

ENVIRONMENTAL IMPACT EVALUATION
for the NAUGATUCK VALLEY COUNCIL OF GOVERNMENTS
WASTEWATER SYSTEMS REGIONALIZATION STUDY

PROJECT IDENTIFICATION

This regional wastewater treatment consolidation study comprises five municipalities in the region: Naugatuck, Beacon Falls, Seymour, Ansonia and Derby. Each of the communities have their own wastewater treatment plants, several of which need significant upgrade. Prior studies of the wastewater collection systems in these communities have also revealed the need for upgrade and rehabilitation, including the abatement of infiltration and inflow (I/I). The wastewater consolidation study explores regional alternatives as an option to the alternative where each community continues to address their own wastewater needs and acts individually (the base case) to meet those needs. The project identifies the economic efficiencies that regionalizing wastewater treatment offers. Regional planning and technical evaluation, encompassing all five basins, with the goal of achieving cost effectiveness while meeting desired environmental objectives, were the focus of this study. Regional alternatives were identified, formulated, compared against each other and to the base case from a cost effectiveness perspective for the next 20 years and beyond. Maintenance of water quality and pollutants reduction were also key drivers of the ultimate recommendation.

SUMMARY OF ENVIRONMENTAL REVIEW

The regional wastewater treatment consolidation study was commissioned by the Naugatuck Valley Council of Governments (NVCOG), to look at the potential for cost-effective wastewater treatment regionalization alternatives among five communities in the Naugatuck Valley. This study was funded through a grant administered by the State of Connecticut Office of Planning and Management (OPM), under the Regional Performance Incentive Program, CGS Sec. 4-124s. The primary objective of the consolidation study was to investigate the potential for cost efficiencies through a more regionalized approach to wastewater treatment for communities in the study area. The communities included in this study were: Derby, Ansonia, Seymour, Beacon Falls and Naugatuck.

The consolidation study was conducted in two phases, with major stakeholders (including from DEEP, NVCOG and each of the five communities) provided review and input at each milestone in the study. The first phase of the study included projecting population, wastewater flows and loads over a 20-year planning period, initial condition assessment of the existing wastewater infrastructure, projecting costs under the 'base case' scenario with no regionalization, and developing a 'long list' of potential regionalization alternatives.

In the second phase of the study, the long list of regionalization alternatives was refined to a short list of the most advantageous alternatives, which were developed and evaluated further. The short-listed alternatives were developed to the point where their reasonable cost projections could be compared versus the related costs for the base case alternative of no regionalization.

Currently the Derby water pollution control facility (WPCF) discharges to the Housatonic River, while treatment plants for the other four communities all discharge to the Naugatuck River.

The regional wastewater treatment consolidation study recommended decommissioning the Derby and Seymour wastewater treatment facilities, and pumping wastewater from those communities to an expanded regional facility located at the site of the current Ansonia treatment plant. The study also recommended pumping the treated effluent from the regional facility back to Derby for discharge to the Housatonic River. The required treatment plant and conveyance infrastructure would be implemented in a phased approach, over a period of approximately six years.

If further refinement of the recommended plan for optimization purposes results in reducing the extent of the overall scope of the proposed project, for example in removing Seymour from being included in the regionalized treatment approach, it is not anticipated that such mid-course modifications or adjustments will necessitate the drafting of a new environmental impact evaluation.

In accordance with the regulations of the Connecticut Environmental Policy Act sections 22a-1a-1 to 22a-1a-12, the findings of the environmental review are summarized below.

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1. Project Description

The proposed project consists of upgrading and expanding the existing wastewater treatment facility in Ansonia to become a regional treatment facility that would also treat the wastewater from Derby and Seymour. Major elements of the project include:

- a. Expansion and upgrade of the Ansonia WPCF to become a regional facility, increasing the annual average design flow to 4.89 MGD (to meet requirements through design year 2040).
- b. Decommission the Derby WPCF, upgrade its influent pump station to become a conveyance pump station, and reconfigure its raw wastewater screening facility.
- c. Decommission the Seymour WPCF, upgrade its influent pump station to become a conveyance pump station, upgrade its screening facility and upgrade its grit chamber.
- d. Construct a new conveyance pipeline from the existing Derby plant to the regional treatment plant in Ansonia.
- e. Construct a conveyance pipeline from the existing Seymour plant to the regional treatment plant in Ansonia, along with one intermediate booster pump station along the route.
- f. Upgrade the effluent pump station at the Ansonia plant and construct a treated effluent pipeline to the Housatonic River, at the Derby plant's existing outfall. (The route for this pipeline would follow that of the new conveyance pipeline from Derby to Ansonia.)
- g. To implement this plan, it is recommended that a Regional Water Pollution Control Authority be created, under Section 22a-500 of the Connecticut General Statutes.

2. Existing Conditions

Derby WPCF

The Derby Water Pollution Control Facility (WPCF) serves 95% of the population of Derby, plus a small portion of Seymour. The WPCF provides secondary treatment with nitrogen reduction, plus seasonal disinfection (chlorination/dichlorination). Since it discharges to a tidally impacted portion of the Housatonic River, there is no requirement for phosphorus removal. Sludge is dewatered, then trucked offsite for incineration and ultimate disposal.

This facility was built in 1964, with a major upgrade to secondary treatment in 1973, followed by more limited upgrades in the 1980's and early 1990's. Due to its age and poor condition, this facility is overdue for a major plant upgrade. The plant site is constrained, with little room available for expansion. Plant systems that require major upgrades include:

- a. Influent Pump Station
- b. Screening Facility
- c. Grit Removal Facility
- d. Primary Clarifiers and sludge pumping systems
- e. Aeration Basins and Blower systems
- f. Secondary Clarifiers and sludge pumping systems
- g. Sludge Treatment systems
- h. Control Building
- i. Secondary Control Building
- j. Plant-Wide SCADA
- k. Plant-Wide Electrical Systems
- l. Numerous plant-wide sub-systems

Ansonia WPCF

The Ansonia WPCF serves 98% of the population of Ansonia plus small portions of Derby, Seymour and Woodbridge. The WPCF provides secondary treatment with BNR (nitrogen reduction) and UV disinfection. Since the plant discharges to the Naugatuck River, which is fresh water, seasonal phosphorus removal is required. Primary sludge and thickened waste activated sludge are removed by tanker trucks, for offsite dewatering and incineration. The plant has demonstrated consistent good performance in meeting discharge permit effluent quality requirements.

The plant was constructed in 1968 and upgraded to provide secondary treatment in 1970. The most recent extensive plant upgrade was completed in 2011. The plant equipment is in satisfactory condition overall. The Ansonia plant site has the advantage of having available room for adding major plant processes if needed. This site is much less constrained than that of the Derby facility.

The Ansonia WPCF upgrades required (under the base case, with no regionalization) are less extensive than those needed at Derby, and include:

- a. Adding a second mechanical screen at the headworks

- b. Adding a second UV channel
- c. Upgrading effluent pump station to meet peak flows
- d. Upgrade to sludge thickening, truck loading and pumping facility

Seymour WPCF

The Seymour WPCF serves most of the population of Seymour, along with a small section of Oxford. The plant was built in the 1970's, with a significant upgrade in the early 1990's. It provides secondary treatment with BNR for nitrogen reduction, with chlorination/dichlorination for disinfection. Since this plant discharges to the Naugatuck River, which is fresh water, seasonal phosphorus removal also is required, which is accomplished through chemical addition. Dewatered sludge is trucked offsite for incineration and disposal.

The WPCF site is on a very narrow site bounded by Route 8 and the Naugatuck River. Due to these geographic constraints, there is limited room available for adding major new facilities at this site. Due to the age of this facility and the length of time since the last major upgrade, much of the mechanical and electrical equipment is at the end of its useful life and in need of replacement or upgrade. Upgrades to the Seymour WPCF that would be needed for reliability and to sustain continued operation, under the base case scenario with no regionalization, include:

- a. Complete mechanical/electrical refurbishment of the headworks area (screenings and grit removal)
- b. Complete mechanical/electrical refurbishment of the influent pump station
- c. Mechanical upgrade to the primary clarifiers
- d. Replace sludge pumps and sludge processing facilities
- e. Mechanical upgrade to the secondary clarifiers
- f. Refurbish the primary control building
- g. General plant-wide SCADA and electrical systems upgrades

For more detailed information regarding the existing condition of the Derby, Ansonia and Seymour WPCF's, and the upgrades that would be required in the absence of regionalization, see Draft Regional Wastewater Treatment Consolidation Study, Tech. Memo. No. 4: Regional Wastewater Alternatives Short List Development (December 23, 2020).

