



JUNE 2024



Centralville Sewer Separation Project

Public Lands Preservation Act – Alternatives Analysis



Prepared for:

SECRETARY OF ENERGY & ENVIRONMENTAL AFFAIRS

Prepared on behalf of:

LOWELL REGIONAL WASTEWATER UTILITY (LRWWU)



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1.0 Public Lands Preservation Act (PLPA)

In accordance with the Executive Office of Energy and Environmental Affairs (EEA) and the Guidance on Public Lands Preservation Act (PLPA) Implementation issued in February 2023, the Lowell Regional Wastewater Utility (LRWWU or Utility) submits the following alternatives analysis as required by the PLPA for the change in use of land related to the proposed Centralville Sewer Separation Project in the City of Lowell (the City, or Lowell). The purpose of the alternatives analysis is to demonstrate that no feasible or substantially equivalent alternative exists that avoids or further minimizes impacts to the public land adjacent to the project site subject to Article 97 of the Massachusetts Constitution.

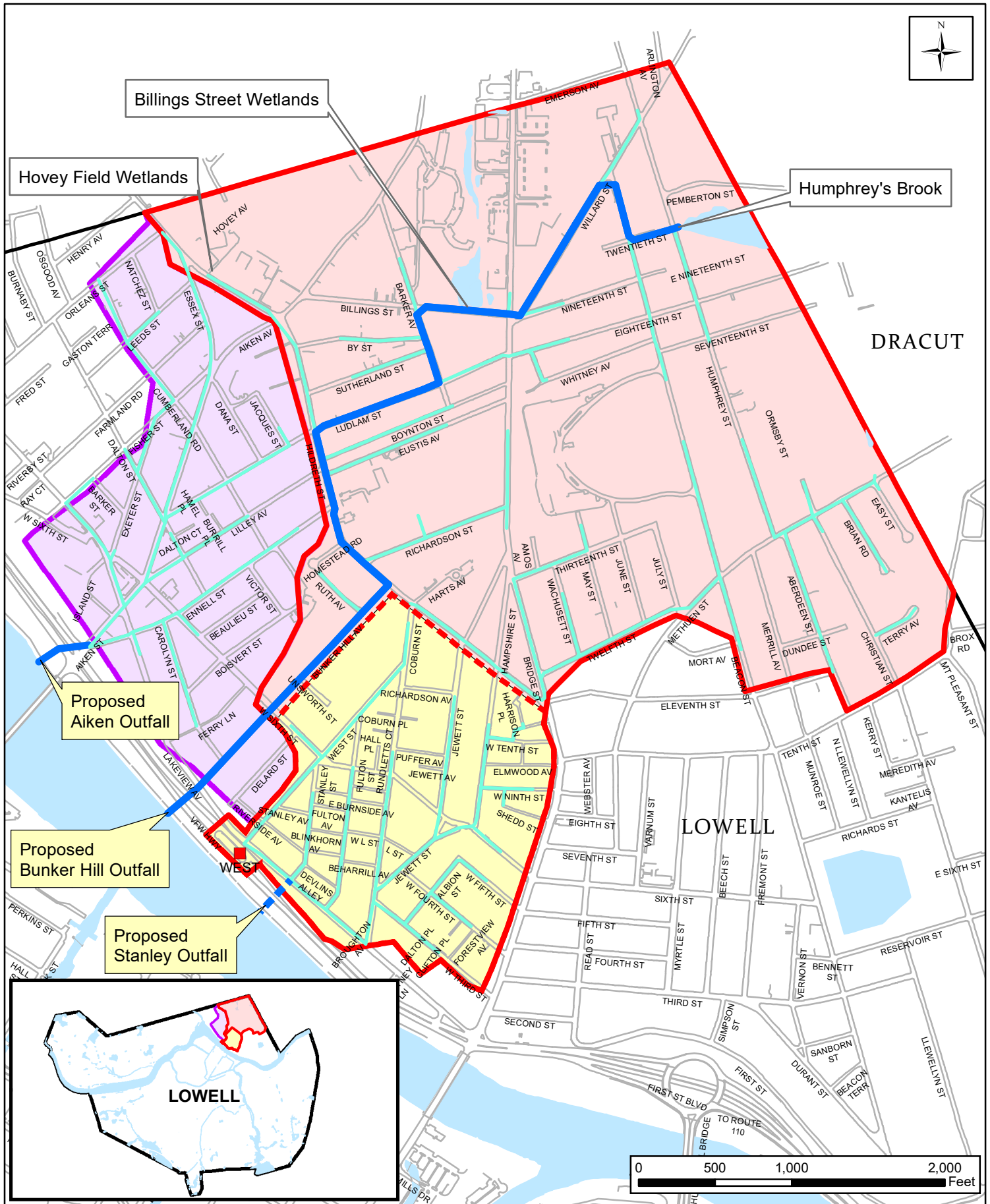
The Proposed Article 97 Action and Public Purpose

