

X. **WATER AND SEWER PLANS CHECKLIST**

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A. Title Page

1. _____ Project Name and/or Subdivision Name on Cover Sheet
2. _____ Engineer's Seal and Signature
3. _____ Vicinity Sketch
4. _____ Title Block
5. _____ Tax Map And Parcel Numbers
6. _____ Name, Address & Phone Number of Developer/Owner
7. _____ Legend of Sanitary sewer and water lines, other utilities and structures, existing and proposed ground and pavement profile.
8. _____ Certification statement of lot numbers, block letters/numbers and road names.
9. _____ Sheet Index

B. General

1. _____ Special notes as appropriate
2. _____ Vertical Scale 1"= 4' and horizontal scale 1"= 40' or as approved by CMUD.
3. _____ All designs conform to the latest city, state and federal regulations or standards.
4. _____ Plan and Profile sheets on 24" x 36" paper with CMUD format and title block.
5. _____ An overall plan of the water and/or sewer layout, indexed to sheet numbers and a vicinity map showing project location.
6. _____ A subdivision plat indexed to sheet numbers.
7. _____ Existing water and/or sewer lines labeled with size and reference distances, and show the nearest existing valve to be used for cut-off purposes.

8. _____ Bench marks every 1000' for water and at every manhole for sewer. Elevations are tied to NGS, NCGS or established CMUD vertical control.
9. _____ Horizontal and vertical scale shown on each sheet.
10. _____ All existing or proposed rights-of-way and construction easements are accurately located and are shown on plans. Separate rights-of-way maps conforming to CMUD standards are attached. Right-of-way parcel numbers are shown and right-of-way and construction easement widths are shown.
11. _____ All existing and proposed storm sewer lines, gas, telephone, power and other utility lines, which cross or run parallel to the sewer or water lines, are shown with exact horizontal alignment. Subsurface exploration must be performed where potential conflicts exist and field changes are not practical.
12. _____ Proposed road and drainage projects are shown.
13. _____ Road names, state route numbers, and right-of-way widths are shown.
14. _____ Plan and Profile are drawn in the same direction. Stations increase from left to right.
15. _____ Proposed future water/sewer projects are shown.
16. _____ Proposed water/sewer lines are shown with reference distances from right-of-way, property boundary, buildings, other utilities, etc.
17. _____ All property corners are shown.
18. _____ Location of existing houses, buildings, fences, wells and other structures are shown on plans. Sewer lines less than 100' from wells are DIP and sewer lines are not within 25 feet of any well.
19. _____ All designs conform to the latest City and State erosion control and sedimentation ordinances, rules and regulations.
20. _____ Locations of special features are shown.
21. _____ Detail drawings of all stream crossings and storm drainage outlets with elevations of the stream bed and current water level and elevations of storm drains and catch basins are shown.
22. _____ Adjacent property owner name (s) are shown on plans.

- 23. _____ Cut and fill areas are shown.
- 24. _____ North arrow on all sheets.
- 25. _____ Where a line is to be bored or tunnelled, indicate location and length of bore or tunnel and type of pipe and casing or tunnel liner.

C. Water Plans

- (1) _____ Plans show all fittings, fire hydrants, and valves including sizes. Each appurtenance properly labeled.
- (2) _____ Fire Hydrant locations comply with design guidelines.
- (3) _____ All conflicts with storm sewers and other utility lines are shown with appropriate design changes shown.
- (4) _____ The specified vertical clearance has been designed and obtained at all crossings of other utilities.
- (5) _____ All water lines have a minimum of 3.0' of cover, or are protected as required.
- (6) _____ Fire hydrants and air relief valves are shown on plans and profile.
- (7) _____ Hydrants or blow-off valves are designed at major low places in the line where possible and air release valves are designed at the high points.
- (8) _____ Blowoffs or hydrants are designed at the end of all lines. Location of hydrants comply with guidelines outlined in design standards.
- (9) _____ All water services are shown in accordance with the design standards.
- (10) _____ Plans show all connections to the existing mains.
- (11) _____ Water system is designed in accordance with available pressures and fire flow and pressure calculations are included.
- (12) _____ Line location is shown relative to back of curb or edge of pavement.

- (13) _____ Approximate material quantities are listed on each sheet.
- (14) _____ Pipe sizes noted on plans.
- (15) _____ Where pipe size is not determined by Utility Department, calculations are provided with the plans.
- (16) _____ Ditch lines are shown on the plan and depth of ditches are shown on the profile at fire hydrant and large service lines.
- (17) _____ Water line stubs for future extensions are to be installed beyond the edge of proposed pavement. Horizontal alignment and profile, if applicable, are to be shown on the construction plans.

D. Sewer Plans

- (1) _____ Manholes and structures are labeled and standard detail reference is included if applicable.
- (2) _____ Special structures are detailed.
- (3) _____ All conflicts with water mains are shown with changes to DIP as required.
- (4) _____ VCP or PVC pipe is replaced with Ductile Iron where there is less than 3.0 feet of cover.
- (5) _____ Bearings and distances between manholes are shown on plan view.
- (6) _____ Proposed pipes and manholes are shaded on profile view.
- (7) _____ Aerial creek crossings or inverted siphons are properly detailed.

