



Department of  
**Environment &  
Conservation**

# Engineering Submittals

February 15, 2023

# Workshop Agenda

- Welcome
- TDEC ARP Update
- Engineering Services
- Rules and Design Criteria
- MyTDEC Forms
- Preliminary Engineering Reports
- Wastewater
- Drinking Water
- Additional information
- Q&A

# TDEC ARP Update

- TDEC is excited to announce that the [framework](#) for Phase II under our American Rescue Plan spending – State Strategic Projects – is available now.
  - Additional information regarding the competitive grant program will be announced in March 2023
- TDEC recently announced dates for the [2023 Non-Competitive Grant Workshop Series](#)
  - Grant applicants and awardees are strongly encouraged to attend in-person. Suggested participants include, but are not limited to:
    - Any partner entities
    - Application’s city or county mayor, grant administration team, legal signee, and finance representative
    - Utilities participating in projects under the application
    - Consulting firm(s) interested in participating in the bid process or those that have already been competitively procured
  - Interested participants can register online at the [ARP Engagement Opportunities](#) website
  - For those who cannot attend in-person, a virtual workshop is scheduled for March 16, 2023

February 23, 2023  
1:00-5:00pm CT

**Jackson, TN**

February 24, 2023  
8:30am-12:30pm CT

**Bartlett, TN**

March 1, 2023  
9:00am-1:00pm ET

**Chattanooga, TN**

March 2, 2023  
1:00-5:00pm CT

**Columbia, TN**

March 3, 2023  
9:00am-1:00pm CT

**Murfreesboro, TN**

March 7, 2023  
1:00-5:00pm ET

**Knoxville, TN**

March 8, 2023  
8:30am-12:30pm CT

**Cookeville, TN**

March 10, 2023  
9:00am-1:00pm ET

**Kingsport, TN**

**TN**

Department of  
**Environment &  
Conservation**



# Engineering Services

# DWR – Engineering Services Unit

Drinking Water Supply

Water Pollution Control

# DWR – Engineering Services Unit

Drinking Water Supply

Water Pollution Control

Division of Water Resources

# DWR – Engineering Services Unit

Division of Water Resources

Drinking Water Unit

Water Based Systems Unit

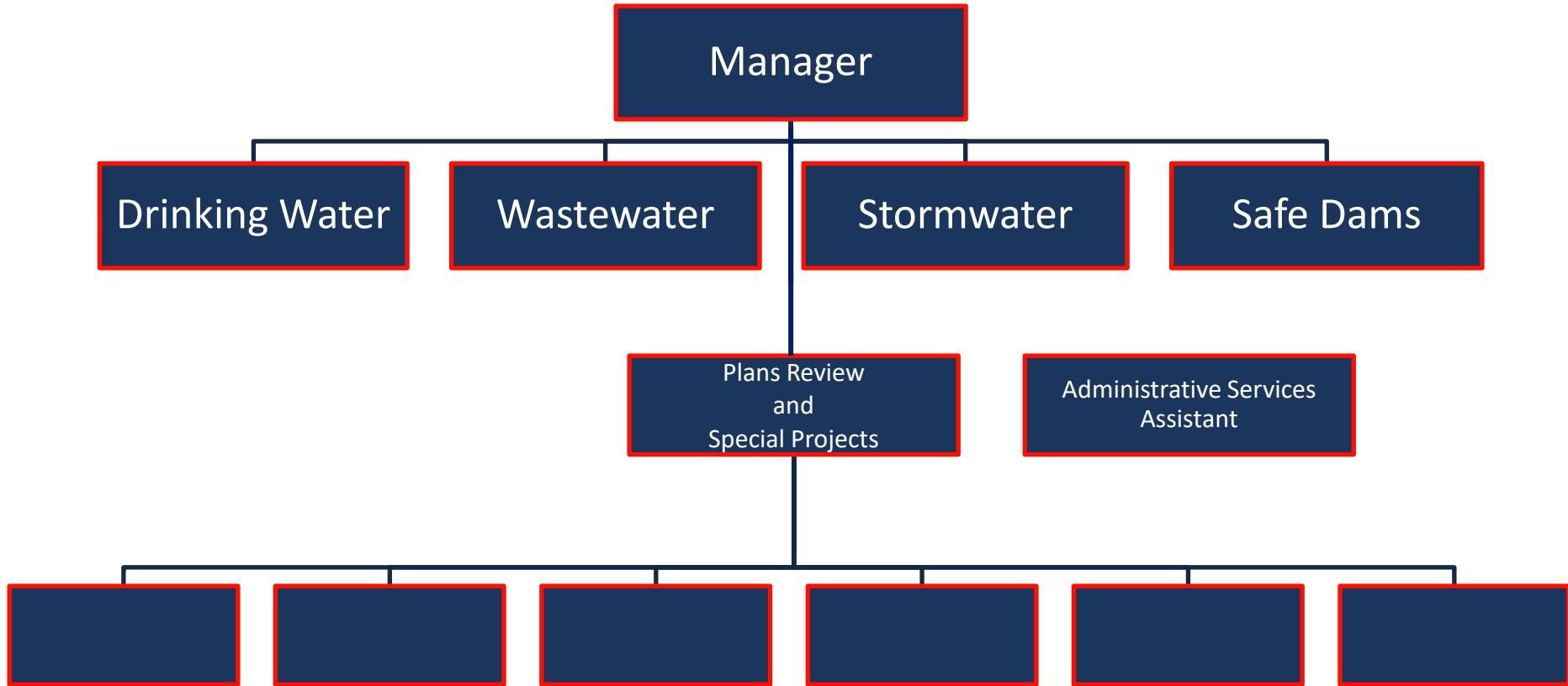
# DWR – Engineering Services Unit

Division of Water Resources

Engineering Services Unit



# DWR – Engineering Services Unit



# Email addresses

- [DWR.Engineering@tn.gov](mailto:DWR.Engineering@tn.gov)