Project Description

The City is under a 2024 Consent Decree (Civil Action 1:24-cv-10290), established by the U.S. Department of Justice and U.S. Environmental Protection Agency (USEPA) jointly with the Massachusetts Department of Justice and Massachusetts Department of Environmental Protection (MassDEP), to mitigate combined sewer overflows (CSOs) discharges (via permitted outfalls) from the City's combined sewer system. The Consent Decree requires the City to separate the City's Centralville neighborhood (formerly identified as the Humphreys' Brook Basin), which includes combined sewer tributary basins that contribute to CSO discharges from the West CSO Station Outfall.

Lowell's existing combined sewer system in this area conveys sanitary and drainage flow from about 540 acres in Lowell and 400 acres of surface water in Dracut. As mandated in the Consent Decree, a Preliminary Design Report (PDR) for the Centralville Sewer Separation Project was developed to consider construction impacts, challenges, and pipe layouts to separate the area. The PDR was submitted to USEPA and MassDEP before December 31, 2023 (CDM Smith, December 2023). The goal of the sewer separation project is to install new drainpipes in City streets to convey the surface water from multiple locations in Dracut and the public street flow in Lowell to the Merrimack River. Based on topography, pipe depths, utility conflicts, and constructability challenges, the preliminary design of the new drainpipe system resulted in the creation of three new drain outfalls to the Merrimack River, as shown on **Figure 1**.

A new drainpipe system in this area is estimated to reduce CSO discharge events from the West Station on average from 17 times per year to approximately 7 times per year. CSO volume is estimated to be reduced by as much 50 million gallons per year on average. In addition, areas of chronic street flooding, a public health and safety hazard, will be mitigated by these sewer separation projects.



- Legend**
- Mainline Conduit and Outfalls (Phase 1)
 - Branch Drain (Future Phase)
 - Stanley Outfall
 - Existing Drain
 - West CSO Diversion Station
 - Separation Area to Bunker Hill Avenue Outfall
 - Separation Area to Aiken Street Outfall
 - Separation Area to Stanley Street Outfall

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Figure 1:
Three Sewer Separation Areas with Separate Outfalls

New drain outfalls are proposed along the Merrimack River riverbank approximately at the end of Aiken Street, end of Bunker Hill Avenue, and the end of Stanley Street. **Figure 2** shows the approximate locations of the proposed outfalls and the property owners. The Massachusetts Department of Conservation and Recreation (DCR) owns the riverbank property at each outfall. The Stanley Street outfall pipe is partially adjacent to a City-owned parcel but this parcel does not extend to the riverbank, where the outfall discharge is to be located on DCR land.

