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REMEDIATION PRE-CHARACTERIZATION AND ANALYSIS OF BROWNFIELDS ALTERNATIVES / REMEDIAL ACTION PLAN

Central Plating Site
12 Westminster Street
Walpole, NH 03608

NH DES Site #: 199806071
Project Type: HAZWASTE
Project Number: 32266

Prepared For:

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November 13, 2020

EXECUTIVE SUMMARY

The following report presents the findings of a Remediation Pre-Characterization and Analysis of Brownfields Cleanup Alternatives (ABCA)/Remedial Action Plan (RAP) performed by Ransom Consulting, LLC (Ransom) for the Town of Walpole through their United States Environmental Protection Agency (U.S. EPA) Brownfields clean-up grant. The Remediation Pre-Characterization was performed for the Central Plating Site located at 12 Westminster Street in the Town of Walpole, New Hampshire (the "Site") that is part of a planned brownfields redevelopment project that will incorporate an abandoned industrial lot and remaining building into a parking lot with planned pocket park and electric vehicle charging stations. Please note that also summarized herein and attached are the results of assessment services conducted for the Town of Walpole, outside of the U.S. EPA Brownfields clean-up grant program, of near-surface soils for the grass parking lot buffer owned by the Mascoma Bank, that directly abuts the Central Plating Site that will also be part of the redevelopment project. The report should be read in its entirety to understand the conclusions and recommendations presented here-in.

The Central Plating Site consists of two adjoining land-locked parcels within the center of Walpole Village. The parcels are designated as Lots 65 and 66 on the Town of Walpole Tax Map 20, and are approximately 0.089 and 0.190 acres, respectively. Access to the site is obtained via a right-of-way from Westminster Street. Lot 65 is improved with a circa 1940 1,008 square foot garage-style, single-story building herein identified as the Wastewater Pre-Treatment Building. A single-story, slab-on-grade, masonry light industrial building, herein identified as the Former Industrial Building, was located on Lot 66 prior to demolition in 2012. Central Plating, Inc. (Central Plating) had conducted electroplating of metal parts at the Site from 1963 until circa 2006. Currently, other than the noted remaining building, the Site is vacant and asphalt-paved surfaces and the sparsely vegetated footprint of the former building cover much of the remaining area. Land use in the vicinity of the Site is primarily commercial and residential. The Former Tole's Sunoco, a listed New Hampshire Department of Environmental Services (NH DES) Leaking Underground Storage Tank (LUST) Site and gasoline service station is located southeast of the Site.

Municipal water service is available to the Site and to the neighborhood. A review of NH DES OneStop Web Geographic Information System records and an inquiry with the Town of Walpole Assessor's Office identified no public or private potable water supply wells within 1,000 feet of the Site. However, a dug residential well used for garden irrigation is located in proximity to the Site at 69 Main Street (Tax Map 20, Lot 51), approximately 175 feet to the north. Site topography is relatively flat, regional topography slopes down to the west towards the Connecticut River 1,750 feet away, and there is a northwest-draining tributary 500 feet north of the Site.

Wastewater from the operations of Central Plating was directed to the municipal sewer system since the start of operations. Central Plating's metal finishing processes included anodizing of aluminum parts; chrome electroplating; nickel electroplating; chromate electropolishing; black oxide finishing; passivation; Teflon coating; and a lacquer dip tank used to coat racks used in nickel plating. The process areas and layout were presented on 1990 and 1997 process schematics and included plating lines and a floor drain(s) located in the south end of the Former Industrial Building. Sumps to receive wastewater piped underground from the Former Industrial Building were shown in the north end of the separate Wastewater Pre-Treatment Building. Chrome fume suppressant(s) were reportedly used to control hazardous emission of hexavalent chrome fumes in the early 2000s and perhaps the late 1990s. Fume suppressants used in this era commonly contained per- and polyfluoroalkyl substances (PFAS). In addition, Teflon coating, which also is known to contain PFAS, was apparently one of the coatings applied based on a Teflon above-ground storage tank, located in the northwest corner of the Former Industrial Building, shown on the 1997 process schematic.

Environmental studies conducted by Stantec Consulting Services, Inc. (Stantec), Sanborn Head and Associates (SHA) and Ransom document environmental concerns on both lots. The Wastewater Pre-Treatment Building lot (Lot 65) has inferred impacts to soils beneath wastewater treatment sumps located within that building. The Former Industrial Building lot (Lot 66) has concentration of metals (notably hexavalent chromium and trivalent chromium) above NH DES Env-Or 600 Soil Remediation Standards (SRS) to surface and deeper (up to 17 feet below grade) soils in the former nickel and chromium plating line areas, which were likely from plating bath spillage/overflows. The impacted soils on Lot 66 are inferred to present a human exposure risk through soils via direct contact and ingestion and via inhalation of dust. Groundwater impacts for dissolved metals (chromium and nickel at concentrations above NH DES Env-Or 600 Ambient Groundwater Quality Standards (AGQS)) are documented in and adjacent to both impacted areas. PFAS impacts were also noted in groundwater above AGQS downgradient of: (1) the former plating areas; and (2) the area of the former Teflon storage tank. Groundwater impacts are inferred to primarily have occurred from on-site releases of hazardous substances between 1963 and 2006 and are ongoing due to residual contamination in Site soils. Volatile organic compounds (VOCs) impacts from off-site sources (petroleum/gasoline storage) were also documented in Site groundwater samples.

The metals soils contaminant distribution and area of groundwater impacts was defined through investigations funded primarily through the Southwest Region Planning Commission (SWRPC) Brownfield Assessment Program, and investigations funded by the owner (initial due diligence assessment and PFAS plume investigation), a prospective purchaser, and the NH DES (to confirm PFAS in groundwater and assess groundwater impacts from a former Teflon storage tank area). Environmental investigations and studies at the property include the 2018 completion of an ABCA/RAP that proposed to excavate and properly dispose of an estimated 216 tons of soil on Lot 65 from beneath the Wastewater Treatment Facility Building subsequent to it’s demolition, and 551 tons of soil on Lot 66 from the ground surface to an underlying clay layer that slopes downward towards the Connecticut River Valley beneath the former plating line area. The extent of groundwater impacts above AGQS was inferred to be limited to the Site and the downgradient adjoining residential (multifamily building) property. No Site contaminants of concern (COCs) were documented at concentrations above AGQS for the groundwater sample collected from the dug well irrigation water supply at the nearby residence located north of the Site. PFAS impacts to groundwater have been largely characterized; however, a possible localized southwesterly component to groundwater flow could warrant some additional assessment to the southwest. A recent revision to the PFAS AGQS indicate one PFAS compound detected above AGQS for a sample collected from a monitoring well (MW202) installed on the west, downgradient Lot 66. Little risk to indoor air is inferred from the results of groundwater sampling at the Site, particularly for Site COCs, namely metals and PFAS, based on: (1) the low concentrations of dissolved contaminants detected proximal to occupied buildings, (2) the low volatility of chromium and PFAS, in general, (3) the low likelihood of diffusion of these COCs from groundwater to a vapor state, and (4) no established NH DES Risk Characterization and Management Policy GW2 standards or Vapor Intrusion Policy standards, which have been established to be protective of indoor air quality for contaminants with a groundwater source. Note that the NH DES has only relatively recently established standards for PFAS for the consumptive use of groundwater.

The 2018 ABCA/RAP noted that subsequent to remediation a Groundwater Management Permit (GMP) application would be prepared, and groundwater would be monitored under a GMP for an assumed period of at least 15 years and at a decreasing frequency of sampling. Analyses would be for Resource Conservation Recovery Act (RCRA) metals, nickel and PFAS. Cessation of permit monitoring is contingent upon AGQS being met and confirmed at all sample locations. The ABCA/RAP notes that to access one of two inferred sources of groundwater impacts at the Site, the Former Wastewater Pre-Treatment Building will require the abatement of hazardous building materials, the removal and proper disposal of hazardous substances from within the building, and demolition and disposal of the building in accordance with applicable town, state and federal regulations.

Ransom completed a Phase I ESA in 2018 which revealed no evidence of recognized environmental conditions (RECs) in connection with the Site, except for the following:

1. The Site was historically the location of an industrial electroplating facility dating from circa 1963 to circa 2006. Multiple releases of hazardous substances from the former industrial operations have adversely impacted Site soil and groundwater quality, with multiple contaminants (metals and PFAS) detected at concentrations above the applicable state standards.

2. An upgradient LUST site has adversely impacted groundwater quality at the Site, resulting in the inclusion of the Site in the Groundwater Management Zone (GMZ) associated with this LUST property.

Based on the information obtained during the 2018 Phase I ESA, Ransom concluded that additional actions to address the above identified RECs were warranted. Ransom recommended the following to address the identified RECs for the Site:

1. Once formally approved by the NH DES, the proposed ABCA/RAP should be implemented, including the monitoring of groundwater quality under a GMP. Some limited additional groundwater quality documentation may be necessary to define the southwesterly limit of the GMZ in support of the GMP application. [Note that based on recent NH DES AGQS revisions for PFAS compounds the westerly limit will also now be likely to require additional delineation.]

2. Interim measures should be implemented, such as providing soils cover (a temporary cap) or fencing for the area with known SRS exceedances to limit access to those soils until such time as the ABCA/RAP can be completed.

3. Once guidance is provided or standards are established by the NH DES, the extent of PFAS soils impacts in suspect release areas that have not been remediated should be characterized and contaminant levels reduced [or soils managed] to promote attainment of soil and groundwater clean-up standards.

The NH DES concurred with Ransom's ABCA/RAP outlining the implementation of the following remedial actions at the Site:

1. Demolition of the on-site building including the abatement of hazardous building materials and the removal and off-site disposal of hazardous substances from within the building.

2. Excavation and off-site disposal of metals-impacted soil exceeding NH DES' soil remediation standards;

3. Long-term groundwater monitoring pursuant to a GMP.

The NH DES concluded that the ABCA/RAP meets the approval criteria established under Env-Or 600 and issued a Notice of Approved Remedial Action Plan in a letter dated April 4, 2019.

Remediation Pre-Characterization and Off-Site Assessment

As part of the Brownfield Cleanup Grant work and as documented herein, additional characterization data was completed to aid in soils management planning for soils to be left in place and to obtain soil/materials disposal quotations from bidders.

In addition, and funded separate by the Town of Walpole, assessment was conducted on near-surface soils on the adjoining Mascoma Bank property that had the potential to be impacted by metals and PFAS releases from the Site and that will factor into remedial planning for the cleanup of Site releases. This work is also summarized herein, and the associated report is in included as an appendix.

The findings of the remediation pre-characterization were as follows:

1. PFAS (specifically the compound perfluorooctane sulfonate (PFOS)) was detected in a sample of the 5-inch thick concrete slab, collected from the recessed floor of the former wastewater pretreatment area of the Wastewater Pre-Treatment Building. The detected concentration of PFOS (0.0164 milligrams per kilogram (mg/kg)) was a factor of 6x less than the NH DES Environmental Health Program (EHP) Direct Contact Risk-Based (DCRB) residential standard for soil (0.1 mg/kg). No NH DES Env-Or 600 SRS has been established for PFAS compounds. No RCRA metals were detected above SRS in the concrete sample, and metals detections were below published NH DES Risk Characterization and Management Policy background levels for New Hampshire soils.

2. PFAS (specifically PFOS) was detected in a composite sample of the residual solids collected from the three sumps in the Wastewater Pre-Treatment Building. The detected concentration of PFOS (1.52 mg/kg) was a factor of 2.5x above the NH DES EHP DCRB maintenance worker standard (0.6 mg/kg). No SRS has been established for PFAS compounds.

3. PFAS (specifically PFOS) was detected in the soil sample collected from 0.5 to 1.5 foot bgs at the location of the chromium soil contaminant maxima in the area of the former chrome plating line at concentrations above the laboratory reporting limit. The detected concentration of PFOS (0.00384 mg/kg) was below the DCRB residential standard for PFOS in soil (0.1 mg/kg).

4. PFAS (specifically PFOS) was detected in 5 of 18 soil samples collected from 9 borings advanced in a 10-foot grid pattern centered on the former Teflon tank location at concentrations above the laboratory reporting limits in samples collected from 0 to 1 foot bgs and 1 to 2 feet bgs. The detected concentrations ranged from 0.00103 to 0.0587 mg/kg, all below the DCRB residential standard for PFOS in soil (0.1 mg/kg). Data suggest the source of the PFOS may have been the Former Industrial Building exhaust vent reportedly located off the north end of that building.

The findings of adjoining Mascoma Bank property soils assessment (of a grassy area proximal to the Former Industrial Building that will become part of the planned Site parking lot):

1. PFAS (specifically PFOS) was detected in 7 of 8 soil samples at concentrations above the laboratory reporting limits in samples collected from 0 to 1 foot bgs and 1 to 2 feet bgs for four hand boring locations along the long axis of the grass strip that bounded the Former Industrial Building. The detected concentrations ranged from 0.00138 to 0.00469 mg/kg, all below the DCRB residential standard for PFOS in soil (0.1 mg/kg).

2. Grab samples from each boring were also screened for metals using an x-ray fluorescence (XRF). Elevated XRF readings for chromium (up to 6,463 parts per million (ppm), equivalent to mg/kg) were noted proximal to/east of the former chrome plating area. The concentration of chromium in the sample closest to the former plating line is inferred to exceed the NH DES Env-Or 600 SRS for trivalent chromium and may exceed the hexavalent chromium standard.

Given the above pre-characterization information, the ABCA/RAP was re-evaluated, especially considering evolving disposal requirements for PFAS-impacted media. The conclusions for remediation are consistent with the past evaluation already approved by the NH DES with minor, but important adjustments. The recommended ABCA/RPA is as follows:

2020 ABCA/RAP

Three alternatives were considered to remediate soils at the Site contaminated by plating processes, and to remediate groundwater at the Site, including: “Monitored Natural Attenuation” (Alternative 1); “Excavate and Dispose of Soils with SRS Exceedances” (Alternative 2); and “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” (Alternative 3). These alternatives were evaluated using the following criteria: Overall Protection of Human Health and the Environment; Technical Practicality; Ability to Implement; Reduction of Toxicity, Mobility, and Volume; Short Term Effectiveness; Resiliency to Climate Change Conditions; and Preliminary Cost.

These remedial alternatives are proposed with the understanding and consideration that the community’s preferred future use of the Site is as a parking lot in support of the Village.

The remedial alternatives evaluated include the removal of the Wastewater Pre-Treatment Building, including abatement of hazardous building materials and hazardous substances associated with inactive wastewater sumps within the building. Although not part of “remediation” under Alternative 1, removal of the building is necessary to construct the planned parking lot. Removal of the building is also necessary for remediation purposes for Alternatives 2 and 3, to access soils beneath the sumps, in addition to construction of the parking lot.

The “Monitored Natural Attenuation” alternative includes removal of near-surface (upper 1.5 feet) soils over a portion of the Site in order to construct the parking lot but did not include removal of soils inferred to be an ongoing source of groundwater impacts. Remaining soils would be managed under an Activity and Use Restriction (AUR). This alternative reduces risk of human exposure to contaminated soils through the removal of near-surface soils and through paving but requires long-term (50 years assumed) groundwater monitoring because Site contaminants are likely to attenuate over time through dilution only and, for the most part, do not degrade. The lack of “source” mass reduction, which leaves in place subsurface chromium, and almost all PFAS-impacted soils is a critical shortcoming of this alternative which was not selected.

The “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” alternative includes removal of the most contaminated soils including soils likely to leach contaminants into groundwater in the area of the former plating lines and from beneath the sumps. Near-surface PFAS-impacted soils outside of the remediation excavation areas would then be used as deep (but above the water table) backfill, reducing human exposure risk. Remaining soils would be managed under an AUR. This approach provides the benefits of source mass and reduced cost due to reduced soil disposal volume. Significant uncertainty is inherent in this approach because no reliable leaching-based standard and no definitive correlation between the lower limit of acceptable leaching potential and XRF field measurements and SPLP laboratory results was supported by the data. Therefore, the uncertainty in the successful implementation of this alternative, i.e. whether the leachable source was truly being removed during remedial excavations, was a shortcoming of this alternative, which was not selected, and insufficient source removal would lead to a longer period of groundwater monitoring.

The “Excavate and Dispose of Soils with SRS Exceedances” alternative includes the removal of all accessible soils with regulated contaminants present at concentrations above the SRS which is both protective of human health and most proactive in terms of source reduction to promote attainment of AGQS. It has the added benefit of removing two documented/probable PFAS source areas and possible residual nickel and cadmium source areas by removing the broader chromium impacts in the plating line area and in soils beneath the sumps. Near-surface PFAS-impacted soils outside of the remediation excavation areas and meeting the NH DES EHP DCRB residential standard would then be used as deep (but above the water table) backfill, further reducing human exposure risk. No AUR is anticipated as an outcome of this approach. This alternative is proven to protect human health and the environment; is effective, technically feasible, and practical; and, although is the most expensive option considered, it is also the most cost-effective.

CONCLUSIONS AND RECOMMENDATIONS

Environmental investigations conducted at the Site identified contamination associated with historic Site operations, including the presence of hazardous building materials, hazardous substances within the building (sumps contents), and metals- (notably hexavalent and trivalent chromium) and PFAS-contaminated soil, and/or groundwater (chromium, nickel, cadmium, and PFAS). To address the impacted media on-site, three remediation alternatives were evaluated, including a “Monitored Natural Attenuation” alternative, an “Excavate and Dispose of Soils with SRS Exceedances” alternative, and a “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” alternative. These alternatives also included additional remedial work including the full removal and abatement of hazardous building materials and demolition of the building as well as soils excavation to prepare for a proposed parking lot.

The “Monitored Natural Attenuation” alternative was determined to be unacceptable because it did not meet threshold criteria of the overall protection of human health and the environment. Alternative 3, “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place”, suffered from the lack of supporting technical documentation to arrive at an appropriate leaching based standard to be protective of future groundwater impacts and also would allow all PFAS impacted soils to remain on Site.

Alternative 2 – “Excavate and Dispose of Soils with SRS Exceedances” was selected as it protects human health and the environment and is effective, technically feasible, practical, and provides a construction site ready for redevelopment as a proposed parking lot in support of the Walpole Village needs. It should be noted that regional soil disposal facilities have a heightening awareness of the possible increased costs of accepting PFAS contaminated soils. These increased costs are associated with the expense of treating landfill leachate to meet possible future landfill leachate discharge limits. As such, some facilities have decided not to accept additional soils with known PFAS contamination. Therefore, the cost estimates provided in this report may increase (or decrease) due to the volatility of this market; the extent of that possible change in cost is presently unknown. Management options for PFAS-contaminated soils and their costs should come into better focus as experience and regulations associated with this emerging suite of contaminants evolve.

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1.0 INTRODUCTION

Ransom Consulting, LLC (Ransom) is pleased to present the findings of a Remediation Pre-Characterization and Analysis of Brownfields Alternatives (ABCA)/Remedial Action Plan (RAP) for the Central Plating Site located at 12 Westminster Street in the Town of Walpole, Cheshire County, New Hampshire (Site). This report was prepared for the Town of Walpole, who received a United States Environmental Protection Agency (U.S. EPA) Brownfields Cleanup Grant (BF 00A00288) to remediate the Central Plating Site. The Site is part of a planned brownfields redevelopment project that will incorporate two lots, which are currently the location an abandoned industrial lot and a remaining Central Plating building, into a larger parking lot with planned pocket park and electric vehicle (EV) charging stations. Please note that also summarized herein and attached are the results of assessment services conducted for the Town of Walpole and funded outside of the U.S. EPA Brownfields clean-up grant program, of near-surface soils for the grass parking lot buffer, owned by the Mascoma Bank, that directly abuts the Central Plating Site and that will also be part of the redevelopment project.

The two land-locked adjoining parcels that comprise the Site, designated Lots 65 and 66 on the Town of Walpole Tax Map 20, are located within the center of Walpole Village, and comprise approximately 0.089 and 0.190 acres of land, respectively. Lot 65 is improved with a garage-style, single-story building identified herein as the Wastewater Pre-Treatment Building. Prior to 2012, a single-story, light industrial building, herein identified as the Former Industrial Building, was formerly located on Lot 66. The currently vacant Site was most recently occupied by Central Plating, Inc. which conducted electroplating of metal parts from 1963 until circa 2006. The Site is a listed Hazardous Waste Site Project with the New Hampshire Department of Environmental Services (NH DES) and is identified as Site number 199806071 and Project number 0032266 in NH DES records. As part of previous assessment work, summarized herein, elevated concentration of metals (most notably chromium) were documented in soils beneath two source areas: (1) the former plating line area; and (2) the area of wastewater treatment sumps, which are the subject of proposed remediation to mitigate a source or known groundwater impacts (including chromium, cadmium, nickel, and per- and polyfluoroalkyl substances (PFAS)), and to eliminate a potential human exposure risk related to impacted near-surface soils.

The pre-characterization work was completed in accordance with Ransom's Site-Specific Quality Assurance Project Plan (SSQAPP) for the Central Plating Site, fully executed June 15, 2020. The SSQAPP was reviewed and approved by the NH DES and the U.S. EPA prior to implementation of the field activities.

1.1 Purpose

The objective of the Remediation Pre-Characterization is to: (1) pre-characterize soil, concrete, and wastewater treatment sump residuals for contaminants of concerns (COCs) that will support disposal planning and budgeting, and contractor bids during the bid solicitation process; and (2) pre-characterize the known PFAS-impacted former Teflon aboveground storage tank (AST) area to refine limits of a possible Activity and Use Restriction (AUR) area and to support on-site soils management plans in known release area(s) as part of the finalized ABCA/RAP and for contractor specifications.

The purpose of the updated ABCA/RAP presented herein is to incorporate evolving considerations relative to PFAS and the management of PFAS-impacted substances into the ABCA/RAP, previously approved by the NH DES, the purpose of which is to protect human health and the environment from impacts associated with known or suspected releases of hazardous substances from the Central Plating, Inc. operations, which when implemented will aid in the redevelopment/and productive reuse of the Site property.

1.2 Special Terms and Conditions

This Remediation Pre-Characterization and ABCA/RAP was conducted in accordance with Ransom's December 18, 2019 Master Services Agreement (the Agreement) with the Town of Walpole.

The services and the contents of any project reports and associated documents prepared by Ransom under the Agreement are for the Town of Walpole, their affiliates and subsidiaries, and their successors and assigns. Reliance or use by any such third party without explicit authorization in the report does not make said third party a third-party beneficiary to Ransom's contract with Walpole. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

1.3 Limitations and Exceptions of Assessment

The Remediation Pre-Characterization was executed in general accordance with the scope of work proposed in the SSQAPP.

1.4 Site Description and Setting

The 0.89 acre Site consists of two land-locked adjoining parcels within the center of Walpole Village and is located at 12 Westminster Street in the Town of Walpole, Cheshire County, New Hampshire. Access to the site is obtained via a right-of-way from Westminster Street. Lot 65 is improved with the 1,008 square foot, single-story Wastewater Pre-Treatment Building. The single-story, slab-on-grade, masonry Former Industrial Building previously was located on Lot 66 and demolished in 2012. Lot 66 in presently an unpaved sparsely vegetated area to which access is partially controlled by a temporary fence. Asphalt-paved surfaces cover about 50 percent of the Site area.

Land use in Walpole Village is primarily residential and commercial; properties adjoining the Site include a residential apartment building to the west, residences to the north and northeast, parking lots and commercial/residential properties to the east, and a restaurant to the south. Current or past land uses of potential environmental concern have been identified in locations that have the potential to impact the property including the former Tole's Sunoco (a listed NH DES Leaking Underground Storage Tank (LUST) Site and gasoline service station), a former fire department station (eastern adjoiner to Lot 65, currently a commercial/residential property), and a former bulk fuel distributor (eastern adjoiner to Lot 66, currently a parking lot owned by Mascoma Bank and leased by the Town).

The topography of the Site is relatively flat; regional topography slopes down to the west and northwest from a topographic high to the east. On a more localized scale, topography north of the Site slopes towards a northwest-flowing drainage. The closest surface water body to the Site is Mad Brook located 500 feet to the north-northwest and the Connecticut River is located 1,750 feet to the west. Refer to the attached Site Location Map (Figure 1) to view the general location of the Site on a 7.5-minute topographic quadrangle. Figure 2 shows the Site and nearby properties discussed in this report.

Based on water use assessment inquiries made by Ransom with the Town of Walpole Assessor's Office, and through queries at the NH DES OneStop, the Site neighborhood is serviced by municipal water and no private or public potable water supplies wells were identified within 1,000 feet of the Site. The sources for the municipal water supply are bedrock and gravel-packed overburden wells, located more than 1,000 feet from the property. As shown on the NH DES OneStop Web Geographic Information System, the site is not located in a Wellhead Protection Area, but the entire region located east of the Connecticut River is located within a Drinking Water Source Protection Area, presumably because the "Cheshire County Nursing Home / Maplewood" located 7 miles downriver of the Site in the Town of Westmoreland relies in part on a Connecticut River source for potable water. Mapped water supply wells shown on the GIS Map generated by the OneStop are located greater than 1,000 feet from the Site. Based on this information, no potable water potential receptors were identified within 1,000 feet of the Site. It is Ransom's understanding that a NH DES August 2017 review of potential consumptive-use water supply well users within 2,000 feet of the subject property identified one commercial parcel located about 1,600 feet west-southwest of the property near the Connecticut River that is not serviced by municipal water and may rely on an on-site water supply well. In addition, as a result of public outreach associated with this project, a dug well located in the basement of a residence was identified that is used for garden irrigation at 69 Main Street (Map 20, Lot 51).

As of 2013, the year of Sanborn Head and Associates (SHA) Phase I and II ESAs, the Site was most recently occupied by Central Plating. As documented in the Phase I ESA, Central Plating conducted electroplating of metal parts at the Site from 1963 until circa 2006. Major process operations included: anodizing of aluminum parts (using nitric and sulfuric acids); chrome electroplating (generally of stainless steel parts); nickel electroplating; chromate electropolishing; black oxide finishing; passivation (using nitrate with dichromate); and a lacquer dip tank used to coat racks used in nickel plating. Supporting/ancillary activities also included solvent degreasing operations, on-site industrial wastewater treatment, and combustion of fuel oil for process and space heating. The industrial building formerly located on the northern portion of the Site (Lot 66) housed the production operations of Central Plating. The structure remaining on the south portion of the Site (Lot 65) housed the wastewater pretreatment of process-derived wastewaters from the electroplating operations; with the pretreated wastewater directed to the municipal sewer for which effluent is conveyed by the Town of Walpole to a wastewater treatment facility located in Rockingham, Vermont. According to a SHA Phase I ESA, wastewater from the operation of Central Plating was directed to the municipal sewer system since the start of operations circa 1963; originally the wastewater was untreated prior to entering the municipal system, which historically was piped directly to the Connecticut River. Reportedly, pretreatment of process-derived wastewater began circa 1982, with subsequent upgrades in the 1990s, to comply with more stringent state and/or federal regulations. The Town of Walpole marked the Site sewer line as wrapping around the north side of the Wastewater Pre-Treatment Building and then south to Westminster Street along the west side of that building; however, an old process schematic shows the sewer line routed to the east of the Wastewater Pre-Treatment Building.

Previous investigations have been completed for the Site and are summarized in Section 1.6.

A property boundary survey was not completed as part of this investigation. The property boundaries shown on the attached figures are approximate based on Town of Walpole tax maps, as well as Site plans for adjoining properties.

Refer to the attached Site Plan (Figure 3) for a layout of the Site and the locations of key Site features.

1.5 Potential Future Site Use

Current re-use plans for the property incorporate the Site parcels into a larger multi-lot plan to redevelop an underutilized commercial hub within the village of Walpole at the corner of Westminster and Main Streets. The Site parcels will augment the current limited parking in support of street-front redevelopment initiatives and business expansion that will expand upon and reinvigorate the village character of this classic New England town. Parking will consist of asphalt paving over an appropriate base. The concept plan includes EV charging stations and a pocket park.

1.6 Previous Environmental Investigations and Selected Correspondence

The aforementioned Phase I ESA was conducted by SHA in 2013 to evaluate the Site for evidence of recognized environmental conditions (RECs) using the procedures set forth in the requirements of ASTM International Standard Practice E 1527-05. Based on the findings of the Phase I ESA, SHA completed a Phase II ESA at the Site to investigate the previously identified RECs. SHA was contracted for this work by a prospective buyer who was considering the Site for redevelopment, primarily for commercial use. The SHA Phase II ESA was followed by additional investigations through the Southwest Region Planning Commission (SWRPC) U.S. EPA Brownfields Assessment Grant. At the time of SHA's ESA work, the Site was owned by Nils A. M. Westberg. [Since that time, Mr. Westberg has passed away and the property was inherited by Ms. Marianne Westberg. The property was acquired by the Town of Walpole on January 2, 2019.]

The following provides a summary of some of the key findings presented in these reports as well as NH DES responses.

