Wells G&H Superfund Site
Woburn MA

U.S. EPA | SUPERFUND CLEANUP PROGRAM AT EPA NEW ENGLAND

THE SUPERFUND PROGRAM protects human health and the environment by investigating and cleaning up often-abandoned hazardous waste sites and engaging communities throughout the process. Many of these sites are complex and need long-term cleanup actions. Those responsible for contamination are held liable for cleanup costs. EPA strives to return previously contaminated land and groundwater to productive use.

YOUR OPINION MATTERS: OPPORTUNITIES TO COMMENT ON THE PLAN

The Environmental Protection Agency (EPA) will be accepting public comments on this proposed plan from July 14, 2017 through August 14, 2017. You do not have to be a technical expert to comment. If you have a concern, suggestion, or preference regarding this Plan, EPA wants to hear from you before making a final decision on how to protect your community. EPA also is requesting public comment concerning its findings that wetland and floodplain resources will be protected, and its Draft Determination regarding the protectiveness of a risk-based PCB cleanup. Comments can be sent by mail, email, or fax. See age 39 for more details.

The public meeting and hearing will be held to further explain the cleanup plan and to offer an opportunity for people to give oral or written comments during the public hearing part of the evening (see page 39 for details). If you have specific needs for the public meeting and hearing, questions about the facility and its accessibility, or questions on how to comment, please contact Jim Murphy, EPA Community Coordinator (see below). To view the proposed plan, please visit: go.usa.gov/xNsVT

cont. next page >

LOCATON: City Hall City Council Chambers
10 Common St., Woburn, MA 01801

PUBLIC INFO MEETING
THURS. 7/13/17 • 7:00PM

FORMAL PUBLIC HEARING
THURS. 8/3/17 • 7:00 PM

CLEANUP PROPOSAL SNAPSHOT

The Proposed Plan (Plan) for the cleanup of soil, groundwater, non-aqueous phase liquid (NAPL), and wetland sediment/soil contamination within the Southwest Properties (SWP) at the Wells G&H Superfund Site generally includes:

- Excavation and off-site disposal of approximately 5,400 cubic yards of significantly contaminated soil[1] at the designated Northern Whitney Soil Area (See Figure 1 denoting "Excavation" and "Deeper Excavation"), and blending remaining contaminated soil below the water table with an amendment prior to backfilling to provide soil and localized groundwater treatment. In addition, excavation and off-site disposal of approximately 12,400 cubic

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July 2017

In accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the law that established the Superfund program, this document summarizes EPA's cleanup proposal. For detailed information on the cleanup options evaluated for use at the SWP, see the Southwest Properties, Wells G&H Superfund Site Feasibility Study, EPA FS Report Addendum, and other documents contained in the SWP's Administrative Record available for review online at https://go.usa.gov/xNFws or at the Site information repositories at the Woburn Public Library, 45 Pleasant St, Woburn, MA 01801, and at the EPA New England Records Center, 5 Post Office Sq., First Floor, Boston, MA.

yards of soil to facilitate capping (for a total of approximately 18,000 cubic yards of excavated soil), and construction of impermeable caps[2] over the remaining lower concentration soils that exceed cleanup levels to reduce soil exposure risks and/or prevent contaminant movement to groundwater (See Figure 1 denoting "Cap Area");

- Excavation and off-site disposal of NAPL, including approximately 6,000 cubic yards of NAPL-contaminated soil and blending any remaining NAPL-contaminated soil below the water table with an amendment prior to backfilling to provide soil and localized groundwater treatment (See Figure 2);
- Containment and cleanup of groundwater contaminants by pumping and treating the groundwater (See Figure 3);
- Excavation and off-site disposal of approximately 7,000 cubic yards of wetland sediment/soil exceeding cleanup levels and wetland restoration (See Figure 4);
- Long-term monitoring;
- Institutional Controls to maintain the integrity of the soil caps, to prevent development of the properties for residential use, to prohibit use of contaminated groundwater until cleanup levels are met, and to require evaluation of the vapor intrusion pathway if a change in usage of any of the existing commercial buildings is contemplated, or as part of new building construction, including any addition to existing buildings on any of the properties.
- EPA's proposed remedy is estimated to cost approximately $19.1 million and is expected to take 1-2 years to construct. Groundwater is estimated to achieve cleanup standards in 20 years. A more detailed description of this proposal is outlined in this document.

A CLOSER LOOK AT EPA'S PROPOSED CLEANUP APPROACH

The November 2016 Remedial Investigation (RI) Report for the Southwest Properties summarized the nature and extent of contamination and was used to prepare a December 2016 Feasibility Study (FS) that identified all the options EPA considered for cleanup. In addition, EPA prepared a July 2017 FS Report Addendum Addendum - Technical Memorandum which modifies sections of the FS and supports this Proposed Plan. The study evaluated different combinations of cleanup options (also called "alternatives") to restrict access to, contain, remove, and/or treat contamination to protect human health and the environment by preventing risk of exposure from SWP-related contaminants in soil, groundwater, and wetland sediment/soil, as well as NAPL, that presently serves as a continuing source of contamination to environmental media. Preliminary Remediation Goals (PRG) and maximum concentrations detected for soils, groundwater and wetland sediments/soils on Southwest Properties OU4 are shown in Tables 1, 2 and 3, respectively. These PRGs represent the proposed cleanup levels for OU4.

Based upon the alternatives evaluated in the FS, EPA is proposing the following long-term cleanup approach for the entire SWP:

Soil:

EPA's preferred alternative for the soil cleanup is known as Alternative SW-3/SM-3/SA-3 in the FS: Excavation, Off-Site Disposal, Capping, and Institutional Controls, and includes the following components:

- Pre-design investigations to further define the horizontal and vertical extents of soil contamination;
- Pre-design investigations to understand the structural integrity of the Whitney Building, and, as necessary, any other buildings and the potential presence of hazardous building materials for abatement/management;
- Design, site preparation and building demolition, as required;
- Installing any wetland/floodplain mitigation measures that may be required, establishing stormwater/erosion control measures, clearing and grubbing of excavation areas, relocating utilities to implement excavation, installing temporary roads to support excavation, and land surveying all clean-up infra-structure to be left in place (e.g., impermeable caps, monitoring wells);

[1] "Significantly contaminated soil" defined as soil with contaminant concentrations 10 times greater than the proposed soil cleanup levels and/or greater than or equal to 50 milligrams per kilogram (mg/kg – equivalent to parts per million [ppm]) of polychlorinated biphenyls (PCBs).

[2] For the purposes of this Proposed Plan and consistency with the Feasibility Study, a cap is considered an impermeable barrier that meets applicable regulatory (e.g., Resource Conservation and Recovery Act (RCRA)) or risk-based requirements, as appropriate, and mitigates contaminated soil risks by preventing direct contact, movement to groundwater and erosion.

- Installation of shoring around the perimeter of excavations, as required. The shoring may be necessary to prevent collapse of the excavation sidewalls, impacts to the nearby wetlands/floodplain, and damage to nearby structures;
- Excavate approximately 5,400 cubic yards of significantly contaminated soil at the Northern Whitney Soil Area[3], as well as approximately 12,400 cubic yards of soil across the SWP to facilitate capping[4] while complying with federal and State environmental standards (termed "Applicable" or "Relevant and Appropriate" standards or "ARARs"), including causing no net flood storage loss (for a total of approximately 18,000 cubic yards of excavated soil). Perform confirmation sampling to demonstrate compliance with excavation goals. Manage excavated soils on-site based on their level of contamination and then dispose off-site at a licensed facility. At the Northern Whitney Soil Area, address any remaining contamination left at the bottom of the excavations below the water table by blending a treatment amendment to reduce volatile organic compounds (VOCs) and provide soil and localized groundwater treatment[5]. Backfill excavations with amended soil below the water table and clean soil above the water table (leaving space to install an impermeable cap at the original grade). Construct the impermeable cap across the SWP where soils are above the proposed cleanup levels, conceptually including geomembranes, geotextiles and 2 feet of imported material (e.g., common borrow, subbase and asphalt, clean soil, etc.). Install the cap over remaining contaminated soils exceeding cleanup criteria in the subsurface to prevent direct contact, movement to groundwater and erosion (see Figure 5). Restoring the SWP to original grades for no net flood storage loss;
- De-water the portion of the excavation that extends below the water table and any excavated soils that require dewatering, treat the water through a temporary treatment system and discharge the treated water to the Aberjona River (or appropriate off-site disposal at permitted facility, or appropriate discharge to Publicly Owned Treatment Works (POTW);
- Air monitoring during the excavation/capping, as well as monitoring of the adjacent wetlands/waterways, to ensure no contaminant releases impact human health and/or environment during the cleanup activities, as required;
- Implement a long-term inspection and maintenance plan to ensure impermeable cap integrity, maintenance, and repair and to maintain any required wetland/floodplain mitigation and/or stormwater controls;
- Long-term monitoring of environmental media to evaluate remedy effectiveness;
- Implement Institutional Controls to maintain the integrity of the cap, to prevent development of the properties for residential use (exclusive of an existing residence at the Aberjona Property), to prohibit use of contaminated groundwater until cleanup levels are met, and to require evaluation of the vapor intrusion pathway if a change in usage of any of the existing commercial buildings is contemplated, or as part of new building construction including any addition/alteration to existing buildings on any of the properties. To facilitate future use and redevelopment of the SWP consistent with the cleanup, Institutional Controls will be established to preserve the remedy, and appropriately manage impacted soil and groundwater encountered during future intrusive activities (e.g. installing subsurface utilities, building foundations/slabs, etc.,) to protect human health and the environment; and
- Periodic Five Year Reviews to assess protectiveness.

Figure 1 provides conceptual layouts of Alternatives SW-3/SM-3/SA-3. Figure 5 provides conceptual fill/cap designs for the proposed impermeable caps associated with Alternative SW-3/SM-3/SA-3. Alternative SW-3 includes the demolition of the Whitney building (including removal of any contaminated media (e.g. asbestos, etc., prior to demolition), installation of shoring around the perimeter of the excavation to prevent collapse of the excavation sidewalls and impacts to the nearby wetlands/floodplain, the excavation and off-site disposal of approximately 5,400 cubic yards of significantly contaminated soils, and removal of the existing drain line from the Whitney building floor drain to the Massachusetts Water Resources Authority (MWRA) sewer manhole from the Northern Whitney Soil Area as indicated in Figure 1 (denoting "Excavation" and "Deeper Excavation"). The Northern Whitney Soil Area denoted as "Excavation" will be excavated to groundwater table, which ranges approximately 6 feet to 10 feet below ground surface (approximate average depth of 8 feet below ground surface), while the "Deeper Excavation"

[3]See Figure 1 denoting "Excavation" and "Deeper Excavation" areas.
[4]See Figure 1 denoting "Cap Area".
[5]See Figure 1 denoting "Deeper Excavation" where amendment will be blended with soils within the shallow and upper portion of the intermediate groundwater zone (e.g. blending estimated from bottom of excavation to 24 feet below ground surface).

will be excavated below the groundwater level to 15 feet below ground surface. Confirmation sampling will be performed to demonstrate compliance with excavation goals. Soil at the bottom of the excavation below the water table will be blended with an amendment to reduce VOCs and provide soil and localized groundwater treatment. The Northern Whitney Soil Area denoted "Deeper Excavation" will be blended with an amendment from the bottom of excavation (e.g., 15 feet below ground surface) to 24 feet below ground surface. Excavations will be backfilled with blended soil amendment below the water table and clean soil above the water table (leaving space to install the impermeable cap at grade).

Some of the excavation will extend below the water table (e.g. Figure 1 denoted "Deeper Excavation") and require dewatering. Excavated saturated NAPL-contaminated soils will also likely require dewatering prior to off-site disposal. The dewatering water is expected to be treated to appropriate levels prior to proper discharge into the Aberjona River. Treatment may include storage and settling tanks, filtration (e.g., bags filters), air stripping to remove VOCs, activated carbon to remove PCBs (as well as VOCs), and ion exchange resins to remove metals. Construction of a dewatering pad to handle the saturated soils and a temporary groundwater treatment system will be necessary.

Alternatives SW-3, SM-3 and SA-3 require some shallow excavation of soils prior to cap installation so that there is no net loss of flood storage within the floodplain (see Figure 6 illustrating the locations of the floodplain and Figure 1 for the locations of the "Cap Area"). The SW-3, SM-3, and SA-3 alternatives will include air monitoring during the excavation/capping, as well as monitoring of the adjacent wetlands/waterways, to ensure no contaminant releases impact human health and/or environment during the cleanup activities, as required. For SM-3 and SA-3, the existing building concrete foundation and slab conditions may be evaluated and assessed during design for adequacy of satisfying the remedial action objectives and ARARs and serving as a component of the cap. This proposed plan assumes these existing SM-3 and SA-3 building concrete foundations and slabs are in good condition and will serve as adequate cap. For the SW-3 Alternative, any concrete foundation and slab remaining intact after building demolition may be evaluated and assessed during design for adequacy of satisfying the remedial action objectives and ARARs and serving as a component of the cap. An estimated approximately 5,200 cubic yards, 6,900 cubic yards and 300 cubic yards of soil (a total of 12,400 cubic yards) will be excavated from the Whitney, Murphy and Aberjona Properties, respectively, to facilitate capping. A conceptual plan view of the "Cap Area" is provided in Figure 1, and conceptual cap designs are provided on Figure 5.

Approximately 18,000 cubic yards of contaminated soil will be excavated from throughout the SWP. Pre-design investigations will further characterize extent of contamination (including PCBs) and excavated soils will be managed on-site based on contaminant characteristics, prior to being transferred off-site for disposal at a properly licensed facility. Prior to refilling the excavations, a geotextile fabric or equivalent will be placed to visually distinguish the clean imported material from the underlying impacted material left in place. The excavations will be backfilled with clean soil (with amendments, as applicable), and the remaining soils exceeding cleanup levels will be covered with the impermeable cap to prevent direct contact, minimize movement of soil contaminants to groundwater (e.g., leaching), and mitigate the potential for erosion to result in impacts to the wetland/floodplain. The cap within the 500-year floodplain will be designed, constructed, and maintained to prevent any releases in the event of flooding (up to a 500-year flood event). Restoration will include returning the area to the pre-existing conditions, and applying seed (native species to the extent practicable), mulch and/or soil amendments to restore the disturbed areas. The properties will be restored to original grades to prevent flood storage loss within the floodplain. EPA's Preliminary Remediation Goals (PRGs) for soils and maximum concentrations detected are shown in Table 1. These soil PRGs represent the proposed soil cleanup levels for OU4.

Reference for Table Next Page:

mg/kg - milligram per kilogram
ILCR - Incremental Lifetime Cancer Risk; 10-6 = 1 in 1,000,000
10-5 = 1 in 100,000
HI - Hazard Index
Leaching - Based on protection of groundwater as drinking water
ND - Not detected above laboratory reporting limit
W - Maximum detected concentration at Whitney Property
M - Maximum detected concentration at Murphy Property

Table 1 - Human Health Preliminary Remediation Goals (PRGs) For Soil & Maximium Concentration Detected On SWP

Contaminant	Maximum Detected Concentration mg/kg	Selected PRG mg/kg	Basis for Selected PRG
4,4-DDD	96 W	10	ILCR = 10^{-6} (Recreational)
4,4-DDT	290 W	8.5	ILCR = 10^{-6} (Recreational)
alpha-BHC	10 W	0.39	ILCR = 10^{-6} (Recreational)
alpha-Chlordane	720 W	8.0	ILCR = 10^{-6} (Recreational)
Arsenic	140 W	30	ILCR = 10-5 (Recreational)
bis(2-Ethylhexyl)phthalate	440 W	170	ILCR = 10^{-6} (Recreational)
Chromium (VI)	29.4 W	14	ILCR = 10^{-5} (Recreational)
Dieldrin	13 W	0.15	ILCR = 10^{-6} (Recreational)
gamma-Chlordane	990 W	8.0	ILCR = 10^{-6} (Recreational)
Heptachlor	110 W	0.69	ILCR = 10^{-6}(Recreational)
Heptachlor epoxide	0.8 W	0.34	ILCR = 10^{-6} (Recreational)
PCBs	1,512 W	5.3	HI = 1 (Recreational)
Trichloroethene	2,600 W	39	ILCR = 10^{-6} (Recreational)
Vinyl chloride	3.1 W	0.10	ILCR = 10^{-6} (Recreational)
Thalllium	30 M	3.5	HI = 1 (Recreational)
1,1,2-Trichloroethane	ND	0.016	Leaching
1,1,1-Trichloroethane	730 W	0.70	Leaching
1,1-Dichloroethane	21 W	0.008	Leaching
1,1-Dichloroethene	0.12 W	0.025	Leaching
1,2,3-Trichlorobenzene	39 W	0.21	Leaching
1,2,4-Trichlorobenzene	150 W	0.20	Leaching
1,2-Dichloroethane	0.0032 M	0.014	Leaching
1,4-Dichlorobenzene	490 W	0.72	Leaching
1,4-Dioxane	ND	0.050	Reporting Limit
2-Methylnaphthalene	151 W	1.9	Leaching
Benzene	6.79 W	0.026	Leaching
C11-C22 Aromatics	72,000 M	6.4	Reporting Limit
C5-C8 Aliphatics	2,190 W	88	Leaching
C9-C10 Aromatics	1,160 W	2.7	Reporting Limit
C9-C12 Aliphatics	775 W	15	Leaching
C9-C18 Aliphatics	6,040 W	15	Leaching
cis-1,2-Dichloroethene	700 W	0.21	Leaching
Ethylbenzene	27 M	7.8	Leaching
Methyl tert-butyl ether	0.37 W	0.050	Reporting Limit
Methylene chloride	2.69 W	0.013	Leaching
Naphthalene	148 W	0.026	Reporting Limit
Tetrachloroethene	1,200 W	0.023	Leaching
trans-1,2-Dichloroethene	3.8 W	0.31	Leaching
Trichloroethene	2,600 W	0.018	Leaching
Vinyl chloride	3.1 W	0.007	Leaching
Xylenes	365 W	98	Leaching

NAPL:
EPA's preferred alternative for the NAPL cleanup is known as Alternative N-3 in the FS: Excavation and Off-Site Disposal, and includes the following components:

- A pre-design investigation to define the extent of NAPL and NAPL-impacted soils;
- Installing any wetland/floodplain mitigation measures that may be required, establishing stormwater/erosion control measures, clearing and grubbing of excavation areas, relocating utilities to implement excavation, and installing temporary roads to excavation areas
- Bench-scale testing of soil amendments
- Installation of shoring around the perimeter of the excavation. The shoring will be necessary to prevent collapse of the excavation sidewalls, impacts to the nearby wetlands/floodplain, and damage to nearby structures;
- Excavate approximately 6,000 cubic yards of NAPL and NAPL-impacted soil across the SWP. Manage excavated soils/NAPL on-site based on their level of contamination and then dispose off-site at a licensed facility. Blend soil at the bottom of the excavation below the water table with an amendment to provide soil and localized groundwater treatment. Backfill excavations with amended soil below the water table and clean soil above the water table, restoring the properties to original grades for no net flood storage loss within the floodplain;
- Air monitoring during the excavation and on-site management of excavated materials, as well as monitoring of the adjacent wetlands/waterways, to ensure no contaminant releases impact human health and/or environment during the cleanup activities, as required;
- De-water the portion of the excavation that extends below the water table and any excavated NAPL-contaminated soils that require dewatering, treat the water through a temporary treatment system and discharge the treated water to the Aberjona River (or appropriate off-site disposal at permitted facility, or appropriate discharge to POTW);
- Long-term monitoring (as part of the groundwater component of the cleanup) to confirm no further presence of NAPL in groundwater); and
- Perform periodic Five Year Reviews to assess protectiveness.

Figure 2 provides a conceptual layout of Alternative N-3. Alternative N-3 includes the excavation and off-site disposal of approximately 6,000 cubic yards of NAPL and NAPL-impacted soil in specific areas where NAPL has historically been observed as indicated in Figure 2. Alternative N-3 prescribes excavation within several portions of the SWP, including the vicinity of monitoring wells MW-7, MW-16, MW-22, MW-23, MW-24, and MW-25 at the Murphy Property and monitoring well WB-201S at the Whitney Property, to approximately 6 feet below the water table (total depth of approximately 12 feet). Excavation would continue in the shallow groundwater until sampling confirms that the excavation goals of removing all the NAPL are met. The conceptual design also includes approximately 795 linear feet of shoring driven to 20 feet below the ground surface to prevent collapse of the excavation sidewalls and impacts to the nearby wetlands/floodplain.

The excavation will proceed below the water table and require dewatering. Excavated saturated NAPL-contaminated soils will also likely require dewatering prior to off-site disposal. The dewatering water is expected to be treated to appropriate levels prior to proper discharge to the Aberjona River. A dewatering system to handle the saturated NAPL-contaminated soils and a temporary groundwater treatment system will be necessary, and may include storage and settling tanks, filtration (e.g., bags filters), air stripping to remove VOCs, activated carbon to remove PCBs (as well as VOCs), and ion exchange resins to remove metals. Treated water will be discharged to a nearby surface water body (e.g., Aberjona River) in accordance with ARAR requirements or sent off-site for treatment and disposal.

The approximately 6,000 cubic yards of NAPL and NAPL-impacted soil will be managed on-site and then transported off-site for disposal at a properly licensed facility. Soil and all other media generated by the remedial action will be evaluated to determine if it meets the definition of a listed hazardous waste or if it exceeds characteristic hazardous waste standards. Portions may also be Toxic Substance Control Act (TSCA) waste, based upon existing data and pre-design investigations. The excavations will be backfilled with amended soil below the water table and clean soil above the water table. The amendment will be designed to provide soil and localized groundwater treatment similar to Alternative SW-3. Restoration will include returning the area to the pre-existing conditions, and applying seed (native species, to the extent practicable), mulch and/or soil amendments. To the extent that the NAPL removal area overlaps the cap areas delineated under Alternatives SW-3 and SM-3, the overlap areas will be capped. The properties will be restored to original grades to prevent flood storage loss within the floodplain.

Note that NAPL removal on the Whitney Property is expected to occur during and as part of the Northern Whitney Soil Area excavations under the SW-3 Alternative (See Figure 1). Hence, the N-3 Alternative costs are adjusted downward in Table 8 (Overall Cost Summary) to account for NAPL removal under the SW-3 Alternative.

