

MEMORANDUM

TO: David Moore, Tavis Austin, John Boisvert
FROM: Chris Perkins, Weston & Sampson
DATE: January 23, 2019
SUBJECT: Stratham, NH – Route 108 Corridor Wastewater Study
Alternatives Analysis and Planning Level Costs Memo - **FINAL**

The purpose of this memorandum is to summarize the revised sewer design alternatives discussed between Weston & Sampson and the Town of Stratham (the town) on October 29, 2018 and to summarize an additional sewer design alternative to transmit waste water to Newmarket. In addition to the revised sewer design alternatives, updated cost estimates to provide water service to Stratham from previously identified alternatives are also provided in this memo.

Please refer to the previous memorandum from Weston & Sampson, dated October 22, 2018, for discussion on the topics of the Initial Subsurface Investigation, Wastewater Flow Development, and Pipe Sizing.

Introduction

The focus of our study has been to assess the options for wastewater collection and potable water service along the Route 108 corridor from Route 101 to Winnicutt Road. As shown in the attached figures, this corridor was divided into three geographic regions; Phases A, B, and C. Phase A encompasses the area from the intersection of Route 108 and Route 101 to Frying Pan Lane, Phase B includes the area from Frying Pan Lane to Bunker Hill Road and Phase C is the area from Bunker Hill Road to Winnicutt Road. After presenting our initial findings to the town on October 29, 2018, the town requested we divide Phase A into two sections and assess what the project costs would be to provide sewer and water service to each section as follows:

- Phase A1 - Route 108 from Route 101 to Market Basket
- Phase A2 - Route 108 from Market Basket to Frying Pan Lane

The following provides a summary of our findings.

Revised Sewer Service Area Findings – October 2018

Recent discussions between the town and Weston & Sampson regarding the proposed effluent disposal infrastructure at Stevens Field and other top-rated disposal sites identified in the disposal site-screening

assessment presented to the town under separate cover lead to the revised alternatives presented here in. After presenting our preliminary findings to the town on October 29th, the town requested we provide a revised conceptual plan and costing for a wastewater system as follows:

- Preliminarily site wastewater treatment facilities at the Labonte property;
- Provide a wastewater collection system along Route 108 from Route 101 to Market Basket;
- Preliminarily site the effluent disposal facilities at either the Bell & Flynn property on Bunker Hill Avenue or the Smyk property recently bequeathed to the town at the corner of Route 108 and Bunker Hill Avenue. These two conceptual effluent disposal routing designs are called Alternative 1 and 2, with disposal at Bell & Flynn and at Smyk respectively.

Alternatively, the town also requested we provide a conceptual plan for collecting wastewater from Route 101 to Market Basket and conveying the untreated wastewater to the headworks of the Exeter wastewater treatment plant (WWTP). The conceptual routing design to Exeter is called Alternative 3.

Please note, the concept which pumped flows to Newfields has been eliminated from consideration at this time.

Table 1 provides estimates for the current and projected wastewater flows in the project area.

Table 1: Estimated Current and Projected Buildout Flows by Project Phase

Project Area	Estimated Current Flow gallons per day (gpd)	Projected Buildout Flow gallons per day (gpd)
Phase A1 – Route 101 to Market Basket	43,900	210,000
Phase A2 – Market Basket to Frying Pan Lane	9,300	110,000
Phase B-Frying Pan to Bunker Hill	10,700	120,000
Phase C-Bunker Hill to Winnicutt	19,700	60,000
TOTAL	83,600	500,000

Revised Routing Descriptions

Revised Alternative 1 as depicted in Figure 1 utilizes the Labonte property as the location for a proposed WWTP to serve the town of Stratham and the Bell & Flynn property as the central disposal field location. The Labonte property would allow space for a phased approach for a WWTP to expand along with development of the Route 108 corridor. Publicly available information regarding ground elevation contours suggest that flow collection and routing could utilize gravity piping from Route 108 to the Labonte property, via West Road and through the existing natural gas easement along Route 101. A pump station at the Labonte property would pump treated effluent to the disposal site at Bell & Flynn. Please note, a field investigation program is necessary to confirm if the Bell & Flynn site is capable of receiving treated effluent for groundwater discharge.

Revised Alternative 2 as depicted in Figure 2 has the same collection, routing and treatment siting as Alternative 1, but the effluent discharge would be sited at the Smyk property instead. The logistics of siting

the discharge field at the Smyk property may be difficult as it is understood that covenants exist that prevent the town from removing trees from the property. The town owns property that abuts the Smyk property and could explore locating the field on the abutting property. In either case, a field investigation program is necessary to confirm if the Smyk property or surrounding area is capable of receiving treated effluent for groundwater discharge. Installation of the required infrastructure for the disposal field will be further assessed when the required discharge parameters are better understood.

In both Alternative 1 and 2, the sequenced approach to a conceptual phased construction program would be as follows:

Initial Route 108 Sewer Project:

- Phase A1:
 - Construction of a gravity sewer main from Market Basket to the Labonte property.
 - Construction of a treatment facility at Labonte property.
 - Construction of a groundwater discharge field at either Bell & Flynn or the Smyk property.

Subsequent Route 108 Sewer Project(s):

- Phase A2:
 - Extend the existing sewer from Market Basket to Frying Pan Lane via a gravity sewer main on Route 108.
 - Additional construction of required treatment plant infrastructure at Labonte property as necessary to account for the buildout of Phase A flows, and construction of additional treated effluent disposal field infrastructure as needed.
- Phase B:
 - Construction of gravity sewer pipe from Frying Pan Lane to Bunker Hill Avenue.
 - Additional construction of required treatment plant infrastructure at Labonte property as necessary to serve the flows from Phases B full buildout., and construction of additional treated effluent disposal field infrastructure as needed.
- Phase C:
 - Construction of gravity sewer pipe from Bunker Hill Avenue to Winnicutt Road .
 - Construction of a pump station near the traffic circle, and a forcemain from the traffic circle to Bunker Hill Avenue (connect into the existing gravity sewer at this point).
 - Additional construction of required treatment plant infrastructure at Labonte property as necessary to serve the flows from Phases C full buildout, and construction of additional treated effluent disposal field infrastructure as needed.