Phase I Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire; Sanborn, Head and Associates, Inc., dated December 2013

SHA's 2013 Phase I ESA was conducted after the industrial building was demolished; however, a previous Phase I ESA was conducted by Stantec in 2006, after the operations of Central Plating had ceased, but prior to the demolition of the industrial building, and is summarized in the SHA report. At the time of Stantec's site reconnaissance, some of the equipment related to the operations of Central Plating remained within the industrial building and some had been sold and removed for reuse by an electroplating company in Vermont. Stantec interviewed persons familiar with the operations of Central Plating and also personnel from the company which purchased the Central Plating equipment. According to these interviews, waste derived from Site operations was directed to a floor drain within the industrial building which was, at that time, directed to the Wastewater Pre-treatment Building currently located on the Site. Personnel from the company purchasing the equipment reportedly were told by an operator of the Central Plating pretreatment wastewater system, that when valves were open in a certain way, untreated process-derived wastewater would be released into soils beneath the treatment building. Additional observations by Stantec in 2006 pertinent to RECs included extensive staining of the floors and walls within the industrial building due to apparent spills and releases related to the operations of Central Plating; and an area of extensively stained soils off the northern end of the industrial building, apparently originating from a vent on the northern wall of the industrial building. At the time of Stantec's 2006 ESA report, an underground storage tank (UST) was located off the southern end of the industrial building, in close proximity to the boiler room. This UST was reportedly utilized for the storage of heating oil and was installed on the Site in 1963. Stantec recommended the removal of this UST. According to SHA's 2013 ESA report, the UST had been removed from the Site and no release was reportedly observed. No formal UST closure documentation was prepared at the time of removal because closure documentation was not a requirement of the NH DES for the size of that UST, which was reportedly a 500 to 600-gallon tank. Site observations and recommendations pertaining to the industrial building and detailed in Stantec's 2006 report were incorporated into the findings of SHA's 2013 Phase I ESA report for the Site.

It was SHA's opinion that the Site exhibited the potential for RECs, primarily related to past uses of the property as an electroplating facility with hazardous chemicals regularly stored and treated at the Site. SHA's review of environmental records indicated that multiple inspections by the NH DES, U.S. EPA, and/or Occupational Safety and Health Administration (OSHA) in the late 1990s and the 2000s found sub-standard operating procedures, improper handling and storage of hazardous wastes, and/or conditions that generally posed a threat to human health and the environment. SHA concluded that releases of hazardous substances from past site operations to soil and groundwater could not be ruled out.

SHA also noted the presence of a LUST site, the former Toles Sunoco Station (still an active gasoline retailer), approximately 200 feet east-southeast from the Site and in an upgradient position relative to the Site. Given the upgradient location, adverse impacts to the Site from this neighboring LUST site were inferred to be possible.

Given the conclusions of the Phase I ESA, SHA recommended the completion of a Phase II ESA to further assess the potential impacts to Site soils and/or groundwater from former Site uses and/or neighboring properties of concern.

Phase II Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire; Sanborn, Head and Associates, Inc., dated December 2013

In October 2013 SHA completed the field work associated with the Phase II ESA at the Site; including the advancement of six soil borings utilizing push-probe methodology (Geoprobe®); identified as GP-1, GP-2, and SH-1 through SH-4 (Figure 3). The borings were advanced to depths of approximately 15 to 25 feet below ground surface (bgs). Four of the borings, SH-1 through SH-4, were completed as groundwater monitoring wells. During the boring activities soil samples were field screened for the presence of photoionizable compounds (PICs), with select soil samples submitted for laboratory analysis. Based on field screening and observation, soil samples were analyzed for the presence of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), select metals, polychlorinated biphenyls (PCBs, for soil samples collected from GP-1, SH-1, and SH-3 only), and total cyanide (for a soil sample from SH-2 only). Groundwater samples were collected at a later date from the newly installed monitoring wells and submitted for laboratory analysis for the presence of VOCs, dissolved select metals, and total cyanide.

Laboratory analysis of soil samples documented elevated concentrations (as compared to typical "background" values) of certain metals, most notably chromium and copper, in the samples collected from borings GP-1 and SH-2. Detectable concentrations of VOCs (GP-1 and SH-1), PAHs (GP-1), and TPH (GP-1 and GP-2) were also present in these samples. Concentrations of target analytes were below applicable New Hampshire Code of Administrative Rules Chapter Env-Or 600 Soil Remedial Standard (SRS), with one exception: the reported concentration of total chromium in the sample collected from boring GP-1 (2,400 milligrams per kilogram (mg/kg)), located in the vicinity of the former chrome plating line, exceeded the SRS for trivalent chromium (1,000 mg/kg), as well as hexavalent chromium (130 mg/kg). Subsequent analyses of the soil sample from GP-1 documented hexavalent chromium at a concentration of 40.4 mg/kg. Although the concentration was below the applicable SRS for hexavalent chromium, it was SHA's opinion that the levels of both trivalent and hexavalent chromium may pose a health risk in a direct exposure scenario.

NH DES Ambient Groundwater Quality Standards (AGQSs) were exceeded for groundwater samples collected from monitoring wells:

1. SH-1 (benzene, naphthalene, 1,2,4-trimethylbenzene, methyl-t-butyl ether (MTBE), and arsenic); and

2. SH-2 (benzene, 1,2-dicholoroethane (DCA), MTBE, tertiary butyl alcohol (TBA), and nickel). VOCs were not generally detected in groundwater samples collected from monitoring locations SH-3 and SH-4 (low level-acetone was detected in the SH-4 sample).

Total cyanide was not detected in samples collected from any of the monitoring locations.

Based on the measured depth to groundwater across the Site, which ranged from 12 to 20 feet below grade, groundwater was inferred to flow to the west towards the Connecticut River. The relatively steep downward gradient from east to west appears to correlate to the depth of clays and silts which likely act as a confining layer. The groundwater flow direction mapped by SHA does not coincide precisely with the north-northwesterly flow interpreted by others for the neighboring Toles Sunoco LUST site located approximately 200 feet east-southeast of the Site.

As summarized in the conclusions and recommendations portion of SHA's Phase II ESA report, soil and groundwater analytical results document the presence of metals and petroleum-impacted environmental media on-site.

The presence of trivalent chromium in soil at a concentration exceeding its SRS at boring location GP-1 suggest that process materials may have been released to the environment as a result of the former site operations. Similarly, concentrations of nickel in groundwater exceeding the applicable AGQS and chromium concentrations above typical background values, but below AGQSs in samples collected from monitoring well location SH-2 suggest that process liquids may have been released to the subsurface in this area via a sump and/or associated subsurface piping.

SHA noted that the elevated concentration of arsenic in groundwater at SH-1 may be related to the geochemical effects of the petroleum/VOC-impacted groundwater in this area, which was inferred to be, at least in part, from an off-site up-hydraulic gradient source (the aforementioned gasoline station).

SHA recommended that their client inform the property owner of the NH DES SRS and AGQS exceedances; in accordance with the New Hampshire Code of Administrative Rules for Contaminated Site Management Chapter Env-Or 600. Mr. Westberg, the owner of the Site, provided the NH DES with copies of the Phase I ESA and Phase II ESA reports.

NH DES Response to Phase II ESA Findings, Dated March 28, 2014

In a letter dated March 28, 2014, the NH DES responded to Mr. Westberg regarding the department's review of the SHA reports. The NH DES correspondence summarized the findings of the Phase I ESA and Phase II ESA reports and provided comments related to the SRS exceedances detected in soil; the AGQS exceedances detected in groundwater; and the potential for off-site groundwater impacts.

Relative to the presence of chromium in soil above SRS, NH DES noted that the proximity to the chrome plating line, coupled with documented findings of past regulatory inspections, indicates that regulated contaminants were released to the environment and that the release(s) were likely associated with past electroplating operations. The NH DES concluded that, in accordance with Env-Or 600, remedial measures are required to mitigate the presence of chromium in soil at concentrations exceeding SRS. Because the lateral and vertical extent of the soil contamination in the vicinity of boring GP-1 has not been fully characterized, additional subsurface explorations are necessary to develop an accurate remedial approach.

The NH DES stated that the notification of groundwater quality violation presented in the Phase II ESA satisfies the reporting requirements of Env-Or 604.02, Notification of Groundwater Quality Violation; in accordance with Env-Or 600, continued groundwater monitoring under a GMP will be required to address the presence of Site related contaminants (primarily 1,2-dichloroethane and nickel) at concentrations exceeding their respective AGQS.

The NH DES concluded that the concentrations of nickel and 1,2-DCA above AGQSs at monitoring well SH-2 coupled with the inferred direction of groundwater flow, indicated the limits of the groundwater contaminant plume have not been established; therefore, an appropriate groundwater management zone cannot be established in support of a GMP. The NH DES stated that additional groundwater monitoring wells are necessary to define the extent of the groundwater contamination, and that some of these wells may need to be located on abutting properties to the west of SH-2. The NH DES went on to state that the source of arsenic in monitoring well SH-1 is not apparent; and acknowledged the conclusion presented by SHA that the level of arsenic may be attributable to mobilization of naturally occurring arsenic in soils associated with petroleum/VOC impacted groundwater, and not related to former Site activity. The NH DES stated that a review and evaluation of current and additional data is needed to evaluate this concept.

Related to the possibility of off-site impacts to Site groundwater quality, the NH DES concurred with SHA's conclusion that the presence of the petroleum-related VOCs exceeding AGQSs in Site groundwater (benzene, naphthalene, 1,2,4-trimethylbenzene, MTBE, and TBA) may be attributable, in part, to the gasoline station located approximately 200 feet from the Site. The NH DES also concurred that the Phase II ESA soil quality data did not suggest the presence of an on-Site petroleum source and the information contained within the NH DES file for the former Walpole Sunoco (NH DES LUST Site #199402012) documents the presence of similar petroleum-related VOCs in groundwater at an apparent hydraulically upgradient location from the Site.

The NH DES noted that additional information was necessary to further characterize the areas of documented releases prior to Site redevelopment and prior to the approval of a remedial action plan and GMP by the NH DES for the Site:

1. Conduct additional subsurface investigation in the vicinity of soil boring GP-1 to fully define the extent of chromium contamination in soil above the SRS;

2. Install additional monitoring wells to support the establishment of a groundwater management zone;

3. Collect an additional round of groundwater samples from the entire monitoring well network for analyses for volatile organic compounds, select metals (arsenic, chromium (total and hexavalent), copper, lead, nickel, and zinc), and total cyanide; and

4. Perform a water use assessment for the immediate Site vicinity to confirm the absence of active residential water supply wells.

The NH DES requested that the Site owner submit the above-mentioned scope of work for additional investigation; however, the owner did not undertake additional subsurface investigations as requested by the NH DES.

Phase II Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire, Ransom Consulting, Inc., dated January 19, 2016

Through the SWRPC U.S. EPA Brownfields Assessment Program, Ransom conducted a Phase II ESA. The specific objectives of the Phase II ESA were to further evaluate and investigate the subsurface contaminants detected in Site soils and/or groundwater during the previous investigations conducted by SHA; and to further investigate the RECs and/or conditions of environmental concern identified in the SHA Phase I ESA.

The work also conformed with the on-Site characterization requirements stipulated by the NH DES in correspondence dated March 28, 2014 but did not fulfill off-Site characterization requirements for properties located downgradient of Lots 65 and 66.

Based on Stantec's and SHA's investigations and findings, RECs identified to be further evaluated by Ransom included the following:

1. Reported and documented releases of wastes associated with the former plating facility operations in the Former Industrial Building to Site soils and possibly to Site groundwater;

2. Reported and documented releases of wastes from the vicinity of the Wastewater Pre-Treatment Building to Site groundwater;

3. Possible releases of petroleum to Site groundwater from a potential former on-Site source (No. 2 fuel oil UST); and

4. Documented releases of petroleum, possibly from an upgradient source.

Although not strictly a REC, Ransom also recommended characterization of hazardous building materials and wastes within the existing Site building sump. To evaluate the RECs, eight areas of concern (AOC, shown on Figure 3) were identified on the Site and included the following:

AOC 1—Chromium Impacted Soil (above SRS);

AOC 2—Former Industrial Building, Floor Drains;

AOC 3—Stained Soils, Off Northern End of Former Industrial Building;

AOC 4—Former Industrial Building, Spray Paint Area;

AOC 5—Former Heating Oil Underground Storage Tank;

AOC 6—Downgradient of Former Industrial Building and Wastewater Pre-Treatment Building;

AOC 7—Upgradient Portion of Site (downgradient of neighboring LUST property); and

AOC 8—Hazardous Building Materials.

Ransom's Phase II ESA included the advancement of soils borings, the collection and analyses of soil samples for field screening for the presence of metals using a x-ray fluorescence (XRF) analyzer and PICs using a photoionization detector (PID), the selection and laboratory analyses of soil samples for the presence of selected metals, PAHs, total cyanide, VOCs and/or TPH-diesel range organics (DRO), the installation of five additional monitoring wells and the collection and laboratory analyses of groundwater samples for the presence of dissolved metals, total cyanide, and VOCs according to U.S. EPA methods.

As documented in Ransom's Phase II ESA, depth to groundwater ranged from 13.07 to 22.56 feet below grade, which probably reflects a seasonally lower water table. The depth to groundwater is deepest along the western edge of the property and shallowest along the eastern slope of the property and groundwater was inferred to flow to the west, towards the Connecticut River. The hydraulic gradient for the September 1, 2015 monitoring date was a steep 0.28 feet/foot. The relatively steep downward gradient from east to west appears to correlate fairly well with the depth of clays and silts which likely act as an aquitard to groundwater. Groundwater elevation data for the nearby and upgradient LUST site suggest there is a more northerly component to groundwater flow in the area which is consistent with local surface water drainage towards Mad Brook to the north. However, as noted above, for Site groundwater the westerly flow direction is supported by subsurface groundwater elevations and the apparent dip down to the west of the underlying silt and clay layer. Bedrock was not encountered to a depth of 30 feet below grade (depth of the deepest site boring).

The following results were identified in Ransom Phase II ESA completed at the site:

AOC 1—Chromium Impacted Soil (above SRS)

Both trivalent and hexavalent chromium contaminated soils were documented in the area of the Former Industrial Building chromium plating line at concentrations exceeding SRS. Contaminant concentrations of chromium were generally highest near the ground surface and are a human exposure risk through direct contact, including dust inhalation (if disturbed), dermal contact and ingestion. The soil contamination in excess of SRS was observed to extend to 13 feet below grade, slightly penetrating into a clay and silt unit and into the groundwater table. The chromium release in this area was documented to have impacted the groundwater quality based on elevated concentrations of dissolved chromium detected in groundwater samples collected from about 30 feet west (down gradient with respect to groundwater flow) of the inferred release area. The volume of impacted soils above SRS was estimated at 250 tons although the report noted that additional sampling locations would be necessary to confirm this.

AOC 2—Former Industrial Building, Floor Drains

Other than arsenic which slightly exceeded its SRS, no other metals were detected at concentrations above the SRS, and no total cyanide or VOCs were detected for soil samples from borings advanced near the floor drains in the former plating area and the former anodizing area of the Former Industrial Building.

Analyses of groundwater samples collected from monitoring well MW102 located downgradient of the former plating line area documented dissolved chromium and nickel at concentrations exceeding their AGQSs by a factor of 57 and 11, respectively, cadmium exceeding its AGQS by a factor of 4, and arsenic slightly exceeding its AGQS. The presence of metals in the groundwater downgradient of the plating lines appears to be associated with the documented mass of chromium impacted soils, and a possible inferred mass of nickel impacted soils likely in the area of the former nickel plating line, which, based on a 1990 facility process diagram was located approximately 10 feet west of the chrome plating line.

The downgradient extent of groundwater with metals impacts exceeding AGQSs was not able to be determined and the findings concluded that it may extend off-Site to the west.

AOC 3—Stained Soils, Off Northern End of Former Industrial Building

Evidence of coal combustion wastes were noted in near-surface soils in shallow borings advanced in this AOC with areas of dark soils and may account for a portion of the staining observed by SHA in an area off of the northern end of the Former Industrial Building where a stained exhaust vent was noted in previous Phase I ESAs. Contaminants detected in these shallow soils at concentrations above SRS were arsenic and PAHs, both of which are likely associated with the observed coal slag and cinders. In addition, trichloroethene (TCE) was detected, but at a concentration below its SRS.

No AGQS violations for VOCs, total cyanide and dissolved metals were documented in the groundwater sample collected from monitoring well SH-3, located down and slightly cross-gradient of the area of dark soils.

AOC 4—Former Industrial Building, Spray Paint Area

Although field screening data for B107 suggested that arsenic and lead might be present at concentrations exceeding SRS in shallow soils from beneath the former spray paint area, no VOCs, total cyanide or metals were detected above SRS in the shallow soil sample submitted for laboratory analyses.

In addition, no AGQS violations for VOCs, total cyanide, or metals were documented in the groundwater sample collected from monitoring well MW103, located downgradient of this area.

AOC 5—Former Heating Oil Underground Storage Tank

No PAHs or TPH-DRO were detected in soil samples collected from this AOC at concentrations exceeding SRS, and no VOCs were detected in the soil sample collected from 10 to 12.5 feet below grade in this area.

In addition, no VOCs were detected in groundwater samples collected from monitoring wells MW102 and SH-2, located down and slightly cross-gradient of this area, that would indicate evidence of a significant release of fuel oil.

AOC 6—Downgradient of Former Industrial Building and Wastewater Pre-Treatment Building

Other than arsenic detected at a concentration slightly exceeding its SRS in a sample collected from 20 to 22.5 feet below grade, no metals were detected in soil samples collected from borings advanced adjacent to and west (downgradient) of the Wastewater Pre-Treatment Building and the Former Industrial

Building. No VOCs and no total cyanide were detected above laboratory detection limits for samples from the three borings.

Dissolved contaminants indicative of releases of metals waste were detected in groundwater downgradient of the Wastewater Pre-Treatment Building and the Former Industrial Building. Nickel and cadmium were detected at concentrations slightly exceeding their respective AGQS in the vicinity of the sumps and associated wastewater piping for the Wastewater Pre-Treatment Building and suggest a modest ongoing source to groundwater in that area. Higher concentration dissolved contaminants indicative of releases of metals wastes (namely chromium and nickel, and to a lesser extent cadmium and arsenic) were detected in groundwater downgradient of the Former Industrial Building plating lines and appear to be associated with areas of known (chromium) or suspected (nickel) contaminated soils.

MTBE and other gasoline constituents were detected in groundwater samples from multiple locations downgradient of the Site building and former building, including MTBE above its AGQS at one location. The source of these impacts was inferred to be located off-site to the east as noted in AOC 7, below.
No cyanide was detected at concentrations above its AGQS for the groundwater samples collected to address AOC 6.

AOC 7—Upgradient Portion of Site (downgradient of neighboring LUST property)

Elevated field readings for PICs (up to 1,610 parts per million by volume (ppmv)) were measured for soil samples collected from depths within the upper portion of the seasonal groundwater table for borings advanced on the eastern and southern (upgradient) portions of the property (borings B101 and B111). Naphthalene was detected at a concentration above its SRS in effect at that time in a soil sample from boring B101 collected from the depth interval with the highest concentration field screening readings, and at lesser concentrations (below SRS) for the soil sample from B111. Note that the detected naphthalene concentration in all samples was well below the current SRS for that compound. The suite of petroleum-related contaminants was similar for each of the two soil samples that were analyzed, the report notes that this likely indicates the same source for each sample.

Benzene, MTBE, naphthalene, and 1,2,4-trimethylbenzene were detected in groundwater samples collected from upgradient monitoring wells MW101 and SH-1 and were inferred to indicate an upgradient gasoline source for these contaminants.

AOC 8—Hazardous Building Materials

Hazardous building materials were identified in the Hazardous Material Inventory (HMI) report for the Wastewater Pre-Treatment Building and include small quantities of asbestos-containing window glazing or presumed asbestos containing materials, presumed PCB-containing fluorescent light ballasts, mercury containing light bulbs, and one thermostat switch that may contain mercury. In addition, high concentrations of metals and cyanide were detected in waste solids in the wastewater pre-treatment sumps; these wastes were inferred to be likely hazardous wastes and the report stated that the sumps will need to be properly decommissioned and their wastes property disposed of.

The status of RECs identified above are listed below, based on the findings for the noted AOCs:

1. Reported and documented releases of wastes associated with the former plating facility operations from the Former Industrial Building to Site soils and possibly to Site groundwater. This REC was confirmed and partially quantified for releases of

chromium, nickel and other metals near the plating lines areas located in the Former Industrial Building. However, this REC can be generally dismissed for the spray paint area, the anodizing line area, and former storage areas of the Former Industrial Building and for the area of reportedly stained soils off the north end of that building.

2. Reported and documented releases of wastes from the vicinity of the Wastewater Pre-Treatment Building to Site groundwater. This REC was confirmed for the sumps and/or wastewater lines proximal to the northwest corner of the Wastewater Pre-Treatment Building, albeit at concentrations that were slightly exceeding AGQSs. Because these AGQS violations have lingered since termination of operations in 2006, it is possible that a modest source of contaminants to groundwater is present in Site soils in that area.

3. Possible releases of petroleum to Site groundwater from a possible former onsite source (No. 2 fuel oil UST). This REC was dismissed as no impacts above regulatory standards for contaminants associated with fuel oil were documented in soils or groundwater.

4. Documented releases of petroleum possibly from an upgradient source. This REC was confirmed based on the observed range, nature, and spatial distribution of dissolved contaminants.

Based on the data collected during this investigation, additional investigation and remedial planning were recommended, as follows:

1. The prospective purchaser should complete a Phase I ESA to update site history, assess for known as well as possible additional RECs, and to meet the "all-appropriate inquiries standard" adopted by the U.S. EPA and as detailed in ASTM E1527-13. If this Phase I ESA identifies additional RECs, a Supplemental Phase II ESA may also be warranted.

2. The prospective purchaser should consider applying for eligibility for participation in the New Hampshire Brownfields Covenant Program (Program). From a practical and eligibility perspective, this Phase II ESA report should meet the Program requirements for a Site Investigation.

3. A remedial investigation scope of work should be prepared for NH DES approval and upon receiving approval, this investigation should be completed. Using that additional information, an ABCA/RAP should be prepared.

   The additional remedial investigations recommended included an assessment of the chromium-impacted soils area to determine the approximate volume of impacted soils that is likely to require disposal as a hazardous waste if excavated, and/or is likely to act as an ongoing source to groundwater impacts; as well as the approximate volume of soils that could require disposal as a non-hazardous waste, or perhaps be allowed to be left in place under an AUR if approved by the NH DES. The investigation would include delineation of inferred nickel-impacted soils in the former nickel plating area. Additionally, because the integrity of the wastewater piping between the Former Industrial Building and the Wastewater Pre-Treatment Building is unknown, the investigation should include the advancement of a boring and the installation of a monitoring well midway between the two building footprints and just downgradient of the subsurface piping to assess for impacts from potential wastewater piping leaks.

Finally, the additional investigation would include the installation of off-site wells to determine the limits of possible Groundwater Management Zone (GMZ).

NH DES Correspondence, dated November 22, 2016

On November 22, 2016, the NH DES corresponded with "Stakeholders" regarding requested analyses of an emerging contaminant commonly known as PFAS in response to having newly established AGQSs for perfluorooctonoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

Supplemental Phase II Environmental Site Assessment and Analysis of Brownfields Cleanup Alternatives/Remedial Action Plan, 12 Westminster Street, Walpole, New Hampshire, Ransom Consulting, Inc., dated April 25, 2018

Through the SWRPC U.S. EPA Brownfields Assessment Program, Ransom conducted the Supplemental Phase II ESA to collect further information to aid the eventual development of a RAP. Note that based on an initial reporting of PFAS in groundwater results of this work to the NH DES and to other stakeholders, two additional investigations were conducted: one contracted through the NH DES, one contracted through the Site owner. The additional investigation findings were also summarized in the Supplement Phase II ESA report. Selected summary tables of soil and groundwater results screening and laboratory results excerpted from this report are included as Appendix A-1. Note revisions to the SRS for naphthalene in soil (upwards to 28 mg/kg from 5 mg/kg) and the AGQS for PFAS which now include standards for four individual PFAS compounds (PFOA at 12 nanograms/L (ng/L), PFOS at 15 ng/L, perfluorohexanesulfonic acid (PFHxS) at 18 ng/L, and PFNA at 11 ng/L) have been made since that work was completed and are not reflected in these excerpted tables.

The following results are indicated for each AOC that was further assessed as part of this investigation:

AOC 1—Chromium Impacted Soil (above SRS)

The scope of the Supplemental Phase II ESA included investigations to: (1) better estimate the mass of chromium-impacted soils with contaminant concentrations above SRS; (2) identify a potential source mass of nickel (and cadmium) impacted soils in the area of the former nickel-plating line; and (3) assess groundwater for plating area impacts, including for PFAS.

Both trivalent and hexavalent chromium contaminated soils were documented in the area of the Former Industrial Building chromium plating line at concentrations exceeding SRS. Neither nickel nor cadmium were detected in soils at concentrations above their SRS for samples with the highest XRF field screening readings that were selectively submitted for analyses. No source mass was identified for these contaminants of concern in Site soils.

XRF field screening results provided a good indication of the vertical distribution of chromium in each soil sample from each boring. In addition, XRF field screening data correlated well to total chromium laboratory data ($Y = 0.64X$, with a goodness of fit (R^2) of 0.84). Based on the distribution of the elevated chromium, the plating line area at the ground surface in the southeast corner of the former building footprint appeared to be the primary source. Records on file at the NH DES (SHA Phase I ESA) document that liquids from the chrome plating line were allowed to overflow onto the floor and drained to a floor drain that reportedly was routed to the municipal sewer from 1963 through the early 1980s and later was routed from the floor drain to the Wastewater Pre-Treatment Building and, after treatment, to the municipal sewer. In addition to the chrome plating line area, chromium impacts were noted in shallow soils collected from boring B211 near the general area of a former chromium mist condensate shed that housed collection equipment for condensate stack emissions from the plating lines. [This wood-floored shed was located off of the south end of the Former Industrial Building and was reportedly underlain by pavement. Two soil samples were collected in the late 1990s to document soil conditions in this area and no significant impacts were detected. The samples were collected from two angled borings advanced 4 feet; the location of these shallow borings is not known precisely.]

In order to contour the limits of the SRS exceedance Ransom considered the ratio of laboratory hexavalent chromium results to XRF screening results and built in a 50% safety factor to account for the variability of hexavalent chrome. This resulted in a threshold (i.e. SRS) XRF screening value of 390 ppm. Based on the mapped distribution of chromium, elevated contaminant concentrations extend about a foot downward into a silty clay unit encountered about 12 feet below grade beneath the east edge of the Former Industrial Building footprint area sloping down to about 17PAPG feet below grade beneath the west edge of the Former Industrial Building. The volume of impacted soils above SRS, and therefore targeted for remediation/removal, was revised and estimated at 380 cubic yards.

Synthetic precipitation leaching procedure (SPLP) analyses for chromium, nickel, and cadmium were conducted on selected soil samples within the saturated zone to assess the likely leaching potential for moderate to low-concentration metals-impacted soils that might be left in place following source removal, particularly within groundwater saturated soils. Concentrations of detected SPLP metals were generally low. Of the samples analyzed, the sample with the highest chromium XRF reading (1,235 parts per million (ppm)) also had the highest SPLP laboratory result (2.26 milligrams per liter (mg/L)) but met the SRS for both hexavalent and trivalent chromium. Detected SPLP nickel and cadmium were typically lower than chromium concentrations and were below quantitative detection limits at the downgradient extent of the area of impacted soils proposed for removal. In general, SPLP chromium detections were lowest laterally away from the concentration hot spot and decreased by a factor of 2 at the downgradient extent of the mass targeted for removal. The SPLP data supports that removal of soils to concentrations meeting SRS will generally result in a significant decrease in the likelihood that remaining soils will act as an ongoing source to groundwater impacts.

Ransom proposed a 1,500 ppm XRF field screening value as a threshold above which excavated soils will be segregated and assumed to fail the hazardous characteristic for chromium. This proposed value is inferred to be conservative considering that for Site soils and regressed XRF and laboratory data for total chromium (for which there is a good correlation for Site data) the proposed 1,500 ppm XRF value corresponds to an actual (i.e. laboratory determined) total chromium concentration of 1,000 mg/kg, the SRS for trivalent chromium.

AOC 2—Former Industrial Building

The scope of the Supplemental Phase II ESA included investigations to identify a potential source mass of nickel (and cadmium) impacted soils in the area of the former nickel plating line (as noted in AOC 1, above), confirm groundwater quality downgradient of the current and former building source areas and assess for potential PFAS impacts to groundwater, and assess soil and groundwater quality downgradient of the industrial wastewater lines buried between the Former Industrial Building and the Wastewater Pre-Treatment Building for metals impacts.

As noted above, no quantifiable source mass was identified for nickel nor cadmium. Metals concentrations detected in soils samples from boring B209 advanced adjacent to industrial wastewater lines buried between the Former Industrial Building and the Wastewater Pre-Treatment Building identified minor evidence of a release of metals in those soils but did not identify contaminant concentrations that would indicate a local source likely to contribute to ongoing impacts to groundwater.

Groundwater quality for the samples collected from wells downgradient of the Former Industrial Building and the Wastewater Pre-Treatment Building confirmed results from 2015 with the highest concentration of dissolved metals located downgradient of the former plating lines (chromium at 5,270 micrograms per liter (µg/L), nickel at 1,390 µg/L and cadmium at 31.52 µg/L exceeding SRS of 100, 100 and 5 µg/L, respectively), with lesser concentrations proximal to the Wastewater Pre-Treatment Building sumps (nickel at 301 µg/L and cadmium at 5.32 µg/L). Groundwater quality for the sample collected from the well installed proximal to the wastewater lines was consistent with Site-wide spatial dissolved contaminant gradients and did not support a secondary source in that immediate area.

PFAS telomeres PFOS and PFOA were detected at concentrations (as high as 7.08 µg/L and 0.0802 µg/L, respectively) above their AGQS at that time (0.070 µg/L for total PFAS and for each telomere, individually). The highest concentrations of PFAS were detected in the groundwater sample collected from the monitoring well located downgradient of the plating line area and lesser concentrations were detected in the sample collected from the monitoring well located downgradient of the Wastewater Pre-Treatment Building sumps. Because a former off-site fire where aqueous film-forming foam (AFFF) was likely used was located upgradient of the plating lines, the PFAS contaminant distribution could be consistent with a fume suppressant release source, a fire-fighting foam source, or a combination of the two.