Groundwater:
EPA's preferred alternative for the groundwater cleanup is Alternative GW-6 in the FS: Pump and Treat and Institutional Controls, and includes the following components:

- Pre-design investigation to assist in the development of the groundwater treatment system design;
- Design and construction of the groundwater treatment and monitoring system, including any measures to address stormwater and wetlands/floodplain mitigation issues;
- Operation and maintenance of the groundwater treatment system to prevent contaminant migration and remove groundwater contaminants[6];
- Off-site disposal of any contaminated media generated from the treatment system or from monitoring;
- Long-term Monitoring of groundwater to evaluate effectiveness of pump and treat system and operation and maintenance of the monitoring well system. The effectiveness of the remedy would be evaluated by sampling groundwater monitoring wells until cleanup levels are achieved;
- Implementation of Institutional Controls to prohibit use of contaminated groundwater above cleanup levels until the cleanup levels are achieved, and to prevent creation of any future vapor intrusion pathway into buildings until groundwater cleanup levels are met. The time to achieve cleanup levels is expected to be 20 years. To facilitate future use and redevelopment of the SWP, Institutional Controls will also be established to preserve the remedy, and appropriately manage impacted groundwater encountered during intrusive activities (e.g. any future subsurface excavation for utilities, building foundations/slabs, etc.) to protect human health and the environment, until cleanup levels are achieved;
- This alternative also provides for Five-Year Reviews to assess protectiveness.

Figure 3 provides a conceptual layout of Alternative GW-6 (anticipated to include between 18 and 22 recovery wells). Alternative GW-6 includes: 1) pre-design investigation activities and groundwater sampling to assist in groundwater treatment system design which may include components such as bag filters, activated carbon vessels, metals polishing vessels, air strippers, vapor phase activated carbon, etc., and to determine the pumping rates, locations and depth of extraction wells; 2) water treatment plant design, and development of health and safety plan; 3) construction of the groundwater pump and treat system including the treatment plant and treatment components, trenching of associated piping to transfer water to the treatment plant, and discharge piping for discharge of treated water to the Aberjona River; 4) operation and maintenance of the treatment system components to reduce contaminant concentrations and achieve groundwater cleanup standards, and prevent contaminant groundwater migration from the SWP; 5) long-term groundwater monitoring to determine long-term effectiveness of pump and treat system; 6) operation and maintenance of the monitoring well system, and 7) implementation of Institutional Controls to prohibit the use of groundwater until cleanup levels are met and to require evaluation of the vapor intrusion pathway if a change in usage of any of the existing commercial buildings is contemplated, or as part of new building construction including any addition to existing buildings on any of the properties. Pre-design investigation activities may include consideration of upgrades to the adjacent Wildwood Source Area Property groundwater treatment system plant to accommodate and adequately treat extracted groundwater from the SWP in lieu of constructing a groundwater treatment plant on the SWP. EPA's Preliminary Remediation Goals (PRGs) for groundwater and maximum concentrations detected are shown in Table 2. These groundwater PRGs represent the proposed groundwater cleanup levels for OU4.

[6]Additional groundwater treatment will occur through the use of treatment amendments mixed into saturated subsurface soil as part of the soil and NAPL components of the remedy, discussed above.

Table 2 - Human Health Preliminary Remediation Goals (PRGs) For Groundwater

	SWP-Wide		
Contaminant	Maximum Detected Concentration (µg/L)	Selected PRG (µg/L)	Basis for Selected PRG
1,1,2-Trichloroethane	0.72	5	MCL
1,1,1-Trichloroethane	3,300	200	MCL
1,1-Dichloroethane	1,200	2.8	ILCR = 10^{-6} (Residential)
1,1-Dichloroethene	68	7	MCL
1,2,3-Trichlorobenzene	50	7	HI = 1 (Residential)
1,2,4-Trichlorobenzene	170	70	MCL
1,2-Dichloroethane	6.9	5	MCL
1,4-Dichlorobenzene	37	75	MCL
1,4-Dioxane	79	0.46	ILCR = 10^{-6} (Residential)
2-Methylnaphthalene	88.8	36	HI = 1 (Residential)
4,4-DDD	0.85	0.032	ILCR = 10^{-6} (Residential)
4,4-DDT	0.34	0.23	ILCR = 10^{-6} (Residential)
4,4-DDE	0.083	0.046	ILCR = 10^{-6} (Residential)
Aldrin	0.22	0.001	ILCR = 10^{-6}(Residential)
alpha-BHC	3.1	0.007	ILCR = 10^{-6} (Residential)
alpha-Chlordane	0.43	2	MCL
Arsenic	389	10	MCL
Benzene	55	5	MCL
Benzo(a)pyrene	0.088	0.2	MCL
beta-BHC	0.41	0.025	ILCR = 10^{-6} (Residential)
C11-C22 Aromatics	587	100	Reporting Limit
C5-C8 Aliphatics	4,460	880	HI = 1 (Residential)
C9-C10 Aromatics	1,000	130	HI = 1 (Residential)
C9-C12 Aliphatics	90.2	50	Reporting Limit
C9-C18 Aliphatics	140	100	Reporting Limit
cis-1,2-Dichloroethene	35,000	70	MCL
Cobalt	16	6	HI = 1 (Residential)
Dieldrin	0.02	0.002	ILCR = 10^{-6} (Residential)
Ethylbenzene	110	700	MCL
gamma-Chlordane	0.34	2	MCL
Heptachlor	0.6	0.4	MCL
Heptachlor epoxide	0.19	0.2	MCL
Iron	33,800	14,000	HI = 1 (Residential)
Lead	129	15	MCL
Lindane	5.7	0.2	MCL
Manganese	4,890	300	Health Advisory
Methyl tert-butyl ether	86	14	ILCR = 10^{-6} (Residential)
Methylene chloride	1,500	5	MCL
Naphthalene	342	0.17	ILCR = 10^{-6} (Residential)
Tetrachloroethene	2,000	5	MCL
PCBs	25.5	0.5	MCL
trans-1,2-Dichloroethene	190	100	MCL
Trichloroethene	4,000	5	MCL
Vinyl chloride	2,600	2	MCL
Xylenes	509	10,000	MCL

µg/L - micrograms per liter
MCL - Maximum Contaminant Level
ILCR - Incremental Lifetime Cancer Risk; 10-6 = 1 in 1,000,000
HI - Hazard Index

Wetland Sediment/Soil:
EPA's preferred alternative for the wetland sediment/soil cleanup is known as Alternative WTL-5 in the FS: Deep (e.g., Estimated Depth of 3 Feet) Excavation, Off-Site Disposal, Backfill Cover, and Wetland Restoration, and includes the following components:

- Pre-design investigation to refine the vertical and horizontal extent of wetland sediment/soil exceeding cleanup levels;
- Installing any wetland/floodplain mitigation measures that may be required, establishing stormwater/erosion control measures, clearing and grubbing of excavation areas, installing temporary roads to excavation areas, and pre- and post-excavation land surveying;
- Site preparation; establishing a soil/sediment dewatering area; de-watering both the excavation, as required, and any excavated contaminated soils/sediments that require dewatering; water treatment through a temporary de-watering and treatment system; and discharge to the Aberjona River;
- Excavate approximately 7,000 cubic yards of wetland sediment/soil exceeding EPA's proposed cleanup levels (approximately 63,000 square feet of wetland area). Perform confirmation sampling to demonstrate compliance with cleanup levels. Manage excavated soils/sediments on-site based on their level of contamination. Add amendments, if required, to dewatered soil/sediment to allow off-site disposal. Dispose of dewatered soil/sediment and any treatment media at a licensed off-site disposal facility
- Backfill excavations to pre-remediation grades with clean wetland soil, and restore the wetland habitat;
- Air monitoring during the excavation/backfilling, as well as monitoring of the adjacent wetlands/waterways, to ensure no contaminant releases impact human health and/or the environment during the cleanup activities, as required;
- Post-remediation monitoring of plantings and ground surfaces to ensure floodplain/wetland restoration goals are met; and
- Perform periodic Five Year Reviews (only if contamination left in place).

Figure 4 provides a conceptual layout of Alternative WTL-5, and illustrates the location of Wetland Sediments (identified within the Murphy Wetland as "SEASONALLY PONDED AREA") and the location of Wetland Soils (identified within the Murphy Wetland as "FORESTED/SCRUB-SHRUB SWAMP"). Alternative WTL-5 includes the excavation and off-site disposal of approximately 7,000 cubic yards of contaminated wetland sediment/soil. Alternative WTL-5 includes excavation to remove all wetland sediment/soil with contaminants in excess of the wetland sediment/soil cleanup levels. Deeper or shallower excavations may be conducted in specific areas of the wetland, depending on pre-design sampling results. Confirmation sampling will be performed to demonstrate compliance with excavation goals. Alternative WTL-5 includes backfilling the excavation to pre-remediation grades and includes restoration of the floodplain/wetland habitat.

As the excavation proceeds below the water table it will be necessary to dewater the excavation. Extracted water is expected to contain PCBs, semi-volatile organic compounds (SVOCs), VOCs, and metals. A temporary dewatering system will be designed and implemented to treat extracted water prior to proper discharge and may include storage tanks, filtration, air stripper, activated carbon, ion exchange resins, etc. Treated water will be discharged to a nearby surface water body (e.g., Aberjona River).

The approximately 7,000 cubic yards of contaminated sediment/soil excavated will be transferred off-site for disposal at a properly licensed facility. Manage excavated soils/sediments on-site based on their level of contamination. Add amendments, if required, to dewatered soil/sediment to allow off-site disposal. The excavations will be backfilled with clean wetland soil to pre-remediation grades. Floodplain/wetland restoration will include planting of native species to restore the disturbed areas. Wetland/floodplain species would be planted in accordance with the restoration plan. The wetland and any altered floodplain will be restored to original grades to prevent flood storage loss. Plantings and visible ground surfaces will be inspected and maintained as required by the restoration plan and ARARs requirements. The monitoring period is assumed to be at least three years. EPA's Preliminary Remediation Goals (PRGs) for wetland sediments/soils and maximum concentrations detected are shown in Table 3. These wetland sediments/soils PRGs represent the proposed wetland sediments/soils cleanup levels for OU4.

Table 3 - Preliminary Remediation Goals (PRGs) For Wetland Sediment/Soil

HUMAN HEALTH			
Contaminant	**Maximum Detected Concentration mg/kg**	**Selected PRG (mg/kg)**	**Basis for Selected PRG**
C11-C22 Aromatics	97,000	14,000	HI = 1 (Recreational)
PCBs	450	8.4	HI = 1 (Recreational)
Lead	35,100	570	Lead Model (Recreational)

ECOLOGICAL			
Contaminant	**Maximum Detected Concentration mg/kg**	**Selected PRG (mg/kg)**	**Basis for Selected PRG**
Wetland Sediment			
PCBs	450	1.9	Wetland mammal protection
Chromium	66,500	130	Background
Lead	35,100	330	Background
Zinc	925	460	Benthic protection
Wetland Soil			
PCBs	15	1.3	Wetland mammal protection
Chromium	62,500	1,900	Wetland mammal protection

mg/kg - milligram per kilogram
HI - Hazard Index

ESTIMATED COST OF THE PROPOSED CLEANUP

The estimated total present value[7] of this proposed cleanup approach, including construction, operation and maintenance, and long-term monitoring is approximately **$19.1 million**. Each component is discussed in the FS Report Addendum and FS in greater detail.

POTENTIAL COMMUNITY IMPACTS

Short-term impacts to the site workers and community include the potential inhalation of airborne contaminants during implementation of the excavation, soil/sediment management and cap construction activities. The minor risks to workers and the community would be temporary and mitigated through the implementation of dust control measures (e.g., water sprays, soil/sediment stockpile covers, etc.) and perimeter air monitoring during all site activities associated with soil excavation and handling. The potential for localized releases of vapors during excavation are not anticipated to impact the community and will be mitigated for workers during remedial actions through proper health and safety precautions (e.g., personal protective equipment). Other impacts to the community include the trucking of supplies and materials to/from

[7] "Present value" is the amount of money set aside today to ensure that enough money is available over the expected life of the project, assuming certain economic conditions (e.g., inflation).

EPA is Asking for Public Comment on the Following Proposed Determinations:

Wetland Impacts

The cleanup plan proposed by EPA includes activities that would impact wetlands. Before EPA can select a cleanup plan that would impact wetlands, Section 404 of the Clean Water Act, regulatory requirements at 44 C.F.R. Part 9, and Executive Order 11990 (Protection of Wetlands) require EPA to make a determination that there is no practicable alternative to conducting work that will impact wetlands. EPA has determined that because significant levels of contamination exist in wetlands within the SWP cleanup areas, there is no practicable alternative to conducting work in these wetlands.

For those wetland areas that would be impacted by cleanup activities, EPA is also required to make a determination that the cleanup activities that are conducted and/or impact these areas are the least environmentally damaging practicable alternatives. EPA has determined that the proposed cleanup action activities that impact wetlands are the least environmentally damaging practical alternatives because they will permanently remove contaminants that are impairing the wetlands and that any wetland resources altered by the cleanup will be restored to the original grade and with native vegetation.

EPA will minimize potential harm and avoid adverse impacts on wetland resources, to the extent practical by using best management practices to minimize harmful impacts on the wetlands, wildlife or habitat. Wetlands will be restored and/or replicated consistent with the requirements of federal and state wetlands protection laws.

Floodplain Impacts

The cleanup plan proposed by EPA includes activities that result in the occupancy and modification of the 500-year floodplain. Before EPA can select such a cleanup alternative, regulatory requirements at 44 C.F.R. Part 9 and Executive Order 11988 (Floodplain Management) requires EPA to make a determination that there is no practicable alternative to altering floodplain resources. EPA has determined there is no practicable alternative to occupancy and modification of the Aberjona River floodplain. EPA would avoid or minimize potential harmful temporary and permanent impacts on floodplain resources within the 500-year floodplain to the extent practical at the cleanup areas including the Murphy Wetland. In addition, any lost flood storage capacity from cleanup activities within the floodplain would be addressed as appropriate. Note that the proposed remedy includes provisions for no net flood storage loss (e.g., soil removed prior to cap installation so no net flood storage loss, sediments removed and clean wetland soils backfilled to original grades, etc.).

Proposed Draft Determination: PCB Cleanup Level is Protective

Through this Proposed Plan, EPA is specifically soliciting public comment concerning its proposed Draft Determination under regulations promulgated under the Toxic Substances Control Act (TSCA) at 40 CFR Part 761, that the risk-based PCB cleanup levels of 5.3 milligrams/kilogram for PCBs for recreational exposure in soil, 1.9 milligram/kilogram for PCBs for ecological exposure in contaminated wetland sediment, and 1.3 milligram/kilogram for PCBs for ecological exposure in contaminated wetland soil at the SWP will not pose an unreasonable risk of injury to health or the environment. Risks from unrestricted exposure to PCBs between 1 milligram/kilogram and 5.3 milligrams/kilogram for PCBs in contaminated soil will be addressed by institutional controls that will prevent residential development (throughout the SWP except on the Existing Aberjona Residence area on the Aberjona parcel and in the Murphy Wetland where no residential exposure is anticipated). The soil excavation component of the proposed cleanup will remove PCBs greater than or equal to 50 milligrams/kilogram of PCBs in soil, with disposal off-site at a licensed facility. Remaining PCB-contaminated soil above the soil cleanup level will be capped to prevent exposure and all remaining soil at or above 1 milligram/kilogram of PCBs will be subject to institutional controls to prevent residential development. In addition, NAPL will be removed from the subsurface including any NAPL containing PCBs, to the extent practicable. NAPL contaminated with equal or greater than 50 milligrams/kilogram of PCBs will be disposed of at a licensed TSCA compliant disposal facility. Wetland sediment/soil contaminated with PCBs will be excavated from the wetland until wetland sediment/soil cleanup levels are achieved. PCBs found in groundwater above cleanup levels will be removed by the pump and treat system, separated from the discharge water, and disposed of off-site at a licensed facility. Consistent with Section 761.61(c) of TSCA, EPA has made a Draft Determination that the disposal of PCB contaminated material as described in the Administrative Record for this Proposed Plan and does not result in an unreasonable risk of injury to human health or the environment as long as certain conditions are met. EPA's Draft Determination, which documents the required conditions related to PCBs, is included in the Administrative Record for thisProposed Plan. The Administrative Record is available online at: https://semspub.epa.gov/src/collection/01/AR63551. A Final Determination will be made after considering all public comments received during the public comment period.

the SWP. Material that is transported off-site would take approximately 1,600 to 2,500 truckloads to transport depending on the size of the truck. Vehicles accessing the SWP would use the existing entrances and EPA would work with town officials to determine the best routes to and from the SWP to minimize any traffic concerns. Clean soils for backfilling and for cap construction will also need to be transported to the SWP. Noise impacts will be controlled through noise dampening equipment and/or limiting operating hours to minimize neighborhood impacts. Overall, the preferred cleanup approach is expected to take 1-2 years to construct.

BACKGROUND

The Wells G&H Superfund Site is comprised of a 330-acre triangular shaped tract of land within the Aberjona River Valley bounded by Route 128/Interstate 95 to the north, the Boston and Maine (B&M) Railroad right-of-way to the west, and Salem Street, Cedar Street, and Interstate 93 to the south (Figure 7). The 1989 Record of Decision (ROD) for the Wells G&H Superfund Site identified five source area properties containing soils and/or groundwater contamination at the Site. The 1991 Explanation of Significant Difference (ESD) provides a description of and rationale for the changes to the 1989 ROD. Under the 1991 agreement (known as the 1991 Consent Decree) between EPA and settling defendants for the Wells G&H Superfund Site, the settling defendants agreed to clean up four of the source area properties which is known as phase 1 or Operable Unit 1 (OU1). EPA investigated the surface water and sediments associated with the Aberjona River, which flows through the Site, as Operable Unit 3, Aberjona River Study). The Aberjona River also flows through the Industriplex Superfund Site, where the Industriplex Site begins approximately 1 mile upstream of the Site in northern Woburn. In 2006, EPA established a ROD cleanup decision for the Aberjona River known as "Industri-plex OU-2 (including Wells G&H Operable Unit 3, Aberjona River Study)". The 1991 settling defendants also agreed to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Central Area, which is generally the remaining areas beyond the source area properties, including the SWP. This RI/FS is part of phase 2 or Operable Unit 2 (OU2).

The SWP are comprised of the contiguous properties of land known as the Aberjona Property (270 & 280 Salem Street; 6.51 acres), Whitney Property (256 Salem Street; 2.67 acres), and Murphy Property (250 & 252 Salem Street; 4.14 acres), which totals approximately 13.3 acres. The SWP includes a wetland area (referred to as the Murphy Wetland; approximately 1.3 acres) that extends along the northern border of the SWP and into the OU1 Wildwood Source Area Property adjacent to the north.

The SWP are in a heavily developed commercial and industrial area and are generally buffered by similarly developed properties. The SWP are bordered to the east by the Aberjona River on the eastern side of the Aberjona Property, to the south by Salem Street, to the west by B&M Railroad on the western side of the Murphy Property, and to the north by the OU1 Wildwood Source Area Property. The SWP are zoned Industrial Park (I-P) by the City of Woburn; however, a residence is located on the Aberjona Property (Figure 8). Bordering the SWP to the east, north and west, the land is zoned Industrial (I-P) by the City of Woburn. Bordering the SWP immediately to the south, the land is zoned Industrial-General (I-G) by the City of Woburn.

A RI/FS of the OU2 Central Area was undertaken by several of the OU1 Settling Defendants (Beatrice Corporation, UniFirst Corporation and W.R. Grace & Co.) and submitted to EPA in February, 1994. A separate RI was also undertaken by Beatrice which specifically addressed the SWP (February, 1994). This was supplemented with an August 2003 RI report for the SWP by Beatrice which included the results of additional data collection and supported the 2006 Baseline Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA). Additional data were collected between 2010 and 2013 in support of an EPA updated baseline HHRA and ERA (March, 2014) at the SWP and submittal of an RI Report (November 2016) and FS Report Addendum for the SWP (December 2016) by Beatrice. EPA prepared an FS Report Addendum – Technical Memorandum for the SWP modifying parts of the FS Report Addendum and supporting this Proposed Plan (July 2017). Under this Proposed Plan and the Record of Decision for the SWP, the SWP cleanup will be Operable Unit 4 (OU4).

The topography proximate to the SWP slopes gently from the west to the east towards the Aberjona River. Surficial features across the SWP are relatively flat and comprised largely of reworked glacial and fluvial sand and gravel deposits mixed with anthropogenic fill which was used to backfill the wetland area bordering the western edge of the Aberjona River and modify the grade at each property to accommodate development. Localized areas of wetland/swamp deposits are also present, including peat layers and organic silts. Groundwater present within the unconsolidated and bedrock formations generally migrates east-northeast across the SWP, towards the Aberjona River.
The Aberjona, Whitney and Murphy Properties and Murphy Wetland, as shown on

Figure 8, include the following primary environmental impacts and contaminant sources, based on historical operations at each of the properties:

- **Aberjona Property** – Prior to 1950, the Aberjona Property operated as a Gulf gasoline station. The Aberjona Property began operations in the mid-1950s for the sale and reconditioning of used and wrecked automobiles, and was also a gasoline service station. During operation, the property contained several hundred junked automobiles, tires and miscellaneous car parts. The auto reclamation business and associated offices ceased operations in the late 1990s. Environmental investigation activities conducted at the property have identified several known or potential sources of contamination including operation of the former gas station, auto salvage yard operations, unauthorized burning activities (e.g., cars, wood and seat cushions), main garage operations including degreasing operation and use of a grease pit draining to an oil-water separator and historic presence of underground storage tanks.
- **Whitney Property** - From approximately 1950 until 1985, the Whitney Barrel Company conducted drum and tank recycling and reconditioning activities, with interior cleaning of drums and exterior cleaning of tanks. Drums, tanks and other items were reportedly brought to the north side of the main building and unloaded either directly into the main building for processing, stored in a warehouse north of the main building awaiting processing and/or stored outside the main building awaiting processing. Environmental investigations conducted at the property have identified several known or potential sources of contamination including drum cleaning operations, floor drains within the building, drum and associated discharge to a sewer, tank and car storage, direct discharges to on-property sewer lines, several fires, scrap metal storage and incidental spills and material handling releases. The Northern Whitney Soil Area, including a former drain line that discharged to a MWRA sewer, is identified as an area of significantly elevated soil and groundwater contaminant concentrations. NAPL is also present in this portion of the property.
- **Murphy Property** - The property was used for storage of virgin oil beginning in the 1920s. By the 1950s, waste oils and solvent contaminated oils were accepted at the facility. The northern portion of the property contained the "oil yard" that housed approximately twenty Above-Ground Storage Tanks (ASTs) for oil storage. The central portion of the property contained a large depression known as the "oil pit" where waste oil and filters were disposed. The property is currently operated by Clean Harbors Environmental Services (CHES) as a transfer, storage and disposal facility (TSDF) for waste oil and solvent-contaminated oil, with their offices located on the abutting 250 Salem Street property.
- **Murphy Wetland** - The Murphy Wetland is located between the upland portions of the SWP and the Wildwood Source Area Property. Given the location of the former "oil yard" and "oil pit" at the Murphy property and former barrel washing activities contributing to impacts within the Northern Whitney Soil Area, historic operational activities have the potential to have impacted the Murphy Wetland. In addition, the wetland likely has been impacted by releases originating from neighboring properties including the former J.J. Riley Tannery to the west (e.g., historic overflows of the sanitary sewer, discharges from a drainage swale, etc.) and Wildwood Property to the north (e.g., mixed-contaminated soil impacts), as well as from flood events with the potential to redistribute contamination between the Murphy Wetland and the adjacent properties.
- **SWP-Wide Groundwater:** Groundwater generally travels across the Murphy, Whitney and Aberjona Properties to the Aberjona River. Leaching has occurred from the sources identified at the SWP, where discharge of solvents, PCBs, pesticides, petroleum hydrocarbons, and possibly other chemicals, has resulted in elevated concentrations of these constituents in soil and groundwater (both overburden and bedrock) beneath the SWP.