3. Purpose and Need

Five municipalities in the Naugatuck River Valley (Derby, Ansonia, Seymour, Beacon Falls and Naugatuck) each have their own water pollution control facility. NVCOG commissioned a study to consider whether there was an opportunity to save cost by implementing a more regionalized approach to wastewater treatment, in which the number of WPCFs would be reduced.

Several of the five WPCF's are at or approaching the time where a major plant upgrade would be required. With that in view, this was considered to be an especially appropriate time to consider potential cost savings from regionalization, before commencing the next round of capital improvements to the existing facilities.

4. Long List of 23 Alternatives Considered and Screened

During Phase 1 of the study, a total of 23 long-list regionalization alternatives were identified within the 5-community area of the study as being feasible for further development; these are identified in Table 1.

Table 1 – ‘Long List’ of 23 Regionalization Alternatives Resulting from Phase 1

No.	Alternative Description
1	Beacon Falls to Naugatuck
2	Beacon Falls to Seymour
2a	Beacon Falls to Seymour, I/I Reduction
3	Derby to Ansonia
3a	Derby to Ansonia, I/I Reduction
4	Derby to Ansonia, Effluent Pumped to Housatonic River
4a	Derby to Ansonia, I/I Reduction, Effluent Pumped to Housatonic River
5	Derby and Seymour to Ansonia
5a	Derby and Seymour to Ansonia, I/I Reduction
5b	Derby and Seymour to Ansonia, Effluent Pumped to Housatonic River
5c	Derby and Seymour to Ansonia, I/I Reduction, Effluent Pumped to Housatonic River
6	Derby to Seymour and Ansonia
6a	Derby to Seymour and Ansonia, I/I Reduction
8	Ansonia to Derby
8a	Ansonia to Derby, I/I Reduction
9	Seymour and Ansonia to Derby
9a	Seymour and Ansonia to Derby, I/I Reduction
10	Seymour to Ansonia, Part of Ansonia to Derby
10a	Seymour to Ansonia, Part of Ansonia to Derby, I/I Reduction
11	Beacon Falls and Seymour to Ansonia, Part of Ansonia to Derby
11a	Beacon Falls and Seymour to Ansonia, Part of Ansonia to Derby, I/I Reduction
12	Beacon Falls, Seymour, and Ansonia to Derby
12a	Beacon Falls, Seymour, and Ansonia to Derby, I/I Reduction

As part of the initial task of the Phase 2 study, a review of the wastewater conveyance routes determined that pipeline and pump station systems required to transfer wastewater from Beacon Falls to either Naugatuck or Seymour would be too costly on a capital cost basis. Furthermore, the multiple pump stations required to cross this challenging and remote terrain would be vulnerable to periodic power interruption, raising reliability concerns. For these reasons, long list regionalization alternatives that include conveyance from Beacon Falls were eliminated from further consideration.

Pipe routes for the other regional alternatives including Seymour, Ansonia, and Derby appear feasible from a conveyance basis. Those regional alternatives were evaluated further from a treatment facility perspective.

Through progressive step evaluations looking at aggressive I/I control, conveyance corridor routings, and plant facilities requirements, the long list of 23 regional alternatives was reduced to a short list of six alternatives for more in-depth study. Four of the six short-listed alternatives featured a regional WPCF located at the Ansonia WPCF site; the other two featured a regional plant at the Derby WPCF site, as shown on Table 2.

Table 2 – Short-Listed Regionalization Alternatives

No.	Alternative Description
	Regional WPCF at Ansonia
3	Derby to Ansonia
4	Derby to Ansonia, Effluent Pumped to Housatonic River
5	Derby and Seymour to Ansonia
5b	Derby and Seymour to Ansonia, Effluent Pumped to Housatonic River
	Regional WPCF at Derby
8	Ansonia to Derby
9	Seymour and Ansonia to Derby

None of the six short-listed alternatives involved Naugatuck or Beacon Falls, because of reliability and cost considerations associated with conveyance corridor pipelines emanating from Beacon Falls. Therefore, the short-listed alternatives involved the wastewater infrastructure in Ansonia, Derby and Seymour only.

5. Comparison of Regionalization Alternatives and ‘Base Case’ (No Regionalization)

Six short-listed regionalization alternatives were further developed to the point where a present worth cost comparison (including capital cost and operations & maintenance costs) could be made versus the ‘base case’ of no wastewater treatment regionalization. The short-listed regional alternatives and base case scenario are summarized below.

a. Base Case – No Regionalization

Under this alternative, the current arrangement would continue. The three separate WPCF’s in Derby, Ansonia and Seymour each would be upgraded, maintained and operated independently, as required. The Derby WPCF would continue to discharge to the Housatonic River, and the other two facilities would continue to discharge to the Naugatuck River.

An overview of the upgrades required to the existing facilities under this Base Case alternative is provided in later in report.

b. (Regional Alternative No. 3) - Derby to Ansonia, Effluent Discharge to Naugatuck River

Under this alternative the existing Derby WPCF would be decommissioned. The existing influent pump station and headworks at Derby would be upgraded and converted to a conveyance pump station with mechanical screening. Derby wastewater would then be pumped from this facility to the Ansonia WPCF via a new wastewater conveyance pipeline.

The Ansonia WPCF would be expanded and upgraded to process the additional wastewater flow. Since this alternative includes continuing the current arrangement of discharge to the Naugatuck River, where seasonal phosphorus removal is required, a new phosphorus removal facility would be required to process the new, higher flows.

c. (Regional Alternative No. 4) - Derby to Ansonia, Effluent Discharge to Housatonic River

This is the same as Alternative No. 3, with one additional feature. The treated effluent would be pumped from Ansonia back to the location of the current Derby outfall into the Housatonic River. The route of the effluent pipeline would follow the route of the new conveyance pipeline

from Derby to Ansonia. The existing effluent pump station at the Ansonia facility would be upgraded to meet the hydraulic requirements of the longer effluent discharge pipeline.

This alternative, same as Alternative No. 3, would require that the existing Derby WPCF to be decommissioned. The existing influent pump station and headworks at Derby would be upgraded and converted to a conveyance pump station with upgraded mechanical screening. Derby wastewater would be pumped from this facility to the Ansonia WPCF via a new wastewater conveyance pipeline.

The Ansonia WPCF would be expanded and upgraded to process the additional wastewater flow.

Since the Housatonic River is tidally influenced in the area of the Derby outfall, it is not subject to the discharge limits for phosphorus that apply to discharges to the freshwater Naugatuck River. Therefore, under Alternative No. 4, phosphorus treatment will not be necessary at the regional Ansonia WPCF. This would reduce capital costs for plant expansion at Ansonia and eliminate ongoing operations and maintenance costs related to phosphorus treatment.

d. (Regional Alternative No. 5) - Derby and Seymour to Ansonia, Effluent Discharge to Naugatuck River

This alternative is similar to Alternative No. 3, except that flow from Seymour would also be pumped to the regional facility in Ansonia.

Therefore, in addition to all the features discussed above for Regional Alternative No. 3, this alternative would also involve decommissioning the Seymour WPCF and converting its existing influent pump station into a conveyance pump station with upgraded degritting and mechanical screening. Seymour wastewater would be pumped from this facility to the regional Ansonia WPCF via a new wastewater conveyance pipeline.

The Ansonia WPCF would be expanded and upgraded to process the increased flows from both Derby and Seymour. Since treated plant effluent would continue to be discharged to the Naugatuck River under this alternative, seasonal phosphorus removal still would be required. Therefore, the plant upgrade would also include new phosphorus removal facilities for the higher, combined flows from the three communities.

e. (Regional Alternative No. 5b) - Derby and Seymour to Ansonia, Effluent Discharge to Housatonic River

This alternative is the same as Alternative No. 5, except that the treated plant effluent would be pumped from Ansonia to the Derby outfall location, for discharge to the Housatonic River.

This alternative also includes constructing an effluent pipeline from Ansonia to the Derby outfall location and upgrading the Ansonia effluent pump station as required for the longer discharge pipeline. Discharging to the Housatonic River would eliminate the need for phosphorus removal facilities at the Ansonia WPCF.

f. (Regional Alternative No. 8) - Ansonia to Derby, Effluent Discharge to Housatonic River

This alternative involves decommissioning the existing Ansonia WPCF, converting the associated influent pump station into a conveyance pump station. All Ansonia wastewater would be pumped via a new conveyance pipeline to a significantly upgraded and expanded regional WPCF at Derby.

Since the existing Derby WPCF site offers very little room for expansion to accommodate the new higher flows, the new expanded facility would require using smaller-footprint technologies such as IFAS or BioMag, rather than a more expansive conventional treatment process layout.

