Progressive solutions for municipal infrastructure

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Memorandum

To: Steve Chrabascz, P.E., State Engineer & Environmental Coordinator, USDA Rural Development
Norman St Jean, Area Loan Specialist, USDA Rural Development

From: Dave Prickett, P.E. President, DPC Engineering, LLC
James Rivers, Staff Engineer, DPC Engineering, LLC

Date: April 7, 2020

Cc. Jim Mersfelder, Vice President & Treasurer, WLSD
Jeff Clark, Board Member, WLSD

Re: **Updates to Preliminary Engineering Report No. 2 – USDA Funding Application Regional Wastewater Management Project, WLSD/Town of Litchfield**

This Memorandum includes additional information related to the Litchfield WPCF, as requested by USDA to update and complete the Preliminary Engineering Report (PER) submitted to USDA Rural Development as part of the funding application for the Wastewater System Upgrades Project for Woodridge Lake Sewer District and the Town of Litchfield, CT. The following items include Section 2 and Section 3 from RUS Bulletin 1780-2.

2) EXISTING FACILITIES

Describe each part (e.g. processing unit) of the existing facility and include the following information:

a) Location Map. Provide a map and a schematic process layout of all existing facilities. Identify facilities that are no longer in use or abandoned. Include photographs of existing facilities.

The geographical location of the Litchfield sanitary sewer collection system and WPCF are shown in Figure 1. The Litchfield existing site layout is shown in Figure 2.

b) History: Indicate when major system components were constructed, renovated, expanded, or removed from service. Discuss any component failures and the cause for the failure. Provide a history of any applicable violations of regulatory requirements.

The Lichfield WPCF was constructed in 1970, and upgraded in 2001. The WPCF has an annual average permitted surface water discharge capacity of 0.80 MGD to the Bantam River. The original construction of the WPCF utilized an activated sludge process which included a headworks with a comminutor and grit removal, two primary settling tanks, two aerations tanks, two final settling tanks, a chlorine contact tank, and a primary and secondary digestor. The WPCF was upgrade in 2001 to incorporate Nitrogen Removal. In order to reduce capital costs and the associated impacts to the rate payers, the 2001 upgrades maintained the discharge capacity of 0.80 MGD but utilized a design flow of 0.550 MGD. The 2001 upgrades included a Nitrogen Removal based activated sludge process, the upgrades included the addition of a third aeration tank, a third final settling tank, conversion of the existing chlorine contact tank to UV disinfection, conversion of the primary and secondary digestors to blended

sludge and thickened sludge storage tanks, a new sludge thickening system and the addition of a septage receiving area. The WPCF has not undergone any improvements since 2001. The existing facility does not have a history or violations or any current violations of regulatory requirements.

c) Condition of Existing Facilities: Describe present condition; suitability for continued use; adequacy of current facilities; and their conveyance, treatment, storage, and disposal capabilities. Describe the existing capacity of each component. Describe and reference compliance with applicable federal, state, and local laws. Include a brief analysis of overall current energy consumption. Reference an asset management plan if applicable.

The Litchfield WPCF was originally constructed approximately 50 years ago, with upgrades completed in 2001. The WPCF has the following process, safety and equipment limitations and needs:

1. Headworks: The manual bar rack is prone to clogging and has to be cleaned multiple times per days. The aerated grit chambers are inefficient. The existing headworks configuration creates a hydraulic bottleneck in the interceptor sewer. The mechanical equipment is ineffective and inefficient and in need of a complete replacement. The current equipment is original to the 2001 upgrades.
2. Primary Settling Tanks: The mechanical equipment is at the end of its design life but has remaining useful life. The current equipment is original to the 2001 upgrades.
3. Aeration Tanks: The mechanical equipment is at the end of its design life but has remaining useful life. The current equipment is original to the 2001 upgrades.
4. Final Settling Tanks: The mechanical equipment is at the end of its design life but has remaining useful life. The current equipment is original to the 2001 upgrades.
5. Disinfection System: The disinfection equipment is at the end of their design and useful life. Litchfield WPCA staff is currently in the process of replacing the existing UV system. The current equipment is original to the 2001 upgrades.
6. Process Pumping: The mechanical equipment is at the end of its design life. The configuration of the return sludge pumping system includes hydraulic bottlenecks that limit the withdrawal and transfer capacity. The current equipment is original to the 2001 upgrades.
7. Sludge Thickening: The mechanical equipment is at the end of its design life but has remaining useful life. The current equipment is original to the 2001 upgrades.
8. Electrical Systems: The electrical equipment is at the end of its design life but has remaining useful life. The current equipment is original to the 2001 upgrades.

d) Financial Status of any Existing Facilities: (Note: Some agencies require the owner to submit the most recent audit or financial statement as part of the application package.) Provide information regarding current rate schedules, annual O&M cost (with a breakout of current energy costs), other capital improvement programs, and tabulation of users by monthly usage categories for the most recent typical fiscal year. Give status of existing debts and required reserve accounts.