Current & Future Land Use

The SWP, as well as the surrounding area, are currently primarily utilized for various light industrial/commercial uses. The future anticipated land use is assumed to remain commercial/industrial due to zoning and surrounding commercial/industrial land use, except for the Existing Aberjona Residence area (e.g. house and backyard) on the Aberjona Property which has historically been isolated from the industrial operations occurring at the Aberjona Property by a concrete wall, fencing, and pavement. Recreational use at the SWP is also a potential future use, considering the presence of the ice skating rink at the Aberjona Property and the wetland between the Murphy and Whitney Properties. Because the SWP are in a highly-developed commercial/industrial area and future residential development is considered highly unlikely, EPA evaluated recreational use as well as commercial/industrial use as exposure scenarios in the baseline HHRA. Future residential use of the SWP (exclusive of the Existing

Environmental Investigations and Cleanup Actions

There have been a number of prior investigations and cleanup actions at the SWP between 1980 and the present. The following provides a summary of the primary remedial investigation and cleanup actions conducted to date at the SWP.

- **Preliminary Site Assessments (1980)** – EPA directed Field Investigation Team (FIT) Program investigations of the Aberjona and Whitney Properties to provide field assessments designed to locate evidence of contamination, identify possible contaminants and determine potential future sampling locations at each property.
- **Remedial Investigation (1986)** – The SWP were included in EPA lead investigation activities at the Wells G&H Superfund Site, including the installation of monitoring wells and the collection and analysis of soil and groundwater samples.
- **Remedial Investigation/Feasibility Study (1988)** – The objective of the supplemental RI activities was to expand upon the conclusions of the 1986 investigation activities and provide the data necessary to support the FS including delineation of soil impacts, collection of hydrogeologic and groundwater data, and assessment of surface water and sediment impacts. The FS compiled the information presented in the RI to develop preliminary remedial goals, screen potential remedial technologies and evaluate remedial alternatives. The FS also included an endangerment assessment.
- **Site Assessment (1988)** – Site assessment and investigation activities were undertaken at the Whitney Property including a geophysical survey, evaluation of the floor drain system, test pit excavation activities, installation of soil borings, monitoring wells and piezometers, water level measurements and groundwater flow analysis and the collection and analysis of soil, soil vapor and groundwater samples. The scope of work was designed to comply with the Administrative Consent Order entered into by the property owner and Massachusetts Department of Environmental Protection.
- **RCRA Corrective Action Investigations (1988 to 1998)** - The facility located at the Murphy Property is registered under RCRA as a TSDF. Several environmental investigations have been undertaken at the Murphy Property in accordance with a RCRA Part B permit issued by MassDEP, including three subsurface investigations between December 1987 and February 1989, Corrective Action investigation activities performed in 1994, and supplemental Corrective Action investigations between October 1997 and January 1998. These investigations included installation of soil borings and monitoring wells, collection and analysis of soil, sediment and groundwater samples and investigations related to the presence of NAPL at the property.
- **Short-Term Remedial Measure** – Murphy Property (1989) – A depression located at the Murphy Property previously referred to as the "oil pit" was reportedly use in the 1950s for the disposal of spent silica media which had been used to filter waste oil. In March/April 1989, a Short-Term Remedial Measure was authorized by the MassDEP under the 21E Program, and performed by Clean Harbors Environmental Services to remove some petroleum-impacted soil. Approximately 1,100 cubic yards of petroleum-impacted soil was excavated and transported offsite for disposal. The excavation activities extended to a depth below the groundwater table over the footprint of the proposed facility building; however, all impacted soil material was not removed as part of this measure.
- **Remedial Investigation (1994)** - An RI of OU2, the Central Area, was undertaken by several of the Settling Defendants (Beatrice, UniFirst Corporation and W.R. Grace & Co.), which included the SWP, the results of which were submitted in February 1994. In addition, a separate RI, also submitted in February 1994, was undertaken by Beatrice which specifically addressed the SWP. The RI activities included records reviews, physical inspections of the SWP, wetland and floodplain assessments, installation of monitoring wells, water level measurement, collection and analysis of soil, sediment and groundwater samples, slug testing and estimates of SWP-specific hydraulic conductivity.
- **Immediate Response Action (2002 to Present)** - A comprehensive gauging event performed at the Murphy Property on November 5, 2001 under their RCRA Part B Permit Groundwater Monitoring Plan resulted in light non-aqueous phase liquid (LNAPL) being detected in three wells. Subsequently, on September 25, 2002 notification was made to

MassDEP and RTN 3-22144 was issued. MassDEP gave verbal approval to conduct an Immediate Response Action (IRA), consisting of periodic gauging of LNAPL and removal of LNAPL when it is encountered. Clean Harbors developed an IRA Plan in 2002, and since that time has been periodically removing accumulated LNAPL from monitoring wells via bailing and submitting semiannual IRA Status Reports to MassDEP. In August 2004, EPA notified Clean Harbors that the RCRA corrective action program for their facility was deferred to CERCLA. The maximum levels of LNAPL measured in monitoring wells on the property includes 1.80 feet at MW-7, 1.43 feet at MW-16, 0.01 feet at MW-23, 3.40 feet MW-24 and 0.44 feet at MW-25.

- **Supplemental Remedial Investigation (2002 to 2003)** – At the request of EPA, additional investigation activities were performed to update and supplement environmental information regarding the SWP and collect additional data in support of a Baseline Risk Assessment. The Supplemental RI included the installation of soil borings and monitoring wells, collection and analysis of soil, sediment and groundwater samples, an evaluation of surface water flow within the Murphy Wetland, evaluation of the sanitary sewer system at the Aberjona Property, evaluation of the floor drains and filling activities at the Whitney Property, slug testing and a geophysical survey.
- **Baseline Human Health and Ecological Risk Assessment (2004/2006)** – A baseline risk assessment was prepared for the SWP in March 2004 and subsequently updated in February 2006. The baseline risk assessment was based on soil, groundwater, sediment and surface water data collected through 2002. The objectives of the risk assessment were to quantitatively assess potential non-carcinogenic and carcinogenic risks to human receptors that have the potential for current and/or future exposure to SWP media and to provide information for use in making remedial decisions.
- **Former John J. Riley Tannery/ Organix Property Site Investigation & Remediation (2004 to 2011)** – EPA completed Expanded Trip Report on September 21, 2004, Preliminary Assessment/Site Inspection on August 11, 2005, and entered into Administrative Settlement Agreement and Order on Consent with Organix on June 30, 2006 for performing a Removal Action to address chromium contaminated surface soil exposed within the drainage swale on the property. Organix removed 26 tons of chromium contaminated surface soil from the swale area and secured the excavation area with geotextile, haybales and rip rap in summer/fall 2006. Between 2006 and 2013, further site investigation and remediation activities were conducted within the former John J. Riley Tannery property to address impacted soil along a drainage swale and downstream depositional area adjacent to the B&M Railroad and discharging to the Murphy Wetland. The activities included phased investigations and soil remediation under the Massachusetts Contingency Plan (MCP) to address contaminants including heavy metals (e.g., arsenic, cadmium, chromium, lead and mercury) and polycyclic aromatic hydrocarbons (PAHs). A closure statement was submitted to MassDEP in January 2011.
- **Supplemental Remedial Investigation (2010 to 2012)** – At the request of EPA, additional investigation activities were undertaken between 2010 and 2012 to further delineate the extent of impacts and further support the Baseline Risk Assessment. These activities included installation of soil borings and monitoring wells, test pit excavations along the former drain line at the Whitney Property, water level measurements, collection and analysis of soil, soil vapor and groundwater samples, analysis of NAPL samples and slug testing.
- **Vapor Intrusion Investigation (2013)** – At the request of EPA, two rounds of sampling were conducted at the Existing Aberjona Residence to assess the potential for vapor intrusion. Following the completion of a building survey to document the existing conditions (e.g., foundation, building material, HVAC system, etc.) samples were collected concurrently for subslab soil vapor, indoor air and ambient air in April and August 2013.
- **Well Installation and Natural Attenuation Assessment (2013)** – Groundwater sampling was conducted to evaluate the potential for natural attenuation processes to be occurring at the SWP. Additional samples of NAPL were also collected at the Murphy Property. In addition, monitoring wells were installed within and proximate to the SWP to further characterize bedrock conditions.

Aberjona Residence area on the Aberjona Property) will be prevented through Institutional Controls.

Consistent with EPA's 1996 Final Ground Water Use and Value Determination Guidance, and the Commonwealth's Comprehensive State Groundwater Protection Program (CSGWPP), the MassDEP has developed a "Use and Value Determination" of the groundwater relative to the Wells G&H Site. The purpose of the Use and Value Determination is to identify whether the aquifer at the Site should be considered of "High", "Medium", or "Low" use and value. In the development of its Determination, MassDEP applied the criteria for groundwater classification as promulgated in the MCP. The classification contained in the MCP considers criteria like those recommended in the Use and Value Guidance as agreed to in the Memorandum of Agreement (MOA) between EPA and MassDEP. MassDEP classified the aquifer as a potential drinking water source area, and supported an overall medium use and value for the aquifer at the Site, where exposure scenarios for groundwater risk evaluations should include, but not limited to, the ingestion and exposure for other domestic uses. Therefore, EPA is proposing cleanup levels based on federal and state drinking water standards, or Maximum Contamination Levels (MCLs), and risk-based criteria that support this use as a future potential drinking water source.

WHY CLEANUP IS NEEDED

Site Contaminants

Tables 1 – 3 present the maximum detected concentrations of contaminants at the SWP. Details of the specific contaminates at the SWP, including some figures illustrating their locations, can be found in the 2016 RI Report and 2017 FS Report Addendum. The "Cap Area" and "Excavation" areas, as well as the Murphy and Whitney Properties buildings and portion of Aberjona Property building, illustrated on Figure 1 generally represent where soil PRGs (Table 1) are exceeded. The "NAPL" areas illustrated on Figure 2 generally represent where NAPL was observed in monitoring wells. The "Treatment Area" illustrated on Figure 3 generally represents where groundwater PRGs for volatile organic compounds (included in Table 2) are exceeded. The "Excavate & Restore" areas on Figure 4 generally represent where wetland soils/sediments PRGs (Table 3) are exceeded.

The contaminants of concern at the SWP include:

PCBs or Polychlorinated Biphenyls are manmade chemicals that were used in electrical manufacturing and were banned in 1979. They are persistent in the environment, meaning they do not readily degrade.

Pesticides are manmade chemicals used for the elimination of unwanted animal, insect and plant pests. Though they are designed to target non-human pests, they can also produce adverse health effects in humans. Many pesticides are also persistent in the environment.

VOCs or Volatile Organic Compounds include a variety of chemicals that are used in glue, paint, solvents, and other products and easily evaporate. Common VOCs include trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and tetrachloroethene (PCE). These compounds are found in SWP-wide groundwater and to some extent in soil.

Petroleum Hydrocarbons are mixtures of aliphatic and aromatic compounds composed of hydrogen and between five and 36 carbons. Gasoline, fuel oil, and waste oil are examples of petroleum hydrocarbon mixtures. Due to the historic use and releases of petroleum products at the SWP, petroleum hydrocarbon fractions are found in groundwater and wetland sediment/soil. NAPL on the Whitney and Murphy Properties is composed primarily of petroleum hydrocarbon mixtures.

SVOCs or Semi-Volatile Organic Compounds are chemicals that may vaporize when exposed to temperatures above room temperature. The SVOC naphthalene is present in SWP-wide groundwater, likely as a result of historic petroleum releases.

Metals are minerals that naturally occur in the Earth's crust, and may be mobilized by industrial activities or releases. Metals present at the SWP include arsenic, lead, chromium, manganese, and others.

NAPL or Non-Aqueous Phase Liquid is free product material (e.g., waste oil, certain solvents) that is found in soil or groundwater due to its historic release at the ground surface and its movement into the subsurface. PCBs, VOCs, metals and other compounds may be found dissolved in the NAPL. The NAPL observed in monitoring wells at the SWP were floating free product or globules.

Exposure Pathways & Potential Risk

Just because contamination exists does not mean the environment or people are at risk. One must have exposure to the contaminant to have a potential risk. Exposure occurs when people or other living organisms eat, drink, breathe or have direct skin contact with a substance or waste material. Based on existing or reasonably anticipated future land use at a site, EPA develops different possible expo-

How is Risk to People Expressed?

In evaluating risk to humans, estimates for risk from carcinogens and non-carcinogens (chemicals that may cause adverse health effects other than cancer) are expressed differently.

For carcinogens, risk estimates are expressed in terms of probability. For example, exposure to a particular carcinogenic chemical may produce an increased chance of causing 1 excess cancer in 10,000 exposed individuals over an estimated lifetime of 70 years. This can also be expressed as 1×10^{-4}. The EPA acceptable risk range for carcinogens is 1×10^{-6} (1 in 1,000,000) to 1×10^{-4} (1 in 10,000). In general, calculated risks higher than this range would require consideration of cleanup alternatives.

For non-carcinogens, exposures are first estimated and then compared to a reference dose (RfD). RfDs are developed by EPA scientists to estimate the amount of a chemical a person (including the most sensitive person) could be exposed to over a lifetime without developing adverse health effects. The exposure dose is divided by the RfD to calculate the measure known as a hazard index (HI) (a ratio). An HI greater than 1 suggests that adverse effects may be possible.

sure scenarios to determine potential risk, appropriate cleanup levels for contaminants, and potential cleanup approaches.

Human health and ecological risk assessments have been prepared for the SWP (detailed risk summaries can be found in the baseline HHRA, the ERA dated March 2014, and Appendix C of the FS Report Addendum). These assessments use a number of possible contamination exposure scenarios to determine if and where there are current or potential future unacceptable risks.

Human Health

People have the potential for exposure to SWP contaminants through the following exposure pathways: having contact with SWP soil or sediment, drinking contaminated groundwater, or inhaling impacted indoor air. Overall, the risk assessment determined that the following exposure pathways pose an unacceptable risk:

Exposure Assessment

Current (e.g. existing commercial land use) and potential future (e.g., potential recreational land use) exposures were assessed. No current human health risks were identified exceeding the upper limit of the National Contingency Plan (NCP) risk range (1×10^{-4}). However, the HHRA determined that human health risk exists for future possible land use conditions.

Health risks were evaluated for a range of possible future uses, including recreational, residential, and commercial/industrial. Recreational use refers to land uses that involve leisure and sporting activities such as walking, hiking, picnicking, nature study or use as athletic fields. Although the risk associated with future residential use was not included in the HHRA because use of the properties as residential is highly unlikely, a supplemental evaluation for unrestricted residential use was performed as part of the FS and FS Report Addendum – Technical Memorandum. The supplemental evaluation was performed to determine no unacceptable risk at the Existing Aberjona Residence area on the Aberjona property which is separated from Aberjona industrial operations, and to determine where residential land use restrictions were required. The recreational use scenario evaluated young children and adults who were assumed to be exposed to soil, as well as to surface water and sediment if wading activities occur. Residential use refers to use of the properties for the location of a residential dwelling, with the assumption that young children and adults spend the majority of their time each day at their property (i.e., at the SWP). Residential land uses are assumed to involve exposure to soil and use of groundwater as a potable water source. The evaluation of risks associated with commercial and industrial uses of the SWP considered risks to full-time adult outdoor workers (e.g., landscape worker), under the assumption that exposures to soil can occur.

Based on the results of the HHRA, areas in which risks exceed the upper limit of the NCP risk range (1×10^{-4}) for future use are:

- Subsurface soils at the Whitney Property, due primarily to heptachlor and PCBs[8]; and
- SWP-wide groundwater, due to VOCs (e.g., TCE and vinyl chloride), PCBs, pesticides (e.g., aldrin, lindane and heptachlor) and arsenic[9].

[8] Cancer risk for future recreational use of 1×10^{-3}.
[9] Cancer risk for future potable use of SWP-wide groundwater of 3×10^{-1}.

Based on the results of the HHRA, areas in which non-cancer Hazard Index (HI) values exceed acceptable non-cancer risks for future use are:

- Surface and subsurface soils at the Whitney Property, due to PCBs[10];
- Surface and subsurface soils at the Murphy Property, due to thallium[11];
- Sediment/soil at the Murphy Wetland, due to PCBs, lead, and the C_{11}-C_{22} aromatic petroleum fraction[12]; and
- SWP-wide groundwater, due to VOCs (e.g., cis-1,2-DCE, xylenes and naphthalene), aliphatic and aromatic petroleum fractions, PCBs, pesticides (e.g., heptachlor epoxide), and metals (e.g., arsenic, iron, lead and manganese)[13].

Due to unacceptable risk for future residential use of the Whitney, Murphy, and Aberjona Properties (excluding the Existing Aberjona Residence area on the Aberjona Property) as demonstrated in the 2017 FS Report Addendum – Technical Memorandum,[14] Institutional Controls will be used to prevent development of the properties for residential use.

The presence of elevated subslab soil gas concentrations of VOCs (presumably from groundwater and/or soil) indicates a potential for further evaluation of the future vapor intrusion pathway if a change in usage of any of the existing commercial buildings is contemplated, or as part of new building construction including any addition to existing buildings on any of the properties. The presence of elevated concentrations of VOCs, in particular TCE, in subslab soil gas beneath the Existing Aberjona Residence indicates a potential for future vapor intrusion to occur if building conditions were to change.

Details of the human health risk assessment can be found in the 2014 Baseline Risk Assessment, 2016 FS Report Addendum, and 2017 FS Report Addendum – Technical Memorandum.

Threats to the Environment

Overall, the ERA concluded that sediments/soils within the Murphy Wetland could pose a significant ecological risk and should be included in evaluation of response actions. Risks to benthic invertebrates in the seasonally ponded portion of the wetland are likely due to PCBs, chromium, lead, and zinc based on benchmark comparisons. Risks to small mammals in the seasonally ponded area (e.g., wetland sediments) and forested/shrub area (e.g., wetland soils) are likely due to PCBs and chromium based on food chain modeling. Details of the ecological risk assessment can be found in the 2014 Baseline Risk Assessment and 2017 FS Report Addendum – Technical Memorandum.

Threats to Groundwater Due to Leaching (and NAPL)

Leaching of volatile and petroleum-related (C5-C8 aliphatic, C9-C12 aliphatic, C9-C18 aliphatic, C9-C10 aromatic, and C11-C22 aromatic) contaminants from soil to groundwater was evaluated in the 2016 FS Report Addendum, where leaching-based Preliminary Remediation Goals (PRGs) for soil above the water table are exceeded. Soils above the water table in various areas of the SWP, including the Murphy, Whitney and Aberjona Properties, exceeded the leaching-based PRGs. Table 1 documents the soil PRGs that were based upon "leaching".

Although the risk assessment did not evaluate the risk associated with NAPL and no risk-based PRGs have been developed for NAPL, NAPL serves as a continuing source of contamination to groundwater as contaminants leach/dissolve from the NAPL and migrate to groundwater. Therefore, the remedy addresses NAPL.

Details of the leaching evaluation can be found in the 2016 FS Report Addendum and 2017 FS Report Addendum – Technical Memorandum.

Principal Threat and Low-Level Threat Wastes

NCP which governs EPA clean ups, at 40 CFR Section 300.430(a)(1)(iii), states that EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable" and "engineering controls, such as containment, for waste that poses a relatively low long-term threat" to achieve protection of human health and the environment. This expectation is further explained in an EPA fact sheet (OSWER #9380.3-06FS), which states that principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human

[10] HIs for future recreational use of 3 and 100 for surface and subsurface soil, respectively; HI for future construction worker exposure to subsurface soil of 40.
[11] HIs for future recreational use of 3 and 5 for surface and subsurface soil, respectively.
[12] HI for future older child trespasser exposures of 2; HI for future recreational use of 10.
[13] HI for future potable use of SWP-wide groundwater of 3,000. HIs for future construction worker contact with shallow groundwater at the Whitney and Murphy Properties of 20 and 4, respectively, due to VOCs.
[14] For the Aberjona Property, HIs for surface and subsurface soil for future residential use are 3 and 40, respectively. For the Whitney Property, HIs for future residential use are 20 and 600 for surface and subsurface soil, respectively, and cancer risks are 3×10^{-4} and 5×10^{-3} for surface and subsurface soil, respectively. For the Murphy Property, HIs for surface and subsurface soil for future residential use are 30 and 100, respectively.

health or the environment should exposure occur. There is no chemical-specific or overall threshold levels for determining what constitutes a principal threat waste, but where toxicity and mobility combine to pose a carcinogenic risk of 1×10^{-3} or greater, the fact sheet states that treatment should be evaluated.