AOC 6—Downgradient of Former Industrial Building and Wastewater Pre-Treatment Building

The scope of this Supplemental Phase II ESA included additional investigations to confirm groundwater quality downgradient of the Former Industrial Building and the Wastewater Pre-Treatment Building (as noted under AOC 2), and to evaluate downgradient and off-site groundwater quality (with exception that the downgradient property owner had declined authorization to assess for PFAS).

Groundwater quality for the sample collected from monitoring well MW202 installed on Tax Map 20 Lot 63, located approximately 55 feet west (downgradient) of the Site, likely downgradient of the inferred dissolved metals contaminant maxima, did not document AGQS violations for Site COCs, only cadmium was detected at a very low concentration (0.09 µg/L, estimated). The sample was not analyzed for PFAS, based on limitations imposed by that property owner.

Per the request of a nearby homeowner, a groundwater sample was collected from a dug well used for irrigation water located in the basement of 69 Main Street (Tax Map 20 Lot 51), 175 feet to the north of the Site. Lead was detected at a concentration (31 µg/L) above its AGQS (15 µg/L). Other than nickel and barium at very low concentrations (3 µg/L estimated, and 47 µg/L), no other Resource Conservation and Recovery Act (RCRA) metals were detected. Lead has not been detected at elevated concentrations in soils or groundwater at the Site. The sample was not analyzed for PFAS. [Reportedly this irrigation well was sampled by the NH DES in 2017 for PFAS, and no exceedances of PFAS AGQSs were noted.]

Based on an initial reporting of the results of this work to the NH DES and to other stakeholders, two additional investigations were conducted and were summarized in the Supplemental Phase II ESA and ABCA:

1. Groundwater samples were collected from selected wells (MW102, MW105, SH-3, and MW202) and analyzed for the presence of PFAS. Two of the wells were selected based

on NH DES information that an above ground storage tank for storing Teflon (for coating metal products) was located in the northwest corner of the Former Industrial Building. The sampling, conducted by SHA under contract to the NH DES, confirmed PFAS compounds above AGQSs in effect at that time and suggested a likely second source of PFAS possibly associated with the Teflon tank.

2. Two additional off-site monitoring wells were installed (MW301 and MW302), and groundwater samples were collected from selected wells (MW103, and new wells MW301 and MW302,) and analyzed for the presence of PFAS. The two new wells were installed to assess the down gradient extent of PFAS impacts above AGQSs in a northwesterly direction (MW301) and to assess for possible impacts associated with the use of AFFF to suppress a fire on the easterly adjoining property (MW302). Although PFAS compounds were detected in the two newly installed wells, the concentrations of the regulated PFAS analytes did not exceed AGQSs in effect at that time. An exceedance of the AGQS for PFOS was documented in the sample from MW103. The results of the additional investigation which was conducted by Ransom on behalf of the Subject Property owner, did not adversely affect the recommendations contained in the RAP but helped to define the limits of the GMZ. It should be noted that the static groundwater level data collected as part of the work appeared to suggest a localized steep southwesterly gradient to the southwest of the Former Industrial Building, which if further substantiated, could necessitate an additional monitoring well to the southwest to confirm the limits of the GMZ (AGQS attainment) in that direction.

The ABCA/RAP included the evaluation of three alternatives to remediate soils at the Site contaminated by plating processes, and to remediate groundwater at the Site: “Monitored Natural Attenuation” (MNA) (Alternative 1); “Excavate and Dispose of Soils with SRS Exceedances” (Alternative 2); and “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” (Alternative 3). These alternatives were evaluated using the following criteria: Overall Protection of Human Health and the Environment; Technical Practicality; Ability to Implement; Reduction of Toxicity, Mobility, and Volume; Short Term Effectiveness; Resiliency to Climate Change Conditions; and Preliminary Cost.

These remedial alternatives were proposed with the understanding and consideration that the community’s preferred future use of the Site is as a parking lot in support of the Village.

All of the remedial alternatives evaluated included the removal of the Wastewater Pre-Treatment Building, including abatement of hazardous building materials and hazardous substances associated with inactive wastewater sumps within the building.

Alternative 2, “Excavate and Dispose of Soils with SRS Exceedances”, included the removal of all accessible soils with regulated contaminants present at concentrations above the SRS was evaluated as being both protective of human health and the most proactive in terms of source reduction to promote attainment of AGQSs. It has the added benefit of removing a probable PFAS source area and possible residual nickel and cadmium source areas by addressing the broader chromium impacts in the former plating line area and in soils beneath the Wastewater Pre-Treatment Building sumps. No AUR was anticipated as an outcome of this approach. This alternative was inferred to be protective of human health and the environment; and considered to be effective, technically feasible, and practical. Although it was the most expensive option considered, it was also the most cost-effective.

The RAP noted that regional soil disposal facilities were wary of the possible increased costs of accepting PFAS-contaminated soils. These increased costs are associated with the expense of treating landfill leachate to meet possible future landfill leachate discharge limits. As a result, the RAP noted that the cost estimates provided in the report may increase (or decrease) and the extent of that possible change in cost was cited as unknown.

The RAP noted that the NH DES was likely to require additional investigations to: (1) address the spatial extent of PFAS groundwater impacts; (2) assess whether a possible upgradient source (the reported likely use of AFFF by the Walpole Fire Department) is contributing to PFAS groundwater impacts; and (3) assess whether stack emissions from the Central Plating facility may have impacted nearby surface soils. Note that items (1) and (2) were addressed in subsequent investigations funded by the NH DES and the owner.

Further, it was noted that:

1. While the proposed remediation is a proactive remedial approach that will probably mitigate PFAS impacts, the presence of PFAS, and the limited spatial data pertaining to PFAS groundwater impacts and no laboratory data on PFAS soils impacts does add uncertainty relative to possible additional required investigations, remediation, liability, disposal costs, and duration of GMP-required groundwater monitoring, which are not fully factored into the ABCA/RAP.

2. Based on the recent findings of a second on-Site probable source (area of the former Teflon tank), in an area not previously targeted for soil excavation, removal of an additional PFAS source in that area may be warranted at some point in the future, if and when leaching-based soils standards are established by the NH DES.

3. The recent investigations on the Site and adjoining properties have helped to define the limits of the GMZ, which has largely been constrained, and the laboratory data support that contaminant concentrations attenuate to meet AGQSs within the study area. If a localized southwesterly component of groundwater flow is further substantiated, then an additional monitoring well may be needed to the southwest of the PFAS release areas to assess groundwater quality in that direction. Off-site monitoring wells currently proposed by Nobis Engineering, Inc. for installation for the neighboring Toles Sunoco LUST site may meet that need. [Note that based on recent revisions in the PFAS AGQS, the concentration of perfluorooctanoic acid (PFOA at 0.0258 mg/L) detected in the sample from the well (MW202) installed on downgradient Lot 63 to define the limits of the Site PFAS plume now exceeds its AGQS (0.012 mg/L).]

Phase I Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire, Ransom Consulting, Inc., dated October 25, 2018

The Phase I ESA was conducted through the SWRPC Brownfields Assessment program and prepared for the benefit of SWRPC, the Town of Walpole, and the Estate of Nils A.M. Westberg (the owner). The scope of work met the ASTM International Designation: E 1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, 2013* (ASTM E 1527-13), which meets the requirements of the U.S. EPA All Appropriate Inquiries (AAI), 40 CFR Part 312 and the report documented findings of the previous reports, generally, as noted above as well as current conditions of the property as observed during a Site visit, an updated record sources review, and appropriate interviews and inquiry

The assessment revealed no evidence of RECs in connection with the Site, except for the following:

1. The Site was historically the location of an industrial electroplating facility dating from circa 1963 to circa 2006. Multiple releases of hazardous substances from the former industrial operations have adversely impacted Site soil and groundwater quality, with multiple contaminants (metals and PFAS) detected at concentrations above the applicable state standards;

2. In support of their management of the SWRPC Brownfields Assessment program, the NH DES reviewed the Draft RAP for the Site and provided comment on the DRAFT report. The final report addressed their comments, but the NH DES has yet to issue their formal approval of the RAP. Ransom anticipates that the NH DES will be in general agreement with the RAP as proposed, perhaps with minor modifications.

3. An upgradient LUST site has adversely impacted groundwater quality at the Site, resulting in the inclusions of the Site in the GMZ associated with this LUST property.

Based on the information obtained during the assessment, Ransom concluded that additional actions to address the above identified RECs were warranted. Ransom recommended the following to address the identified RECs for the Site:

1. Once formally approved by the NH DES, the RAP should be implemented, including the monitoring of groundwater quality under a GMP. Some limited additional groundwater quality documentation may be necessary to define the southwesterly limit of the Groundwater Management Zone in support of the GMP application.

2. Interim measures should be implemented, such as providing soils cover (a temporary cap) or fencing for the area with known SRS exceedances to limit access to those soils until such time as the RAP can be completed. [Note that fencing was installed by the Town.]

3. Once guidance is provided or standards are established by the NH DES, the extent of PFAS soils impacts in suspect release areas that have not been remediated should be characterized and contaminant levels reduced to promote attainment of soil and groundwater clean-up standards.

Ransom also provided the following non-scope recommendations:

1. If appropriate, the Town of Walpole should consider applying for eligibility for participation in the New Hampshire Brownfields Covenant Program (Program). [Note that this was completed.]

NH DES Correspondence, dated April 4, 2019

This correspondence was addressed to the Town of Walpole and formally approved the April 25, 2018 RAP prepared by Ransom and noted the Town's participation in the New Hampshire Brownfield Covenant Program. In approving the plan to (1) abate hazardous building materials and properly manage hazardous substances located in the building, and then demolish the Site building, (2) excavate and dispose of metals impacted soils exceeding SRS, and (3) conduct monitoring as will be required under a GMP, the NH DES noted that:

1. The extent of the PFAS plume has been delineated with the exception of possible migration to the southwest of the Site.

2. Because the concentration of PFAS proximal to the AFFF potential PFAS source were well below AGQSs, no further assessment of that possible source was required "at this time."

3. The scope and frequency of monitoring under a GMP will be based on a NH DES review of an Application for GMP.

Note that as a result of the recent (June 30, 2020) revision to PFAS AGQS, one compound detected in groundwater (PFHxS at 0.0576 mg/L) in the sample from the well (MW302) installed to assess for AFFF impacts on upgradient Lot 47, the Mascoma Bank property, exceeded its AGQS (0.018 mg/L).

In addition, based on the recent revisions in the PFAS AGQS, the concentration of PFOA (at 0.0258 mg/L) detected in the sample from the well (MW202) installed on downgradient Lot 63 to define the limits of the Site PFAS plume exceeded its AGQS (0.012 mg/L).

NH DES Correspondence, dated October 4, 2019

This correspondence transmits a fully executed Covenant Not to Sue to the Town of Walpole as part of the New Hampshire Brownfield Covenant Program, where upon implementation of the approved RAP, and NH DES approval of that implementation, certain liability relief is granted as allowed under RSA Chapter 147-F, the New Hampshire Brownfields Program.

PFAS Assessment of a Portion of the Mascoma Bank Property, dated September 4, 2020

The September 4, 2020 data submittal letter report prepared by Ransom for the Town of Walpole documented soil sampling and analysis conducted for the grass strip of the Mascoma Bank property (Map 20, Lot 47 at 53 Main Street) that abuts the former Central Plating property. This report is attached as Appendix A-2.

On June 23, 2020, Ransom collected soil samples at four locations from the grass strip that bounds the west side of the Mascoma Bank-owned and Town of Walpole-leased parking lot. Prior to its demolition and removal, the Central Plating industrial building was located along the west edge of this grass strip, and the grass strip adjoins areas of known metals impacts (to soil and groundwater) and areas of documented PFAS impacts (to groundwater).

Soil samples were collected from 0 to 1 foot below grade and 1 to 2 feet below grade, were collected at each of four shallow test boring locations (MBHB1 through MBHB4). The samples were analyzed for the presence of PFAS using Modified Method 537 with isotope dilution. The work was conducted on the same date as pre-characterization sampling at the Central Plating Site and under separate agreement. In addition, a composite sample from each location was also screened for the presence of metals using an XRF.

PFOS was detected in seven of the eight soil samples at concentrations ranging between 0.00138 mg/kg to 0.00469 mg/kg, all at concentrations below NH DES Environmental Health Program (EHP) Direct Contact Risk-Based (DCRB) Standard established for PFOS of 0.1 mg/kg. No other PFAS compounds were detected. XRF field screening results measured chromium at el. The following readings, in ppm (equivalent to mg/kg), were recorded for chromium at each boring location:

MBHB1	**MBHB2**	**MBHB3**	**MBHB4**
Chromium (ppm)			
6,463 +/-259	1,183 +/-135	215 +/- 116	154 +/- 98

The chromium readings for the sample closest to the former plating line location at the Central Plating Site (a known area of elevated chromium and the target of remediation planning for that site) is inferred to exceed the NH DES Env-Or 600 SRS for trivalent chromium and may exceed the hexavalent chromium standard. Note that field screening analyses is not typically as accurate as laboratory analyses.

Ransom recommended that the information documented in the data submittal be considered in the ABCA/RAP currently being updated for the Central Plating Site, i.e. this report.

2.0 INVESTIGATION METHODOLOGY

The sampling and analyses documented herein was conducted to support a U.S. EPA-funded Brownfields cleanup program for the Central Plating Site, namely to: (1) pre-characterize soil, concrete, and wastewater treatment sump residuals for COCs that will support disposal planning and budgeting, and contractor bids during the bid solicitation process; and (2) pre-characterize the known PFAS-Impacted Former Teflon AST Area to refine limits of a possible AUR area and to support on-site soils management plans in known release area(s) as part of the finalized ABCA/RAP and for contractor specifications.

As fully elaborated in the SSQAPP for the Central Plating Site fully executed June 15, 2020, removal of the Wastewater Pre-Treatment Building, concrete slab and sumps is required to access contaminated soils beneath the sumps as part of remediation. In addition, soil excavation and disposal in the former chromium plating area is planned; and re-use of targeted soils and processed Wastewater Pre-Treatment Building concrete as backfill in the remediation excavations is anticipated. The presence of PFAS, a known COC, factors into remedial planning, specification preparation and contractor bidding.

To support disposal/reuse planning, and remediation contractor bid pricing:

1. Samples of concrete within the Wastewater Pre-Treatment Building's recessed wastewater treatment area were collected and pre-characterized for PFAS and RCRA metals. The sample of pulverized concrete was collected using a carbide steel drill bit and a rotary hammer drill over the entire thickness of the recessed concrete slab adjoining the three sumps within the Wastewater Pre-Treatment Building and analyzed for the presence of RCRA metals and PFAS. The protocol adopted by the U.S. EPA for sampling porous surfaces for PCBs details was used with the exception that the entire thickness (determined to be 6 inches) of the slab was sampled.

2. Residual contents (dry granular material) from each of the three sumps within the Wastewater Pre-Treatment Building were collected using hand tools and were composited into one sample and analyzed for the presence of PFAS.

3. A grab soil sample was collected using hand tools from a depth of 0.5 to 1.5 feet below ground surface proximal to the defined near-surface soil contamination maxima (near boring B108 as shown on Figure 4) in the area of the former chrome plating line and was analyzed for the presence of PFAS.

4. Shallow soil samples were collected in a 10-foot grid pattern centered on the former Teflon AST location (see Figure 4) and the samples were analyzed for the presence of PFAS. The shallow soil samples were collected using hand tools (a stainless steel screw auger) at an interval of 0.5 to 1 foot and at 1.5 to 2 feet below grade; with 9 borings advanced, for a total of 18 soil samples.

Protocols adopted by the NH DES for sampling groundwater, which minimize the likelihood of introducing PFAS from other sources when collecting and handling samples, were utilized when collecting the solid matrix samples (see the SSQAPP for additional detail).

Sampling equipment blanks for PFAS and one duplicate sample for each media and analysis were collected and analyzed for quality assurance purposes.

3.0 RESULTS

The following sections documents the results of the Remedial Pre-Characterization work. Sample analytical results are summarized by media in Table 1 and shown on Figure 4. A summary of equipment blank PFAS sample results is presented in Table 2, and duplicate soil sample analytical results are presented in Table 3. Certified laboratory analytical reports are included in Appendix B.

Analytical results were compared to regulatory guidelines presented in the SSQAPP. The regulatory guidelines include the following:

Table: Regulatory Standards Criteria

Concrete	
Metals, PFAS	Disposal / Reuse Facility Acceptance/Permit Criteria - for Bidder's use; NH DES EHP DCRB residential standards and maintenance worker standards for soil
Sump Residue	
PFAS	Disposal Facility Acceptance/Permit Criteria (soils are assumed hazardous for metals) for Bidders use; NH DES EHP DCRB residential and maintenance worker standards for soil
Soil (on Site re-use, or AUR limits)	
PFAS	NH DES EHP DCRB residential and maintenance worker standards for soil

The findings of the remediation pre-characterization were as follows:

3.1 Wastewater Pre-Treatment Building Concrete Sample

PFAS (specifically the compound perfluorooctane sulfonate, or PFOS) was detected in a sample of the 6-inch thick concrete slab, collected from the recessed floor of the former wastewater pretreatment area of the Wastewater Pre-Treatment Building. The detected concentration of PFOS (0.0164 mg/kg) was a factor of 6x less than the NH DES EHP DCRB residential standard for soil (0.1 mg/kg) and 36x less than the maintenance worker standard. No NH DES Env-Or 600 SRS has been established for PFAS compounds.

No RCRA metals were detected above SRS in the concrete sample, and metals detections were below published NH DES Risk Characterization and Management Policy background levels for New Hampshire soils.

3.2 Wastewater Pre-Treatment Building Sumps Residual Solids

PFAS (specifically PFOS) was detected in a composite sample of the residual solids collected from the three sumps in the Wastewater Pre-Treatment Building. The detected concentration of PFOS (1.52 mg/kg) was a factor of 2.5x above the above the NH DES EHP DCRB maintenance worker standard (0.6 mg/kg). No SRS has been established for PFAS compounds.

3.3 Soil

Former Chrome Plating Area Inferred Chromium Soil Contaminant Maxima Sample

PFAS (specifically PFOS) was detected in the soil sample collected from collected from 0.5 to 1.5 foot bgs at the location of the chromium soil contaminant maxima in the area of the former chrome plating line at concentrations above the laboratory reporting limit. The detected concentration of PFOS (0.00384 mg/kg) was below the DCRB residential standard for PFOS in soil (0.1 mg/kg) and 156x less than the maintenance worker standard.

Former Teflon Tank Area Samples

PFAS (specifically PFOS) was detected in 5 of 18 soil samples collected from 9 borings advanced in a 10-foot grid pattern centered on the former Teflon tank location at concentrations above the laboratory reporting limits in samples collected from 0 to 1 foot bgs and 1 to 2 feet bgs. The detected concentrations ranged from 0.00103 to 0.0587 mg/kg, all below the DCRB residential standard for PFOS in soil (0.1 mg/kg), and well below the maintenance worker standard.

The distribution of the higher detected concentrations suggests that the potential source of the PFOS may have been the Former Industrial Building exhaust vent reportedly located off the north end of that building.

4.0 QUALITY ANALYSIS/QUALITY CONTROL

The contracted laboratory, Alpha, provided Level II analytical data according to U.S. EPA protocols and U.S. EPA laboratory data validation guidance included in Ransom's SSQAPP for Tier I Plus data review. Alpha provided the following information in analytical reports:

1. Data results sheets;
2. Method blank results;
3. Surrogate recoveries and acceptance limits;
4. Duplicate results/acceptance limits;
5. Spike/duplicate results/acceptance limits;
6. Laboratory control sample results;
7. Description of analytical methods and results; and
8. Other pertinent results/limits as deemed appropriate.

As outlined in the SSQAPP, at the completion of the field tasks and subsequent to receipt of the analytical results, a data usability analysis was conducted to document the precision, bias, accuracy, representativeness, comparability, and completeness of the results. The following sections present this analysis. A summary of equipment blank results for PFAS analyses is included in Table 2 under "Equipment Blank Concrete", "Equipment Blank Sump", and "Equipment Blank Soil". A summary of duplicate sample analytical results are included in Table 3 (for concrete, sump granular materials, and soil) under samples designated "Conc Dup" for concrete for metals and PFAS analyses, "Sumps Dup" for Sump granular materials for PFAS analyses, and "Soil Dup" for soil for PFAS analyses.

4.1 Precision

Precision measures the reproducibility of measurements. The precision measurement is established using the relative percent difference (RPD) between the duplicate sample results. Relative percent differences were calculated for samples where both sample and duplicate values were greater than five times the Practical Quantitation Limit (PQL) of the analyte. The RPD is calculated as follows:

$$\text{RPD} = \frac{(\text{Sample Result - Duplicate Result})}{\text{Mean of the Two Results}} \times 100$$

Precision of the sampling and analytical results is considered acceptable if the RPDs are less than or equal to 50% for soil samples. Duplicate solid matrices samples were collected for laboratory analysis as part of this pre-characterization. Three duplicate soil samples were collected as follows:

1. "Conc Dup" for concrete for RCRA metals and PFAS analyses;
2. "Sumps Dup" for Sump granular materials for PFAS analyses; and

3. “Soil Dup” for soil for PFAS analyses.

GS Conc / Conc Dup

Arsenic, barium, and total chromium were detected at concentrations greater than five times the respective PQLs of the analytes. The RPD for barium was 2.4% and for chromium was 0.7% and therefore, the precision of these metals analyses sample results is acceptable because the RPD is below 50%. The RPD for arsenic was slightly outside of the acceptable range at 52.5%. This is likely due to sample heterogeneity, and because the arsenic concentrations were relative low (4.59 mg/kg or the sample and 7.86 mg/kg for the duplicate), below established “background” soils concentrations in New Hampshire and well below most re-use or waste facility acceptance criteria, a slight exceedance of the precision limits is not inferred to affect the usability of the data.

PFOS was detected at a concentration greater than five times the PQL for this analyte. The RPD for PFOS was 5.9% and therefore, the precision of the PFAS analyses sample result is acceptable because the RPD is below 50%.

GS Sumps / Sumps Dup

PFOS was detected at a concentration greater than five times the PQL for this analyte. The RPD for PFOS was 0.0% and therefore, the precision of the PFAS analyses sample result is acceptable because the RPD is below 50%.

GS 1 / Soil Dup

PFOS was detected at a concentration less than five times the PQL for this analyte, therefore no RPD was calculated.

4.2 Bias

Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. Bias assessments are made using personnel, equipment, and spiking materials or reference materials as independent as possible from those used in the calibration of the measurement system. Bias assessments were based on the analysis of spiked samples so that the effect of the matrix on recovery is incorporated into the assessment. A documented spiking protocol and consistency in following that protocol are important to obtaining meaningful data quality estimates.

Matrix spike and matrix spike duplicate samples (MS/MSD) were used to assess bias as prescribed in the specified methods. Unless specified in the notes, below for each analytic method and media, acceptable recovery values were within the recoveries specified by each of the analysis methods. Control samples for assessing bias were analyzed at a rate as specified in the analytical SOPs and specified analytical methods.

The lab provides quality control non-conformance reports that indicate if Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) and/or MS/MSD had low, failing, or high recoveries and if the sample result was affected. Likewise, the lab reports any compounds that had failing RPDs in the LCS/LCSD pair or the MS/MSD pair. This indicates the percent difference between the lab sample and its duplicate or the spike and its’ duplicate. Specific comments from the laboratory and LCS/LCSD results meriting discussion are provided below for each analytical method and media.

In addition, for PFAS analyses, bias introduced by potential equipment sources for target analytes was assessed for each type of sampling equipment used and results are discussed below.

4.2.1 Metals

No bias issues were identified for metals analyses by the laboratory.

4.2.2 Per- and Polyfluoroalkyl Substances

For batch WG1387942, MS was not analyzed because the dilution required by the elevated concentrations of target compounds present in the native sample would have caused the spike compounds to be diluted below the range of calibration. This result does not affect the usability of the data.

Three equipment blanks were collected for three sets of sampling equipment (the results are summarized in Table 2). Of the three equipment rinsate samples, one sample, designated Equipment Blank Sump, had a detection above the reporting limit for PFAS compounds. For that sample PFOS was detected at 4.26 nanograms per liter (equivalent to parts per trillion). The sampling equipment consisted of a stainless steel sampler attached to a CPVC pipe extension handle with two new stainless steel hose clamps. The source of the PFOS is not known; however, the PFOS detection in the rinsate sample is much less (more than two orders of magnitude less) than the 1.52 mg/kg (equivalent to parts per million) PFOS detected in the sump sample; therefore, no significant adverse impact on the use of the sump sample data is inferred.

4.3 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random error (variability due to imprecision) and systemic error. It therefore reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value or known concentration of the spike or standard. For PFAS, surrogate compound recoveries are also used to assess accuracy and method performance for each sample analyzed. Analysis of performance evaluation samples will also be used to provide additional information for assessing the accuracy of the analytical data being produced. Both accuracy and precision are calculated for each analytical batch, and the associated sample results are interpreted by considering these specific measurements.

The laboratory provides a non-conformance summary that reports if all of the quality control criteria including initial calibration, calibration verification, surrogate recovery, holding time and method accuracy/precision for analysis were within acceptable limits. According to the laboratory, unless noted in the non-conformance summary, all of the quality control criteria for these analyses were within acceptable limits. Discussion of the items identified by the laboratory in that narrative is provided below.

4.3.1 Per- and Polyfluoroalkyl Substances

For samples HB2 (1-2), HB5 (0-1), HB5 (1-2), HB6 (0-1), HB6 (1-2), HB7 (0-1), HB7 (1-2), HB8 (0-1), HB8 (1-2) corresponding to laboratory sample IDs L2026697-06, -09 through -16, -21, -22, for batches WG1387433-4, WG1388071-4, and WG1388071-5, there were Extracted Internal Standard recoveries that were outside the acceptance criteria for individual analytes. Analytical results for surrogate recoveries for one or more surrogates in the noted samples fell below the lower limit criteria at percent recoveries ranging from 1 to 16% lower that the lowest acceptance criteria. Therefore, it is likely that some sample results are biased low; however, on balance, the data document concentrations well below the risk-based exposure standard for PFOS, or, in one case, well above the risk-based exposure standard. Therefore, a moderate bias low is not inferred to adversely affect the usability of the data, as no detections were close to the standard for which a slight to moderate bias could affect the usability of the results.

The WG1388071-4 MS recovery, performed on sample GS Conc corresponding to laboratory sample ID L2026697-21, is outside the upper limit acceptance criteria for PFOS by 4%. This would suggest a possible bias high for the sample result; however, the detected concentration of PFOS in the sample was well below the risk-based exposure standard. Therefore, a moderate bias high for the reported result is not inferred to adversely affect the usability of the data.

4.4 Representativeness

Objectives for representativeness are defined for each sampling and analysis task and are a function of the investigative objectives. Representativeness was accomplished during this project through use of standard field, sampling, and analytical procedures.

All objectives for sampling and analytical representativeness, as specified in SSQAPP, were met.

4.5 Comparability

Comparability is the confidence with which one data set can be compared to another data set. The objective for this QA/QC program is to produce data with the greatest possible degree of comparability. Comparability was achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions and using standard and comprehensive reporting formats. Complete field documentation was used, including standardized data collection forms to support the assessment of comparability. Historical comparability shall be achieved through consistent use of methods and documentation procedures throughout the project, and these goals were met for the work documented herein.

4.6 Completeness

Completeness is calculated by comparing the number of samples successfully analyzed to the number of samples collected. The goal for completeness is 95 percent. The completeness for this project was 100 percent, as there were no samples that could not be analyzed due to holding time violations, samples spilled or broken, or any other reason.

4.7 Project Quantitation Limits

Project specific PQLs were developed for the SSQAPP to ensure analytical results would meet relevant applicable standards.

According to the laboratory, detection limits for GS Sumps and Sumps Dup (laboratory designations L2026697-23 and -24) were elevated due to the dilution required by the elevated concentrations of target compounds. Although elevated, they were well below the risk-based standards for the individual analytes.

Dilutions were not required for the other samples and PQLs did not exceed the risk-based standards in all cases.

5.0 UPDATES TO CONCEPTUAL MODEL

Based on an initial reporting of the above results to the NH DES and to other stakeholders, two additional investigations were conducted and are summarized below.

5.1 Geology and Hydrogeology

Based on observations made by Ransom during previous assessments, and by SHA during the 2013 Phase II ESA, the Site is generally underlain by layers of fine to medium and fine to coarse sands, overlying silts and clays. The sand/clay interface is shallowest along the east edge of the property, at approximately 13 feet below grade and dips down steeply to the west and the southwest corner of the property to 25 feet below grade. Note that Site surface grades are relatively flat with a downward slope to the west of less than 1 foot across the Site.

In the general plating area (south portion of the Former Industrial Building) and as part of the 2015 Phase II ESA, a darker layer of sand was noted just above the clay at borings B109 and B112. A similar layer was noted in borings B206, B207, B209, and B211 as part of this investigation.

For the groundwater sampling events conducted by Ransom in September 2015 and July 2017, the depth to groundwater ranged from as shallow as 12.57 to 13.07 and as deep as 19.84 to 22.56 feet below grade at the Site. The depth to groundwater is deepest along the western edge of the study area and shallowest along the eastern edge of the property. For the July 17, 2017 monitoring date, the hydraulic gradient was a steep 0.14 feet/foot but flattened on the western abutting Lot 63 parcel to 0.002 feet/foot. The hydraulic gradient from east to west appears to correlate fairly well with the depth of clays and silts which likely act as an aquitard to groundwater.

Figure 6 shows groundwater flow as interpreted from the static groundwater levels measured on July 17, 2017. A subsequent groundwater elevation survey in 2018 suggested a possible localized southwesterly gradient to the southwest of the Former Industrial Building. However, in general, based on the measured depth to groundwater across the Site, groundwater was inferred to flow to the west, towards the Connecticut River.