The Town of Litchfield utilizes an Enterprise Fund for its wastewater utility. The revenues for the Enterprise Fund are generated through a sewer user fee system based on a fixed-fee per equivalent dwelling unit (EDU). The revenues are utilized for funding the annual operation and maintenance (O&M) costs of the wastewater utility. The current sewer charge is $408 per EDU.

e) Water/Energy/Waste Audits: If applicable to the project, discuss any water, energy, and/or waste audits which have been conducted and the main outcomes.

Energy efficiency and renewable energy projects are critical to the sustainability of any utility system. Although much of the Project is focused on upgrades to address permitting requirements to accommodate flows from WLSD, the proposed Project design phase will include an evaluation of these cost saving measures including high efficiency motors, variable frequency drives to decrease power costs, and energy rebates to mitigate capital costs.

3) NEED FOR PROJECT

Describe the needs in the following order of priority:

a) Health, Sanitation, and Security: Describe concerns and include relevant regulations and correspondence from/to federal and state regulatory agencies. Include copies of such correspondence as an attachment to the Report.

The Litchfield WPCF does not have a history of regulatory violations, and is not subject to any orders from regulatory agencies. The majority of the health and sanitation concerns for the proposed Project are related to the WLSD WPCF, and its 1989 Consent Order for its subsurface discharge permit, as described in the PER dated March 25, 2020. The proposed Project is required to address these issues at the WLSD WPCF, and ensure sufficient capacity at the Litchfield WPCF to accommodate flows from its current and future sewer users, as well as WLSD.

b) Aging Infrastructure: Describe the concerns and indicate those with the greatest impact. Describe water loss, inflow and infiltration, treatment or storage needs, management adequacy, inefficient designs, and other problems. Describe any safety concerns.

The Litchfield WPCF was constructed in 1970 and upgraded in 2001. The majority of the mechanical equipment at the plant is at the end of its design life but has remaining useful life. The Litchfield collection system is prone to excessive infiltration and inflow, which puts additional strain on the WPCF and its mechanical equipment. The interceptor sewer, that conveys 100% of flows from Litchfield sewer users, is prone to surcharging during wet weather events. The manual bar rack at the headworks frequently clogs, causing a hydraulic bottleneck into the interceptor sewer.

c) Reasonable Growth: Describe the reasonable growth capacity that is necessary to meet needs during the planning period. Facilities proposed to be constructed to meet future growth needs should generally be supported by additional revenues. Consideration should be given to designing for phased capacity increases. Provide number of new customers committed to this project.

The Litchfield WPCF is a regional facility the accepts flows from the Town of Litchfield and Town of Morris. The WPCF has a current average daily flow of 0.504 MGD. A breakdown of the current and proposed flows is provided in the Table 1 below. The Litchfield buildout (approximately 300 EDU's) is based on information provided by the WPCA.

Table 1: Current and Proposed Flows – Litchfield WPCF

Flow Constituent	Current Flow (gpd)	Future Flow (gpd)	Design Flow (gpd)
Litchfield Residential	453,800	-	453,800
Litchfield Septage	5,400	-	5,400
Industry #1 (Arethusa Dairy)	6,650	-	6,650
Industry #2 (Distillery)	550	-	550
Morris Residential	37,600	-	37,600
Future Litchfield Residential (300 EDUs)	-	56,600	56,600
Future Morris (Up to IMA Allocation)	-	37,400	37,400
Proposed WLSD IMA Allocation	-	150,000	150,000
Remaining NPDES Reserve Flow	-	-	52,000
Total	**504,000**	**244,000**	**800,000**

We projected the future flow and pollutant loadings at build-out conditions by estimating average dwelling and per-capita unit generation rates from existing data, and applying them to the projected sewer connections and estimated population at build out. Specifically, we developed per-connection and per-capita unit generation rates based on the guidelines provided by TR-16.

The future flow is important for understanding the need for ongoing I/I removal, and for determining the conceptual size and hydraulic capacity of the proposed facilities for the evaluation of local and regional alternatives. Pollutant loads are important for understanding the treatment requirements for evaluation of the local alternative. The flows and loads data were used to facilitate the comparison of local WPCF upgrades versus regional wastewater alternatives.

