Site Selection and Evaluation Work Plan
Remedial Design - Lower 8.3 Miles of the Lower Passaic River
Operable Unit Two of the Diamond Alkali Superfund Site
In and About Essex, Hudson, Bergen and Passaic Counties – New Jersey
REVISION RECORD

Revisions to this Site Selection and Evaluation Work Plan (SSEWP) will be reviewed and approved by someone qualified to have prepared the original document. All revisions must be authorized by the Tetra Tech Project Manager and the Glenn Springs Holdings, Inc. Project Coordinator, or their designee(s) and documented below.

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<td>1</td>
<td>9/1/2017</td>
<td>Multiple Sections, Tables 2-1 and 3-1, Figures 1-2 and 1-5</td>
<td>Response to 8/8/2017 EPA and NJDEP Comments</td>
<td>Steve McGee (Tetra Tech) Juan Somoano (GSH)</td>
<td>Yes (EPA, NJDEP)</td>
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# ACRONYMS / ABBREVIATIONS

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<tr>
<td>AOC</td>
<td>Administrative Settlement Agreement and Order on Consent</td>
</tr>
<tr>
<td>AST</td>
<td>above-ground storage tank</td>
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<tr>
<td>BFE</td>
<td>base flood elevation</td>
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<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>COC</td>
<td>constituent of concern</td>
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<tr>
<td>CY</td>
<td>cubic yard</td>
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<td>U.S. Environmental Protection Agency</td>
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<td>FCS</td>
<td>final candidate site</td>
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<td>Focused Feasibility Study</td>
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<td>MGD</td>
<td>million gallons per day</td>
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<td>Operable Unit 2 (the lower 8.3 miles of the Lower Passaic River); the Project</td>
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<tr>
<td>PCB</td>
<td>polychlorinated biphenyl</td>
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<td>preliminary candidate site</td>
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<td>pre-design investigation</td>
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<tr>
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<td>water treatment plant</td>
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1 INTRODUCTION

This Site Selection and Evaluation Work Plan (SSEWP) has been prepared pursuant to the requirements set forth in the Administrative Settlement Agreement and Order on Consent for Remedial Design (Settlement Agreement) between the United States Environmental Protection Agency (EPA) and Settling Party, effective September 30, 2016, for the lower 8.3 miles of the Lower Passaic River (Operable Unit Two [OU 2]) of the Diamond Alkali Superfund Site (the Site) located in and about Essex, Hudson, Bergen, and Passaic Counties, New Jersey (the Project), refer to Figure 1-1.

The Settling Party, as defined in the Settlement Agreement, is Occidental Chemical Corporation. Communications associated with, and execution of, the Settlement Agreement are being led by Glenn Springs Holdings, Inc. (GSH) on behalf of Occidental Chemical Corporation.

The Settlement Agreement provides that the Settling Party shall undertake a Remedial Design (RD), including various procedures and technical analyses, to produce a detailed set of plans and specifications for implementation of the Remedial Action (RA) selected in EPA's March 3, 2016, Record of Decision (ROD) (EPA, 2016a). RD activities include the completion of all pre-design and design activities and deliverables associated with implementation of the RD for the remedy selected in the ROD. The selected remedy was chosen by EPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§9601-9675, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The selected remedy chosen by EPA is bank-to-bank dredging and capping of OU 2, with the dredged sediment being dewatered and transported for off-site disposal. These activities will be performed at one or more upland sediment processing facilities located in the vicinity of the Lower Passaic River, which includes nearby portions of the Newark Bay, Hackensack River, or Arthur Kill shorelines. The selected remedy for OU 2 is shown on Figure 1-2.

The purpose of this SSEWP is to outline the process and present the methodology that will be used to identify, screen, evaluate, and ultimately select a sediment processing facility site(s) and/or a potential upland staging area(s) for backfill/engineered cap material within the OU 2 work area, consistent with the objectives defined in the ROD.

1.1 PREVIOUS SEDIMENT PROCESSING FACILITY SITING WORK

A Focused Feasibility Study (FFS) Report for OU 2, issued by EPA in 2014, included an evaluation of the operating logistics and engineering characteristics required for a single, integrated large-scale upland sediment processing facility (EPA, 2014b). The evaluation included the following high-level site selection criteria: location parameters, size requirements, highway access, waterfront access, railroad access, zoning, and physical constraints. The FFS work built on a sediment processing facility siting study performed by the United States Army Corps of Engineers (USACE) in 2006 to aid in selection of a facility location for managing maintenance dredging materials generated by the Port Authority of New York and New Jersey. However, the USACE study area extended well beyond OU 2 and was focused on management of materials regulated in a different manner than those in OU 2. In the ROD (EPA, 2016a), EPA refined the FFS results and identified potential sites proximate to OU 2 (located between Passaic River Mile [RM] 3 and the northern portion of Arthur Kill) that met the general siting criteria developed in the FFS. These potential sites are shown on Figure 1-3 and listed in Table 1-1. The siting criteria used in the FFS and the sites identified in the ROD will be incorporated into the work performed in accordance with this SSEWP.
1.2 SITE SELECTION STUDY AREA AND RIVER SEGMENT BREAKDOWN

The SSEWP study area focuses on the following locales:

1. Lower 8.3 miles of the Lower Passaic River (OU 2) in northeastern New Jersey, extending from the river’s confluence with Newark Bay at RM 0 to RM 8.3, which is near the City of Newark and Belleville Township border (refer to Figure 1-4).

2. Newark Bay from the mouth of the Lower Passaic River southward and into Arthur Kill to its confluence with the Rahway River.

3. Newark Bay from the mouth of the Lower Passaic River northward into the Hackensack River up to the Interstate 95/New Jersey Turnpike bridge crossing (Lewandowski Bridge).

OU 2 is located in a highly developed urban area with a population of approximately 1.4 million, with Essex County to the west and Hudson County to the east. The land uses around Newark Bay (RM 0), at the mouth of the river, are primarily commercial and industrial. At RM 4, residential and recreational uses are present as well, resulting in mixed usage. Near RM 7, parkland, suburban neighborhoods, marinas, and boat launches are present. Approximately 95 percent of the OU 2 shoreline area is comprised of bulkheads or riprap shorelines, while the remaining 5 percent consists of aquatic vegetation.

The SSEWP study area includes sites along the entire shoreline of OU 2 (RM 0 to RM 8.3) and extends 0.25 mile on either side of the approximate river centerline. For the purposes of site selection, the OU 2 work area has been subdivided into three segments based on proximity to areas of significant dredge material volume and the presence of low-clearance bridges. These factors can influence the means and methods selected to both dredge sediments and place backfill/capping materials which, in turn, will influence design decisions regarding the size/capacity and preferred location of the sediment processing facility(ies). The segment breakdown was previously documented by Louis Berger Group, LLC and has been adopted and modified for use in this work plan. The total OU 2 in-situ dredge volume as estimated in the ROD is 3,550,000 cubic yards (CY) and the segment breakdown and corresponding estimated in situ dredge volumes are as follows:

- Segment 1 (RM 0 to RM 2.6) – 2,070,000 CY
- Segment 2 (RM 2.6 to RM 5.7) – 830,000 CY
- Segment 3 (RM 5.7 to RM 8.3) – 650,000 CY

A figure showing the estimated in situ volumes of sediment to be dredged in each river segment, as well as all bridge locations and clearances within OU 2, is included as Figure 1-5. As part of the RD, GSH will evaluate the advantages and disadvantages of hydraulic and mechanical dredging operations and how they may be implemented (e.g., hydraulic or mechanical dredging only or a combination of hydraulic and mechanical dredging) during OU 2 remediation. A discussion of mechanical and hydraulic dredging, as they relate to site requirements and selection, is presented in Section 3.

