

Wastewater Treatment Plant (WWTP) Modernization

Downtown Business District Sewer Feasibility Analysis

- ✓ **Findings / Products**
- ✓ **Near Term Proposed Efforts**
- ✓ **Long Term Vision**

Holliston, MA Board of Selectmen
Progress Report
November 7, 2022

Environmental Engineers/ Consultants

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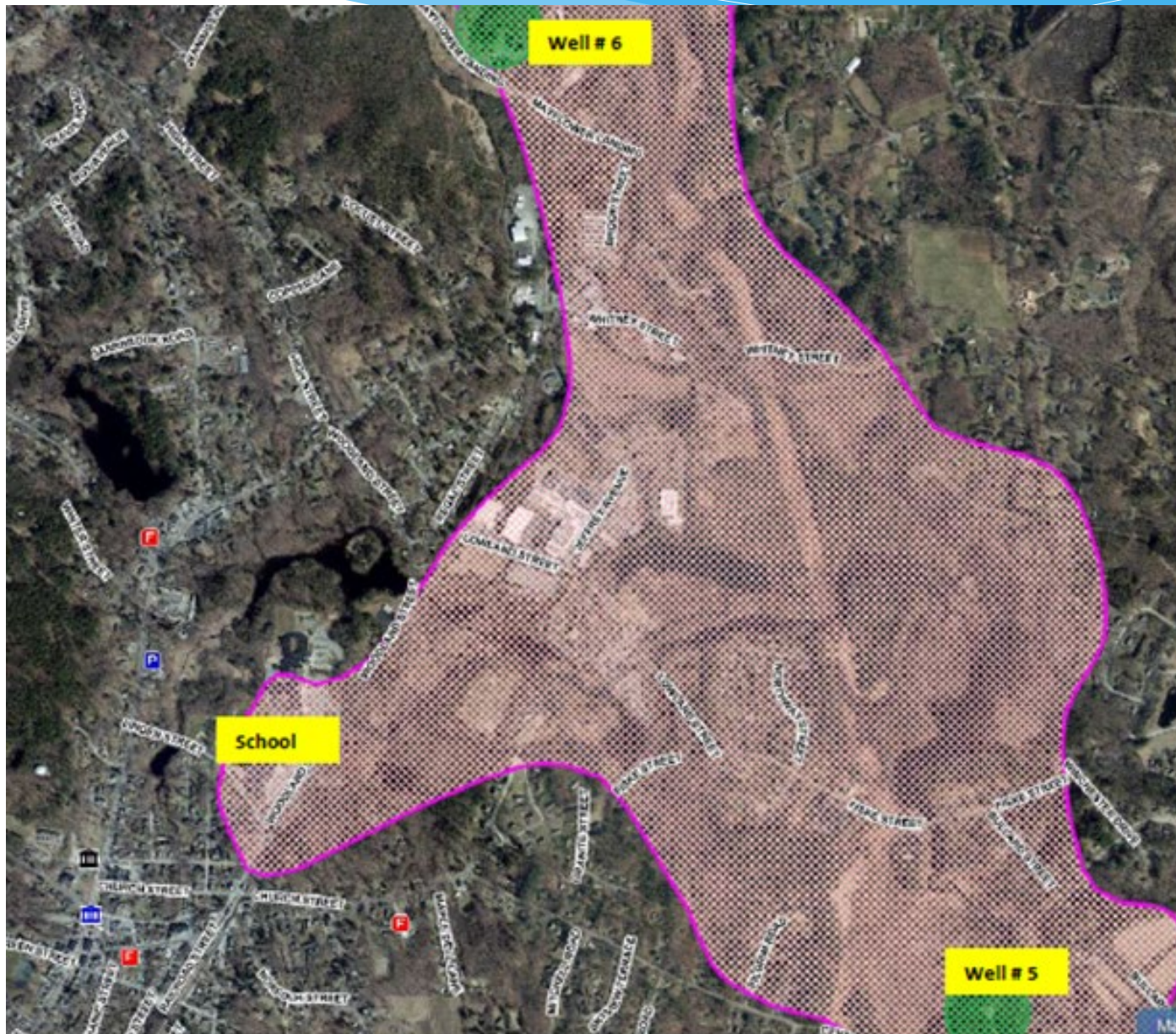
Work Completed To Date & Products

