

Design Criteria Checklist for Low Pressure Sewer (LPS) Collection Systems

	Design Plans - General Information
	<u>DESIGN NOTE:</u> <i>Unless explicitly authorized by FUD, Gravity Sewer deeper than eight (8) feet will not be accepted, and Low Pressure Sewer will be required.</i>
	Vicinity Map
	Key Map, for linear or large projects
	Clear depiction of future phases of Development
	Location of Sewer Lines & manholes relative to bridge, structures, and identifiable objects
	Location of proposed force main lines, valves, air release valves, fittings, and appurtenances
	Location of existing and proposed utilities (water, sewer, gas, power, communication, etc.)
	Profile of proposed Sewer Main(s), including: existing and proposed Utility and Storm crossings, and existing and proposed ground surfaces.
	Stream Crossing details, including construction methods and materials used.
	Locations of permanent Utility Easement(s) and temporary Construction Easement(s).
	For projects requiring work in State or County Right-of-Ways, provide stamped Traffic Control Plans for FUD's use in making Utility ROW Permit Application.
	Sealed by a TN-Licensed Professional Engineer.
	Design Report
	Summarize the population served, per capita flows, percentage of units contributing flow at instant in time, design flows, corresponding velocities, minimum and maximum elevations, minimum and maximum pressures, etc. Design calculations shall be prepared using Environment One's (E-One's) <i>LPS Design Assistant</i> , latest version. Note: <ul style="list-style-type: none"> • Clearly depict "zones" used in the E-One Software on the Design Plans. • Verify the line sizes match between calculation and plans. Use HDPE DR11 for calcs. • Use C_{HW} roughness coefficient not greater than 135. • Main shall be sized to be the largest diameter that allows a velocity greater than 2-ft/s and a pump total dynamic head less than 180-ft at both initial and final phases of development. <i>(For example, Engineer submits a design report depicting a zone with a 2-inch force main carrying a flow of 55-gpm, resulting in a velocity of 6.2-ft/s and pump TDH of 170-ft. FUD calculates the line could be a 3-inch, which would result in a velocity of 2.7-ft/s and significantly reduced pump head. FUD will require design change to provide increased pump life.)</i> • Submit all <i>LPS Design Assistant</i> worksheets with review package.
	When connecting to an existing low pressure sewer system, Engineer shall provide hydraulic calculations that verify (1) both the existing and proposed grinder pumps will be operational and (2) allowable pressures are maintained in the system.
	Design basis for wastewater flow shall be based on E-One's <i>LPS Design Assistant</i> software, TDEC's <i>Design Criteria for Sewage Works</i> – Appendix 2A, peer reviewed literature values, and/or from comparable regional data.
	Identify future phases of development. Verify initial design is adequate to serve future growth.
	Sealed by a TN-Licensed Professional Engineer.

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	Environmental / Permitting
	Stream crossings of Gravity or Force Main Sewer shall be permitted and approved by TDEC Division of Water Resources
	Material & Construction Requirements
	LPS Main Line – Size and Material (Specification 33 33 00 and related sections) <ul style="list-style-type: none"> • 2" min. diameter. • Bedding and backfill per FUD Specifications and TDEC Criteria. • Clearance with other underground utilities: <ul style="list-style-type: none"> • Water – 10-ft horizontal, 18-in vertical • Other underground – 3-ft horizontal, 12-in vertical • Cover - Per TDEC <i>Design Criteria for Sewage Works</i>, latest version.
	Connection to Existing Sewer <ul style="list-style-type: none"> • To Manhole – Construct “internal drop” tie-in per FUD Standard Drawings. • Connection to Gravity Sewer requires application of Spectrashield coating to connecting manhole and next two downstream manholes. • To Force Main Sewer – Consult with FUD Engineering Department during the Design Phase.
	Line Valve Placement & Spacing <ul style="list-style-type: none"> • Refer to Specification Section 33 33 00. • Spacing at no greater than 1,000-ft apart, or as directed by FUD. • Placed on each main branching from a Tee.
	Service Lines & Cleanouts <ul style="list-style-type: none"> • Refer to Specification Section 33 33 00 for product requirements. • For single-family residential, each Lot shall be provided a service line and valve box. • Each lot’s valve box shall be set near the middle of the property frontage. • Set top of box at four to six inches (4” – 6”) above top of curb elevation. • Easements are required on service lines that cross private property to service another lot. (This practice will typically not be accepted by FUD.)
	Easements & Property
	15-ft Utility Easement (o.c.) is required for all public sewer mains. Plans to reference Instrument #200908100011396 at Knox County Register of Deeds Office.
	Property for Sewer Pump Station shall be deeded to FUD. Depending on location, FUD may require a dedicated 20-ft wide access easement to pump station.
	Utility Easements or subdivision plats must be recorded before the system will be accepted by FUD.