For OU4, NAPL (Murphy and Whitney Properties) and significantly contaminated soils (i.e., 10 times greater than the proposed soil cleanup level and/or greater than or equal to PCBs at 50 mg/kg (ppm)) within the Northern Whitney Soil Area (Whitney Property) are Principal Threat wastes, considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Wastes generally considered to be principal threats are liquid, mobile, and/or highly-toxic source material. Although the proposed cleanup plan will permanently remove the Principal Threat wastes from the site and dispose of them off-site at facilities licensed to accept the waste untreated, the statutory preference for treatment of the waste will not be achieved. Given technology and space, no practicable means of on-site treatment was identified, except for potential measures to add stabilizing agents to the waste prior to shipment to facilitate waste transport and meeting off-site disposal facility requirements. There also will be some limited treatment of any water that may be contaminated from the Principal Threat waste produced either from the excavations or from dewatering the material.

The soils and wetland sediments/soils on the SWP are considered Low-level Threat wastes, which generally can be reliably contained and would present only a low risk in the event of exposure. Wastes that are generally considered to be Low-level Threat wastes include non-mobile contaminated source material of low to moderate toxicity, surface soil containing chemicals of concern that are relatively immobile in air or groundwater, low leachability contaminants or low toxicity source material.

Estimated Volumes

The estimated volumes of impacted soils, groundwater, wetland sediments/soils and NAPL:

Media/Waste	Estimated Volumes
Approximate Impacted Soils	46,000 cubic yards
Approximate Impacted Groundwater	300,000 cubic yards
Approximate Impacted Wetland Sediments/Soils	7,000 cubic yards
Approximate Impacted NAPL	6,000 cubic yards

VI. Cleanup Alternatives Considered

Once possible exposure pathways and potential risk have been identified at the SWP, cleanup alternatives are developed to address the identified risks and achieve the site-specific Remedial Action Objectives (RAOs), also known as cleanup objectives. The cleanup objectives for the SWP are summarized as follows:

Soil - Murphy Property:

- Prevent direct human contact/ingestion/inhalation with contaminated soils that exceed ARAR and risk-based standards.
- Prevent soil leaching and resulting contaminant migration to groundwater in excess of leaching-based standards.
- Prevent migration of contaminated soil to wetlands and adjoining properties.

Soil - Aberjona Property (excluding Existing Aberjona Residence):

- Prevent direct human contact/ingestion/inhalation with contaminated soils that exceed risk-based standards.
- Prevent soil leaching and resulting contaminant migration to groundwater in excess of leaching-based standards.
- Prevent migration of contaminated soil to wetlands and adjoining properties.

Soil - Whitney Property:

- Prevent direct human contact/ingestion/inhalation with contaminated soils that exceed ARAR and risk-based standards.
- Prevent soil leaching and resulting contaminant migration to groundwater in excess of leaching-based standards.
- Prevent migration of contaminated soil to wetlands and adjoining properties.

Groundwater:

- Prevent human exposure to groundwater containing concentrations of contaminants in excess of the ARAR and risk-based standards.
- Prevent or minimize migration of contaminants in groundwater.
- Restore groundwater to its beneficial use by attaining ARAR and risk-based standards.

NAPL:

- Remove and/or contain NAPL and residual NAPL to the extent practicable, as a source control measure.
- Prevent human exposure to NAPL containing concentrations of contaminants that contribute to exceedances of groundwater and/or soil ARAR and risk-based standards.
- Prevent NAPL migration, leaching to groundwater, and discharge to wetlands.

Sediment (including wetland soils) - Murphy Wetland:

- Prevent direct human contact with contaminated sediments that exceed ARAR and risk-based standards.
- Prevent exposure of ecological receptors to contaminants in sediment that present an unacceptable ecological risk.

Soil Gas (SWP-wide including Existing Aberjona Residence):

- Prevent human exposure to volatile compounds that would pose an inhalation risk.

SOIL ALTERNATIVES[15]

SW-1, SM-1, and SA-1: No Action

Under the No Action Alternative, no additional actions would be taken to address exposure to soils. The No Action Alternative does not include active remediation or institutional controls and the current levels of contaminants in soil are assumed to remain unchanged. As required by the Superfund law, five-year reviews would still be performed as part of the No Action Alternative. As required by the Superfund law, the No Action Alternative serves as a baseline for comparing the effectiveness of other remedial alternatives for soils. Except for the cost of five-year reviews, there is no cost associated with this alternative.

SW-2, SM-2, and SA-2: Capping and Institutional Controls

Under this alternative, all soils exceeding cleanup levels would be covered with a cap designed to prevent direct contact with impacted soils, to prevent soil from being carried to the wetland or neighboring properties during rain events via erosion, and/or to prevent soil contaminants from leaching to groundwater. The cap would be adequately designed with long-term integrity for seasonal conditions, severe storms (up to a 500-year storm event), and freeze/thaw conditions; to satisfy ARAR requirements (e.g., TSCA and/or RCRA); and prevent contaminant leaching to groundwater (i.e. meet impermeability requirements). Flood storage loss due to capping would require mitigation nearby within the waterway. Additional mitigation measures may be required to address any additional floodplain impairment within the 500-year floodplain. This alternative also includes long-term monitoring and maintenance of the capped areas as well as Institutional Controls to insure the cap is maintained, prohibit residential use (except on the Existing Aberjona Residence area on the Aberjona Property), and guard against the future vapor intrusion pathway. Five-year reviews will be required since contamination will be left in place. The total estimated cost of this alternative is approximately $2.3 million for the Whitney Property, $1.8 million for the Murphy Property and $0.16 million for the Aberjona Property.

SW-3, SM-3 and SA-3: Soil Excavation, Off-Site Disposal, Capping, and Institutional Controls *(EPA's preferred alternative)*

Under this preferred alternative, the significantly contaminated soils exceeding cleanup levels (i.e. 10 times greater than the proposed soil cleanup level and/or greater than or equal to PCBs at 50 mg/kg (ppm)) at the Whitney Northern Soil Area (estimated to be approximately 5,400 cubic yards at the Whitney Property) would be excavated and disposed of at an approved off-site facility. Excavated materials will be managed so as to not impair resources within the 500-year floodplain or adjacent wetlands, to the extent practicable. Mitigation measures may be required to address any unavoidable impairment within the 500-year floodplain. Excavated areas would then be backfilled with clean soils which would serve as a cap over areas of remaining subsurface soil contamination. The clean backfill material placed in the Northern Whitney Soil Area would include mixing amendments (e.g Zero-Valent Iron (ZVI)) below the water table to support shallow groundwater cleanup (preferred Alternative GW-6). Due to the depth of the excavation, shoring would also be installed in the Northern Whitney Soil Area to prevent collapse of the sidewalls and impacts to the wetland/floodplain. Dewatering and appropriate treatment of the extracted groundwater and any water removed from dewatering saturated soils will be required in association with excavations below the groundwater table. The remaining soils exceeding cleanup levels (estimated to be approximately 70,000 square feet for Whitney Property, 93,500 square feet for the Murphy Property

[15] SW soil alternatives relate to the Whitney Property; SM soil alternatives relate to the Murphy Property; SA soil alternatives relate to the Aberjona property.

and 3,600 square feet for the Aberjona Property) would be covered with a cap designed to prevent direct contact with impacted soils, to prevent soil from being carried to the wetland or neighboring properties during rain events via erosion or flooding, and/or to prevent soil contaminants from leaching to groundwater (i.e. meet impermeability requirements). Shallow excavation would occur in areas subject to capping (estimated to be approximately 5,200 cubic yards at the Whitney Property, 6,900 cubic yards at Murphy Property and 300 cubic yards at Aberjona Property, for a total of approximately 12,400 cubic yards) to facilitate cap placement without a net loss of floodplain storage. This excavated material (a total of 18,000 cubic yards) would also be transported off-site for disposal. The large building located at the center of the Whitney Property will likely require complete demolition. The cap will be adequately designed with long-term integrity for seasonal conditions, severe storms (up to a 500-year storm event), and freeze/thaw conditions; to satisfy ARAR requirements (e.g., TSCA and/or RCRA); to prevent flood storage loss; and prevent contaminant leaching to groundwater (i.e. meet impermeability requirements). Existing structures (e.g. concrete foundations and slabs) may be evaluated during the Remedial Design process for potentially satisfying cap requirements. This alternative also includes long-term monitoring and maintenance of the capped areas as well as Institutional Controls to insure the cap is maintained, prohibit residential use (except on the Existing Aberjona Residence area on the Aberjona Property), and guard against the future vapor intrusion pathway. Five-year reviews will be required since contamination will be left in place. The total estimated cost of this alternative is approximately $7.0 million for the Whitney Property, $3.0 million for the Murphy Property and $0.41 million for the Aberjona Property.

SW-4, SM-4, and SA-4: Soil Excavation, Off-Site Disposal, Cover and Institutional Controls

This alternative includes the excavation of the Northern Whitney Soil Area (5,400 cubic yards, consistent with Alternative SW-3) and all soils exceeding cleanup levels above the water table (estimated to be approximately 16,400 cubic yards for Whitney Property, 26,500 cubic yards for Murphy Property, and 800 cubic yards for Aberjona Property) and disposal of these excavated materials at an approved off-site disposal facility. Excavated materials (a total of approximately 44,000 cubic yards) will be managed so as to not impair resources within the 500-year floodplain or adjacent wetlands, to the extent practicable. Mitigation measures may be required to address any unavoidable impairment within the 500-year floodplain. Buildings on the Whitney and Murphy Properties will require complete demolition, while the building on Aberjona Property may require complete or partial demolition. Shoring, dewatering and extracted water treatment would be necessary in association with the implementation of this alternative. Excavated areas would then be backfilled with clean soils, and amendments (e.g Zero-Valent Iron (ZVI)) would be mixed below the water table to reduce soil and local groundwater concentrations and support groundwater cleanup (i.e., in the Northern Whitney Soil Area). This alternative also includes Institutional Controls to manage deeper soils that exceed cleanup levels, prohibit residential use (except on the Existing Aberjona Residence area on the Aberjona Property), and guard against the future vapor intrusion pathway. Five-year reviews will be required since contamination will be left in place. The total estimated cost of this alternative is approximately $9.8 million for the Whitney Property, $11.4 million for the Murphy Property and $0.63 million for the Aberjona Property.

NON-AQUEOUS PHASE LIQUID (NAPL) ALTERNATIVES

N-1: No Action

Alternative N-1 is the No Action Alternative. This alternative provides No Action to address this source of contamination to environmental media, particularly groundwater and soil. As required by the Superfund law, the No Action Alternative serves as a baseline for comparing the effectiveness of other remedial alternatives to be developed for NAPL. Except for the cost of five-year reviews, there is no cost estimated as part of this alternative.

N-2: NAPL Skimming/Recovery and Institutional Controls

Alternative N-2 includes automatic skimming of NAPL from monitoring wells within the NAPL areas at the Whitney and Murphy Properties and an excavated recovery trench, NAPL recovery into drums for off-site disposal, and institutional controls. The recovery trench will improve the efficiency of NAPL removal and protect the wetland from continuing impacts by intercepting NAPL before discharge to the wetland occurs. Contaminated soils excavated from the trench will be managed so as to not impair resources within the 500-year floodplain or adjacent wetlands, to the extent practicable. Mitigation measures may be required to address any unavoidable impairment within the 500-year floodplain. [In some areas the design of the trench will need to be incorporated into the design for the soil caps called for under the soil component of the remedy.] The skimming system would require long-term routine inspection and maintenance throughout implementation of this cleanup approach. This alternative also includes the implementation of Institutional Controls to prohibit use of NAPL-impacted groundwater, and to control

the future vapor intrusion pathway until groundwater cleanup levels are achieved. The duration these controls would need to remain in place would be associated with the selected groundwater cleanup alternative. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $0.76 million.

N-3: Excavation and Off-Site Disposal *(EPA's Preferred Alternative)*

Preferred Alternative N-3 includes the excavation of NAPL areas at the Whitney and Murphy Properties, and disposal of these excavated materials at an approved off-site disposal facility. The excavation will extend below the water table (estimated 12 feet below the ground surface). The excavation activities will collect approximately 6,000 cubic yards of NAPL-impacted soil. Excavation would continue until sampling confirms that the NAPL is completely removed. The alternative also includes blending an amendment into soil in the bottom of the excavation prior to backfilling to provide soil and localized groundwater treatment. Excavated soils would be moved to a stockpile area and pre-conditioned (removal or absorption of free water) for shipment to an off-site disposal facility. Shoring will be installed to prevent collapse of the sidewalls, damage to nearby structures and impacts to the wetland/floodplain. Excavations/backfilling will be coordinated with the remedial excavations/capping required under the soil component of the remedy. Mitigation measures may be required to address any unavoidable impairment within the 500-year floodplain. Dewatering and appropriate treatment of the extracted groundwater will be required in association with excavations below the groundwater table, with discharge to the Aberjona River or appropriate disposal off-site at licensed facility. Five-year review requirements triggered by remnant NAPL that will be left behind will be addressed through review of the groundwater component of the remedy. The estimated present value of this alternative is approximately $3.4 million.

GROUNDWATER ALTERNATIVES

The groundwater alternative would be coordinated with the selected soil and NAPL cleanup approach as excavation below the water table in the Northern Whitney Soil Area and NAPL areas presents an opportunity for shallow groundwater treatment to be enhanced through the placement of amended (Zero-Valent Iron (ZVI)) backfill. The amended backfill would treat soils and shallow groundwater where the amendment is placed.

GW-1: No Action

Alternative GW-1 is the No Action Alternative. This alternative provides no active groundwater treatment. As required by the Superfund law, the No Action Alternative serves as a baseline for comparing the effectiveness of other remedial alternatives to be developed for groundwater. Concentrations of contaminants in groundwater are assumed to remain unchanged from current concentrations. Except for the cost of five-year reviews, there is no cost estimated as part of this alternative.

GW-2: Institutional Controls

Alternative GW-2 includes implementation of Institutional Controls to prohibit future use of impacted groundwater as a drinking water source and to control the future vapor intrusion pathway. However, groundwater contaminant discharge to the wetland area would continue. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $0.05 million.

GW-3: Monitored Natural Attenuation and Institutional Controls

Alternative GW-3 includes long-term annual groundwater monitoring to monitor the groundwater concentrations and evaluate the concentration decreases due to natural attenuation (biodegradation, volatilization, dispersion, dilution, etc.). Mitigation may be required for any alteration of 500-year floodplain and/or wetlands from the installation and maintenance of monitoring wells. Well locations would need to be designed so as to not interfere with the remedial infrastructure required for the soil, NAPL, and wetland components of the selected remedy. This alternative also includes the implementation of Institutional Controls to prohibit future use of impacted groundwater as a drinking water source until groundwater cleanup standards are achieved and to control the future vapor intrusion pathway. However, groundwater contaminant discharge to the wetland area would continue. Five-year reviews will be required since contamination will be left in place. Time to achieve cleanup levels is estimated from approximately 100 to 225 years. The estimated present value of this alternative is approximately $1.5 million.

GW-4: *In Situ* Biological Treatment and Institutional Controls

Alternative GW-4 includes the injection of microbes or substrates into the aquifer to stimulate the biological breakdown of organic compounds, and the subsequent reduced solubility of metals, returning the aquifer to its natural condition. This alternative requires the installation of several hundred injection points/wells. Two injection events are assumed, the second injection event occurring approximately two years after the initial injection event. Monitoring would be performed to follow the progress of the treatment, and additional injections would be performed if the treatment appears to be incomplete or

additional treatment is periodically necessary to maintain contaminant reductions within a timely manner. Groundwater contaminant migration into the wetlands would be controlled. Mitigation may be required for any alteration of 500-year floodplain and/or wetlands from the installation and maintenance of injection/monitoring wells. Well and injection well/point locations would need to be designed so as to not interfere with the remedial infrastructure required for the soil, NAPL, and wetland components of the selected remedy. This alternative also includes the implementation of Institutional Controls to prohibit future use of impacted groundwater as a drinking water source until groundwater cleanup levels are achieved, and to control the future vapor intrusion pathway. Time to achieve cleanup levels is uncertain due to difficulties with technology at greater depths, etc., but estimated to be approximately as much as 94 years. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $7.1 million.

GW-5: *In Situ* Chemical Oxidation and Institutional Controls

Alternative GW-5 includes the injection of oxidants into the aquifer to break down VOCs and the subsequent reduced solubility of metals, PCBs and other typically low solubility compounds, returning the aquifer to its natural condition. The chemicals injected into the aquifer are associated with health hazards and require extreme caution with management and application on the SWP. This alternative requires the installation of several hundred injection points/wells. Three injection events are assumed for the overburden with four injections assumed for bedrock. Monitoring would be performed to follow the progress of the treatment, and additional treatment would be performed if the treatment appears to be incomplete or additional treatment is periodically necessary to maintain contaminant reductions within a timely manner. Groundwater contaminant migration into the wetlands would be controlled. Mitigation may be required for any alteration of 500-year floodplain and/or wetlands from the installation and maintenance of injection/monitoring wells. Well and injection well/point locations would need to be designed so as to not interfere with the remedial infrastructure required for the soil, NAPL, and wetland components of the selected remedy. This alternative also includes the implementation of Institutional Controls to prohibit future use of impacted groundwater as a drinking water source until groundwater cleanup levels are achieved, and to control the future vapor intrusion pathway. Time to achieve cleanup levels is uncertain due to difficulties with technology at greater depths, etc., but estimated to be approximately 92 years for the shallow and intermediate zones. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $27 million.

GW-6: Pump and Treat and Institutional Controls *(EPA's Preferred Alternative)*

Preferred Alternative GW-6 includes the installation and operation of a SWP-wide groundwater extraction and treatment system to reduce contaminant concentrations in groundwater and provide hydraulic containment, preventing further contaminant migration. The treatment system may include components such as bag filters, activated carbon vessels, metals polishing vessels, air strippers, vapor phase activated carbon, etc. Eighteen to twenty-two groundwater extraction wells would be installed in the overburden and bedrock. Pre-design investigation activities may include consideration of upgrades to the adjacent Wildwood Source Area Property groundwater treatment system plant to accommodate and adequately treat extracted groundwater from the SWP in lieu of constructing a groundwater treatment plant on the SWP. Operation and maintenance would include monitoring to assure that the extraction pumps are operating properly, the treatment components are in proper operation, the activated carbon and ion exchange resins are changed as needed, the air stripper is maintained, and compliance monitoring for air emissions and treated water are being performed. Mitigation may be required for any alteration of 500-year floodplain and/or wetlands from the installation and maintenance of the groundwater treatment system. Well and piping locations, as well as the location of the treatment system, would need to be designed so as to not interfere with the remedial infrastructure required for the soil, NAPL, and wetland components of the selected remedy. This alternative also includes the implementation of Institutional Controls to prohibit future use of impacted groundwater as a drinking water source until groundwater cleanup levels are achieved, and to control the future vapor intrusion pathway. Time to achieve cleanup levels is estimated to be approximately 20 years. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $4.2 million.

MURPHY WETLAND SEDIMENT/SOIL ALTERNATIVES

WTL-1: No Action

Under the No Action Alternative (Alternative WTL-1), no additional actions would be taken to address exposure to wetland sediment/soil. As required by

the Superfund law, the No Action Alternative serves as a baseline for comparing the effectiveness of other remedial alternatives to be developed for wetlands. The current levels of contaminants in wetland sediment/soil are assumed to remain unchanged. Except for the cost of five-year reviews, there is no cost estimated as part of this alternative.

WTL-2: Monitored Natural Recovery (MNR) and Institutional Controls

Alternative WTL-2 involves monitoring the wetland for natural processes that contain, destroy or reduce the bioavailability or toxicity of contaminants in wetland sediment/soil. The most predominant natural process would be the gradual covering of the impacted wetland sediment/soil with clean sediment/soil. The covered sediment/soil would then be inaccessible for contact by recreational visitors or animals and insects. This mechanism would take an extended and uncertain timeframe to achieve cleanup levels in the top foot of wetland sediment/soil. This alternative also includes Institutional Controls such as fencing to prevent trespassing, signs warning to not enter or dig in the area, deed restrictions to control future intrusive work (excavation and drilling for example), and routine inspections to assure the Institutional Controls are maintained. Institutional Controls will not address ongoing risks to ecological receptors. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $0.22 million.

WTL-3: Capping, Wetland Mitigation, Monitoring and Institutional Controls

Alternative WTL-3 involves actively filling in the wetland pond and scrub/shrub wetland areas with clean fill (approximately 63,000 square foot area). The thickness of the cover would be three feet to effectively isolate the high concentrations of lead, chromium, petroleum hydrocarbons, and PCBs. The cap would be adequately designed with long-term integrity for seasonal conditions, severe storms (up to a 500-year storm event), and freeze/thaw conditions; to satisfy regulatory ARAR requirements (e.g. TSCA and/or RCRA); and prevent contaminant leaching to groundwater (i.e. meet impermeability requirements). Native plantings appropriate to the new ground elevation and degree of soil saturation would be installed. Placement of the cap would change drainage patterns in the area. Installation of catch basins and transfer lines is anticipated. Inspection and maintenance of the cap, plantings, and drainage features would be required. Construction of at least 1.44-acre compensatory wetlands and floodplain mitigation in another location within the waterway upstream of any sensitive floodplain receptors, would also be required as raising the wetland area three feet will effectively eliminate the wetland habitat and flood storage capacity of the wetland. Mitigation would also be required for any temporary alteration of wetland/floodplain during cap construction. Native vegetation would be used for all mitigation work. Institutional Controls would be implemented to ensure long-term cap integrity and to prohibit intrusive activities unless properly controlled. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $1.0 million.