Treated effluent would be discharged through the existing Derby plant outfall to the tidally influenced portion of the Housatonic River. Therefore, phosphorus removal facilities would not be required.

g. (Regional Alternative No. 9) - Seymour and Ansonia to Derby, Effluent Discharge to Housatonic River

This alternative is similar to Alternative No. 8, except that the Seymour WPCF would also be decommissioned, and all flows from Seymour would be pumped to the new regional WPCF in Derby as well.

This would require upgrading the Seymour WPCF influent pump station to a conveyance pump station, which would convey all Seymour wastewater through a new conveyance pipeline to the site of the existing Ansonia WPCF. From there, flow from both communities would be pumped via an intermediate conveyance pump station to the site of the newly expanded regional WPCF in Derby.

The existing WPCF in Derby would be significantly upgraded and expanded to accommodate the combined flows from the three communities, utilizing small-footprint technologies to accommodate the existing constrained site. Since treated effluent would be discharged through the existing plant outfall to the tidal Housatonic River; no phosphorus removal facilities would be required under this alternative.

Each of the above regional alternatives, as well as the base case scenario, were developed to the point where the regional alternatives and base case scenario could be financially compared on a present worth cost basis. This included assessing the required upgrades to existing facilities, making planning level process selections, preparing WPCF site layouts, and determining concept level conveyance pipeline routes.

A present worth cost comparison of the base case and the six short-listed alternatives was made, taking into consideration capital costs as well as operating costs over a 25-year period. Since the two regional alternatives based on a newly expanded regional WPCF located at Derby (Regional Alternatives No. 8 and 9) were more expensive than the base case of no regionalization, they were eliminated from further consideration.

All four of the remaining short-listed regional alternatives based on a regional WPCF in Ansonia were found to be economically advantageous, with lower present worth cost than the base case. The two alternatives with the greatest cost savings over the base case were Regional Alternative Nos. 4 and 5b, both of which feature pumping the treated effluent to the Housatonic River outfall in Derby rather than providing phosphorus removal at Ansonia and discharge to the Naugatuck River.

These two most advantageous regional alternatives are very similar. Both involve pumping wastewater from Derby to Ansonia, expanding and upgrading the Ansonia WPCF to process the wastewater from both communities, and then pumping the treated effluent back to Derby for discharge to the Housatonic River.

The difference between the two most advantageous alternatives is that Regional Alternative No. 4 is a regional solution involving only Derby and Ansonia, while Regional Alternative No. 5b also adds Seymour to the regionalization plan.

It is recommended that a new Regional Wastewater Authority be created, pursuant to Section 22a-500 of the Connecticut General Statutes. The proposed regionalization project would be eligible for state SRF funding, which involves a combination of grants and low-interest loans for eligible capital costs. A regional authority facility project would receive higher priority points by CT DEEP, making it more fundable than base case scenarios. Additionally, a regional facility will receive a 25% grant from DEEP for an initial eligible project. When likely grant funding is taken into consideration, the most advantageous Regional Alternatives is No. 5b. Similar savings are projected for Regional Alternative No.4, the second most advantageous alternative evaluated. Table 3 below presents the present worth costs of the four short-listed regional alternatives that are the most cost effective with lower present worth costs than the base case. Table 3 also shows the net savings of the regional alternatives compared to the base case.

Table 3 – Present Worth Cost Comparison of Ansonia Regionalization Alternatives. vs. Base Case Scenario

No.	Regionalization Alternative	Regional Alternative Costs (\$M)					Base Case, No Regionalization	Base Case Costs (\$M)					Present Worth Savings in Regionalization (\$M)	
		Capital		O&M	Total			Capital	O&M	Total		With No Grants	With Grants ¹	
		With 0% Grant	With 25% Grant		With 0% Grant	With 25% Grant				With 0% Grant	With 20% Grant			With 0% Grant
3	Derby to Ansonia	\$78.2	\$58.7	\$57.5	\$135.7	\$116.2	WPCF's Remain in Derby, Ansonia	\$85.7	\$68.6	\$67.9	\$153.6	\$136.5	\$17.9	\$20.3
4	Derby to Ansonia; Effluent Pumped to Housatonic	\$71.1	\$53.3	\$57.1	\$128.2	\$110.4	WPCF's Remain in Derby, Ansonia	\$85.7	\$68.6	\$67.9	\$153.6	\$136.5	\$25.4	\$26.1
5	Derby & Seymour to Ansonia	\$125.8	\$94.4	\$74.2	\$200.0	\$168.6	WPCF's Remain in Derby, Ansonia, Seymour	\$118.1	\$94.5	\$95.6	\$213.7	\$190.1	\$13.7	\$21.5
5b	Derby & Seymour to Ansonia; Effluent Pumped to Housatonic	\$117.9	\$88.4	\$73.8	\$191.7	\$162.2	WPCF's Remain in Derby, Ansonia, Seymour	\$118.1	\$94.5	\$95.6	\$213.7	\$190.1	\$22.0	\$27.9

Clarifications

- Costs for 0% grant scenario taken from Table 6-1 - Base Case and Regional Alternatives Comparison of TM 4 (Draft) Regional Wastewater Alternatives Short List Development (12/23/2020);
- SRF grant funding for capital costs is set at 25% for regional alternatives, and 20% for non-regional alternatives.
- No costs are included in the above table related to overall utility system administration.

6. Water Quality Impacts of the Two Finalist Regional Alternatives

Regional Alternatives No. 4 and No. 5b both reduce effluent discharges to the Naugatuck River by consolidating and relocating discharge to the Housatonic River at Derby.

The Naugatuck River is a 40-mile long freshwater river, all within the State of Connecticut, that is under tidal influence only at the lowest end, for about 1 mile from its confluence with the Housatonic River at Derby. Fresh water resources in Connecticut such as the Naugatuck River and its in-river impoundment lakes are typically considered phosphorus-limited for eutrophication. Therefore, WPCF permits for discharges to the Naugatuck River include seasonal limits for phosphorus that require treatment beyond conventional secondary treatment, for phosphorus removal.

The Housatonic River is tidally influenced brackish water from the foot of Lake Housatonic and the Derby Dam to its outlet into Long Island Sound. Since marine aquatic systems are considered to be nitrogen-limited rather than phosphorus-limited, there is no requirement for phosphorus removal for discharges to the Housatonic River downstream of the Derby Dam. For that reason, the existing WPCF at Derby is not required to meet seasonal phosphorus limits in its discharge, unlike the WPCFs discharging to the Naugatuck River. Since both the Naugatuck and Housatonic Rivers are tributary to Long Island Sound, which is nitrogen-limited, the communities discharging to either of those rivers must meet nitrogen removal requirements.

The Housatonic River upstream of Derby has a much larger watershed area than the Naugatuck River. Consequently, the Housatonic River has significantly greater flow than the Naugatuck. While flows vary seasonally and depending on operation of in-river impoundments on both rivers, historic data from upstream USGS river gages indicates that the Housatonic River upstream contributes on the order of 6 or more times the flow of the Naugatuck River at their confluence.

The Naugatuck River was one of the most polluted waterbodies in the Northeastern US in the 19th and early 20th centuries, primarily due to legacy industrial discharges. However, over the past 40 years there has been a remarkable turnaround in the water quality in the river. Once a noxious and environmentally 'nearly-dead' river, it has been cleaned up and restored to the point where it is an environmental centerpiece for recreational activity in the Naugatuck Valley region. The river is now a popular resource for kayaking, canoeing and fishing. Local communities also have developed walkways and trails in the vicinity of the river.

Regional Alternative No. 4 would provide a net water quality benefit by eliminating one WPCF discharge to the Naugatuck River (at Ansonia), while Regional Alternative No. 5b would provide additional benefit by eliminating two Naugatuck River discharges (at Ansonia and Seymour). Under either of these regionalization alternatives, the additional flow would be discharged to the Housatonic River at the existing Derby outfall. Since the Housatonic River has substantially greater flow than the Naugatuck River, it has much greater assimilative capacity. Also, since phosphorus is not a limiting nutrient in the brackish water at the Derby discharge point at the Housatonic River, this change reduces the contribution of phosphorus that could contribute to eutrophication in a fresh-water aquatic ecosystem.

7. Recommended Plan

a. **Recommended Regional Alternative – 5b (Derby and Seymour to Ansonia; effluent discharge to Housatonic River at Derby)**

After reviewing the two most financially advantageous finalist alternatives, the recommended alternative is Regional Alternative No. 5b (Derby and Seymour to Ansonia, with treated effluent pumped to the Derby outfall on the Housatonic River). This has comparable financial advantages to Regional Alternative No. 4, but also provides additional water quality benefit by eliminating two wastewater discharges to the Naugatuck River.