The bedrock stratigraphic unit underlying the Site and vicinity is mapped on the Bedrock Geologic Map of New Hampshire (1997), as the Littleton Formation; detailed as gray metapelite and metawacke and subordinate metavolcanic rocks; generally, but not everywhere, conformable with underlying Fitch or Madrid Formations. Bedrock was not encountered to a depth of 30 feet below grade (depth of the deepest boring advanced on site) and has not been determined as part of previous assessments.

5.2 Source Areas in Soil

Soils with regulated contaminants (namely trivalent and hexavalent chromium) at concentrations greater than Env-Or 600 SRS have been identified or inferred in two areas of impacted soils: the former plating line area and beneath the wastewater pre-treatment sumps.

Soils with chromium impacts in the former plating line area are in the south end of the Former Industrial Building footprint. The wastewater pre-treatment sumps soil removal area is beneath the north end of the Wastewater Pre-Treatment Building; the building will have to be removed to access these soils. The extent of soil contamination in the former plating area has been delineated extensively and the areal and volumetric extent of soils contamination beneath the sumps has been approximated based on sump location and depth as shown in Figures 4 and 5. In each area the contamination is inferred to extend down through silty sands to a silty clay layer, to the seasonal/historical low groundwater elevation. Nickel and cadmium are also present in Site groundwater and may be present in soils at concentration that act as an ongoing source to groundwater; however, these metals have not been detected in soils at concentrations above their SRS. The mass of impacted soils with concentrations above SRS, that is the target of remediation planning, is estimated as 850 tons (assuming the weight of soil soils is 1.4 to 1.5 tons per cubic yard, depending on soil type).

PFAS is known to be present in Site groundwater and is associated with two past operational practices: chromium fume suppression in the chrome plating line area (and thus in plating solutions that discharged to the pre-treatment sumps) and coating processes involving Teflon which occurred in the northwest area of the Former Industrial Building. The nature and extent of PFAS impacts has been estimated through groundwater quality assessment in inferred source/impact areas, pre-characterized for soils management planning as part of the work documented herein and assessed as part of recent investigation undertaken by the Town of Walpole for the portion of the Mascoma Bank property (Lot 47) that immediately adjoins the Site to the east. The distribution of the detected PFAS compound (namely, PFOS) supports a possible source associated with reported exhaust vent at the north end of the Former Industrial Building as well as a source associated with the former chrome plating line.

5.3 Groundwater Impacts

Groundwater quality for the samples collected in 2015 and 2017 from monitoring wells downgradient of the Former Industrial Building and the Wastewater Pre-Treatment Building documented the highest concentrations of dissolved metals are located downgradient of the former plating lines (chromium at 5,270 µg/L, nickel at 1,390 µg/L and cadmium at 31.52 µg/L exceeding SRS of 100, 100 and 5 µg/L, respectively), with lesser concentrations proximal to the Wastewater Pre-Treatment Building sumps (nickel at 301 µg/L and cadmium at 5.32 µg/L).

PFAS compounds have been detected at concentrations above their AGQS. The highest concentrations of PFAS were detected in the groundwater sample collected from the monitoring well located downgradient of the former plating line area (MW102) and lesser concentrations were detected in the sample collected from the monitoring well located downgradient of the Wastewater Pre-Treatment Building sumps (MW104). The newly (June 2020) revised PFAS AGQS, when compared to past sample data, suggests that the dissolved contaminant plume exceeding at least one PFAS standard now likely extends beyond the westernmost monitoring well installed on Lot 63.

In addition, the revision to the PFAS standards downward implicate a possible minor off-site source (historical use of AFFF) to the east on Lot 47, because now the concentration of PFHxS detected in the sample collected in the past from the well (MW302) installed to assess for AFFF impacts on that property, exceeded its AGQS.

5.4 Potential Receptors and Pathways of Exposure, by Media

Soil

Based on the known contaminant distribution, which indicates chromium impacts to surface soils, there is the potential for a direct contact and dust inhalation human exposure risk. The Town of Walpole has erected a temporary fence which presents a barrier to typical entry points from the east, south and west and significantly mitigates human exposure risks. Chromium impacts are now inferred to extend to the grass strip on the Mascoma Bank parking lot (Lot 47), which are mostly contained within the fenced area. Dust generation, and therefore inhalation risk from surface soils is largely mitigated by no ongoing or active disturbance of the soils, partial vegetation of the Site, and the grain size of soils.

Groundwater

Although groundwater is impacted above AGQSs for Site COCs, including specific metals and PFAS, at the Site and downgradient of the Site at least as far as the westerly adjoining lot, no consumptive use of groundwater was identified by Ransom or the NH DES (as part of their PFAS impact assessment protocol) within 1,000 feet of the Site. One nearby dug well (at Lot 51 at 69 Main Street) is used for irrigation purposes, but no Site COCs have been detected at concentrations above AGQSs in the groundwater sample collected from the well. Reportedly, PFAS detections were identified when this well was sampled for PFAS in 2017 by the NH DES. In a follow-up conversation with the NH DES, Ransom understands that the results were apparently just below current AGQSs for two detected PFAS compounds.

Soil Vapor/Indoor Air

None of the Site COCs (*i.e.*, with an inferred on-Site source) are inferred to present a risk to indoor air quality. The NH DES has no established chromium or PFAS standards for soil vapor or indoor air. No quantifiable risk of human exposure to volatile compounds present in air and related to documented Site sources is inferred.

6.0 SITE CHARACTERIZATION AND CLEANUP GOALS

These remediation pre-characterization activities and previous environmental investigations completed at the Site identified evidence of: metals impacted soils (most notably chromium) and groundwater (chromium, nickel, cadmium,) associated the Central Plating facility; PFAS impacted soil and groundwater that is likely associated with the Central Plating facility, but also could be at least partly from an adjoining former bulk petroleum storage facility where AFFF was reportedly used to extinguish a fire 30 years ago; and MTBE impacts to groundwater from a neighboring gasoline station. Background concentrations of PAHs (in some instances above SRS) were also documented for soils with coal combustion residuals in surface soils on the north edge of Lot 66.

In addition, fine-grained residual solids were previously identified in Wastewater Pre-Treatment Building sumps with high concentrations of metals, cyanide and PFOS.

The identified contamination and appropriate cleanup goals are summarized below.

6.1 Impacted Soils

Soils with exceedances of the chromium SRS were identified in the footprint of and adjacent to the Former Industrial Building, specifically in the area of the former plating lines, in the southern quarter of that former building extending down to the water table. Dissolved metals in groundwater has supported the former plating lines area as a source area. Detailed spatial soil characterization has documented a volume of chromium contaminated soils inferred to exceed the SRS for hexavalent chromium of approximately 440 cubic yards. Some of these soils may be a characteristic hazardous waste based on high total chromium concentrations (no TCLP analyses has been conducted). The source of the chromium impacts is possible process “dumps” or “overflow” from plating line tanks. According to process schematics for the facility, cyanide solutions were not listed as being used on the chromium plating line, additionally the discharges are not inferred to have been comprised of sludges. Therefore, F-listed waste codes do not appear to apply for the chromium detected in Site soils.

Neither nickel nor cadmium has been identified in Site soils at concentrations above SRS, despite collection and analyses of numerous soil samples from suspected source areas. If present, soils with nickel or cadmium concentrations above SRS are very likely to be co-located with the impacted mass of chromium contaminated soils that has been targeted for remediation in the former plating line area. This inference is based on the proximity of the former plating lines and wastewaters management that are potential sources for nickel and cadmium impacts.

PFAS is known to be present in Site soil and groundwater and is associated with two past operational practices: chromium fume suppression in the chrome plating line area (and thus in plating solutions that discharged to the pre-treatment sumps) and coating processes involving Teflon which occurred in the northwest area of the Former Industrial Building. The nature and extent of PFAS impacts has been estimated through groundwater quality assessment in inferred source/impact areas, pre-characterized for soils management planning as part of the work documented herein and assessed as part of recent investigation undertaken by the Town of Walpole for the portion of the Mascoma Bank property (Lot 47) that immediately adjoins the Site to the east. The distribution of the detected PFAS compound (namely, PFOS) supports a possible source associated with reported exhaust vent at the north end of the Former Industrial Building as well as a source associated with the former chrome plating line. Presently, there are no PFAS SRS in New Hampshire. Remediation of chromium impacted soils will reduce the mass of soils impacted by possible PFAS releases that remains on Site.

Based on laboratory results for waste fine-grained residual solids in the three wastewater treatment sumps located in the Wastewater Pre-Treatment Building, where cyanide, arsenic, barium, hexavalent and trivalent chromium, copper, lead, nickel and zinc were detected at elevated concentrations, and the presence of nickel, cadmium and PFAS detected above AGQSs in groundwater samples from monitoring wells near the sumps it is possible that leakage of discharges to the sumps or from that vicinity are a secondary source of impacts (albeit at much lesser concentration) to soils (and groundwater). Residuals within the sumps would require remediation are likely an F-listed hazardous waste due to their probable association with wastewater plating sludges and with cyanide. Information provided in environmental due diligence interviews with facility employees conducted by others references the ability of the operator to discharge waste waters directly to soils in the sumps, bypassing treatment, although it was unclear if that was a past practice. Assuming the volume of soils beneath/adjacent to the sumps has been impacted to the depth of the groundwater table, Ransom estimates an inferred contaminated soil volume of 154 cubic yards. It is Ransom's understanding, based on NH DES preliminary input for the specific occurrence of these soils, that soils from beneath the sump would not be considered an F-listed waste, absent the presence of observable sludge.

The background concentrations of PAHs documented for soils with coal combustion residuals in surface soils on the north edge of Lot 66 have not impacted groundwater in that area and are inferred to be exempt from regulation under Env-Or 600 due to their association with coal combustion residuals. This is also an area of soils impacted by PFOS, presumably from exhaust vent emissions. There are not SRS for PFAS impacted soils. No soil remediation volume has been assumed because the soils are not considered a regulated waste under the applicable rules (coal combustion source), provided they remain on-Site, and no SRS have been established for PFAS impacted soils. Although no clean-up is required, management of these surface soils could include use as remediation backfill above the groundwater table and beneath the proposed parking lot pavement and subgrade section for the planned redevelopment.

Proposed soil clean-up goals are as follows for two active remediation scenarios:

1. Remove regulated contaminated soil at concentrations above NH DES SRS to reduce or eliminate the source of impacted groundwater and to eliminate long-term potential human exposure risks.

2. If contaminant leaching risk can be defined at Site-specific threshold soil concentrations for Site COCs, then a tiered remediation approach could be considered that would be protective of groundwater using Site-specific leaching based standards and NH DES Risk Characterization and Management Policy (RCMP) Method 1 NH S-3 standards to reduce human exposure risk via engineering and institutional controls. Results of past SPLP analyses for chromium (and other metals) did not support this approach based on the difficulty in assigning a leaching based clean-up value. This clean-up standard uncertainty will factor into the *Ability to Implement* and *Reduction of Toxicity, Mobility and Volume* when evaluating and comparing remedial alternatives.

3. No PFAS SRS have been established by the NH DES although it is possible and perhaps likely that SRS will be established for both leaching-based considerations and for human contact exposures to soils (currently, NH DES direct-contact risk-based standards are considered guidance and detected concentrations of PFAS in soils sampled to date do not exceed these standards).

6.2 Impacted Groundwater

Site impacts to groundwater from known on-Site sources include for chromium, nickel, cadmium.

Site impacts to groundwater from on-Site sources also include a number of PFAS compounds. A minor off-site contribution (fire-fighting foam likely used on an adjoining property) is also possible for these compounds.

Petroleum-impacted groundwater (notably MTBE) has been documented from an off-Site source and is monitored under a GMP by that responsible party, the facility owner of nearby upgradient property Lot 69.

Groundwater quality for samples collected in 2015 and 2017 from monitoring wells downgradient of the Former Industrial Building and the Wastewater Pre-Treatment Building documented that the highest concentration in dissolved metals are located downgradient of the former plating lines, with lesser concentrations proximal to the Wastewater Pre-Treatment Building sumps.

PFAS compounds have been detected at concentrations above their AGQS. The highest concentrations of PFAS were detected in the groundwater sample collected from the monitoring well located downgradient of the former plating line area (MW102) and lesser concentrations were detected in the sample collected from the monitoring wells located downgradient of the Wastewater Pre-Treatment Building sumps (MW104), and the former Teflon tank area and north end of the Former Industrial Building. The newly (June 2020) revised PFAS AGQSs, when compared to past sample data, suggests that the dissolved contaminant plume exceeding at least one PFAS standard now likely extends beyond the westernmost monitoring well installed on Lot 63. In addition, the revision to the PFAS standards downward implicate a possible minor off-site source (historical use of AFFF) to the east on Lot 47, because now PFHxS in the sample collected in the past from the well (MW302) installed to assess for AFFF impacts on that property, exceeded its AGQS.

Although no consumptive use of groundwater has been identified within the subject property neighborhood (with the possible exception of a commercial property located 1,600 feet west-southwest of the Site as identified by the NH DES), the clean-up goal for groundwater is the attainment, with time, of AGQSs in the Groundwater Management Zone.

6.3 Impacted Indoor Air Quality

No analytes have been detected at concentrations exceeding the RCMP GW-2 screening levels, which have been established to screen for risk to indoor air quality from potential contaminant vapors. No RCMP GW-2 standards have been established for Site COCs so compliance with GW-2 does not factor into remedial alternatives evaluation for this Site. Note that a GW-2 standard has been established for MtBE which is migrating onto the Site; however, the GW-2 standard is almost 50x higher than the concentrations detected in Site groundwater. None of the other Site COCs (namely metals and PFAS) have established RCMP GW-2 screening levels. Therefore, no Site indoor air quality risk is inferred, should an occupancy Site land use be developed at some point in the future, or in consideration of likely potential downgradient impact.

The NH DES has not provided direction on PFAS soil vapor or groundwater concentrations that would pose a risk to indoor air quality. The relatively low volatility and high water solubility of PFAS, in general, may indicate a relatively low risk to indoor air quality from subsurface sources for this suite of compounds.

6.4 Hazardous Building Materials Considerations

Access to suspect impacted Site soils beneath the Wastewater Pre-Treatment Building sumps will require removal of the building.

Asbestos-containing material (ACM) was identified in this building, lead-based paint is inferred, universal wastes have been inventoried, and sump contents (residual solids) with elevated COCs have been documented, and wood and concrete adjoining the sumps will require cleaning, characterization, and proper disposal all to be coordinated with building demolition and disposal.

The cleanup goal for the Site, pertaining to the ACM, is to eliminate the risk of human contact to ACM during renovation/demolition activities and future Site reuse. Cleanup actions including removal and/or long-term maintenance of ACM should be completed to meet U.S. EPA and NH DES regulatory requirements.

Handling of components coated with lead-containing paint *at any concentration* requires compliance with the OSHA lead standard (*Lead in Construction*, 29 CFR 1926.62). Under the existing conditions, contractors may perform demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that have lead-based paint or lead-containing paint, provided that this regulatory requirement is met.

Universal waste is a general term used to describe hazardous wastes that are generated by a large, diverse population. This term is intended to be broad so that a wider range of wastes may be managed under the reduced requirements of the U.S. EPA's Universal Waste Rule. U.S. EPA's universal waste regulations streamline hazardous waste management standards for federally designated "universal wastes", which include: batteries; pesticides; mercury-containing equipment; and lamps (bulbs). The State of New Hampshire has expanded the designation of universal waste to include, in addition to those items listed above, cathode-ray tubes and antifreeze. The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment.

Universal wastes and other hazardous/potentially hazardous materials/wastes present at the Site include, but are not limited to:

1. Potential PCB-containing fluorescent light ballasts;
2. Potential mercury-containing fluorescent light tubes, and thermostat switches; and
3. Sumps contents and adjoining concrete and wood and sumps ventilation system.

The clean-up goal for universal waste and other hazardous/potentially hazardous material/wastes is to prevent these wastes from entering the general waste stream through proper removal, storage, and transport to an appropriate off-Site recycling or disposal facility as universal waste or hazardous material/waste.

6.5 Wastewater Pre-Treatment Building Slab and Foundation

The Wastewater Pre-Treatment Building concrete slab and foundation (frost walls), after processing to 6-inch minus size, may have on-Site re-use potential as backfill in the remediation excavations above the groundwater table. Re-use of this material on Site would be contingent upon further characterization of the materials to document that concentrations of Site COCs are less than Env-Or 600 SRS. If SRS are exceeded, then after waste characterization the materials would need to be removed from the Site and disposed of as a regulated waste, or further processed off-site for an off-site re-use in accordance with receiving facility requirements.

7.0 DESCRIPTION OF EVALUATION CRITERIA

The comparison of the remediation alternatives was conducted using the evaluation and threshold criteria discussed below.

7.1 Overall Protection of Human Health and the Environment

Alternatives must pass this threshold criterion to be considered for implementation as the recommended alternative. The goal of this criterion is to determine whether a remediation alternative provides adequate protection of human health and the environment. It also addresses how identified risks are eliminated, reduced, or controlled. Protection of human health is assessed by evaluating how Site risks from each exposure route are eliminated, reduced, or controlled through the specific alternative.

7.2 Technical Practicality

The focus of this evaluation criterion is to determine technical practicality of implementing the specific alternative. This criterion evaluates the likelihood that the alternative will meet project specifications.

7.3 Ability to Implement

This criterion analyzes technical feasibility and the availability of services and materials. Technical feasibility assesses the ability to implement and monitor the effectiveness of the alternative. Availability of services and materials evaluates the need for off-site treatment, storage or disposal services and the availability of such services. Necessary equipment, specialists and additional resources are also evaluated.

Considering the goals and public nature of the project, the "ability to implement" should also reflect the degree of public support for the remedial approach. In consideration of this aspect of the project, these criteria also factor in the value of the remedial outcome to the community from a redevelopment perspective. The basis for evaluating the remedial alternatives level of community support is described below.

Manufacturing operations at the Site were discontinued in 2006. Since that time little progress has been made to integrating the two parcels into productive re-use for the community. At present the Former Industrial Building has been removed leaving behind sparsely vegetated soils in the building footprint, with known elevated concentrations of metals present in surface and near-surface soils. The Town of Walpole has conducted a series of public hearings to gauge community support and seek comment on the prospect of acquiring the property with the intent being to seek funding to remediate the Site and to incorporate these small land-locked parcels into a redevelopment plan for this portion of Walpole Village. The lots would be used to provide important off-street parking that would support street-front buildings and would reinvigorate the adjoining small commercial businesses in the Village. The community support for the project, to date, has been positive.

7.4 Reduction of Toxicity, Mobility, and Volume

This criterion evaluates the ability of the remediation alternative to significantly achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site. This analysis evaluates the quantity of contaminated soils to be removed, the degree of expected reduction in toxicity, the type and quantity of residuals to be reduced, and the manner in which the principle threat is addressed through the remediation alternative.

7.5 Short Term Effectiveness

This criterion addresses the period of time needed to complete the remediation, potential adverse impacts on human health and the environment that may exist until the cleanup goals are achieved, and the time frame for accomplishing the associated reduction in the identified environmental conditions.

7.6 Resiliency to Climate Change Conditions

This criterion evaluates the resilience of the remediation alternative to reasonably foreseeable changing climate conditions, such as increasing/decreasing temperatures, increasing/decreasing precipitation, extreme weather events, rising sea level, changing flood zones, and higher/lower groundwater tables, among others.

7.7 Preliminary Cost

The preliminary cost criterion for the remediation alternatives evaluates the estimated capital, operation, and maintenance costs of each alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering, sampling contingencies, and licenses. Costs were developed as a balancing criterion for the remedial alternatives and should not be construed as bid costs or engineer's cost estimates. Cost may be used as a distinguishing factor in the selection of the remedial action. The preliminary costs developed should in no way be construed as a cost proposal, but rather a guide for selecting a remedial alternative.

8.0 EVALUATION OF REMEDIATION ALTERNATIVES

Based on the evaluation criteria outlined in the previous section and the potential exposure pathways identified for the Site, the remedial actions selected for the Site should accomplish the following objectives:

1. Remove the residual mass of chromium-impacted soil documented at the Site and suspect nickel, cadmium, and PFAS contaminated soils and reduce or eliminate the potential for human contact to surface or near-surface soils;

2. Reduce or remove the known Site source and inferred sources of contaminated groundwater;

3. Remove the Wastewater Pre-Treatment Building to minimize the potential for human exposure to hazardous building materials and former industrial process residuals and allow access to a suspect source (soils impacted from sump discharges); and

4. Reduce the toxicity, mobility, and volume of Hazardous Building Materials.

To achieve these objectives, three remedial options were considered and are discussed in the following subsections.

8.1 Considered Remediation Alternatives

Three remedial alternatives were considered for the Site to remediate soils contaminated by plating processes, and to remediate groundwater at the Site, including the “Monitored Natural Attenuation” alternative, the “Excavate and Dispose of Soils with SRS Exceedances” alternative, and the “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” alternative. These alternatives were evaluated using the criteria described in Section 7.0 and are summarized below. At this time, redevelopment plans have not yet been finalized; therefore, these remedial alternatives are proposed with the understanding and consideration that the community’s preferred future use of the Site is as a parking lot in support of the Village. It should be noted that in addition to the selected alternative, abatement/removal of hazardous building materials is assumed to occur regardless of the alternative selected.

8.1.1 Monitored Natural Attenuation

A MNA alternative signifies that no remediation activities would be conducted at the Site, other than the removal (and proper disposal) of the upper 1.5 feet of soils over non-paved areas to construct a parking lot, but periodic sampling of the groundwater would be ongoing over a long time period as attenuation through mobilization and dilution slowly reduces the residual source(s) in contact with groundwater. Remaining soils would be managed in place under an AUR. The MNA alternative does not include an active means for mitigating long-term groundwater quality standard violations. The MNA alternative includes long-term groundwater monitoring activities that would be required with this approach. If no remedial action is taken, metal and PFAS-impacted groundwater would likely persist at the Site for a significantly longer time period than for remedial alternatives that actively reduce source(s); therefore, 50 years of monitoring is assumed.

The MNA alternative is not fully protective of human health and the environment and does not meet the threshold criteria because it does not address ongoing sources to groundwater impacts. The MNA alternative achieves some reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site by removal of the building and associated wastes as well as surface soils to construct the parking lot.

The MNA alternative was not selected for implementation or further consideration because NH DES-required source reduction to mitigate ongoing risk of groundwater impacts would not be achieved. As such a detailed evaluation is not provide here-in, but criteria evaluations for this alternative and the logic for its elimination are presented in Tables 4, 5, and 8.

8.1.2 Excavate and Dispose of Soils with SRS Exceedances

The second remediation alternative evaluated in this ABCA is the "Excavate and Dispose of Soils with SRS Exceedances" alternative. As part of this alternative:

1. The building on-site would be abated of hazardous materials the sump's contents removed and properly disposed of and the sumps and adjoining areas cleaned and tested, the building demolished and properly disposed of;

2. Regulated soils with impacts greater than SRS would be removed (from plating line area and from beneath the sumps);

3. Soils would be stockpiled into suspect hazardous soils, and suspect non-hazardous (from the plating area low-level impacts, or sump area contingent upon field screening results) soils;

4. Stockpiled soils would be tested for waste characterization parameters;

5. Stockpiled and characterized soils would be disposed of based on hazardous waste listing (beneath sumps soils) or characteristic (plating area soils);

6. Non-regulated soils with PAH SRS exceedances, soils in the upper 1.5 feet and outside of the remediation excavation areas, and concrete from the demolished building foundations and floor slab containing PFAS would be reused as backfill in remedial excavations beneath the paving section but above the groundwater table; and

7. A GMP application would be prepared and groundwater would be managed under a GMP for an assumed period of 15 years at a proposed initial frequency of five wells, two times per year for two years followed by five wells, one time per year for three years and at a subsequent frequency of five wells one time per year for five years; summary reports to be prepared two times every five years. Analyses is for RCRA metals, nickel and PFAS.

The "Excavate and Dispose of Soils with SRS Exceedances" alternative fulfills the evaluation criteria, as discussed below.

8.1.2.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health and the environment through minimizing or eliminating the regulated mass of contaminated soils at the Site and reducing the accessibility of unregulated soil with PAH impacts and concrete containing PFAS at the Site, thereby reducing the risk of human exposure to future Site visitors and/or the ongoing source to groundwater impacts. The goal of reducing or eliminating the risk of human exposure and meeting soil and groundwater regulatory objectives could be achieved through this alternative.

8.1.2.2 Technical Practicality

Removal/demolition of the Site building and excavation/disposal of impacted soils at the Site is technically practical and could be completed utilizing accepted remediation and construction techniques. Contractors with experience with similar projects are readily available in the region.

8.1.2.3 Ability to Implement

Removal/demolition of the Site building and excavation/disposal of impacted soils at the Site is technically feasible and is an effective action for reducing the risk of human exposure to impacted soil and attainment of AGQS over time. Services and materials necessary to conduct this alternative are readily available.

8.1.2.4 Reduction of Toxicity, Mobility, and Volume

This remediation alternative can achieve significant reduction of the residual volume of impacted soil at the Site, in-turn decreasing the duration of groundwater impacts above AGQS. Removal of Site impacted soil and on-Site relocation and management of unregulated PAH-impacted soils and PFAS-containing shallow soil and concrete would reduce or eliminate the risk of exposure by trespassers and potential workers associated with Site redevelopment or ongoing maintenance. Following removal of the source of groundwater impacts, significant reductions in overburden groundwater chromium and PFAS concentrations and possibly nickel and cadmium concentrations could be expected in the near term at the Site. However, it is anticipated that groundwater impacts will remain for a number of years since this alternative does not target remediation of the existing dissolved-contaminant groundwater plume, which has extended off-Site, and attenuation of impacts to groundwater as a result of the plume extending downward into low-permeability soils (clay/silt) will extend the period of natural attenuation.

8.1.2.5 Short Term Effectiveness

Potential adverse impacts to human health from exposure to impacted near-surface soils is ongoing in the area of the former plating lines and where coal combustion residuals or PFAS compounds (albeit at concentrations less that DCRB standards) are present, particularly to trespassers. Once the remediation is completed, the risk of human exposure to the near-surface contamination sources will be eliminated. Ransom anticipates that this remedial approach could be implemented within one year of funding and approval to proceed.

8.1.2.6 Resiliency to Climate Change Conditions

Based on the information contained in the SHA Phase I ESA, the Site is situated at an approximate elevation of 396 feet above mean sea level (AMSL) and is not located within mapped 100-year or 500-year flood zones. Due to the upland setting and lack of potentially-threatening surface water features in the area, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat. As such, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. Due to the short time span estimated to complete the remedial soil excavation activities, this alternative should be timed with seasonal low groundwater table to reduce construction complexity (dewatering needs, excavation slope stability degradation, and backfill compaction difficulties), and would otherwise generally not be impacted by extreme weather conditions.

8.1.2.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 6 - Summary of Estimated Remediation Costs for “Excavate and Dispose of Soils with SRS Exceedances”. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering contingencies. The costs associated with this alternative are not prohibitive but are higher than the costs associated with Alternative 3 “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place”.

8.1.3 Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place

The third remediation alternative evaluated in this ABCA is the “Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place” alternative. As part of this alternative:

1. The building on-site would be abated of hazardous materials the sump’s contents removed and properly disposed of and the sumps and adjoining areas cleaned and tested, the building demolished and properly disposed of;

2. Regulated soils with impacts greater than a leaching-based Site-specific standard would be removed from the plating line area and all soils from beneath the sumps would be removed;

3. Soils would be stockpiled into known hazardous (from beneath the sumps) soils, suspect hazardous (from the plating area of high-level impacts) soils;

4. Stockpiled soils would be tested for waste characterization parameters;

5. Stockpiled and characterized soils would be disposed of based on hazardous characteristic;

6. Soils exceeding SRS but meeting the Site-specific leaching based standard as well as non-regulated soils with PAH SRS exceedances, soils in the upper 1.5 feet and outside of the remediation excavation areas, and concrete from the demolished building foundations and floor slab containing PFAS would be

reused as backfill in remedial excavations beneath the paving section but above the groundwater table and managed under an AUR; and

7. A GMP application would be prepared and groundwater would be managed under a GMP for an assumed period of 25 years at a proposed initial frequency of five wells, two times per year for two years followed by five wells one time per year for three years and at a subsequent frequency of five wells one time per year for five years; summary reports to be prepared two times every five years. Analyses is for RCRA metals, nickel and PFAS.

The "Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place" alternative fulfills the evaluation criteria, as discussed below.

8.1.3.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health and the environment through minimizing or eliminating the regulated mass of contaminated soils at the Site that is likely to contribute to groundwater impacts and reducing the accessibility of lower concentration soils above the SRS and unregulated soil with PAH impacts and concrete and shallow soil with PFAS at the Site, thereby reducing the risk of human exposure to future Site visitors. The goal of reducing or eliminating the risk of human exposure and meeting soil and groundwater regulatory objectives could be achieved through this alternative.

However, the success of this approach is contingent upon being able to identify a Site-specific leaching based standard that is protective of groundwater and then being able to identify soils above that standard in "real time", during excavation.

8.1.3.2 Technical Practicality

Removal/demolition of the Site building and excavation/disposal of impacted soils at the Site is technically practical and could be completed utilizing accepted remediation and construction techniques. Contractors with experience with similar projects are readily available in the region.

SPLP data collected as part of this investigation did not identify a leaching-based standard at a concentration greater than the SRS that would provide confidence in reducing future impacts to groundwater, nor was the investigation able to develop a good correlation between SPLP data and real-time XRF field data. Therefore, although financially desirable, this alternative does not appear to be practical from a technical implementation perspective.