WTL-4: Shallow (1 foot) Excavation and Targeted Deeper (3 feet) Excavation, Off-Site Disposal, Amended Cap, Wetland Restoration, Monitoring and Institutional Controls

Alternative WTL-4 involves excavation of the top one foot of sediment/soil across the wetland, excavation to 3 feet in areas with significantly elevated contaminant concentrations, off-site disposal of excavated wetland sediment/soil, placement of an amended clean soil/sediment cap to return the wetland to the original elevation and habitat type, plantings to restore the wetland, and Institutional Controls. The final elevation of the cap would be the same as the pre-remediation elevation. Native wetland plantings would be installed to restore the wetland habitat. The cap would be adequately designed with long-term integrity for seasonal conditions, severe storms (up to a 500-year storm event), and freeze/thaw conditions. Dewatering and appropriate treatment of the extracted groundwater and any water removed from dewatering saturated soils will be required in association with excavations below the groundwater table with discharge to the Aberjona River or appropriate disposal off-site at a licensed facility. An estimated total of approximately 3,700 cubic yards of material would be excavated. This estimate includes an additional approximately 1,400 cubic yards for deeper excavation in areas of significantly elevated concentrations. Periodic monitoring would be performed to evaluate cap effectiveness and to confirm wetland soil/sediment used during restoration does not become impacted by the underlying contamination. Long-term monitoring and Institutional Controls will be required to ensure the cap remains protective. Five-year reviews will be required since contamination will be left in place. The estimated present value of this alternative is approximately $1.9 million.

WTL-5: Deep (3 feet) Excavation and Off-site Disposal, Backfill, and Wetland Restoration *(EPA's Preferred Alternative)*

Preferred Alternative WTL-5 includes excavation to remove all wetland sedi-

ment/soil with contaminants in excess of the proposed cleanup levels, estimated to be approximately 63,000 square foot area, and off-site disposal of excavated sediment/soil. Pre-design investigation sampling results and confirmatory sampling will refine and determine extent of excavation. Dewatering and appropriate treatment of the extracted groundwater and any water removed from dewatering saturated soils will be required in association with excavations below the groundwater table with discharge to the Aberjona River or appropriate disposal off-site at licensed facility. The excavation area would be backfilled to pre-remediation grades and the wetland habitat restored using native species. An estimated total of approximately 7,000 cubic yards of material would be excavated. Plantings and visible ground surfaces will be inspected and maintained until plantings are established. The estimated present value of this alternative is approximately $2.2 million. See Figure 4 Conceptual Plan for Wetland Sediment/Soil Alternative WTL-5.

The Nine Critera for Choosing A Cleanup Plan

EPA uses nine criteria to evaluate cleanup alternatives and select a **final** cleanup plan. EPA has already evaluated how well each of the cleanup alternatives developed for the **Southwest Properties, Wells G&H Superfund Site (OU-4)** meets the first seven criteria in the FS. Once comments from the state and the community are received and considered, EPA will select the **final** cleanup plan.

1. **Overall protection of human health and the environment:** Will it protect you and the plant and animal life on and near the site? EPA will not choose a cleanup plan that does not meet this basic criterion.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):** Does the alternative meet all federal and state environmental statutes, regulations and requirements? The cleanup plan must meet this criterion.
3. **Long-term effectiveness and permanence:** Will the effects of the cleanup plan last or could contamination cause future risk?
4. **Reduction of toxicity, mobility or volume through treatment:** Using treatment, does the alternative reduce the harmful effects of the contaminants, the spread of contaminants, and the amount of contaminated material?
5. **Short-term effectiveness:** How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?
6. **Implementability:** Is the alternative technically feasible? Are the right goods and services (i.e. treatment equipment, space at an approved disposal facility) available?
7. **Cost:** What is the total cost of an alternative over time? EPA must select a cleanup plan that provides necessary protection for a reasonable cost.
8. **State acceptance:** Do state environmental agencies agree with EPA's proposal?
9. **Community acceptance:** What support, objections, suggestions or modifications did the public offer during the comment period?

CLEANUP ALTERNATIVES COMPARISON

The alternatives for soil, groundwater, NAPL, and wetland sediment/soil cleanup were compared with each other to identify how well each alternative meets EPA's evaluation criteria. The following discussion and tables present a general comparison summary of the alternatives by media (Soil, NAPL, Groundwater, and Wetland Sediment/Soil). Detailed evaluations and comparisons of alternatives are included in the FS and FS Report Addendum.

Soil:

Overall Protection of Human Health and the Environment

All alternatives except for the No Action Alternative (SW-1/SM-1/SA-1) are protective of human health and the environment when combined with a groundwater/NAPL remedy. All of the alternatives other than the No Action Alternative provide for Institutional Controls to prevent future residential development of the properties (except for the Existing Aberjona Residence area on the Aberjona Property) and to protect against the future vapor intrusion pathway, with additional Institutional Controls needed for the alternatives where a cap will be a component of the remedy. Alternatives SW-2/SM-2/SA-2 provide an impermeable cap above the soils to prevent exposure and prevent leaching of soil contaminants to groundwater, but do not provide for excavation of significantly contaminated soil in the saturated zone at the Northern Whitney Soil Area that could continue to impact groundwater and prolong the time to achieve groundwater cleanup levels in the area. In addition, Alternatives SW-2/SM-2/SA-2 would result in flood storage loss that requires mitigation measures within the watershed upstream of any sensitive flood receptors to address any impairment within the 500-year floodplain. The ability of the alternatives to be protective depends on the availability of suitable floodplain mitigation areas. Alternatives SW-3/SM-3/SA-3 provide for the excavation and off-site disposal of the significantly contaminated soils (e.g., Northern Whitney Soil Area) and blending contaminated soil below the water table with a treatment amendment prior to backfilling which would decrease soil, groundwater and wetland impacts and provide an impermeable cap above the remaining soils above cleanup levels to prevent exposure and leaching of soil contaminants to groundwater which would reduce time to achieve groundwater cleanup levels. Alternatives SW-3/SM-3/SA-3 may use existing building foundations as part of the protective cap, if they are suitable. Caps constructed under Alternatives SW-2/SM-2/SA-2 and SW-3/SM-3/SA-3 within the 500-year floodplain need to be constructed and maintained to prevent any release of contamination during flooding. Alternatives SW-4/SM-4/SA-4 provide for the excavation and off-site disposal of all soils above cleanup levels located above the water table, along with excavation of the Northern Whitney Soil Area. Alternatives SW-3/SM-3/SA-3 and Alternatives SW-4/SM-4/SA-4 each will include potential treatment of water generated from excavations or dewatered soils and discharge of treated water to the Aberjona River. All of the alternatives will require five-year reviews since each will leave contaminated soil in place that exceeds unrestricted use risk standards.

Compliance with ARARs

All alternatives, except for the No Action and SW-2/SM-2/SA-2 Alternatives, have been developed to comply with ARARs. The SW-2/SM-2/SA-2 Alternatives will not comply with ARARs unless flood storage mitigation is possible within the watershed upstream of any sensitive floodplain receptors to compensate for floodplain areas that are capped without first undergoing excavation. The caps constructed as part of the SW-3/SM-3/SA-3 Alternatives will comply with RCRA regulations pertaining to capping PCBs and/or hazardous waste and thus, will comply with ARARs. Alternatives SW-4/SM-4/SA-4 meet ARARs as soils with concentrations above cleanup levels located above the water table will be removed and will be managed on-site in compliance with ARARs until disposed of at a licensed off-site disposal facility. Water and any associated air discharges generated from dewatering activities during excavations and the management of excavated soil will meet applicable ARAR discharge requirements. Alternatives SW-3/SM-3/SA-3 and SW-4/SM-4/SA-4 do not result in net filling of the floodplain and will not cause any net flood storage loss. Alternatives SW-3/SM-3/SA-3 and SW-4/SM-4/SA-4 will dispose of soils off-site at a licensed facility and comply with TSCA and RCRA regulations.

Long-Term Effectiveness and Permanence

The No Action Alternatives rate the lowest for long-term effectiveness and permanence because the risks identified in the baseline HHRA are not addressed and soil contaminants leaching to groundwater above cleanup levels remain unchanged. The long-term effectiveness and permanence of the capping and excavation (SW-3/SM-3/SA-3) and excavation only (SW-4/SM-4/SA-4) alternatives are anticipated to be high, where SW-4/SM-4/SA-4 provides for the most removal of contaminated soil. Although capping alone meets the criterion for long-term effectiveness and permanence, a larger amount of significantly contaminated soils in the unsaturated and saturated soil (e.g., the Northern Whitney Soil Area) will be

left in place in Alternatives SW-2/SM-2/SA-2, prolonging the time to achieve groundwater cleanup levels in the area.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

Alternatives SW-1/SM-1/SA-1 and SW-2/SM-2/SA-2 do not include any treatment. Alternatives SW-3/SM-3/SA-3 and SW-4/SM-4/SA-4 include very limited treatment as a component of each alternative: significantly contaminated soils (e.g. Northern Whitney Soil Area) will be blended with a treatment amendment to reduce soil and localized groundwater contamination (e.g. VOCs), treatment of water generated from excavation/dewatering prior to disposal, and the potential addition of bulking amendments to make excavated soils suitable for off-site disposal.

Short Term Effectiveness

The No Action Alternative will not be effective in the short-term in protecting human health or the environment, but because no remedial activities will occur so ongoing short-term risks will still be present. There would be no adverse short-term impacts to the public or workers because no cleanup will be performed. The SW-2/SM-2/SA-2 and SW-3/SM-3/SA-3 Alternatives meet the established RAOs for the soils, and will likely take approximately the same timeframe to achieve RAOs. Although the SW-4/SM-4/SA-4 Alternatives will also achieve RAOs for soil, these alternatives will take the longest time to implement due to the anticipated longer duration of site work, causing more prolonged disruption to property owners and greater potential for accidents.

The community and workers performing the cleanup are protected the most in the short term by Alternatives SW-2/SM-2/SA-2 because minimal soil disturbance is anticipated and no soils are transported off-site (e.g. less truck traffic, etc.). Alternatives SW-3/SM-3/SA-3 will require approximately 5,400 cubic yards of significantly contaminated soils to be transported off-site, and an additional approximately 12,400 cubic yards of contaminated soil to be transported off-site to prevent flood storage loss prior to cap placement (a total of approximately 18,000 cubic yards). Alternatives SW-4/SM-4/SA-4 will also require approximately 5,400 cubic yards of significantly contaminated soils, and an additional approximately 44,000 cubic yards of contaminated soil, to be transported off-site (a total of approximately 49,000 cubic yards). Alternatives SW-3/SM-3/SA-3 and SW-4/SM-4/SA-4 are the least protective of workers performing the cleanup, as these alternatives involve the handling of large volumes of significantly contaminated soil and the handling and treatment of water contaminated from the remedial process. The SW-4/SM-4/SA-4 Alternatives would pose greater risks to workers and the community compared to the SW-3/SM-3/SA-3 Alternatives since the SW-4/SM-4/SA-4 Alternatives involve a larger amount of excavation and volume of contaminated soils shipped off site, a larger amount of contaminated water requiring treatment, a larger amount of fill delivered on-site, and the most truck traffic. Air monitoring will need to be performed for worker and community protection, and workers performing the cleanup will be required to wear appropriate personal protective equipment.

Implementability

The No Action Alternative receives a high rating for implementability because no remedial actions are required. Alternatives SW-2/SM-2/SA-2 may have significant implementability issues because of the limited availability of areas for required floodplain mitigation. Regarding the active alternatives, capping and excavation remedial components are easy to implement due to the availability of trained personnel, equipment and materials. Alternatives SW-3/SM-3/SA-3 are easier to implement and will be less disruptive to the existing on-property businesses compared to SW-4/SM-4/SA-4 because it will require the complete or partial demolition of fewer buildings (likely just on the Whitney Property) and the need to vacate the properties for less time. Alternatives SW-3/SM-3/SA-3 will require construction of impermeable caps within areas with active businesses and possible tie in of the caps into existing building foundations.

Cost

Except for the cost of five-year reviews, there is no cost estimated as part of the No Action Alternatives. Of the active alternatives, Alternatives SW-2/SM-2/SA-2 have the lowest costs, since no soil excavation/disposal is required. Building demolition, off-site transport and disposal of contaminated soils, and volume of clean fill delivered are the most costly components of the SW-3/SM-3/SA-3 and SW-4/SM-4/SA-4 Alternatives. The SW-4/SM-4/SA-4 Alternatives are the most expensive alternatives, because of the larger volumes of soil to be excavated/disposed of. See Table 4 (alternative comparison table) for the estimated costs for each alternative.

NAPL:

Overall Protection of Human Health and the Environment

Alternative N-1 does not eliminate the NAPL source material nor prevent its movement; therefore, the N-1 Alternative is not protective of human health or the environment. The N-2 and N-3 Alternatives protect human health and the

Table 4. Comparison of Cleanup Alternatives - Soil [a]

Nine Criteria	SW-1/SM-1/SA-1 - No Action	SW-2/SM-2/SA-2 - Capping and Institutional Controls	SW-3/SM-3/SA-3 - Soil Excavation, Off-Site Disposal, Capping and Institutional Controls	SW-4/SM-4/SA-4 - Soil Excavaton, Cover, Off-Site Disposal and Institutional Controls
Protects Human Health and the Environment	☐	☑☑	☑☑	☑☑
Meets Federal & State Requirements	☐	☐	☑☑	☑☑
Provides Long-Term Protection	☐	☑	☑☑	☑☑
Reduces Mobility, Toxicity & Volume	☐	☐	☑	☑
Provides Short-Term Protection	☑☑	☑	☑	☑
Implementability	☑☑	☑☑	☑☑	☑☑
Cost (millions)				
▪ Capital Cost - SW	$0	$1.4	$5.3	$7.6
▪ Contingency - SW		$0.47	$1.3	$1.9
▪ O&M - SW		$0.36	$0.37	$0.34
▪ Total Cost - SW		$2.3	$7.0	$9.8
▪ Capital Cost - SM	$0	$1.2	$2.0	$8.4
▪ Contingency - SM		$0.38	$0.65	$2.7
▪ O&M - SM		$0.29	$0.31	$0.34
▪ Total Cost - SM		$1.8	$3.0	$11.4
▪ Capital Cost - SA	$0	$0.11	$0.25	$0.40
▪ Contingency - SA		$0.04	$0.08	$0.13
▪ O&M - SA		$0.01	$0.09	$0.10
▪ Total Cost - SA		$0.16	$0.41	$0.63
Capital Cost - SW/SM/SA	$0	$2.7	$7.5	$16.3
Contingency - SW/SM/SA		$0.89	$2.1	$4.7
O&M - SW/SM/SA		$0.65	$0.76	$0.78
Total Cost - SW/SM/SA		$4.3	$10.4	$21.9
State Agency Acceptance	To be determined after public comment period			
Community Acceptance	To be determined after public comment period			
EPA's Preferred Option	☑☑	Meets Criterion	☑ Partially Meets Criterion	☐ Does Not Meet Criterion

[a] This table is not a substitute for the detailed alternatives analysis included in the 2016 Feasibility Study, and 2017 Feasibility Study Addendum. It is an evaluation summary intended to be helpful for the public.

environment by reducing or eliminating a continuing NAPL source of contamination to soil, groundwater and the wetlands. The N-3 Alternative will more effectively and quickly eliminate the NAPL through excavation, while the N-2 Alternative will rely on slow removal of the NAPL by skimming and controlling movement to the wetland. The N-2 Alternative, which uses skimming and movement control technologies, may not be completely effective at recovering NAPL and/or preventing NAPL discharge to the wetland. The N-2 Alternative also includes Institutional Controls to prevent human contact with the NAPL until its removal is complete. The N-3 Alternative is more protective of human health and the environment than the N-2 Alternative, since a larger volume of NAPL will be removed over less time resulting in a lower risk of discharge to the wetlands and faster groundwater remediation.

Compliance with ARARs

There are no chemical-specific ARARs for NAPL. However, the N-1 Alternative will not meet risk-based standards developed using chemical-specific TBCs since no removal or containment of NAPL will occur. Alternatives N-2 and N-3 can be implemented in compliance with location and action-specific ARARs, in particular, State standards that require all NAPL be removed to the extent practicable. Alternative N-3 achieves risk-based standards developed using chemical-specific TBCs because removal of the NAPL through excavation will prevent its continuing discharge to the wetland and will eliminate it as a continuing source of contamination to soil and groundwater, facilitating the cleanup of those media. It is less certain that the N-2 Alternative will achieve risk-based standards developed using chemical-specific TBCs, and more time may be required to remove the NAPL from the subsurface and eliminate the NAPL movement. Alternatives N-2 and N-3 do not result in net filling of the 500-year floodplain and will not cause any net flood storage loss. Water and air discharges generated from dewatering activities during excavation and the management of excavated soil under Alternative N-2 (during trench installation) and N-3 will meet applicable ARAR discharge requirements.

Long-Term Effectiveness and Permanence

The N-1 Alternative has no long-term effectiveness or permanence due to lack of NAPL removal. Alternative N-3 is expected to have the best long-term effectiveness and permanence because the NAPL will be excavated and disposed off-site. This process is permanent, reliable, and certain to reduce risks. The N-2 Alternative is expected to have less long-term effectiveness than Alternative N-3 since residual NAPL may remain.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

N-1 Alternative would provide no reduction in toxicity, mobility and volume of NAPL through treatment. Alternative N-2 may have some very limited treatment through the required treatment of water generated during the installation of the trench. Alternative N-3 includes limited treatment through the addition of amendments to the bottom of the excavations and treatment of contaminated water generated both from the excavation and from dewatering any saturated excavated soil. Treatment will achieve both water and air discharge standards. There may also be some reduction of pollutant mobility through the addition of bulking agents to allow for off-site disposal of the excavated material.

Short Term Effectiveness

The No Action Alternative will not be effective in the short-term in protecting human health or the environment, but because no remedial activities will occur, there will be no adverse impacts to the public or workers performing the cleanup. Although Alternative N-2 involves very little short term risk to workers, NAPL is brought to the surface where it would need to be appropriately managed for an extended period of time. The N-3 Alternative will achieve RAOs in the shortest period of time since NAPL will be excavated and no longer serve as a source of impacts to soil, groundwater, and the wetland. However, Alternative N-3 may be associated with short-term risks to workers performing the cleanup due to the required handling of NAPL-impacted materials and more disruption to property owners. Air monitoring will need to be performed for worker and community protection, and workers performing the cleanup will be required to wear appropriate personal protective equipment.

Implementability

Alternative N-1 is the easiest to implement because it does not involve excavation and off-site disposal or the construction, operation, or maintenance of a remedial system or enforcement of Institutional Controls. The N-2 Alternative is more difficult to implement than the N-3 Alternative because it requires the construction, operation or maintenance of a remedial system (i.e. collection wells and trench) to recover NAPL in the subsurface. The trench and collection well system would also need to be installed and maintained so that it doesn't interfere with any of the caps to be installed as part of the soil component of the remedy. In addition, Alternative N-2 may be less reliable for eliminating the subsurface NAPL and may require the use of additional remedial technologies in the future to achieve RAOs. The reliability of the N-3 Alternative is high because excavation and off-site disposal are relatively routine tasks. However, it produces the highest

amount of disruption to property owners and greater impact to the community from increased truck traffic during its brief implementation duration. Excavation work needs to be coordinated with the other components of the remedy: soil excavation/capping, sediment excavation, and the groundwater pump and treat system.

Cost

Except for the cost of five-year reviews, there is no cost estimated as part the N-1 Alternative. Alternative N-3 costs are more than four times that of the N-2 Alternative. See Table 5 (alternative comparison table) for a summary of costs for all alternatives.

Groundwater:

Overall Protection of Human Health and the Environment

The protectiveness of all the groundwater alternatives, except the GW-1 No Action Alternative, is in part contingent on the effectiveness of the source control alternatives for NAPL, soil, and the wetlands. Alternative GW-1 (No Action

Table 5. Comparison of Cleanup Alternatives - NAPL[a]

Nine Criteria	N-1 - No Action	N-2 - NAPL Skimming/Recovery and Institutional Controls	N-3 - Excavation and Off-Site Disposal
Protects Human Health and the Environment	☐	☑☑	☑☑
Meets Federal & State Requirements	☐	☑☑	☑☑
Provides Long-Term Protection	☐	☑	☑☑
Reduces Mobility, Toxicity & Volume	☐	☑	☑
Provides Short-Term Protection	☑☑	☑	☑
Implementability	☑☑	☑	☑☑
Cost (millions)			
▪ Capital Cost	$0	$0.54	$2.6
▪ Contingency		$0.14	$0.66
▪ O&M		$0.09	$0.13
▪ Total Cost		$0.76	$3.4
State Agency Acceptance	To be determined after public comment period		
Community Acceptance	To be determined after public comment period		

EPA's Preferred Option

☑☑ Meets Criterion ☑ Partially Meets Criterion ☐ Does Not Meet Criterion

[a] This table is not a substitute for the detailed alternatives analysis included in the 2016 Feasibility Study, and 2017 Feasibility Study Addendum. It is an evaluation summary intended to be helpful for the public.

Alternative) fails this criterion because it does not address risks posed by contaminated groundwater. Alternative GW-2 (Institutional Controls) fails the overall protection of human health and the environment criterion because, although it would address human contact risks, it will not reduce, control or eliminate risks to human health or the environment. Alternative GW-3 does not meet this criterion because relying on monitored natural attenuation to achieve cleanup standards will not achieve cleanup standards within a reasonable time period (100-225 years) compared with active remedial alternatives. The GW-4 and GW-5 Alternatives pass this criterion, but the distribution and performance challenges of groundwater cleanup at greater depths may prevent the injection alternatives from effectively achieving groundwater cleanup standards. The GW-6 Alternative passes the overall protection of human health and the environment. The alternative protects human health by prohibiting use of contaminated groundwater as a drinking water source via Institutional Controls until cleanup levels are met in approximately 20 years. The time to achieve cleanup levels for Alternatives GW-3 through GW-6, ranked from the longest to shortest time frames are GW-3 (approximately 100 to 225 years), GW-4 (approximately 94 years), GW-5 (approximately 92 years) and GW-6 (approximately 20 years). The GW-6 Alternative also provides for hydraulic containment of groundwater contaminants, limiting movement of contamination that poses a risk to the adjacent wetlands.

Compliance with ARARs

The No Action Alternative fails because it contains no remedial action to address ARAR requirements to restore the groundwater. Alternative GW-2 fails the compliance with ARARs criterion because it includes no provision to restore groundwater to required ARAR-based cleanup levels. Alternative GW-3 does not pass this criterion because the estimated time to achieve cleanup levels does not meet TBC standards for Monitored Natural Attenuation remedies to meet groundwater cleanup standards within a reasonable time period, compared to active treatment alternatives (100 to 225 years compared to 20 years for the pump and treat alternative). Alternatives GW-4, GW-5 and GW-6 will meet chemical-specific ARARs because of treatment of groundwater contamination throughout the overburden and bedrock, although there is less certainty about the effectiveness in the two injection alternatives fully meeting groundwater cleanup standards. Alternative GW-6 is expected to achieve ARAR-based groundwater cleanup goals in the shortest timeframe (approximately 20 years). There are no location or action-specific ARARs for Alternatives GW-1 or GW-3. The GW-3, GW-4, GW-5, and GW-6 Alternatives all will meet ARAR requirements for mitigation of any alteration of 500-year floodplain and/or wetlands from the installation and maintenance of injection/monitoring wells or piping systems. Alternative GW-6 also will meet all water and air treatment and discharge ARAR requirements for the pump and treat system.