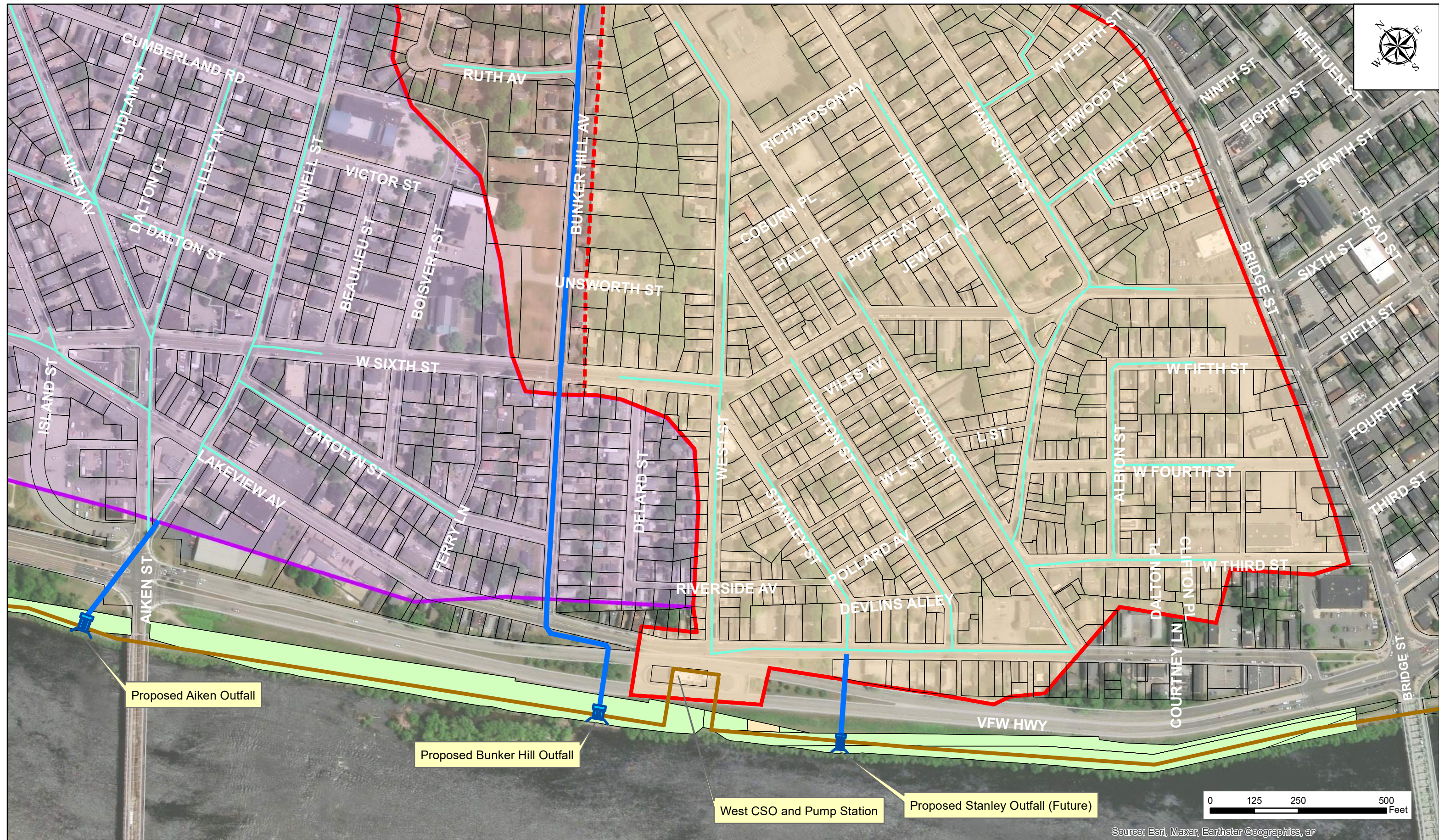
The Bunker Hill Avenue and Stanley Street outfalls are both located within the Lowell Flood Damage Reduction (FDR) System, regulated by the U.S. Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA). At these two locations the FDR is comprised of an earthen levee system, where the crest was modified by the Massachusetts Department of Transportation (MassDOT) for the Veterans of Foreign Wars (VFW) Highway. The earthen levee bank descends from the VFW Highway to the toe of the slope that ends about 50 feet from the riverbank. **Figure 3** shows some of these features. The paved Lowell Riverwalk also runs along the riverbank, as well as the City's 96-inch diameter North Bank Interceptor, which runs adjacent to the paved walkway (to the left of the paved walkway in Figure 3. DCR owns property along the riverbank that includes portions of the earthen levee, the paved walkway, and the land above the North Bank Interceptor.



Figure 3 – Riverwalk along the Merrimack River

Each outfall will have a drainpipe of various sizes that will approach the river at generally a perpendicular line. Each outfall pipe will enter a rectangular transition structure where the pipe will be divided into two smaller outfall pipes as the drain system has to extend over the existing 96-inch interceptor. The outfall pipes will have backflow preventer, swing check valves mounted on each pipe. Most of the new infrastructure will be below grade with only typical sewer manhole access, so the visible feature will be manhole covers. The riverbank outfall will also have concrete wingwall recessed into the riverbank so the concrete walls may be visible right on the riverbank. Some further details of each outfall are provided below:

- **Aiken Street Outfall:** the drainpipe extends from the intersection of Aiken Street and VFW Highway as a 5-foot by 6-foot box culvert (or similar sized pipe) to a transition structure, where dual 2-foot by 8-foot drains would outlet into the Merrimack River.
- **Bunker Hill Avenue Outfall:** the drainpipe extends from Lakeview Avenue with a new 5-foot by 6-foot box culvert (or similar sized pipe) to a transition structure where dual 2-foot by 8-foot drains would outlet into the Merrimack River. The transition structure will be installed approximately in the flat area to the river of the paved riverwalk in **Figure 3**.



Legend

- Separation Area to Bunker Hill Avenue Outfall
- Separation Area to Aiken Street Outfall
- Separation Area to Stanley Street Outfall

- Existing Sewer Interceptor
- Outfall / Mainline Drain
- Phase 2 - Branch Drains

- Proposed Outfall Structure
- Parcels

- DCR Property
- City Property

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Figure 2:
Proposed Outfalls and Property Ownership

- **Stanley Street Outfall:** the drainpipe extends from Stanley Avenue with a new 4-foot by 6-foot box culvert to a transition structure, where dual 2-foot by 8-foot drain would outlet into the Merrimack River. The transition structure will be installed approximately in the flat area to the river of the paved riverwalk in **Figure 3**.