Conveyance Pipeline Corridors

The proposed routes for the new conveyance pipelines from Seymour to Ansonia, and from Derby to Ansonia, are shown in Figures 1 and 2. The treated effluent pipeline from the Ansonia WPCF to the existing Derby outfall on the Housatonic River will follow the same route as the conveyance pipeline from Derby to Ansonia.

The routes for the conveyance pipelines were selected to maximize the use of available rights-of-way adjacent to local roads. For the most part, the pipeline routes are routed along residential, commercial, and industrial areas of the communities. Appendix A, presented as two tables (Table A-1 and Table A-2), provides a brief description of the conveyance pipeline routes with a focus on land uses along the alignments. The description provides for a more complete understanding of the lay of the land through which the wastewater conveyance pipelines will be located.

A primary objective was to avoid any interruption to State Highway 8 and the local railroads, by minimizing the number of crossings of those transportation rights of way and utilizing pipe jacking and boring construction techniques at the few locations where these pipelines must cross these existing transportation corridors. Pipe jacking will require two jacking pits per crossing site during construction and is commonly used to cross under major infrastructure runs of generally up to 1,000 feet without disrupting ongoing operations.

As indicated on Figure 1, the proposed conveyance route from Seymour to Ansonia would require two crossings of State Highway 8, and one crossing of the ConnDOT tracks on the Waterbury Branch of the Metro-North Railroad. As indicated on Figure 2, the pipeline conveyance route from Derby to Ansonia would involve crossing once each the Housatonic Railroad (in Derby, just north of the WPCF), State Highway 8, and the ConnDOT tracks for the Waterbury Branch of Metro-North Railroad.

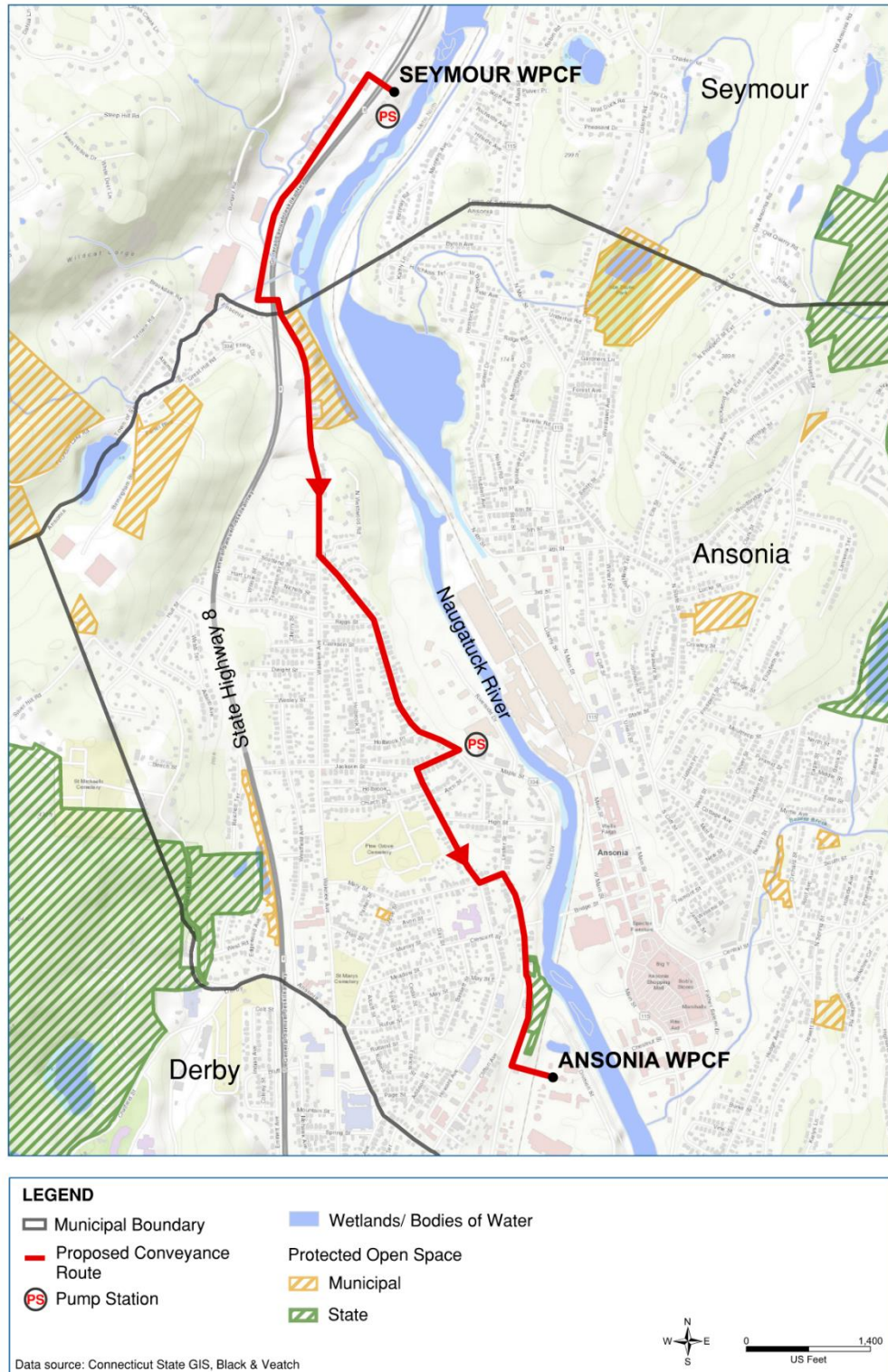


Figure 1 – Proposed Conveyance Pipeline Route, Seymour to Ansonia WPCF



Figure 2 – Proposed Conveyance Pipeline Route, Derby to Ansonia WPCF

The only construction challenge identified are the railroad and highway crossings that will be constructed using the jack and bore method described before. Besides the expected impacts

during construction, at this point of the study, the proposed pipelines will have no long-term environmental, social, economic or community impacts.

As noted above, the conveyance pipeline will be situated within the rights-of-ways of area roadways. Some small sections will be aligned on private property and these areas would require easements. There will be close coordination with property owners during planning, design and construction to minimize the short-term construction impacts. Some anticipated construction impacts along the routes are highlighted below. These will be mitigated as described in Section 8 of this document.

- Increased noise, dust, and/or vibrations,
- Traffic flow and detouring associated with construction,
- Reduced availability of on-street parking,
- Temporary obstruction of driveways, and
- Temporary obstruction of storefronts.

Regional Ansonia WPCF

The existing Ansonia WPCF would be expanded and upgraded to a regional facility to accommodate the wastewater flows from Derby and Seymour. This would require comprehensive renovation to several existing treatment systems and adding some new additional facilities. The new facilities proposed to be added at that plant site include:

- One additional grit removal unit,
- One additional primary clarifier,
- One additional secondary clarifier,
- One additional UV disinfection channel, and
- A new sludge handling facility.

A revised layout of the proposed regional WPCF at Ansonia, showing proposed upgraded and new expansion treatment facilities at that site, is shown in Figure 3. All treatment facilities would be located at the existing plant site.

