



Phase III CSO Program

I. Introduction

The Narragansett Bay Commission (NBC) has embarked on the design and construction of Phase IIIA of its Phase III CSO Program. The Pawtucket Tunnel Design Build project is the largest and most significant project in the Program, currently in the final design and construction phases by the Design Build team of CBNA-Barletta Phase IIIA Joint Venture (CB3A). The tunnel will have a 30-foot finished inside diameter and it will be approximately 11,600 feet long once completed. It will be constructed using a tunnel boring machine (TBM), beginning at a tunnel launch shaft on property acquired by NBC at 804 School Street in Pawtucket.

Tunneling will displace upwards of 600,000 cubic yards of crushed up rock which requires management during construction. This displaced tunnel construction material will be brought to the surface on a conveyor belt system through the bored tunnel and vertically up through the launch shaft, where it will be temporarily stockpiled before being hauled offsite. The Pawtucket Tunnel Design-Builder has prepared a Tunnel Muck Management Plan, available to Coastal Resources Management Council (CRMC) for review under separate cover, that describes how this material will be handled and managed.

One of the measures proposed for managing displaced tunnel construction material is to use some of it in the shaping and grading on top of the North and South Landfills at the Bucklin Point Wastewater Treatment Facility (WWTF). It is estimated that approximately 160,000 cubic yards of this tunnel construction material can be used at the two landfills. This represents a sizable fraction (i.e. approximately 25%) of the total amount of material generated from tunnel construction given that many different sites may be required to manage the entire quantity of tunnel material generated. The project is highly beneficial to NBC for several reasons.

- The project is proposed on landfills that have been closed for decades, land which is not actively being used by NBC for other purposes.
- NBC owns and controls the landfill sites, so there will be no disposal tipping fees unlike offsite disposal locations.
- The Bucklin Point WWTF is contiguous to the tunnel launch shaft site, only separated by Nassau Street. This will minimize haul times, allowing more material to be removed from the site with fewer trucks. It will also reduce emissions by taking trucks off public roads that would otherwise need to travel to offsite locations.
- Material can be hauled to the Bucklin Point WWTF based on the permitted hours for trucking in accordance with contract requirements and local ordinances. This eliminates reduced material hauling based on operating hours in place at offsite reuse sites or disposal facilities.
- By establishing an approved location for this material that is under the Owner's control, it greatly reduces the risk of the Design-Builder running out of room at the tunnel





construction site if material hauling does not keep pace with tunneling (a condition often referred to as being “muck bound” in the tunneling industry). If the tunnel construction site does become muck bound, significant costs and delays may occur as tunneling cannot proceed until excess material is moved off site.

NBC has several goals for the project, as follows.

- Maximize the use of displaced tunnel construction material to reduce the amount of material that otherwise requires offsite disposal. This will reduce project costs and reduce schedule risk by providing an Owner-controlled site for displaced tunnel construction material.
- Reduce the wear and tear on local roads around the site by minimizing the distance traveled to haul the material off site.
- Reduce impacts on nearby residents by decreasing truck traffic on roads surrounding the site.
- Provide final grades that support potential future site uses. No future uses have been decided on at this time, but options under consideration include passive recreation and renewable energy (e.g., ground mounted solar).
- Provide final grades with stabilized vegetated slopes that promote stormwater runoff in a non-erosive manner.
- Provide final grades that have minimal impact on stakeholders by limiting the final height of each landfill and minimizing encroachment toward property lines.
- Incorporate stormwater controls into the proposed final grades to prevent erosion and reduce nuisance flooding.
- Add controls to vent methane to the surface, to mitigate potential offsite migration.

The proposed activities are depicted on the enclosed drawings entitled “Phase III Combined Sewer Overflow Program, Pawtucket Tunnel – Construction Spoils Reuse, Bucklin Point Landfills, East Providence, RI”, prepared by Stantec and Pare Corporation and dated February 2022. Tunneling is expected to begin in August 2022 and take approximately 12 – 18 months. NBC desires to have the required permit approvals and authorizations for these activities before August 2022 so that the Bucklin Point Landfills can start receiving displaced tunnel construction materials at the start of tunneling. This will provide maximum schedule flexibility and allow for its use to be coordinated with the availability of other offsite locations that will be required to make up the remaining tunnel construction material surplus. The proposed activities are in accordance with pre-application meetings conducted with staff from the RIDEM and CRMC on September 20, 2021 and October 27, 2021, respectively.

II. Background

The Bucklin Point WWTF was operated by the Blackstone Valley District Commission (BVDC) until its merger with the Narragansett Bay Water Quality Management District Commission, which later became NBC. This merger went into effect on January 1, 1992. The North and





South Landfills have historically been regulated by the RIDEM Division of Water Resources (now the Office of Water Resources) because they were used for disposal of wastewater treatment plant sludge. They have also been regulated by CRMC because of their location in Coastal Resources Management Program (CRMP) jurisdiction.

RIDEM issued **Order of Approval (OA) No. 492** to the BVDC on May 21, 1982 for wastewater treatment plant sludge disposal operations. This authorized the creation of a sludge landfill to the north of the WWTF (i.e., the North Landfill), based on plans entitled “Additions and Modifications to Existing Wastewater Facilities, Sludge Landfill – Plan” prepared by Metcalf & Eddy, Inc. (M&E) and dated February 1980. Prior to its development, aerial photographs and historic shoreline mapping available from CRMC show that filling into the river occurred in this area. The nature of this filling is unclear. The historical photographs suggest this primarily occurred between the 1950s and early 1970s. The approved 1980 M&E plan called for the preparation of subgrade, installation of perimeter drainage piping and controls, and construction of a dike along the shoreline. This dike essentially now represents the shoreward edge of an existing grass perimeter access road along the western toe of the present-day North Landfill. Other records suggest that the dike was constructed to approximately 10 feet high above the shoreline, which topographic survey generally corroborates. Once established, waste sludge from the Bucklin Point WWTF, and intermittently from the Fields Point WWTF, was being buried at the North Landfill with gravel cover material.

The Bucklin Point South Landfill is located directly south of the Bucklin Point WWTF. Based on file information reviewed at the RIDEM, this site was used as a borrow area and for stockpiling and disposal before it was established as a sludge landfill in the early 1990s. Historic deposition of iron slag and concrete reportedly formed a berm along the shoreward side of the site. Aerial images also suggest that portions of the river were filled in this area in the 1950s.