Proposed Activities on Article 97 Land

The three outfalls and connecting pipe are all located on portions of Article 97 land. The Article 97 property along the Merrimack Riverbank includes portions of the FDR earthen levee (between Aiken Street to Bridge Street) and the River Walk that extends along the Merrimack River in the project area, as well as the land above the 96-inch sewer interceptor.

The current use of the land is for passive recreation. Also, there are roadways/accessways granted to the City to access the manholes along the 96-inch interceptor for maintenance of the sewer and to perform periodic maintenance of the earthen levee system to maintain vegetation along the levee per USACE requirements.

The three proposed drain outfalls require the installation new stormwater infrastructure (piping and transition structures) that will be below-grade with manhole access. Accordingly, the proposed Article 97 action involves the change in use of approximately 4,000 square feet of Article 97 land that is needed for a 20 to 50-ft wide permanent utility easement centered around the drain piping, transition structure, and wingwall for future maintenance purposes for each outfall. The proposed construction would not result in any permanent physical change of the land, as the new drain piping and transition structure for each outfall would be installed below ground. Upon completion of installation, all temporary impacts would be restored to their pre-construction condition and not experience a permanent physical change. The only new visible above ground structures would be the access manhole (typical for a drain in the street) for each transition structure and the concrete wingwalls (and backflow gate attached to the wingwalls) on the bank of the Merrimack River. **Figure 4** shows a similar headwall and wingwall structure with a backwater gate at the West CSO Station, nearby to the proposed outfalls.



Figure 4 – West Station Outfall at the riverbank

Identify the Alternatives Considered

Alternatives were considered to effectively and economically remove surface water connections to the sewer system in the Centralville Sewer Separation Project area in the 2023 PDR. All new drain alternatives require a new drain system outfall to the Merrimack River. As noted above, based on topography, pipe depths, utility conflicts, and constructability challenges, the preliminary design of the new drainpipe system resulted in the creation of three new drain outfalls to the Merrimack River.

The following two alternatives could potentially minimize the Article 97 land takings proposed for the City's current project.

No Action Alternative

This alternative would avoid impacting Article 97 lands but is not feasible as the City is under a Consent Decree to complete sewer separation in the Centralville area in compliance with the Clean Water Act and Federal and State National Pollutant Discharge Elimination System (NPDES) outfall permitting regulations. No Action would put the City in federal and state violation status.

West Station Outfall (or Consolidation of Outfalls)

One alternative is to connect to the West CSO Station outfall to minimize the number of outfalls. However, the connection of all the proposed new outfalls to this existing would require the existing outfall size to be significantly increased to convey the additional flow of all three outfalls. The connection piping from Aiken Street would have to be routed east either along Lakeview Avenue and portions along VFW Highway, which is within the earthen levee, and would likely not be approvable by USACE, or along the riverbank, on DCR property and within the toe of the slope of the earthen levee, which again would likely not be approvable by USACE.

The new drain connection pipe(s) from the three proposed outfalls would conflict with the existing 96-inch diameter North Bank Interceptor. The Interceptor extends from the riverbank around the West Pump Station (because of the Station Outfall Pipe) and the new drain(s) would have approximately the same invert as the interceptor which would impede the pipe route.

Finally, the West CSO Station outfall and connecting pipe are located on DCR land. For the connection pipe routing and the resizing and restructuring of the West CSO Outfall, it is likely that an equal amount of disturbance and easement takings would be required.

Describe Why Each Alternative Not Selected is Not Feasible or Substantially Equivalent to the Proposed Article 97 Action

The PDR investigated alternatives to complete the separation of the Centralville area, which is mandated by a Consent Decree and state and federal clean water regulations. The best alternatives for the construction of new drainage to separate the existing combined sewer system in this area is to install new drainage pipe, which following the general topography of the area, will result in the creation of three new drain outfall/structures along the Merrimack River bank.

As noted above, the No Action Alternative is not a feasible alternative as the City would be in violation of state and federal requirements. The alternative to consolidate flows and attempt to connect it to an existing but larger outfall still requires Article 97 land takings for the connection piping and the larger outfall. A single outfall pipe for this large a surface area may also be infeasible given the depth of the river, the proximity and existence of the 96-inch interceptor along the riverbank, and general pipe flow characteristics that require a discharge to be above the bottom of the river.

Summary

Based on the analysis above, the City's proposed Centralville Sewer Separation project, requiring the Article 97 land taking for three new drain outfalls serves a significant public interest in that it will reduce untreated CSO discharge from the City of Lowell combined sewer system, reduce upstream street flooding and basement backups due to sewer system surcharging, reduce the impacts to the riverbank by strategically locating three new drain structures instead of a single huge structure, and significantly limits any above-grade changes in use of the DCR land.