1.3 SEDIMENT PROCESSING AND WATER TREATMENT

Activities associated with a sediment processing facility include debris screening, sand separation, pre-thickening, and active dewatering using filter presses. The facility will also need holding areas for dewatered sediments and transloading areas to transfer the dewatered materials to rail cars and/or trucks for transport to a permitted off-site disposal facility or for beneficial use. In addition, the facility will require a water treatment plant (WTP) to manage water generated from sediment handling and dewatering activities and treat this water to meet New Jersey
Department of Environmental Protection (NJDEP) water quality standards before discharging it to a receiving water course. OU 2 sediments may be dredged using mechanical and/or hydraulic methods, to be selected as a part of the RD process. For the purpose of site selection, it is estimated that 4.5 million gallons per day (MGD) would be treated under a 100% hydraulic dredging scenario, assuming a slurry averaging approximately 10% solids. For a 100% mechanical dredging scenario, with sediment being transferred as a 20% solids slurry, treatment of up to 2.3 MGD could be required. These estimates are based on a 31-week dredging season over 6-years and will vary depending on the percent solids pumped, water used in the plant for polymer makeup and backwashing of filters, and operational limitations due to maintenance. To ultimately transfer the sediments from the Lower Passaic River to appropriate disposal or beneficial use locations, the ROD focuses on processing the materials at a single large-scale facility. The selected remedy in the ROD also includes bank-to-bank placement of an engineered cap, except in areas where backfill may be placed after impacted sediments containing constituent of concern (COC) concentrations exceeding remediation goals (RG) have been removed. Approximately 2.7 million CY of backfill/engineered cap material will be placed to support the Project. Therefore, the processing facility site may also function as a staging/storage/transloading area for cap materials that will be imported from off-site sources.

The typical daily facility operations will include the following:

- Barge unloading and barge water separation (if sediment is barged).
- Sediment holding, mixing, and conveyance.
- Sand separation and management.
- Sediment dewatering.
- Water treatment including chemical and materials unloading, storage, and handling.
- Offloading and holding of large debris items removed from the river.
- Loading of debris and dewatered sediment for transport to a permitted off-site disposal facility and/or for beneficial use.

Taken together, the operational activities listed above will require a variety of staging, storage, and working areas as well as direct or proximate multi-modal transportation access (water, road, and rail). A conceptual large-scale sediment processing facility that integrates receipt of barged and/or slurried dredge materials, typical daily facility operations, and multi-modal transportation access is provided as Figure 1-6. However, given the high density development in the site selection study area, it may be very difficult to identify and acquire a site that could accommodate a single, large-scale integrated processing facility. As such, utilizing a combination of two or more processing facilities having varying production capacities and limited support activity areas may be necessary or advantageous. A conceptual sediment processing facility that is scalable and could be used to meet the desired production rates along OU 2 is provided as Figure 1-7. Additional details regarding both of these types of facilities is included in Section 3 of this SSEWP. The final material handling, processing/dewatering, water treatment, storage, and transloading methods and technologies will be developed during RD.

1.4 SEDIMENT TRANSPORTATION AND DISPOSAL

1.4.1 Transportation Options

As noted in the ROD, processed sediments will most likely be transported off-site via rail for disposal. In addition, if the processing facility site is also to be used for stockpiling capping materials, there would be operational and commercial advantages to being able to receive the materials via rail. Therefore, access to existing rail, or the
ability to construct on-site rail access and tie into an existing rail line, are important siting considerations. Direct and adequate road access must also exist or be achievable to help facilitate development of the processing facility site, to allow Project personnel to enter and leave the facility during operations, to provide for some level of processed sediment disposal off-site via truck (if necessary), and to allow for receipt of capping material deliveries by truck. Siting considerations related to rail service and on-road trucking are detailed in Subsections 2.3.3 and 2.3.4 of this SSEWP.

1.4.2 Disposal Options

Sediment dredged from OU 2 is anticipated to be classified as either hazardous (Subtitle C), non-hazardous (Subtitle D), or designated for beneficial use, based on its chemical characteristics. There is also a possibility that a portion of the sediments will be subject to the Toxic Substance Control Act (TSCA). The sediment classification will dictate how the dredged material (including associated debris) will be managed. The sediment processing facility(ies) will be required to manage these materials in accordance with applicable regulatory requirements and need to include infrastructure to load out and transport the materials to the appropriate off-site disposal facility. GSH anticipates multiple disposal facilities will receive the processed dredged sediments and debris in order to manage the volume of material generated over the duration of the Project.

1.4.2.1 Beneficial Use of Sand and Sediment

Sand separation will be performed as part of the sediment processing and dewatering activities. Sand and sediment may be transported to a beneficial use site(s) identified during OU 2 RD and RA provided they meet the applicable regulatory requirements.

1.4.2.2 Landfilling

Sediments which classify as Resource Conservation and Recovery Act (RCRA) Subtitle C (hazardous solid waste) or Subtitle D (non-hazardous solid waste) materials, or as TSCA materials, must be managed in accordance with appropriate regulations and, as per the ROD, disposed at facilities located outside of New Jersey.

1.4.2.3 Incineration

The ROD estimates that 7 percent of the dredged sediment may require incineration due to its chemical characteristics. If needed, this material will be transported off-site to an incinerator facility instead of directly to a Subtitle C landfill. The ash generated by incineration will be disposed at a Subtitle C landfill. As noted in the FFS, incineration facilities that accept hazardous waste are located in the United States and Canada. GSH will further evaluate the incineration facilities identified in the FFS report during development of the Project Transportation and Off-Site Disposal Plan (TODP).
2 PROCESSING FACILITY SITE SELECTION CRITERIA

The ROD focuses on processing dredged materials at a single large-scale facility. However, as discussed in Subsection 1.3, there may be a need or advantages to having two or more smaller-scale processing facilities and/or backfill/capping material staging areas strategically positioned along the OU 2 work area, in particular to serve river Segments 2 and 3. GSH has identified the types of facilities envisioned to manage dredged sediments within or proximate to OU 2 and detailed descriptions of these types of sediment processing facilities are included in Subsection 3.2 of this SSEWP.

The site selection process will focus on the engineering criteria associated with safe and efficient operation of either type of sediment processing facility with a focus on meeting engineering performance standards as well as quality of life, environmental impact, current and planned land uses, regulatory compliance, financial liability, and land acquisition/leasing criteria. Siting considerations associated with these criteria are summarized in the following subsections with additional detail provided in Table 2-1.

2.1 Available Space

A critical aspect of facility siting and design will be finding locations that have sufficient area available for locating the various components of a sediment processing facility. The FFS indicates that 26 to 40 acres would be required for a single, large-scale, upland sediment processing facility designed to meet the required production performance standards for the Project. However, there may be advantages to using additional smaller-scale facilities strategically positioned along the OU 2 work area for sediment dewatering and/or material staging areas. To provide flexibility for identifying and ultimately evaluating potential sites, a range of minimum areas for processing facility sites and material staging sites have been established for each river segment and are presented in Table 2-1 and Subsection 3.2 of this SSEWP. As the RD progresses, these areas may be modified.

2.2 Proximity to Dredge and Cap Areas

The proximity of a sediment processing facility to the dredge areas will influence numerous aspects of the RD and RA such as transport efficiencies (time of transport from dredge location to facility), size of barges, numbers of tows and trips, and fuel consumption should mechanical dredging be performed. If hydraulic dredging is performed, sediment will be pumped through pipelines without the need for transport barges, off-loading facilities, and bridge openings.

If mechanical dredging is performed, multiple facilities may be needed to avoid bridge clearance issues and schedule impacts due to the scheduling of bridge openings. For the purposes of site selection, the OU 2 work area has been subdivided into segments based on proximity to areas of significant dredge material volume and the presence of low-clearance bridges that could limit river travel for dredges, barges, scows and other equipment. Based on this subdivision, sites that are centrally located within a work area reach would be more likely to provide a favorable balance of operational efficiency and cost, with sites located toward the ends of a work area reach likely exhibiting lower overall levels of operational efficiency and cost. In addition, GSH will not evaluate sites between RM 5.7 (Bridge Street Bridge) and RM 6.1 (Clay Street Bridge) as the vertical bridge clearance is restricted (7 feet at high tide and 15 feet at low tide). To provide flexibility for identifying and ultimately evaluating potential sites, processing facility sites and material staging sites located within the entire SSEWP study area will be considered and are presented in Table 2-1 and Subsection 3.2. As the RD progresses, these locations may be modified.
2.3 Engineering Criteria

2.3.1 Waterfront Access

The ROD describes transport of dredged sediments by barge or pipeline to a sediment processing facility and, as such, waterfront access for the facility is a critical factor for site selection. Important considerations for siting include accessibility to the river and the condition of the waterfront (i.e., whether the waterfront has existing, functional, mooring capabilities or the potential to develop such capabilities). Additional siting considerations, as they relate to river access, include sufficient shoreline frontage with adequate draft to support projected barge operations and the proximity of the shoreline to the navigable river channel.

