Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

LACONIA VILLAGE SEWER/WATER MASTER PLANNING CAPACITY

March 28, 2025 *(rev1 May 30, 2025)*

SEWER DEMAND

Sewer demand and offsite sewer capacity for the proposed Laconia State School project is summarized below. Flow Calculations (attached) are based on NHDES Table 1008-1.

Current flow.

Dwinnell building (E-911 dispatch center):
50 employees daily X 15 GPD / Employee = 750 GPD plus infiltration from leaking sewer network
This building will be vacated prior to Phase 1 construction and thus can be disregarded in full-build calculations.

Phase 1: Daily Flow:

49,800 GPD Usage + 500 GPD Infiltration = 50,300 GPD
50,300 GPD Average x peaking factor = 6[1]; thus Peak Flow = 0.47 cfs
8" Pipe Capacity (see below) = 1.6 cfs > 0.47 cfs = **OKAY**

Full Build: Daily Flow:

49,800 GPD + 577,000 GPD = 627,300 GPD Usage + 10,000 GPD Infiltration = 637,000 GPD
637,000 GPD Average x peaking factor = 4.4[1]; thus Peak Flow = 4.3 cfs
12" Pipe Capacity (see below) =6.6 cfs < 4.3 cfs = **OKAY**

SEWER CAPACITY

Existing Offsite Sewer to Opechee Interceptor

The sewer for the site crosses Parade Road near Old N Main Street, as shown in plan and profile views on the following page. The minimum pipe slope is in the 8" sewer upstream of the crossing from Sewer Shed to SMH#505. This pipe is an 8" PVC sewer at slope S=0.014 ft/ft. The next flattest pipe is S=0.028.

Existing Capacity of 8" sewer from Shed to SMH-505 at S=0.014 ft/ft

- 8" Pipe Capacity at S=0.014 (80% Manning's full flow) = 1.6 cfs

Consider rebuild pipe @10" sewer from Shed to SMH-505 at S=0.028 ft/ft

- 10" Pipe Capacity at S=0.028 (80% Manning's full flow) = 4.1 cfs

Consider rebuild pipe @12" sewer from Shed to 48" Interceptor at S=0.028 ft/ft

- 12" Pipe Capacity at S=0.028 (80% Manning's full flow) = 6.6 cfs

SUMMARY

Phase 1 - Existing offsite sewer capacity to WRBP Opechee Interceptor is sufficient for Phase 1.

Full-Build - Offsite sewer to be replaced with 12" PVC under Parade Road to Opechee Interceptor.

