e.g. Public Works, Parks, etc.), if applicable.

F. Date: Provide the month and year the cover sheet is sealed.

G. Sheet Index: Provide a sheet index to the right of the location map. Provide sheet index on subsequent sheet(s) for larger plan sets.

H. Engineer: Provide the Engineer of Record's name, seal (Preliminary or Final), and engineering firm name and registration number in the lower, right-hand area.

### 6.3 Plat

A copy of the recorded (or proposed) final plat is required for all private and proposed subdivisions. The plat should be included directly after the cover sheet or sheet index, as required. Refer to the *Waco Development Guide, latest edition* for platting requirements.

### 6.4 General Notes, Estimated Quantities, Legend and Contacts Sheet(s)

All construction drawing sets that include public improvements shall include general notes, an estimated quantities table (per sheet, line designation and total), legend, and applicable contact information. More than one sheet may be necessary for larger plan sets.

A. General Notes: The general note sheet shall incorporate notes to the contractor regarding contract administration, schedule and submittal requirements, traffic control, environmental and trench safety, pavement, water, sanitary sewer and other miscellaneous utilities as deemed necessary by the Engineer, City Engineer, or the WUSD.

B. Estimated Quantities: An estimated bid quantities table shall be shown that breaks down the bid quantities by utility, line designation and sheet. A total for each bid quantity shall be shown that matches the bid proposal for publicly bid projects.

C. Legend: A legend shall be provided that includes all relevant and non-standard symbols shown in the construction plan/profile drawings. Use the City of Waco's standard drafting symbols and abbreviations. Refer to Appendices B and C.

D. Contacts: A list of contact information shall be provided for the City Project Engineer (if applicable), all utility providers, and other entities that are, or could potentially be, impacted by the project, including electric, gas, communications, TxDOT and Railroads. Provide company, contact name and phone number. **Include Texas811.**

### 6.5 Layout Sheet(s)

Layout sheets shall be provided for survey control data (Benchmarks and Control Points), existing/proposed water line improvements and existing/proposed sanitary sewer main improvements. Layout sheets shall sufficiently show the entire scope of the project and include:

A. Scale: 1" = 100', typical

B. General notes specific to the layout sheet, if required.

C. Sheet legend (if different from plan/profile legend).

D. Property/ROW lines, street labels, easements, creeks, floodplains, TxDOT and RR rights-of-way.

E. Subdivision names, blocks and lot numbers.

F. Separate sheets shall be provided for survey control, water, and sanitary sewer layouts on all public improvement projects, unless otherwise directed by the WUSD.

1. Survey Control: The survey control layout sheet shall identify all applicable City of Waco permanent benchmarks and control points set during the survey, including descriptions. **Provide a minimum of 2 survey control points for each line segment in compliance with Water and Sewer Design Manual Item 2.5 B.**
2. Water: All water line layout sheets shall include the following:
    a. Existing, proposed, and future (if known) water line alignments.
    b. Existing, proposed, and future (if known) water line sizes, materials, gate valves, fire hydrants, and other appurtenances.
    c. Fire hydrant coverage limits.
    d. A sheet layout that identifies the limits of the proposed improvements shown on each individual plan/profile sheet.
3. Sanitary Sewer: All sanitary sewer main layout sheets shall include the following:
    a. Existing, proposed, and future (if known) sanitary sewer main alignments.
    b. Existing, proposed, and future (if known) sanitary sewer main sizes, materials, manholes, cleanouts, and flow direction arrows.
    c. Bypass pumping requirements, if applicable.
    d. A sheet layout that identifies the limits of the proposed improvements shown on each individual plan/profile sheet.

## 6.6 Water and Sanitary Sewer Plan & Profile Sheet(s)

A. General:

1. Scale: 1” = 20’ horizontal, 1” = 4’ vertical; typical
2. Proposed water and sanitary sewer construction notes may not be combined on the same sheet, unless showing only service connections for a single lot private development.
3. Identify the limits of the improvements that are Private vs. Public, if applicable.
4. All proposed water and sanitary sewer improvements that require a profile (i.e. ≥ 12-inch water lines and ALL sanitary sewer mains) shall be shown with the plan view stations aligned above the profile stations, beginning on the left side of the sheet.
5. Proposed 8-inch water lines, not requiring a profile, may be shown with a split plan view (plan view of proposed improvements shown in both the top half and bottom half of the sheet) with corresponding match lines.
6. Profile all water lines crossing channels, creeks, rivers, detention ponds etc., regardless of size.
7. Identify the following existing, proposed, and future (if anticipated) features in the plan view:
    a. Trees, bushes, and landscaping.
    b. Monuments, signs, street lights and street signals.
    c. Streets, roadways, curbs, gutters, sidewalks and driveways.
    d. Pavement types (concrete, asphalt, gravel etc.)
    e. Right-of-way, easement, and lot lines.
    f. Label TxDOT and railroad rights-of-way.
    g. Street names, street widths, right-of-way and easement widths.
    h. Property owners, lot, block and subdivision names.
    i. Buildings, bridges, railroad tracks, and structures.
    j. Rivers, lakes, ditches, and 100-year floodplain elevations.
    k. Above and below ground public and franchise utilities and appurtenances including, but not limited to, water lines, gate valves, meter boxes, fire hydrants, sanitary sewer mains, manholes, cleanouts, storm drains, inlets, vaults, gas lines, test stations, meters, electric, cable and telecommunication lines, boxes and poles.
    l. Distance between the water and sanitary sewer utilities.
    m. Distance from proposed utility to the ROW or property line.
8. Label existing underground utility sizes and materials, if known.
9. Proposed, and if applicable, existing station labels.
10. Include “Warning to Contractor” utility locate note (1-800-DIG-TESS).
11. Provide caution notes for existing franchise utilities in close proximity to the proposed improvements.