The South Landfill was created by relocating and burying sludge and cover soils excavated from the Bucklin Point North Landfill as part of a project referred to as the “Rejuvenation of the BVDC Sludge Disposal Facilities”. At the time, the BVDC viewed the North Landfill as an asset that allowed them to properly manage sludge generated from wastewater treatment operations. RIDEM initially issued **OA No. 887** on March 15, 1990, authorizing the creation of the South Landfill. However, plans for excavating material out of the North Landfill and burying it in the proposed South Landfill changed later that year. Two new approvals, **OA No. 953** and **OA No. 954**, were issued by RIDEM on December 24, 1990. **OA No. 953** authorized work at the North Landfill proposed by drawings entitled “Rejuvenation of the Blackstone Valley District Commission Sludge Disposal Facilities”, dated October 1990 and prepared by BETA Group, Inc. **OA No. 954** authorized modified plans for the creation of the South Landfill, based on plans prepared by BETA Group, Inc. and dated December 1990.

The CRMC authorized these activities through **Assent B90-9-15** (or alternatively referred to as Assent 1990-09-015), issued January 2, 1991. The Assent authorized relocation of





approximately 120,000 cubic yards of sludge/gravel material (reported to be 90% gravel and 10% sludge by BVDC) from the North Landfill to the South Landfill, as well as relocation of an additional 140,000 cubic yards of material from the North Landfill to the Central Landfill in Johnston, RI. The actual amount of material used in creating the South Landfill is unknown. The Assent made several stipulations, the most important of which have been summarized below.

- All work shall strictly adhere to the approved plans unless otherwise stipulated.
- Material transferred to the South Landfill shall be adequately compacted to fill voids.
- Two groundwater monitoring wells shall be installed at the South Landfill.
- The site shall be loamed and seeded, with minimum eight inches of loam used.
- Conservation grass seed mixture approved by the CRMC biologist shall be used to seed the South Landfill.
- A row of tree saplings and shrubs shall be planted along the shoreline to act as a seed source for regrowth of the buffer zone, with the species planted approved by CRMC biologist.
- A 50-foot wide buffer zone on the north and south sides of the South Landfill, expanding to 100 feet wide on the central western shore, shall be established and retained in a natural undisturbed condition in perpetuity. The plan shall be modified to demarcate this buffer zone, and shall be approved by CRMC staff.
- As a condition of the Assent, the BVDC shall perform an assessment of the feasibility of providing public access to the South Landfill site following its stabilization. A report describing this public access feasibility assessment was required to be submitted to CRMC within one year of the Assent being issued.

Earlier plans for the Bucklin Point South Landfill included an access road circling the site and a culvert discharging stormwater to the river to the southwest, but these features were removed to meet the buffer zone conditions that were ultimately stipulated in the Assent. Based on recent topographic survey and site visits to the South Landfill, it appears that there are Coastal shrubs within this buffer zone. The site is otherwise grassed as required by the Assent. Public access is not currently provided to the South Landfill, but BVDC may have identified concerns with providing public access so close to an active wastewater treatment facility.

It appears that the South Landfill was closed in accordance with the requirements and stipulations of the CRMC Assent and RIDEM Order of Approval. The Assent provided a deadline of January 2, 1994 but a schedule provided by BVDC planned for the work at the South Landfill to be performed in early 1991, with the site graded and stabilized by April 1991. File information indicates that BVDC requested an extension, but that closure was anticipated to be completed later in 1991. It is presumed that the South Landfill was closed sometime during the early 1990s and in accordance with the approved plans.

File information suggests that closure of the North Landfill was first considered in the late 1980s with multiple versions of closure plans having been submitted to the RIDEM. These early plans





investigated expanding the North Landfill by filling the paved access road along with the abutting landfill side slope (east side slope) and atop the landfill prior to its closure. Two alternatives, proposing 10 feet of fill and 20 feet of fill in the access road, were considered but neither were constructed. Closure would not be performed for several years after these plans were developed. Instead, additional sludge removal activities were performed at the North Landfill in the mid-1990s under multiple RIDEM approvals, including **OA No. 1106** issued December 2, 1992 and **OA No. 1159** issued October 18, 1993. These authorized hauling of additional excavated material to the Central Landfill, where the Rhode Island Solid Waste Management Corporation (RISWMC) used it as no cost cover material. NBC benefitted from creating additional airspace in the landfill for future disposal of sludge from wastewater treatment operations. These activities had previously been allowed by CRMC **Assent B90-9-15**, which was modified on August 30, 1993 based on CRMC Permit Database records.

In correspondence from NBC to RIDEM at this time, material being excavated from the North Landfill was described as a:

“mixture of stabilized wastewater residuals and gravel. The wastewater solids are highly stabilized as a result of having undergone both anaerobic digestion and chemical treatment”

And,

“the material to be removed from the landfill is approximately 3 to 4 parts gravel to 1 part sludge...the resulting material causes little or no problems in terms of handling and odors.”

The material currently buried in the North and South Landfills is anticipated to fit this description, consistent with the findings of two borings performed in the North Landfill in 2017.

A report by NBC entitled “Bucklin Point North Landfill Closure Plan”, dated August 1995 and revised in November 1995, described the planned closure of the North Landfill. This was a modification from previous closure plans, to reflect the topography of the landfill at the time. The maximum allowable elevation of the landfill at closure was 145 feet in the Pawtucket Datum, or 47.3 feet above MSL in NGVD 1929. Based on file information reviewed at the RIDEM, it appears RIDEM had directed the BVDC to limit the final elevation of the North Landfill to this elevation. Correspondence from BVDC to RIDEM in July 1991 states that previous plans allowed a peak elevation of 155 feet (Pawtucket Datum), which was consistent with elevations in the surrounding area. The northern 500 feet of the North Landfill was reported to be at elevation 156, which corresponds to approximately 58 feet MSL (NGVD 1929). An exception to this is in the northern plateau where the existing top of landfill had already exceeded this elevation. It appears this area was allowed to stay at its current height to avoid excavation and relocation of buried sludge. This part of the landfill is at a maximum elevation of approximately





58 feet MSL (NGVD 1929). Otherwise, the remainder of the landfill is at or below 47.3 feet MSL (NGVD 1929).