If hydraulic dredging is employed, a sediment processing facility that does not have waterfront access may be feasible. Important considerations for siting such an inland site include access to, and the condition of, the closest waterfront access point to support both a slurry pipeline and discharge pipeline for treated water, and the ability to install above-ground or underground piping (open trench or directionally drilled) without encountering obstructions.

2.3.2 Docking/Mooring Infrastructure

Barge docking/mooring infrastructure is a critical component for a sediment processing facility to allow for receipt and transfer of mechanically dredged material and for loadout of capping materials that may be stockpiled on site for transport and placement along the river. Important considerations for siting include the presence of existing functional piers/bulkheads or other suitable loading/docking infrastructure and the potential for expansion or rehabilitation of otherwise limited or unsuitable infrastructure.

2.3.3 Rail Accessibility and Capacity

As noted in the ROD, processed dredged sediments will most likely be transported off-site via rail. In addition, if the processing facility site is also to be used for stockpiling capping materials, there would be operational and commercial advantages to being able to receive the materials via rail. Therefore, access to existing rail, or the ability to construct on-site rail access and tie into an existing rail line, are important siting considerations. Ideally, the facility would be located such that rail access can be developed with little or no modification of existing rail lines and would tie into a line with adequate existing service capacity or where an adequate service capacity agreement with the railroad(s) could be readily negotiated.

2.3.4 Road Access

Direct and adequate road access must exist or be able to be developed to help facilitate development of the processing facility site and to allow Project personnel to enter and leave the facility during operations. Although not identified in the ROD, some processed dredged sediments may be transported off site via trucks to a permitted disposal facility, incineration facility, and/or an intermodal facility (e.g., Synagro Brills Yard intermodal container facility located in Newark, New Jersey) for transport via rail. Additionally, if a beneficial use of some portion of the dredged material is viable (e.g., separated sand), appropriate transportation, most likely by truck, would be required. Therefore, proximity to primary local roads and public highways is another siting consideration. RD activities will take into account the existing road network, including traffic capacity evaluations, existing and proposed road design conditions (e.g., turning radii, lines of sight, etc.), and road surface ratings relative to the types and numbers of vehicles that will be used for constructing and operating the facility.
2.3.5 Availability of Utilities

The sediment processing facility will require a variety of utility services to support its construction and operation. Critical among these are adequate and reliable levels of electric service and potable water. The existing service levels, capacities, and infrastructure for these critical utilities along with sewer (both sanitary and storm), natural gas, and communication services will be an important consideration during facility siting. During the RD process, the required utility service levels will be determined, which may result in an associated refinement of siting considerations.

2.3.6 Subsurface Conditions and Surface Features

The characteristics of local underlying soils and bedrock are important considerations in the siting, design, and construction of a sediment processing facility. Construction will require either existing suitable soil and bedrock conditions or the ability to reasonably improve these conditions, as well as having the ability to grade the site to provide adequate operational space and properly manage stormwater runoff. Suitable soil characteristics and bedrock depth to support heavy loads (e.g., construction equipment and processing and water treatment equipment and operations) will be critical. The facility’s foundation loading requirements will be determined based on anticipated equipment loads and factored into the siting evaluation.

Geologically, OU 2 is situated within the glaciated Newark Basin portion of the Piedmont physiographic province. In this area, sedimentary bedrock (primarily sandstone) is covered by glacial and post-glacial natural soil deposits that can vary between 20 and 150 feet thick and include interbedded gravel, sand, silt, and clay, with deposits of peat and organic silt found primarily in areas located along and near Newark Bay. Along the Lower Passaic River, natural soils are often covered with a variety of fill materials of varying depth that were placed to facilitate a mix of urban and industrial development. Due to this combination of factors, subsurface conditions for any sediment processing facility site are expected to be highly variable and generally poor. As such, after the number of candidate sites has been refined to a manageable number, available information regarding site soil conditions and strengths will be evaluated, if available, to assess whether or not a candidate site appears to have soil conditions that would pose significant challenges for construction, and evaluate it accordingly. A site-specific geotechnical investigation may be required for the site(s) selected for the sediment processing facility to develop recommendations for the facility’s foundations and general site development.

2.4 Environmental Impact Criteria

2.4.1 Cultural Resources

Section 106 of the National Historic Preservation Act, as amended, requires that federal agencies with jurisdiction over a proposed federal project take into account the effect of the undertaking on cultural resources listed or eligible for listing on the National Register of Historic Places and affords the State Historic Preservation Offices and Advisory Council on Historic Preservation a reasonable opportunity to comment with regard to the undertaking.

Facility siting involves awareness of, and sensitivity to, cultural resources and cultural resource issues, and the facility siting process will be accomplished in a manner consistent with Section 106. Cultural resource issues will be considered early in the facility siting process as part of the activities to be performed in accordance with the Cultural Resources Survey Work Plan. The process of determining the significance of cultural resources as they relate to screening and evaluating candidate sites will be developed in consultation with EPA and appropriate New Jersey agencies.

If a site has any cultural resources listed on the National Register of Historic Places (NRHP), the anticipated durations to complete applicable site-specific cultural resource investigations will be considered in the site selection
evaluation process. In addition, consideration of the nature and extent of any potential impacts to cultural resources listed on or eligible to the NRHP will be taken into consideration.

2.4.2 Existing and Historical Land Uses

The current and/or historical land uses of a site (as well as surrounding land uses) will be relevant to the siting process and can influence engineering and design activities. As an example, a site that was previously used for industrial purposes may have several favorable engineering features for developing a processing facility (e.g., suitable existing water, rail, and road access, and minimal regrading requirements). On the other hand, a former industrial facility may have environmental impacts that require remediation or existing structures that require demolition before the site can be re-purposed as a sediment processing facility. Sites requiring remediation or significant site preparation prior to site development will be considered less favorable as these activities could severely impact the schedule, increase Project costs, and create additional liabilities. Desirable current land usage (e.g., surface parking lots, cleared lots, low building/structure density, or existing development that is generally industrial in nature) is also a consideration.

Phase I Environmental Site Assessments (ESAs) will be performed to identify the potential presence of environmental impacts. The Phase I ESAs will be performed using publically available information. If the results of a Phase I ESA indicate known or likely environmental impacts, a Phase II ESA may be performed to better define the extent and significance of the impacts. If a Phase III ESA is determined to be needed based on the findings of a Phase II ESA, a qualitative evaluation of the site will be performed to evaluate whether the site should be eliminated from further consideration.

The land uses of surrounding areas will also be considered in facility siting in order to maintain EPA quality of life performance standards (air quality, odor, noise, light, and navigation). The focus of siting efforts will be on identifying and preferentially ranking existing and historical industrial and commercial properties that minimize quality of life impacts.

2.4.3 Habitats Critical to Ecological Processes

The Passaic River, which traverses both New Jersey and a small portion of New York, is fed from an approximately 803-square-mile watershed. The Lower Passaic River is a 17-mile tidal stretch extending from Dundee Dam in Clifton, New Jersey, to Newark Bay. Due to the size, structure, and diversity of the Passaic River watershed, there are many different types of aquatic and terrestrial habitats within OU 2. The absence of sensitive, rare, threatened, or endangered species, habitats, or management areas, as well as the absence or minimal presence of wetlands, are desired characteristics for siting a sediment processing facility. Therefore, the facility siting process will identify any such resources and evaluate their potential impact on site use. GSH will prepare a Habitat Survey Report as part of the PDI activities. Information gathered during the survey work will be used to the extent possible when evaluating the sites. The resources and areas that will be considered include:

- **Wildlife and Rare Species Habitats and Management Areas.** Areas identified as unique or sensitive may be considered biologically diverse and/or may be used by rare plants or animals. Accordingly, these areas are important to the State of New Jersey and are protected under state laws.

- **Threatened and Endangered Species.** Federally endangered and threatened species fall under the protection of the Endangered Species Act, and if an action jeopardizes a threatened or endangered species population, the action must be avoided or appropriate mitigation measures must be developed.

- **Wetlands.** New Jersey has established the Freshwater Wetlands Protection Act (N.J.A.C. 7:7A), which protects wetlands identified as unique or sensitive habitats, including any mitigation requirements. The USACE also protects wetlands, regardless of size, under Section 404 of the Clean Water Act.
If a sediment processing facility site is ultimately selected that includes resources and/or areas outlined above, the RD will determine and incorporate measures to avoid and/or mitigate any adverse impacts, as appropriate.