8.1.3.3 Ability to Implement

Removal/demolition of the Site building and excavation/disposal of impacted soils at the Site is technically feasible and is an effective action for reducing the risk of human exposure to impacted soil and attainment of AGQS over time. Services and materials necessary to conduct this alternative are readily available.

8.1.3.4 Reduction of Toxicity, Mobility, and Volume

This remediation alternative can achieve significant reduction of the residual volume of impacted soil at the Site, in-turn decreasing the duration of groundwater impacts above AGQSs. Removal or on-Site relocation and management under an AUR of Site impacted soil with concentrations above the SRS would reduce or eliminate the risk of exposure to trespassers and potential workers associated with Site redevelopment or ongoing maintenance. Following removal of the source of groundwater impacts, significant reductions in overburden groundwater chromium and PFAS concentrations and possibly nickel and cadmium concentrations could be expected in the near term at the Site. However, it is anticipated that groundwater impacts will remain for a number of years since this alternative would leave in place marginally impacted soils at concentrations less than a Site-specific leaching-based standard, the reliability of the Site specific standard is suspect, the remediation would not mitigate the existing dissolved-contaminant groundwater plume which has extended off-Site, and attenuation of impacts to groundwater as a result of the plume extending downward into low-permeability soils (clay/silt) will extend the period of natural attenuation.

8.1.3.5 Short Term Effectiveness

Potential adverse impacts to human health from exposure to impacted near-surface soils is ongoing in the area of the former plating lines and where coal combustion residuals are present, particularly to trespassers. Once the remediation is completed, the risk of human exposure to the near-surface contamination sources will be eliminated. Ransom anticipates that this remedial approach could be implemented within one year of funding and approval to proceed.

8.1.3.6 Resiliency to Climate Change Conditions

Based on the information contained in the SHA Phase I ESA, the Site is situated at an approximate elevation of 396 feet AMSL and is not located within a mapped 100-year or 500-year flood zones. Due to the upland setting and lack of potentially-threatening surface water features in the area, climate change effects from rising sea level and changing flood zones are not anticipated to represent a major threat. As such, the primary climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. Due to the short time span estimated to complete the remedial soil excavation activities, this alternative should be timed with seasonal low groundwater table to reduce construction complexity (dewatering needs, excavation slope stability degradation, and backfill compaction difficulties), and would otherwise generally not be impacted by extreme weather conditions.

8.1.3.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 7 - Summary of Estimated Remediation Costs for "Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place". Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering contingencies. The costs associated with this alternative are not prohibitive and are lower than the costs associated with Alternative 2 “Excavate and Dispose of Soils with SRS Exceedances”.

8.2 Selection of Proposed Remediation Alternative

After assessing each Alternative using the previously listed evaluation criteria, the Alternatives were compared using the decision matrix approach (see Table 8). The decision matrix technique allows both objective and subjective parameters to be evaluated quantitatively.

For each Alternative, a value was assigned to each of the seven criteria. The rationale for assignment of values is presented below:

1. *Overall Protection of Human Health and the Environment* – A value of 2 was assigned for Alternative 1 (MNA). This reflects that near surface soils (upper 1.5 feet) will be removed to prepare the Site for paving; therefore, a reduction in exposure risk will be achieved; however, because no effort will be made to reduce the sources of impacts to groundwater a long term requirement for monitoring of groundwater (50 years) has been assumed. Contaminated soils will remain in place and require continued management under an AUR. Alternative 2 (excavate soils above SRS) was assigned a value of 5 because inferred sources of contamination will be removed, and the remaining contaminated groundwater will attenuate following removal of the source of contamination. Alternative 3 (excavate soils above leaching based standard, with AUR for other soils) will reduce the risk of human exposure to soils, but the soils will remain in place and require continued management under an AUR. In addition, although the approach is intended to achieve the same objective of groundwater source removal as Alternative 2, the uncertainty of establishing a reliable leaching-based soils standard further erodes the certainty of this option. A value of 3 was assigned.

2. *Technical Practicality* – Alternative 1 (MNA) presented no significant challenges to technically practicality and was assigned a value of 5. Alternative 2 (excavate soils above SRS) presents standard potential excavation safety concerns and requires the removal of cover soils to access deeper soils and was assigned a value of 3. Alternative 3 (excavate soils above leaching based standard, with an AUR for other soils) has some of the excavation safety concerns of Alternative 2, but also the technical challenge of determining and meeting a leaching-based clean-up criteria. Furthermore, reduction in the volume of mass removal will reduce the likelihood that one PFAS source is removed. Therefore, it was assigned a value of 2.

3. *Ability to Implement* – There were no significant limiting technical factors or the materials or services availability affecting the ability to implement Alternatives 1, and 2. However Alternative 3 (excavate soils above leaching based standard, with AUR for other soils) will be difficult to implement because of the uncertainty surrounding selecting a reliable leaching-based standard for chromium and no evidence to support a clear correlation of laboratory data to XRF data for an acceptable lower-limit of chromium leachability for soils to be left in place, which make field implementation impractical. Based on these considerations Alternatives 1, 2, and 3 were assigned values of 5, 4 and 2, respectively.

4. *Reduction of Toxicity, Mobility, and Volume* – A value of 2 was assigned for Alternative 1 (MNA). This reflects a long time period for the process of contaminant attenuation (through dilution only) but a reduced risk of soils exposure while the source remains. Alternative 2 (excavate soils above SRS) was assigned a value of 5 because the known and inferred sources of metals contamination and one PFAS source will be removed and the remaining contaminated groundwater will attenuate following removal of the source of contamination. Alternative 3 (excavate soils above leaching based standard, with an AUR for other soils) was assigned a value of 3 because low-level impacted surficial soils will be relocated under a pavement section managed under an AUR, the most grossly impacted soils will be removed, and the remaining contaminated groundwater will attenuate following removal of the source of contamination.

5. *Short Term Effectiveness* – Alternative 1 (MNA) is expected to require many years for remediation due to the uncertainty of contaminant attenuation rates at this Site, but parking lot construction will remove surface soils, and an AUR for remaining soils will result in effective near-term reduction of human exposure risk to soils. A value of 3 was assigned. Alternative 2 (excavate soils above SRS) and 3 (excavate soils above leaching based standard, relocate shallow soils to deep excavation areas and manage those remaining soils under an AUR) will eliminate short-term exposure risks for metals impacted soils and eliminate or reduce source area contributions to groundwater impacts and therefore a value of 5 and 4, respectively, was assigned to each alternative.

6. *Resiliency to Climate Change Conditions* – None of the alternatives are directly affected by climate change and the duration of site disturbance for the excavation options is short-lived and is not inferred to present unmanageable risks resulting from severe storms. Therefore, each of these alternatives was assigned a value of 5.

7. *Preliminary Costs* – Alternative 1 (MNA) has no construction costs other than those to construct the parking lot, but the long duration of monitoring increases the life cycle cost and the removal and excavation and disposal of near-surface soils over a broad area to accommodate the paving section adds to this alternative's cost. Hence a value of 4 was assigned. Costs for Alternative 2 (excavate soils above SRS) are the highest and there is uncertainty relative to disposal costs for PFAS contaminated soils (at some point in the future regulations/facility acceptance criteria may change and increase or decrease disposal costs), therefore a value of 2 was assigned. Excavation and disposal costs for Alternative 3 are less than for 2; however, the possible increase in the groundwater monitoring time period at least partially offsets any short-term savings, therefore a value of 3 was assigned.

Weighting factors were then applied as noted below and a total score calculated for each alternative. Weighting factors are somewhat subjective, range from a high of 4 to a low of 1, and are used as a multiplier to reflect the significance of each criteria relative to project goals. The highest weighting factor, 4, was assigned to Overall Protection of Human Health and the Environment. The lowest weighting factor, 1, was assigned to Resiliency to Climate Change, because no issues were identified for this Site and the remedial alternatives considered. The remaining criteria (Technical Practicality, Ability to Implement, Reduction in Toxicity/Mobility/Volume, Short Term Effectiveness and Preliminary Costs) were equally weighted at a multiplier of 3 which acknowledges the importance of each of these factors in successful implementation of any corrective action.

Results of the decision matrix comparison are presented in Table 8. Based on the results of the Decision Matrix, Alternative 2: the “Excavate and Dispose of Soils with SRS Exceedances” has been selected as the preferred remediation alternative. This alternative is proven to protect human health and the environment; is effective, technically feasible, and practical; and is cost-effective.

9.0 CONCEPTUAL REMEDIAL ACTION PLAN

The "Excavate and Dispose of Soils with SRS Exceedances" Alternative protects human health and the environment and is effective, technically feasible, and practical. Because this alternative meets the evaluation criteria and is not cost-prohibitive, this alternative has been selected for implementation at the Site. Appendix C provides a breakdown of costs for remediation under this scenario, and also provides back-up for the costs presented in Tables 5, 6, and 7.

Note that the identification of PFAS in shallow Site soils and groundwater and the identification of past Site operations as one possible source of the PFAS introduces additional unknowns to this ABCA. Although no SRS for regulated PFAS compounds have been established by the NH DES, that regulatory outcome is likely. It is also likely that if the Site plating operations were a source of the PFAS detected in Site groundwater and shallow soils and that the excavations proposed under this ABCA/RAP will mitigate a potential ongoing residual PFAS source that could be present in Site soils.

9.1 Remedial Soil Excavation

As noted in Section 8.1.2:

1. Regulated soils with impacts greater than SRS will be removed (from plating line area and from beneath the sumps). Soils to be removed are as shown in Figure 4 and Figure 5. An XRF analyzer will be used to screen soils during the excavation work to substantiate the limits of the excavation using criteria developed as part of this Supplemental Phase II ESA. To meet the SRS for hexavalent chromium an XRF screening standard of 390 ppm total chromium will be used; soils with XRF screening results greater than 1,500 ppm will be segregated (see Section 1.6 for screening standards rationale) as potential characteristic hazardous waste. The soils will be strategically removed leveraging off of the 3-dimensionally mapped concentration data to be as efficient as possible in segregating high-level impacted soils from low-level impacted soils for the former plating area. As a soil volume (and disposal cost) reduction measure Ransom proposes that a step-wise approach to soils excavation be implemented such that priority analyses of excavation endpoint samples for hexavalent and trivalent chromium be conducted when XRF screening results document concentrations at 50% of the 1,500 ppm field segregation value (i.e. 750 ppm), which also corresponds to approximately two times the SRS hexavalent screening standard. The same field screening criteria and excavation approach will be used for soils excavated from beneath the sumps in the Former Wastewater Pre-Treatment Building to determine probable SRS attainment as well as the potential for soils to be a characteristic waste. It is Ransom's understanding, based on NH DES preliminary input for the specific occurrence of these soils, that soils from beneath the sump would not be considered an F-listed waste, absent the presence of observable sludge.

2. Endpoint sampling will be conducted for laboratory analyses for Site COCs (total chromium, hexavalent chromium, nickel, cadmium, and PFAS for the former plating line excavation; the same suite of analyses plus the additional RCRA 8 metals for the sump area excavation) to document contaminant concentrations remaining post-remediation. Discrete soil samples will be collected from shallow (0 to 2 feet bgs), mid-depth (8 to 10 feet bgs) and deep (0 to 2 feet above the sand/clay interface) excavation sidewall soils, as well as the excavation base for the plating line excavation. Discrete soil samples will

be collected from mid-depth sidewall soils (8 to 10 feet bgs), as well as the base for the sump area excavation. Should SRS exceedances be documented then additional excavation and endpoint sampling and analyses would be warranted. If additional excavations are not practicable then the NH DES will be contacted to report the findings and seek authorization to manage potentially lower-risk COCs that may remain under an AUR.

3. Soils will be stockpiled into suspect hazardous (plating area high-level impacted) soils, and suspect non-hazardous (plating area low-level impacted, and beneath sumps) soils. Stockpiled soils will be tested for waste characterization parameters, including for TCLP chromium.

4. Stockpiled and characterized soils will be disposed of based on characteristic.

5. Non-regulated soils with PAH SRS exceedances and concrete from the demolished building foundations and floor slab containing PFAS as well shallow (less than 1.5 feet deep) soils with PFAS concentrations less than the NH DES EHP DCRB residential standard will be reused as backfill in remedial excavations beneath the paving section, but above the groundwater table in a known and mapped location. The concrete will require processing to a 6 inch minus material size prior to being reused as backfill in remedial excavations. No requirement for an AUR is anticipated, contingent upon excavations endpoint laboratory results.

6. Dewatering of one or both excavations may be required to provide stable excavation condition and safely remove deep soils, and/or to place and compact backfill. Groundwater removed from the excavation will require off-site disposal or treatment and discharge in accordance with necessary local, state, or federal permitting requirements if to the ground, or to the stormwater drainage systems (i.e., ultimately surface water). The Town has indicated that it will not accept discharges of treated or untreated groundwater from the Site to the municipal sewer.

7. A GMP application would be prepared and groundwater would be managed under a GMP for an assumed period of 15 years (specifically until two consecutive sampling rounds meet AGQS) at a proposed initial frequency of five wells, two times per year for two years followed by five wells one time per year for three years and at a subsequent frequency of five wells one time per year for five years; summary reports to be prepared two times every five years. Analyses is for RCRA metals, nickel and PFAS.

9.2 Former Wastewater Pre-Treatment Building Abatement and Demolition

In order to access one of two inferred sources of groundwater impacts at the Site, the Former Wastewater Pre-Treatment Building will require the abatement of hazardous building materials, the removal and proper disposal of hazardous substances from within the building, and demolition and disposal of the building.

9.2.1 Asbestos Abatement/Removal

The building on-site would be abated of hazardous materials, the sumps contents removed and properly disposed of, and the sumps and adjoining areas cleaned, tested, the building demolished and properly disposed;

ACM abatement will be performed using approved methods in accordance with applicable regulations established by the U.S. EPA, OSHA, and the NH DES. ACM will be removed by a licensed asbestos abatement contractor in accordance with RSA 141-E and the NH Administrative Rules Env-A 1800, *Asbestos Management and Control*.

9.2.2 Hazardous Substances

The contents of the sumps will be removed, containerized, sampled, tested, and securely stored, in compliance with the Hazardous Waste Rules until properly disposed. Concrete sump walls, floor, and wood in proximity to the sump, and sump vent materials will be cleaned/decontaminated, and/or properly characterized and disposed of in accordance with the Solid Waste Rules and Hazardous Waste Rules, as appropriate.

9.2.3 Lead-Based Paint Abatement

Any lead-based paint present on the building will be abated in accordance with State and Federal regulations. Since the building is proposed to be demolished, LBP abatement conducted as part of this cleanup project will include demolition and off-site disposal of the lead-painted surfaces/materials as construction and demolition debris at an appropriate disposal facility.

Handling of components coated with lead-containing paint requires compliance with the OSHA lead standard ("Lead in Construction," 29 CFR 1926.62). Under the existing conditions, demolition contractors may perform demolition, renovation, abatement, stabilization, cleanup, and daily operations in buildings that have lead-based paint or lead-containing coatings, provided that the following regulatory requirements are met:

1. Demolition activities that disturb surfaces that contain lead must be conducted in accordance with the OSHA regulation 29 CFR 1926.62 "Lead Exposure in Construction: Interim Final Rule." This regulation requires that a Site-specific health and safety plan be prepared before conducting activities that create airborne lead emissions such as cutting, grinding, or sanding surfaces coated with lead-containing paint. Such a plan must include the identification of lead components, an exposure assessment, and, if applicable, the required work procedures and personal protective equipment to be used.

2. The U.S. EPA and NH DES regulate the disposal of potentially hazardous wastes. Such wastes include paint chips and residue generated during abatement or repainting work, or whole components, such as wood windows, doors, and trim coated with lead-containing paint and disposed of as a result of proposed demolition work. Metal components are not regulated if they will be recycled and not disposed of in a landfill.

3. To minimize exposure to airborne dust or fumes containing lead and avoid the requirement to implement a lead exposure assessment, torch burning, cutting, grinding, or similar high impact work on components covered by lead-containing paint should be avoided. Such work would need to be conducted by properly trained workers using appropriate worker protection and engineering controls. For work activities that may generate airborne lead, the employer should perform an initial exposure assessment (personal air monitoring) for each individual task (e.g. demolition, abrasive blasting, and painting) that has the potential for causing worker exposure to be at or above the OSHA Action Level (30 micrograms of lead per cubic meter of air). In lieu of monitoring, recent historical data from similar operations may be used to comply with OSHA requirements.

9.2.4 Universal Waste Removal

Universal and other identified wastes will be properly characterized, handled, transported, and disposed off-site in accordance with NH DES regulations. Trained individuals will package the waste in appropriate containers with proper labeling. Shipment of waste will be conducted in accordance with established New Hampshire Department of Transportation protocol.

9.3 Green Remediation Principals

The remediation will be implemented in accordance with the U.S. EPA's Clean and Greener Policy for Contaminated Sites, Revised February 2012 (Green Remediation Principals). As much as feasible, the demolition and remediation contractors will use well maintained, appropriate-sized machinery, which may reduce fuel consumption and emissions. When economically feasible, building materials of value will be salvaged for reuse. For example, durable building materials, such as concrete, and masonry debris from demolition of the existing building will be staged on-site for reuse as pavement subgrades of remediation excavation backfill (above the groundwater table) as part of future site development or recycled off-site for reuse as an aggregate. In addition, as noted in Section 9.1, the proposed remediation would require, to the extent practicable, re-use of proposed "cut" asphalt parking area subgrade soils as remediation excavation backfill (above the groundwater table) to minimize energy use of materials trucking, minimize virgin material (clean backfill of off-site origin) resource consumption, and to preserve landfill capacity otherwise needed for low-level contaminated soils disposal.

The remediation will be conducted in a manner which is ultimately protective of the air (via dust control and minimizing equipment idling emissions), nearby stormwater and surface water drainages (through stringent erosion and sedimentation control measures), and human receptors (via physical barriers and restrictions to prevent human contact with the impacted areas).

10.0 REPORTING

Following completion of the selected alternative, the following reporting requirements will be completed.

1. An independent industrial hygienist that performs any required asbestos abatement clearance air sampling shall provide copies of the air sampling results to NH DES per the applicable rules.

2. A remediation implementation report summarizing the field activities, confirmatory sampling results, and disposal documentation associated with the soils remediation will be submitted to NH DES and EPA.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Environmental investigations conducted at the Site identified contamination associated with historic Site operations, including the presence of hazardous building materials, hazardous substances within the building (sumps contents), and metals- (notably hexavalent and trivalent chromium), and PFAS-contaminated soil and groundwater (chromium, nickel, cadmium, and PFAS). To address the impacted media on-site, three remediation alternatives were evaluated, including a Monitored Natural Attenuation" alternative, an "Excavate and Dispose of Soils with SRS Exceedances" alternative, and a "Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place" alternative. These alternatives also included additional remedial work including the removal and abatement of hazardous building materials and demolition of the building as well as soils excavation to prepare for a proposed parking lot.

Alternative 1 – the MNA alternative was determined to be unacceptable because it did not meet threshold criteria of the overall protection of human health and the environment.

Alternative 3 – Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place suffered from the lack of supporting technical documentation to arrive at an appropriate leaching-based standard to be protective of future groundwater impacts and also would be less aggressive at remediating suspect PFAS impacted soils.

Alternative 2 – Excavate and Dispose of Soils with SRS Exceedances protects human health and the environment and is effective, technically feasible, practical, and provides a construction site ready for redevelopment as a proposed parking lot in support to the Walpole Village needs. Because this alternative meets the evaluation criteria and could be largely funded through a U.S. EPA Clean-up Grant, this is the recommended remedial alternative. It should be noted that since the preparation of the initial draft of this RAP, regional soil disposal facilities have a heightening awareness of the possible increased costs of accepting PFAS contaminated soils. These increased costs are associated with the expense of treating landfill leachate to meet possible future landfill leachate discharge limits. As such, some facilities have decided not to accept additional soils with known PFAS contamination. Therefore, the cost estimates provided in this report have been updated and may increase (or decrease); the extent of that possible change in cost is presently unknown. Management options for PFAS-contaminated soils and their costs should come into better focus as experience and regulations associated with this emerging suite of contaminants evolve.

Please note that because inferred uses of PFAS on the Site associated with past facility operations were largely co-located with the plating and waste management processes that are also driving the clean-up proposed herein, the recommended remedial action is anticipated to mitigate PFAS source soils in the planned excavation areas on Site. The NH DES is likely to require additional investigations to: (1) further assess the spatial extent of PFAS groundwater impacts; and (2) investigate whether PFAS impacts on the upgradient Mascoma Bank property where the reported likely use of AFFF by the Walpole Fire Department to extinguish a fire has contributed to PFAS groundwater impacts. While the proposed remediation is a proactive remedial approach that will remove soils from some areas of known or inferred PFAS impacts, evolving regulations pertaining to PFAS -contaminated soils as well as evolving disposal facility limitations on accepting those soils adds uncertainty relative to possible additional required investigations, remediation, liability, disposal costs, and the duration of GMP-required groundwater monitoring, which are not fully factored into this ABCA/RAP.

In addition, based on the recent findings of a second on-Site source (area of the former Teflon tank and vent discharge at that north end of the Former Industrial Building), in an area not previously targeted for soil excavation, removal of this additional PFAS source may be warranted at some point in the future, if and when leaching-based soils standards are established by the NH DES.

12.0 REFERENCES

1. Sanborn, Head and Associates, Inc., December 2013; Phase I Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire.

2. Sanborn, Head and Associates, Inc., December 2013; Phase II Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire.

3. Stantec, July 20, 2006; Phase I Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire.

4. NH DES Env-Or 600 Soil Remediation Standards and Ambient Groundwater Quality Standards, Updated June 1, 2016.

5. NH DES Risk Characterization and Management Policy, Method 1 Soil Standards, Updated February 2013.

6. U.S. EPA; May 2016; Maximum Contaminant Levels.

7. U.S. EPA; May 2016; Regional Screening Levels.

8. NH DES OneStop Database.

9. Ransom Consulting, Inc.; January 19, 2016; Phase II Environmental Site Assessment, 12 Westminster Street, Walpole, New Hampshire.

10. Ransom Consulting, Inc.; June 23, 2017; Site-Specific Quality Assurance Project Plan – Supplemental Phase II Environmental Site Assessment; Central Plating, Inc. Site, Walpole, New Hampshire RFA #17091 Central Plating Site, Addendum No. 3, Rev. 1 to the State of New Hampshire Brownfields Assessment Projects Generic Quality Assurance Project Plan.

11. Ransom Consulting, Inc.; February 23, 2018; Limited Subsurface Investigation, 12 Westminster Street, Walpole, New Hampshire.

12. Sanborn Head & Associates, Inc.; October 17, 2017; Data Transmittal for Groundwater Sampling Per- and Polyfluoroalkyl Substances (PFAS); Former Central Plating Site, Walpole, New Hampshire.

13.0 SIGNATURE(S) OF ENVIRONMENTAL PROFESSIONAL(S)

Ransom performed services in a manner consistent with the guidelines set forth in the ASTM E1903-11, and in accordance with the scope of work and standard operating procedures outlined in the Generic QAPP and SSQAPP.

The following Ransom personnel possess the sufficient training and experience necessary to conduct an Supplemental Phase II ESA and ABCA, and from the information generated by such activities, have the ability to develop opinions and conclusions regarding remediation alternatives and a ABCA/RAP, as presented herein, for the Site.

Project Professional Engineer:

Jay P. Johonnett, P.E.
Project Engineer

Environmental Professionals:

Stephen J. Dyer, P.E.
Senior Project Manager

Steven Rickerich, P.G.
Senior Project Manager / Principal-in-Charge

TABLE 1: SOIL, CONCRETE, AND SUMP RESIDUALS SAMPLES LABORATORY ANALYTICAL RESULTS
Former Central Plating, Inc. Property
Walpole, New Hampshire

Sample Location	**NH DES Direct Contact Risk-Based (DCRB)S-1 Standard**	**NH DES DCRB S-2 Standard**	**NHDES Env-Or 600 Soil Remediation Standards (and NHDES RCMP Method 1, NH S-1)**	**NHDES RCMP Method 1, NH S-2 Soil Standard**	**NHDES RCMP Method 1, NH S-3 Soil Standard**	HB1	HB1	HB2	HB2	HB3	HB3	HB4	HB4	HB5	HB5	HB6	HB6	HB7	HB7	HB8	HB8	HB9	HB9	GS1	GS conc	GS Sumps
Sample Depth (feet bgs)						(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	(0-1)	(1-2)	0.5-1.5	N/A	N/A
RCRA Metals (mg/kg)																										
Arsenic	See NH S-1	See NH S-1	11	11	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.59	--
Barium	See NH S-1	See NH S-1	1,000	2,500	5,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	85.2	--
Cadmium	See NH S-1	See NH S-1	33	280	280	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	nd(0.435)	--
Chromium	See NH S-1	See NH S-1	130	130	130	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28.5	--
Lead	See NH S-1	See NH S-1	400	400	400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.37	--
Mercury	See NH S-1	See NH S-1	7	52	52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	nd(0.075)	--
Selenium	See NH S-1	See NH S-1	180	1,600	1,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	nd(0.87)	--
Silver	See NH S-1	See NH S-1	89	690	690	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	nd(0.435)	--
Per- and Polyfluoroalkyl Substances (PFAS) (mg/kg)																										
Perfluorobutanoic Acid (PFBA)	NE	NE	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluoropentanoic Acid (PFPeA)	NE	NE	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorobutanesulfonic Acid (PFBS)	NE	NE	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorohexanoic Acid (PFHxA)	NE	NE	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluoroheptanoic Acid (PFHpA)	NE	NE	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorohexanesulfonic Acid (PFHxS)	0.1	0.9	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorooctanoic Acid (PFOA)	0.2	1.3	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorononanoic Acid (PFNA)	0.1	0.9	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	nd(0.000910)	nd(0.00103)	nd(0.000950)	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	nd(0.00119)	nd(0.00143)	nd(0.00103)	nd(0.00100)	nd(0.0509)
Perfluorooctane sulfonate (PFOS)	0.1	0.6	NE	NE	NE	nd(0.00107)	nd(0.000921)	nd(0.00106)	nd(0.000998)	nd(0.000981)	nd(0.000909)	nd(0.000937)	nd(0.000942)	nd(0.000992)	0.00103	0.00217	0.00157	nd(0.00119)	nd(0.000949)	nd(0.000998)	nd(0.00106)	0.0016	0.0587	0.00384	0.0164	1.52

Legend:

bgs = Below Ground Surface	NE = None established	mg/kg = milligrams per kilogram	-- = not analyzed

nd( ) = none detected, detection limit (the reporting limit) is shown in parenthesis
J = estimated concentration detected above laboratory detection limit, but below laboratory reporting limit

NOTES:

1 - NHDES Env-Or 600 Soil Remediation Standards, Updated September 1, 2018. NH DES Risk Characterization and Management Policy (RCMP), Updated Feb 2013 (Appendix A-E Soil Values).
2 - PFHxS, PFOA, PFNA, and PFOS "standards" are Direct Contact Risk-Based (DCRB) Standards for PFAS developed by NH DES Environmental Health Program, updated December 11, 2020, utlizing NH DES Risk Characterization and Management Policy (RCMP) methodology. Exposure scenarios are for S-1 (residential) and S-2 (maintenance worker). These DCRB "standards" have not been adopted under Env Or 600.
3 - Bold type font and boxed value indicates concentration exceeds the NH DES DCRB standard (none indicated).

TABLE 2: EQUIPMENT BLANK LABORATORY ANALYTICAL RESULTS
Former Central Plating, Inc. Property
Walpole, New Hampshire

Sample Location	Equipment Blank Soil	Equipment Blank Concrete	Equipment Blank Sump
Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)			
Perfluorobutanoic Acid (PFBA)	nd(2)	nd(2)	nd(2)
Perfluoropentanoic Acid (PFPeA)	nd(2)	nd(2)	nd(2)
Perfluorobutanesulfonic Acid (PFBS)	nd(2)	nd(2)	nd(2)
Perfluorohexanoic Acid (PFHxA)	nd(2)	nd(2)	nd(2)
Perfluoroheptanoic Acid (PFHpA)	nd(2)	nd(2)	nd(2)
Perfluorohexanesulfonic Acid (PFHxS)	nd(2)	nd(2)	nd(2)
Perfluorooctanoic Acid (PFOA)	nd(2)	nd(2)	nd(2)
Perfluorononanoic Acid (PFNA)	nd(2)	nd(2)	nd(2)
Perfluorooctane sulfonate (PFOS)	nd(2)	nd(2)	4.26

Legend:

ng/L - nanograms per liter
nd( ) = none detected, detection limit (the reporting limit) is shown in parenthesis
J = estimated concentration detected above laboratory detection limit, but below laboratory reporting limit

TABLE 3. SUMMARY OF SAMPLES DUPLICATE LABORATORY ANALYTICAL RESULTS
Former Central Plating, Inc. Property
Walpole, New Hampshire

	Sample ID.	GSConc	Conc Dup	Relative Percent (%) Difference	GS Sumps	Sumps Dup	Relative Percent (%) Difference	GS1	Soil Dup	Relative Percent (%) Difference
CHEMICAL PARAMETER	**Date**	**6/23/20**	**6/23/20**		**6/23/20**	**6/23/20**		**6/23/20**	**6/23/20**	
RCRA METALS (mg/kg)										
Arsenic		4.59	7.86	52.5						
Barium		85.2	87.3	2.4						
Cadmium		nd(0.435)	nd(0.412)	NC						
Chromium		28.5	28.7	0.7						
Lead		3.37	3.23	NC						
Mercury		nd(0.075)	nd(0.077)	NC						
Selenium		nd(0.87)	nd(0.825)	NC						
Silver		nd(0.435)	nd(0.412)	NC						
Per- and Polyfluoroalkyl Substances (PFAS) (mg/kg)										
Perfluorobutanoic Acid (PFBA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluoropentanoic Acid (PFPeA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorobutanesulfonic Acid (PFBS)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorohexanoic Acid (PFHxA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluoroheptanoic Acid (PFHpA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorohexanesulfonic Acid (PFHxS)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorooctanoic Acid (PFOA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorononanoic Acid (PFNA)		nd(0.001)	nd(0.00101)	NC	nd(0.0509)	nd(0.05)	NC	nd(0.00103)	nd(0.00103)	NC
Perfluorooctane sulfonate (PFOS)		0.0164	0.0174	5.9	1.52	1.52	0.0	0.00384	0.00242	NC

Legend:
(mg/kg) = milligrams per kilogram
NC = not calculated
nd = parameter not detected above the reporting limit (provided in parentheses)

NOTE:
1. Relative percent difference is not calculated if the detected concentration is less than 5x the laboratory reporting limit.