  - Engineering
  - Plans review
  - Approval extension requests
  
- [Water.Permits@tn.gov](mailto:Water.Permits@tn.gov)
  - Permitting
  
- [TDEC.ARP@tn.gov](mailto:TDEC.ARP@tn.gov)
  - American Rescue Plan (ARP)



# Rules and Design Criteria

# Design Criteria

- Design Criteria for Review of Sewage Works Construction Plans and Documents
  - Recent Updates to Chapters 1, 2, and 9
- Community Public Water Systems Design Criteria

# Rules

- Tennessee Department of Environment and Conservation
  - 0400-40-02 Regulations for Plans, Submittal, and Approval; Control of Construction; Control of Operation
  - 0400-40-05 Individual National Pollutant Discharge Elimination System (NPDES) Permits
  - 0400-40-06 State Operating Permits
  - 0400-40-16 Public Sewerage Systems
  - 0400-45-01 Public Water Systems
- Tennessee Board of Architectural and Engineering Examiners
  - 0120-02 Rules of Professional Conduct
  - (Tennessee Board of Architectural and Engineering Examiners Reference Manual)

# Rule 120-02

- Seals on plans cover sheets
  - Tennessee Code Annotated section 62-2-306(b) and Rule 0120-02-.08(2)(A) indicate plans cover sheets must be sealed by the engineer of record. If more than one engineer sealed a sheet in the set of plans, each engineer should seal the cover and state which area/sheets they are responsible for.
- Calculations
  - The original cover or index page(s) for design calculations or reports that are submitted for review must be sealed.

# Rule 0120-02 – Successor Registrants

- Rule 0120-02-.08 (5) (b)
  - In circumstances where a registrant can no longer provide services on a project (such as death, retirement, disability, contract termination, etc.), a successor registrant may perform work on a set of plans originally prepared by another registrant. If the plans are incomplete (are at a stage prior to submittal to a reviewing official), the successor registrant may not seal the set of drawings prepared by the original registrant; rather, the successor registrant must take all steps necessary to ensure that the drawings were prepared under his or her responsible charge before sealing them. If the plans are complete and have been submitted to a reviewing official, the successor registrant may prepare and seal addenda sheets or document and seal changes to the original sheets if revisions are necessary.