2.4.4 Regulatory and Land Use Criteria

Identification and screening of candidate sites will need to consider regulatory and land use criteria because they will significantly impact the RD process. As such, the facility siting process will consider the following:

- **Federal Emergency Management Agency Floodplains and Floodways.** A waterfront facility cannot adversely impact the capacity and conveyance characteristics of a 100-year floodplain or floodway of a river. Site development may be affected by hydraulic flow characteristics, based on upland topographic and physical features, floodplain features, river flow, and flow variations through a particular floodplain/floodway section. A facility will also need to be protected from potential 100-year flood damage by either its existing elevation above the floodplain or with permissible engineering design features.

- **Shoreline Development Offsets.** On-land impacts (e.g., odors, noise, light pollution, etc.) associated with a sediment processing facility may be mitigated through engineered controls such as buffer zones around construction sites and operational setbacks. Section 7:7-9.7 of the New Jersey Administrative Code (Coastal Zone Management Rules–Navigation Channels) indicates that placement of structures within 50 feet of any authorized navigation channel is discouraged unless it can be demonstrated that the proposed structure will not hinder navigation. Section 7:7-2.4(d)3 of the New Jersey Administrative Code states that "special areas" (as defined in Section 7:7-9) are not to be adversely environmentally impacted and that a minimum 15-foot setback from the mean high water line should be used. For the purposes of this SSEWP, a minimum 50-foot setback criterion will be applied.

Other applicable NJ Land Use Regulations include:

- N.J.A.C. 7:13 (Flood Hazard Area)
- N.J.A.C. 7:7 (Coastal Zone Management)
- N.J.A.C. 7:7A (Freshwater Wetlands)

Throughout the siting process, additional state and local regulations, ordinances, and land use plans will be reviewed to refine criteria pertaining to applicable setback distances so they can be used to assist in site selection and incorporated into the RD.

2.4.5 Proximity to Residential and Sensitive Facilities

GSH intends to avoid siting a sediment processing facility close to sensitive populations and facilities. Examples of these include hospitals, schools, day care facilities, senior housing, assisted living facilities, churches, and public parks and recreational areas. In addition to sensitive populations, GSH intends to avoid siting a sediment processing facility within close proximity to residential locations. Buffer and offset distances will be established and applied based on local ordinances, codes, or other regulatory guidelines as the RD progresses.

2.5 Zoning and Property Tax Classification

Property zoning is an important consideration. The focus of siting efforts will be on identifying and evaluating industrial or commercial properties for sediment processing facility development.
2.6 Financial Liabilities

This criterion involves identifying existing liens against the property/property owner(s) and/or any unpaid property taxes that could result in delays and additional or prohibitive costs for securing the site.

2.7 Land Acquisition/Leasing

This criterion involves assessing the potential ability to acquire land for development of a sediment processing facility and will involve a number of purchasing or leasing issues including type of ownership (commercial, private, or public), number of owners, existing leases, and existing easements. Publicly owned lands are more likely to be protected under local, state, or federal laws. The purchase or lease of private lands is typically a less complicated process, depending on landowner interest.
3 SITE IDENTIFICATION AND PRELIMINARY EVALUATION

GSH has identified existing commercial soil and dredged sediment processing facilities that can potentially be used to supplement the sediment processing capabilities of the facility(ies) identified under this SSEWP. In addition, two properties available for use by GSH have been identified as potential support sites. These sites are shown on Figure 3-1 and listed in Table 3-1. In addition, GSH has identified potential landfill disposal sites to receive some processed sediments from the Project. Existing support facilities, including sediment processing, treatment, and disposal sites, are described in the following subsections.

3.1 Existing Facilities and Disposal Options

Prior to the initiation of dredging, sediment will be characterized in situ as hazardous waste requiring treatment prior to disposal, hazardous waste eligible for direct disposal, or non-hazardous waste, so that sediment with the same characterization can be dredged and processed at the same time. Non-hazardous sediment may be further characterized as sediment requiring disposal or sediment that could be treated and beneficially used. Mixing of materials with different characterizations will be avoided to the extent practical. Sediment characterization will be performed in accordance with the Pre-Design Investigation Work Plan (PDI WP). The results of the PDI (physical and chemical data) will be used to determine which dredged sediments can be processed at existing commercial facilities and/or a new, project-specific sediment processing facility (discussed in Section 3.2), including consideration of materials that would be characterized as hazardous to ensure they are processed and disposed of appropriately.

Sediment will be dredged, either mechanically or hydraulically, and transported by barge (mechanical dredging) or piped as a slurry (hydraulic dredging) to an upland sediment processing facility for desanding and dewatering. Dewatering will be performed using filter presses, and the resulting filter cake will be transported to an off-site disposal facility for treatment and/or disposal based on the waste characterization. Sand removed during desanding will be disposed at a landfill or be beneficially used in compliance with applicable regulations, but will need to be stored prior to off-site transport.

3.1.1 80-120 Lister Avenue Property

To facilitate initial work on the Project, the 80-120 Lister Avenue Property (Operable Unit 1) located at 80-120 Lister Avenue, Newark, New Jersey, provides space to process sediment cores and can provide temporary office space until the Project’s sediment processing facility is developed as desired.

3.1.2 Diamond Site Property

The Diamond Site located at 1015 Belleville Turnpike, Kearny, New Jersey, may provide potential material/equipment storage and can provide temporary office space until the Project’s sediment processing facility is developed as desired. This site could also be used to manage the sediments from a single segment or segments of the river using a scalable sediment processing facility as described in Subsection 3.2.2.

3.1.3 Clean Earth Koppers Facility

The Clean Earth Koppers Facility is located along the Hackensack River and is an existing commercial facility specializing in managing non-hazardous dredged sediment. This facility could be used to process (stabilize) non-hazardous dredged sediment from OU 2 either alone or to supplement a new sediment processing facility developed for the Project in order to maintain dredge productivity. This facility is the largest sediment processing and stabilization facility serving the New York and New Jersey Harbor and has a history of successfully processing CERCLA regulated materials, including 800,000 CY of sediments in three months to support the Tappan Zee Bridge Reconstruction Project. The facility has the following existing capabilities:
• Barge Off-loading Infrastructure
  o Komatsu PC 1250 material handler with 4 CY hydraulic clamshell bucket
  o Permitted Capacity: 3,000 CY/Day

• Shaker Screens
  o Removes debris 4-Inches and larger

• Conveyor Belt with Weight Scales

• Pug Mill for Amendment Addition
  o Typically Portland Cement (amendment rate is typically 10% by weight)
  o Silos pneumatically fed by delivery trucks
  o Air handling on pug mill and cement silos

• Radial Stacker
  o Processed sediment is immediately stackable and ready to ship off-site in a single day
  o Three staging areas are maintained

• Transloading Capabilities
  o Trucks: 450 trucks/day
  o Rail: 1.7 mile drayage to rail capability owned by Clean Earth; Intermodal and gondola cars available

Materials sent to this facility would be transported to a Subtitle D landfill or to a beneficial use site as permissible. Clean Earth currently has a permitted and operational beneficial use site located in Bethlehem, Pennsylvania which could potentially receive acceptable materials from the Project.

3.1.4 Clean Earth North Jersey Facility

The Clean Earth North Jersey Facility is an existing commercial facility located along the Passaic River (RM 2.3) that can manage hazardous and non-hazardous materials. This facility could be used to transfer processed sediment from OU 2 either alone or to supplement a new sediment processing facility developed for the Project in order to maintain dredge productivity. This facility has a throughput capacity of 2,800 CY per day, is permitted to process RCRA Part B regulated materials, has an on-site certified laboratory for analysis of contamination and stabilization, and has indoor rail transloading capabilities.

3.1.5 Subtitle C Landfill Disposal

The ROD indicates that some sediments in OU 2 have the potential to be characterized as Subtitle C (hazardous materials) under RCRA standards. Subtitle C materials will be mechanically dewatered and transported to a RCRA Subtitle C disposal facility for direct disposal. When required, this sediment will be incinerated prior to disposal. GSH has identified the following potential Subtitle C landfills that are permitted to receive hazardous materials:

• Clean Harbors Lone Mountain, LLC – Waynoka, Oklahoma
• US Ecology – Belleville, Michigan
Additional Subtitle C disposal facilities may be identified during development of the Project TODP.