RIDEM issued **OA No. 1268** on December 4, 1995 accepting modifications to sludge handling and management at the Bucklin Point WWTF, including the landfill closure. Similarly, CRMC issued **Assent 1996-02-051** on February 26, 1996 approving activities associated with its closure. Closure of the North Landfill was performed from February 1996 to October 1996 based on correspondence from NBC to RIDEM Division of Water Resources. The closure was performed by regrading slopes with imported gravel, covering with loam and compost, and hydroseeding to stabilize the site and limit erosion. An impermeable cover was disregarded due to the type of material buried in the landfill. Landfill side slopes would be graded to a maximum slope of 3 horizontal to 1 vertical (e.g., 3:1) unless steeper slopes were already stable whereas regrading might destabilize them. The minimum top slope was set to 3% to promote runoff.

III. Applicability

CRMC issued a Category B Assent, A2020-02-043, following their review of a Master Plan that presented the projects in Phase IIIA of the Phase III CSO Program. Individual projects and Design-Build work packages are being permitted as Modifications to Assent A2020-02-043. Filling and grading at the Bucklin Point landfills was not included in the Master Plan, so CRMC has determined that a new Assent is required.

The work is adjacent to the Seekonk River at both landfills, which has been designated Type 4: Multi-Purpose Waters by CRMC. Shoreline features and coastal wetland areas have been identified in the field and are shown on the enclosed drawings. Work is not proposed within tidal waters or on adjacent shoreline features but alterations, including filling and grading, is proposed within the 200-foot Contiguous Area. Approximately 3.4 acres of Contiguous Area are within the project limits at the North Landfill. Approximately 1.5 acres of Contiguous Area are within the project limits at the South Landfill. In accordance with Section 1.1.4 (A) of the Coastal Management Program 650-RICR-20-00-1 (a.k.a., the Red Book), an Assent is required because alterations and activities are proposed within the Contiguous Area.

Freshwater Wetlands in the Vicinity of the Coast (FWWIVC) have also been mapped proximate to the landfills. At the North Landfill, this includes Forested Wetlands, Areas Subject to Storm Flow (ASSF), and a stream less than 10-feet in width with an associated 100-foot Riverbank. There is an isolated freshwater wetland to the north of the South Landfill, as well as an emerging plant community to its west. Work in areas proximate to these wetland features also fall under CRMC jurisdiction. While alteration of wetlands is not proposed, a permit is expected to be required in accordance with Section 2.5 of the Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast because the work as planned will change runoff characteristics to these areas. It is our understanding that activities proximate to these wetland areas will be reviewed as part of this Assent application.





The project is located within the geographic limits of the CRMC's Metro Bay Region Special Area Management Plan (Metro Bay SAMP; 650-RICR-20-00-5). More specifically, both the North and South Landfill sites are classified as High Priority Restoration Areas (HPRAs). It is our understanding that the Metro Bay SAMP was developed to evaluate and classify open land that may be considered for future development or redevelopment. The regulation defines "development" as "the construction of any new commercial, industrial, or residential structures as defined in § 1.3.1(C) of [650-RICR-20-00-1] for the purposes of the urban coastal greenway requirements. This also includes structures accommodating a mix of uses within a single development, building, or tract, as allowed by a municipality. The term "redevelopment" is similarly defined as "any alteration or reconstruction of existing commercial, industrial, or residential structures."

The referenced section of the Red Book defines development in terms of structural activities, which is not applicable to this project. The proposed activities are also not a redevelopment as defined, nor is the project an economic development which appears to be the intent of the Metro Bay SAMP. No change in use of the site is proposed, and both the North and South Landfills will be stabilized and revegetated consistent with their current condition once the project is complete. As such, the provisions of the Metro Bay SAMP, and by extension Urban Coastal Greenway requirements, do not appear to apply to this project. The proposed project is not an activity that triggers urban coastal greenway requirements, as described in Section 5.5 (C) of the Metro Bay SAMP. Regardless, we believe the proposed activities do not detract from the goals and requirements of the Metro Bay SAMP.

Public access to the shoreline is not currently provided at the site because it is an active wastewater treatment facility, consistent with similar facilities throughout the State. However, NBC is considering future uses at the North Landfill once this project is complete. No decisions on future uses have yet been made, but public access may be a component of these so long as they do not interfere with site operations, safety, and security.

IV. Existing Conditions

Existing conditions at the North Landfill are depicted on drawing sheets C-4 and C-5. Existing conditions generally reflect what was proposed on the closure plans for the landfill, with a plateau at elevation 58 feet (NGVD 1929) and a lower southern part of the landfill at an approximate peak elevation of 47.5 feet (NGVD 1929). The peak elevation in the lower section of the landfill is consistent with the maximum top elevation called for in the Closure Plan, converted to NGVD 1929 datum. Because the northern section of the landfill was already higher than this when the landfill was closed, it was allowed to remain at this higher elevation. Side slopes are 3H:1V, or steeper in some areas, transitioning to very flat topography at the top of the landfill.

A paved road provides access for trucks and delivery vehicles to the Bucklin Point WWTF from an entrance at Nassau Street. This road travels alongside the eastern toe of the North Landfill





and into the Bucklin Point WWTF. The other entrance to the site, from Campbell Avenue, is the main entrance and is used by passenger vehicles because of truck restrictions in the residential neighborhood east of the site. An entrance to the southern limit of the site, off Roger Williams Avenue, is gated and not typically used. Three paths provide access to the top of the North Landfill from the paved access road – a gravel access road travels to the top of the landfill at the approximate midpoint while grass roads lead to the top at the far north and south ends. A grass access road along the western toe of the landfill is also maintained by NBC. NBC mows the top of the landfill while brush and woody vegetation has grown along the side slopes. Two osprey nest platforms located atop the North Landfill were removed by NBC in advance of this proposed construction, while the poles will be removed once the frost layer thaws. Several bat houses at the northern end of the landfill will be removed and replaced during the proposed construction.

A closed drainage system was constructed when the landfill was developed in the 1980s. This system collects surface drainage from both the site and offsite areas from the east that drain to the site, and an underdrain constructed along the east side of the paved access road. Record drawings show that this underdrain consists of 12-inch perforated corrugated metal pipe (CMP) and is upwards of 20 feet below grade in some areas, presumably to intercept groundwater. The surface drainage system consists of drainage manholes and other structures, piping up to 36 inches in diameter, and culverts crossing beneath the paved access road. The surface drainage and underdrain systems discharge to the river at outfalls to the northwest and southwest of the landfill. A 60-inch CSO outfall from the North Diversion Structure, identified by NBC as OF-002, also discharges combined sewer overflows during wet weather events to the southwest of the landfill. Other outfalls along the western toe of the slope are believed to be inactive.