Revised Alternative 3 as depicted in Figure 3 utilizes a gravity main on Route 108 which travels from Market Basket down Route 108, West Road, through the existing natural gas easement on Route 101, underneath Route 101 to the Labonte property, similar to the gravity main in Alternative 1 and 2. However, instead of a treatment plant at the Labonte property, a pump station sited at either the Labonte property or in the area behind Shaw's would be utilized to transmit flow under the Squamscott River to the headworks of the Exeter WWTP. The pump station sited at the Labonte property was used to cost this alternative, however, further investigation should be conducted to identify if the Shaw's site is a better alternative. Please note, crossing Route 101 and the Squamscott River would entail horizontal directional drill methods of pipe installation or other types of trenchless technology.

Additional Routing Alternative – December 2018

Shortly after the November 8, 2018 draft memorandum was submitted to the town, it was requested that Weston & Sampson develop a routing plan and planning-level cost estimate for an additional alternative. This new alternative; Alternative 4, modeled a design in which all sewer flows from Phase A and B would be conveyed south via gravity sewer to a medium sized pump station on the Labonte property. From here, the Phase A and B flows would be pumped north to a large pump station located at the traffic circle at the intersection of Route 33 and Route 108. Sewer flows from Phase C would be conveyed north via gravity sewer to the traffic circle pump station. All Phase A, B and C flows would then be pumped from the traffic circle, predominantly along Route 108 in Stratham, Newfields and Newmarket to Newmarket's WWTP for treatment and disposal.

Alternative 4 is designed to accommodate the same estimated flows as presented in Table 1 of this memorandum. The sequence of construction phasing in this alternative would be as follows:

Initial Route 108 Sewer Project:

- Phase A1:
 - Construction of a gravity sewer main from Market Basket to the Labonte property.
 - Construction of a pump station facility at Labonte property.
 - Construction of a forcemain from the Labonte pump station to the Route 33/108 traffic circle.
 - Construction of a pump station at the Route 33/108 traffic circle.
 - Construction of a forcemain from the Route 33/108 traffic circle pump station to the intersection of Route 108 and New Road in Newmarket.
 - Connect to existing gravity sewer main at Route 108 and New Road intersection in Newmarket

Subsequent Route 108 Sewer Project(s):

- Phase A2:
 - Extend the existing sewer from Market Basket to Frying Pan Lane via a gravity sewer main on Route 108.
 - Additional construction of possible infrastructure upgrades at Labonte property pump station and/or the Route 33/108 traffic circle pump station as necessary to account for the buildout of Phase A flows, as needed.
- Phase B:
 - Construction of gravity sewer pipe from Frying Pan Lane to Bunker Hill Avenue.
 - Additional construction of possible infrastructure upgrades at Labonte property pump station and/or the Route 33/108 traffic circle pump station as necessary to account for the buildout of Phase B flows, as needed.
- Phase C:
 - Construction of gravity sewer pipe from Bunker Hill Avenue to the traffic circle pump station.
 - Construction of gravity sewer pipe from Winnicut Road to the traffic circle pump station.
 - Additional construction of possible infrastructure upgrades at the Route 33/108 traffic circle pump station as necessary to account for the buildout of Phase C flows, as needed.

Crossing the Squamscott River with the forcemain that follows Route 108 north to New Road in Newmarket would entail horizontal directional drill methods of pipe installation, or other trenchless technology methods, as referred to in the previous section.

Planning-Level Cost Estimate Assumptions

The planning-level costs for each phase were divided into collection/conveyance costs and treatment/disposal costs, with considerations for engineering and contingency. The collection and conveyance cost estimates utilize unit costs for the installation of sewer along each phase presented herein. The unit costs are a composite meant to include all aspects of each unit cost. For example, the cost for installing a gravity sewer includes multiple components such as the sewer main itself, service connections, manholes, earthwork, rock removal, dewatering, and paving. Major items, like proposed pump stations, have been included on their own as a lump sum cost to account for the anticipated scale of the item.

Where included, treatment and disposal costs are based on an expected level of treatment targeting effluent water quality of 30/30/10 Biological Oxygen Demand (BOD)/ Total Suspended Solids (TSS)/ Total Nitrogen (N) (all in mg/L). The effluent quality targets are based on correspondence with State of New Hampshire regulatory bodies and assessing other permit requirements of a similar nature in the State. It is assumed at this time that a numerical phosphorus limit would not be included within a discharge permit generated by the State for Stratham's effluent discharge. If more stringent effluent water quality limits are required, costs related to treatment may increase. If Stratham chooses to implement more stringent effluent limits from the onset of this project, costs can be adjusted.

Other external considerations which would impact the actual construction costs include the cost of land acquisitions or easements, NHDOT mandating the use of controlled density fill (CDF) in the sewer trench, the cost to extend 3-phase electric and natural gas piping to pump stations and treatment facility sites, or the costs of above ground pump station buildings. The costs provided were scaled to a March 2020 dollar value using Engineering News Record (ENR) guidelines. ENR analyzes the construction market and forecasts into future years the expected annual escalation of a present day construction value. The ENR index value for March 2020 is 16,977.02.