TM

# MyTDEC Forms



# MyTDEC Forms

- Forms
  - Drinking Water Engineering Plans Submittal
  - Wastewater Engineering Plans Submittal

# MyTDEC Forms

- Forms
  - Drinking Water Engineering Plans Submittal
  - Wastewater Engineering Plans Submittal
- Share your form if the owner will pay the review fee

Wastewater Engineering Plans Submittal ⓘ  
Submission HPM-QAE7-JVETM Revision 1 Form Version 1.5

Calculated Fee  
Computed at Payment



Project Information

Utility Information

Funding

## Project Information

Project Name

or

## Contact Info

### Address

Tennessee Department of Environment  
and Conservation  
Division of Water Resources  
Tennessee Tower, 11th Floor  
312 Rosa L. Parks Avenue  
Nashville, TN 37243

### Contacts

Contact Email  
DWR.Engineering@tn.gov

### Access

Not shared with any users.

Share with...

- Location
  - Click on map and lat/long will auto populate

# MyTDEC Forms

- Submittal
  - Include a narrative in the calculations, engineering report, or cover letter
    - Include the project purpose, considerations, and any items outside the Design Criteria
  - Enter the project description as you want it to appear on the approval letter
    - This should include linear feet, size, and material of pipe, pump flow rate and TDH
  - Sealed single PDF for each
    - Plans
    - Calculations
    - Specifications
  - Leave a spot for the approval stamp on your cover sheet (roughly 4.5"x3.6")
  - Payment must be received for the Form to be visible by TDEC staff
  - Do not upload incomplete submittals to get in "line" earlier


# MyTDEC Forms

- Response to comments
  - Submit a complete PDF including the changes
  - State how comments were addressed or provide additional information
  - Mark each comment as complete
  - Resubmit the form
  - Do not create a new submission, response to comments will be under the same submission number
  - If correction requests are not addressed, second notification sent
    - Additional comments will be in MyTDEC Forms, not the email
- Revisions to previously approved plans
  - Complete submittal
  - Include previous approval number
  - Mark the project as a revision

# Data viewer

- <https://www.tn.gov/environment/about-tdec/tdec-dataviewers.html>
- Search for “TDEC Data Viewer”
- Click on “Division of Water Resources Data Viewer”
- Click on “Engineering Plans”

# Data viewer

 DataViewer - Division of Water Resources (DWR) 🔍 guest

Home | Permits | Documents | Complaints | Inspections | **Engineering Plans** | Hydrologic Determinations | Exceptional Waters | Ambient Monitoring | QLP Data | Oil & Gas Wells | Water Wells | Certified Operators

Home \ Engineering Plans \

Sewage Works Construction Plans and Documents Track Sewer Plans

Plans Review and Approval of Sewage Works Construction Plans and Documents

Plans Review and Approval for Public Water Systems Track Water Plans

Plans Review and Approval for Public Water Systems

# Data viewer

Received is in the last 6 months × Highlight Sewer Plans ×

101 - 150 of 503

Plan Type	Project No	Project	Project Type	Submittal Type	System	Received ↓	Status
Sewer	22.0364	7725 Old Harding	GP	CD	Harpeth Valley Utility District	08-AUG-2022	Approved
Sewer	22.0344	Alligood Park	GRLSFM	CD	Lebanon	08-AUG-2022	Approved
Sewer	22.0202	Clinton Utilities Board 2022 Sanitary Sewer Rehabilitation Phase I	GR	CD	Clinton Utilities Board	08-AUG-2022	Approved
Sewer	22.0507	Erin Wastewater Treatment Plant Force Main Upgrades	GRLSFM	CD	Erin	06-AUG-2022	Approved
Sewer	22.0509	City of Sneedville Sanitary Sewer Improvements Phase 6	GRRH	CD	Sneedville	05-AUG-2022	Approved
Sewer	22.0508	S.R. 33; (Main Street), Bridge Over Greasy Rock Creek, L.M. 11.77 (IA) Sanitary Sewer Relocation	-	-	-	05-AUG-2022	Incomplete
Sewer	22.0505	Addison Park Pump Station Upgrade	GRLSFM	CD	Lebanon	05-AUG-2022	Approved
Sewer	22.0504	City of Savannah Standard Specifications -Sanitary Sewer Construction	STDSPEC	CD	Savannah	05-AUG-2022	Approved
Sewer	22.0503	Sunnyslope Dr. Force Main Extension	GRLSFM	CD	Jackson Energy Authority	05-AUG-2022	Approved
Sewer	22.0502	Five Oaks Subdivision Phase 5 Section 3,4&5	GR	CD	Lebanon	05-AUG-2022	Approved
Sewer	22.0501	City of Gallatin standard specifications	STDSPEC	CD	Gallatin Public Utilities	05-AUG-2022	Incomplete
Sewer	22.0498	Lake Haven Subdivision (103 units)	DCLADRIP	PPD	-	05-AUG-2022	Pending
Sewer	22.0115	The Farm at Cedar Valley	GP	CD	Pegram	05-AUG-2022	Approved
Sewer	22.0558	BIR Travel Plaza LLC	DCLADRIP	PPD	-	04-AUG-2022	Pending
Sewer	22.0500	Shiloh Falls Utilities Wastewater Up-Grades	DCLADRIP	ER	Shiloh Falls Utilities, Inc.	04-AUG-2022	Pending
Sewer	22.0497	BIR Travel Plaza LLC	DCLADRIP	PP-ER	-	04-AUG-2022	Incomplete
Sewer	22.0400	McRath Dump Station Relocation	GRLSFM	CD	Alma	03-AUG-2022	Approved