The Bucklin Point South Landfill is relatively small in comparison to the Bucklin Point North Landfill. It is also much lower, with an existing peak elevation of about 22 feet MSL (NGVD 29). The top of the landfill is very flat, with side slopes typically about 5:1 or flatter. The site is primarily covered with grass and brush, along with plantings used to establish a buffer in accordance with the CRMC Assent authorizing its construction. The landfill is bordered by a grass access road to the east, which travels from the Bucklin Point WWTF to Roger Williams Way to the south. The 48-inch East Providence Interceptor (EPI) flows to the Bucklin Point WWTF beneath this access road. According to City of East Providence tax assessor mapping, an easement borders this site directly to the south and the property beyond this easement is reportedly owned by Merrymeeting Realty LLC.

The Seekonk River borders the entire North Landfill to the west and surrounds the South Landfill to the north, west, and southwest. Salt marsh, coastal wetlands, and several areas of contiguous phragmites marsh have been mapped along the Seekonk River at the North Landfill along with isolated stands of *Spartina cynosuroides*. Salt marsh was mapped in areas along the shoreline at the South Landfill. Areas of FWWIVC were identified at both sites, including forested wetlands at the North Landfill and an isolated freshwater wetland to the north of the





South Landfill. An area of emergent plant community was also identified near the northwest corner of the South Landfill. The shoreline feature and wetlands were mapped by Pare Corporation. A wetland field report and photo document are provided with this Assent application.

Borings were performed at the North Landfill in late 2017 as part of the Phase III CSO Geotechnical Exploration Program (GEP). These borings were identified as B17-1 and B17-2A and are shown on the drawings. Another boring, B17-2, was started but abandoned and grouted closed before it was completed due to the discovery of high levels of methane. Both B17-1 and B17-2A were converted to monitoring wells and groundwater was monitored periodically following their installation. Boring logs and groundwater monitoring results are provided in the Design Basis Report submitted as part of this application package. Borings have not been performed at the South Landfill. USDA Soil Survey maps for both the North and South Landfills are provided with the figures that support this Assent Modification application, though it should be noted that native soils conditions at both sites have been heavily disturbed based on previous activities.

The site is entirely outside of any mapped Natural Heritage Areas (RIGIS). RIDEM has made NBC aware that Diamondback terrapin have been observed along the Seekonk River in the vicinity of Bishop Cove and Bucklin Point. No work is proposed in tidal waters or on the shoreline feature, so areas along both landfills that may be suitable for terrapin nesting will not be disturbed.

According to FEMA Flood Insurance Rate Maps for the area, the majority of the North Landfill lies in Zone X (Areas of Minimal Flood Hazard). A VE Zone (Coastal High-Risk Flood Zone) with base flood elevation 14 feet (NAVD 1988) extends onto the site at the southern half of the landfill where a separate VE Zone with base flood elevation 21 feet (NAVD 1988) extends onto the site at the northern half of the landfill. A Zone X with 0.2% Annual Chance Flood Hazard extends onto the site in the vicinity of the existing northern drainage outfall, at the northwest of the landfill. Very limited work is proposed within coastal flood plain at the North Landfill. A FIRMette for the area around the North Landfill has been provided as part of the figures supporting this Assent Modification application.

FEMA Flood Insurance Rate Maps for the area around the South Landfill show that the limits of proposed work are entirely within either a VE Zone with base flood elevation 13 feet (NAVD 1988) or in a Zone X with 0.2% Annual Chance Flood Hazard. A FIRMette depicting this condition is included with the figures supporting this Assent Modification application. While filling in flood plain is proposed, compensatory storage is not provided because the work occurs in the coastal zone.





V. Proposed Conditions

Filling and grading of the North Landfill will be done in phases to minimize disturbance during construction. Based on the landfill size and configuration, four phases are planned. Drawing sheet C-6 (Key Plan) and sheets C-7 through C-10 (Phases 1 – 4) are color coded drawings showing how the work is currently planned to be phased. Phasing is anticipated to begin in the lower, southern end of the landfill (Phase 1) with the work progressing northerly, toward higher areas of the landfill in Phases 2 and 3. Temporary swales and diversions and temporary sediment traps (TSTs) are anticipated to be used as each phase is developed to control stormwater. These controls will be constructed as the work progresses in each phase, getting removed and replaced as parts of the work area are stabilized and final stormwater controls are in place. An anticipated sequence of work is included on each phasing plan. A Soil Erosion and Sediment Control (SESC) Plan is enclosed as part of this application package.

Truck access to the Bucklin Point WWTF must be maintained at all times and cannot be interrupted during the proposed work. As such, a 30-foot wide gravel access road allowing for two-way truck traffic is proposed over the landfill. This road will be constructed before the existing paved access road along the eastern toe of the landfill undergoes reconstruction so that access to the Bucklin Point WWTF is always maintained. The phasing plans have been sequenced accordingly, with reconstruction of the paved access road planned as the last phase of construction at the North Landfill.

The final site grading and stormwater controls at the North Landfill are depicted on drawing sheets C-12 and C-13. Side slopes will be graded at maximum slope of 3H:1V, transitioning to a flatter top plateau with a minimum slope of 3% consistent with the minimum slope at the current landfill. The proposed peak elevation of the Bucklin Point North Landfill is approximately 66 feet MSL (NGVD 1929). The final grades have been planned to minimize potential visual impacts to abutters; otherwise, greater fill heights and volumes would be considered. This is discussed further in the Alternatives Analysis section that follows.

The proposed final grades accommodate future uses being considered by NBC, including recreation or renewable energy (e.g., ground mounted solar). Because the tunnel construction material used in filling will contain arsenic above RIDEM Direct Exposure Criteria, a one-foot clean soil cover underlain by nonwoven geotextile will be used to cover it unless other surface treatment is proposed (e.g., paved and/or gravel access roads). Accounting for this soil cover, approximately 95,000 cubic yards of tunnel construction material is anticipated to be used in the proposed grading at the North Landfill.