TABLE 4. SUMMARY OF THE EVALUATION AND COMPARISON OF REMEDIAL ALTERNATIVES
Central Plating Site
Walpole, New Hampshire

Remedial Action Alternative (RAA)	Overall Protection of Human Health and the Environment	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility and Volume	Short Term Effectiveness	Resiliency to Climate Change	Estimated Cost[1]	Comments
1) Monitored Natural Attenuation	• Long-term risks to human health by exposure through direct contact, ingestion, and/or inhalation of chromium (and possible co-located nickel, cadmium and PFAS) contaminated soil will be mitigated by removal of 1.5 ft of soil and paving; remaining soils managed under an AUR. • No source reduction that would improve groundwater quality. No consumptive use of impacted groundwater identified. • Cleanup levels will not be met. • Risks to human health by direct contact, inhalation, and ingestion of hazardous building materials is significantly reduced or eliminated by removing the hazardous building materials from the Site and near-surface soils.	• No significant challenges.	• No significant challenges. • From a redevelopment and community support perspective, this approach does reduce human exposure risk and does not support planned redevelopment initiatives. • This option is unlikely to receive DES approval and would therefore not be a candidate for grant funding.	• Reduction in toxicity by removal of near-surface soils during parking lot construction. • No reduction in mobility or volume of the contaminated soils; no enhanced benefit to plume attenuation.	• Risk for human exposure to Site contamination will be immediately reduced or eliminated.	• This alternative is not directly affected by climate change.	• This alternative will require long-term groundwater monitoring and will cost approximately $182,452 over 50 years (present worth). • Costs for Full Hazardous Building Materials Abatement, materials removal/disposal and demolition/disposal is $62,500. • Cost for soils excavation, loading and disposal of upper 1.5 feet of soils over unpaved areas is $89,581. • Related engineering costs, including AUR preparation and recordation are $40,000. • These cost estimates are for remedial alternatives comparison purposes only and in no way should be construed as a cost proposal.	• This alternative does not fully address the key recognized environmental conditions at the property and is unlikely to receive DES approval due to little to no reduction in sources of groundwater impacts.
2) Excavate and Dispose of Soils with SRS Exceedances	• Protection of human health and the environment will be provided by excavation and off-site disposal of chromium (and possible co-located nickel, cadmium and PFAS) contaminated soil at the Site; therefore reducing the risk of human exposure to future Site visitors and/or occupants and off-Site water supply wells. • AGQSs will be attained sooner for groundwater. • Risks to human health by direct contact, inhalation, and ingestion of hazardous building materials or hazardous substances is significantly reduced or eliminated by removing the hazardous building materials and substance from the Site.	• Standard potential excavation safety concerns and requires the removal of cover soils to access some deeper soils. • No leaching-based soils standards have been established for PFAS; PFAS removal is solely focused on PFAS co-located with metals-impacted soils.	• The necessary services and materials to complete the remedial tasks are readily available, including the necessary equipment and contractors. • From a redevelopment and community support perspective, this approach is anticipated to garner modest to strong support, contingent upon managing expense.	• The known and inferred Site sources of contamination will be removed and unregulated surface soils with PAH concentrations above SRS will be relocated beneath the paving section; therefore, exposure risk will be eliminated. • The remaining contaminated groundwater will attenuate following removal of the Site sources of contamination. • No PFAS soils standards (leaching-based or exposure based) have been established. PFAS-impacted soils co-located with metals-impacted soils will be removed resulting in improved groundwater quality.	• Risk for environmental impacts and human exposure to Site contamination will be immediately reduced or eliminated.	• This alternative is not directly affected by climate change and the duration of site disturbance for the excavation option is short-lived and is not inferred to present unmanageable risks resulting from severe storms.	• This alternative will require reduced long-term groundwater monitoring and will cost approximately $81,697 over 15 years (present worth). • Costs for Full Hazardous Building Materials Abatement, materials removal/disposal and demolition/disposal is $62,500. • Cost for soils excavation, loading and disposal of regulated soils exceeding SRS is approximately $250,635. • Related engineering costs are $74,900. • These cost estimates are for remedial alternatives comparison purposes only and in no way should be construed as a cost. proposal.	• Worst-case soil disposal costs are high (additional $156,000) and would be in addition to the costs noted under this option. This cost addition would be if all excavated soils tested as hazardous. This is partly due to disposal premiums resulting from the inferred presence of PFAS in soils. • Not shown are programmatic costs ($30,000) if grant funding is utilized. • Not shown are cost for PFAS investigation and/or additional limited soils removal (if and when soil remediation standards are established) that are estimated to range from $1,500 to upwards of $50,000. • This alternative meets the evaluation criteria, is cost-effective, and provides flexibility in the future Site redevelopment. Therefore, this alterative is the recommended remedial alternative.

---

[1]. All costs are engineering order-of-magnitude estimates for the purpose of alternatives comparison based on information available at the time of this report. Actual bid costs may deviate from the estimates provided herein

TABLE 4. SUMMARY OF THE EVALUATION AND COMPARISON OF REMEDIAL ALTERNATIVES
Central Plating Site
Walpole, New Hampshire

Remedial Action Alternative (RAA)	Overall Protection of Human Health and the Environment	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility and Volume	Short Term Effectiveness	Resiliency to Climate Change	Estimated Cost^{1}	Comments
3) Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place	• Protection of human health and the environment will be provided by soils with a high potential to leach chromium (and possible co-located into groundwater at the Site and relocation use of impacted soils presenting and human exposure risk as deep backfill (above the groundwater table) isolated beneath paving and paving subgrade soils, managed under an AUR and therefore reducing the risk of human exposure to future Site visitors and/or occupants and off-Site water supply wells. • AGQSs will be attained sooner for groundwater, although. • Risks to human health by direct contact, inhalation, and ingestion of hazardous building materials or hazardous substances is significantly reduced or eliminated by removing the hazardous building materials and substance from the Site.	• Standard potential excavation safety concerns and requires the removal of cover soils to access some deeper soils. • Determining and meeting a leaching-based clean-up criteria for Site metals is a technical challenge. • No leaching-based soils standards have been established for PFAS; PFAS removal is solely focused on PFAS co-located with metals-impacted soils. • Reduction in the volume of mass removal will reduce the extent to which probable PFAS sources in the former planting line or sump areas are removed.	• The necessary services and materials to complete the remedial tasks are readily available, including the necessary equipment and contractors. • From a redevelopment and community support perspective, this approach is anticipated to garner modest to strong support, contingent upon managing expense.	• The low-level impacted surficial soils with contaminant concentrations above SRS will be relocated under a pavement section and managed under an AUR, the most grossly impacted soils that are likely to contribute to groundwater impacts will be removed; therefore, exposure risk will be controlled. • The remaining contaminated groundwater will attenuate following removal/reduction of the Site sources of groundwater contamination. • No PFAS soils standards (leaching-based or exposure based) have been established. PFAS-impacted soils co-located with metals-impacted soils will be removed resulting in improved groundwater quality.	• Risk for environmental impacts and human exposure to Site contamination will be immediately reduced or eliminated.	• This alternative is not directly affected by climate change and the duration of site disturbance for the excavation option is short-lived and is not inferred to present unmanageable risks resulting from severe storms.	• This alternative will require reduced long-term groundwater monitoring and will cost approximately $117,768 over 25 years (present worth). • Costs for Full Hazardous Building Materials Abatement, materials removal/disposal and demolition/disposal is $62,500. • Cost for soils excavation, loading and disposal of regulated soils exceeding SRS is approximately $165,762. • Related engineering costs, including AUR preparation and recordation are $59,900. • These cost estimates are for remedial alternatives comparison purposes only and in no way should be construed as a cost proposal.	• Worst-case soil disposal costs for this limited soil removal option are high (additional $56,000) and would be in addition to the costs noted under this option. This cost addition would be if all excavated soils tested as hazardous. This is partly due to disposal premiums resulting from the inferred presence of PFAS in soils. • Not shown are programmatic costs ($30,000) if grant funding is utilized. • Not shown are cost for PFAS investigation and/or additional limited soils removal (if and when soil remediation standards are established) that are estimated to range from $1,500 to upwards of $50,000. • This alternative meets many of the evaluation criteria, and is cost-effective; however, there is considerable uncertainty relative to establishing and meeting leaching-based clean-up goals which is a critical component of successful implementation. Therefore, this alterative is not the recommended remedial alternative.

[1]. All costs are engineering order-of-magnitude estimates for the purpose of alternatives comparison based on information available at the time of this report. Actual bid costs may deviate from the estimates provided herein.

TABLE 5. SUMMARY OF ESTIMATED REMEDIATION COSTS FOR MONITORED NATURAL ATTENUATION ALTERNATIVE

Central Plating Site
12 Westminster Street
Walpole, New Hampshire

Monitored Natural Attenuation Alternative	Number	Units	Unit Cost	Total
HBM Abatement & Demolition				
Design, abatement, materials removal/disposal, demolition, and oversight	1	LS	$62,500	$62,500
Surface Soils Removal/Disposal to Pave Site (assumes upper 1.5 feet of 7,165 ft^2)	1	LS	$89,581	$89,581
Monitoring				
Assumes 50 years of monitoring	1	LS	$182,452	$182,452
Engineering				
Design, oversight, RPI lab analyses and report, Groundwater Management Permit, AUR	1	LS	$40,000	$40,000
			Subtotal:	*$374,533*
			Contingency 20%:	$74,907
			TOTAL:	**$449,440**

Notes:

1. HBM = Hazardous Building Materials, LS = Lump Sum, RPI = Remedial Plan Implementation
2. Costs for Hazardous Building Materials Remediation assumes that all asbestos, lead-based paint, and universal wastes are abated and removed from the site. Sumps and area cleaned and wastes disposed of. Building demolished.
3. Costs to construct a parking lot are not included nor are costs for possible PFAS investigations and monitoring other than 5 wells, periodically, under "Monitoring".
4. See basis calculations in Appendix C for general assumptions. All costs are engineering order-of-magnitude estimates for the purpose of alternatives comparison based on information available at the time of this report. Actual bid costs may deviate from the estimates provided herein.
5. Cost shown for monitoring is a present-worth estimate assuming 3% inflation, 5% return on investment, and no permit fees (i.e., municipally owned).

TABLE 6. SUMMARY OF ESTIMATED REMEDIATION COSTS FOR EXCAVATE AND DISPOSE OF SOILS WITH SOIL REMEDIATION STANDARD EXCEEDANCES ALTERNATIVE

Central Plating Site
12 Westminster Street
Walpole, New Hampshire

Excavate and Dispose of Soils with SRS Exceedances	Number	Units	Unit Cost	Total
HBM Abatement & Demolition				
Design, abatement, materials removal/disposal, demolition, and oversight	1	LS	$62,500	$62,500
Soil Excavation				
Excavation, disposal, and backfilling	1	LS	$250,635	$250,635
Monitoring				
Assumes 15 years of monitoring (cannot be funded through EPA clean-up grants)	1	LS	$81,697	$81,697
Engineering				
Design, oversight, RPI lab analyses and closure report, Groundwater Management Permit	1	LS	$74,900	$74,900
Programmatic Costs for grant-funded projects, assuming two grants, if applicable.	1	LS	$30,000	$30,000
			Subtotal:	*$499,732*
			Contingency 20%:	$99,946
			TOTAL:	**$599,678**

Notes:

1. HBM = Hazardous Building Materials, LS = Lump Sum, RPI = Remedial Plan Implementation
2. Costs for Hazardous Building Materials Remediation assumes that all asbestos, lead-based paint, and universal wastes are abated and removed from the site. Sumps and area cleaned and wastes disposed of. Building demolished.
3. Costs to construct a parking lot are not included nor are costs for possible PFAS investigations, former Teflon tank areas soil excavation and disposal, and monitoring other than 5 wells, periodically, under "Monitoring".
4. See basis calculations in Appendix C for general assumptions. All costs are engineering order-of-magnitude estimates for the purpose of alternatives comparison based on information available at the time of this report. Actual bid costs may deviate from the estimates provided herein.
5. If all Site soils budgeted for excavation are disposed as hazardous and contain PFAS, then estimated disposal cost increases by $160,000.
6. Cost shown for monitoring is a present-worth estimate assuming 3% inflation, 5% return on investment, and no permit fees (i.e., municipally owned).

TABLE 7. SUMMARY OF ESTIMATED REMEDIATION COSTS FOR EXCAVATE AND DISPOSE OF SOILS TO REDUCE LEACHING POTENTIAL, MANAGE SOILS IN PLACE ALTERNATIVE

Central Plating Site
12 Westminster Street
Walpole, New Hampshire

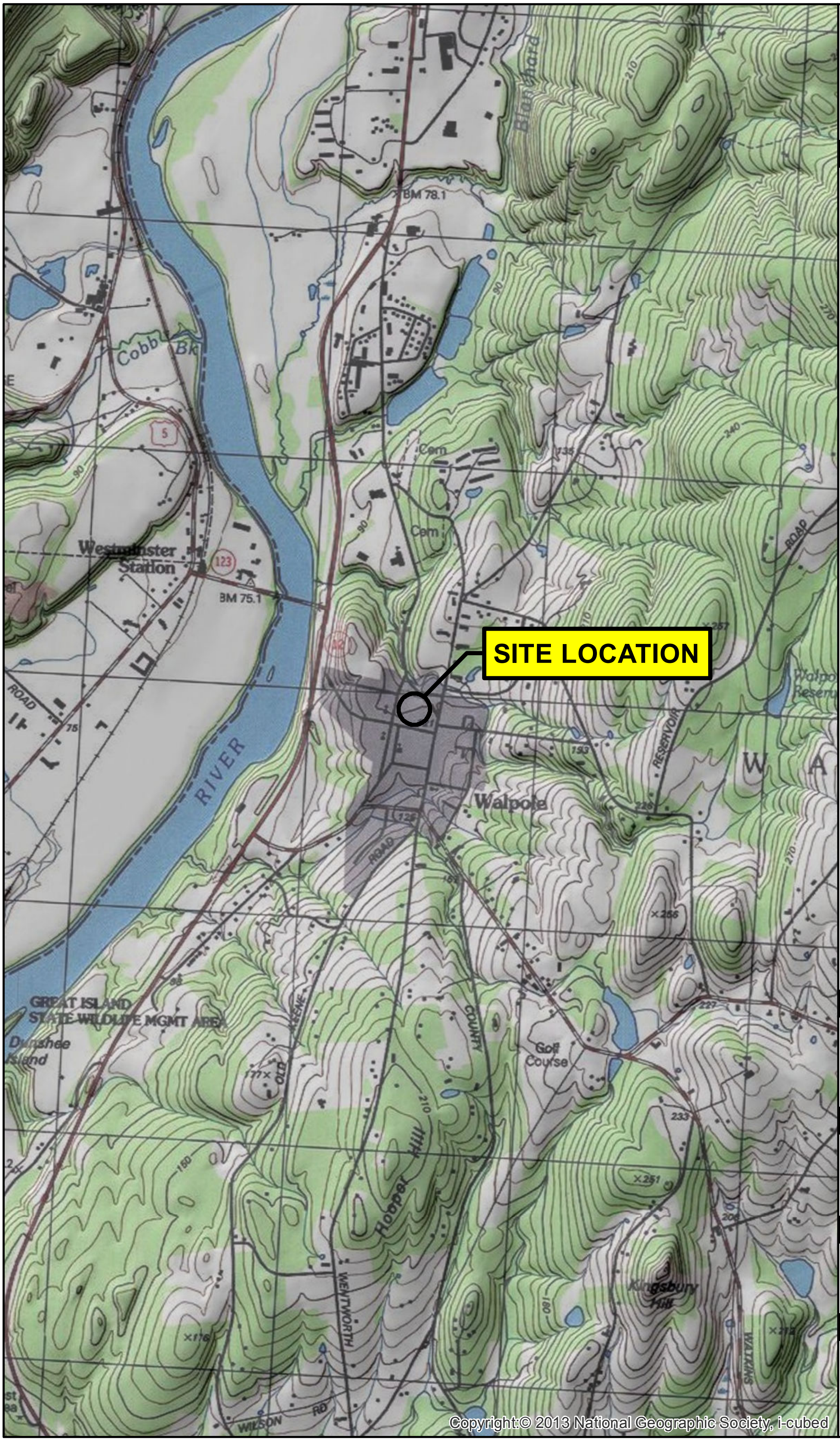
Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place	Number	Units	Unit Cost	Total
HBM Abatement & Demolition				
Design, abatement, materials removal/disposal, demolition, and oversight	1	LS	$62,500	$62,500
Soil Excavation - Source Removal Limited to Soils with Leaching Risk				
Excavation, disposal, and backfilling	1	LS	$165,762	$165,762
Monitoring				
Assumes 25 years of monitoring	1	LS	$117,768	$117,768
Engineering				
Design, oversight, RPI lab analyses, and closure report, Groundwater Management Permit, AUR	1	LS	$59,500	$59,500
Programmatic Costs for grant-funded projects, assuming two grants, if applicable.	1	LS	$30,000	$30,000
			Subtotal:	*$435,530*
			Contingency 20%:	$87,106
			TOTAL:	**$522,636**

Notes:

1. HBM = Hazardous Building Materials, LS = Lump Sum, RPI = Remedial Plan Implementation
2. Costs for Hazardous Building Materials Remediation assumes that all asbestos, lead-based paint, and universal wastes are abated and removed from the site. Sumps and area cleaned and wastes disposed of. Building demolished.
3. Costs to construct a parking lot are not included nor are costs for possible PFAS investigations, former Teflon tank areas soil excavation and disposal, and monitoring other than 5 wells, periodically, under "Monitoring".
4. See basis calculations in Appendix C for general assumptions. All costs are engineering order-of-magnitude estimates for the purpose of alternatives comparison based on information available at the time of this report. Actual bid costs may deviate from the estimates provided herein.
5. If all Site soils budgeted for excavation are disposed as hazardous and contain PFAS, then estimated disposal cost increases by $60,000.
6. Cost shown for monitoring is a present-worth estimate assuming 3% inflation, 5% return on investment, and no permit fees (i.e., municipally owned).

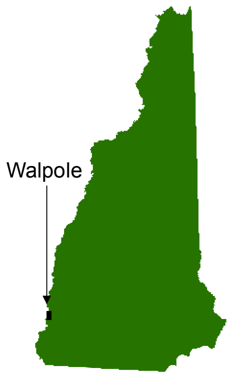
TABLE 8. DECISION MATRIX FOR REMEDIAL ALTERNATIVES
Central Plating Site
12 Westminster Street
Walpole, New Hampshire

	ALTERNATIVES	Overall Protection of Human Health and the Environmental	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility, and Volume	Short Term Effectiveness	Resiliency to Climate Change Conditions	Preliminary Costs	TOTALS
	DECISION CRITERIA WEIGHTING FACTOR	*4*	*3*	*3*	*3*	*3*	*1*	*3*	
1.	Monitored Natural Attenuation (with surface soils removal for paving)	2	5	5	2	3	5	4	70
2.	Excavate and Dispose of Soils with SRS Exceedances	5	3	4	5	5	5	2	82
3.	Excavate and Dispose of Soils to Reduce Leaching Potential, Manage Soils in Place	3	2	2	3	4	5	3	59



RANSOM
Consulting, LLC

Regional Locator Map



Notes

1. Data Source: USGS National Map Seamless Server, 24K DRG, 1/3" NED
2. USGS Quad Name: Walpole
3. Latitude: 43° 04' 48" N
   Longitude: 72° 25' 36" W
   UTM Northing: 4772913 mN
   UTM Easting: 709481 mE

Scale and Orientation

0 1,000 2,000
1 inch = 2,000 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

Central Plating Site
12 Westminster Street
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 1

Site Location Map

G:\Data\NH\Project\141_05051\001\Maps\Figure_1.mxd

RANSOM
Consulting, LLC

Legend & Notes

▨	Site Boundary
—	Parcel Boundary
61	Lot Number

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20.
2. Some features are approximate in location and scale.
3. This plan has been prepared for The Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Scale & Orientation

0 25 50

1 inch = 50 feet

Prepared For

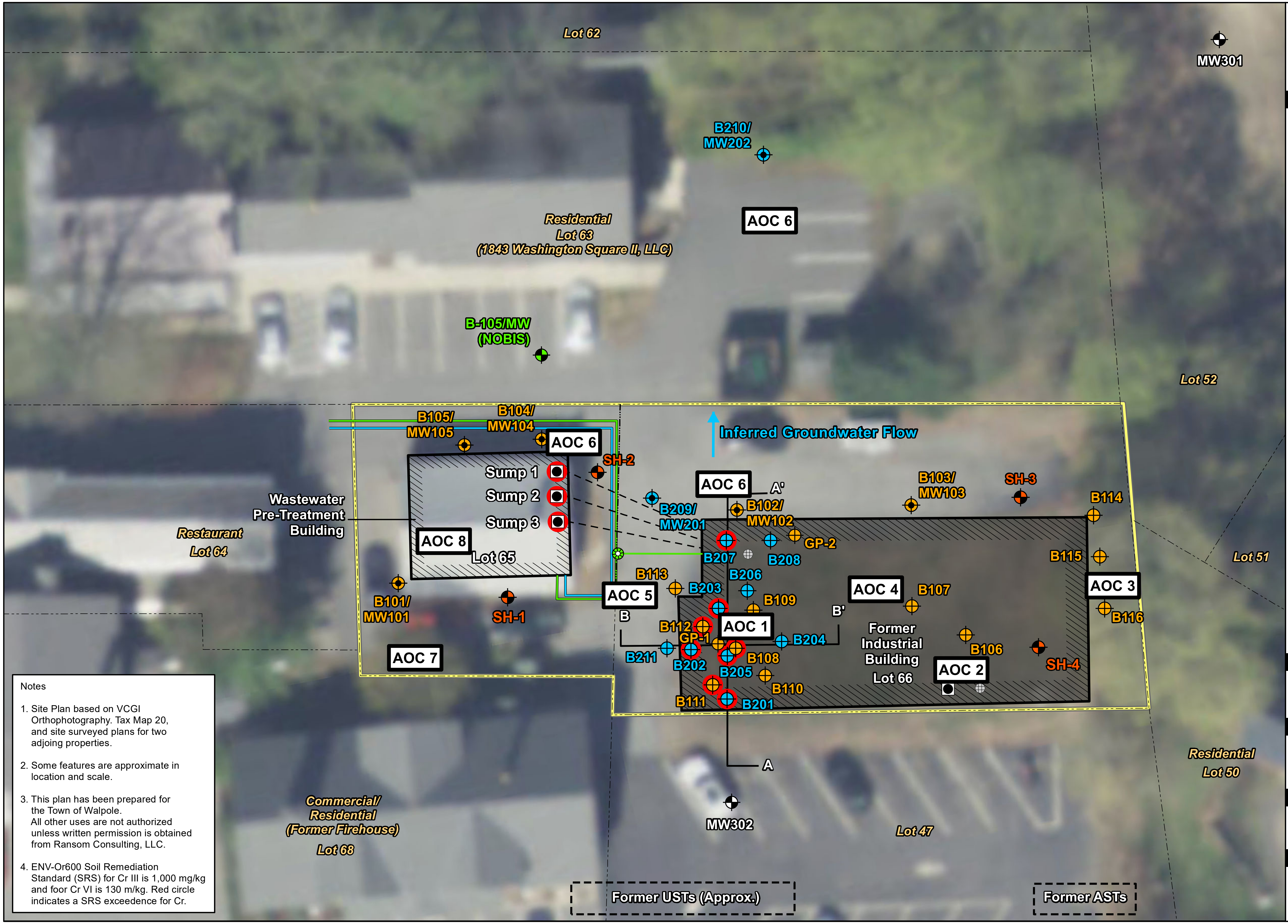
Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 2
Site Neighborhood Plan



Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoining properties.

2. Some features are approximate in location and scale.

3. This plan has been prepared for the Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

4. ENV-Or600 Soil Remediation Standard (SRS) for Cr III is 1,000 mg/kg and foor Cr VI is 130 m/kg. Red circle indicates a SRS exceedence for Cr.

RANSOM
Consulting, LLC

Legend & Notes

- Site Boundary
- ⊕ 300 Series Monitoring Well
- ⊕ 200 Series Soil Boring/Monitoring Well
- ⊕ 200 Series Soil Boring
- ⊕ Previously Existing Monitoring Well
- ⊕ Soil Boring
- ⊕ Boring/ Monitoring Well
- ■ Former Sump
- ⊕ Former Floor Drain
- ⊕ Sewer Manhole
- Sewer Line
- Water Line
- Lot Line (Approximate)
- A—A' Cross-Section
- AOC Area of Concern

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

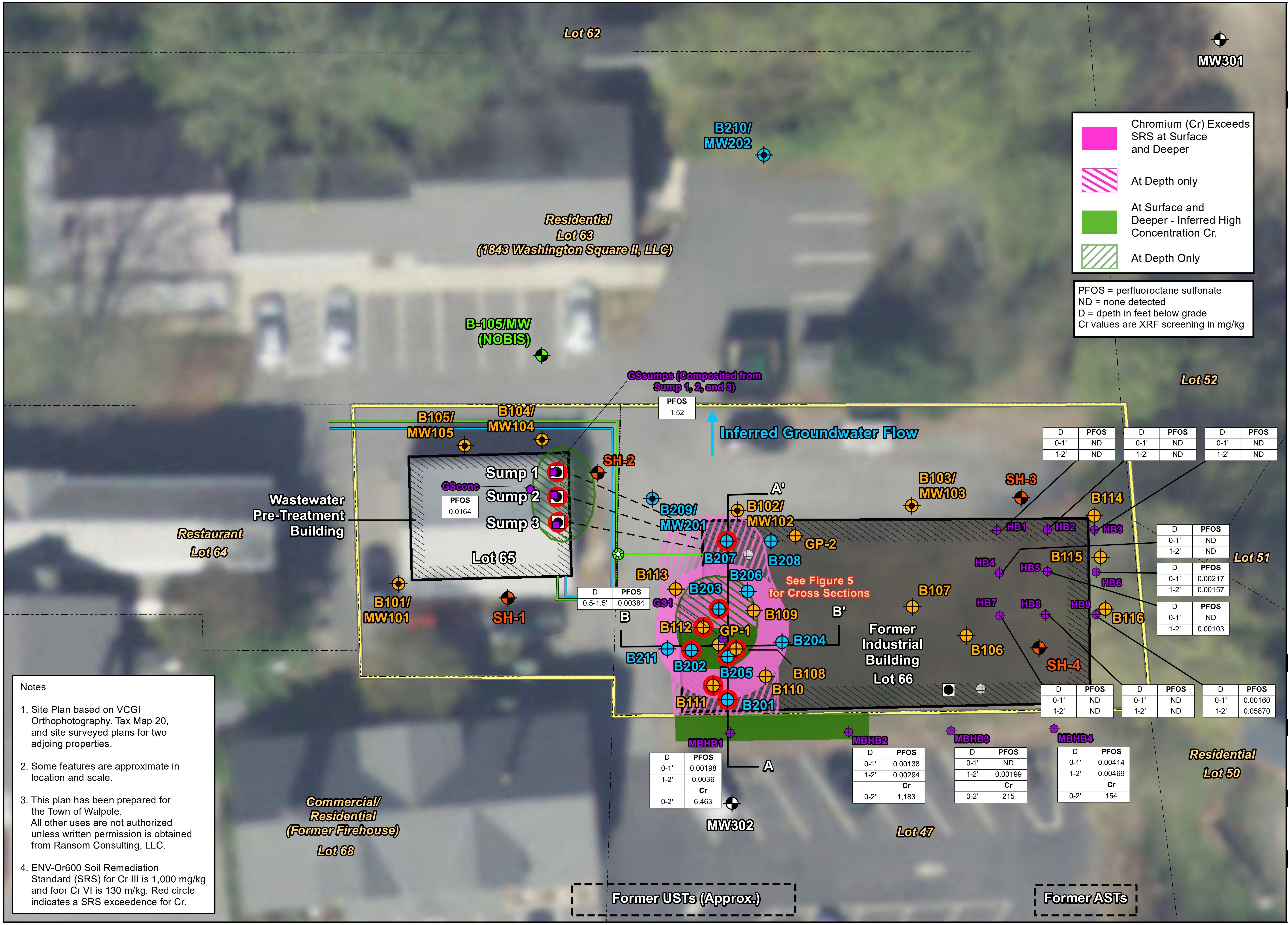
Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 3

Site Plan with AOCs & Previuos Explorations

X:\Ransom_NewEngland\NewHampshire\Walpole_NH\CentralPlatingSite\CPS_WalpoleNH-F3_SP.mxd



PFOS
1.52

PFOS
0.0164

D	PFOS
0.5-1.5'	0.00384

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	0.00217
1-2'	0.00157

D	PFOS
0-1'	ND
1-2'	0.00103

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	ND
1-2'	ND

D	PFOS
0-1'	0.00160
1-2'	0.05870

D	PFOS
0-1'	0.00198
1-2'	0.0036
	Cr
0-2'	6,463

D	PFOS
0-1'	0.00138
1-2'	0.00294
	Cr
0-2'	1,183

D	PFOS
0-1'	ND
1-2'	0.00199
	Cr
0-2'	215

D	PFOS
0-1'	0.00414
1-2'	0.00469
	Cr
0-2'	154

	Chromium (Cr) Exceeds SRS at Surface and Deeper
▨	At Depth only
🟩	At Surface and Deeper - Inferred High Concentration Cr.
▨	At Depth Only

PFOS = perfluorooctane sulfonate
ND = none detected
D = dpeth in feet below grade
Cr values are XRF screening in mg/kg

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoining properties.
2. Some features are approximate in location and scale.
3. This plan has been prepared for the Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.
4. ENV-Or600 Soil Remediation Standard (SRS) for Cr III is 1,000 mg/kg and foor Cr VI is 130 m/kg. Red circle indicates a SRS exceedence for Cr.