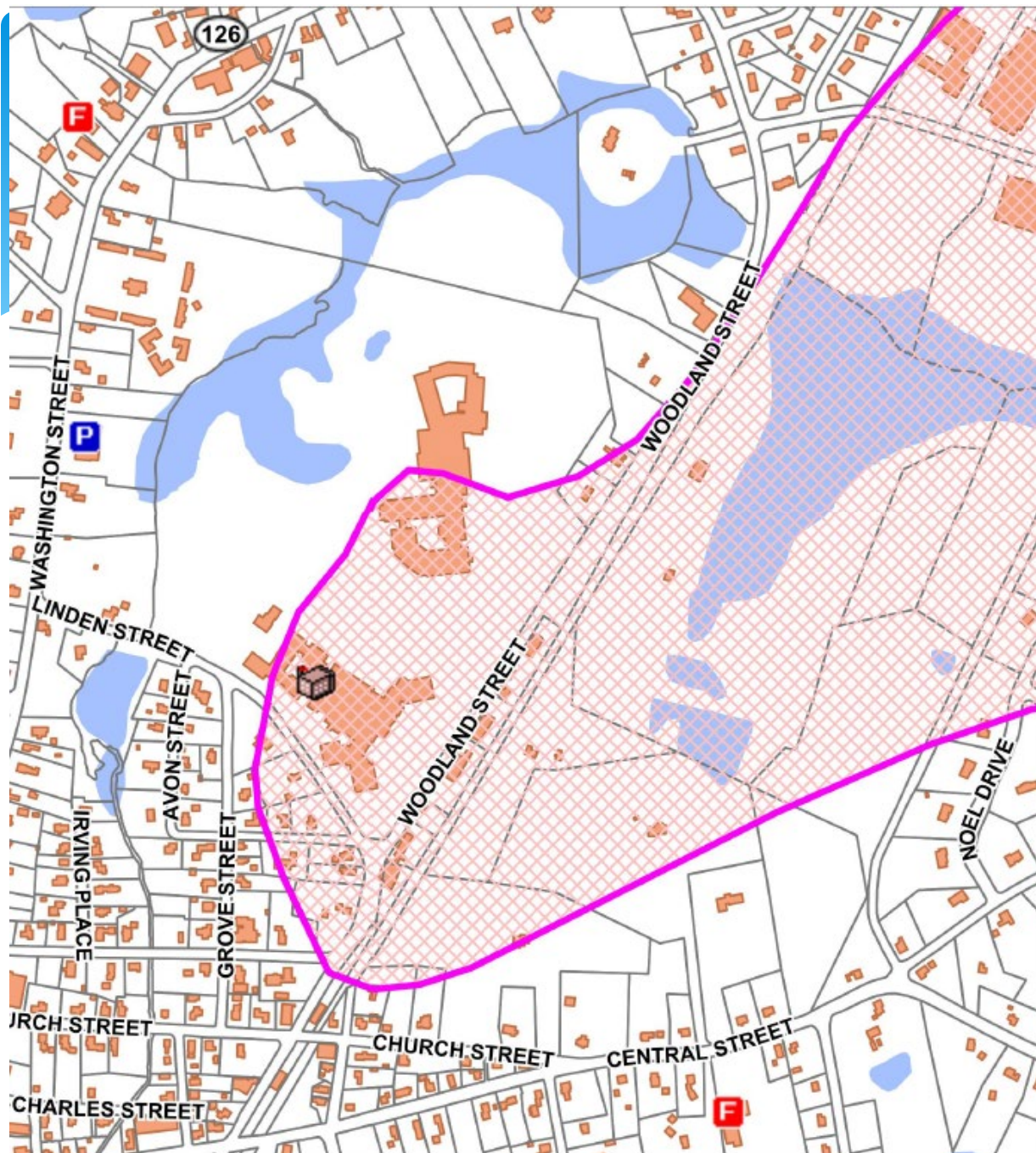
1. Hydrogeologic Disposal Capacity at Woodland Street School
 - October 26, 2022 Updated Report
 - MassDEP Review – Oct. 6, 2022
2. Sewer Feasibility Analysis
 - Sewer Feasibility Report with budgets
 - Plan and profile of preliminary sewer route
3. WWTP Modernization
 - Immediate Improvements Report – Sept. 23, 2022
 - WWTP Assessment Report
 - AutoCAD Drawings creation
 - Drainfields inspections
 - Data gathering & analysis
 - Directed numerous operations changes to improve performance