Proposed conditions at the South Landfill are depicted on drawing sheets C-25 through C-28. Side slopes will be graded at maximum slope of 3H:1V, transitioning to a flatter top plateau with a minimum slope of 3%. The proposed peak elevation is 47.5 feet NGVD 1929. The proposed limits of disturbance represent approximately 5.2 acres, and the work is planned to be





performed in a single phase. Riprap drainage swales will collect stormwater runoff around the toe of the landfill, which will discharge offsite through two new culvert outfalls. These are located to the northeast and southwest of the landfill. A 10-foot wide gravel access road will be provided to the top of the landfill and the exiting gravel access road to the east of the landfill will be raised to better collect and convey stormwater runoff. Future uses are not currently being considered for the South Landfill. Approximately 65,000 cubic yards of material are planned to be used in the proposed shaping and grading, accounting for a one-foot thick clean soil cover like that proposed for the North Landfill.

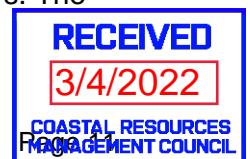
At the North Landfill, plateaus and moderately sloped areas (maximum slope of 10%) will be seeded with RIDOT Park Mix to mimic existing conditions. Steep slopes will be seeded with RIDOT Slope Mix, except where RIDOT Wildflower Seed Mix is proposed. This will provide a stabilized, low-maintenance restoration on the steep slopes where mowing is more difficult. NBC will maintain areas seeded with grass seed by periodically mowing them. Drainage swales, areas along the toe of the landfill, and areas along the paved access road where slopes steeper than 3H:1V are required will be stabilized with R-4 riprap to slopes as steep as 2H:1V. Gabion walls are proposed where the grades require that retaining walls be used. The paved access road along the east side of the North Landfill will be restored with bituminous pavement. Otherwise, newly proposed or improved existing access roads will be constructed with processed gravel. Final site conditions are depicted on drawing sheets C-14 and C-15 for the North Landfill.

At the South Landfill, work will be conducted within the 100-foot buffer area previously established during its closure. Coastal shrubland planting will be incorporated to reestablish the buffer and wildflower mix will be used over the majority of site. Plantings have been selected based on the CRMC's Coastal Buffer Zone Planting Guide. Restoration of the South Landfill is shown on sheet C-26. Otherwise, riprap drainage swales will be used to manage stormwater and gravel access roads will be constructed to provide access to the site.

VI. Alternatives Analysis

The Pawtucket Tunnel Design Builder and NBC are identifying several sites for reuse and/or disposal of the crushed rock that will be generated during tunnel construction, because no one site is likely able to accept all this material given its quantity. The Bucklin Point North and South Landfills represent a preferred alternative, which is planned to accept approximately 160,000 cubic yards of the total 600,000 cubic yards of material generated during tunneling. Bucklin Point Landfills provide several benefits to NBC, stakeholders, and NBC rate payers for reasons previously described.

Several design alternatives were investigated and ultimately pursued, rejected, or scaled back. In most instances these design decisions resulted in less material in the proposed grading for the benefit of meeting other project goals, such as improving stormwater control, avoiding or minimizing work in resource areas, and reducing the likelihood of impacting stakeholders. The





selected approach fulfills the project goals while minimizing, or altogether avoiding, impacts to coastal resources and FWWIVC to the greatest extent possible. Unavoidable impacts have been mitigated using controls and best management practices (BMPs), as depicted on the enclosed drawings.

Preliminary design scenarios for both the North and South Landfills proposed using substantially more fill through methods such as grading the North Landfill to a higher peak elevation or by allowing the South Landfill to have a more expansive footprint. The current grading plans for the North Landfill fill the site to a proposed finished grade of 66 feet NGVD 1929, but earlier design concepts graded the site to a peak elevation of 82 feet NGVD 1929. This design was scaled down to provide versatility in potential future uses (e.g., recreation, ground mounted solar) and encourage more stable final slopes. It also was scaled back to avoid significantly impeding sight lines from abutters. A visual impact assessment was conducted for the North Landfill in March 2021 to assess impacts to these sight lines. The analysis consisted of flying 4-foot diameter weather balloons from various locations on the existing landfill, which were raised to the proposed final height of the landfill following filling and grading to represent final site conditions. Five weather balloons were used. Observations were made from several vantage points around the site and recorded by taking photographs looking out toward the landfill. Views of the balloons in the surrounding neighborhoods were generally limited and it was concluded that the current proposed height of the landfill would not likely have a significant visual impact on the residents in the surrounding area. This work was done in early Spring before foliage was in bloom so that sight lines were not obscured by tree canopy.

Several design alternatives were considered around the toe of the North Landfill to improve access and stormwater control. Widening the grass and gravel access along the western toe of landfill, along the shoreline, was considered. This would require that the road be raised and widened by benching it into the landfill side slope; however, this would also require filling on the shoreward side of this access road. Given the amount of work that would have been required on the shoreline feature, this alternative has not been pursued.

Raising the existing paved access road to the east of the landfill is proposed. This requires work near multiple areas of FWWIVC. Various grading alternatives were considered, but the current design incorporates retaining walls and armored slopes (e.g., riprap) to avoid filling into FWWIVC areas while maintaining a 24-foot wide roadway where possible. New stormwater controls, consisting of riprapped swales and drainage structures, have been added alongside the road where not currently present. Country drainage (disconnected runoff) directs stormwater to these new swales. A new entrance to the site along this road is also proposed, because NBC has reported that large trucks have difficulty navigating the current site entrance due to the steep grade. This realignment and raising low areas of the paved access road allow for a flatter slope that will be easier for large trucks to traverse.





Alternatives from the current design that were considered for the South Landfill included expanded limits of work. Previous design schemes proposed filling partially into the steep slope to the east of the site. This would require substantial tree clearing, which would significantly reduce the visual buffer that currently exists between the landfill and residential properties to the east, across the railroad tracks. In the current design, minimal tree clearing is proposed in this area to allow for the access road to be widened with improved stormwater controls installed. Additional filling was also considered closer to the shoreline, but this was scaled back to minimize work in the 50-foot coastal buffer and to avoid disturbing an emergent plant community that has been mapped at the site.

VII. Coastal Resources Management Program Compliance

Section 1.3 of the Coastal Resources Management Program (i.e., Red Book) identifies activities in tidal and coastal pond waters, on shoreline features, and within Contiguous Areas that fall under CRMC jurisdiction. It is anticipated that a Category B Assent is required because the project proposes greater than 10,000 cubic yards of filling and disturbs more than 2 acres. Compliance with only the applicable components of Section 1.3.1 of the Coastal Resources Management Program is described herein.