The final major component of these costs is an engineering and contingency allowance. This has been set at 25 percent. At this stage of conceptual considerations, this allowance can typically range between 20 and 40 percent. The contingency will account for items that have not been quantified under this planning level effort. For example, the need for additional pump stations once ground contours are more accurately assessed, the need for specialty dewatering techniques once groundwater conditions are more accurately gauged for localized conditions, or the need to perform more complex environmental permitting.

Neither Alternative 3 or Alternative 4 include a cost component for a negotiated tie-in fee to the Exeter or Newmarket wastewater system, respectively. Determining what Exeter or Newmarket would charge for a tie-in fee would likely depend on the loading of the anticipated flows, the initial flow quantity, the buildout flow quantity, and existing and expected permitting requirements. This tie-in fee is likely to be a large supplemental cost, on the order of several million dollars, and is likely to include an annual fee. The tie-in fee would also require the writing of and agreement to an inter-municipal agreement (IMA) for both parties. At this stage of planning, costs presented do not include annual acceptance fees either.

Lastly, the length of gravity sewer pipe and forcemain piping listed in the October 22, 2018 memo has also changed slightly. In the revised Alternatives 1 and 2, the location of the proposed treatment facility has been shifted from the front of the Labonte property near Stoney Brook Lane to the back of the Labonte property near the Squamscott River, thus increasing the linear footage of gravity sewer piping and discharge

forcemain piping required. The purpose for moving the facility was to maintain available land on the Labonte property for potential future development. The costs included in this memorandum will reflect this additional piping as compared to the cost table in the October 22, 2018 memorandum.

Revised Wastewater System Cost Estimates

With the planning-level cost estimate assumptions in mind, cost tables were built for each wastewater project concept as follows:

- Treatment and Disposal in Stratham
- Conveyance to Exeter WWTP
- Conveyance to Newmarket WWTP

The following table provides a breakdown of the costs per phase to convey wastewater to a Stratham facility for treatment and disposal.

**Table 2: Wastewater Planning-Level Cost Estimates by Project Phase
w/Treatment and Disposal in Stratham**

Project Area	Collection and Conveyance Cost	Treatment and Disposal Cost*	Engineering and Contingency	Phase Total Cost
Phase A1– Route 101 to Market Basket	\$8.5M	\$7.3M	\$4.0M	\$19.8M
Phase A2 – Market Basket to Frying Pan Lane	\$1.2M	\$4.6M	\$1.5M	\$7.3M
Phase B-Frying Pan to Bunker Hill	\$1.9M	\$3.8M	\$1.4M	\$7.1M
Phase C-Bunker Hill to Winnicutt	\$4.4M	\$1.7M	\$1.5M	\$7.6M
TOTAL	\$16M	\$17.4M	\$8.4M	\$41.8M

*Does not include cost to purchase/obtain and easement on Labonte property or Bell & Flynn property

Table 2 costs assume that the initial treatment and disposal infrastructure has been sized to accommodate 160,000 gpd in “Phase A1 – Route 101 to Market Basket”. The 160,000 gpd value represents the initial wastewater treatment plant capacity that was presented in the October 22, 2018 memo and represents the minimum WWTP capacity we would recommend installing at this time. This option is presented as a way of demonstrating where potential cost savings could be recognized under the initial project concept.

The subsequent phases in Table 2 are then sized to collect, treat and dispose of the remaining Phase A1 flow (50,000), 110,000 (Phase A2), 120,000 (Phase B) and 60,000 (Phase C) gpd, respectively.

Table 3 provides a breakdown of the costs per phase to convey wastewater to the Exeter WWTP.

**Table 3: Wastewater Planning-Level Cost Estimates by Project Phase
w/ Conveyance to Exeter WWTP**

Project Area	Collection and Conveyance Cost*	Treatment and Disposal Cost	Engineering and Contingency	Phase Total Cost
Phase A1 – Route 101 to Market Basket	\$5.7M	N/A	\$1.4M	\$7.1M
Phase A2 – Market Basket to Frying Pan Lane	\$1.2M	N/A	\$0.3M	\$1.5M
Phase B-Frying Pan to Bunker Hill	\$1.8M	N/A	\$0.5M	\$2.3M
Phase C-Bunker Hill to Winnicutt	\$4.3M	N/A	\$1.1M	\$5.4M
TOTAL	\$13M	N/A	\$3.3M	\$16.3M

*Does not include cost to purchase/obtain and easement on Labonte property. Also does not include tie in fees for the Exeter wastewater system

Table 3 costs include the option of collecting wastewater from “Phase A1 – Route 101 to Market Basket” and conveying the flow to the headworks of the Exeter WWTP. The infrastructure in this option is sized to accommodate the full buildout flow (210,000 gpd) in this section of the project. The subsequent phases in Table 3 are then sized to convey the remaining flow from Phase A2, Phase B and C, respectively.

Table 4 provides a breakdown of the costs per phase to convey wastewater to the Newmarket WWTP.

**Table 4: Wastewater Planning-Level Cost Estimates by Project Phase
w/ Conveyance to Newmarket WWTP**

Project Area	Collection and Conveyance Cost*	Treatment and Disposal Cost	Engineering and Contingency	Phase Total Cost
Phase A1 – Route 101 to Market Basket	\$21.0M	N/A	\$5.2M	\$26.2M
Phase A2 – Market Basket to Frying Pan Lane	\$1.2M	N/A	\$0.3M	\$1.5M
Phase B-Frying Pan to Bunker Hill	\$1.7M	N/A	\$0.4M	\$2.1M
Phase C-Bunker Hill to Winnicutt	\$2.9M	N/A	\$0.8M	\$3.7M
TOTAL	\$26.8M	N/A	\$6.7M	\$33.5M

*Does not include cost to purchase/obtain and easement on Labonte property or at the Stratham Traffic Circle. Also, does not include tie in fees for the Newmarket wastewater system

Table 4 costs include the option of collecting wastewater from “Phase A1 – Route 101 to Market Basket” and conveying the flow to existing sewer on New Road in Newmarket for ultimate treatment and disposal at the Newmarket WWTP. The infrastructure in Phase A1 is sized to accommodate the full buildout flow (210,000 gpd) in this phase of the project. The subsequent phases in Table 3 are then sized to convey the remaining flow from Phase A2, Phase B and C, respectively.