Note: Drinking Water projects submitted prior to June 2020 may not be viewable



# Preliminary Engineering Reports



# Preliminary Engineering Reports

- Alternatives Analysis
- Do nothing is not an option
- Consider feasible alternatives
- Explain how the selected alternative was determined

# Preliminary Engineering Reports



January 16, 2013

## INTERAGENCY MEMORANDUM

Attached is a document explaining recommended best practice for the development of Preliminary Engineering Reports in support of funding applications for development of drinking water, wastewater, stormwater, and solid waste systems.

The best practice document was developed cooperatively by:

- [US Department of Agriculture, Rural Development, Rural Utilities Service, Water and Environmental Programs;](#)
- [US Environmental Protection Agency \(EPA\), Office of Water, Office of Ground Water and Drinking Water and Office of Wastewater Management;](#)
- [US Department of Housing and Urban Development \(HUD\), Office of Community Planning and Development;](#)
- [US Department of Health and Human Services, Indian Health Service \(IHS\);](#)
- [Small Communities Water Infrastructure Exchange;](#)

# Preliminary Engineering Reports

## GENERAL OUTLINE OF A PRELIMINARY ENGINEERING REPORT

- 1) PROJECT PLANNING
  - a) Location
  - b) Environmental Resources Present
  - c) Population Trends
  - d) Community Engagement
  
- 2) EXISTING FACILITIES
  - a) Location Map
  - b) History
  - c) Condition of Existing Facilities
  - d) Financial Status of any Existing Facilities
  - e) Water/Energy/Waste Audits
  
- 3) NEED FOR PROJECT
  - a) Health, Sanitation, and Security
  - b) Aging Infrastructure
  - c) Reasonable Growth



# Wastewater

# Checklists

- Checklists are in the Design Criteria for Review of Sewage Works Construction Plans and Documents
- Appendix 1-D-1 Preliminary Project Discussion Guidance
- Appendix 1-D-2 Preliminary Design Submission Review – Engineering Report Guidance
- Appendix 1-D-3 Preliminary Design Submission Review - Preliminary Plans Guidance
- Appendix 1-D-4 Final Design Submittal Guidance

# Checklists

APPENDIX 1-D	
SPECIFIC SUBMITTAL GUIDANCE BY PHASE AND BY PROJECT TYPE	
LEGEND: Project Types and Checklist annotations	
Project Classes	Definition
TF	<i>Treatment Facility</i> construction; new or modifications: conventional treatment with discharge to surface waters via NPDES permit and capacity >30,000 gallons per day (gpd); reuse and land application may be included
DC	<i>Decentralized</i> facility construction, new or modification: on-site treatment systems with discharge to surface waters via NPDES permit, and to land application via SOP and capacity ≤ 30,000 gpd; reuse may be included
IW	<i>Industrial wastewater treatment facility</i> treating primarily “industrial wastes” as defined by Rule 0400-40-05-.02-(39)
LA	<i>Land Application</i> projects covered by Chapter 16 and 17 of <i>Criteria</i> of treated wastewater; may be included with TF, DC, or IW class projects.
SLS	<i>Sewer Lift Station</i> : wastewater pumping system within collection system or within conventional treatment facility (TF) or decentralized treatment (DC) facilities; could be included in reuse (RU) projects
FM	<i>Force Main</i> : pressurized closed conduit system for transmission of wastewater; may be included in TF, DC, LA, RU and SLS project categories.
GR	<i>Gravity Collection Piping</i> : closed conduit system for transmission of wastewater by gravity flow open to the atmosphere; may be included in TF, DC, LA, RU, SLS project categories.
RH	<i>Sewer Rehabilitation</i> : gravity or force main and/or associated appurtenances such as manholes; currently not reviewed by DWR unless such review is included in funding agency requirement.
RU	<i>Beneficial Reuse</i> of Reclaimed Wastewater; may be included with TF, DC, IW, SLS, FM or LA projects; engineering information included in permit modification and Reuse Management Plan when implemented