E. Water and Sewer Contract Maps for Donated Projects

- (1) _____ Size: 8 1/2" x 11" or 8 1/2" x 14" (CMUD Title Block)
- (2) _____ Project Name and Job number
- (3) _____ Streets with street names
- (4) _____ Lots with lot numbers
- (5) _____ North Arrow

Sewer:

- (6) _____ Summary of total number of manholes, total length of pipe and number of lots served
- (7) _____ Proposed and existing sewer lines with flow directions
- (8) _____ Manholes and manhole numbers
- (9) _____ Bearings on any off-street sewer mains
- (10) _____ Distances between manholes for gravity lines
- (11) _____ Force mains and distances, low-pressure mains and distances (if applicable)
- (12) _____ Pump station locations (if applicable) and access road
- (13) _____ Proposed and existing sewer right-of-ways
- (14) _____ Right-of-ways dedicated for future use
- (15) _____ Size of sewer mains (if larger than 8-inch)

Water:

- (16) _____ Summary of total length of water main, hydrants and number of lots served
- (17) _____ Proposed and existing water lines and sizes
- (18) _____ Lengths of proposed water lines
- (19) _____ Fire Hydrant locations

NOTE: These maps may also be used as existing facilities maps for dedication of roads to the state by changing any wording of proposed to existing.

F. As-Built Checklist

- (1) _____ Mark through changed stations, bearings, distances, etc. and print actual as-built station, bearing, distance, etc.
- (2) _____ Mark through "proposed" for items that were actually installed.
- (3) _____ NCPE and/or NCRLS seal and signature required on each plan sheet.
- (4) _____ Drafter's initials and date of as-built is required on each sheet.

- (5) _____ As-builts completed in ink.
- (6) _____ On each sheet, label the type and class of pipe installed.
- (7) _____ Label bores and tunnels to show steel casing/tunnel liner type, size, and thickness. Show beginning and ending stations.
- (8) _____ Mark through and redraw manholes, valves, fire hydrants, etc. when the as-built location is more than one inch (plan or profile on any scale) from the proposed location.
- (9) _____ Temporary erosion control measures shall not be as-built.
- (10) _____ Permit number shall be recorded on the cover sheet of each set of plans.

Sewer

- (11) _____ Show all manhole depths and rim elevations.
- (12) _____ Show as-built bearings and distances between manholes on the plan view.
- (13) _____ Show distances between manholes on the profile.
- (14) _____ Show location of all sewer laterals by station and as measured from the nearest downstream manhole along the centerline of the sewer.

Water

- (15) _____ All valves, hydrants, fittings, air releases, etc. shall be stationed.
- (16) _____ At offset fire hydrants, show station for tee, valve, and hydrant.
- (17) _____ Show location of all water services by station and as measured from the nearest valve along the centerline of the water main.
- (18) _____ Show details for concrete blocking.
- (19) _____ Show location and type of restrained joint pipe and/or fittings.

G. Activation/Project Final Checklist

Sewer:

- (1) _____ Construction must be complete including but not limited to pipe, backfill, manholes (including inverts, frame and cover, vents), laterals, etc.

- (2) _____ On-site right-of-way in a condition that sewer maintenance division can access the site as needed.
- (3) _____ Off-site right-of-way must be completely restored (seed, mulch, rip-rap, etc)
- (4) _____ Airtest passed
- (5) _____ Mandrell test passed
- (6) _____ Manhole test passed
- (7) _____ Step pull-out test passed
- (8) _____ Infiltration test passed
- (9) _____ Mains and manholes flashed
- (10) _____ ALL problems resolved
- (11) _____ EXISTING road right-of-way restoration must be complete (seed, mulch, pavement, concrete, etc.)
- (12) _____ Original plans as-built by NCRLS with seal and signature of PE and RLS.
- (13) _____ Copies of recorded Plat Maps
- (14) _____ Original right-of-way maps with NCRLS seal and signature
- (15) _____ Right-of-way agreement for any off-site right-of-way
- (16) _____ Original encroachment map for NCDOT takeover, if applicable

Water:

- (17) _____ Construction must be complete including but not limited to pipe, valves, backfill, valve boxes, fire hydrants, services, etc.
- (18) _____ Road right-of-way, valves, fire hydrants, services, blow-offs, etc. in a condition that water distribution division can access as needed.
- (19) _____ Hydrostatic test passed

- (20) _____ Chlorination completed
- (21) _____ Bacteria test approved by lab
- (22) _____ Verify certificate of accuracy for developer installed meters
- (23) _____ Curb and gutter and stone base complete
- (24) _____ ALL problems resolved
- (25) _____ EXISTING road right-of-way restoration must be complete (seed, mulch, pavement, concrete, etc.)
- (26) _____ Original plans as-built by engineer with seal and signature
- (27) _____ Copies of recorded plat maps
- (28) _____ Original right-of-way maps for water main right-of-way, if applicable
- (29) _____ Original encroachment map for NCDOT takeover, if applicable
- (30) _____ Certificate of accuracy for each meter larger than one inch, if applicable
- (31) _____ Butterfly valve factory test certificates for each valve, if applicable.