Hydrogeologic Disposal Capacity at Woodland Street School

- **Very promising**
 - Add'l Soils / GW testing info needed to confirm estimated capacities
 - Capacity dictated by Darcy's Law $Q \text{ (gpd)} = KiA$, with consideration of mounding constraints
 1. Hydraulic Conductivity, K = King Issue, from slug tests
 2. Surface Discharge Cross-Sectional Area (A)– from GW elevation data
 3. Slope (i) from GW elevation data
 4. Mounding analysis with new dataDEP agrees that utilizing USGS Report of $K = 130 \text{ ft/day}$ for site
Site capacity, initial estimate, $> 100,000 \text{ gpd}$
- **Most of School Site within Zone II – High treatment requirements**
- **Target minimum capacity 85,000 gpd**
 - Schools 15,000 gpd
 - Existing Downtown 30,000 gpd
 - Add'l downtown with sewer 40,000 gpd







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Permit Requirements

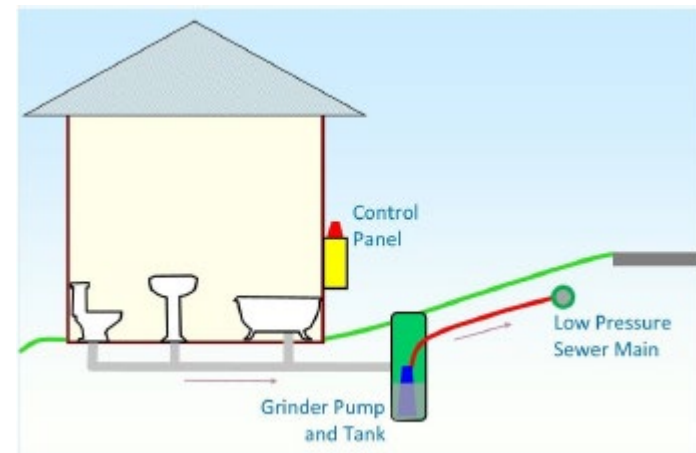
Current Permit	Groundwater Discharge Into Zone II - Permit Treatment Requirements		
		Maximum Effluent Quality	Maximum Effluent Quality
	Regulation	5.10-4A(a)	5.10-4A(c)
< 30 mg/L	Total Suspended Solids (TSS)	< 10 mg/L	< 5 mg/L
	Turbidity	< 5 NTU	< 2 NTU
	Total Organic Carbon (ToC)	3 mg/L *	1 mg/L
	Disinfection - Fecal Coliform	< 200 colonies/100 mL	< 14 colonies/100 mL
< 30 mg/L	BOD		< 10 mg/L
< 10 mg/L	Total Nitrogen (TN)		< 5 mg/L
< 10 mg/L	Nitrate-Nitrogen (NO ₃ -N)		< 5 mg/L
>6.5 & < 8.5	pH		
< 15 mg/L	Oil and Grease (O & G)		
	* Unless agreed to otherwise by DEP		

Sewer Feasibility Analysis

- Low pressure collection system recommended
- Cross – country vs street sewer options significantly affect cost
- Technology options - Septic tank effluent vs grinder pump

Next Steps

1. Allocation / cost of sewer capacity needs to be addressed once capacity is confidently defined.
2. Define development potential property by property