# Checklists

APPENDIX I-D-2										
PRELIMINARY DESIGN SUBMISSION REVIEW GUIDANCE – ENGINEERING REPORT - CHECKLIST										
LEGEND: SEE APPENDIX I-D										
II. ENGINEERING REPORT (BASIS OF DESIGN OR DESIGN MEMORANDUM): PURPOSE: DEMONSTRATE DUE DILIGENCE WITH RESPECT TO INFLUENT CHARACTERIZATION AND CONFORMANCE TO <i>CRITERIA</i> OR JUSTIFICATION FOR DEPARTURES; DEFINE START-UP AND DEMONSTRATION CONDITIONS; RESOLVE ISSUES OF OPERATIONAL AND PERFORMANCE INTENT IN FUTURE YEARS AS PLANT APPROACHES EXPANSION; PROVIDE OWNER-ENGINEER-REGULATOR UNDERSTANDING OF EXPECTATIONS OF PERFORMANCE FOR FINAL DESIGN AND CONSTRUCTED FACILITY; PROVIDE DOCUMENTATION BASIS FOR OPERATOR TRAINING AND OPTIMIZATION.										
				4-step process req'd			4-step process optional			
				Treatment			Non-treatment			
ITEM	DESCRIPTION	TF	DC	IW	LA	SLS	FM	GR	RH	RU
	Cover Letter including: Description of the project; utility and design contact persons (name, organization name, address, email, phone number and fax number); project location (county and city); associated NPDES or SOP number and treatment plant name; enclosures, e.g., plan sheets (format), engineering report (format), fee worksheet (format), engineering report check fee. Cover letter must be signed by utility representative or submitted “on behalf of “the utility and an appropriate representative of the utility copied.	X	X	X	X	X	X	X	X	X
	Cover letter continued: linear feet, diameter, and type (force main, gravity sewer, low pressure sewer);						X	X		
	Cover letter continued: treatment/pumping capacity in MGD	X	X	X	X	X				X
	Cover letter continued: for line rehabilitation: linear feet and size by activity, e.g., replacement, pipe-bursting, cured-in-place, slip-line, TV inspection, smoke testing; number of manhole or service lateral rehabs								X	
A.	Basis for influent flow characterization (e.g. estimates from <i>Design Criteria</i> -Chapter 2, flow monitoring or other current data, sampling, pretreatment program, industrial owner projections, population trends, population predictions, etc.)	X	X	X	X	X	X	X	X	X
B.	Characterization of flow (diurnal patterns, ADDWF, ADF, Design Flow, Peak Flow; organic and industrial inorganic loads (CBOD5, NH3-N, pH, TN, TP, (COD), alkalinity, metals, toxic/hazardous materials); grit and trash loading estimates or data	X	X	X	X	X	X	X	X	X
C.	Unit process design parameters (referenced to <i>Design Criteria</i> chapters 2-17; or pertinent data on systems not covered by Design Criteria); equipment selection rationale should demonstrate appropriateness of capacity and capability throughout range of operation currently (ADDWF-Peak Flow) and existing to 20 year design flow in order to meet discharge permit, land application conditions or reuse conditions. Conformance to manufacturers’ hydraulic or	X	X	X	X	?	?	?	?	?