### 3.1.6 Subtitle D Landfill Disposal

The ROD indicates that approximately 90 percent of OU2 dredged sediments will be characterized as non-hazardous materials (Subtitle D) under RCRA standards. The State of New Jersey has no permitted Subtitle D landfills that are authorized to accept dredged materials from coastal or tidal waters for disposal as solid waste, as such materials are specifically excluded from the definition of solid waste under New Jersey regulations.

Non-hazardous materials may be eligible for direct landfill disposal at a RCRA Subtitle D facility, depending on the facility permit. These materials would be stabilized using a pug mill or dewatered using mechanical means and transported via truck or rail depending on the disposal facility’s receiving infrastructure. If non-hazardous sediment can be treated to meet the requirements for beneficial use, it will be stabilized prior to shipment off-site for beneficial use. The Clean Earth Koppers Facility and the Clean Earth North Jersey Facility identified in Sections 3.1.3 and 3.1.4., respectively, are examples of existing commercial facilities that are capable of handling such materials and transporting them for disposal.

Additional Subtitle D disposal facilities may be identified during development of the Project TODP.

### 3.2 New Facilities

For the purposes of this SSEWP, GSH has identified two different types of sediment processing facilities that will be further evaluated as the RD progresses to meet the requirements outlined in the ROD and to determine which sites could operate the most efficiently to manage the dredged materials from OU 2. The two types of processing facilities GSH envisions include a large-scale integrated sediment processing facility and a smaller scalable facility. A single, large-scale facility or a combination of two or more smaller-scale processing facilities and dedicated material staging areas may be utilized during OU 2 remediation, with their corresponding site needs as described below:

- A single site (approximately 20 acres or larger) for processing all sediment, including sediment that will be disposed off-site or beneficially used, having direct river access, rail service, and large enough for staging backfill/capping material. This type of facility typically requires a larger parcel and operations are predominantly contained in a single, large building. Refer to Figure 1-6 for a schematic of this type of facility.

- One or more sites (5 to 15 acres each) configured to either process all sediment or a specific (hazardous or non-hazardous) sediment stream, and having direct river access and rail service, along with one or more supporting sites (approximately 5 acres each) having direct access to OU 2 for staging backfill/capping material. The smaller-scale sediment processing facility used during the Passaic River Phase I Sediment Removal Action is an example of this type of facility. Refer to Figure 1-7 for a schematic of this type of facility.

The number and type of sites selected for sediment processing will be based on a number of considerations related to the method of dredging selected. A description of each method, and how it potentially affects site selection, is as follows:

- Mechanical dredging – this type of dredging is performed using environmental clamshell buckets that...
remove sediment and place it in a scow, which is used to transport the sediment to an off-loading facility where it is transferred to a holding tank and ultimately to the dewatering plant. Where bridges prevent passage of a scow, the sediment would be pumped around the bridge to a second scow to avoid the bridge opening. Alternatively, smaller-scale dewatering plants could be strategically located to avoid the double-handling of the sediment. In this event, two or three sites would be needed in Segments 2 and 3 of the river, in addition to a larger site near Newark Bay. Each site would require holding and thickening tanks, filter presses, a water treatment plant with a discharge point, and a covered load-out area. Temperature control would be beneficial to allow for processing in cold weather. These sites could also provide staging areas for cap materials, if of sufficient size. Mechanical dredging may not be as precise as hydraulic dredging (depending on the equipment that’s ultimately selected), so the increased cost arising from this would also need to be considered.

- Hydraulic dredging – this type of dredging is performed using dredges with a cutter head that loosens sediment so it can be pumped the required distance through a pipeline to a sediment processing plant. Booster stations are placed along the pipeline to keep the sediment flowing at the desired rate, and the pipelines are placed along the bank or on the river bottom. One large-scale processing plant could handle sediment from all of the dredges simultaneously. The same processing equipment is required as for the smaller plants, but at a larger scale. This type of dredging avoids the need for double-handling and off-loading facilities, since sediment would be pumped directly to the processing plant. This type of dredging would require a single processing plant, and one or two small cap material staging areas, depending on the location of the plant. Hydraulic dredging produces a much greater quantity of water to be managed compared to mechanical dredging. As such, a larger WTP (and corresponding larger facility site) would be needed if hydraulic dredging is selected.

The method of placing backfill/cap material will also be considered when determining the size, location, and number of material staging sites during the site selection and evaluation process. If capping is performed mechanically, it will require utilization of several barges and mechanical equipment to place the materials, with cap materials either staged at the same sites as the processing facilities or dedicated staging sites. If capping is performed hydraulically, less equipment would be required since cap materials could be pumped to a hydraulic spreader system.

### 3.2.1 Large Scale Sediment Processing Facility

The assumptions used for the selection and design of a large-scale, integrated sediment processing facility (including the WTP) sized to process all sediment dredged during OU 2 remediation will be described in the Design Criteria Report, in accordance with the EPA Statement of Work (SOW) (EPA, 2016b). The design of a large-scale sediment processing facility will consider “lessons learned” from the Hudson River Polychlorinated Biphenyls (PCBs) Dredging Project and the Passaic River Phase I Removal Action; experience gained by Tetra Tech through operating this type of facility for a similar-sized sediment remediation project, the Lower Fox River Remediation in Green Bay, Wisconsin; and information provided by Stuyvesant Projects Realization, Inc., the sediment desanding and dewatering plant operator for the Fox River facility. However, the size and function of the OU 2 facility could vary from the referenced facilities, or an alternative process could be proposed if a large volume of sediment is found to be potentially eligible for beneficial use during the treatability study, during which pilot studies will be conducted to determine contaminant levels that could be treated to beneficial use levels. Therefore, the volume of sediment expected to be processed at the sediment processing facility is currently unknown.

As previously noted, existing commercial facilities, such as the Clean Earth Koppers and Clean Earth North Jersey Facilities, may be utilized to support management of dredged sediments during OU 2 remediation. These facilities could process hazardous and non-hazardous sediment delivered by a scow, with minimal dewatering, and stabilize the sediment for beneficial use, if permissible.
3.2.2 Scalable Sediment Processing Facilities

Smaller-scale sediment processing facility(ies) may be considered to manage the sediments from a single segment or segments of the river. This type of facility can be scaled according to the available property size to achieve required dredge productivity rates. Small-scale facilities can stand-alone or be used in conjunction with a new or existing large-scale sediment processing facility. These facilities can be configured with production rates ranging between 750 and 4,000 CY per day, with associated minimum footprint requirements ranging from 5 to 15 acres, respectively.

3.2.3 Material Staging Areas

As stated in the ROD, dredging and backfilling will likely be concurrent tasks. Materials used for capping and habitat layers may be staged at a single, large-scale or smaller scalable sediment processing facility, but additional material staging sites may be needed for backfill/capping aggregate material staging.

3.2.4 Supporting Facilities

To support processing operations, facilities will be needed to perform field data processing, site engineering, and project management. These supporting operations will likely be located at the sediment processing facility(ies). The 80-120 Lister Avenue Property, identified as an existing facility in Section 3.1.1, is considered a potential supporting facility and is centrally located in Segment 2.

3.3 Financial Considerations

GSH will evaluate financial considerations of the various means and methods of managing the dredged sediments during OU 2 remediation when developing the Project Design Criteria Report. Removing the sand and water from sediment, to the extent practicable, results in the lowest tonnage of waste for disposal versus methods that solidify sediment and add weight. Conversely, stabilization of sediment, which works best with sand in the sediment as a binder, increases the density significantly (i.e., perhaps as much as 30 percent more tonnage per CY processed) and would therefore increase disposal costs proportionately.

Additionally, the number of proposed processing sites will be considered when evaluating the cost of developing multiple sites and/or utilizing an existing commercial facility. Utilizing one main sediment processing facility, versus multiple facilities, provides several advantages, including:

- Risks associated with land acquisition/leasing for multiple sites will be avoided.
- Development of designs and plans for multiple sites will be avoided.
- Duplication of equipment and facilities will be minimized.
- Economy of scale will be realized.
- Impact to community and monitoring for quality of life parameters will be minimized.
4 SITE SELECTION PROCESS

To identify potential sediment processing sites and refine the number of viable sites, an iterative screening and evaluation approach will be used. This will involve reviewing information and data from previous site evaluation studies, developing and reviewing new information and data from both desktop studies and field reconnaissance, developing Project-specific siting criteria, evaluating all of the compiled data with respect to the siting criteria in a step-wise fashion to focus on sites warranting more in-depth evaluation, and soliciting input and feedback from EPA, NJDEP, other Partner Agencies, and community stakeholders. The proposed approach is described below and presented graphically in Figure 4-1.