12. Identify a minimum of two (2) benchmarks and/or survey control points, including Northings and Eastings, per sheet.

B. Water

1. Plan:

a. Bold all proposed water lines, appurtenances and service lines.

b. Identify proposed size of water lines (e.g. Prop. 16" WL "A") and (e.g. Prop. 8" WL "B", See Sht. XX), if shown on another sheet.

c. Dimension distance from the centerline of the water line to the adjacent right-of-way or easement line.

d. Identify 100-ft. stations along proposed water line. Stations shall begin at 0+00 (left side of sheet).

e. Identify proposed stations, state plane Northings and Eastings, at each deflection, bend, horizontal curve, encasement limits, and appurtenances (fittings, valves, fire hydrants, service connections, etc.).

f. Identify existing and proposed easements (permanent and temporary).

g. Identify proposed appurtenances:

i. Tees and bends - Use standard manufactured fittings and identify deflections, where required. Reference Standard Detail(s).

ii. Valves, fire hydrants, water service connections, etc. Reference Standard Detail(s).

iii. Steel casing - Identify length, thickness, and size. Reference Standard Detail(s).

h. Curve Data: Identify stations, point of curvature (PC), point of tangency (PT), length, radius, and joint deflection.

i. Identify existing and proposed water services, meters, sizes and type (domestic, irrigation, or fire).

j. Identify adjacent pressure planes, if applicable, and label all pressure plane boundary valves.

k. Identify pavement replacement limits (show as shaded).

l. Identify the type of proposed connection to the existing water system (e.g. remove plug and connect, cut-in tee, etc.)

m. Identify match line stations, if proposed improvements cannot be shown on one sheet.

n. Identify required minimum vertical separation distances from other utilities, if no profile.

2. Profile:

a. A profile is required for all proposed water lines 12-inch, and larger.

b. Identify the existing, proposed, and future (if anticipated) ground surfaces.

c. Identify proposed size, type and length of water line.

d. Identify proposed embedment, backfill, and surface restoration. Reference Standard Detail(s).

e. Identify 100-ft. stations with top of pipe along bottom of profile grid.

f. Identify proposed stations and top of pipe elevations at each vertical deflection and bend, encasement limits, and appurtenances (fittings, valves, fire hydrants, etc.).

g. Identify proposed concrete encasement and steel casing, if applicable.

h. Identify crossing utilities and parallel utilities within 5 feet.

i. Identify minimum vertical separation requirements.

j. Illustrate geotechnical soil bore data, when applicable.

C. Sanitary Sewer:

1. Plan:

a. Bold all proposed sanitary sewer mains, appurtenances and service lines.

b. Flow direction arrows shall be shown for all existing and proposed sanitary sewer mains.

c. Identify proposed size and type of sanitary sewer mains (e.g. Prop. 15" SS "A") and (e.g. Prop. 8" SS "B", See Sht. XX), if shown on another sheet.

d. Dimension distance from the centerline of the sanitary sewer main to the center of the road.

e. Identify 100-ft. stations along proposed sanitary sewer main. Stations shall begin at 0+00 (left side of sheet) and increase from the downstream elevation to the upstream elevation.

f. Existing sanitary sewer main stations shall be shown at the point of connection.

g. Identify proposed stations, state plane Northings and Eastings, encasement limits, and appurtenances (manholes, service connections, etc.).

h. Identify existing and proposed easements (permanent and temporary).

i. Identify proposed appurtenances:

i. Manholes, service connections, etc. Reference Standard Detail(s).

ii. Steel casing - Identify length, thickness, and size. Reference Standard Detail(s).

j. Curve Data: Identify stations, point of curvature (PC), point of tangency (PT), length, and radius.

k. Identify existing and proposed sewer services and cleanouts, if applicable.

l. Identify pavement replacement limits (show as shaded).

m. Identify match line stations, if proposed improvements cannot be shown on one sheet.

n. Identify and hatch existing utilities to be abandoned and utilities that were previously abandoned (if known).

2. Profile:

a. A profile is required for ALL proposed sanitary sewer mains.

b. Identify the existing, proposed, and future (if anticipated) ground surfaces.

c. Identify proposed size, type, length, and grade of sanitary sewer main.

d. Identify the required and proposed flow capacities (Qavg, Qdesign, Qpeak, Qcap) for all sanitary sewer mains ≥ 12-inch. Reference sanitary sewer study, where applicable.

e. Identify proposed embedment, backfill, and surface restoration. Reference Standard Detail(s).

f. Identify 100-ft. stations along bottom of profile grid.

g. Identify sewer vents.

h. Identify bolted and gasketed ring and covers.

i. Identify proposed stations and flowline elevations at encasement limits and manholes.

j. Identify proposed manhole rim elevations. If located within existing or proposed pavement, add a note that contractor is required to match pavement surface.

k. Identify proposed encasement, casing, and clay dams, where applicable.

l. Identify crossing utilities and parallel utilities within 5 feet.

m. Identify minimum vertical separation requirements.

n. Identify geotechnical soil data, if applicable.

## 6.7 Detail Sheet(s)

A. <u>City Standard Details:</u>

1. Include all applicable City standard details.
2. City standard details shall maintain original 8 ½" x 11" formatting.

B. <u>Non-standard details:</u>

1. Engineer shall provide project specific details for any non-standard, or specialized installations.
2. Project specific details may be shown at larger scales for clarity.
3. Project specific details, whether shown in plan, section, or elevation, shall have the same horizontal and vertical scale.