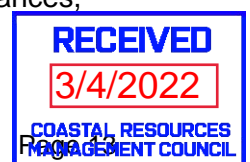
Section 1.3.1 (A) Category B Requirements

a. Demonstrate the need for the proposed activity or alteration;

NBC is under a Consent Agreement with the RIDEM for the Phase III CSO Program, NBC's approach to combined sewer overflow abatement in the Bucklin Point Service Area. The Phase III CSO Program underwent an alternatives analysis in which the projects required to meet regulatory objectives were selected. The Pawtucket Tunnel was identified during that process, and it is the largest project in the Phase III CSO Program. Tunneling will generate upwards of 600,000 cubic yards of crushed rock which must be reused or disposed of offsite. The use of a portion of this material for filling and grading at the Bucklin Point North and South Landfills, in lieu of offsite disposal, will help lower project costs and reduce schedule risk, while meeting several other project goals described previously in this narrative.

b. Demonstrate that all applicable local zoning ordinances, building codes, flood hazard standards, and all safety codes, fire codes, and environmental requirements have or will be met; local approvals are required for activities as specifically prescribed for nontidal portions of a project in §§ 1.3.1(B), (C), (F), (H), (I), (K), (M), (O) and (Q) of this Part; for projects on state land, the state building official, for the purposes of this section, is the building official;

NBC is a non-profit public corporation regulated by the RI Public Utilities Commission and is therefore exempt from complying with local regulations and zoning codes and ordinances,





but makes every effort to do so where feasible. Both sites have work proposed in coastal flood plains, but the nature of the work is limited to filling and grading and constructing stormwater improvements. No structures are proposed so building codes are not thought to be applicable to this project.

c. Describe the boundaries of the coastal waters and land area that is anticipated to be affected;

Shoreline features, coastal wetlands, and their associated boundaries are depicted on the enclosed drawings and have been described previously in this narrative.

d. Demonstrate that the alteration or activity will not result in significant impacts on erosion and/or deposition processes along the shore and in tidal waters;

No work is proposed on the shoreline feature and work within the 50-foot coastal buffer has been minimized. The shoreline along the North Landfill is manmade shoreline. A slope stability analysis was performed for both the North and South Landfills, the results of which are presented in the Design Basis Report included with this application package.

e. Demonstrate that the alteration or activity will not result in significant impacts on the abundance and diversity of plant and animal life;

The project is not anticipated to impact plant and animal life. Tree clearing has been minimized to the greatest extent while meeting the stated goals of the project. No work is proposed on the shoreline feature or in tidal waters that could impact Diamondback terrapin nesting areas.

f. Demonstrate that the alteration will not unreasonably interfere with, impair, or significantly impact existing public access to, or use of, tidal waters and/or the shore;

There is no public access to the shore currently at this site, and the project will not interfere with the use of tidal waters.

g. Demonstrate that the alteration will not result in significant impacts to water circulation, flushing, turbidity, and sedimentation;

The proposed project is located entirely outside of tidal waters and therefore will not directly impact water circulation, flushing, turbidity, and sedimentation. Sedimentation resulting from stormwater discharges will be mitigated by using erosion controls and best management practices (BMPs) during construction in accordance with the Soil Erosion and Sedimentation Control (SESC) Plan for the project. The site will be stabilized in its final condition and maintained by NBC.





h. Demonstrate that there will be no significant deterioration in the quality of the water in the immediate vicinity as defined by DEM;

Deterioration of water quality is not expected. Construction-phase erosion and sediment controls are proposed to minimize the possibility of sediment discharge to the Seekonk River, and construction equipment will be properly maintained to prevent pollution of groundwater and surface water. Final site conditions will be stabilized and the project proposes improvements to stormwater control from existing conditions. Material to be used in proposed fills is bedrock that has been pulverized and brought to the surface as part of tunnel construction. While this material is known to have naturally-occurring levels of arsenic, no other contaminants regulated under the RIDEM Remediation Regulations are expected and significant impacts to surface water or groundwater are not anticipated. Direct exposure to this material will be mitigated by constructing a clean soil cover as shown on the drawings. Stormwater runoff will not come into contact with the buried tunnel construction material once the site is stabilized with the clean soil cover. NBC will maintain the clean soil cover as required.

i. Demonstrate that the alteration or activity will not result in significant impacts to areas of historic and archaeological significance;

Based on past coordination with the Rhode Island Historical Preservation and Heritage Commission (RIHPHC), areas of historic or cultural significance have not been identified on the Bucklin Point WWTF property.

j. Demonstrate that the alteration or activity will not result in significant conflicts with water dependent uses and activities such as recreational boating, fishing, swimming, navigation, and commerce;

The project does not conflict with water dependent uses.

k. Demonstrate that measures have been taken to minimize any adverse scenic impact (see § 1.3.5 of this Part).

Adverse scenic impacts are not expected. The project proposes filling and grading of two landfill sites and final site conditions will restore them both to a condition similar to existing conditions. No structures or change in use to either site is planned. During design, an assessment was performed to verify that impact to sight lines from abutting properties would be minimal and the final heights and limits of filling at both landfills were selected to





minimize such impacts. Clearing of existing trees has been avoided where possible to maintain buffers between the site and abutting properties or natural areas.

Section 1.3.1 (B) Filling, Removing, or Grading of Shoreline Features

No filling, removing, or grading is planned on shoreline features, but these activities are proposed within the 200-foot Contiguous Area.

3.a.(1) The maximum vegetated slope shall be 3H:1V. Steeper slopes are proposed to tie into existing grades, which will be stabilized with riprap or gabion retaining walls.

3.a.(2) All excess materials, fill, debris, etc. will be disposed of offsite and no such material will be disposed of in tidal waters or on a coastal feature.

3.a.(3) Disturbed upland areas will be graded and re-vegetated during and immediately following construction activities.

3.a.(4) No removal or placement of sediments along jetties or groins is proposed.

3.a.(5) The material to be used in proposed fills is crushed rock containing naturally-occurring arsenic, and filled areas will be covered by a clean soil cover to mitigate direct contact or migration in stormwater runoff and erosion. Perimeter erosion controls will be used during construction and each phase of work at the site will be stabilized once construction in that area is complete. No pollution of tidal waters should result from this project.