Long-Term Effectiveness and Permanence

The No Action Alternative is neither effective in the long term nor effective with respect to permanence because it will have the highest residual risk due to lack of Institutional Controls or groundwater treatment. Due to the need for permanent Institutional Controls for the GW-2 Alternative and that the alternative does not address ongoing migration of contamination to the wetlands, this alternative is considered less effective in the long term than the remaining alternatives. Alternative GW-3, which is expected to require over 100 years to achieve cleanup levels, may require that institutional controls remain in place for an extended period of time, which negatively impacts its long-term effectiveness. Also, it is not known whether natural process alone will ultimately reduce groundwater contaminant levels to cleanup standards. Alternatives GW-4, GW-5, and GW-6 are all expected to have good long-term effectiveness due to the combination of Institutional Controls and active treatment. Rebounding concentrations may occur with the GW-4 and GW-5 Alternatives along with the formation of undesirable breakdown products and potentially temporary metals mobilization. While rebound may also occur with Alternative GW-6, it can be addressed through operational changes to pumping while maintaining containment of impacted groundwater. Treatment residuals formed as part of the GW-6 Alternative can be properly managed and pose minimal risk.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

The No Action, GW-2, and GW-3 Alternatives score the lowest for this criterion because treatment is not part of the remedy. Alternative GW-6 scores the highest for this criterion for extracting and treating contaminated groundwater. The GW-4 and GW-5 Alternatives scored intermediate for this criterion. For the GW-4 Alternative, contaminant concentrations over the cleanup levels will be treated, but residuals may remain. Toxic breakdown products (such as vinyl chloride) may potentially form with the implementation of Alternative GW-4 and metals may be temporarily mobilized by the treatment of groundwater associated with the GW-5 Alternative.

Short Term Effectiveness

The No Action and GW-2 Alternatives have no impact on human health and the environment as a result of implementation. The GW-3 Alternative may have some minor impact due to monitoring well installation, sampling, and maintenance and relies on permanent Institutional Controls. The short-term effectiveness of the GW-3 Alternative relies on long-term Institutional Controls, while the GW-4, GW-5, and GW-6 Alternatives will prevent human exposure to contaminants in groundwater through Institutional Controls, preventing use of groundwater as drinking water until cleanup levels are achieved and active treatment. Alternative GW-6 is predicted to achieve groundwater cleanup goals more quickly than the other alternatives. Reagents used under the GW-4 Alternative would be of low toxicity while exposure to treatment residuals associated with the GW-6 Alternative can be readily controlled. The GW-5 Alternative is ranked the lowest in terms of short term effectiveness because the chemical oxidants are reactive and require special handling, and migration of oxidants to the wetland area may pose a concern.

Implementability

Alternative GW-1 is the easiest to implement because it does not involve the construction, operation or maintenance of remedial systems or enforcement of Institutional Controls. The GW-2 Alternative would also be easy to implement because it only requires the establishment and enforcement of Institutional Controls. Alternative GW-3 would be easier to implement than the GW-4, GW-5 or GW-6 because it would only involve installation, sampling, and maintenance of monitoring wells, rather than active treatment infrastructure. Of the active remedial alternatives considered for groundwater, Alternative GW-6, though it includes the construction of a treatment plant and installation of transfer lines and extraction wells, is easier to implement in the short term than the GW-4 and GW-5 Alternatives because these alternatives require the installation of several hundred injection points/wells and effective reagent dispersal with greater depths in overburden and in the bedrock is uncertain. The reliability of the GW-6 Alternative is high because groundwater extraction, treatment, and discharge are relatively routine tasks and equipment and services required for implementation are readily available. Alternatives GW-3, GW-4, GW-5, and GW-6 all have varying levels of implementability issues with installing/maintaining monitoring/treatment wells and other groundwater infrastructure in areas also subject to remedial measures being taken to address soils, NAPL, and wetland (e.g. protecting impermeable caps).

Cost

The range in estimated cost for all six alternatives is from $0 million for GW-1 (No Action) Alternative (except for the cost of five-year reviews) to $27 million for the GW-5 Alternative. See Table 6 (alternative comparison table) for a summary of costs for all alternatives. Of the active remedial alternatives considered for groundwater, Alternative GW-6 has the lowest cost (approximately $4.2 million).

Table 6. Comparison of Cleanup Alternatives - Groundwater [a]

Nine Criteria	GW-1 - No Action	GW-2 - Institutional Controls	GW-3 - Monitored Natural Attenuation and Institutional Controls	GW-4 - In Situ Biological Treatment and Institutional Controls	GW-5 - In Situ Chemical Oxidation and Institutional Controls	GW-6 - Pump and Treat and Institutional Controls
Protects Human Health and the Environment	☐	☐	☐	☑☑	☑☑	☑☑
Meets Federal & State Requirements	☐	☐	☐	☑☑	☑☑	☑☑
Provides Long-Term Protection	☐	☐	☐	☑	☑	☑☑
Reduces Mobility, Toxicity & Volume	☐	☐	☑	☑	☑	☑☑
Provides Short-Term Protection	☑☑	☑☑	☑☑	☑☑	☑	☑☑
Implementability	☑☑	☑☑	☑☑	☑	☑	☑☑
Cost (millions)						
▪ Capital Cost	$0	$0	$1.1	$5.3	$21.6	$1.8
▪ Contingency		$0	$0.28	$1.7	$5.40	$0.58
▪ O&M		$0.05	$0.05	$0.05	$0.05	$1.8
▪ Total Cost		$0.05	$1.5	$7.1	$27.0	$4.2
State Agency Acceptance	To be determined after public comment period					
Community Acceptance	To be determined after public comment period					
EPA's Preferred Option	☑☑ Meets Criterion		☑ Partially Meets Criterion	☐ Does Not Meet Criterion		

[a] This table is not a substitute for the detailed alternatives analysis included in the 2016 Feasibility Study, and 2017 Feasibility Study Addendum. It is an evaluation summary intended to be helpful for the public.

Wetland Sediment/Soil:

Overall Protection of Human Health and the Environment

All alternatives except for the WTL-1 Alternative and WTL-2 Alternative are protective of human health and the environment when combined with groundwater, soil, and NAPL remedies. Alternative WTL-2 is not protective of the environment because conditions do not appear to be suitable for natural recovery, although Institutional Controls to prevent access to the wetland would be in place for the protection of human health. The alternative does not include measures to protect the environment. Alternative WTL-3 provides a cap above the wetland sediments/soils to prevent human and environmental exposures, but does not provide for excavation of wetland sediment/soil. Therefore, it will require wetland and flood storage mitigation elsewhere nearby within the watershed. Alternative WTL-4 provides for the excavation and off-site disposal of the high concentration wetland sediments/soils, and provides a cap above the remaining lower concentration wetland sediments/soils to prevent exposure. The excavation of wetland sediments/soils and restoration of the wetland to initial grades would prevent the need for further wetland or flood storage mitigation (other than restoring the surface of the cap to native wetland/aquatic habitat and restoring any access ways to the excavation/cap areas). Alternatives WTL-3 and WTL-4 also provide for Institutional Controls to prevent disturbance of the cap and long-term monitoring to confirm that cleanup levels continue to be met over time. Alternative WTL-5 provides for the excavation and off-site disposal of wetland sediments/soils above cleanup levels, restoration of the wetland to initial grades to prevent the need for further wetland or flood storage mitigation measures, and no institutional controls. Therefore, WTL-5 is most protective of human health and the environment.

Compliance with ARARs

All alternatives except for the WTL-1 and WTL-2 Alternatives will comply with ARARs. Under Alternative WTL-1 PCB-impacted wetland sediment/soil will not be removed or treated so will not comply with chemical-specific ARARs for PCBs and metals. Alternative WTL-2 is not expected to meet chemical-specific ARARs for PCBs and metals within a reasonable period of time since MNR is not effective for PCBs and metals. The WTL-3 Alternative does not comply with ARARs requiring wetland and flood storage mitigation within the watershed to replace wetland/floodplain filled to install the cap. Alternative WTL-3, because it does not include adequate provisions for creating compensatory wetlands/floodplain. The WTL-4 and WTL-5 Alternatives will comply with federal and state waste disposal regulations since wetland sediment/soil with PCBs exceeding TSCA thresholds will be excavated and disposed off-site, rather than capped on-site. WTL-4 and WTL-5 Alternatives will also reestablish the wetlands in place so that wetland mitigation may occur in place. Alternatives WTL-4 and WTL-5 do not result in net filling of the 500-year floodplain and will not cause any net flood storage loss. ARAR standards also require that caps need to be designed and maintained so as to not result in any contaminant releases in up to a 500-year storm event. Water and air discharges generated from dewatering activities during excavation and the management of excavated soil/sediment under Alternatives WTL-4 and WTL-5 will meet applicable ARAR discharge requirements. All work within the wetlands under Alternatives WTL-3, WTL-4, and WTL-5 will meet Action-specific standards for protecting water quality. Excavated sediments/soils generated from Alternatives WTL-4 and WTL-5 will be managed on-site in compliance with ARARs until disposed of at a licensed off-site disposal facility. WTL-5 Alternative removes all wetland sediments/soils above action levels and does not require Five Year Reviews because no waste will be left in place. EPA has determined that Alternative WTL-5 is the Least Environmentally Damaging Practicable Alternative under the federal Clean Water Act for addressing contaminants in the wetland, while protecting wetland resources.

Long-Term Effectiveness and Permanence

The WTL-1 and WTL-2 Alternatives would be neither effective in the long-term nor provide permanent protection from contaminated sediment/soil because contaminant concentrations exceeding cleanup levels will remain and exposure pathways to these contaminants continue to exist, indicating a high level of residual risk remains. The long-term effectiveness and permanence of the WTL-5 Alternative is the highest. With Alternative WTL-5, all contaminated wetland sediments/soils would be removed, backfilled with clean wetland soil, and restored to original grades. Although capping meets the criterion for long-term effectiveness and permanence, a large amount of significantly contaminated wetland sediment/soil will remain in place in Alternative WTL-3. The significantly contaminated wetland sediments/soils are removed in Alternative WTL-4, but this alternative, like the WTL-3 Alternative, relies on cap integrity to maintain protectiveness. Long-term effectiveness is dependent on durability of the cap.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

The WTL-1, WTL-2, WTL-3, and WTL-4 Alternatives do not include any treatment

so do not meet the criterion. Alternatives WTL-4 and WTL-5 include limited treatment of any water generated from the excavation or from dewatering sediments prior to discharge and any bulking agents used to reduce contaminant mobility prior to off-site disposal.

Short Term Effectiveness

The WTL-1 Alternative will not be effective in the short-term in protecting human health or the environment, but because no remedial activities will occur, there will be no adverse impacts to the public or workers performing the cleanup. Alternative WTL-2 will have limited effectiveness in preventing human contact once Institutional Controls are established. The WTL-3 Alternative ranks the lowest for short term effectiveness due to the deleterious effects the filling of the wetland will have on wetland species. The WTL-3 Alternative will also require the longest time to achieve RAOs due to the need to construct a compensatory wetland elsewhere nearby within the watershed, prior to capping the wetland, and the time required for establishment of the replacement wetland.

Alternatives WTL-4 and WTL-5 rank intermediate for short term effectiveness. Because these alternatives include the excavation and handling of significantly contaminated wetland sediment/soil, air monitoring will need to be performed for worker and community protection, and workers performing the cleanup will be required to wear appropriate personal protective equipment. In addition, there will be temporary adverse impacts to wetland species within the work area.

Implementability

All five alternatives rank highly for implementability, except for Alternative WTL-3 where the feasibility of constructing compensatory wetland/flood storage elsewhere nearby within the watershed will be difficult/uncertain. Alternative WTL-1 is the easiest to implement because no remedial action will be taken. Alternative WTL-2 will also be easy to implement since long-term monitoring requires few resources and can be easily implemented. For Alternatives WTL-3, WTL-4 and WTL-5, there are no technical barriers associated with capping, excavation or institutional controls. The necessary trained personnel, equipment and materials are readily available to implement each alternative.

Cost

The range in estimated cost for all five alternatives is from $0 million for WTL-1 (No Action) (except the cost of five-year reviews) to $2.2 million for Alternative WTL-5. The WTL-5 Alternative is the most costly alternative and is moderately more costly than the WTL-3 ($1.0 million) and WTL-4 ($1.9 million) Alternatives. See Table 7 (alternative comparison table) for a summary of costs for all alternatives.

Table 7. Comparison of Cleanup Alternatives - Wetland Sediment/Soil [a]

Nine Criteria	WTL-1 - No Action	WTL-2 - Monitored Natural Recovery and Institutional Controls	WTL-3 - Capping, Wetland Mitigation, Monitoring and Institutional Controls	WTL-4 - Shallow Excavation, Targeted Deeper Excavation, Off-Site Disposal, Amended Cap, Wetland Restoration, Monitoring and Institutional Controls	WTL-5 - Deep Excavation and Off-Site Disposal, Backfill, and Wetland Restoration
Protects Human Health and the Environment	☐	☐	☑☑	☑☑	☑☑
Meets Federal & State Requirements	☐	☐	☐	☑☑	☑☑
Provides Long-Term Protection	☐	☐	☑	☑	☑☑
Reduces Mobility, Toxicity & Volume	☐	☐	☐	☑	☑
Provides Short-Term Protection	☑☑	☑☑	☐	☑	☑
Implementability	☑☑	☑☑	☑☑	☑☑	☑☑
Cost (millions)					
▪ Capital Cost	$0	$0.15	$0.75	$1.3	$1.5
▪ Contingency		$0.04	$0.24	$0.44	$0.38
▪ O&M		$0.03	$0.05	$0.10	$0.28
▪ Total Cost		$0.22	$1.0	$1.9	$2.2
State Agency Acceptance	To be determined after public comment period				
Community Acceptance	To be determined after public comment period				
EPA's Preferred Option					

☑☑ Meets Criterion ☑ Partially Meets Criterion ☐ Does Not Meet Criterion

[a] This table is not a substitute for the detailed alternatives analysis included in the 2016 Feasibility Study, and 2017 Feasibility Study Addendum. It is an evaluation summary intended to be helpful for the public.

WHY EPA RECOMMENDS THIS PROPOSED CLEANUP PLAN

EPA believes the proposed cleanup plan for the Southwest Properties, Wells G&H Superfund Site OU4 achieves the best overall balance among EPA's nine criteria (excluding state and community acceptance which will be considered following public comment) used to evaluate the various alternatives presented in the FS. The proposed cleanup approach is protective of human health and the environment, uses proven cleanup technologies such as excavation, treatment and disposal, and is cost effective, while achieving the SWP-specific cleanup objectives in a reasonable timeframe. This cleanup approach provides both short and long-term protection of human health and the environment; attains all applicable or relevant and appropriate federal and state environmental laws and regulations; reduces the toxicity, mobility, and volume of contaminated soil, groundwater, NAPL, and wetland sediment/soil through treatment, to the maximum extent practicable; utilizes permanent solutions and uses land use restrictions to prevent unacceptable exposures in the future to the remaining SWP-related contaminants that will be contained at the SWP.

SW-3/SM-3/SA-3 is EPA's preferred soil alternative for the following reasons:

- The SW-1/SM-1/SA-1 Alternative does not meet ARARs and is not protective of human health and the environment.
- The SW-2/SM-2/SA-2 Alternative will leave behind significantly contaminated soils in the saturated zone which will continue to impact groundwater and the wetland. This alternative may also present significant challenges for complying with ARARs, including TSCA, Wetland Protection Act, 44 CFR 9 Floodplain Management and Protection of Wetlands, and flood storage regulations.
- EPA believes that the preferred SW-3/SM-3/SA-3 Alternative (partial excavation and capping of contaminated soils) will control exposures to impacted soil in a relatively short period of time and should allow for continued commercial use of the Aberjona and Murphy properties during remedial action, substantially reducing the disruption to current businesses, compared to the SW-4/SM-4/SA-4 Alternative which will require the complete or partial demolition of on-property buildings.
- The SW-4/SM-4/SA-4 Alternative is $11.5 million more expensive than the SW-3/SM-3/SA-3 Alternative, would require an extra approximately 31,000 cubic yards of impacted soil be shipped off-site compared to the SW-3/SM-3/SA-3 Alternative, and would further increase truck traffic due to the requirement to import an extra approximately 34,000 cubic yards of clean soil compared to the SW-3/SM-3/SA-3 Alternative.
- The SW-3/SM-3/SA-3 Alternative will include the placement of amended backfill below the water table prior to backfilling within the Northern Whitney Soil Area and NAPL remedies within the Whitney and Murphy Properties, to provide soil and localized groundwater treatment.
- The SW-3/SM-3/SA-3 Alternative would meet all of the RAOs and ARARs. The threats of release and direct exposure would be eliminated by removing the significantly contaminated soils. The remaining contaminated soils would be covered by an impermeable cap to prevent direct contact, erosion and movement of contaminants to groundwater. Complete excavation of all soils exceeding clean up levels with off-site disposal (i.e., SW-4/SM-4/SA-4 Alternative) would be more difficult to implement, would be very costly, and may not be significantly more protective of human health. The time to achieve RAOs is estimated to be within 2 years of commencing remedial construction.

N-3 is EPA's preferred NAPL alterntive for the following reasons:

- The N-1 Alternative is not protective of human health or the environment and will not meet ARARs.
- The N-2 Alternative may not achieve RAOs, as residual NAPL may persist in the subsurface despite prolonged skimming and recovery.
- The N-2 Alternative may not be completely effective at preventing NAPL discharge to the wetland.
- The N-3 Alternative uses excavation to remove free-draining and residual NAPL which is a well-proven, reliable technology and is largely irreversible.
- The N-3 Alternative is the only alternative expected to effectively remove NAPL from the subsurface, and control this continuing source of contamination to soil, groundwater, and the wetland.
- The N-3 Alternative provides the most robust strategy for both the long-term and short-term protection of human health and the environment, as well as compliance with ARARs.

GW-6 is EPA's preferred groundwater alternative for the following reasons:

- Alternatives GW-1 and GW-2 are not protective because they do not meet RAO or ARAR standards. Alternative GW-3 would not meet RAO and ARARs standards within a reasonable period (100-225 year versus 20 years for GW-6).
- The use of the pump and treat technology (GW-6 Alternative) is expected to meet ARARs and, in conjunction with EPA's preferred alternatives for NAPL and soil, groundwater cleanup levels for all contaminants in overburden and bedrock in a reasonable timeframe (approximately 20 years).
- The GW-6 Alternative provides for containment of groundwater contamination on-site while treating both the overburden and bedrock groundwater in a reasonable timeframe (approximately 20 years).
- Institutional controls will prevent potential on- and off-property human exposure to groundwater contaminants that exceed ARARs or groundwater cleanup levels until cleanup levels are met.
- Uncertainty with reagent dispersal at greater depths and throughout impacted zones to achieve in-situ biological treatment and chemical oxidation destruction exist with the GW-4 and GW-5 Alternatives.
- The chemical oxidants associated with the GW-5 Alternative are reactive and present a hazard to workers handling them during injection, and the migration of oxidants to the wetland area poses a concern.
- Rebound in contaminant concentrations and temporary mobilization of metals are concerns with the GW-4 and GW-5 Alternatives.
- Contaminant concentrations over the cleanup levels will be treated by the GW-4 Alternative but undesirable breakdown products are a concern. The formation and treatment of undesirable byproducts is not a concern with the GW-6 Alternatives as contaminated groundwater is not significantly altered during extraction. Treatment residuals formed as part of the GW-6 Alternative can be properly managed and pose minimal risk. Alternative GW-6 will be easier to implement than the GW-4 and GW-5 Alternatives which both require the installation of hundreds of injection points and multiple rounds of treatment before cleanup levels are achieved.
- Reuse/redevelopment opportunities and protection of the remedy may be easier to pursue under GW-6 Alternative with 18-22 recovery wells, while GW-4 and GW-5 Alternatives may be difficult with several hundred injection points/wells, multiple rounds of injections, and uncertainties.
- The GW-6 Alternative is $2.9 million less expensive than the GW-4 Alternative and $22.8 million less expensive than the GW-5 Alternative and would achieve groundwater cleanup levels in similar or shorter timeframe.

WTL-5 is EPA's preferred wetland sediment/soil alternative for the following reasons:

- Alternative WTL-1 (No Action) does not meet ARARs and is not protective of human health and the environment. Alternative WTL-2 (Monitored Natural Recovery) would not achieve cleanup standards within a reasonable time period compared with the capping/excavation alternatives.
- Alternative WTL-3 would result in significant filling of wetlands and loss of flood storage capacity with no identified practicable area within the watershed, upstream of sensitive flood receptors, to create replacement wetland/flood storage.
- Significantly contaminated sediment/soil would remain in place as part of Alternative WTL-3. It may be difficult for this alternative to comply with ARARs since areas for wetland and flood storage mitigation within the watershed are extremely limited. An impermeable cap meeting TSCA standards would be required since PCBs above TSCA landfilling thresholds would remain in the wetland.
- Due to filling of the wetland, the WTL-3 Alternative would have deleterious effects on wetland species.
- The significantly contaminated wetland sediments/soils are removed in Alternative WTL-4, but this alternative, like the WTL-3 Alternative, relies on cap integrity to maintain protectiveness.
- Alternative WTL-5 is highly reliable since all contaminated wetland sediment/soil exceeding remediation goals will be removed and no cap or Institutional Controls would be required to manage residually impacted sediment.
- EPA has determined that Alternative WTL-5 is the Least Environmentally Damaging Practicable Alternative under the federal Clean Water Act for addressing contaminants in the wetland, while protecting wetland resources.
- The WTL-5 Alternative is slightly more costly than the WTL-4 Alternative ($2.2 million vs. $1.9 million). However, Alternative WTL-5 is considered easier to install from a construction perspective (e.g. excavate 3 feet and backfill to original grades, versus variable elevations of excavation)

The combined preferred cleanup approach for soil, NAPL, groundwater, and wetland soil/sediment would avoid significant long-term impacts to floodplain and wetland areas, to the extent practicable, and provide restoration of damage to accelerate habitat recovery. The total cost for the preferred cleanup approach is $19.1 million (see Table 8). This total cost reflects that the cost for Alterative N-3 has been adjusted downward because Alternative SW-3 includes excavation within the area where NAPL is present on the Whitney Property.

