

WATER DESIGN REVIEW CHECKLIST

PROJECT NAME: _____

W.F.I.D.# _____

REVIEWED BY: _____

DATE REVIEW: _____

COMMENTS:

CHART A-1: General Water Drawing Requirements

Comment Number	First Date: _____	Second Date: _____	Review Criteria
1			At least Two copies of the design plans and a single copy of the stormwater/grading plan(s) are submitted for initial review.
2			Design plans are 24" x 36" (D Size) drawings.
3			KUB Border
4			The Title Block and the design's plan view clearly indicate whether the water project is a private or public water system.
			Title Block at the bottom of each sheet must include:
5			-Project name (Public or Private)
6			-Engineer's company, address and phone number
7			-Engineer's stamp (signed and dated)
8			-Developer's name, address, and phone number
9			If submitted design plans are of a project with multiple phases, all prior phases and their respective easements must already be approved and accepted.
10			Vicinity Map (Upper right-hand corner)
11			Show location of nearest fire hydrant and control monument on Vicinity Map.
12			Location, station number, and elevation of nearest TDOT or Knoxville survey control marker
13			North Arrow on all sheets
14			Plan View Scale: Any scale used from a standard engineering scale, such as 1"=20', 1"=50', 1"=100', etc.
15			Proposed and existing phases of the project are clearly shown.
16			Future development in adjacent parcels is addressed in the design (if necessary.)
17			Rights-of-way (ROW), edges of pavement, driveways, and property lines are shown.
18			Existing and proposed streets and street names shown (actual street names used) if known.
19			Show all building footprints and other proposed structures such as pool, garage, clubhouse, etc., on drawing plan that affect or complement the design (if applicable).
20			Clearly mark periodic station and line numbers throughout proposed project to match hydraulic calculations.
21			Checklist of documents attached to first set of reviewed plans. (KUB only)
22			Property units are given in table format.
23			Reviewer dates and signs office copy of plans (KUB only)
24			Print out LandViewer drawing showing all utilities (i.e. water sewer, gas, electric, storm, etc.)
25			Ensure that figure numbers from KUB's Standards and Specifications are used for particular appurtenances, especially taps, tees, fire hydrants, and blow-off assemblies.

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CHART B-1: Water Main and Services Requirements

Comment Number	First Date:	Second Date:	Review Criteria
26			Existing and proposed water and/or wastewater lines shown appropriately.
27			Existing water mains and services (dashed lines)
28			Proposed water mains and services (solid continuous lines)
29			Proposed pipe materials and sizes clearly labeled on drawing.
30			Bold all water utilities and gray out other utilities in order to clarify the project's items of interest.
31			All utilities shown where appropriate (i.e. water, sewer, gas, electric, storm, etc.)
32 & 33			Proposed water mains should be either in: A) Street right-of-way & out of paved areas at least 4 feet from edge of pavement or B) Easements.
34			Station 0+00 is located where proposed water is tapped from existing water main.
35			All the proposed locations of all services are shown with correct symbol:
36			Each lot contains a separate, individual water service line and lot number.
37			All typical residential services shall be constructed using a ¾ inch Type-K copper pipe or 1 inch HDPE pipe if approved by KUB – No dissimilar materials along service. Any water services 2 inch or larger shall be HDPE or DIP.
38			Water service lines are installed in pairs near the common property corners of two adjacent lots that are adjoining the street right-of-way.
39			Typical Water Meter size is clearly indicated on the plans.
40			Water meter has an appropriate size for the proposed service and the meter size is 5/8", 1", 2", 3", 4", 6", 8", and 10".
41			Specify if a fire-rated meter is necessary.
42			All private fire lines shall have a control valve located at either the edge of right-of-way or easement.
43			Show vegetation.