3.a.(6) Coastal banks are not proposed to be disturbed by this project.

3.a.(7) All toxic substances will be properly stored and disposed of in accordance with all applicable federal, state, and local requirements. Fueling areas have been designated on the phasing plans in the drawing set.

3.c.(1) – (7) No earthwork is planned on a shoreline feature, so these standards do not apply.

3.d.(1) Erosion control barrier will be installed at the downstream perimeter of all areas subject to disturbance, in advance of clearing, filling, or grading.

3.d.(2) The project proposes filling to extend existing slopes to higher elevations. These new slopes will have maximum slope of 3H:1V except in select areas where steeper slopes are required to tie new work into existing grades. This is primarily along the toe of landfill and near the limits of disturbance. Steeper slopes up to 2H:1V will be stabilized with R-4 riprap (6" – 12" stone size); otherwise, gabion retaining walls are proposed where required to meet existing grades.





3.d.(3) All new slopes will be seeded with native grass or wildflower mix, as specified on the drawings, to reestablish vegetation and stabilize the slopes to prevent erosion. Existing steep slopes that currently have deep rooting vegetation are proposed to remain undisturbed, particularly on the river side of the site. A slope stability analysis has been performed and is summarized in the design basis report.

3.d.(4) The work is planned to be constructed in phases to minimize stormwater flow during construction. Phasing plans, showing proposed erosion controls, are included in the drawing set.

3.d.(5) Dewatering, if required, is expected to be limited to installation of new drainage structures. Otherwise, no deep cuts are proposed. Sediment traps will be used for treatment prior to discharging dewatered flows into the closed drainage system at the site.

3.d.(6) There are no existing catch basins or inlets at the site. Proposed catch basins installed during the course of the work will be protected with sediment barriers. Perimeter erosion controls will be used at downgradient limits of disturbance to protect existing culverts and channels from sedimentation.

3.e. Work is proposed on slopes steeper than 15%. Existing steep slopes that are disturbed, or new steep slopes constructed, during the course of this project will be stabilized as described herein. A slope stability analysis was performed for both the North and South Landfills, which has been summarized in the Design Basis Report.

Section 1.3.1 (C) Residential, commercial, industrial, and recreational structures

This project does not propose new structures, nor does it represent a development or redevelopment project as defined in the CRMP. As such, this standard is not applicable to the project.

Section 1.3.1 (F) Treatment of sewage and stormwater

Stormwater from the existing North Landfill is by overland flow which sheds off the site by following existing site topography. Runoff that sheds to the east of the landfill runs onto the paved access road and slowly drains into existing wetland areas across the road, including areas subject to storm flow (ASSF). These areas shed this stormwater toward an existing closed drainage system which combines with stormwater from offsite areas to the east of the site. This drainage system discharges to the river to the northwest and southwest of the landfill.

Stormwater improvements are proposed for the North Landfill to capture stormwater runoff. Drainage swales are proposed alongside the paved and gravel access roads where none exist now. Diversion benches are proposed along portions of the eastern side slope of the landfill to collect runoff before it potentially reaches erosive velocities. These stormwater conveyances will





discharge to new drainage infrastructure that connects into the existing closed drainage system with discharge to the existing outfalls at the northwest and southwest of the landfill.

For the South Landfill, a gravel access road is proposed to the top of the landfill for future maintenance. This represents approximately 5,000 square feet of gravel access road, a relatively negligible increase in impervious area of approximately 5,000 square feet. Accordingly, stormwater is proposed to be managed by collecting it in riprap swales similar to the North Landfill. These swales will discharge toward the Seekonk River at two new outfall locations, as shown on the drawings.

Stormwater conveyances such as drainage swales and diversion benches have been sized based on a hydraulic evaluation using the Rational method. These calculations are provided in the Design Basis Report included with this application package. Drainage swales and diversion benches will be constructed of riprap and will be pervious, to promote groundwater recharge. The site will be covered with a permeable layer of clean soil to further promote groundwater recharge.

Several of the 11 minimum standards in the RIDEM Stormwater Management, Design, and Installation Rules are not applicable to this project. This includes standards relating to peak flow control, because the project discharges to the Seekonk River (a 4th Order or larger stream). Land Uses with Higher Potential Pollutant Loads (Minimum Standard 8) and Illicit Discharges (Minimum Standard 9) also do not apply to this project. A SESC Plan (Minimum Standard 10) and Stormwater Management System Operation and Maintenance (O&M) Plan (Minimum Standard 11) have been prepared and are included with this application package.

Because the project does not represent a change in use of either site, and existing conditions will primarily be restored, we believe there is technical justification to waive some of the remaining requirements of the RIDEM Stormwater Management, Design, and Installation Rules relating to pre-treatment and Low Impact Development (LID). Space limitations exist at the North Landfill that make fully meeting the RIDEM Stormwater Management, Design, and Installation Rules very challenging. Given the existing conditions at the site, a significant increase in piping would be required to convey stormwater to the far north and south limits of the site where there may be space and conditions to allow for BMPs, though the subsurface conditions are unknown. This additional work would significantly increase the cost of the project, eroding some of the cost-saving benefits that NBC is trying to capture by implementing an alternative way of managing tunnel construction materials. We believe these added costs would be an unnecessary hardship.

The work proposed at the South Landfill does not appear to qualify it as a redevelopment because the change in impervious area is negligible. The stormwater controls that are proposed are a vast improvement from the existing condition and NBC requests that CRMC take that into





account in reviewing this application. It would likely be difficult to site stormwater BMPs outside of filled areas given the history of the site.

This approach to stormwater control at both landfill sites is consistent with discussions held during our pre-application meeting with RIDEM.

VIII. Freshwater Wetlands in the Vicinity of the Coast (FWWIVC) Compliance

This project includes activities regulated by the CRMC under the Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast. No alteration to freshwater wetlands is proposed; however, activities that could potentially alter the natural character of these wetlands, as defined by Section 2.5 of the Regulations, are currently planned. The project does not appear to meet any of the Exempt Activities described in Section 2.6. Conformance with the Avoidance, Minimization, and Mitigation requirements of the Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast is presented below.

Avoidance

(AA) Whether the primary proposed activity is water-dependent, or whether it requires access to freshwater wetlands as a central element of its primary purpose (e.g., a pier);

The proposed activity is not water dependent and access to freshwater wetlands is not a central element of its primary purpose.