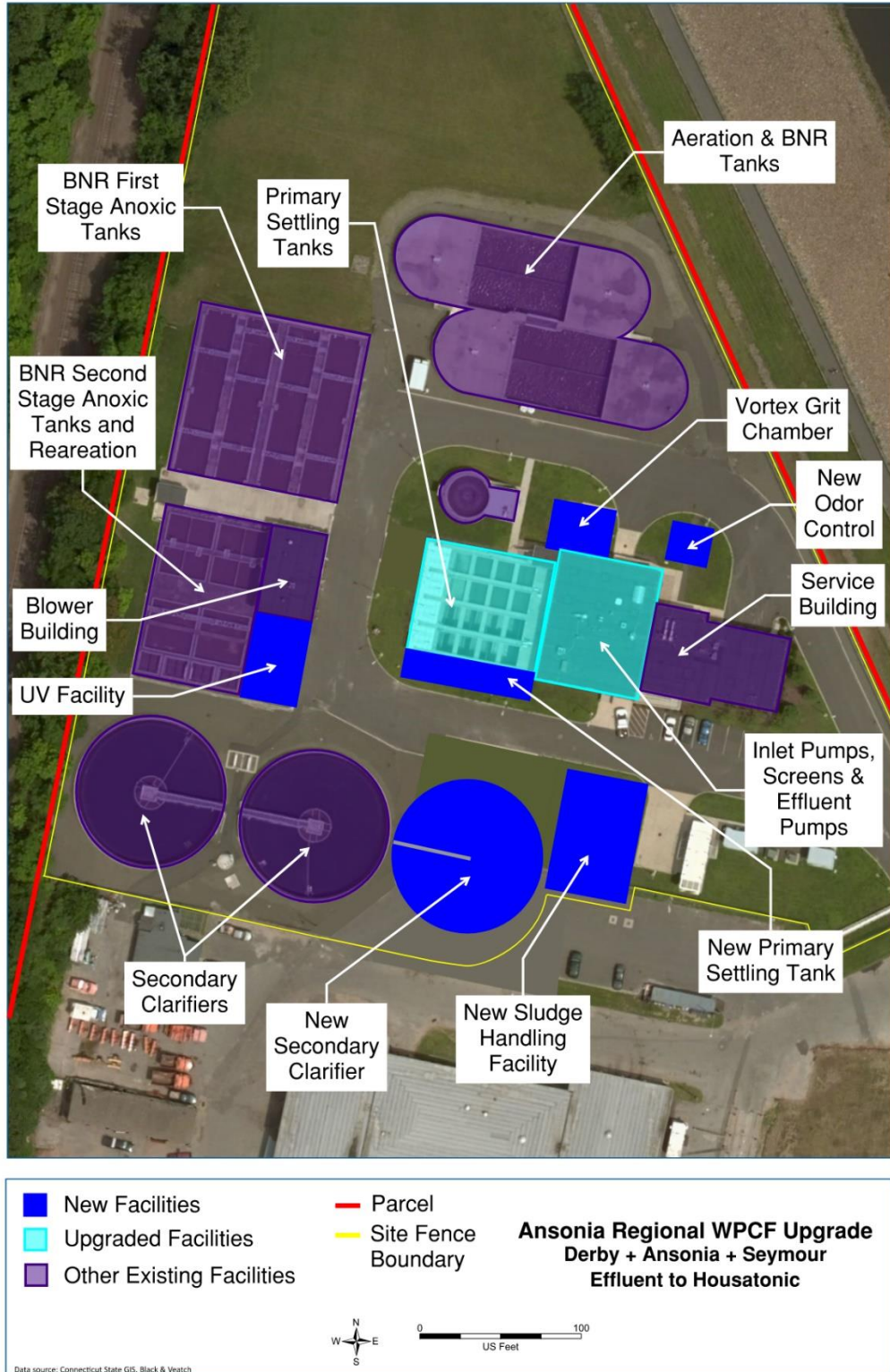


Figure 3 – Proposed Ansonia WPCF Site Plan - Recommended Regional Alternative 5B

Collection Systems

Upgrades to the sewerage collection system pipelines, manholes and structures are required for all three communities. This is the same whether for the base case or for regionalization purposes. As such this collection system rehabilitation program is part of the recommended plan. Historically there has been a lack of concerted upkeep and rehabilitation of these buried systems. The collection systems of all three communities; Derby, Ansonia and Seymour experience excessive infiltration and inflows (I/I) which can overwhelm the systems during more intense storm events, including at the WPCFs. Derby is under Consent Order by US EPA to develop a CMOM plan and an I/I control plan. A recent collection system inspection by DEEP indicated that maintenance was lacking overall at Ansonia. Neither Ansonia nor Seymour have undertaken community wide I/I investigation and control programs for over 15 years. All three collection systems require prolonged investment to rehabilitate the pipe systems and reduce excessive I/I flow.

b. Socio-Economic Impact

The objective of the wastewater regionalization study was to investigate the opportunities to reduce costs over the base case scenario where each of the five communities in the study area maintain its own WPCF. The recommended plan is projected to result in a net savings to local rate payers of approximately \$27.9M, on a present worth cost basis as indicated on Table 3. Therefore, this plan would cost less than the base case of continuing to upgrade and operate each of the three affected existing WPCFs (at Derby, Ansonia and Seymour).

It is assumed that the new Regional Wastewater Authority that would be formed as part of this plan (pursuant to Section 22a-500 of the Connecticut General Statutes) would be able to utilize SRF funding to finance this project, with SRF funding opportunity for 25% grant and the remainder in low interest loans (20-year term at 2.0% interest) for eligible capital costs. Implementing a regional solution could improve the likelihood of obtaining SRF funding, due to higher priority points available based on greater population served, as well as positive impacts on recreational fisheries and reduced impact on eutrophication (by eliminating two Naugatuck River discharges).

c. Recommended Implementation Schedule

In view of the condition of the Derby WPCF, where much of the equipment is at the end of its useful life, the regionalization upgrade improvements program should be implemented as soon as feasible. The recommended regional wastewater treatment solution requires close coordination between the three communities involved, including a legal/administrative framework for managing the new regional authority, and an equitable financial cost-sharing arrangement.

Therefore, it is recommended that Derby, Ansonia and Seymour begin immediately on the legal/administrative/financial arrangements that will need to be in place before engineering design and construction of the capital program can begin. The proposed planning level implementation schedule is summarized in Figure 4.

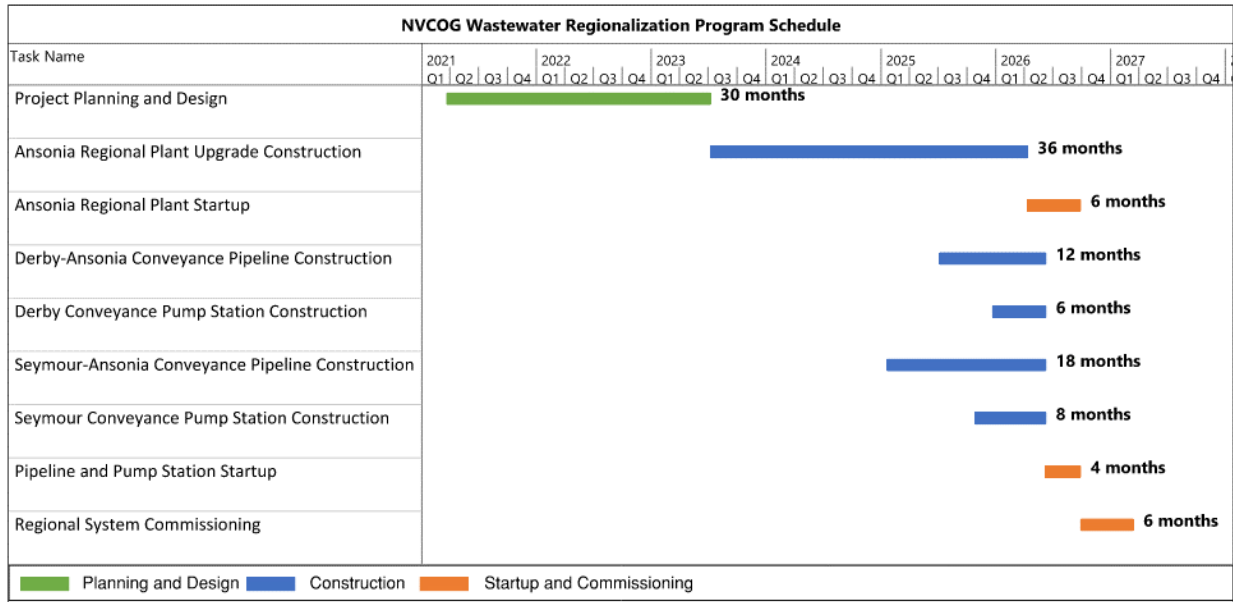


Figure 4 – Recommended Implementation Schedule

The proposed implementation schedule assumes 30 months to negotiate a regionalization framework between the three municipalities, to select a design engineer and to prepare construction bid documents for the regionalization infrastructure program. That would be followed by a 36-month construction period for expansion and upgrade of the Ansonia WPCF and building the conveyance pipelines and pump stations and preliminary treatment upgrades at the Derby and Seymour plant sites. The new regional infrastructure facilities would be started up and commissioned at the end of the six-year period, as indicated on the schedule in Figure 4.

8. Environmental Impact of the Proposed Project

The recommended project has been evaluated to identify any significant environmental impacts, in accordance with the criteria identified in Section 22a-1a-3 of the Regulations of Connecticut State Agencies. This includes potential direct, indirect and cumulative impacts.

a. Effect on Water Quality, Including Surface and Groundwater

The recommended wastewater regionalization project will have a net positive effect on local environmental surface water quality. This project will remove two existing discharges of treated domestic wastewater from the Naugatuck River (fresh water), relocating the effluent discharged from the upstream communities to the much larger Housatonic River, downstream of Derby (tidally influenced, brackish water).

One of the benefits will be removing all of the remaining nutrient phosphorus from the Naugatuck River that is currently coming from the Ansonia and Seymour WPCF discharges. The Housatonic River is not phosphorus-limited at Derby, since additional phosphorus does not contribute to eutrophication in brackish or saltwater environments.