4.1 Data Collection and Review

Site selection and evaluation activities will require compiling and reviewing information that can be obtained from both electronic and non-electronic databases and record repositories and performing limited non-intrusive field reconnaissance (upland and on-water) to develop a data set and accompanying Geographic Information System (GIS) database that will be used to help identify, screen, and evaluate Preliminary Candidate Sites (PCS), Final Candidate Sites (FCS), and Recommended Sites (RS). These activities will include obtaining and/or compiling:

- Publically available digital aerial photography and topographic mapping.
- Property ownership and associated tax and debt liability information.
- Local zoning ordinances and overlays.
- Local, county, and state Land Use Plans.
- Local, county, state, and federal environmental buffers, offsets, and overlays (floodplains, wetlands, wildlife habitat and management areas, shoreline development offsets).
- Publically available property environmental liability information.
- Utility mapping and capacity information (water [service and fire], sewer [sanitary and storm], electric, gas, communications).
- Railroad ownership/operations and service agreements.
- Listing of permitting and approval agencies (local, county, state, and federal) that will need to be engaged for site development work.

In addition to reviewing the information and data summarized above, an essential component of the screening and evaluation process will be to conduct non-intrusive field reconnaissance investigations (upland and on-water) to verify the accuracy of publically available mapping and note information gaps and differences, and to make site-specific observations of conditions that cannot be discerned from photographs, maps, or data sets. To the extent practical and allowable, on-water reconnaissance will include observing the condition of the waterfront (including piers and bulkheads), high and low tidal influences, existing river traffic, physical obstacles such as bridge height restrictions and other river uses, stormwater discharge outlet locations, and the potential for construction of new or expanding existing mooring infrastructure. Similarly, upland reconnaissance will include observing current site surface characteristics that would impact development of the facility, such as topography, structures, utilities, rail service, stormwater collection and conveyance systems, and low-clearance roadway obstructions.
4.2 Application of Siting Criteria

The application of siting criteria will be an iterative process that involves using the appropriate criteria and associated metrics given the stage of the evaluation process. The siting criteria were presented in Section 2 and have been grouped into either threshold criteria or evaluation criteria. Potential sites will be compared to these siting criteria in a step-wise fashion to reduce the number of potential sites to those sites that are most viable for the Project. As each criteria grouping is applied, a more in-depth evaluation of the potential sites will be performed. The types of criteria are defined as follows:

- **Threshold Criteria.** This includes high-level engineering criteria that will initially be applied to either eliminate infeasible or otherwise impractical sites from further consideration or retain them for additional evaluation and will be applied to all of the properties initially identified in the study area – categorized as PCS – that warrant further evaluation. Threshold criteria are limited to the following:
  - Available Space;
  - Proximity to Dredge and Cap Areas;
  - Waterfront Access; and
  - Zoning.

- **Evaluation Criteria.** This includes more detailed/site-specific engineering, regulatory (e.g., threatened and endangered species requirements), and commercial (e.g., land acquisition costs) criteria used to evaluate and eliminate sites with limited usefulness or excessive development needs. Evaluation criteria will be applied to all of the PCS to narrow the sites down to FCS that are viable for facility development and warrant further evaluation. The FCS will be further evaluated to determine RS which GSH intends to pursue developing. Sites that are not considered FCS may be reconsidered as part of the RD work for use as potential backfill/engineered cap material staging areas.

The findings after applying both the threshold and evaluation criteria will be summarized in two Technical Memoranda submitted to EPA for review. After submission of Technical Memorandum #2, a Site Selection and Evaluation Report (SSER) will be submitted that will provide final site selection recommendations.

Initial siting criteria and associated metrics are included in Table 2-1. The siting criteria will have variable input into the evaluation and selection process based on the characteristics of the identified sites and the corresponding applicability of each of the criteria to a particular site. Although it is possible that a candidate site may not be optimal with respect to each siting criterion, all candidate sites that are retained should possess an acceptable balance of trade-offs among the criteria. There is flexibility in the process in that some evaluation criteria may be applied at an earlier stage in the process to reduce the list of potential locations to a more manageable number (depending on the number of sites that are retained) and that additional evaluation criteria can be developed depending on site-specific considerations that become evident as the number of sites is reduced.

4.3 Coordination of Community Involvement

Identification and evaluation of sites will be an iterative process. As such, final site selection will be a collaborative effort among GSH, EPA, and community stakeholders, whereby the parties will meet to discuss and resolve key design issues and provide input. The Community Involvement Plan (EPA, 2017) was updated to focus on the cleanup of the lower 8.3 miles of the Passaic River and provides an overview of the outreach tools and techniques that EPA uses to share information and to inform and involve the public. An important component of community involvement for the SSEWP will occur through public meetings to update the community on the status of the site selection process.
and to provide a forum for questions and comments from community stakeholders. GSH will provide regular updates to the Community Advisory Group throughout the site selection and evaluation process. GSH will continue to coordinate community involvement with EPA.

4.4 Land Leasing or Acquisition Plan

As RS are established, GSH will begin negotiations with the property owner(s) to either lease or acquire the property. The initial step will be to obtain term sheets and commitment letters from the property owners and supporting facilities. Rail service negotiations will also commence for properties which have rail access or will require rail extension/expansion on or to the property(ies).

4.5 Schedule

As outlined in the Remedial Design Work Plan (RDWP), a SSER must be submitted to EPA for review and comment within 180 days after EPA approval of the SSEWP. The following schedule includes activities associated with the implementation of the SSEWP and anticipated corresponding dates.

<table>
<thead>
<tr>
<th>SSEWP Activities</th>
<th>Anticipated Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA Approval of Site Selection and Evaluation Work Plan*</td>
<td>7 October 2017</td>
</tr>
<tr>
<td>Technical Memorandum #1 (60 Days after EPA Approval)</td>
<td>6 December 2017</td>
</tr>
<tr>
<td>Technical Memorandum #2 (120 Days after EPA Approval)</td>
<td>5 February 2018</td>
</tr>
<tr>
<td>Site Selection and Evaluation Report (180 Days after EPA Approval)</td>
<td>4 April 2018</td>
</tr>
</tbody>
</table>

*EPA approval estimated at 30 days after the draft SSEWP comment responses have been submitted.
5 REFERENCES


TABLES
Table 1-1. EPA-Identified Potential Sediment Processing Sites

<table>
<thead>
<tr>
<th></th>
<th>Size</th>
<th>Description</th>
<th>Waterfront</th>
<th>Rail Road (RR) Access</th>
<th>Distance Main Rd</th>
<th>Utilities on Site</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29 Acres</td>
<td>Rectangular (irregularly)</td>
<td>Passaic</td>
<td>Yes</td>
<td>0.5 mile</td>
<td>Gas, sewer, water</td>
<td>Site by itself too small but 5 acres of green space adjacent to the site which, if available, would provide space for RR sidings for train car storage. Warehouse and shipping facility on northern half, industrial operations southern half, gone by 2005. New facility with above-ground storage tanks (ASTs) constructed pre 2012. Small adjacent parcel used until ~2004, unknown purpose.</td>
</tr>
<tr>
<td>2</td>
<td>Two parcels-noncontiguous</td>
<td>Square</td>
<td>Passaic</td>
<td>Yes</td>
<td>1 mile</td>
<td>Unknown</td>
<td>Small parcel between RR siding and larger site that may need to be addressed by an easement for an access road. Small parcel – industrial operation on site although does not appear active after 2008; large number of AST previously on site. Large parcel - open space since before 1995; used as a shipping container storage area between 2003 and 2010.</td>
</tr>
<tr>
<td></td>
<td>10 acres waterfront</td>
<td>~650 x 700</td>
<td>Passaic</td>
<td>Yes</td>
<td>--</td>
<td>Unknown</td>
<td>Located adjacent to Kearny Pt property where mudflats need to be remediated. Appears unused since before 1995. Majority of previous site infrastructure demolished by 2012.</td>
</tr>
<tr>
<td>3</td>
<td>25 acres</td>
<td>Triangular</td>
<td>Passaic</td>
<td>Yes</td>
<td>--</td>
<td>Unknown</td>
<td>Located adjacent to Kearny Pt property where mudflats need to be remediated. Appears unused since before 1995. Majority of previous site infrastructure demolished by 2012.</td>
</tr>
<tr>
<td>4</td>
<td>Two parcels-contiguous</td>
<td>Long, irregularly shaped</td>
<td>Passaic</td>
<td>Maybe</td>
<td>3 miles</td>
<td>Unknown</td>
<td>No spur on site but adjacent to switching yard. Eastern parcel clear by 1995 but indications of former ASTs on site. Parcel not used until 2010 – storage yard. Western parcel has small facility in one section, remainder unused since ~1995. Area adjacent to Bay has wetlands and dredging required to establish a docking area.</td>
</tr>
<tr>
<td>5</td>
<td>83 acres</td>
<td>unknown</td>
<td>Rahway</td>
<td>Yes</td>
<td>--</td>
<td>Available</td>
<td>Exact property boundaries unclear, and general area has a lot of wetlands, need to confirm.</td>
</tr>
<tr>
<td>7</td>
<td>210 acres total</td>
<td>Rectangular</td>
<td>Arthur Kill</td>
<td>Yes</td>
<td>1 mile</td>
<td>Available</td>
<td>Half of site are wetlands; site filled to base flood elevation (BFE). Multiple sites, may be possible to subdivide. 3 ASTs on site through 2009. Southern half - used for material screening/sorting operations possibly as part of fill operations. Northern half - major excavation operation in 2012.</td>
</tr>
</tbody>
</table>