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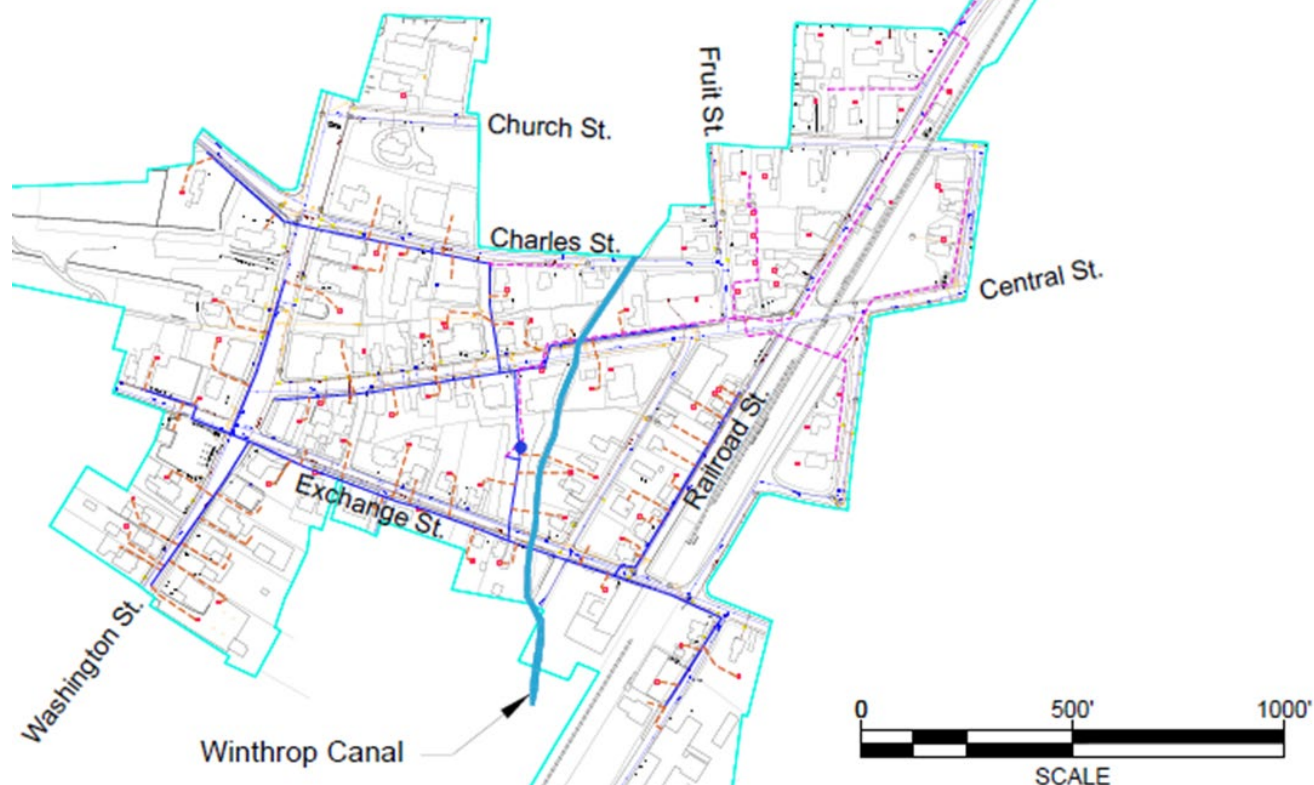


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LEGEND

To Woodland Street WWTP

STUDY AREA BOUNDARY	
PROPOSED GRAVITY SEWER	
PROPOSED PRESSURE SEWER	
SEPTIC TANK	
PUMP STATION	
HOUSE CONNECTION - GRAVITY	
HOUSE CONNECTION - PRESSURE	
EXISTING WATER LINE	
EXISTING GAS LINE	
DRAINAGE PIPING	



WWTP Modernization

- a. **WWTP – Immediate Improvements Report**
 - \$450,000 Budget
 - b. **Major improvements / additions will be needed for connecting downtown.**
 - i. Minimum expected flow is 85,000 + gpd
 - ii. Zone II treatment requirements
 - 1. recalibrate Zone II boundaries?
 - c. **Permitting Process with MassDEP**
 - 1. Hydrogeo Report & MODFLOW computer simulation
 - 2. Engineering Plan of proposed treatment & disposal system
 - 3. Plans & Specifications
- Concurrently**
Environmental Permitting
MEPA