The recommended plan includes a concerted sustained long-term approach to rehabilitation and infiltration/inflow reduction in the local sewerage collection systems of all three communities (Derby, Ansonia and Seymour). This will benefit local groundwater quality as well.

b. Effect on Public Water Supply Systems

The construction involved under the recommended project does not encroach on aquifer protection areas. Also, this project will not result in a net increase in demand for the existing potable water systems.

c. Effect on Flooding, In-Stream Flows, Erosion or Sedimentation

No in-stream work is anticipated under the recommended project.

It is not anticipated that any construction will be required in the 100-year floodplain. Floodplain information was accessed at:

<https://msc.fema.gov/portal/search?AddressQuery=amsonia%2C%20ct#searchresultsanchorFebruary2021>.

Also, no adverse impact on flood elevations are anticipated. Most of the conveyance pipeline construction will be taking place within the right of way of existing roads. Therefore, there should be no net increase in impervious areas, and no change to existing surface contours and grading.

The design documents will require contractors to utilize erosion and sedimentation control measures such as silt fences and hay bales in strategic areas including at storm drains and structures, and to promptly replant areas where ground cover has to be removed for construction.

d. Impact on Historical, Archaeological, Cultural, Recreational Sites

Almost all of the pipeline conveyance construction will be taking place within the right of way of existing public roads. If any construction is identified that will take place on a previously undisturbed site, the appropriate archaeological review will take place prior to construction.

A review of publicly available resources was undertaken; this included National Registry of Historic Places (NRHP) information accessed from National Park Service, National Register of Historic Places, <https://npgallery.nps.gov/NRHP/SearchResults/> accessed February 2021. The information from this data base shows that the City of Derby has listed properties on the National Register of Historic Places (NRHP). Listings in the vicinity of the project are at a distance of a quarter to a third of a mile from the proposed work. NRHP-listed properties in Derby near the project include the Birmingham Green Historic District, John I. Howe House, Kraus Corset Factory. The Osborne Homestead located in Osbornedale State Park is approximately a mile and a half from any proposed work.

NRHP resources in Ansonia are located at a distance from the project on the east side of the Naugatuck River. Impacts to these NRHP-listed resources are not anticipated due to work associated with the project being at a distance of at least a quarter of a mile or more from NRHP-listed properties.

Nearby recreational sites include the Derby Greenway trails system and the Ansonia Riverwalk. None of the local recreation sites are projected to be impacted by the project.

e. Impact on Natural Environmental Habitat, Migratory Wildlife and Critical Species

No known endangered species will be impacted by project construction activities. A search of the U.S. Fish & Wildlife Service (USFWS) Information, Planning and Consultation database returned the result, "There are no critical habitats at this location." IPaC database search was conducted at <https://ecos.fws.gov/ipac/> February 2021.

No in-stream work is proposed as a part of this project. Therefore, no adverse impact is anticipated regarding the movement of fish or other aquatic species.

f. Use of Pesticides, Toxic or Hazardous Materials

Other than chemicals normally used in the treatment of domestic wastewater, the only toxic chemicals anticipated to be used in the project would be related to typical construction activities, such as fuel for construction vehicles. A Spill Prevention, Control and Countermeasures (SPCC) Plan will be developed and followed throughout construction, to minimize any accidental releases of any toxic or hazardous substances to the environment during construction.

It is noted that the recommended plan will use UV irradiation at the Ansonia regional WPCF for final effluent treatment prior to discharge. This fully eliminates the use of chlorine and dichlorination chemical solutions which are currently used at both the Derby and Seymour WPCFs.

g. Aesthetic or Visual Impacts

The project will have a net positive visual and aesthetic impact. The two existing WPCF's in Derby and Seymour will be decommissioned and each converted to a pumping station and headworks, while the Ansonia WPCF will be added to within the boundaries of the existing site. The buried pipelines will not be visible after construction is completed.

h. Consistency with State, Local and Regional Plans

The recommended plan is consistent with the policies of the State Conservation and Development (C&D) Plan, developed in accordance with Section 16a-30 of the Connecticut General Statutes. It also is consistent with the Draft State Plan for 2018-2023, other agency plans, and applicable local and regional C&D plans for Ansonia, Derby and Seymour.

By eliminating the existing Derby WPCF, the recommended plan enhances the opportunity for development within that community's Downtown Redevelopment Zone, one of the objectives identified in Derby's C&D Plan.

None of the communities in the project area are within the boundaries of the Connecticut Coastal Management Area.

i. Displacement of Local Residents or Businesses

No displacement of local residents or businesses is anticipated for this project.

j. Impact on Traffic Congestion

Vehicular and pedestrian traffic on local roads will be temporarily disrupted or rerouted during conveyance pipeline construction activity in or adjacent to public roadways. A traffic control plan and traffic details will be required to address this in all construction contracts.

Traffic disruption will be minimized by requiring a traffic control plan to re-route traffic in the impacted areas and utilizing appropriate signage and traffic control personnel.

k. Impact on Energy Use

Energy consumption will increase temporarily during construction activities, due to the power required for construction vehicles and equipment, and to manufacture project materials such as pipe and concrete. After construction is completed, under the proposed regionalization plan, no net increase in overall energy consumption is anticipated versus the base case of continuing to operate three smaller WPCF's.

l. Potential Hazards to Human Health or Safety

The proposed project is not expected to create any significant net increase in hazard to human health or safety.

m. Effect on Ambient Air Quality and Noise Levels

Eliminating the Derby WPCF and the Seymour WPCF (along with associated onsite sludge thickening and dewatering operations) would reduce the potential for odors in the vicinity of those two existing facilities. Since the Derby WPCF is relatively close to downtown Derby and to adjacent properties that are available for future development, the overall impact to local air quality would be positive.

Increasing the flows to the existing Ansonia WPCF is not expected to have any appreciable impact on local air quality, particularly since the plan is to continue to haul liquid sludge offsite in tanker trucks for dewatering and incineration, rather than processing sludge onsite.

The only potential adverse air quality-related impacts related to this project would be short-term impacts that may occur during the construction phase, related to the noise and emissions of construction vehicles. To mitigate these impacts on local residents, working hours for construction would be limited by specification to comply with local requirements and ordinances. Increased exhaust emissions would be minimal compared to background levels from local traffic.

Blasting may be required for deeper sewer construction in some of the areas that contain ledge. However, the contractors will be required to comply with local permitting requirements; and would be restricted to normal working hours in the middle of weekdays. There may be a short-term increase in local dust particle levels in the immediate area during construction. This will be mitigated during dry periods by wetting down the dust-generating surfaces with water during construction.

During construction, the temporary noise impact will be minimized by limiting construction to normal daytime working hours, and by using equipment and methods that attenuate sound.

n. Effect on Wetlands and Other Land Resources and Landscapes

No wetlands areas designated within the project areas or along the recommended pipeline routes that have been identified would be negatively impacted by this project.

o. Effect on Agricultural Resources

The project is not projected to have any impact on Connecticut agricultural resources. There are no areas that have been designated as prime farmlands within the project area.

p. Adequacy of Existing or Proposed Utilities and Infrastructure

The existing utilities can be readily upgraded to meet the needs of the proposed project. The new regional treatment facility at Ansonia will expand on the existing utilities and infrastructure. The existing treatment plants at Derby and Seymour will be largely decommissioned, leaving only a pump station and headworks at each of those two sites.

q. Effect on Greenhouse Gas Emissions

Construction equipment will contribute to greenhouse gas emissions during the construction phase. However, during operation of the regional WPCF no net increase in greenhouse gases (CO₂ and methane) is anticipated versus the base case condition of continuing to operate with three separate, smaller WPCFs.

r. Effect of Changing Climate, and Resiliency Measures Incorporated into Project

All new or upgraded wastewater projects must be designed to take into consideration severe weather and anticipated climate change impacts. Projects funded by the state of Connecticut must be designed for uninterrupted operation, and to be protected from physical damage, during the 100-year storm event.

Based on a review of the most recent available FEMA Flood Insurance Rate Maps (FIRMettes) covering the areas of the Ansonia, Derby and Seymour, none of the three WPCF's are within the 100-year flood plain. The Derby and Ansonia WPCF's are protected by the local flood control levees. While the Seymour WPCF is located near the Naugatuck River, it is at an elevation well above the 100-year and 500-year flood zones, and therefore is not considered in danger of flooding. During detailed design, the most current flood maps and regulations will be reviewed to confirm that designed facilities meet climate change and resiliency requirements.

s. Indirect Impacts

No negative long-term environmental impacts on air or water quality are anticipated resulting from this project. The project will not impact land development or flood patterns and is not expected to displace any homes or businesses. This wastewater regionalization plan should not impact the potential for future development that would otherwise occur within the service areas of the three impacted communities.