Notes:
- Dimensions are approximate, acreage and utility information provided by broker/seller.
- All sites on the Lower Passaic River are between RM 0 and RM 3.
- Main road – interstate.
- Comments based on Google Earth historical aerial photos, no additional research on site conditions.
- Source: EPA ROD Table III.C.2-2. Potential Site Options (EPA, 2016a).
- Site 7 not identified on EPA ROD Figure III.C.2-1. Potential Site Locations (EPA, 2016a). All site locations except Site 7 shown on Figure 1-3.
<table>
<thead>
<tr>
<th>Table 2-1</th>
<th>Initial Processing Facility Site Selection Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Selection and Evaluation Work Plan</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Remedial Design - Lower 8.3 Miles of the Lower Passaic River</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Operable Unit 2 of the Diamond Alkali Superfund Site</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Site Size</th>
<th>Site Selection and Evaluation Work Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Available Space</strong></td>
<td>Segment 1: Sediment Processing Site</td>
<td>&gt; 5 (Scalable Facility) to 20+ (Large, Fully-Integrated Facility)</td>
</tr>
<tr>
<td></td>
<td>Segment 2: Sediment Processing Site</td>
<td>&gt; 5 Acres</td>
</tr>
<tr>
<td></td>
<td>Segment 3: Sediment Processing Site</td>
<td>&gt; 5 Acres</td>
</tr>
<tr>
<td><strong>Proximity to Dredge and Cap Areas</strong></td>
<td>Backfill Material Staging Site</td>
<td>5 to 10 Acres (Scalable Facility w/o Backfill Material Staging)</td>
</tr>
<tr>
<td><strong>Waterfront Access</strong></td>
<td>Backfill Material Staging Site</td>
<td>&gt; 5 Acres</td>
</tr>
<tr>
<td><strong>Docking/Mooring Infrastructure</strong></td>
<td>Backfill Material Staging Site</td>
<td>&gt; 5 Acres</td>
</tr>
<tr>
<td><strong>Zoning/Property Tax Classification</strong></td>
<td>Backfill Material Staging Site</td>
<td>&gt; 5 Acres</td>
</tr>
</tbody>
</table>

**Threshold Criteria**

| **Availability of Utilities** | Yes | Adequate Public Water, Sewer Connection, Electrical, and Communication Services Available (Natural Gas Optional) |
| **Rail Accessibility and Capacity** | No | Required Public Water, Sewer Connection, Electrical, and Communication Services Capable of Being Extended to Site |
| **Road Access** | Direct Access to Primary Road(s) | Access Does Not Require Trafficking Residential Streets |
| **Subsurface Conditions & Surface Features** | Depth to Competent Bedrock Allows for Conventional Foundation Construction (Not Applicable to Material Staging Sites) | Existing Site Topography Requires Little to No Regrading |

**Accessibility**

- New Jersey Bay & Arthur Kill: RM 0 to RM 8.3
- Newark Bay & Arthur Kill: RM 0 to Northern Portion of Arthur Kill (at confluence with Rahway River)
- Hackensack River: RM 0 to Interstate 95/NJ Turnpike Bridge Crossing (Lewandowski Bridge)

**Engineering**

- Waterfront Property: Existing or Potential for Adding Bulkhead/Pier/Mooring Capabilities
- Inland Property: Waterfront Can Support Sluice Line Installation and Pipeline Construction to Facility Appears Feasible

**Zoning/Property Tax Classification**

- Site Must Be Zoned Industrial or Commercial
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Environmental Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Cultural Resources</td>
<td>Not Listed On or Be Eligible For Listing On The NRHP</td>
</tr>
<tr>
<td>11 Existing and Historical Land Uses</td>
<td>Commercial or Industrial Uses Only</td>
</tr>
<tr>
<td></td>
<td>Adequate Buffers/Offsets To Residual and Public Recreation Areas Feasible</td>
</tr>
<tr>
<td></td>
<td>Manageable or No Environmental Impacts Identified In Phase 1 or 2 ESA</td>
</tr>
<tr>
<td></td>
<td>Abandoned Buildings on Property Can Be Demolished With Reasonable Effort and Controls</td>
</tr>
<tr>
<td>12 Habitats Critical to Ecological Processes</td>
<td>Wildlife &amp; Rare Species Habitats and Management Areas Not Present</td>
</tr>
<tr>
<td></td>
<td>Threatened/Endangered Species Not Present</td>
</tr>
<tr>
<td></td>
<td>Wetlands Not Present or Mitigation Measures Appear Feasible</td>
</tr>
<tr>
<td>13 Regulatory and Land Use Limitations</td>
<td>No Active or Planned Site Remediation</td>
</tr>
<tr>
<td></td>
<td>Any Existing Easements and/or Rights-of-Way Do Not Appear to Significantly Restrict Site Use</td>
</tr>
<tr>
<td></td>
<td>Adequate Buffers/Offsets To Planned Commercial or Residential Development Feasible</td>
</tr>
<tr>
<td></td>
<td>Existing Stormwater NPDES Outfall at Site (Preferred)</td>
</tr>
<tr>
<td></td>
<td>No to Minimal Encroachment of FEMA 100-Year Floodplain or FEMA Floodway</td>
</tr>
<tr>
<td></td>
<td>Applicable Shoreline Development Offsets Can Be Achieved</td>
</tr>
<tr>
<td>14 Proximity to Sensitive Populations &amp; Facilities</td>
<td>Adequate Buffers/Offsets To Hospitals, Schools, Daycare Facilities, Senior Housing, and Assisted Living Facilities Feasible</td>
</tr>
<tr>
<td>15 Financial Liabilities</td>
<td>Manageable or No Liens Against Property(ies)</td>
</tr>
<tr>
<td></td>
<td>Manageable or No Unpaid Property Taxes</td>
</tr>
<tr>
<td>16 Land Acquisition/Leasing</td>
<td>Site Has One (Preferred) or a Limited Number of Owners</td>
</tr>
<tr>
<td></td>
<td>If Site is Currently Leased, Leases Expire in Timeframe that Supports Project</td>
</tr>
<tr>
<td></td>
<td>If Owner(s) Currently Occupy the Site, Acquisition and Conveyance Can Be Completed in Timeframe that Supports the Project</td>
</tr>
<tr>
<td>Site Name</td>
<td>Approximate Area (Acres)</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Site 1 Diamond Site</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 2 Clean Earth - Koppers</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|                                 |                          |                |                                  |        |                   |                      |             |              | - Permitted to process CERCLA regulated materials; Owners stated that they should be able to obtain RCRA permit for hazardous material processing.
|                                 |                          |                |                                  |        |                   |                      |             |              | - Surrounding Land Use: Industrial Facilities                             |
| Site 3 Clean Earth - North Jersey | 7                      | Passaic (RM 2.3) | 115 Jacobus Avenue               | Hudson | Yes               | Yes                  | Yes         | Yes          | - Permitted to process RCRA Part B regulated materials                  |
|                                 |                          |                | Kearny, New Jersey               |        |                   |                      |             |              | - Non-Hazardous/Industrial Waste Capacity: 2,800 cy/day                  |
|                                 |                          |                |                                  |        |                   |                      |             |              | - Indoor transloading capabilities.                                      |
|                                 |                          |                |                                  |        |                   |                      |             |              | - On-site certified laboratory for analysis of contamination and stabilization. |
|                                 |                          |                |                                  |        |                   |                      |             |              | - Surrounding Land Use: Industrial Facilities                             |
| Site 4 80-120 Lister Avenue     | 6                       | Passaic (RM 3.5)| 80-120 Lister Avenue             | Essex  | Yes               | Yes                  | No          | Yes          | - Referred to as OGU1. Available usable acreage to be determined (if any). Potential environmental issues are present at this site as it is managed as an EPA Superfund Site (Identification Number #NJ0198012999). |
| Property                        |                          | Newark, New Jersey |                                  |        |                   |                      |             |              | - A new warehouse has recently been constructed adjacent to west of this parcel. A new warehouse is being constructed to the east of the parcel. |
|                                 |                          |                |                                  |        |                   |                      |             |              | - Recently listed For Sale under bankruptcy proceedings.                  |
|                                 |                          |                |                                  |        |                   |                      |             |              | - Surrounding Land Use: Industrial Facilities                             |
FIGURES
Dredging and Capping for Recreational Use