Table 8. Cost Summary for EPA's Preferred Options

Alternative	**Capital Cost** (construction) (millions)	**Contigency** (millions)	**O&M** (millions)	**Total Cost** (construction, contigenc and O&M) (millions)
SW-3/SM-3/SA-3 - Soil Excavation, Off-Site Disposal, Capping and Institutional Controls	$7.5	$2.1	$0.76	$10.4
GW-6 - Pump and Treat and Institutional Controls	$1.8	$0.58	$1.8	$4.2
N-3 - Excavation and Off-Site Disposal [(1)]	$1.8	$0.44	$0.13	$2.3
WTL-5 - Deep Excavation and Off-Site Disposal, Backfill, and Wetland Restoration	$1.5	$0.38	$0.28	$2.2
			Overall Cost for Preferred Options	$19.1

Notes

[(1)] Cost for Alterative N-3 has been adjusted downward because Alternative SW-3 includes excavation within the area where NAPL is present on the Whitney Property.

What Is A Formal Comment?

EPA will accept public comments during a 30-day formal comment period. EPA considers and uses these comments to improve its cleanup approach. During the formal comment period, EPA will accept written comments via mail, email, and fax. Additionally, verbal comments may be made during the formal Public Hearing on Thursday, August 3, 2017 during which a stenographer will record all offered comments during the hearing. EPA will not respond to your comments during the formal Public Hearing.

EPA will hold a brief informational meeting prior to the start of the formal Public Hearing on Thursday, August 3, 2017. Additionally, once the formal Public Hearing portion of the meeting is closed, EPA can informally respond to any questions from the public.

EPA will review the transcript of all formal comments received during the hearing, and all written comments received during the formal comment period, before making a final cleanup decision. EPA will then prepare a written response to all the formal written and oral comments received. Your formal comment will become part of the official public record. The transcript of comments and EPA's written responses will be issued in a document called a Responsiveness Summary when EPA releases the final cleanup plan, in a document referred to as the Record of Decision. The Responsiveness Summary and Record of Decision will be made available to the public on-line, at the Woburn Public Library and at the EPA Records Center (see addresses below). EPA will announce the final decision on the cleanup plan through the local media and via EPA's website.

For More Detailed Information:

The Administrative Record, which includes all documents that EPA has considered or relied upon in proposing this cleanup plan for the Southwest Properties, Wells G&H Superfund Site (OU-4) is available for public review and comment at the following locations:

EPA Records and Information Center
5 Post Office Square, First Floor
Boston, MA 02109-3912
(617) 918-1440

Woburn Public Library
45 Pleasant Street
Woburn, MA 01801
(781) 933-0148

Proposed Plan Can Be Viewed At:
go.usa.gov/xNsVT

SEND US YOUR COMMENTS

Provide EPA with your written comments about the Proposed Plan for the Southwest Properties, Wells G&H Superfund Site.

You may email (lemay.joe@epa.gov), fax (617-918-0323), or mail comments, postmarked no later than
Monday, August 14, 2017 to:

Joseph LeMay, P.E.
EPA Region New England
5 Post Office Sq., Suite 100
Mail Code OSRR 07-4
Boston MA 02109-3912

View more site information:
https://go.usa.gov/xNFvG

List of Abbreviations & Acronyms

ARAR .....Applicable or Relevant and Appropriate Requirement
B&M.....Boston and Maine
CERCLA .....Comprehensive Environmental Response, Compensation, and Liability Act
CFR .....Code of Federal Regulations
CHES.....Clean Harbors Environmental Services
CSGWPP ....Comprehensive State Groundwater Protection Program
DCE.....Dichloroethene
EPA .....United States Environmental Protection Agency
ERA.....Ecological Risk Assessment
ESD.....Explanation of Significant Difference
FIT.....Field Investigation Team
FS.....Feasibility Study
FYR .....Five-Year Review
GW.....Groundwater - Southwest Properties
HHRA.....Human Health Risk Assessment
HI .....Hazard Index
ICs.....Institutional Controls
IEUBK .....Integrated Exposure Uptake Biokinetic
I-G.....Industrial General
I-P.....Industrial Park
IRA.....Immediate Response Action
kg.....Kilogram
MassDEP....Massachusetts Department of Environmental Protection
MCL.....Maximum Contamination Levels
MCP .....Massachusetts Contingency Plan
MNA.....Monitored Natural Attenuation
MNR.....Monitored Natural Recovery
MOA.....Memorandum of Agreement
mg.....Milligram
N.....NAPL
NAPL .....Non-Aqueous Phase Liquid
NCP .....National Oil and Hazardous Substances Pollution Congency Plan
NPL .....National Priorities List
O&M .....Operation and Maintenance
OSWER .....Office of Solid Waste and Emergency Response
OU .....Operable Unit
PAH .....Polycyclic Aromatic Hydrocarbons
PCBs .....Polychlorinated Biphenyls
PCE.....Tetrachloroethene
Plan.....Proposed Plan
POTW.....Publicly Owned Treatment Works
ppb .....Parts Per Billion
ppm .....Parts Per Million
PRG .....Preliminary Remediation Goals
PRP .....Potentially Responsible Party
RAO .....Remedial Action Objectives
RCRA .....Resource Conservation and Recovery Act
RI .....Remedial Investigation
RI/FS.....Remedial Investigation and Feasibility Study
ROD.....Record of Decision
RPM.....Remedial Project Manager
SA .....Soil – Aberjona Property
SM .....Soil – Murphy Property
SW.....Soil – Whitney Property
SWP.....Southwest Properties
TBC.....To be considered
TCE.....Trichloroethene
TSCA.....Toxic Substance Control Act
ug.....Microgram
VOC .....Volatile Organic Compounds
WTL .....Wetland Sediments/Soils – Murphy Wetland
ZVI.....Zero-Valent Iron

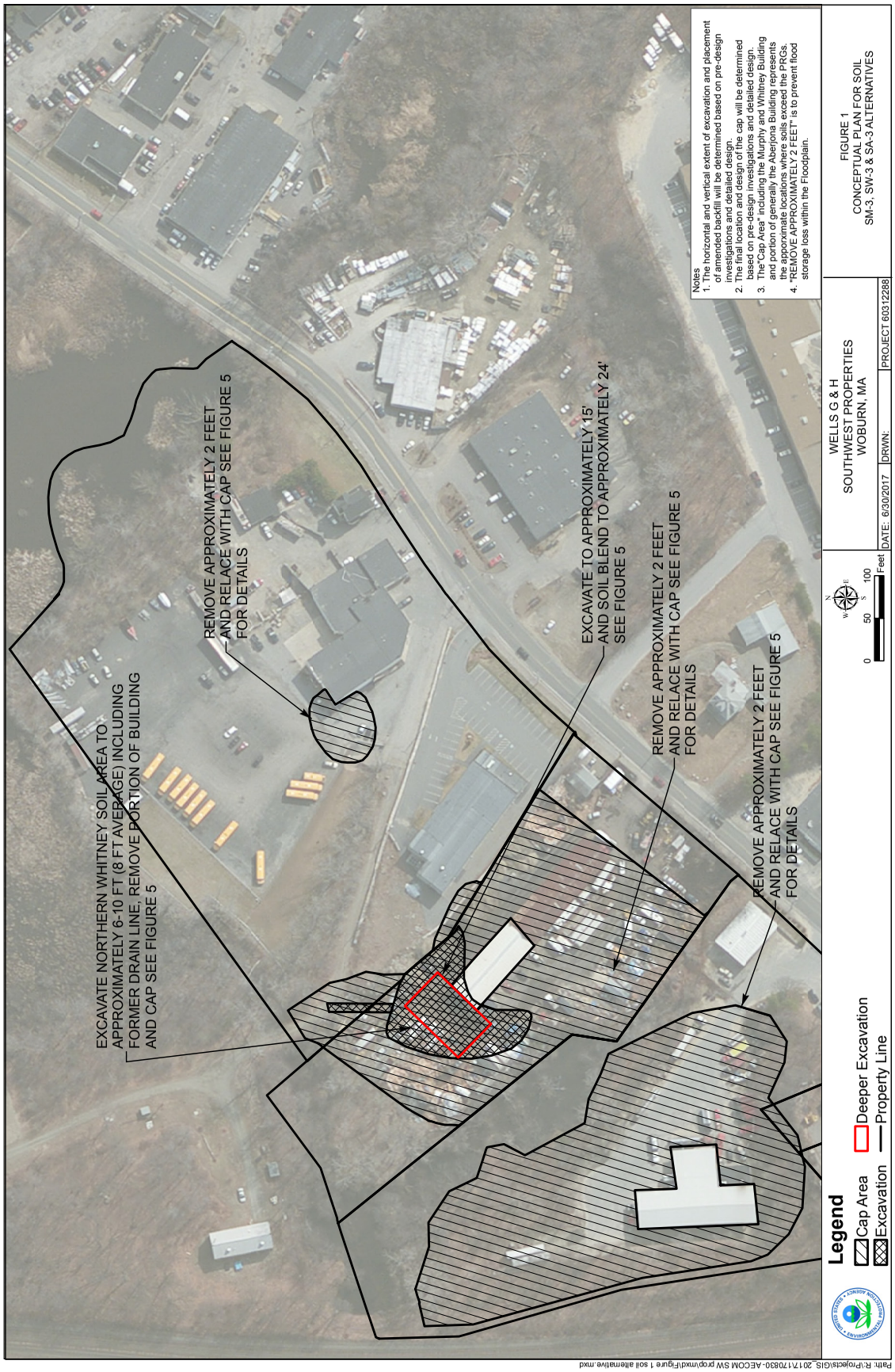

EXCAVATE NORTHERN WHITNEY SOIL AREA TO APPROXIMATELY 6-10 FT (8 FT AVERAGE) INCLUDING FORMER DRAIN LINE, REMOVE PORTION OF BUILDING AND CAP SEE FIGURE 5
REMOVE APPROXIMATELY 2 FEET AND RELACE WITH CAP SEE FIGURE 5 FOR DETAILS
EXCAVATE TO APPROXIMATELY 15' AND SOIL BLEND TO APPROXIMATELY 24' SEE FIGURE 5
REMOVE APPROXIMATELY 2 FEET AND RELACE WITH CAP SEE FIGURE 5 FOR DETAILS
REMOVE APPROXIMATELY 2 FEET AND RELACE WITH CAP SEE FIGURE 5 FOR DETAILS
Legend
Cap Area
Excavation
Deeper Excavation
Property Line
0 50 100 Feet
Notes
1. The horizontal and vertical extent of excavation and placement of amended backfill will be determined based on pre-design investigations and detailed design.
2. The final location and design of the cap will be determined based on pre-design investigations and detailed design.
3. The "Cap Area" including the Murphy and Whitney Building and portion of generally the Aberjona Building represents the approximate locations where soils exceed the PRGs.
4. "REMOVE APPROXIMATELY 2 FEET" is to prevent flood storage loss within the Floodplain.
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN:
PROJECT 60312288
FIGURE 1
CONCEPTUAL PLAN FOR SOIL
SM-3, SW-3 & SA-3 ALTERNATIVES
Path: R:\Projects\GIS_2017\70830-AECOM SW prop\mxd\Figure 1 soil alternative.mxd

Figure 1

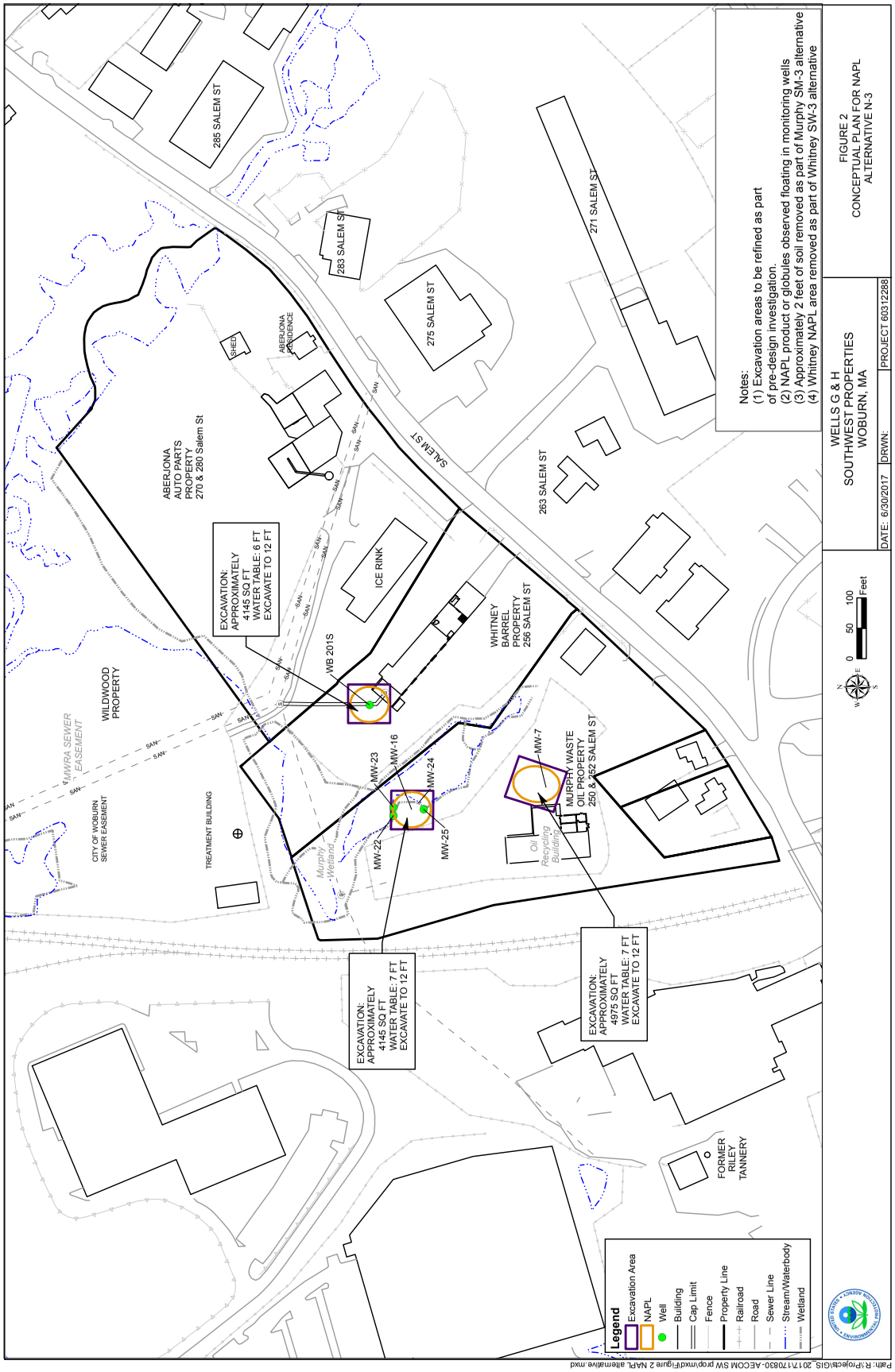

285 SALEM ST
283 SALEM ST
275 SALEM ST
271 SALEM ST
263 SALEM ST
SALEM ST
ABERJONA AUTO PARTS PROPERTY 270 & 280 Salem St
ABERJONA PROVIDENCE
SHED
ICE RINK
WB 201S
WHITNEY BARREL PROPERTY 256 SALEM ST
WILDWOOD PROPERTY
MWRA SEWER EASEMENT
CITY OF WOBURN SEWER EASEMENT
TREATMENT BUILDING
Murphy Wetland
MW-22
MW-23
MW-16
MW-24
MW-25
MW-7
MURPHY WASTE OIL PROPERTY 250 & 252 SALEM ST
Oil Recycling Building
FORMER RILEY TANNERY
EXCAVATION: APPROXIMATELY 4145 SQ FT WATER TABLE: 6 FT EXCAVATE TO 12 FT
EXCAVATION: APPROXIMATELY 4145 SQ FT WATER TABLE: 7 FT EXCAVATE TO 12 FT
EXCAVATION: APPROXIMATELY 4975 SQ FT WATER TABLE: 7 FT EXCAVATE TO 12 FT
Notes:
(1) Excavation areas to be refined as part of pre-design investigation.
(2) NAPL product or globules observed floating in monitoring wells
(3) Approximately 2 feet of soil removed as part of Murphy SM-3 alternative
(4) Whitney NAPL area removed as part of Whitney SW-3 alternative
FIGURE 2
CONCEPTUAL PLAN FOR NAPL ALTERNATIVE N-3
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN:
PROJECT 60312288
0 50 100 Feet
Legend
Excavation Area
NAPL
Well
Building
Cap Limit
Fence
Property Line
Railroad
Road
Sewer Line
Stream/Waterbody
Wetland
Path: R:\Projects\GIS_2017\70830-AECOM SW prop\mxd\Figure 2 NAPL alternative .mxd

Figure 2

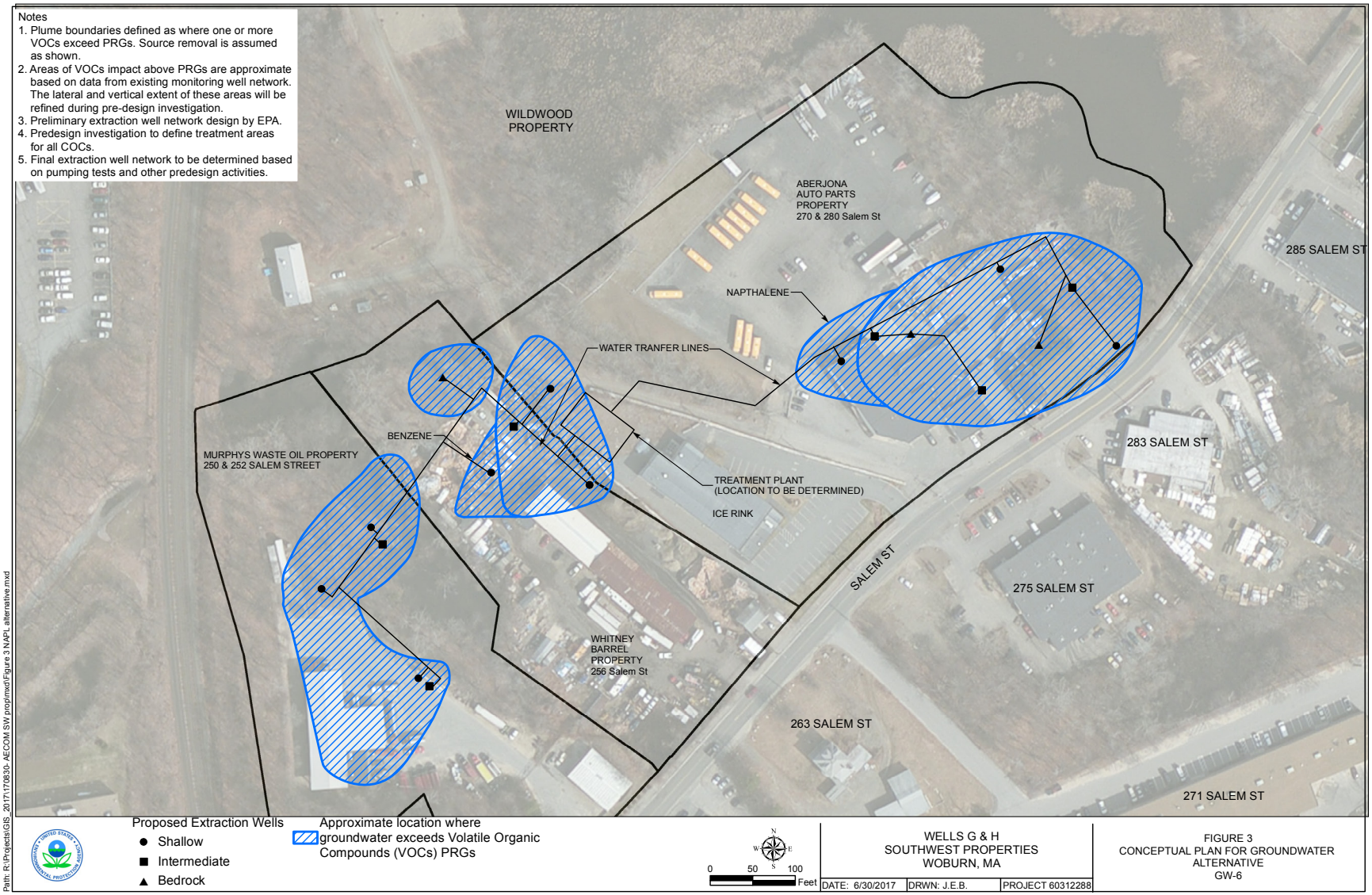

Notes
1. Plume boundaries defined as where one or more VOCs exceed PRGs. Source removal is assumed as shown.
2. Areas of VOCs impact above PRGs are approximate based on data from existing monitoring well network. The lateral and vertical extent of these areas will be refined during pre-design investigation.
3. Preliminary extraction well network design by EPA.
4. Predesign investigation to define treatment areas for all COCs.
5. Final extraction well network to be determined based on pumping tests and other predesign activities.
WILDWOOD PROPERTY
ABERJONA AUTO PARTS PROPERTY 270 & 280 Salem St
285 SALEM ST
NAPTHALENE
WATER TRANFER LINES
BENZENE
MURPHYS WASTE OIL PROPERTY 250 & 252 SALEM STREET
TREATMENT PLANT (LOCATION TO BE DETERMINED)
ICE RINK
283 SALEM ST
SALEM ST
275 SALEM ST
WHITNEY BARREL PROPERTY 256 Salem St
263 SALEM ST
271 SALEM ST
Proposed Extraction Wells
Shallow
Intermediate
Bedrock
Approximate location where groundwater exceeds Volatile Organic Compounds (VOCs) PRGs
0 50 100 Feet
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN: J.E.B.
PROJECT 60312288
FIGURE 3
CONCEPTUAL PLAN FOR GROUNDWATER ALTERNATIVE
GW-6
Path: R:\Projects\GIS_2017\170830-AECOM SW prop\mxd\Figure 3 NAPL alternative.mxd