Revised Potable Water System Cost Estimates

As requested by the town, we have revised previous cost estimates that were prepared for the town to establish an updated March 2020 cost to develop a water system in Stratham. The two options we reviewed are as follows:

- Potable water furnished by Exeter
- Potable water furnished by a new groundwater well in Stratham

Interconnection with Exeter Potable Water System Cost Estimate

As requested by Stratham, we have revised previous cost estimates that were prepared for the town to establish an updated March 2020 cost to develop a water system in Stratham supplied by the town of Exeter. Providing potable water to Phase A1, A2, B and C will have different infrastructure requirements. The following provides a summary of infrastructure that was included in the updated cost estimates for each phase:

- Phase A1 - Exeter town line on Route 108 to Market Basket on Route 108 in Stratham. The basis of the cost estimate includes the extension of 16-inch diameter water main from the Exeter town line for approximately 3,500 linear feet to the Market Basket property. In addition, approximately 1,500 LF of 16-inch water main would be extended on Stratham Heights Road (approximately 750 feet of parallel water main from the intersection of Route 108 to the Verizon Communication building site) to a proposed pump station at the Verizon site. The pump station would not only house domestic and fire pumps to serve the Stratham water system but also include a backflow preventer and municipal water meter required by Exeter to serve the town of Stratham. Please note, the updated cost estimate for Phase A1 does not provide the cost for a water storage tank in the town of Stratham.
- Phase A2 – Market Basket to Frying Pan Lane. The cost estimate includes the extension of approximately 1,600 LF of 16-inch diameter water main from Market Basket to Frying Pan Lane. All conditions of water demand would be provided by the pump station on Stratham Heights Road installed under Phase A1. A water storage tank is not included in this phase.
- Phase B – Frying Pan Lane to Bunker Hill Avenue. Upon extending water service to Bunker Hill Avenue, the water system in Stratham should incorporate a gravity water storage tank to support all Phase A1, A2 and B water demands (fire and domestic) due to the size of the system once Phase B is added. As a result, the pump station on Stratham Heights Road would no longer be used to serve all conditions of domestic and fire flows. The pump station would be utilized to fill the storage tank based on desired water level parameters in the tank. The basis of the cost estimate for Phase B includes approximately 3,400 LF of 16-inch diameter water main from Frying Pan Lane to Bunker Hill Avenue and approximately 2,000 LF of 16-inch diameter main from Route 108 to the location of a water storage tank on Bunker Hill behind the Municipal Center. A 1.0 million-gallon (MG) tank is included in the Phase B cost estimate.
- Phase C – Bunker Hill Avenue to Winnicutt Road. The cost estimate includes the extension of approximately 5,200 LF of 16-inch diameter water main from Bunker Hill Avenue to Winnicutt Road. The storage tank at Bunker Hill will be sized, under Phase B, to support the demands of Phase C.

The following is the revised cost estimate for potable water service supplied by Exeter:

**Table 5: Potable Water System Planning-Level Cost Estimate
Supply Furnished by Exeter**

Project Area	Construction Cost*	Engineering and Contingency	Total Cost
Phase A1-Exeter Town Line to Market Basket	\$2.8M	\$0.8M	\$3.6M
Phase A2-Market Basket to Frying Pan	\$0.7M	\$0.2M	\$0.9M
Phase B-Frying Pan to Bunker Hill	\$4.3M	\$1.2M	\$5.5M
Phase C-Bunker Hill to Winnicutt	\$2.3M	\$0.7M	\$3.0M
TOTAL	\$10.1M	\$2.9M	\$13.0M

*Does not include tie in fees for the Exeter potable water system

Stratham Supplied Potable Water System Cost Estimate

We also revised the previous cost estimates that were prepared for the town to establish an updated March 2020 cost to develop a water system in Stratham supplied by a new groundwater well located in the town of Stratham.

- Phase A1 - Exeter town line on Route 108 to Market Basket on Route 108 in Stratham. The basis of the cost estimate includes developing a new groundwater well in the town of Stratham and furnishing treatment for the groundwater. Under this scenario, the Stratham well would provide all potable water supply for all phases of the project. Additionally, a water storage tank would be built under the initial construction project (Phase A1) rather than meeting demands with pumping alone as is the case under the Exeter supply alternative described above. Since there is existing water storage in Exeter, utilizing a pump station to supply Stratham's water demands initially is feasible. However, should Stratham provide the supply to meet the water demands of the project, incorporating storage at the onset of developing a new water system is ideal and was incorporated into the cost estimate presented herein. The basis of this cost estimate therefore includes the cost to develop a new groundwater well and includes the cost to furnish treatment for the well. We referenced previous information that indicates the location of a new well would be on the Scamman Farm property. The location of the water storage tank would also be on Bunker Hill behind the Municipal Center (as described under the Exeter supply alternative). The tank would be 1.0 MG in capacity. To transmit water from the well site to the storage tank and to the intersection of Route 101 and Route 108 (Phase A1) approximately 10,500 LF of 16-inch diameter water main would need to be installed. As a result, potable water service would be available to not only Phase A1 but also Phase A2 and B.
- Phase A2 – Market Basket to Frying Pan Lane. The cost to provide water service to Phase A2 is included in the Phase A1 cost estimate.
- Phase B – Frying Pan Lane to Bunker Hill Avenue. The cost to provide water service to Phase B is included in the Phase A1 cost estimate.
- Phase C – Bunker Hill Avenue to Winnicutt Road. The cost estimate includes the extension of approximately 5,200 LF of 16-inch diameter water main from Bunker Hill Avenue to Winnicutt Road. The water supply at Scamman Farm and the storage tank at Bunker Hill will be sized, under Phase A1, to support the demands of Phase C.