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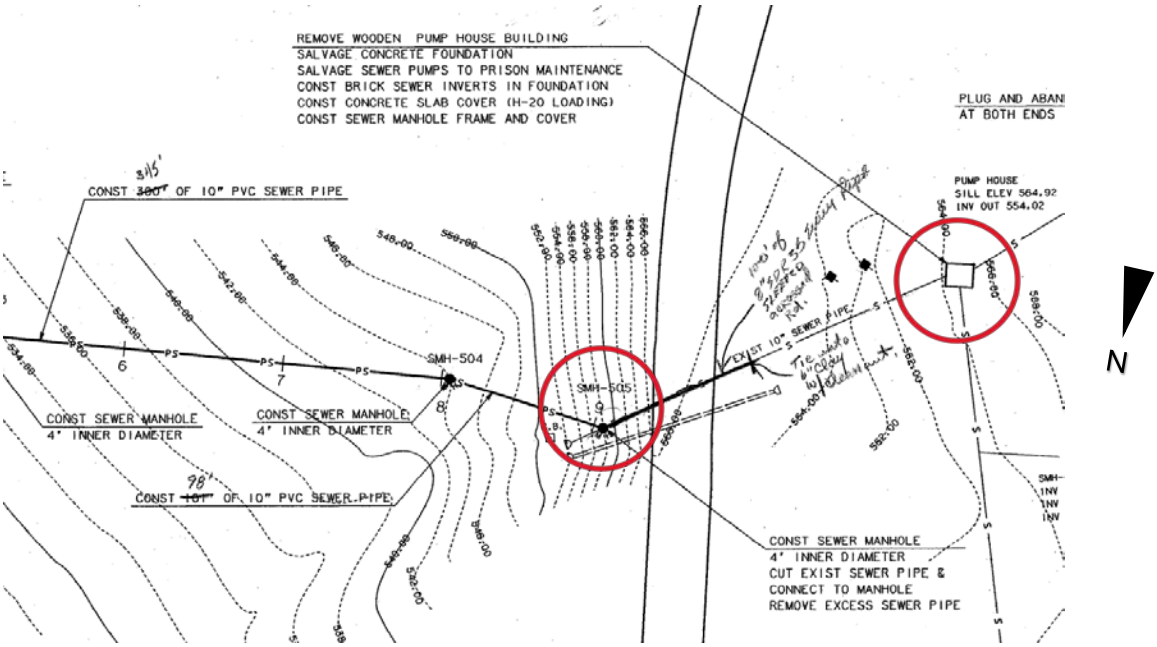
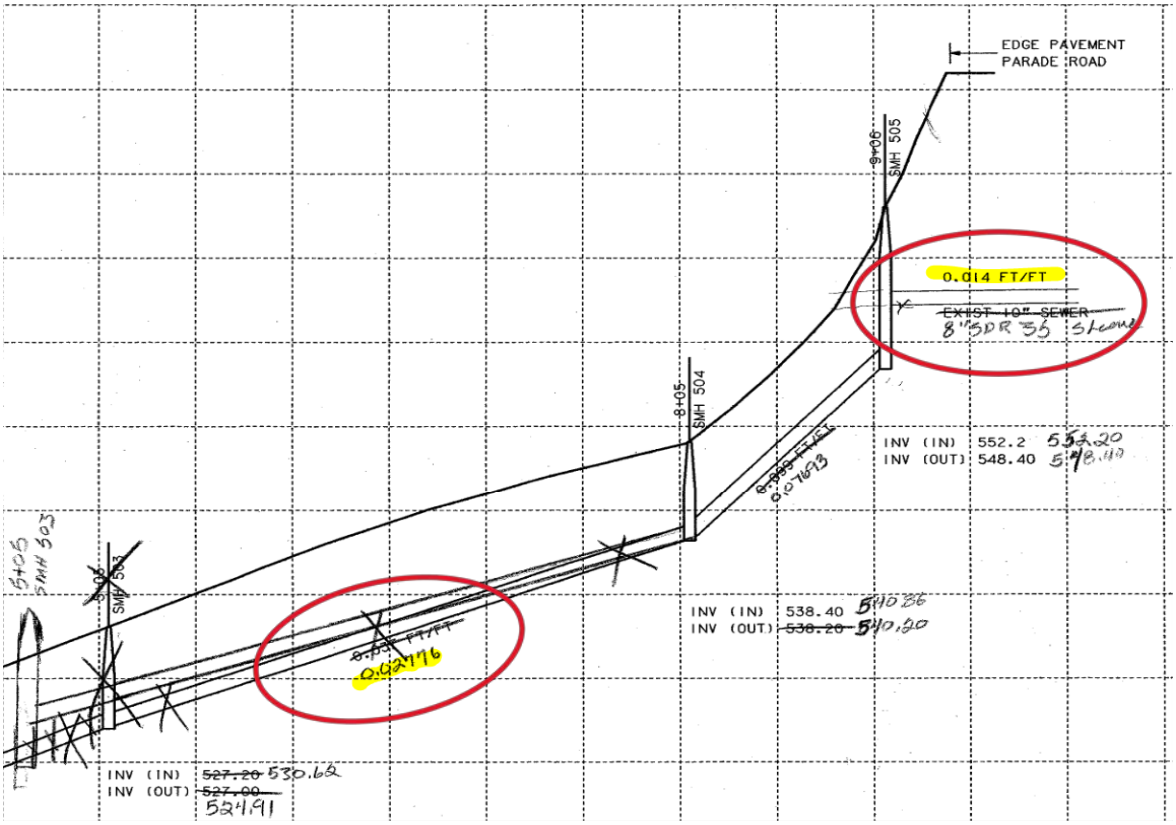
[1] Peaking Factors based on Figure 2.1 of TR-16 "Guides for the Design of Wastewater Treatment Works", New England Interstate Water Pollution Control Commission, 2011 Edition