Since the recommended plan does not involve constructing new local sewers, it does not impact the potential for further development within the service area. The recommended plan does not extend the sewer service area in any of the municipalities involved, nor does it create new restrictions to future growth within the service area.

t. Irreversible and Irretrievable Commitment of Resources

The resources that will be committed to implementing this project include the labor, energy and materials required to install new conveyance pipelines and to upgrade existing wastewater pumping stations and the WPCFs. After construction, the project should result in reduced electric power demand for wastewater treatment, and reduced labor for maintenance of existing infrastructure. This is because overall treatment is consolidated at one WPCF and not dispersed at three plants as it is now.

u. Unavoidable Adverse Impacts

Unavoidable adverse impacts should be limited to typical short-term consequences from conveyance pipeline construction in residential and commercial areas. That would include temporary traffic restrictions or rerouting; noise from construction vehicles; and increased sediment erosion from runoff associated with construction. Appropriate steps will be undertaken during development of design plans and specifications to communicate steps to minimize these impacts during construction. There should be no affect to habitat other than minimal tree removal that may be required along the routes of the conveyance pipelines.

v. Mitigation of Adverse Environmental Impacts

Adverse impacts are related to construction activities. These impacts therefore will be short-term and can be mitigated to a large extent by including proper control measures in all construction contract documents and enforcing these requirements.

9. Permits, Certifications and Approvals Needed

It is anticipated that the following permits and approvals will be required for construction of this project:

- Local inland wetland permit would be required for work within 100 feet of any inland wetland, if any construction activity near wetlands is identified during design.
- CT DOT Encroachment permits will be required for any work within the right-of-way of state roads along the route of the conveyance pipelines. That would include for pipe jacking crossing of State Highway 8.
- Local road opening permit for any work on municipal roads in Derby, Seymour and Ansonia.
- Proposed construction plans must be coordinated with Planning and Zoning in each of the impacted municipalities, in accordance with the requirements of CT General Statue 8-24.
- State Historic Preservation Office (SHPO) Coordination
- DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities
- DEEP Flood Management Certification.
- Local building and electrical permits will be required for capital construction work at the treatment plants, pump stations and headworks facilities.
- Approvals for RR crossings, from ConnDOT and Housatonic Railroad.

10. Summary of Agency and Public Consultations

The proposed project was the recommended outcome of a study commissioned by the Naugatuck Valley Council of Governments (NVCOG). Throughout the project, there was ongoing communication, site visits, meetings and workshops held with representatives of all five communities participating in the study (Derby, Ansonia, Seymour, Beacon Falls and Naugatuck).

Input into the study process was sought and received from members of the local Water Pollution Control Authorities from each community as well as from the local Departments of Public Works, plant operators, municipal leaders and municipal wastewater consultants.

The study consisted of a multi-step process that began with assessing the existing conditions and coming up with a long list of regionalization alternatives. The long list was then reduced to a short list of alternatives for additional study. The alternatives on the short list underwent further development, costing and analysis to come up with a recommended plan. At each major step of this process, representatives of NVCOG as well as the individual communities were involved in providing advice, feedback and input. The recommended plan therefore reflects significant public consultation from the impacted communities.

Appendix A – Conveyance Pipeline Route Descriptions

Table A-1: Derby to Ansonia Conveyance Pipeline Descriptions by Segments

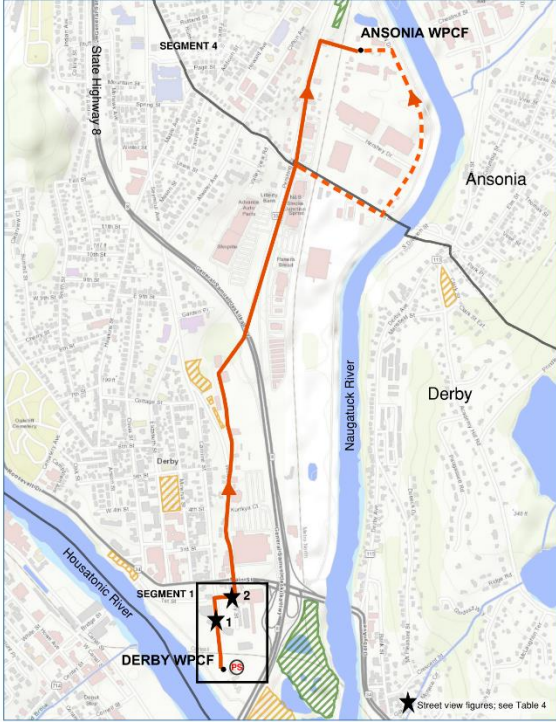

Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 1 – Approx. 1,300 ft long (within street ROW)</p> 	<ul style="list-style-type: none"> • City Land Use Zoning Designation (Central Design Development) consisting of varied land uses in Derby’s central core • Mix of industrial and commercial establishments with some multi-family residential units • Several empty lots within this segment 	

Table A-1 (continued): Derby to Ansonia Conveyance Pipeline Descriptions by Segments



Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 2 – Approx. 1,500 ft long (within street ROW)</p> 	<ul style="list-style-type: none"> • City Land Use Zoning Designation (Central Design Development) consisting of varied land uses in Derby’s central core • Mostly a mix of commercial establishments and multi-family residential units 	

Table A-1 (continued): Derby to Ansonia Conveyance Pipeline Descriptions by Segments



Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 3 – Approx. 1,500 long (private parcels)</p> 	<ul style="list-style-type: none"> • City Land Use Zoning Designation (Industrial) • Mix of commercial and industrial establishments • Portion of private parcel is vegetated and will be restored after construction 	

Table A-1 (continued): Derby to Ansonia Conveyance Pipeline Descriptions by Segments

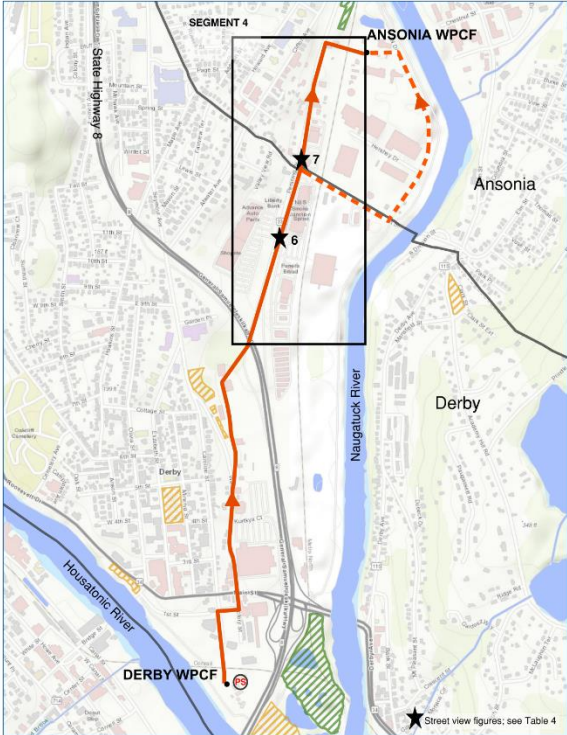

Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 4 – Approx. 3,800 ft long (within street ROW)</p> 	<ul style="list-style-type: none"> • Derby Land Use Zoning Designation (Business) and Ansonia Land Use designation (Commercial) • Commercial establishments including shopping centers both sides of street • Some multi-use residential units 	