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CHART C-1: Materials

Comment Number	First Date:	Second Date:	Review Criteria
44			Location of all proposed fire hydrants and apparatuses shown.
45			Fire hydrants are spaced approximately 500 feet apart in city limits/TDEC.
46			Contact KUB for all information regarding flow rate and pressure values for the existing fire hydrant used in the design of the proposed area in which the water system will be built.
47			Provide residual pressure, static pressure, flow, and elevation for the existing fire hydrant tested on design and the date of the test.
48			Valve nest needs to be spaced out to extend to opposite side of road to ensure operational ability if intersection is flooded. See example drawing.
49			Valves are placed on each main branching from a tee or cross.
50			Valves are placed out of pavement, but within street right-of-ways or easements.
51			Valves shall not be spaced more than 1000 feet apart.
52			Clearly indicate the proposed location of each air release valve.
53			Air Release Valves are located at crest high points in the water main design.
54			Blow-Off assemblies are placed at the end of all water mains.
55			Public water mains that provide fire flow shall be no less than 8 inches in diameter.
56			All water lines greater than 2 inches in diameter shall be ductile iron or HDPE pipe.
57			HDPE pipe diameters smaller than 2 inches shall be SDR 9. HDPE pipe diameters 2 inches and larger shall be SDR 11 including exterior blue stripe.

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CHART D-1: Easements

Comment Number	First Date: _____	Second Date: _____	Review Criteria
58			All required easements and/or subdivision plats shall be submitted, approved, and recorded before the new water system will be accepted.
59			With project easements, a minimum 15-foot wide permanent utility easement exists (minimum 7.5 feet on either side) for all water and wastewater mains as installed plus an additional 10 foot utility construction and maintenance easement as required, necessary to install and maintain the utilities.
60			If joint permanent easement (JPE) with utilities is used rather than public ROW, then JPE must include with utilities to remove the requirement for the utility easement.
61			Signed and recorded utility easements and/or JPE are required before the construction plans will be returned to the developer/consultant.
62			For existing easements, the deed instrument number shall be clearly indicated on the plans. If multiple instrument numbers exist for the development, then each instrument number shall be listed.

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CHART E-1: Water Construction Notes

Comment Number	First Date: _____	Second Date: _____	Review Criteria
63			Road right-of-ways or utility easements shall be to finished grade and sloped to meet required specifications or as approved by KUB prior to staking and installing water mains.
64			The Developer's Authorized Representative shall stake the proposed water main layouts, property corners, and easement locations etc...prior to construction or approval of plans or both to allow ample time for KUB's inspectors to inspect the layouts prior to construction. KUB will determine if staking may be required prior to approval of plans.
65			Construction materials must meet KUB specifications. KUB representatives must approve material submittals prior to construction.
66			Water main installation must be inspected by KUB. Contact KUB field services at least three (3) days prior to construction at 558-2786. Trenches shall be left open and not backfilled until inspected by KUB.
67			Contractor will sterilize water mains when installation and testing are complete. Contractor shall provide taps as required for sterilizing mains. Water quality sampling and testing will be performed by KUB.
68			Contractor must have a valid State of Tennessee municipal utility license for construction of water mains on site at all times.
69			Air release valves shall be installed on high points on the mains in accordance with the plans and/or as requested by KUB's inspectors.
70			The Contractor must have water service lines installed across streets before any surface cover is finalized to include paving, concrete driveways, etc.

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CHART E-2: General Water Notes

Comment Number	First Date:	Second Date:	Review Criteria
71			All water lines and appurtenances shall be installed in accordance with the Knoxville Utilities Board's Standard Water System Specifications and Details.
72			Requirements for proper trench and backfill operations must meet or exceed City of Knoxville, Knox County, and TDOT Standards.
73			Location of all existing utilities is approximate. Contractor shall field locate all existing utilities prior to excavation.
74			Water services shall be buried at a minimum depth of 24 inches to prevent freezing.
75			Minimum 36 inches depth of cover for water mains.
76			Utilities shall be installed after grading has been completed and approved before any surface cover is finalized to include paving, concrete driveways, etc...
77			After completing each section of the water, all debris and construction materials shall be removed from the work site. The disturbed ground surface shall be smoothly graded.
78			All water valves shall conform to KUB Standards and Specifications.
79			KUB personnel will test water service to the existing public ROW or easement from the existing system for the proposed water system.
80			Horizontal separation between water and sewer mains is a minimum of 10 feet.
81			Water mains are not installed in the same trench with other utilities unless approved through KUB Engineering in writing.
82			Any field changes to approved plans must be approved by the appropriate KUB representative before construction.
83			A copy of the latest approved set of utility plans designated by the KUB/TDEC RED stamp must be present during all times of construction of the appropriate utilities.