RANSOM
Consulting, LLC

Legend & Notes

	Site Boundary
⊕	300 Series Monitoring Well
⊕	200 Series Soil Boring/Monitoring Well
⊕	200 Series Soil Boring
⊕	Previously Existing Monitoring Well
⊕	Soil Boring
⊕	Boring/ Monitoring Well
⊕	Hand Soil Boring
⬟	Pulverized Concrete Sample
■	Sump Residue Sample
1,400	(Cr Concentration mg/kg)
(W)	Waste Sample
●	Former Sump
⊕	Former Floor Drain
⊕	Sewer Manhole
—	Sewer Line
—	Water Line
-·-·-	Lot Line (Approximate)
A—A'	Cross-Section (See Figure 5)

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

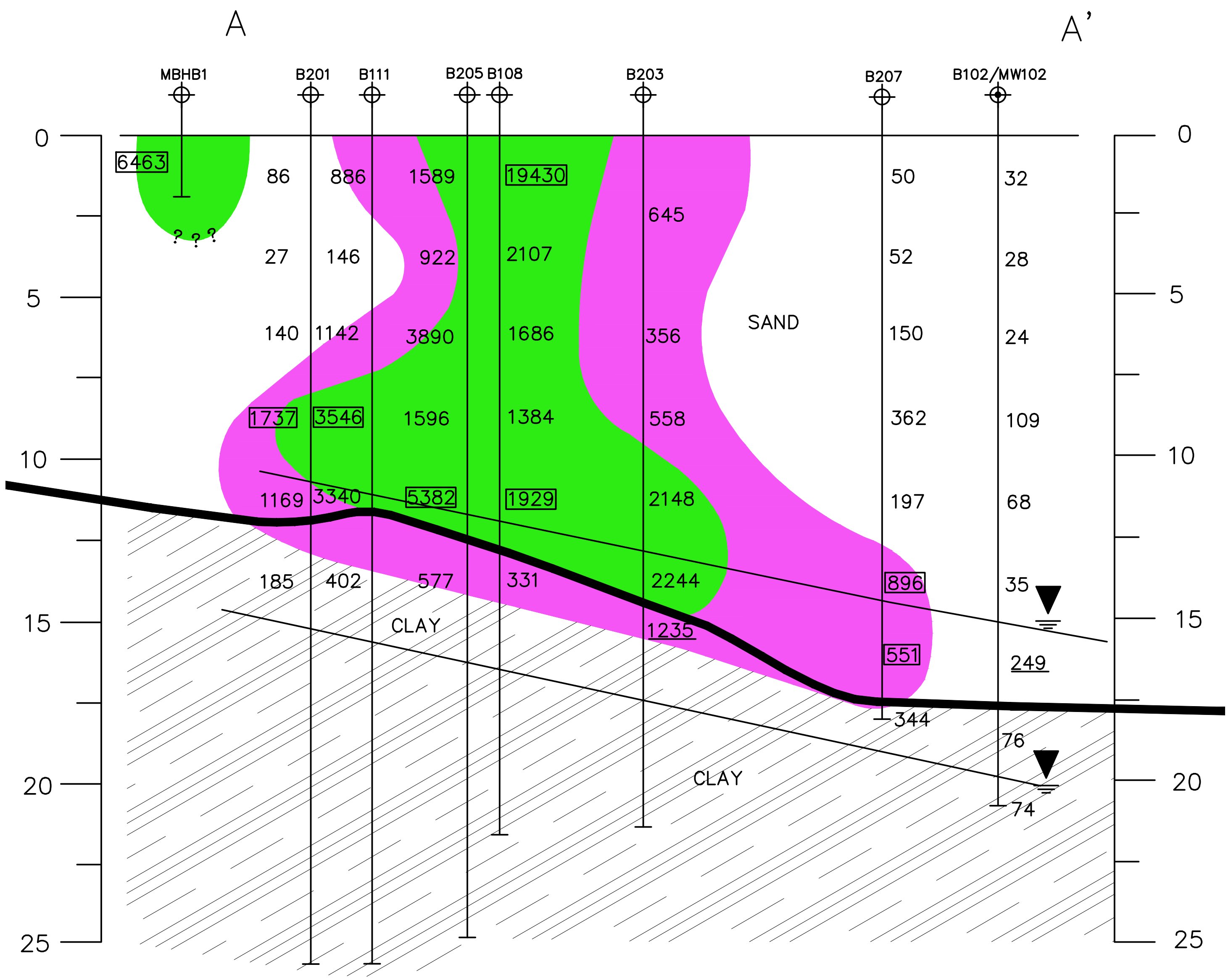
Central Plating Site
12 Westminster St.
Walpole, New Hampshire

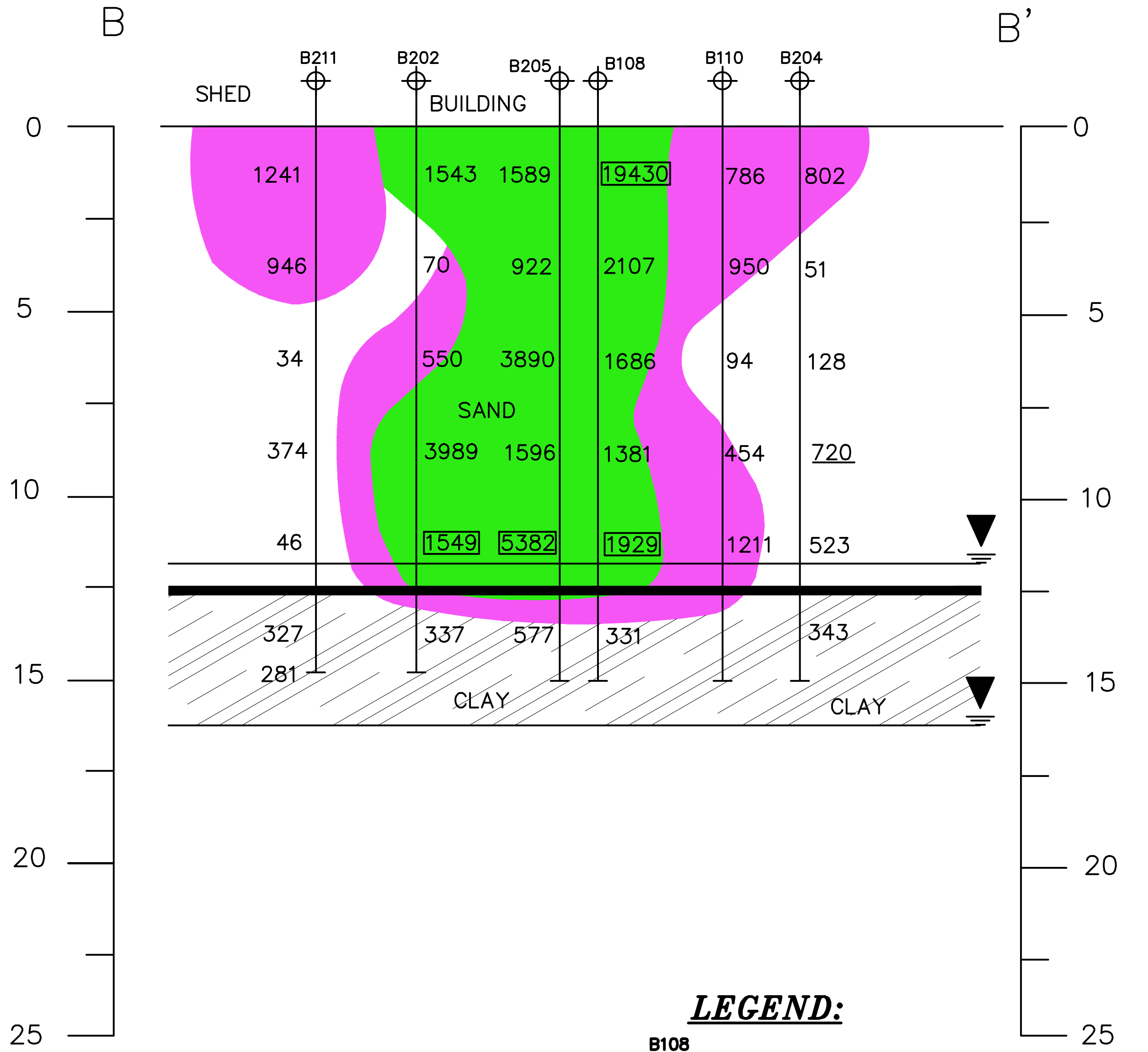
201.05001 | Nov 2020

Figure 4

Chromium + PFOS
Distribution in Soils

X:\Ransom_NewEngland\NewHampshire\Walpole_NH\CentralPlatingSite\CPS_WalpoleNH-F4_SoilDist.mxd





LEGEND:

B108 ⊕ SOIL BORING

── GROUND SURFACE

🟪 AREA OF CHROMIUM ABOVE SOIL REMEDIATION STANDARDS (SRS) (CONCENTRATIONS IN PARTS PER MILLION ppm) ESTIMATED >SRS=BOX, <SRS=UNDERLINE FOR LABORATORY DATA

🟩 AREA OF CHROMIUM ABOVE SRS AND POSSIBLY ABOVE HAZARDOUS WASTE CRITERIA

━ STRATA LAYER

▼ GROUNDWATER SURFACE (OBSERVED RANGE)

⊥ BOTTOM OF BORING

896 = LABORATORY RESULT >SRS

720 = LABORATORY RESULT <SRS

NOTES:

1. SITE PLAN BASED ON MEASUREMENTS AND OBSERVATIONS MADE BY RANSOM CONSULTING, LLC.
2. SOME FEATURES ARE APPROXIMATE IN LOCATION AND SCALE.
3. THIS PLAN HAS BEEN PREPARED FOR THE TOWN OF WALPOLE. ALL OTHER USES ARE NOT AUTHORIZED, UNLESS WRITTEN PERMISSION IS OBTAINED FROM RANSOM CONSULTING, LLC.
4. CRITERIA USED: XRF READING >390ppm (50% OF 781ppm FOR CrVI REGRESSED LABORATORY AND XRF CONCENTRATIONS) FOR SRS; XRF>1562ppm FOR AN ASSUMED 1000mg/kg LABORATORY CONCENTRATION FOR HIGH CONCENTRATION CHROMIUM.

HORIZONTAL SCALE

0 5 10 20

SCALE in FEET
1"=10'

VERTICAL SCALE

0 2.5 5 10

SCALE in FEET
1"=5'

RANSOM Consulting, LLC

PREPARED FOR:

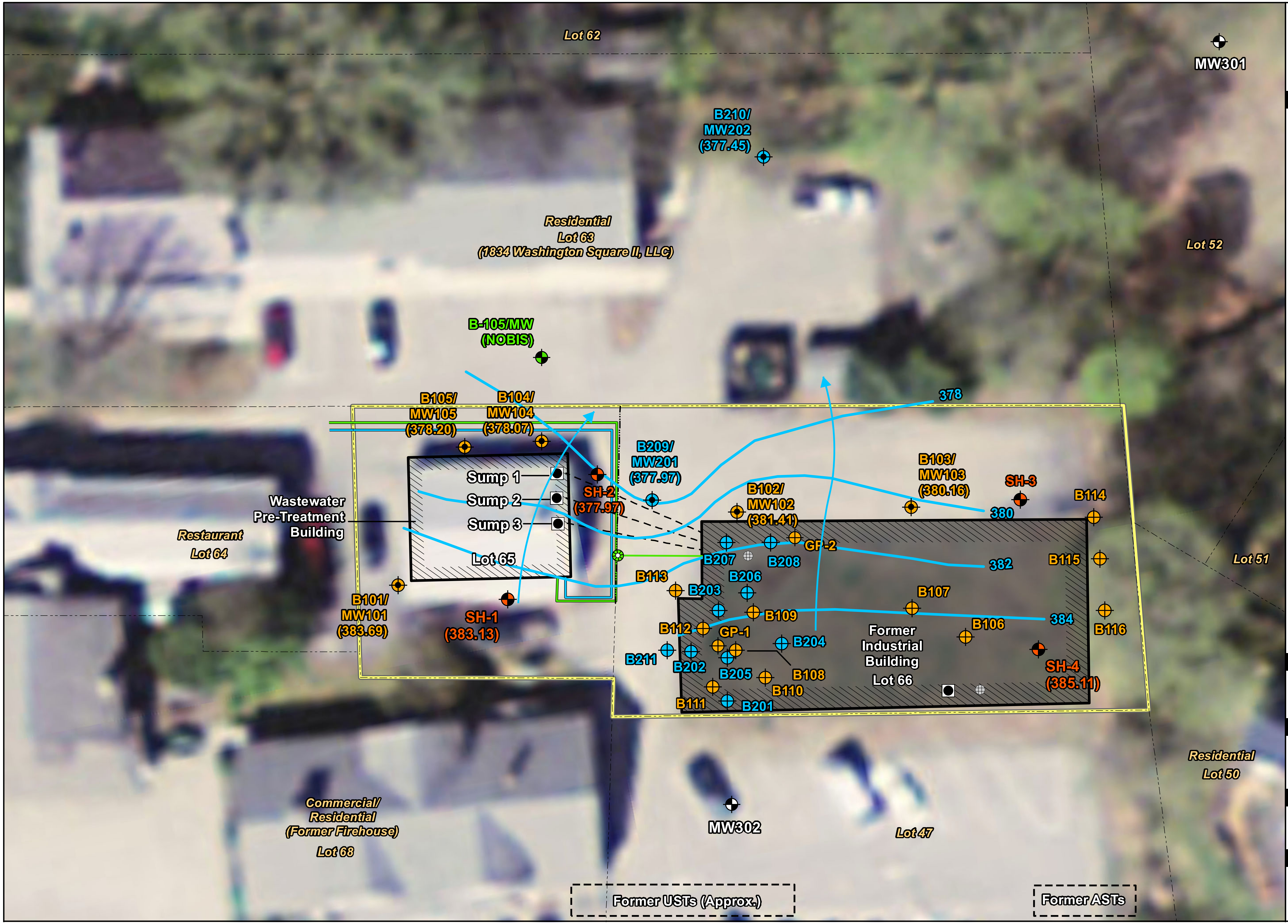
TOWN OF WALPOLE
34 ELM STREET
WALPOLE, NEW HAMPSHIRE

SITE:

CENTRAL PLATING SITE
12 WESTMINSTER STREET
WALPOLE, NEW HAMPSHIRE

CROSS–SECTION OF XRF CHROMIUM MEASUREMENTS

DATE: NOVEMBER 2020
PROJECT: 201.05001
FIGURE: 5



RANSOM
Consulting, LLC

Legend & Notes

- Site Boundary
- ⌖ 300 Series Monitoring Well
- ⌖ 200 Series Soil Boring/ Monitoring Well
- ⊕ 200 Series Soil Boring
- ⌖ Monitoring Well (Sanborn Head & Associates, Inc)
- ⊕ 100 Series Soil Boring
- ⌖ 100 Series Boring/ Monitoring Well
- ■ Former Sump
- ⊕ Former Floor Drain
- ⊛ Sewer Manhole
- — Sewer Line
- — Water Line
- -·-·- Lot Line (Approximate)
- — Groundwater Contour
- → Inferred Groundwater Flow
- 381.41 Groundwater Elevation

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoing properties.
2. Some features are approximate in location and scale.
3. This plan has been prepared for the Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 6
Groundwater Flow
July 17, 2017

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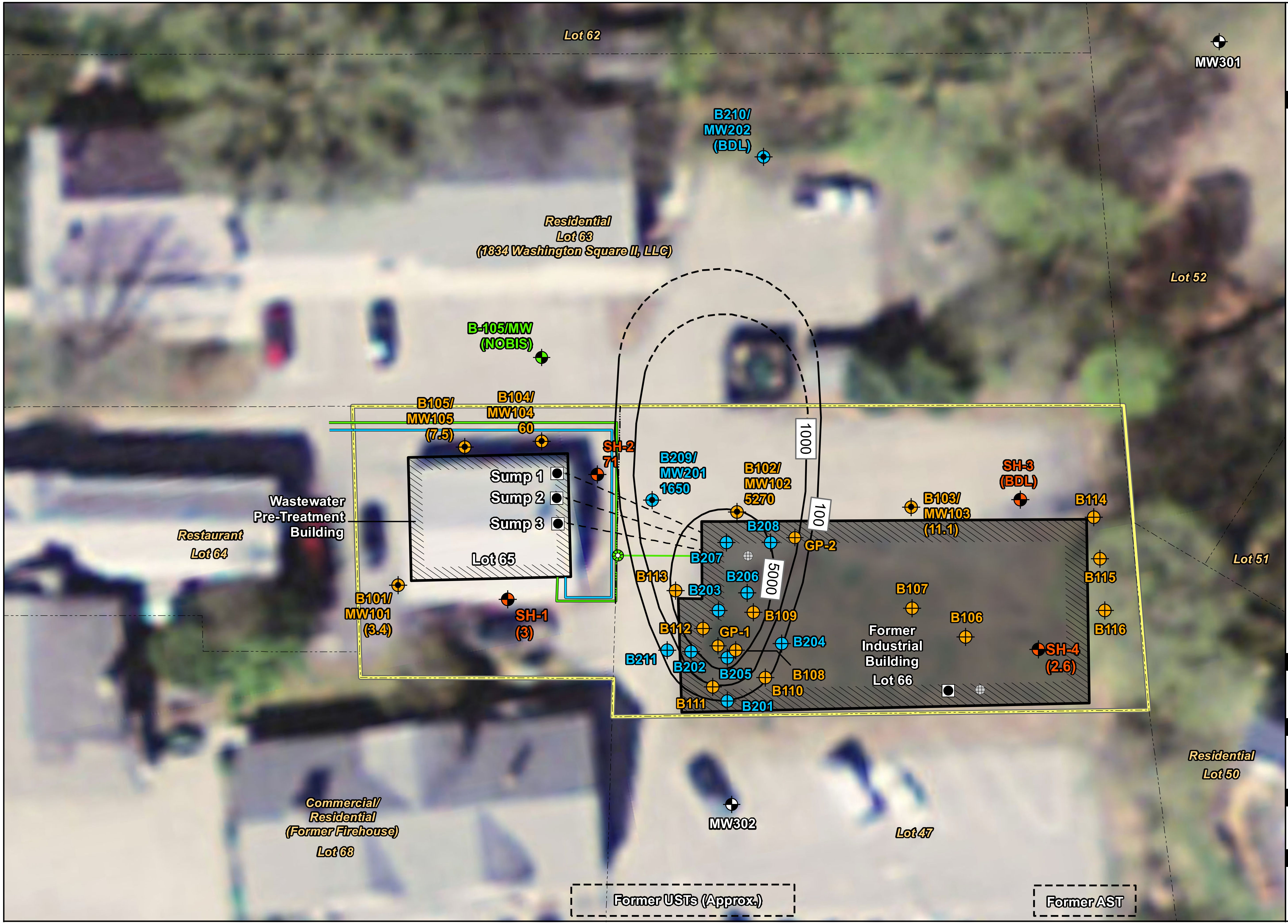


RANSOM
Consulting, LLC

Legend & Notes

Site Boundary
300 Series Monitoring Well
200 Series Soil Boring/ Monitoring Well
200 Series Soil Boring
Previously Existing Monitoring Well
Soil Boring
Boring/ Monitoring Well
Former Sump
Former Floor Drain
Sewer Manhole
Sewer Line
Water Line
Lot Line (Approximate)

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoing properties.
2. Some features are approximate in location and scale.
3. This plan has been prepared for the Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.
4. ENV-Or600 Ambient Groundwater Quality for Cr is 100 ug/L.

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

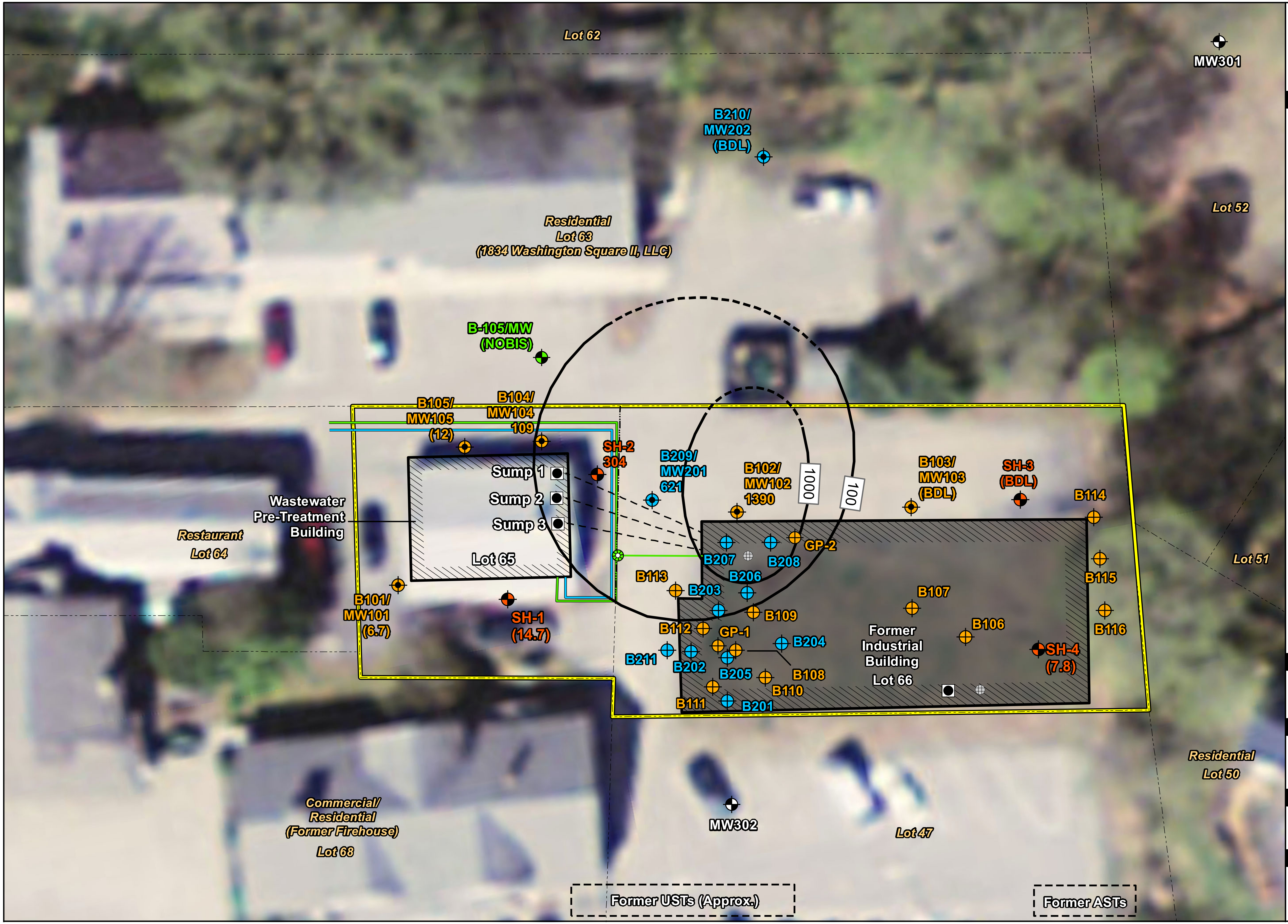
Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 7

Dissolved Groundwater Chromium Distribution Map

G:\Data\NH\Project\141_05051\001\Maps\AUG_UPDATE\Figure_7.mxd



RANSOM
Consulting, LLC

Legend & Notes

- Site Boundary
- 300 Series Monitoring Well
- 200 Series Soil Boring/ Monitoring Well
- 200 Series Soil Boring
- Monitoring Well (Sanborn Head & Associates, Inc.)
- 100 Series Soil Boring
- 100 Series Boring/ Monitoring Well
- ■ Former Sump
- Former Floor Drain
- Sewer Manhole
- Sewer Line
- Water Line
- Lot Line (Approximate)

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoing properties.
2. Some features are approximate in location and scale.
3. This plan has been prepared for the Town of Walpole. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.
4. ENV-Or600 Ambient Groundwater Quality for Ni is 100 mg/L.

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Nov 2020

Figure 8

Dissolved Groundwater
Nickel Distribution Map

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APPENDIX A-1

Selected Tables from the April 25, 2018
Supplemental Phase II Environmental Site Assessment
and Analysis of Brownfields Alternatives / Remedial Action Plan

by
Ransom Consulting, Inc. for the Southwest Region Planning Commission

Ransom Consulting, LLC
Project 201.05001

TABLE 1A. SOIL SAMPLE XRF FIELD SCREENING RESULTS - 100 SERIES BORINGS
Central Plating Site
Walpole, New Hampshire