Table A-2: Seymour to Ansonia Conveyance Pipeline Descriptions by Segments

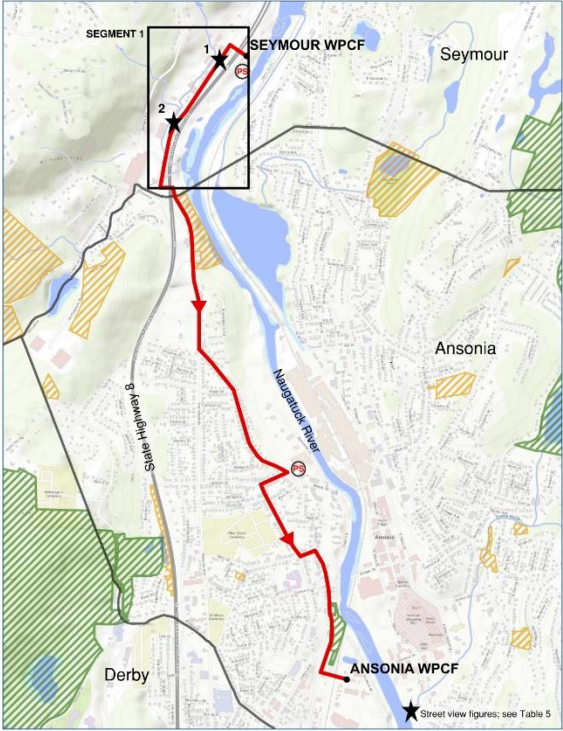
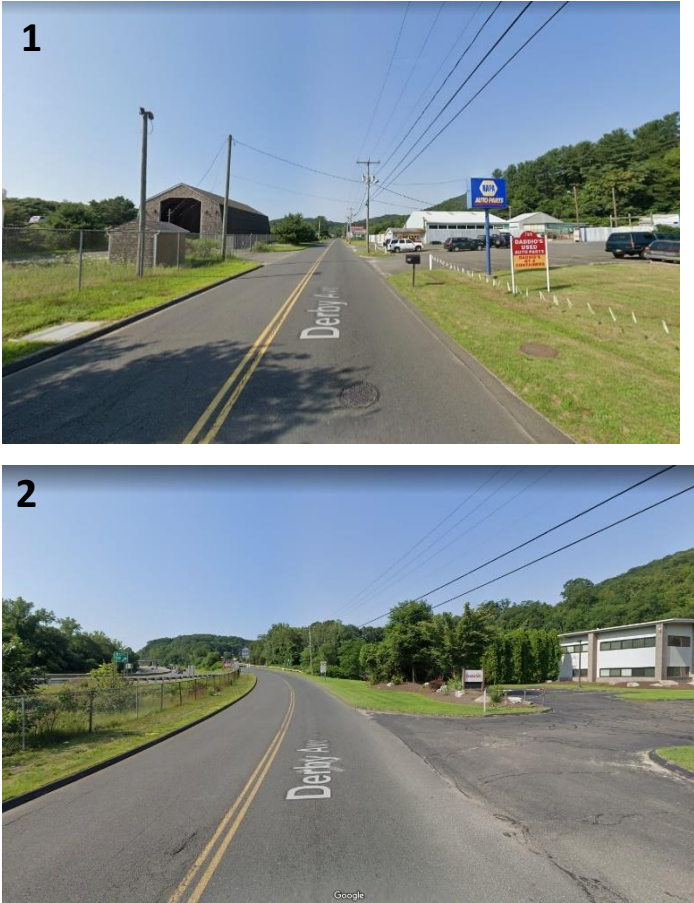
Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 1 – Approx. 3,500 ft long (within street ROW)</p> 	<ul style="list-style-type: none"> • Town of Seymour Land Use Designation (limited industrial) • Commercial and industrial establishments including a shopping center along the west side • Route 8 highway borders east side of segment 	

Table A-2 (continued): Seymour to Ansonia Conveyance Pipeline Descriptions by Segments

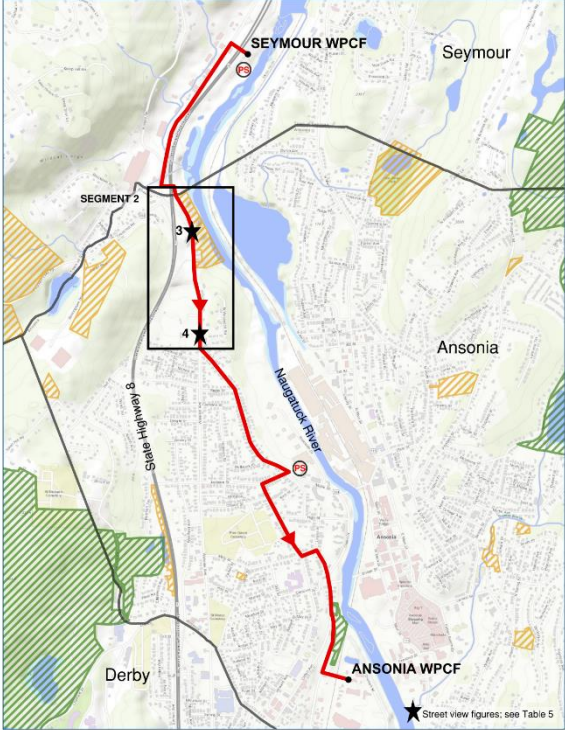

Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 2 – Approx. 3,000 ft long (within street ROW)</p> 	<ul style="list-style-type: none"> • City of Ansonia Zoning Land Use Designation (Heavy Industrial followed by Residential) • Mix of single-family residential units and recreational facilities 	

Table A-2 (continued): Seymour to Ansonia Conveyance Pipeline Descriptions by Segments

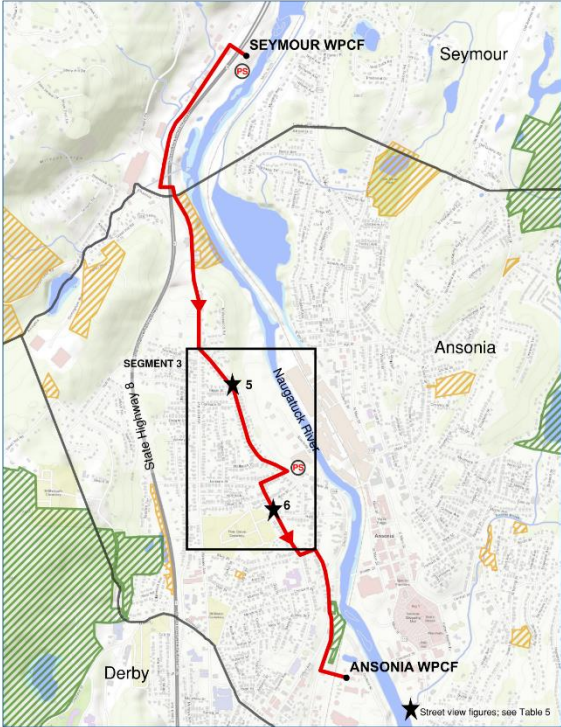

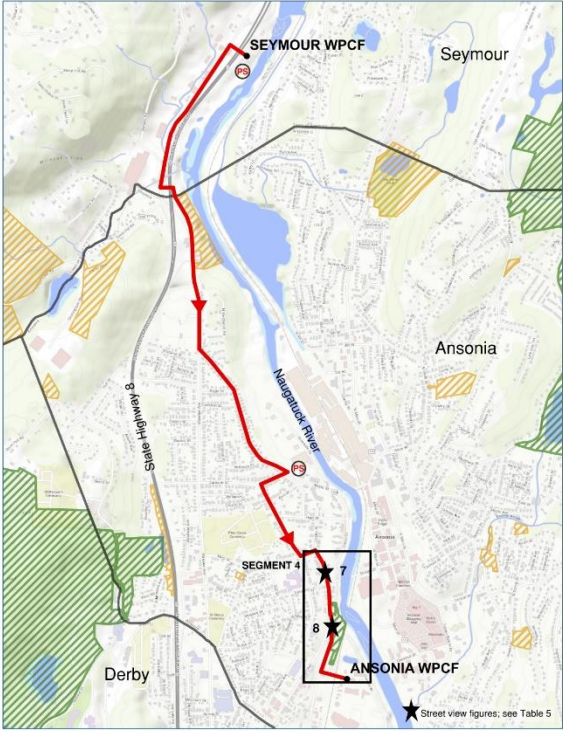
Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p>Segment 3 – Approx. 5,100 ft long (within street ROW)</p>  <p>The map shows the conveyance pipeline route (red line) starting at SEYMOUR WPCF, passing through Seymour, Ansonia, and Derby, and ending at ANSONIA WPCF. The route is labeled SEGMENT 3. Key features include State Highway 8, Naugatuck River, and various zoning designations (yellow and green hatched areas). Street view markers 5 and 6 are indicated along the route.</p>	<ul style="list-style-type: none"> • City of Ansonia Zoning Land Use Designation (Residential) • Mix of single and multi-family residences 	 <p>Image 5: A street view showing a residential area with double yellow lines on the road, utility poles, and houses. The number 5 is in the top left corner.</p> <p>Image 6: A street view showing a residential area with a car on the road, utility poles, and houses. The number 6 is in the top left corner.</p>

Table A-2 (continued): Seymour to Ansonia Conveyance Pipeline Descriptions by Segments

Route Segment and Attributes	Description	Typical Conveyance Corridor View
<p data-bbox="310 342 886 407">Segment 4 – Approx. 2,600 ft long (within street ROW)</p> 	<ul data-bbox="913 342 1171 873" style="list-style-type: none"> • City of Ansonia Zoning Land Use Designation (Multi-Family District, followed by Residential and then Commercial) • Residential in the north and central parts of the segment and commercial establishments along the south part of segment 	