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CHART F-1: Water Hydraulic By-Hand Calculation Requirements

Comment Number	First Date: _____	Second Date: _____	Review Criteria Requirements for Hydraulic By-Hand Calculations of Proposed Water System
84			Clearly indicate location of each Nodes / Junctions used in calculations.
85			Clearly indicate location of each pipe used in calculations.
86			Indicate station critical points of pressure in the proposed system (i.e., High Elev. Points).
87			Clearly mark periodic station numbers throughout proposed project.
88			Clearly indicate location of existing fire hydrants and their surface elevation.
89			Clearly indicate all formulas used in hydraulic analysis of the proposed system.
90			Clearly define all the variables used in the calculations with their appropriate values.
91			Present appropriate units with all values used and obtained in every calculation.
92			Present calculations in an orderly, clear, and concise manner.
93			Clearly show station numbers and water line segments in the calculations [i.e., Label: Sta 9+40 (Line A) and Sta 0+00 (Line B)].
94			Present a calculation for the pressure at the top floor of the proposed building at the highest elevation in the system and for the furthest point in the system from the source tie-in.
			Show that the pressure at all levels of all buildings with water service will be above 20 psi.
95			-(for each multiple story building: add 10 feet above the ground surface and add an additional 7 feet to the highest level for calculations)
96			-(for each single story building: add 7 feet from the ground surface)
97			Present specific building height calculations separately from the ground surface elevation calculations for hydraulic adequacy.
98			Write a brief narrative indicating all assumptions, data, and hydraulic results in the introduction of the proposed water system calculation sheets.
99			Provide a tabulated summary page identifying all important variables, calculations, and results. Please see example for required summary contents.
100			Suggest checking with fire marshal for additional flow requirements.

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CHART G-1: Water Computer Simulation Requirements

Comment Number	First Date: _____	Second Date: _____	Review Criteria Requirements for Computer Simulation of Proposed Water System
101			Provide each Node's ID with simulated data results.
102			Node ID location identified in each drawing of proposed layout.
103			Each Node's elevation is shown on drawing and calculation results.
104			Provide each Node's flow / demand (gallons per minute).
105			Provide the Nodes contained between each section of pipe.
106			Provide each Pipe ID listed with a set of simulated data results.
107			Pipe ID location identified in each drawing of proposed layout.
108			Provide the length of each pipe in calculations.
109			Provide the diameter of each pipe in calculations.
110			Show each pipe's diameter and length of pipe on a drawing.
111			Provide each pipe's Roughness Coefficient (C) used in calculations.
112			Provide the pressure head and/or pressure calculated (psi or feet) for each node.
113			Provide the flow for each pipe calculated in gallons per minute.
114			Provide the friction head loss for each pipe calculated in feet.
115			Write a brief narrative indicating all assumptions, data, and hydraulic results in the introduction of the proposed water system calculation sheets.
			Show that the pressure at all levels of the buildings will be above 20 psi
116			-(for each multiple story building: add 10 feet above the ground surface and add an additional 7 feet to the highest level for calculations)
117			-(for each single story building: add 7 feet from the ground surface for hydraulic calculations)
118			Present specific building height calculations separately from the ground surface elevation calculations.
119			Provide a tabulated summary page identifying all important variables, calculations, and results.
120			Suggest checking with fire marshal for additional flow requirements.

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