# Checklists

- Appendix 1-E Preliminary Engineering Report (PER) Guidance
- Appendix 1-F CAP/ (P)ER Guidance
- Appendix 2-B Final Design Submission for Collection System Projects Review Guidance



# Checklists

**APPENDIX 2-B  
FINAL DESIGN SUBMISSION FOR COLLECTION SYSTEM PROJECTS  
REVIEW GUIDANCE – CHECKLIST**

<b>WPN:</b>	<b>Project Name:</b>
-------------	----------------------

Acceptable	Item Number	DESCRIPTION	COMMENTS
<b>General</b>			
<input type="checkbox"/>	<b>1</b>	Accurately completed Wastewater Plans Review Fee Worksheet (CN-1457)	
<input type="checkbox"/>	<b>2</b>	Cover letter and/or plan signed by utility representative and/or letter provided by the utility stating they approve the design and will own, operate and maintain the improvements.	
<input type="checkbox"/>	<b>3</b>	Check received for the correct amount	
<input type="checkbox"/>	<b>4</b>	All plan sheets sealed by a professional engineer licensed in TN, signed by owner; legible when printed on an 11x17 sheet	
<input type="checkbox"/>	<b>5</b>	Calculations sealed by a professional engineer licensed in TN	
<input type="checkbox"/>	<b>6</b>	Ownership of all proposed lift stations and lines designated, easements shown	
<input type="checkbox"/>	<b>7</b>	Other utilities shown on plan and profile sheets	
<input type="checkbox"/>	<b>8</b>	Adequate separation from water lines (10-feet horizontal, 18-inches vertical)	
<input type="checkbox"/>	<b>9</b>	Does the downstream system have capacity for the proposed flow?	

# Gravity sewer

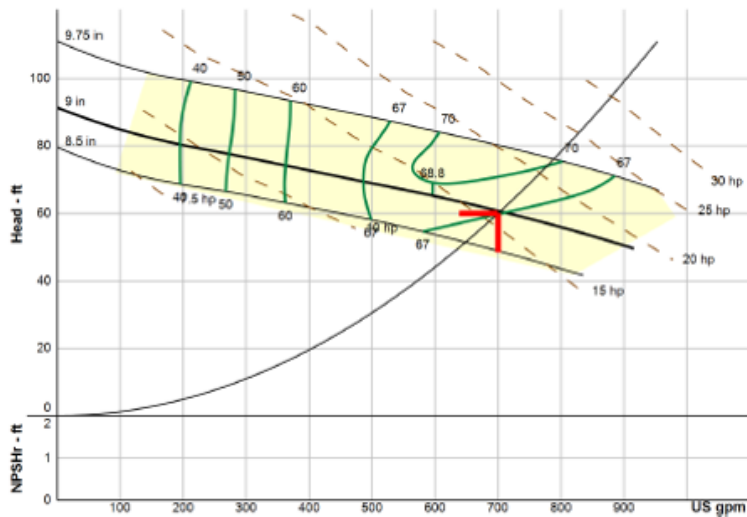
- Calculations should include the basis of design
  - Appendix 2-A Design Basis for Wastewater Flow and Loadings
    - Number of lots
    - Acres served
- Velocity and capacity flowing full
- Calculations must be sealed - Rule 0120-02-.08(2)
- Show utility crossings on the profile

# Lift Stations and Forcemains

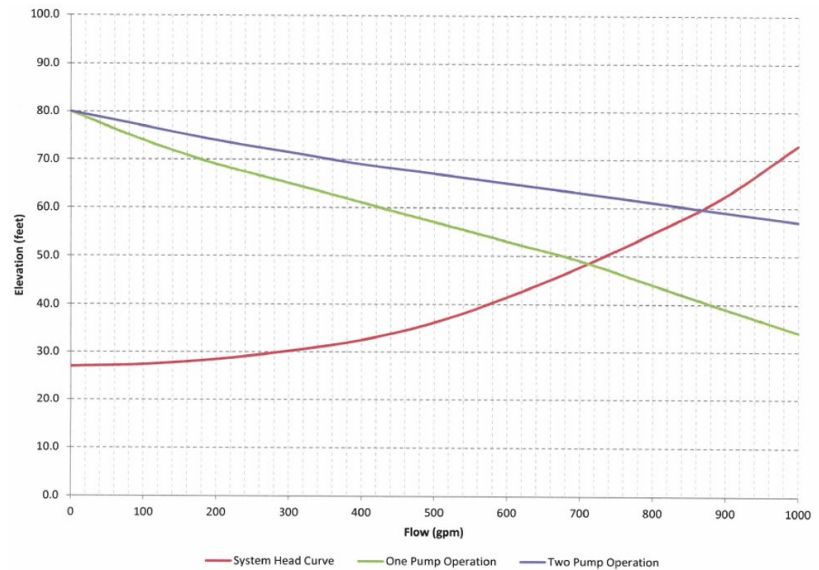
- Plans should include notes for relevant pump specifications
- Include pump operating conditions in calculations
  - Run times, cycle times at average and peak flows
- If lines manifold, include hydraulics for pump operating alone and with other pumps in operation
  - Ensure new pump does not adversely affect operation of existing pump