With Add'l Capacity (gpd)	40,000
Expansion Potential for only one use	
Reastuarant Seats	1,100
Retail (sf)	800,000
Office Space (sf)	533,300
Residential Bedrooms	400

Construction Budget		Eng	Total
Equipment	Material	Est. Design + CE + Start	Est. Capital Costs
Splitter Box	\$ 8,000	\$ 2,840	\$ 18,440
Ultrasonic Level Transducer	\$ 3,000	\$ 3,450	\$ 10,650
Alk	\$ 13,400	\$ 4,390	\$ 26,470
SCADA	\$ 90,000	\$ 26,400	\$123,400
Piping	\$ 1,000	\$ 6,640	\$ 19,840
Anox. Mixing	\$ 5,000	\$ 3,840	\$ 21,840
Effl Flow	\$ 17,000	\$ 6,930	\$ 36,930
Analytical Equip	\$ 4,800	\$ 3,400	\$ 11,560
Instruments	\$ 32,800	\$ 5,570	\$ 48,530
Sampler	\$ 9,000	\$ 2,550	\$ 14,550
Misc	\$ 30,000	\$ 8,840	\$ 56,840
Spare Parts	\$ 30,000	\$ 3,600	\$ 39,600
Process Data Collection	\$ 1,000	\$ 19,760	\$ 20,760
Subtotals		\$ 98,210	\$449,410

- * Engineering Authorizations
- * Existing and Proposed

Holliston WWTP Modernization & Downtown Sewer Analysis - Budget Status			As of		
			4-Nov-22		
Description	Task Budget				
Original Agreement - WWTP Modernization & Sewer Analysis			Expended	To be Authorized	Unexpended
WWTP Modernization	\$ 43,568		\$ 43,568		
Downtown Sewer Connect Analysis	\$ 40,908		\$ 40,908		
Original Agreement Subtotal		\$ 84,476			
Amendment # 1 - Borings, Hydrogeo analysis & 6 GW MWs					
School WW Disposal Capacity Estimates	\$ 35,000		\$ 35,000		
Install Six (6) GW Monitoring Wells	\$ 18,000				\$ 18,000
Amendment # 1 Subtotal		\$ 53,000			
Amendment # 2 - 8 GW MWs					
Install eight (8) groundwater monitoring wells	\$ 24,989			\$ 24,989	
Amendment # 3 Subtotal		\$ 24,989			
Amendment # 3 Slug tests, Monitor GW 6 months & DEP Report					
Perform slug tests / calculate hydraulic cond		\$5,636			
Survey the Top of Casings (ToC) of wells		\$4,309			
Monitor GW elevations (6) months		\$12,707			
Update Site Capacity Report w GW flow direction		\$21,280			
Amendment # 3 Subtotal		\$ 43,931		\$ 43,931	
Amendment # 4 WWTP Immediate Improvements					
Plans & Specifications		\$30,565			
Equipment / Materials Procurement		\$14,725			
Process Data Collection & Analysis		\$22,497			
Construction Engineering & Start – Up Services		\$27,565			
Amendment # 4 Subtotal		\$ 95,351		\$ 95,351	
Total		\$ 301,748	\$ 119,476	\$ 164,272	\$ 18,000
				Total	\$ 301,748

Potential Add'l Efforts		Prelim. Budget
1	MODFLOW + MassDEP Permit	\$ 50,000
2	Development Potential	\$ 30,000
3	Zone II redo	\$ 10,000
4	Program Manage	\$ 10,000

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Long Term Vision

Sewered Downtown + Upgraded WWTP & Disposal/Reuse

Critical Path activities

1. **Disposal Capacity Definition** – good confidence after current proposed efforts completed. Best confidence after MODFLOW computer simulation.
2. **Zone II redo** – can be combined with MODFLOW site analysis
3. **Develop Project Implementation Master Plan**
Engineering, environmental, financing, public participation, etc. – Scope of Work, Budget & Schedule
4. **Downtown Development Potential** – initiate by early January

Questions / Discussion

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