0 1,250 2,500 5,000 7,500 Feet

N

Plant Pump Station

Goshen

Torrington

Litchfield

Morris

WPCF

WPCF

Legend

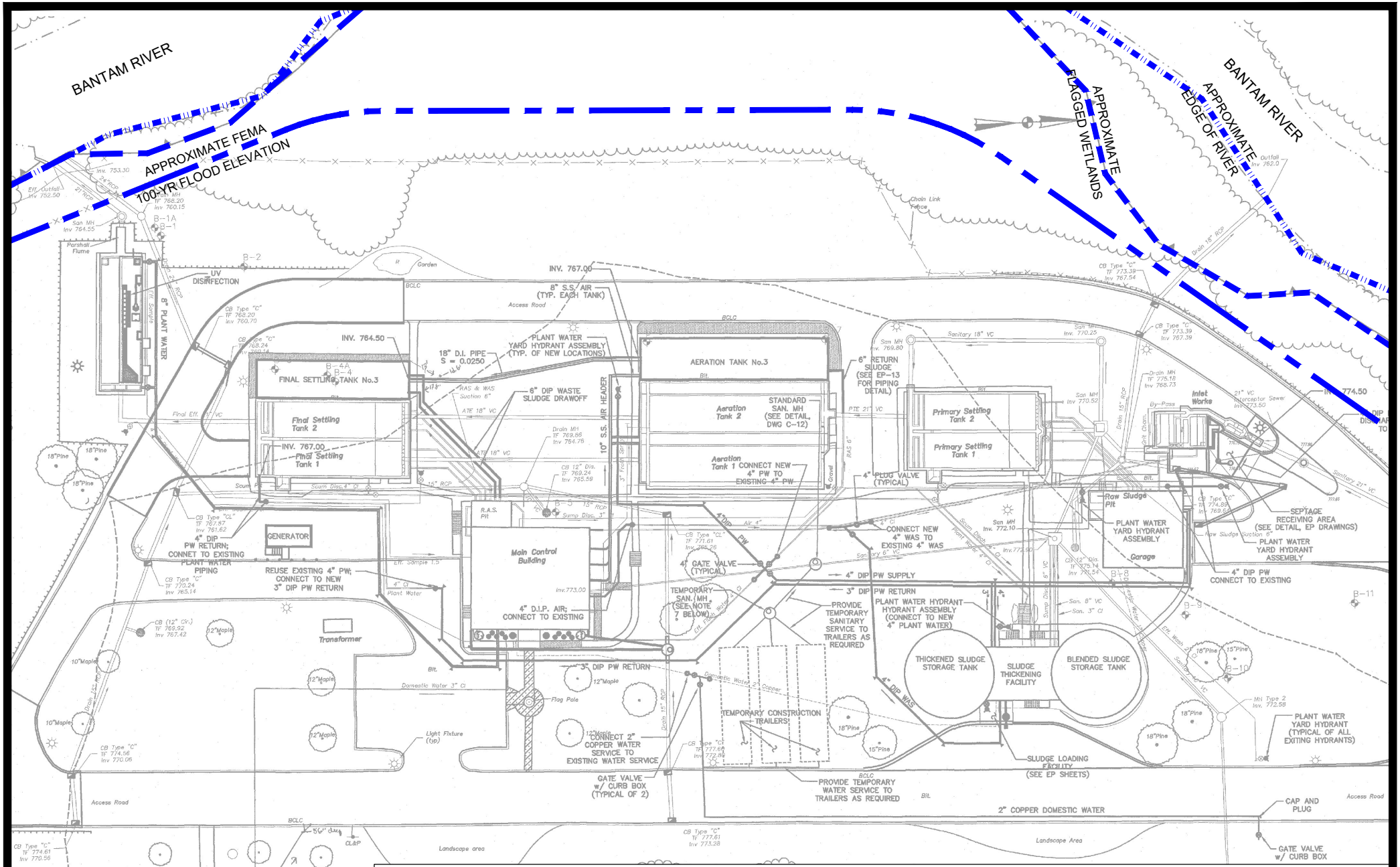
- WPCF — Torrington WPCF
- WPCF — Litchfield WPCF
- WPCF — WLSD WPCF
- Parcel

Woodridge Lake Sewer District

Figure 1
Geographic Overview of PER Components

DPC Engineering, LLC

JOB NO: WLSD	DRAWN BY: GF
DATE: April 2020	



EXISTING CONDITIONS PLAN

SCALE: 1" = 50'

LITCHFIELD WATER POLLUTION CONTROL FACILITY	DPC Engineering, LLC
FIGURE 2	
USDA-RD: PER	April 2020