(BB) Whether any areas within the same property or other properties owned or controlled by the applicant could be used to achieve the project purpose without altering the natural character of any freshwater wetlands;

The primary purpose of the project is to use displaced tunnel construction material in filling and grading the Bucklin Point North and South Landfills. Other project goals are to improve stormwater control along the toe of the landfill at the existing paved access road, and to provide a more consistent road width that allows for two-way traffic to pass. To achieve this goal, new drainage swales will be constructed between the road and the landfill. The road will be raised and sloped toward these drainage swales, which will require grading alongside freshwater wetlands to meet existing grades. Filling and grading into the wetlands is not currently proposed.

While this work will alter drainage patterns to the wetlands, it represents significant improvement to stormwater control. Currently, stormwater runs off the landfill and into the paved access road where it collects and ponds due to the road's relatively flat slope and the height of the shoulder alongside it. This causes freezing in winter. Some of this runoff eventually drains toward the





wetland areas immediately east of the road, after picking up any roadway contaminants that may be present. We believe the proposed activity represents improvements to water quality and does not adversely impact these wetland areas.

(CC) *Whether any other properties reasonably available to, but not currently owned or controlled by, the applicant could be used to achieve the project purpose while avoiding wetland alterations. A property is reasonably available if, in whole or in part, it can be acquired without excessive cost, taking individual circumstances into account, or, in the case of property owned or controlled by the same family, entity, group of affiliated entities, or local, state or federal government, may be obtained without excessive hardship;*

There are no abutting properties that could be acquired to avoid wetland alterations while achieving the project purpose of using displaced tunnel construction material in filling and grading the landfills at the site.

(DD) *Whether alternative designs, layouts or technologies could be used to avoid freshwater wetlands or impacts on functions and values on the subject property or whether the project purpose could be achieved on other property that is reasonably available and would avoid wetlands;*

The design as currently proposed incorporates necessary stormwater controls while avoiding filling in wetland areas. In some areas, riprap slopes and gabion retaining walls have been used to meet existing grades without encroaching into wetland areas.

(EE) *Whether the applicant has made any attempts (and if so what they were) to avoid alterations to freshwater wetlands by overcoming or removing constraints imposed by zoning, infrastructure, parcel size or the like;*

Zoning, existing infrastructure, and parcel size do not present constraints that contribute to unavoidable impacts to freshwater wetlands.

(FF) *Whether feasible alternatives that would not alter the natural character of any freshwater wetlands on the subject property or on property that is reasonably available, if incorporated into the proposed project, would adversely affect public health, safety or the environment.*

Alternatives that further avoid alteration of the natural character of freshwater wetlands would reduce or altogether avoid construction new stormwater controls as proposed. However, the stormwater controls as proposed are thought to be improvements to water quality and will be





beneficial to NBC's long-term use of the site by correct longstanding nuisance stormwater ponding and freezing on the access road.

Minimization

- (1) *Whether the proposed project is necessary at the proposed scale or whether the scale of the wetland alteration could be reduced and still achieve the project purpose;*

Work near FWWIVC results from filling and grading planned at the existing paved access road. This is proposed to provide space for new stormwater controls and to provide appropriate pitch to shed stormwater runoff. Improving stormwater control at the site is a goal of this project. The scale of this work has been minimized so that this project goal can be met without filling and grading in FWWIVC.

- (2) *Whether the proposed project is necessary at the proposed location or whether another location within the site could achieve the project purpose while resulting in less impact to the wetland;*

There are no other locations at the site that are appropriate for the proposed activities. The two project areas are closed landfills that are not being used for other purposes, while other areas of the site are used in WWTF operations.

- (3) *Whether there are feasible alternative designs, layouts, densities or technologies, that would result in less impact to the wetland while still achieving the project purpose; and*

The design incorporates ways to minimize the work and avoid filling and grading in FWWIVC, such as gabion retaining walls.

- (4) *Whether reduction in the scale or relocation of the proposed project to minimize impact to the wetland would result in adverse consequences to public health, safety or the environment.*

Adverse consequences would not be anticipated due to relocating the project of reducing its scale. This project will manage a fraction of the tunnel construction material so reducing its scale will require that more of this material be managed at offsite locations.

Mitigation

Mitigation measures and best management practices (BMPs) will be implemented as follows:





- Alterations to freshwater and coastal wetlands have been avoided to the extent possible. No work is proposed within coastal wetlands or FWWIVC. Measures such as gabion retaining walls have been used so that filling and grading does not extend into these resource areas.
- Work in coastal floodplain has been avoided to the extent feasible while meeting project goals. No electrical or mechanical components are proposed for the project and only grading and installation of new drainage piping and outfalls are proposed in floodplain. No mitigation of unavoidable loss in floodplain by providing compensatory storage is required because all work is proposed in the coastal zone.
- Phasing of the work at the North Landfill to minimize the limits of disturbance and keep work areas under 5 acres. Phasing plans are included in the project drawings.
- A Soil Erosion and Sediment Control (SESC) has been prepared and is included as part of this Assent application. The SESC Plan will be maintained at the site throughout construction and amended if required. The SESC Plan will be available for CRMC review if requested throughout construction.
- Implementing temporary controls during construction, including temporary sediment traps and swales to control stormwater from disturbed areas before they are stabilized.
- Construction of permanent stormwater controls and implementation of a site-specific operation and maintenance (O&M) plan.
- Stabilizing the sites with vegetation, including loam and seed and low-maintenance wildflower mix along with buffer plantings consistent with the CRMC Coastal Buffer Zone Planting Guide.



National Flood Hazard Layer FIRMette



71°22'29"W 41°51'18"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

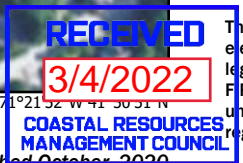
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/15/2022 at 9:42 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020



National Flood Hazard Layer FIRMMette



71°22'34"W 41°51'34"N



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | | |
|------------------------------------|--|---|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
Zone A, V, A99 |
| | | With BFE or Depth Zone AE, AO, AH, VE, AR |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X |
| | | Future Conditions 1% Annual Chance Flood Hazard Zone X |
| | | Area with Reduced Flood Risk due to Levee. See Notes. Zone X |
| | | Area with Flood Risk due to Levee Zone D |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard Zone X |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard Zone D |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | 17.5 Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| | | Profile Baseline |
| | | Hydrographic Feature |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |



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