# Lift Stations and Forcemains

- System head curve plotted on the pump curve
  - In addition to the pump curve from the supplier

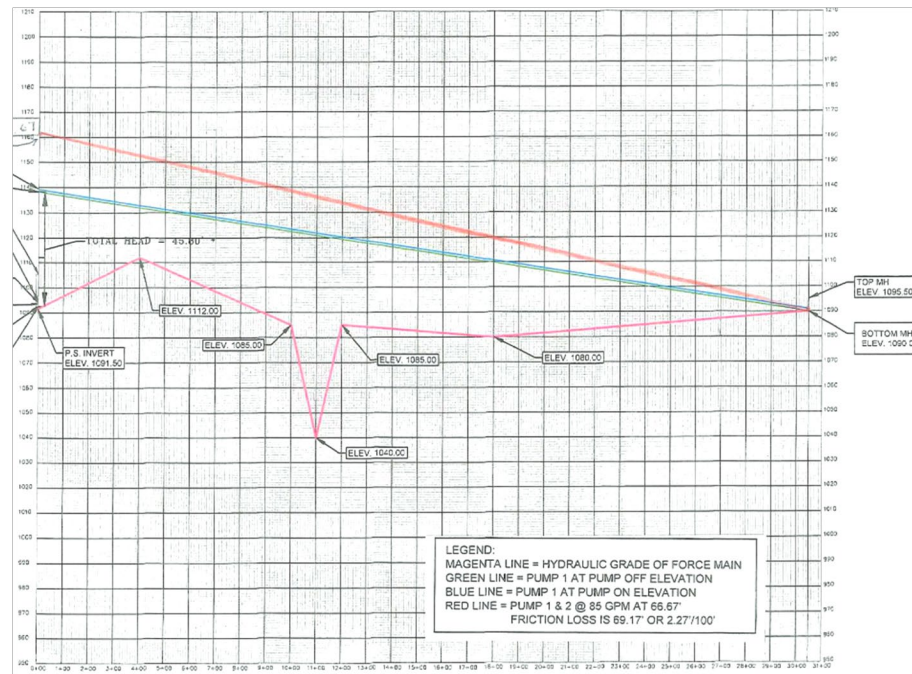


and



# Lift Stations and Forcemains

- Hydraulic Grade Line (HGL) plotted above the forcemain profile



# Lift Stations and Forcemains

- C=130 plus C=150 for PVC and C=110 for DIP
- Critical response time
- Site plan, plan and profile views
- Operations and maintenance

# Rule 0400-40-05

- Proper operation and maintenance ... Low pressure pumps and tanks are integral to the treatment and conveyance of sewage in a low - pressure system design and shall be owned or under control of the municipality, other body of government, public utility district, or a privately-owned public utility demonstrating lawful jurisdiction over the service area.