1.) Flow Calculations (based on Env-Wq 1008.03 Table 1008-1) **See Site Layout**

UNITS	USE		FLOW RATE		FLOW	
65,000	S.F. Supermarket with Meat Department with Garbage Grinder (Phase 1)		11	GPD / 100 S.F.=	7,150	GPD
25,000	S.F. Retail (Dry Goods) (Phase 1)		5	GPD / 100 S.F.=	1,250	GPD
45	Employees. Retail (Dry Goods) (Phase 1)		10	GPD / employee=	450	GPD
60	1 Bedrooms Residential Multifamily - Senior Units (Full Build)		225	GPD / BR =	13,500	GPD
38	1 Bedrooms Residential Multifamily Units (Full Build)		225	GPD / BR =	8,550	GPD
28	2 Bedrooms Residential Multifamily Units (Full Build)		150	GPD / BR =	8,400	GPD
14	2 Bedrooms Residential Duplex Units (Phase 1)		150	GPD / BR =	4,200	GPD
14	3 Bedrooms Residential Duplex Units (Phase 1)		150	GPD / BR =	6,300	GPD
				Phase 1 Sub Total	**49,800**	**GPD**
30,000	S.F. Retail (Dry Goods) (Phase 2 & 3)		5	GPD / 100 S.F.=	1,500	GPD
55	Employees. Retail (Dry Goods) (Phase 2 & 3)		10	GPD / employee=	550	GPD
60,000	S.F. Office (Medical) (Phase 2)		5	GPD / 100 S.F.=	3,000	GPD
40,000	S.F. Office (Small) (Full Build)		5	GPD / 100 S.F.=	2,000	GPD
500	participants, Recreation (No Showers, i.e. Bowling) (Phase 2)		5	GPD / participant	2,500	GPD
125	BR Hotel Hospitality (Phase 3)		200	GPD / BR =	50,000	GPD
15	Employees Hotel Hospitality (Full Build)		10	GPD / employee=	150	GPD
335	seats, Civic (Civic Club) (Full Build)		10	GPD/Seat =	3,350	GPD
280	2 Bedrooms Residential Townhouse Units (Full Build)		150	GPD / BR =	84,000	GPD
36	2 Bedrooms Residential Duplex Units (Full Build)		150	GPD / BR =	10,800	GPD
36	3 Bedrooms Residential Duplex Units (Full Build)		150	GPD / BR =	16,200	GPD
208	1 Bedrooms Residential Triplex/Quadplex Units (Full Build)		225	GPD / BR =	46,800	GPD
208	2 Bedrooms Residential Triplex/Quadplex Units (Full Build)		150	GPD / BR =	62,400	GPD
83	1 Bedrooms Residential Courtyard/Cottage Court Units (Full Build)		225	GPD / BR =	18,675	GPD
83	2 Bedrooms Residential Courtyard/Cottage Court Units (Full Build)		150	GPD / BR =	24,900	GPD
20	4 Bedrooms Residential Live/Work Units (Phase 3)		150	GPD / BR =	12,000	GPD
190	1 Bedrooms Residential Multifamily - Senior Units (Full Build)		225	GPD / BR =	42,750	GPD
262	1 Bedrooms Residential Multifamily Units (Full Build)		225	GPD / BR =	58,950	GPD
455	2 Bedrooms Residential Multifamily Units (Full Build)		150	GPD / BR =	136,500	GPD
				Future Build Sub Total	**577,025**	**GPD**
	4" Sewer Infiltration Allowance	300 / inch pipe diameter / mile or 0.23 per lf	4000	LF	920	GPD
	6" Sewer Infiltration Allowance	300 / inch pipe diameter / mile or 0.34 per lf	2000	LF	680	GPD
	8" Sewer Infiltration Allowance	300 / inch pipe diameter / mile or 0.45 per lf	18666	LF	8,400	GPD
				Infiltration Allowance Sub Total	**10,000**	**GPD**
			Daily Average Flow =	**Total**	**636,825**	**GPD**



PLAN



PROFILE

Source: “SEWER REPLACEMENT PLANS”, Project: 97418, Lakes Region Development Center, NHDOC, Project 97418, dated 03-31-1995, marked “As-Built Plans” Sheets C1 and C2.

WATER DEMAND

Water demand for the proposed Laconia State School project are based on sewer demand calculations and are summarized below. Flow calculations are based on sewer flows per NHDES Table 1008-1 and are attached to this Memo.

Current Usage.

Dwinnell building (E-911 dispatch center):
50 employees daily X 15 GPD / Employee = 750 GPD.
This building will be vacated prior to Phase 1 construction and thus can be disregarded in full-build calculations.

Phase 1: Daily Usage:

48,300 GPD Average Usage x 1.1 = 53,300 GPD
Average x peaking factor (6) = 225 gpm peak flow

Full Build: Daily Flow:

627,000 GPD Average Usage x 1.1 = 690,000 GPD
Average x peaking factor (4.4) = 2,100 gpm

WATER SUPPLY

Existing Offsite Water Supply

Preliminary discussions with the Laconia Water Department provided the following information relative to existing water supply conditions at the site:

- The site is served by a single 6"-8" DI pipe that crosses Parade Road and connects to a 12" ductile iron pipe circa 1996 from downtown Laconia up Old N. Main Street to Parade Road.
- A 10" cast iron pipe circa 1957 runs north along Parade Road from Old North Main Street to Anthony Drive, where it joins another 12" cast iron pipe circa 1966. The 12" pipes are believed to be in acceptable condition, but the 10" cast iron pipe is approaching end of life.
- The 6"-8" pipe needs to be replaced across Parade Road with a 12" DI pipe to provide sufficient water to serve Phase 1 development.
- There is sufficient water capacity to service at least the Phase 1 portion of the site, although larger buildings in Phase 1 may require a fire pump. Pressure may be marginal for multi-story buildings and the higher-elevation phases of the project.
- The two existing water tanks on the site are not suitable for potable water, although one tank is in service for irrigation water to the Robbie Mills sports complex across Eastman Road.
- The Water Department recommends a new 1MG water tank with a small pump station to house booster pumps and controls be installed at or near the existing tank location (highest elevation on site).

SUMMARY:

Phase 1. The new 12" pipe across Parade Road will accommodate Phase 1 peak water demand. Hydrant flow tests have been performed, and initial results appear favorable. Once the final report is available, adequacy of flow for Phase 1 can be confirmed.

Full-Build 2. With new 1 MGD water tank in place, adequate water supply can be assured by selection of appropriate tank booster pump to accommodate peak flow rate of the development.