The following is the revised cost estimate for potable water service supplied by Stratham:

**Table 6: Potable Water System Planning-Level Cost Estimate
Supply Furnished by Stratham**

Project Area	Construction Cost	Engineering and Contingency	Total Cost
Phase A1-Exeter Town Line to Market Basket	\$11.4M	\$3.2M	\$14.6M
Phase A2-Market Basket to Frying Pan	N/A	N/A	N/A
Phase B-Frying Pan to Bunker Hill	N/A	N/A	N/A
Phase C-Bunker Hill to Winnicutt	\$2.3M	\$0.7M	\$3.0M
TOTAL	\$13.7M	\$3.9M	\$17.6M

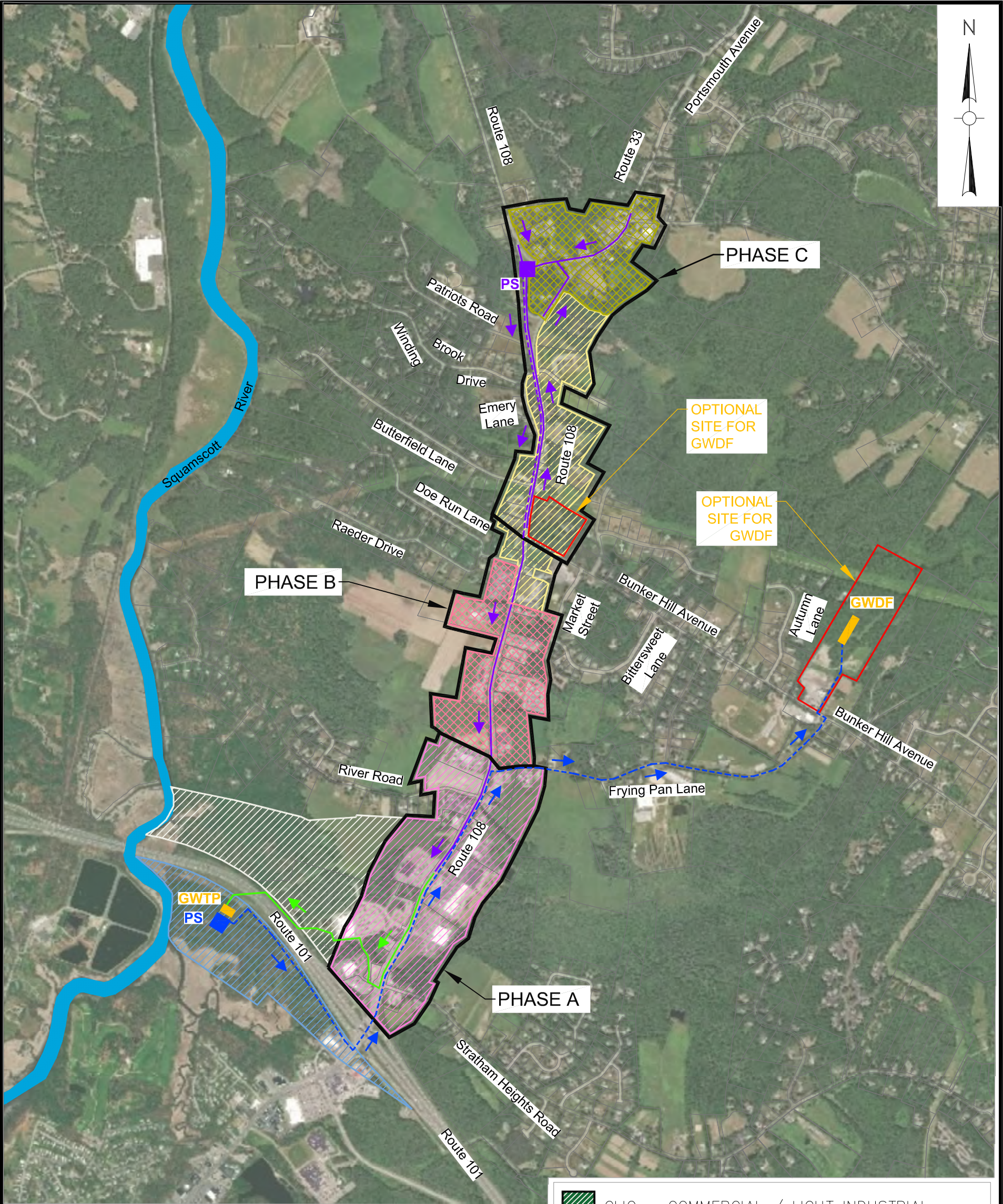
Summary

Weston & Sampson is pleased to present this analysis to the Town of Stratham. Working with Stratham, Weston & Sampson helped to develop four (4) conceptual sewer design alternatives. These developed alternatives present the town with multiple outlets for the desired ability to install municipal sewer in the project area defined herein (Route 101 to Winnicutt Road along Route 108). These alternatives were developed to allow for a stepwise, phased approach to allow the town to build out as needed. Similarly, presented herein, we revised costs for two alternatives to provide potable water to the project area. The two potable water alternatives were also developed with a phased approach to allow the system to expand based on the town's needs.