# Rule 0400-40-05

- Operational control for privately owned low-pressure pumps and appurtenances appropriately includes the following:
- Legal mechanism e.g. local regulations, ordinance, plumbing codes, resolution etc. that provides the authority to
  - Deny the use of low-pressure pumps and tanks
  - Establish and enforce design standards
  - Access the site and equipment (including inspection)
  - Obtain remedies for non-compliance
  - Conduct an emergency response



# Rule 0400-40-05

- Plans review process to ensure compliance with the locally established design standards (including inspection of installation)
- Construction, inspection, and approval process
- Preventative and emergency maintenance program

# Low-Pressure Systems

- Provide profile of the low-pressure line
- Hydraulic Grade Line (HGL) plotted above low-pressure line not required
- Calculations should include Total Dynamic Head (TDH) for the lowest pump in each section with anticipated number of pumps operating simultaneously
- Include existing system in calculations

# Rehab

- The Division excludes from the requirements of the Criteria sewer rehabilitation work that does not reduce the cross-sectional area of the sewer pipe by less than 15 percent such as with cured-in-place rehabilitation. Submittal of an engineering report or construction plans and specifications is not required in this case unless funding agencies require it
- If changing pipe size, slope, or location, must submit construction documents for review and approval

# Rehab and relocation

- Include calculations for rehabilitation and relocation projects
  - Forcemain relocations - HGL plotted above the forcemain profile and system head curve plotted on the pump curve for existing and proposed conditions
  - Gravity line relocations - calculations including basis of design



# Drinking Water

# Submittals

- Submittal requirements
  - Community Public Water Systems Design Criteria  
Part 1 - Section 1.0.a-f
- Hydraulic calculations
  - Ensure compliance with Part 9 – Distribution Systems
  - Show that flow and pressure are adequate
    - Instantaneous peak flow (Design Criteria Section 9.0.1(f))
      - 2 gpm per residential connection up to 150 connections
      - reduces as connections increase
    - Plus a minimum of 500 gpm when fire flow is being considered

# Submittals

- Hydraulic model
  - If prepared by the owner or another engineer
    - Document how the project has been included in the model
    - Include summary sheet and results
    - Incorporate the Design Criteria
- Show how connections will be made

# Booster pumps

- Plans should include:
  - Site plan, plan and profile view
  - Enclosure details
  - Pipe sizes and material
  - Pressure gauges and valves
- Hydraulic calculations should include:
  - Basis of design
  - Flow range
  - Head conditions
  - Pump curve
  - Run times



# Rehab and relocation

- Rehab and relocation projects require hydraulic calculations
- All projects should be submitted for review and approval

# Updates

- HDPE
  - AWWA Specification C906 was revised in February 2022
  - HDPE material is PE4710 (Previously 3408 or 3608)
- C905
  - AWWA Specification C905 has been revoked
  - PVC pipe diameters previously listed in that specification are now included in AWWA C900
- Hydrostatic pressure
  - AWWA Specifications C600 and C605
  - Depends on pipe type

# Water Treatment Projects

- Preliminary Project Discussion
  - Prior to beginning construction documents
  - Includes
    - Engineer
    - Owner
    - Engineering Services
    - Environmental Field Office
    - Permitting
    - Funding Agency
- Water Withdrawal Permits
  - Grandfathered at the rate the water treatment plant was withdrawing in July 2000
  - Based on 20-year population projection



**Additional Information**

# Specifications

- Project specifications should include:
  - Cover page
  - Project name
  - Engineer's seal
  - Materials, equipment, testing for all portions of the project

# Standard Specifications

- Approval expires after 5 years
  - Check approval date on the data viewer
- If both water and sewer are included, submit to drinking water
- If used for a specific project, the standard specifications must include everything in the project and be current
- If details are included in the standard specification, they do not need to be included on the project drawings

# Additional Considerations

- Aquatic Resource Alteration Permit (ARAP) should be approved prior to plans approval
  - Include funding agency in narrative
- If mark-ups from the owner modify the design, revised documents should be submitted for review and approval
- No qualifying language on plans submitted to TDEC for review and approval
- Project must connect to existing water line, sewer line, or lift station
- Easements should be obtained and shown on the plans

# Approvals

- Preliminary Engineering Reports
  - Memo stating there are no concerns with the selected alternative
- Engineering Reports and Construction Documents
  - Approval letter and construction documents with approval stamp
- Make sure to download your approved documents within 30 days



# Questions?

The logo consists of a red square with the letters 'TN' in white, serif font. Below the red square is a thin white horizontal line, and below that is a dark blue horizontal bar. A small 'TM' trademark symbol is located at the bottom right corner of the blue bar.

TN

Angela Jones, PE, CPM

Manager, Engineering Services Unit

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[DWR.Engineering@tn.gov](mailto:DWR.Engineering@tn.gov)