Figure 3

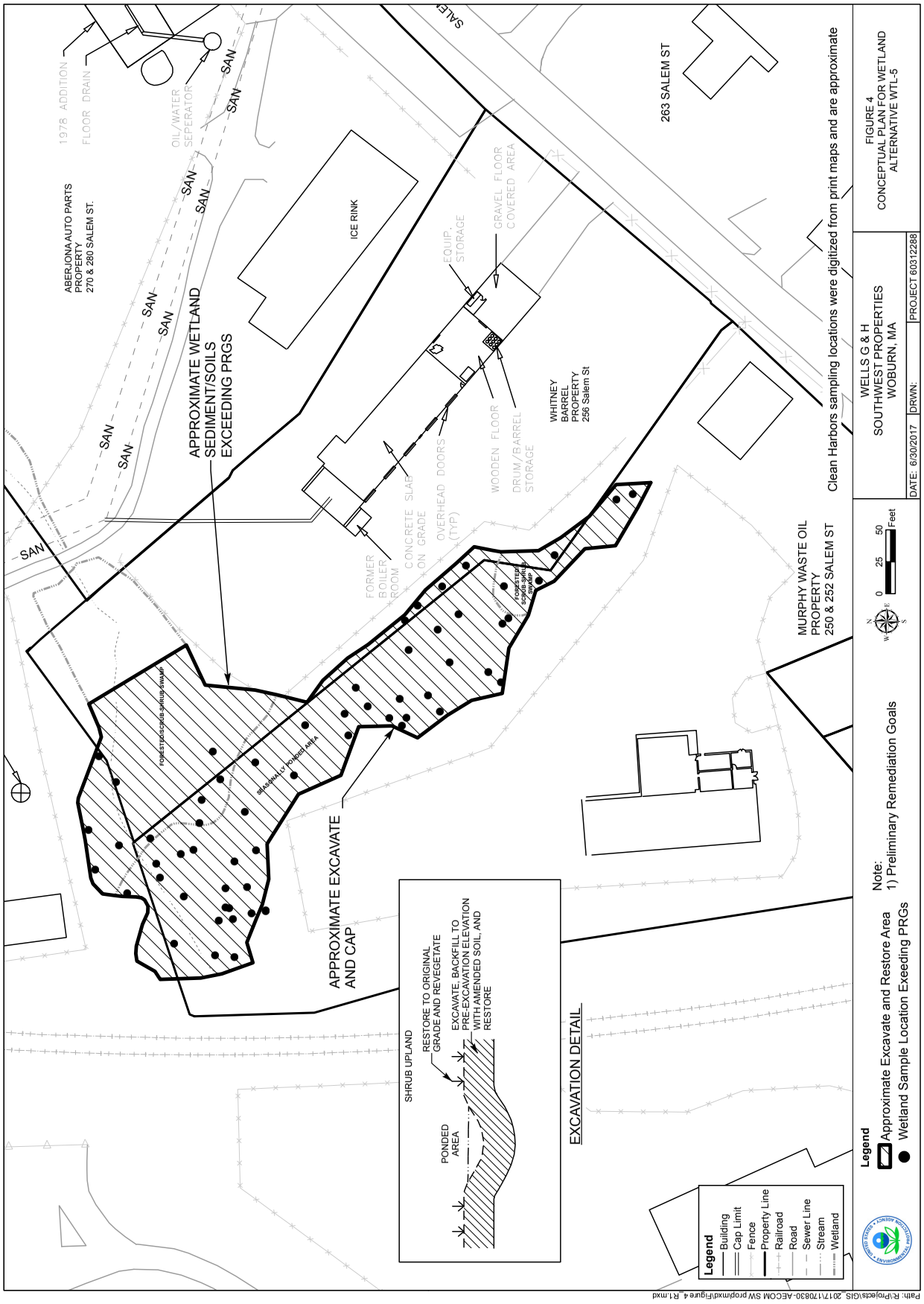
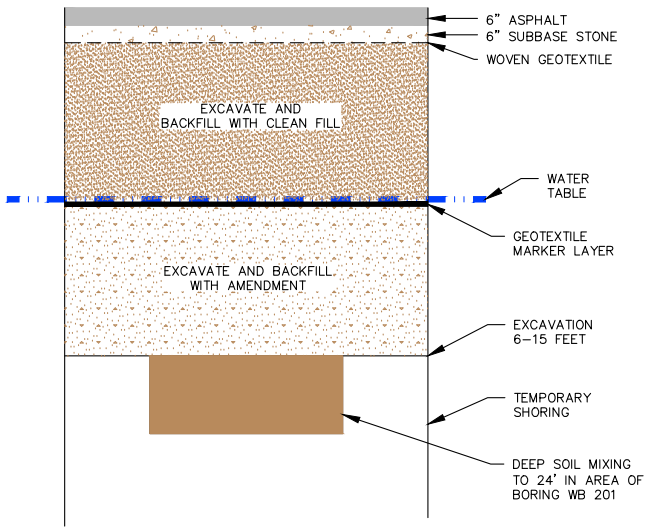
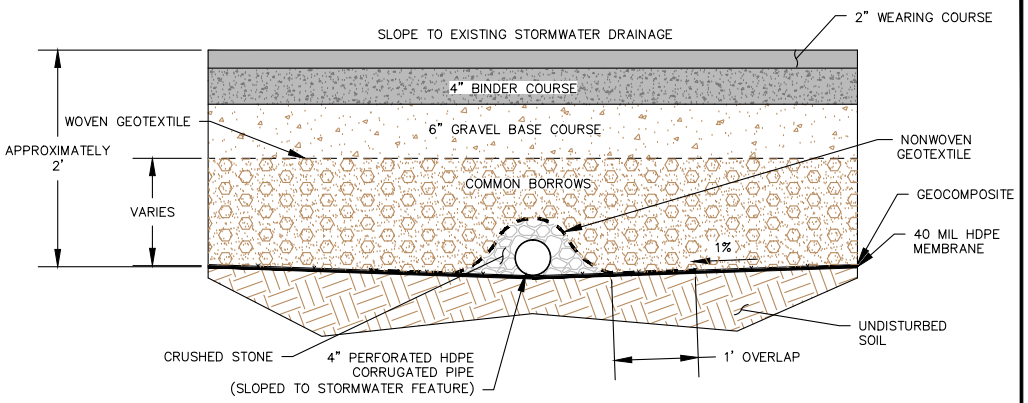

ABERJONA AUTO PARTS PROPERTY 270 & 280 SALEM ST.
1978 ADDITION
FLOOR DRAIN
OIL/WATER SEPERATOR
SAN
APPROXIMATE WETLAND SEDIMENT/SOILS EXCEEDING PRGS
ICE RINK
FORMER BOILER ROOM
CONCRETE SLAB ON GRADE
OVERHEAD DOORS (TYP)
WOODEN FLOOR
DRUM/BARREL STORAGE
EQUIP. STORAGE
GRAVEL FLOOR COVERED AREA
WHITNEY BARREL PROPERTY 256 Salem St
263 SALEM ST
MURPHY WASTE OIL PROPERTY 250 & 252 SALEM ST
Clean Harbors sampling locations were digitized from print maps and are approximate
APPROXIMATE EXCAVATE AND CAP
EXCAVATION DETAIL
SHRUB UPLAND
RESTORE TO ORIGINAL GRADE AND REVEGETATE
EXCAVATE, BACKFILL TO PRE-EXCAVATION ELEVATION WITH AMENDED SOIL, AND RESTORE
PONDED AREA
Legend
Approximate Excavate and Restore Area
Wetland Sample Location Exeeding PRGs
Note:
1) Preliminary Remediation Goals
Legend
Building
Cap Limit
Fence
Property Line
Railroad
Road
Sewer Line
Stream
Wetland
0 25 50 Feet
FIGURE 4
CONCEPTUAL PLAN FOR WETLAND ALTERNATIVE WTL-5
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN:
PROJECT 60312288
Path: R:\Projects\GIS_2017\708330-AECOM SW prop\mxd\Figure 4_R1.mxd

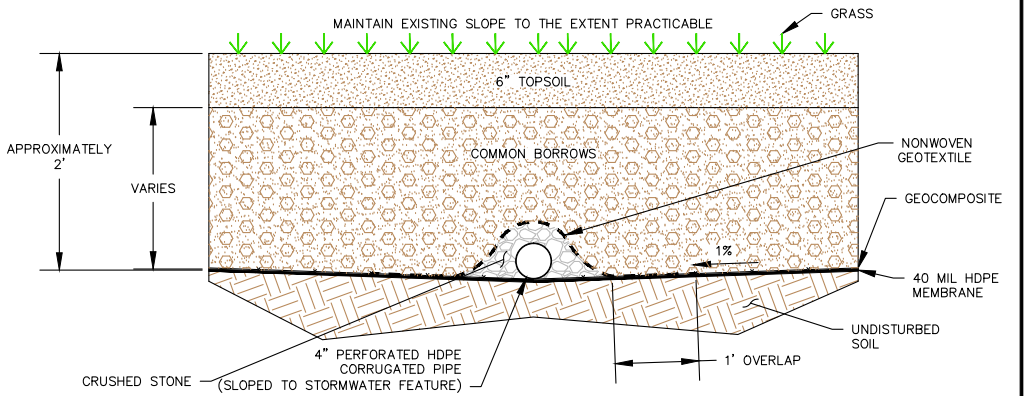
Figure 4



DETAIL A



EXCAVATE 2' AND MEMBRANE CAP
WITH ASPHALT SURFACE



EXCAVATE 2' AND MEMBRANE CAP
WITH GRASS SURFACE

DETAIL B

WELLS G & H SOUTHWEST PROPERTIES WOBURN, MA DATE: 6/29/2017 DRWN: JB	**FIGURE 5** **CONCEPTUAL FILL/CAP DESIGNS**

File: K:\Projects\GIS_2017\170830- AECOM SW prop\mxd\Fig_5_3A_5_3B_ConceptualL_FIL_Cap_Design.dwg Layout: Fig 5-3A User: RiYer PlotText: Jun 29, 2017 - 4:09pm Xref's:

Figure 5

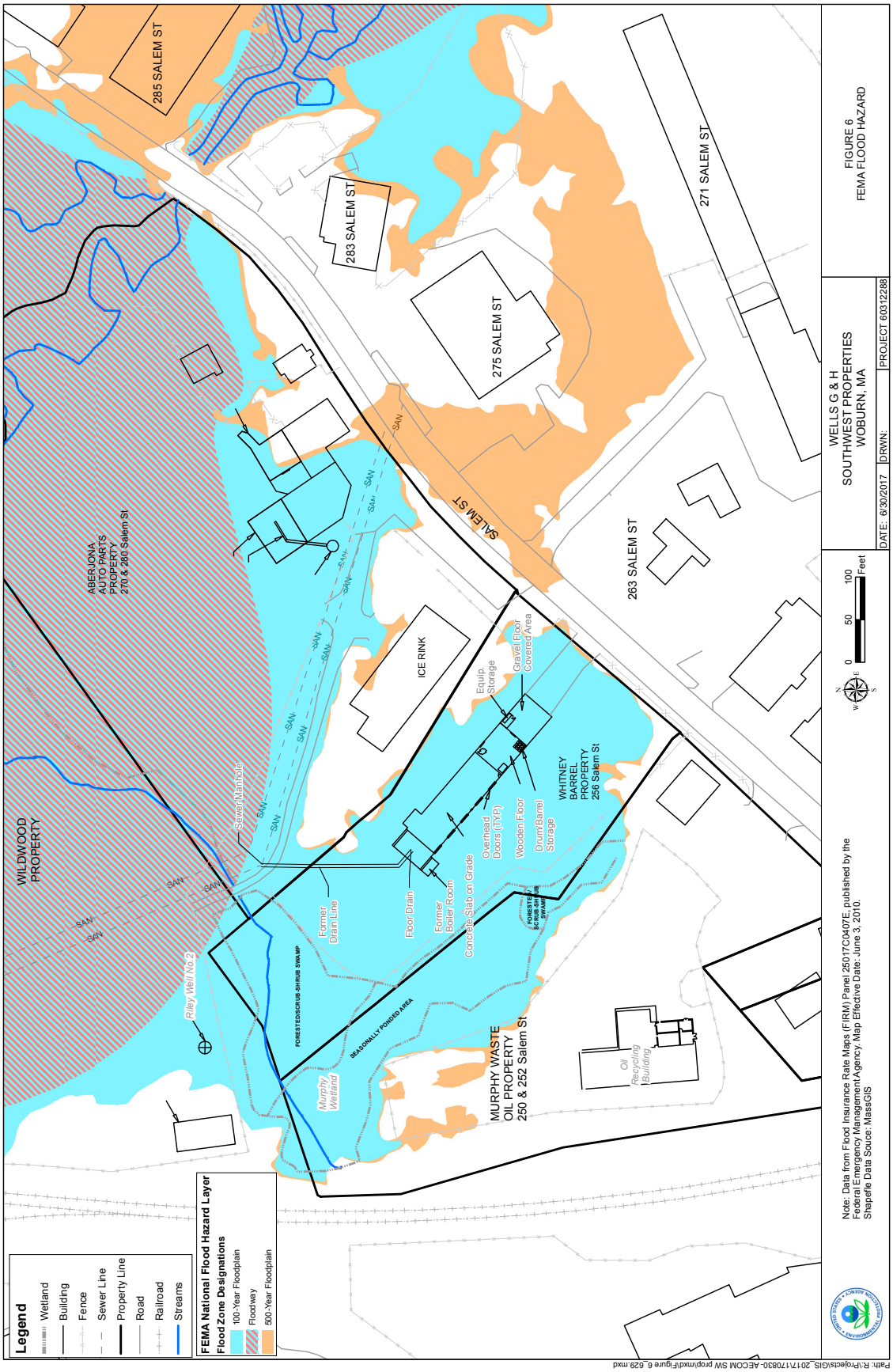

285 SALEM ST
283 SALEM ST
275 SALEM ST
271 SALEM ST
263 SALEM ST
SALEM ST
ABERJONA AUTO PARTS PROPERTY 270 & 280 Salem St
WILDWOOD PROPERTY
ICE RINK
Equip. Storage
Gravel Floor Covered Area
WHITNEY BARREL PROPERTY 256 Salem St
Overhead Doors (TYP)
Wooden Floor
Drum/Barrel Storage
Former Drain Line
Floor Drain
Former Boiler Room
Concrete Slab on Grade
Sewer Manhole
Riley Well No. 2
FORESTED/SCRUB-SHRUB SWAMP
SEASONALLY PONDED AREA
Murphy Wetland
MURPHY WASTE OIL PROPERTY 250 & 252 Salem St
Oil Recycling Building
Legend
Wetland
Building
Fence
Sewer Line
Property Line
Road
Railroad
Streams
FEMA National Flood Hazard Layer
Flood Zone Designations
100-Year Floodplain
Floodway
500-Year Floodplain
0
50
100
Feet
N
W
E
S
Note: Data from Flood Insurance Rate Maps (FIRM) Panel 25017C0407E, published by the Federal Emergency Management Agency; Map Effective Date: June 3, 2010.
Shapefile Data Souce: MassGIS
FIGURE 6
FEMA FLOOD HAZARD
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN:
PROJECT 60312288
Path: R:\Projects\GIS_2017\60830-AECOM SW prop\mxd\Figure 6_629.mxd

Figure 6

Figure 7

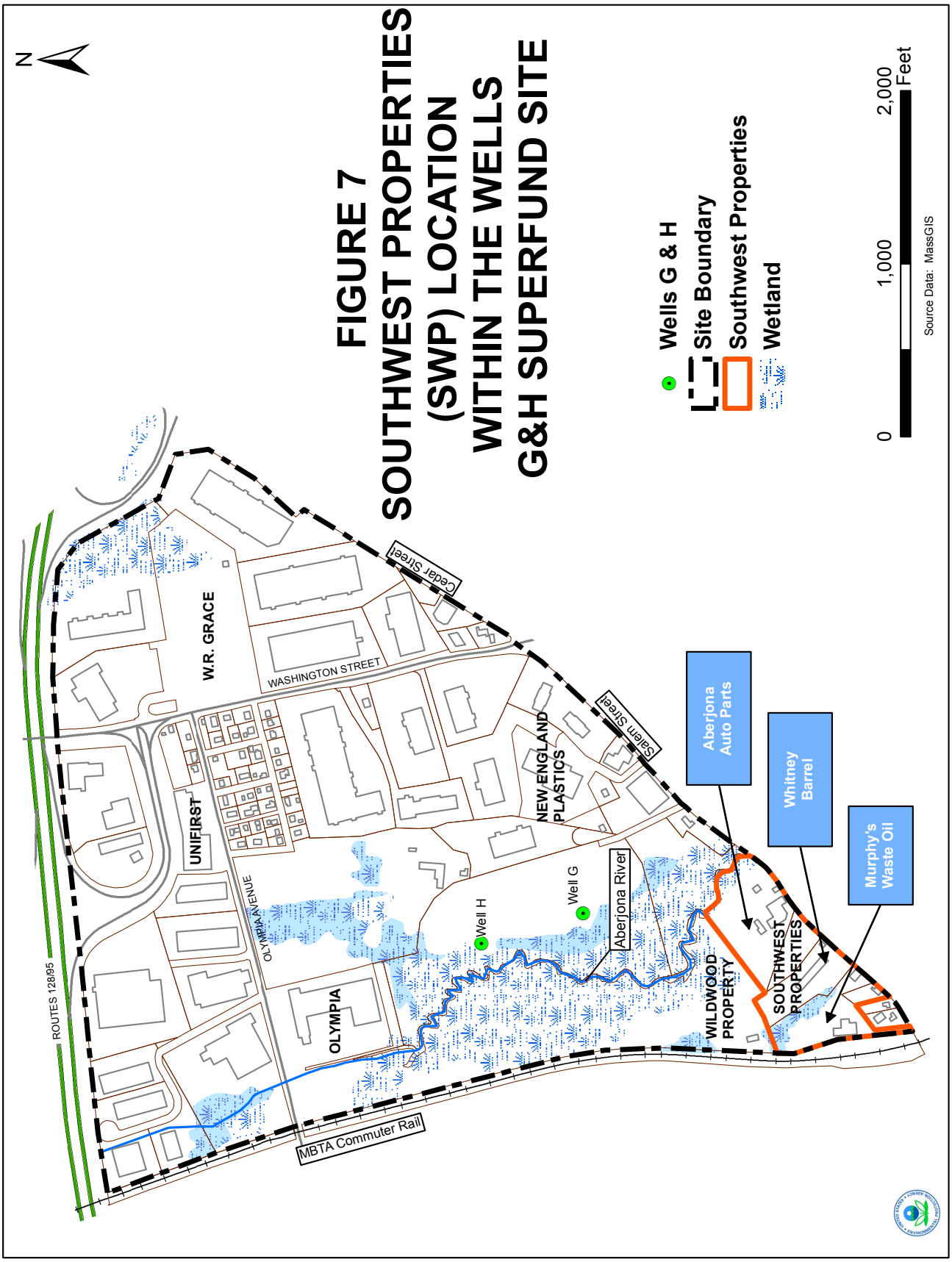


FIGURE 7
SOUTHWEST PROPERTIES
(SWP) LOCATION
WITHIN THE WELLS
G&H SUPERFUND SITE
N
Wells G & H
Site Boundary
Southwest Properties
Wetland
0
1,000
2,000
Feet
Source Data: MassGIS
W.R. GRACE
WASHINGTON STREET
Cedar Street
Salem Street
UNIFIRST
OLYMPIA AVENUE
NEW ENGLAND PLASTICS
Aberjona Auto Parts
Whitney Barrel
Murphy's Waste Oil
Well H
Well G
Aberjona River
WILDWOOD PROPERTY
SOUTHWEST PROPERTIES
OLYMPIA
ROUTES 128/95
MBTA Commuter Rail
R:\Projects\GIS_2017\170830- AECOM SW prop\mxd\Figure 6.mxd


FIGURE 8
SWP LAYOUT
WELLS G & H
SOUTHWEST PROPERTIES
WOBURN, MA
DATE: 6/30/2017
DRWN:
PROJECT 60312288
0 50 100 Feet
ABERJONA RIVER
285 SALEM ST
283 SALEM ST
275 SALEM ST
271 SALEM ST
263 SALEM ST
SALEM ST
ABERJONA AUTO PARTS PROPERTY 270 & 280 Salem St
WILDWOOD PROPERTY
WHITNEY BARREL PROPERTY 256 SALEM ST
MURPHY WASTE OIL PROPERTY 250 & 252 SALEM ST
248 SALEM ST
246 SALEM ST
ICE RINK
FORMER SHED (APPROX)
1968 ADDITION
FORMER WASTE OIL TANK
ABERJONA RESIDENCE
SHED
1978 ADDITION - FLOOR DRAIN
FORMER DIESEL UST
OIL/WATER SEPERATOR
REMOVED AREA OF FORMER GASOLINE ISLAND
REPORTED AREA OF FORMER GASOLINE USTS (APPROX)
Sewer Manhole
Former Drain Line
Floor Drain
Former Boiler Room
Concrete Slab on Grade
Overhead Doors (TYP)
Wooden Floor
Drum/Barrel Storage
Equip. Storage
Gravel Floor Covered Area
FORMER OIL PIT (APPROX.)
Oil Recycling Building
FORMERWATER OIL ASTAREA (APPROX.)
ASSUMED PONDED AREA
FORESTED/SCRUB-SHRUB SWAMP
Murphy Wetland
Riley Well No.2
TREATMENT BUILDING
MWRA SEWER EASEMENT
CITY OF WOBURN SEWER EASEMENT
B&M RAILROAD
Approximate Limit of Drainage Swale/ Organix Removal Action
FORMER RILEY TANNERY
Legend
Culvert (Approximate Location)
Building
Cap Limit
Fence
Property Line
Railroad
Road
Sewer Line
Stream/Waterbody
Wetland
Disposal Site Limits
Historic Features
Wetland Area
Forested Scrub Shrub
Seasonally Ponded Area
Path: R:\Projects\GIS_2017\70830-AECOM SW prop\mxd\Figure 7.mxd

Figure 8