Engineered segments of the lower 8.3 miles, as long as protectiveness is maintained.

**Approximately 2.5 feet of dredging is expected to prevent the engineered**

Segments of the lower 8.3 miles, as long as protectiveness is maintained.

**Note:**
- Engineered cap thickness is expected to be, on average, 2 feet, although it may be determined during design that the cap thickness can vary in segments of the lower 8.2 miles, as long as protectiveness is maintained.
- **Approximately 2.5 feet of dredging is expected to prevent the engineered cap from causing additional flooding, some additional smoothing out of a few areas to achieve at least 10 feet below MLW for necessary anticipated recreational future use.

**Source:**

**Acronyms:**
- MLW - Mean Low Water as defined by USACE
- NJDEP - New Jersey Department of Environmental Protection
- NJDOT - New Jersey Department of Transportation
- NOAA - National Oceanic and Atmospheric Administration
- USACE - United States Army Corps of Engineers

**Legend:**
- Shoreline as defined by NJDEP
- Proposed Extent of Cap or Backfill
- Federally Authorized Navigation Channel
- Federally Authorized (USACE)
- Navigation Channel Centerline
- Tidal Mudflats
- Armor Areas
- Tierra Removal - Phase 1 and Phase 2
- Transects
- Debris Targets (Sunken Cars)
- Bridges and Bridge Abutments
- Political Boundary - Municipalities
- Political Boundary - Counties

**Utilities (by Location):**
- Submerged
- Overhead Cable Lines
- Unknown

**Sections:**
- Authorized Navigation Channel Lateral Limits
- Top of Cap
- Approximate Removal Depth
- Existing Sediment Surface (2004)
- Future Use Depth of Navigation Channel
- MLW = 0

**Table 33: Dredging and Engineered Capping Expectations for the Selected Remedy**

<table>
<thead>
<tr>
<th>Row Mile Section</th>
<th>Channel Centerline Width</th>
<th>Dredging Depth (MLW)</th>
<th>Engineered Cap Thickness</th>
<th>Resulting Channel Depth (MLW)</th>
<th>Outside of the Navigation Channel (in the Shoal?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 0 to RM 0.6</td>
<td>300 feet</td>
<td>23 feet</td>
<td>generally 2 feet</td>
<td>20 feet</td>
<td>-0.5 feet of dredging and 2-foot cap</td>
</tr>
<tr>
<td>RM 0.6 to RM 1.7</td>
<td>300 feet</td>
<td>25.5 feet</td>
<td>generally 2 feet</td>
<td>20 feet</td>
<td>-0.5 feet of dredging and 2-foot cap</td>
</tr>
</tbody>
</table>

**Notes:**
- Engineered cap thickness is expected to be, on average, 2 feet, although it may be determined during design that the cap thickness can vary in segments of the lower 8.2 miles, as long as protectiveness is maintained.
- **Approximately 2.5 feet of dredging is expected to prevent the engineered cap from causing additional flooding, some additional smoothing out of a few areas to achieve at least 10 feet below MLW for necessary anticipated recreational future use.**
EPA Identified Potential Sites for Processing Facility
Lower 8.3 Miles of the Lower Passaic River (OU 2)
Figure 1-3

Source: EPA ROD Figure III.C.2-1, Potential Site Locations (EPA 2016a)

Note:
1. Location of Site 7 listed on Table 1-1 not depicted on EPA source figure.
Vicinity and Site Selection Study Area
Lower 8.3 Miles of the Lower Passaic River (OU 2)

Figure 1-4
Sediment Mass Balance Diagram

Lower 8.3 Miles of the Lower Passaic River (OU 2)

Figure 1-5

Estimated In-Situ Sediment Volume by River Mile

| Segment No. 1 | RM 0 - RM 2.6 | (~2,070,000 CY) |
| Segment No. 2 | RM 2.6 - RM 5.7 | (~830,000 CY) |
| Segment No. 3 | RM 5.7 - RM 8.3 | (~650,000 CY) |

Notes:
1. MHW = Mean High Water

Sources:
2. EPA Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River Appendix G Table 1-6. Volume of Sediment to be Removed for Alternative 3 (EPA, 2014).

Estimated In-Situ Dredge Volume (MCY)

Bridge Street Bridge (RM 5.6) ~ 7 Feet MHW Vertical Clearance
Clay Street Bridge (RM 6.1) ~ 8 Feet MHW Vertical Clearance
Polaski Skyway Bridge (RM 2) ~ 135 Feet MHW Vertical Clearance
SR 1 & 9 Lincoln Highway Bridge (RM 1.8) ~ 40 Feet MHW Vertical Clearance
Conrail’s Point-No-Point Railroad Bridge (RM 2.6) ~ 16 Feet MHW Vertical Clearance
NJ Turnpike (I-95) Bridge (RM 2.7) ~ 100 Feet MHW Vertical Clearance
Jackson Street Bridge (RM 4.6) ~ 18 Feet MHW Vertical Clearance
Amtrak’s Dock Street Bridge (RM 5) ~ 200 Feet MHW Vertical Clearance
NJTRO Newark-Harrison (Morristown Line Railroad) Bridge (RM 5.8) ~ 15 Feet MHW Vertical Clearance & I-280 Bridge (RM 5.8) ~ 35 Feet MHW Vertical Clearance
Fourth Avenue Conrail Bridge (RM 6.1) ~ 7 Feet MHW Vertical Clearance
NJTRO West Arlington (Erie/Mountclair-Greenwood Lake Railroad) Bridge (RM 8.1) ~ 35 Feet MHW Vertical Clearance

Not To Scale

Lower 8.3 Miles of the Lower Passaic River (OU 2)

Figure 1-5
Notes:
1. Targeted Production Capacity is 4,000 CY/Day.
Notes:
1. Plant depicted is very similar to Passaic River Phase I Sediment Removal conducted by Tierra Solutions at RM 3.2. Capacity as shown is approximately 750 CY/Day.
2. The Phase I Removal Action used a footprint of 5 acres. Facility can be scaled up to process 4,000 CY/Day with an associated minimum footprint of 15 acres.
3. Phase I Removal Action used mechanical dredging.
5. Plant capable of processing hydraulically dredged sediments with minor modifications.
6. Dewatering performed by membrane filter presses fabricated in Italy.
7. An associated water treatment plant (not depicted) requires an additional 1 acre area (assuming a capacity of 800 gpm operated by Clean Harbors).
Existing Support and Commercial Sediment Processing Sites for Potential Use

Lower 8.3 Miles of the Lower Passaic River (OU 2)

Figure 3-1
Site Selection and Evaluation Work Plan Sequence Diagram

Lower 8.3 Miles of the Lower Passaic River (OU 2)

Figure 4-1

1. Identify Potential Sites in Study Area
2. Apply Threshold Criteria (Identify Preliminary Candidate Sites)
3. Issue Technical Memorandum #1
4. Apply Evaluation Criteria (Identify Final Candidate Sites)
5. Issue Technical Memorandum #2
6. Site Selection and Evaluation Report (Identify Recommended Sites)
7. Final Site Selections