Figures and estimated costs have been included for each design option. However, an important cost consideration missing from these estimated costs is the fee mandated by each municipality for acceptance and/or treatment of sewer flows and/or potable water service, as applicable. The town requested that we not estimate or include these separate fees at this time. Along with the typical, one-time, large acceptance fee (paid for up front at the time service begins), there would be on-going, smaller fees charged to the town for the volume of sewer flows accepted and/or potable water furnished by municipalities. Over a 20-year period (a typical life-cycle period used to compare the cost of alternatives), these two fees could become a significant factor in the total cost incurred by the town for each alternative. Weston & Sampson strongly recommends that the town study the impact of these costs when determining which of the enclosed design concepts to move forward with.

Thank you for the opportunity to work with the town on this important project. Please contact Weston & Sampson with any comments or questions.

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LEGEND

- TARGET GROUNDWATER DISCHARGE PARCELS
- GRAVITY SEWER
- SEWER FORCEMAIN
- PUMP STATION
- TREATMENT PLANT AND GROUNDWATER DISCHARGE FIELD
- FUTURE GRAVITY SEWER
- FUTURE SEWER FORCEMAIN
- FUTURE PUMP STATION

- CLIO — COMMERCIAL / LIGHT INDUSTRIAL
- GCD-A — GATEWAY COMMERCIAL DISTRICT (A)
- GCD-B — GATEWAY COMMERCIAL DISTRICT (B)
- PRE — PROFESSIONAL RESIDENTIAL
- TC — TOWN CENTER
- SCD — SPECIAL COMMERCIAL

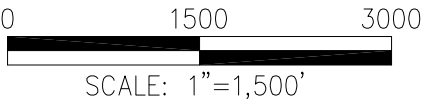


FIGURE 1

STRATHAM, NEW HAMPSHIRE

ROUTE 108 CORRIDOR SEWER DESIGN

ALTERNATIVE 1

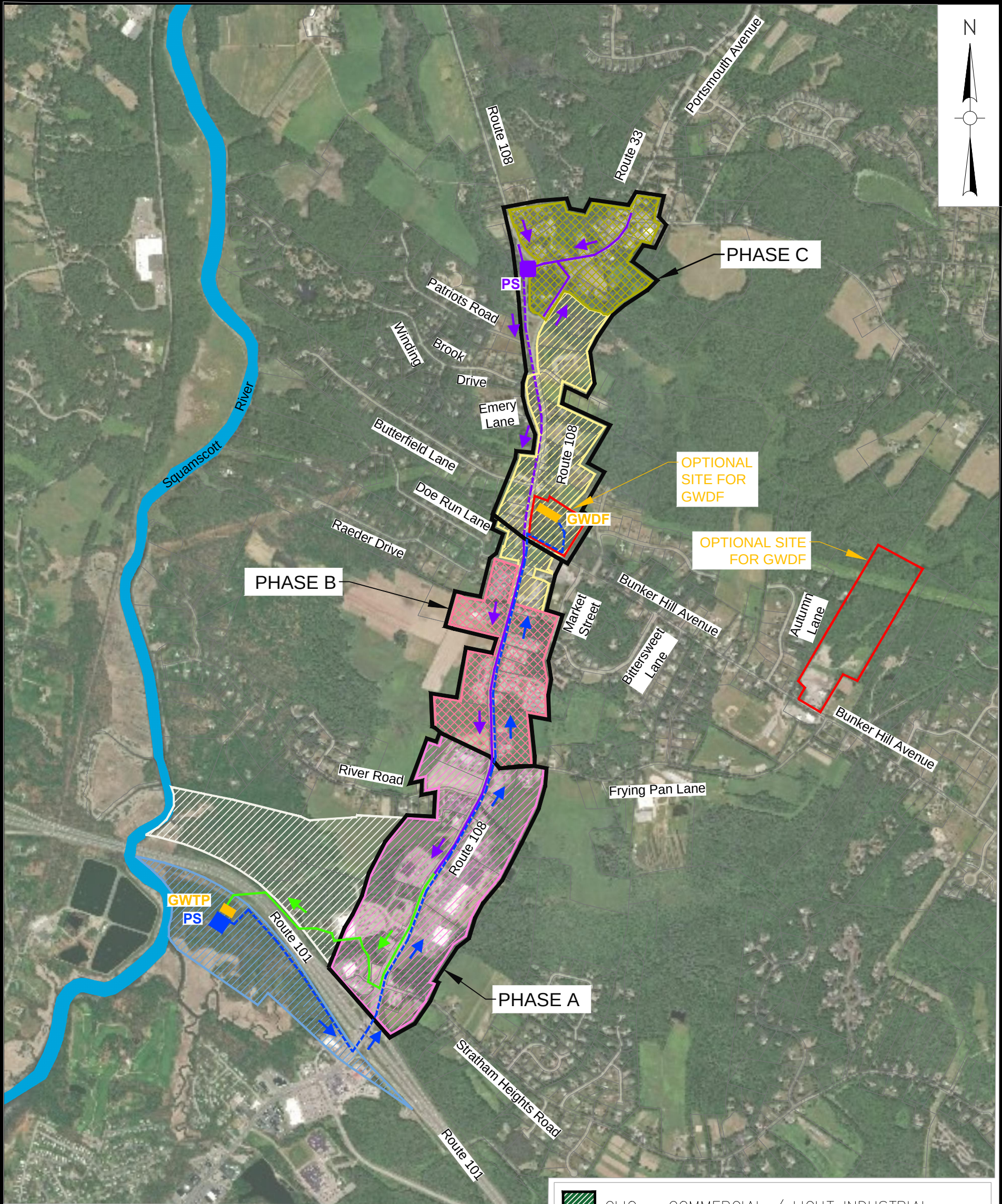
LABONTE TREATMENT, BELL & FLYNN DISCHARGE

DESIGNED BY: EMD

CHECKED BY: CMP

DATE: JANUARY 2019

Weston & SampsonSM



LEGEND

- TARGET GROUNDWATER DISCHARGE PARCELS
- GRAVITY SEWER
- SEWER FORCEMAIN
- PUMP STATION
- TREATMENT PLANT AND GROUNDWATER DISCHARGE FIELD
- FUTURE GRAVITY SEWER
- FUTURE SEWER FORCEMAIN
- FUTURE PUMP STATION

- CLIO – COMMERCIAL / LIGHT INDUSTRIAL
- GCD-A – GATEWAY COMMERCIAL DISTRICT (A)
- GCD-B – GATEWAY COMMERCIAL DISTRICT (B)
- PRE – PROFESSIONAL RESIDENTIAL
- TC – TOWN CENTER
- SCD – SPECIAL COMMERCIAL

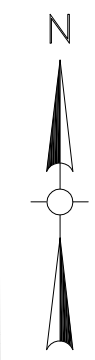
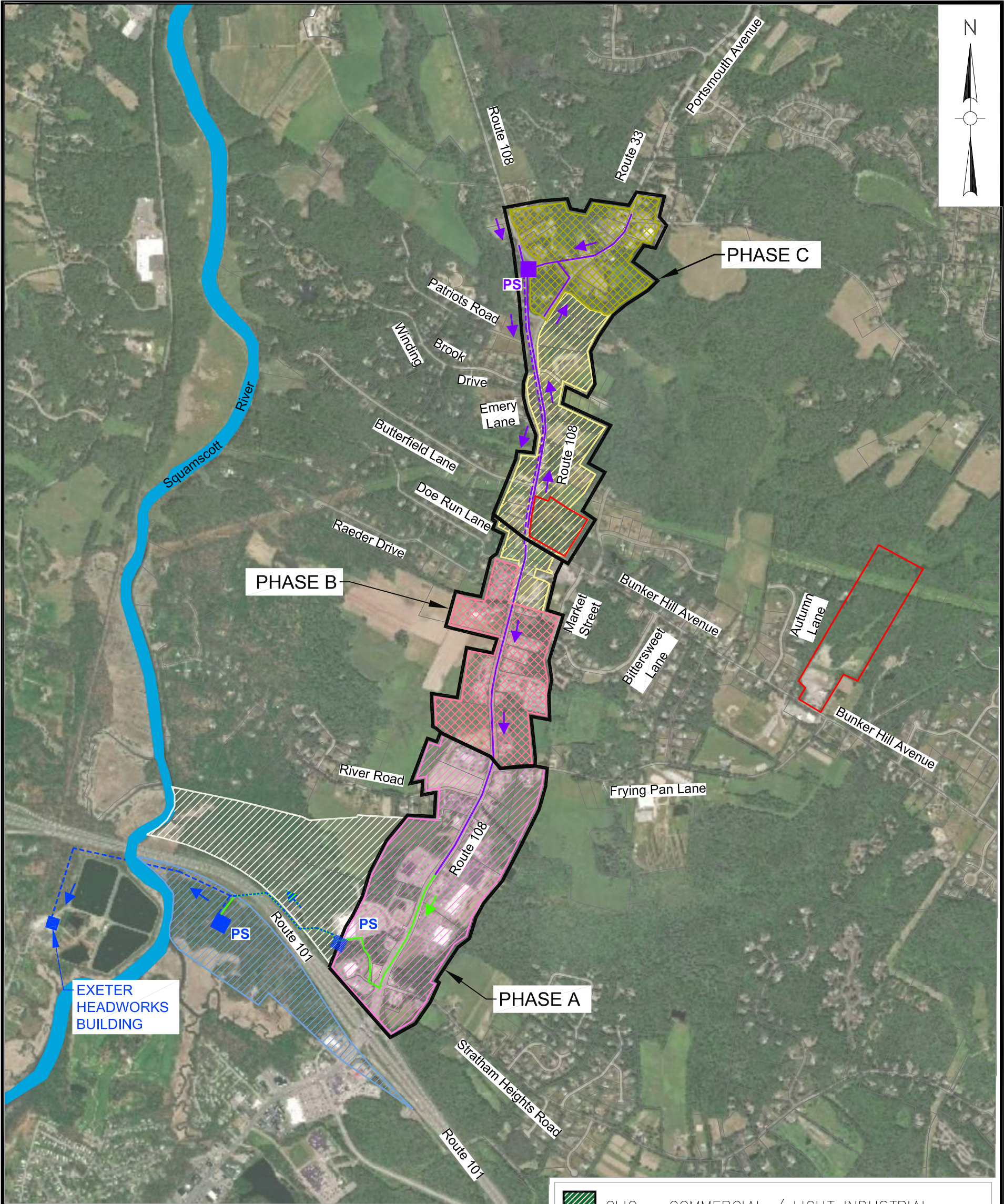
FIGURE 2

STRATHAM, NEW HAMPSHIRE
ROUTE 108 CORRIDOR SEWER DESIGN

ALTERNATIVE 2
LABONTE TREATMENT, SMYK PROP. DISCHARGE

DESIGNED BY: EMD CHECKED BY: CMP DATE: JANUARY 2019

Weston & SampsonSM



LEGEND

- TARGET GROUNDWATER DISCHARGE PARCELS
- GRAVITY SEWER
- SEWER FORCEMAIN
- PUMP STATION
- DESIGN DEPENDENT PUMP STATION
- TREATMENT PLANT AND GROUNDWATER DISCHARGE FIELD
- DESIGN DEPENDMENT GRAVITY OR FORCEMAIN PIPE
- FUTURE GRAVITY SEWER
- FUTURE SEWER FORCEMAIN
- FUTURE PUMP STATION

- CLIO — COMMERCIAL / LIGHT INDUSTRIAL
- GCD-A — GATEWAY COMMERCIAL DISTRICT (A)
- GCD-B — GATEWAY COMMERCIAL DISTRICT (B)
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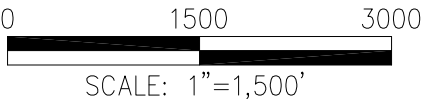


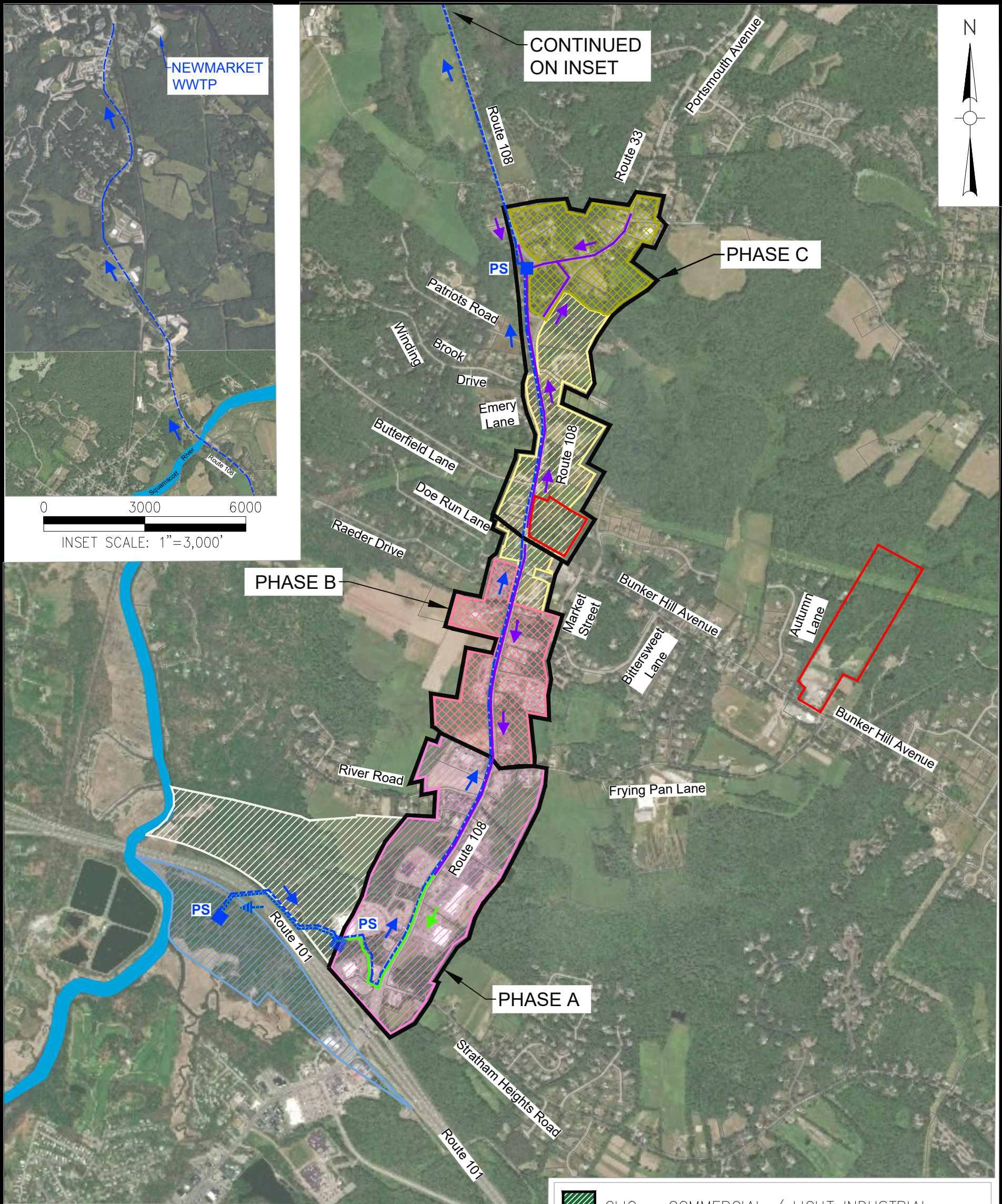
FIGURE 3

STRATHAM, NEW HAMPSHIRE
ROUTE 108 CORRIDOR SEWER DESIGN

ALTERNATIVE 3
LABONTE COLLECTION, EXETER DISCHARGE

DESIGNED BY: EMD CHECKED BY: CMP DATE: JANUARY 2019

Weston & SampsonSM



LEGEND

- TARGET GROUNDWATER DISCHARGE PARCELS
- GRAVITY SEWER
- SEWER FORCEMAIN
- PUMP STATION
- DESIGN DEPENDENT PUMP STATION
- DESIGN DEPENDMENT GRAVITY OR FORCEMAIN PIPE
- FUTURE GRAVITY SEWER
- FUTURE SEWER FORCEMAIN
- FUTURE PUMP STATION

- CLIO – COMMERCIAL / LIGHT INDUSTRIAL
- GCD-A – GATEWAY COMMERCIAL DISTRICT (A)
- GCD-B – GATEWAY COMMERCIAL DISTRICT (B)
- PRE – PROFESSIONAL RESIDENTIAL
- TC – TOWN CENTER
- SCD – SPECIAL COMMERCIAL

0 1500 3000
SCALE: 1"=1,500'

FIGURE 4

STRATHAM, NEW HAMPSHIRE
ROUTE 108 CORRIDOR SEWER DESIGN

ALTERNATIVE 4
LABONTE COLLECTION, NEWMARKET DISCHARGE

DESIGNED BY: EMD | CHECKED BY: CMP | DATE: JANUARY 2019

Weston & Sampson