Date	Boring	Sample	Depth	As (Arsenic)	As +/-	Ba (Barium)	Ba +/-	Cd (Cadmium)	Cd +/-	Cr (Chromium)	Cr +/-	Cu (Copper)	Cu +/-	Pb (Lead)	Pb +/-	Hg (Mercury)	Hg +/-	Ni (Nickel)	Ni +/-	Se (Selenium)	Se +/-	Ag (Silver)	Ag +/-	Zn (Zinc)	Zn +/-
NH DES Env-Or 600 Soil Remediation Standard (SI				11		1,000		33		130/1,000		NE		400		7		400		180		89		1,000	
8/13/2015	B101	S1	0.0-2.5	<LOD	19	418	32	<LOD	16	58	5	54	4	572	7	5.3	1.7	30	4	<LOD	1.9	<LOD	13	226	5
		S2	2.5-5.0	<LOD	5	256	25	<LOD	16	53	4	<LOD	9	17.2	1.7	<LOD	4.5	20	4	<LOD	1.6	<LOD	13	30	2
		S3	5.0-7.5	<LOD	4.4	284	24	<LOD	15	29	4	<LOD	8	7.3	1.4	<LOD	4.2	16	4	<LOD	1.5	<LOD	12	22	2
		S4	7.5-10.0	<LOD	5.1	430	29	<LOD	16	52	4	<LOD	9	18.7	1.7	<LOD	4.5	20	4	<LOD	1.5	<LOD	13	41	2
		S5	***10.0-12.5***	***<LOD***	***6***	***416***	***35***	***<LOD***	***20***	***57***	***6***	***<LOD***	***11***	***18***	***2***	***<LOD***	***5.3***	***22***	***5***	***<LOD***	***1.9***	***<LOD***	***17***	***54***	***4***
		S6	12.5-15.0	<LOD	4.9	366	28	<LOD	15	31	4	<LOD	8	16.3	1.6	<LOD	4.1	18	4	<LOD	1.5	<LOD	12	27	2
		S7	15.0-17.5	<LOD	5	358	31	<LOD	16	37	5	15	3	14.7	1.6	<LOD	3.9	24	4	<LOD	1.6	<LOD	13	29	2
8/12/2015	B102	S1	0.0-2.5	<LOD	8	404	22	<LOD	12	32	3	33	2	162	2	<LOD	3.2	29	3	<LOD	1.2	<LOD	9	121	3
		S2	2.5-5.0	<LOD	4.9	382	23	<LOD	11	28	3	15	2	47.7	1.6	3.7	1.1	31	3	<LOD	1.1	<LOD	9	62	2
		S3	5.0-7.5	<LOD	4.6	290	22	<LOD	15	24	3	9	3	13.1	1.5	<LOD	4.3	21	4	<LOD	1.5	<LOD	12	19.3	2
		S4	7.5-10.0	<LOD	5.7	<LOD	307	<LOD	16	109	18	21	4	13.8	1.8	<LOD	5	37	5	<LOD	1.8	<LOD	13	33	3
		S5	10.0-12.5	<LOD	4.8	310	24	<LOD	16	68	4	23	3	12	1.6	5.6	1.5	30	4	<LOD	1.6	<LOD	13	48	3
		S6	12.5-15.0	<LOD	4.8	313	25	<LOD	16	35	4	18	3	14.2	1.6	<LOD	4.2	49	4	<LOD	1.5	<LOD	13	60	3
		S7	***15.0-17.5***	***<LOD***	***4.9***	***407***	***30***	***<LOD***	***16***	***249***	***7***	***52***	***4***	***15.2***	***1.6***	***<LOD***	***4.3***	***95***	***5***	***<LOD***	***1.5***	***<LOD***	***13***	***49***	***3***
		S8	17.5-20.0	<LOD	4.9	301	27	<LOD	16	76	4	25	3	14.1	1.6	<LOD	4.6	56	5	<LOD	1.5	<LOD	13	44	3
		S9	20.0-22.5	6.4	1.8	723	38	<LOD	16	74	6	30	3	14.8	1.7	<LOD	4.7	56	5	<LOD	1.6	<LOD	13	81	3
8/12/2015	B103	S1	0.0-2.5	17	3	406	32	<LOD	17	63	5	37	4	112	3	<LOD	4.8	61	5	<LOD	1.7	<LOD	14	126	4
		S2	2.5-5.0	<LOD	5.6	306	25	<LOD	16	26	4	11	3	27.1	1.8	<LOD	4.2	20	4	<LOD	1.5	<LOD	13	32	2
		S3	5.0-7.5	<LOD	5.4	338	29	<LOD	18	28	4	<LOD	9	12.9	1.7	<LOD	4.7	15	4	<LOD	1.6	<LOD	15	34	3
		S4	7.5-10.0	<LOD	5.2	451	34	<LOD	16	37	5	<LOD	9	15.2	1.7	<LOD	4.7	31	5	<LOD	1.6	<LOD	13	34	2
		S5	***10.0-12.5***	***<LOD***	***5.7***	***399***	***31***	***<LOD***	***18***	***161***	***7***	***<LOD***	***9***	***19.3***	***1.8***	***<LOD***	***4.8***	***56***	***5***	***<LOD***	***1.6***	***<LOD***	***14***	***25***	***2***
		S6	12.5-15.0	<LOD	4.7	381	28	<LOD	16	35	4	10	3	9.4	1.5	<LOD	4.6	15	4	<LOD	1.6	<LOD	13	28	2
		S7	***15.0-17.5***	***<LOD***	***4.6***	***405***	***31***	***<LOD***	***16***	***37***	***5***	***17***	***3***	***8.4***	***1.5***	***<LOD***	***4.5***	***72***	***5***	***<LOD***	***1.5***	***<LOD***	***13***	***29***	***2***
		S8	17.5-20.0	<LOD	5.2	798	39	<LOD	16	62	5	23	3	18.6	1.7	<LOD	4.2	43	5	<LOD	1.5	<LOD	13	66	3
		S9	20.0-22.5	<LOD	5.1	783	39	<LOD	16	76	6	21	3	13.1	1.7	<LOD	4.7	49	5	<LOD	1.7	<LOD	13	69	3
		S10	22.5-25.0	<LOD	5.1	736	38	<LOD	16	78	6	22	3	14.8	1.7	6.4	1.6	50	5	<LOD	1.6	<LOD	13	72	3
8/13/2015	B104	S1	0.0-2.5	<LOD	16	469	33	<LOD	16	50	5	23	3	388	5	<LOD	4.6	24	4	<LOD	1.8	<LOD	13	144	4
		S2	2.5-5.0	<LOD	4.8	272	26	<LOD	16	24	4	11	3	11.5	1.5	<LOD	4.3	19	4	<LOD	1.5	<LOD	13	38	2
		S3	5.0-7.5	<LOD	4.4	259	22	<LOD	15	28	3	11	3	9.7	1.5	<LOD	4.2	14	3	<LOD	1.6	<LOD	12	33	2
		S4	7.5-10.0	<LOD	4.4	260	24	<LOD	16	34	4	39	3	9.3	1.5	<LOD	4.2	19	4	<LOD	1.5	<LOD	13	41	2
		S5	10.0-12.5	<LOD	5.3	359	31	<LOD	16	52	5	18	3	16.9	1.8	<LOD	4.8	34	5	<LOD	1.6	<LOD	13	88	3
		S6	12.5-15.0	<LOD	4.8	354	26	<LOD	16	42	4	9	3	14.8	1.6	<LOD	4.4	28	4	<LOD	1.5	<LOD	13	39	2
		S7	15.0-17.5	<LOD	4.9	305	25	<LOD	16	36	4	15	3	14.6	1.6	<LOD	4.2	21	4	<LOD	1.5	<LOD	13	47	3
		S8	17.5-20.0	<LOD	5	429	29	<LOD	16	53	5	27	3	17.9	1.7	<LOD	4.3	36	4	<LOD	1.5	<LOD	13	52	3
		S9	***20.0-22.5***	***<LOD***	***4.7***	***410***	***31***	***<LOD***	***15***	***49***	***4***	***22***	***3***	***13.9***	***1.5***	***<LOD***	***4.2***	***42***	***4***	***<LOD***	***1.4***	***<LOD***	***12***	***27***	***2***
		S10	22.5-25.0	<LOD	4.9	305	28	<LOD	16	85	5	25	3	11.9	1.6	<LOD	4.5	38	4	<LOD	1.6	<LOD	13	21	2
8/13/2015	B105	S1	0.0-2.5	<LOD	7	445	40	<LOD	16	39	6	12	3	64	2	<LOD	4.4	20	4	<LOD	1.6	<LOD	13	78	3
		S2	2.5-5.0	<LOD	4.8	252	23	<LOD	15	32	4	13	3	16.7	1.6	<LOD	4.1	14	4	<LOD	1.4	<LOD	12	38	2
		S3	5.0-7.5	<LOD	4.6	330	31	<LOD	16	22	4	<LOD	8	12	1.6	<LOD	4.2	19	4	<LOD	1.6	<LOD	13	31	2
		S4	7.5-10.0	<LOD	4.6	293	22	<LOD	15	23	3	11	3	9.3	1.5	<LOD	4.2	15	4	<LOD	1.5	<LOD	12	41	2
		S5	10.0-12.5	<LOD	4.8	358	25	<LOD	16	47	4	11	3	15.3	1.6	<LOD	4.1	29	4	<LOD	1.5	<LOD	13	65	3
		S6	12.5-15.0	<LOD	4.9	286	27	<LOD	16	32	4	<LOD	9	12.5	1.6	<LOD	4.2	29	4	<LOD	1.6	<LOD	13	48	3
		S7	15.0-17.5	<LOD	4.9	358	28	<LOD	16	49	4	17	3	15	1.6	<LOD	4.4	24	4	<LOD	1.6	<LOD	13	30	2
		S8	17.5-20.0	<LOD	4.9	392	31	<LOD	16	34	4	10	3	11.5	1.6	<LOD	4.4	26	4	<LOD	1.6	<LOD	13	33	2
		S9	20.0-22.5	<LOD	4.5	355	24	<LOD	16	24	4	31	3	10.6	1.5	<LOD	4.2	43	4	<LOD	1.5	<LOD	13	33	2
		S10	***22.5-25.0***	***5.3***	***1.5***	***272***	***29***	***<LOD***	***16***	***31***	***4***	***10***	***3***	***7***	***1.4***	***<LOD***	***4.3***	***25***	***4***	***<LOD***	***1.5***	***<LOD***	***12***	***31***	***2***
8/12/2015	B106	S1	0.0-2.5	<LOD	6	458	35	<LOD	16	36	5	15	3	34.8	2	5.5	1.6	27	4	<LOD	1.6	<LOD	13	51	3
		S2	2.5-5.0	<LOD	4.4	349	25	<LOD	16	30	4	10	3	8.4	1.4	<LOD	4.2	21	4	<LOD	1.5	<LOD	13	25	2
		S3	5.0-7.5	<LOD	4.7	361	27	<LOD	16	32	4	18	3	10.1	1.5	<LOD	4.3	21	4	<LOD	1.5	<LOD	13	35	2
		S4	7.5-10.0	<LOD	5.1	411	30	<LOD	16	35	4	18	3	15.6	1.6	<LOD	4.4	12	4	<LOD	1.5	<LOD	13	29	2
		S5	10.0-12.5	<LOD	4.7	302	25	<LOD	15	47	4	30	3	12.8	1.5	<LOD	4.2	23	4	<LOD	1.5	<LOD	12	29	2
		S6	***12.5-15.0***	***<LOD***	***5.5***	***721***	***39***	***<LOD***	***17***	***82***	***6***	***18***	***3***	***19.4***	***1.8***	***<LOD***	***4.7***	***41***	***5***	***<LOD***	***1.6***	***<LOD***	***13***	***78***	***3***
8/12/2015	B107	***S1***	***0.0-2.5***	***41***	***7***	***435***	***32***	***<LOD***	***16***	***34***	***4***	***37***	***3***	***578***	***7***	***<LOD***	***4.9***	***26***	***4***	***<LOD***	***2.1***	***<LOD***	***13***	***165***	***4***
		S2	2.5-5.0	<LOD	4.6	467	27	<LOD	16	26	4	<LOD	8	10.8	1.5	5.8	1.5	16	4	<LOD	1.6	<LOD	13	26	2
		S3	5.0-7.5	<LOD	4.6	386	30	<LOD	16	25	4	<LOD	8	8.6	1.5	<LOD	4.4	19	4	<LOD	1.6	<LOD	13	22	2
		S4	7.5-10.0	<LOD	5.1	303	27	<LOD	16	30	4	16	3	14.6	1.6	<LOD	4.5	19	4	<LOD	1.6	<LOD	13	33	2
8/12/2015	B108	***S1***	***0.0-2.5***	***<LOD***	***10***	***<LOD***	***162***	***<LOD***	***16***	***19,430***	***271***	***209***	***6***	***126***	***3***	***<LOD***	***4.4***	***164***	***7***	***<LOD***	***1.8***	***<LOD***	***13***	***94***	***4***
		S2	2.5-5.0	5.1	1.6	342	31	<LOD	16	2,107	32	34	3	10.1	1.5	<LOD	4.4	24	4	<LOD	1.6	<LOD	13	23	2
		S3	5.0-7.5	<LOD	5.7	209	29	<LOD	16	1,686	26	30	3	28.1	1.8	<LOD	4.4	34	4	<LOD	1.6	<LOD	13	29	2
		S4	7.5-10.0	<LOD	5.3	291	33	<LOD	16	1,384	24	20	3	19.2	1.7	<LOD	4.4	31	4	<LOD	1.5	<LOD	13	35	2
		S5	***10.0-12.5***	***<LOD***	***4.8***	***291***	***31***	***<LOD***	***16***	***1,929***	***28***	***30***	***3***	***12.3***	***1.6***	***<LOD***	***4.5***	***34***	***4***	***<LOD***	***1.6***	***<LOD***	***13***	***29***	***2***
		S6	12.5-15.0	<LOD	5.7	802	40	<LOD	16	331	9	29	3	20.2	1.8	7.3	1.7	50	5	<LOD	1.7	<LOD	13	82	3
8/12/2015	B109	***S1***	***0.0-2.5***	***<LOD***	***10***	***354***	***31***	***<LOD***	***16***	***600***	***12***	***115***	***5***	***145***	***3***	***<LOD***	***4.6***	***180***	***7***	***<LOD***	***1.6***	***<LOD***	***13***	***74***	***3***
		S2	2.5-5.0	<LOD	4.8	302	24	<LOD	16	38	4	<LOD	9	13.9	1.6	<LOD	4.3	87	5	<LOD	1.6	<LOD	13	35	2
		S3	5.0-7.5	<LOD	5.9	307	26	<LOD	16	260	7	28	3	29.8	1.9	6	1.6	45	4	<LOD	1.6	<LOD	13	27	2
		S4	7.5-10.0	<LOD	5.1	278	27	<LOD	16	356	9	49	4	16.7	1.7	<LOD	4.5	33	4	<LOD	1.6	<LOD	13	29	2
		S5	10.0-12.5	<LOD	5.2	306	28	<LOD	16	911	17	248	6	22	1.7	<LOD	4.1	67	5	<LOD	1.5	<LOD	13	30	2
		S6	12.5-14.7	<LOD	4.8	410	30	<LOD	15	1,058	17	66	4	15.1	1.6	4.5	1.5	37	4	<LOD	1.5	<LOD	12	51	3
		S7	14.7-15.0	<LOD	5.3	722	38	<LOD	16	176	7	24	3	20.8	1.8	<LOD	4.6	45	5	<LOD	1.5	<LOD	13	75	3

TABLE 1A. SOIL SAMPLE XRF FIELD SCREENING RESULTS - 100 SERIES BORINGS
Central Plating Site
Walpole, New Hampshire

Date	Boring	Sample	Depth	As (Arsenic)	As +/-	Ba (Barium)	Ba +/-	Cd (Cadmium)	Cd +/-	Cr (Chromium)	Cr +/-	Cu (Copper)	Cu +/-	Pb (Lead)	Pb +/-	Hg (Mercury)	Hg +/-	Ni (Nickel)	Ni +/-	Se (Selenium)	Se +/-	Ag (Silver)	Ag +/-	Zn (Zinc)	Zn +/-
NH DES Env-Or 600 Soil Remediation Standard (SI				11		1,000		33		130/1,000		NE		400		7		400		180		89		1,000	
8/13/2015	B110	S1	0.0-2.5	<LOD	7	346	32	<LOD	17	768	14	79	4	62	2	<LOD	4.4	53	5	<LOD	1.6	<LOD	13	95	3
		S2	2.5-5.0	<LOD	5.6	282	31	<LOD	17	958	19	40	4	19.7	1.8	4.9	1.6	23	4	<LOD	1.6	<LOD	14	41	3
		S3	5.0-7.5	<LOD	4.9	313	26	<LOD	15	94	5	10	3	15.1	1.6	<LOD	4.3	17	4	<LOD	1.6	<LOD	12	24	2
		S4	7.5-10.0	<LOD	5	280	28	<LOD	16	454	10	49	4	11.8	1.6	<LOD	4.7	32	4	<LOD	1.6	<LOD	13	27	2
		S5	***10.0-12.5***	***<LOD***	***4.6***	***238***	***27***	***<LOD***	***16***	***1,211***	***20***	***41***	***3***	***10.6***	***1.5***	***<LOD***	***4***	***27***	***4***	***<LOD***	***1.5***	***<LOD***	***12***	***41***	***2***
		S6	12.5-15.0	<LOD	6	816	42	<LOD	16	565	12	44	4	24.6	1.9	<LOD	4.8	64	5	<LOD	1.7	<LOD	13	86	3
8/13/2015	B111	S1	0.0-2.5	<LOD	10	453	37	<LOD	16	882	16	93	4	118	3	<LOD	4.7	51	5	<LOD	1.7	<LOD	13	170	4
		S2	2.5-5.0	<LOD	5.7	347	28	<LOD	16	146	6	19	3	28.3	1.8	6.2	1.6	26	4	<LOD	1.6	<LOD	13	46	3
		S3	5.0-7.5	<LOD	6	373	31	<LOD	16	1,142	20	24	3	29.5	1.9	<LOD	4.6	18	4	<LOD	1.7	<LOD	13	63	3
		S4	***7.5-10.0***	***6.3***	***1.9***	***412***	***39***	***<LOD***	***16***	***3,546***	***51***	***15***	***3***	***27.1***	***1.8***	***<LOD***	***4.3***	***11***	***4***	***<LOD***	***1.6***	***<LOD***	***13***	***29***	***2***
		S5	***10.0-12.5***	***<LOD***	***5.4***	***414***	***41***	***<LOD***	***17***	***3,340***	***53***	***54***	***4***	***19.5***	***1.7***	***<LOD***	***4.3***	***26***	***4***	***<LOD***	***1.6***	***<LOD***	***13***	***54***	***3***
		S6	12.5-15.0	5.7	1.9	850	41	<LOD	16	402	10	34	4	17.8	1.8	<LOD	4.7	57	5	<LOD	1.7	<LOD	13	85	3
8/13/2015	B112	S1	0.0-2.5	<LOD	8	432	33	<LOD	16	321	8	48	4	75	2	<LOD	4.5	35	4	<LOD	1.6	<LOD	13	66	3
		S2	2.5-5.0	<LOD	10	368	32	<LOD	16	877	16	131	5	127	3	<LOD	4.6	165	6	<LOD	1.7	<LOD	12	213	5
		S3	5.0-7.5	<LOD	10	230	24	<LOD	15	651	12	88	4	146	3	<LOD	4	77	5	<LOD	1.5	<LOD	12	15.8	1.9
		S4	7.5-10.0	<LOD	8	327	33	<LOD	17	678	14	69	4	71	2	<LOD	4.6	38	5	<LOD	1.6	<LOD	14	28	2
		S5	10.0-12.5	<LOD	9	439	36	<LOD	15	1,970	31	313	7	99	3	<LOD	4.5	97	5	<LOD	1.6	<LOD	12	39	3
		S6	***12.5-14.7***	***<LOD***	***4.3***	***281***	***29***	***<LOD***	***16***	***1,544***	***23***	***26***	***3***	***7.7***	***1.4***	***<LOD***	***4.1***	***12***	***4***	***<LOD***	***1.5***	***<LOD***	***13***	***25***	***2***
		S7	14.7-15.0	<LOD	5.8	790	41	<LOD	17	496	11	30	4	22	1.9	<LOD	4.8	45	5	<LOD	1.7	<LOD	14	89	3
8/12/2015	B114	***S1***	***0.0-2.5***	***<LOD***	***16***	***515***	***37***	***<LOD***	***17***	***54***	***5***	***160***	***6***	***326***	***5***	***<LOD***	***5.3***	***169***	***7***	***<LOD***	***2***	***<LOD***	***13***	***439***	***7***
		S2	2.5-5.0	<LOD	4.7	341	27	<LOD	16	13	3	12	3	9.8	1.5	<LOD	4.3	22	4	<LOD	1.6	<LOD	13	69	3
8/12/2015	B115	***S1***	***0.0-2.5***	***<LOD***	***7***	***488***	***35***	***<LOD***	***16***	***44***	***5***	***45***	***4***	***45***	***2***	***<LOD***	***4.6***	***35***	***4***	***<LOD***	***1.6***	***<LOD***	***13***	***227***	***5***
		S2	2.5-5.0	<LOD	4.6	412	28	<LOD	16	16	4	<LOD	9	10.8	1.5	5.3	1.5	17	4	<LOD	1.5	<LOD	13	29	2
8/12/2015	B116	***S1***	***0.0-2.5***	***<LOD***	***8***	***548***	***36***	***<LOD***	***16***	***136***	***6***	***149***	***5***	***75***	***3***	***<LOD***	***4.5***	***44***	***5***	***<LOD***	***1.7***	***<LOD***	***13***	***572***	***8***
		S2	2.5-5.0	<LOD	4.6	333	32	<LOD	16	21	4	<LOD	8	11.8	1.5	<LOD	4.2	18	4	<LOD	1.6	<LOD	13	32	2

Notes:
1 - Concentrations and SRS are in parts per million (milligrams/ kilogram).
2 - LOD - Limit of Detection (lower limit); < = less than.
3 - Instrument degree of measurement accuracy indicated by +/- value by metal and sample.
4 - Sample depth is in feet below ground surface.
5 - Sampling indicate in bold and italics was submitted for laboratory analyses for one or more parameters.
6 - Values highlighted in yellow exceed the SRS for that metal.
7 - Cr SRS is 130 for hexavalent Cr and 1,000 for trivalent Cr; for exceedence designation, Cr is inferred to be trivalent.

TABLE 1B. SOIL SAMPLE XRF FIELD SCREENING RESULTS - 200 SERIES BORINGS
Central Plating Site
Walpole, New Hampshire

Date	Boring	Sample	Depth (ft.)	As (Arsenic)	As +/-	Ba (Barium)	Ba +/-	Cd (Cadmium)	Cd +/-	Cr (Chromium)	Cr +/-	Pb (Lead)	Pb +/-	Hg (Mercury)	Hg +/-	Ni (Nickel)	Ni +/-	Se (Selenium)	Se +/-	Ag (Silver)	Ag +/-
NH DES Env-Or 600 Soil Remediation Standard (SRS)				11		1,000		33		130/1,000		400		7		400		180		89	
6/29/2017	B201	S1	0.0-2.5	< LOD	12.65	215.78	76.84	< LOD	16.65	86.35	17.57	45.41	10.83	< LOD	11.76	< LOD	83.78	< LOD	5.08	< LOD	12.99
		S2	2.5-5.0	< LOD	8.59	254.41	63.22	< LOD	13.78	26.63	14.61	< LOD	11.51	< LOD	11.16	< LOD	80.21	< LOD	4.51	< LOD	10.8
		S3	5.0-7.5	< LOD	9.52	223.84	58.74	< LOD	12.84	140.27	34.85	< LOD	11.59	< LOD	11.7	< LOD	84.92	< LOD	4.49	< LOD	9.8
		S4	***7.5-10.0***	***< LOD***	***8.34***	***268.64***	***62.3***	***< LOD***	***13.22***	***1737.26***	***41.16***	***< LOD***	***10.45***	***< LOD***	***12.05***	***< LOD***	***85.38***	***< LOD***	***4.46***	***< LOD***	***10.48***
		S5	10.0-12.5	< LOD	8.44	372.92	58.01	< LOD	12.2	1168.95	34.63	< LOD	10.46	< LOD	12.17	< LOD	83.76	< LOD	4.72	< LOD	9.55
		S6	12.5-15.0	< LOD	9.12	519.91	50.21	< LOD	10.39	184.99	25.66	< LOD	12.22	< LOD	13.04	< LOD	89.88	< LOD	4.46	< LOD	7.96
6/29/2017	B202	S1	0.0-2.5	< LOD	18.07	171.15	55.87	< LOD	12.5	1542.9	37.65	117.24	14.86	< LOD	11.4	111.86	58.67	< LOD	4.56	< LOD	9.43
		S2	2.5-5.0	< LOD	7.76	223.81	62.53	< LOD	14.25	69.87	16.22	< LOD	10.17	< LOD	12.01	< LOD	84.56	< LOD	4.46	< LOD	10.52
		S3	5.0-7.5	< LOD	8.59	261.35	48.78	< LOD	10.9	549.95	49.59	< LOD	11.23	< LOD	11.48	< LOD	80.47	< LOD	4.09	< LOD	8.25
		S4	7.5-10.0	< LOD	9.62	145.68	77.95	< LOD	17.21	3988.65	114.87	13.1	8.32	< LOD	12.11	< LOD	84.02	< LOD	4.77	< LOD	12.63
		S5	***10.0-12.5***	***< LOD***	***8.66***	***350.04***	***80.72***	***< LOD***	***17.62***	***1548.53***	***71.06***	***< LOD***	***10.2***	***< LOD***	***13.47***	***< LOD***	***93.77***	***< LOD***	***5.39***	***< LOD***	***12.88***
		S6	***12.5-15.0***	***< LOD***	***10.08***	***612.39***	***62.71***	***< LOD***	***13.31***	***336.65***	***48.53***	***< LOD***	***12.6***	***< LOD***	***12.06***	***< LOD***	***90.87***	***< LOD***	***5.22***	***< LOD***	***9.9***
6/29/2017	B203	S1 & S2	0.0-5.0	< LOD	13.31	94.69	53.88	< LOD	12.09	645.13	24.85	52.21	11.13	< LOD	12.39	88.89	57.31	< LOD	4.07	< LOD	9.22
		S3	5.0-7.5	< LOD	11.31	150.99	58.05	< LOD	12.66	355.53	20.59	40.46	10.05	< LOD	11.34	< LOD	75.53	< LOD	4.26	< LOD	9.97
		S4	7.5-10.0	< LOD	14.28	333.72	65.48	< LOD	14.34	558.32	52.25	58.74	12.19	< LOD	12.44	108.42	63.45	< LOD	4.87	< LOD	10.17
		S5	10.0-12.5	< LOD	9.63	141.71	60.57	< LOD	13.75	2148.01	43.45	12.18	8.06	< LOD	11	122.88	60.86	< LOD	4.11	< LOD	10.3
		S6	***12.5-15.0***	***< LOD***	***9.18***	***133.32***	***63.05***	***< LOD***	***13.82***	***2243.85***	***47.16***	***< LOD***	***10.64***	***< LOD***	***12.04***	***< LOD***	***87.63***	***< LOD***	***4.36***	***< LOD***	***10.35***
		S7	***clay/silt @ 15.0***	***< LOD***	***10.19***	***349.15***	***79.11***	***< LOD***	***16.79***	***1234.59***	***65.11***	***16.18***	***8.89***	***< LOD***	***12.42***	***< LOD***	***94.91***	***< LOD***	***4.65***	***< LOD***	***12.91***
6/29/2017	B204	S1	0.0-2.5	< LOD	20.83	190.99	77.47	< LOD	16.76	802.44	57.23	161.63	17.3	< LOD	11.38	< LOD	88.88	< LOD	4.32	< LOD	13.19
		S2	2.5-5.0	< LOD	8.53	327.4	65.96	< LOD	14.26	51.32	14.6	< LOD	10.98	< LOD	12.17	< LOD	86.59	< LOD	4.98	< LOD	10.73
		S3	5.0-7.5	< LOD	7.87	345.56	57.34	< LOD	12.56	127.91	16.33	< LOD	9.91	< LOD	11.4	< LOD	82.46	< LOD	5.29	< LOD	9.36
		S4	***7.5-10.0***	***< LOD***	***9.28***	***185.82***	***65.21***	***< LOD***	***14.85***	***720.44***	***55.06***	***< LOD***	***12.68***	***< LOD***	***13.34***	***124.53***	***69.91***	***< LOD***	***4.93***	***< LOD***	***10.7***
		S5	**10.0-12.5**	**< LOD**	**8.26**	**308.18**	**55.8**	**< LOD**	**12.46**	**523.45**	**49.47**	**< LOD**	**10.47**	**< LOD**	**11.61**	**< LOD**	**89.47**	**< LOD**	**5.2**	**< LOD**	**9.51**
		S6	12.5-15.0	< LOD	9.98	430.11	63.95	< LOD	13.24	342.88	27.16	< LOD	12.35	< LOD	12.81	< LOD	98.63	< LOD	4.72	< LOD	10.33
6/29/2017	B205	S1	0.0-2.5	< LOD	9.45	157.91	62.45	< LOD	13.53	1588.79	72.97	< LOD	12.56	< LOD	13.24	< LOD	92.74	< LOD	4.86	< LOD	10.37
		S2	2.5-5.0	< LOD	8.27	174.24	48.07	< LOD	10.77	922.27	29.41	< LOD	10.92	< LOD	11.63	90.99	60.17	< LOD	4.37	< LOD	8.03
		S3	5.0-7.5	< LOD	9.59	339.7	62.7	< LOD	13.71	3890	57.48	< LOD	11.65	< LOD	13.79	< LOD	99.71	< LOD	5.22	< LOD	10.06
		S4	7.5-10.0	< LOD	8.39	324.41	48.99	< LOD	10.66	1595.92	38.67	< LOD	10.42	< LOD	11.45	< LOD	82.94	< LOD	4.06	< LOD	8.11
		S5	***10.0-12.5***	***< LOD***	***21.84***	***178.14***	***49.36***	***< LOD***	***10.68***	***5382.11***	***66.65***	***142.66***	***18.2***	***< LOD***	***14.47***	***418.72***	***88.1***	***< LOD***	***6.11***	***< LOD***	***8.2***
		S6	12.5-15.0	< LOD	9.8	492.56	64.6	< LOD	13.49	576.68	32.11	< LOD	11.91	< LOD	13.22	< LOD	96.98	< LOD	4.44	< LOD	10.04
6/29/2017	B206	S1	0.0-2.5	< LOD	16.98	226.22	57.5	< LOD	12.61	720.26	28.39	101.69	14.35	< LOD	11.88	< LOD	83.81	< LOD	4.8	< LOD	9.88
		S2	2.5-5.0	< LOD	9.34	199.33	60.93	< LOD	13.47	220.69	19.22	< LOD	11.32	< LOD	10.76	< LOD	85.19	< LOD	4.02	< LOD	10.65
		S3	***5.0-7.5***	***< LOD***	***9.45***	***233.79***	***77.02***	***< LOD***	***16.8***	***496.18***	***42.97***	***< LOD***	***11.82***	***< LOD***	***12.04***	***90.67***	***59.14***	***< LOD***	***4.11***	***< LOD***	***13.28***
		S4	7.5-10.0	< LOD	11.34	311.32	59.2	< LOD	12.75	400.43	24.73	18.9	9.28	< LOD	13.01	< LOD	96.52	< LOD	5.12	< LOD	9.78
		S5	10.0-12.5	< LOD	9.42	394.22	50.89	< LOD	11.22	771.08	30.12	< LOD	11.63	< LOD	12.18	< LOD	88.05	< LOD	4.92	< LOD	8.38
		S6	***12.5-15.0***	***< LOD***	***8.2***	***< LOD***	***91.87***	***< LOD***	***13.92***	***1126.64***	***33.15***	***< LOD***	***9.77***	***< LOD***	***12.15***	***< LOD***	***85.26***	***< LOD***	***4.51***	***< LOD***	***10.28***
			silt/clay @ 15.0	< LOD	9.56	264.21	49.77	< LOD	10.81	456.94	27.85	< LOD	11.35	< LOD	12.49	< LOD	89.96	< LOD	5.03	< LOD	8.29
6/29/2017	B207	S1	0.0-2.5	< LOD	14.11	287.84	62.61	< LOD	13.6	50.28	15.49	57.23	11.77	< LOD	12.48	< LOD	83.88	< LOD	4.83	< LOD	10.51
		S2	2.5-5.0	< LOD	8.45	305.92	48.85	< LOD	10.76	51.83	31.11	< LOD	10.9	12.32	7.89	108.77	61.82	< LOD	4.62	< LOD	8.01
		S3	5.0-7.5	< LOD	8.56	123.81	55.06	< LOD	12.07	149.95	18.5	< LOD	10.91	< LOD	12.28	< LOD	83.65	< LOD	4.51	< LOD	8.94
		S4	7.5-10.0	< LOD	8.39	280.01	74.67	< LOD	16.03	362.16	22.77	< LOD	11.22	< LOD	11.16	< LOD	79.69	< LOD	4.3	< LOD	12.93
		S5	10.0-12.5	< LOD	8.65	287.19	63.08	< LOD	13.83	197.01	18.89	< LOD	11.4	< LOD	12.63	< LOD	92.74	< LOD	4.65	< LOD	10.51
	Lab	***S6***	***12.5-15.0***	***< LOD***	***9.57***	***251.65***	***59.67***	***< LOD***	***12.4***	***895.61***	***30.96***	***< LOD***	***11.5***	***< LOD***	***11.98***	***131.37***	***61.55***	***< LOD***	***4.86***	***< LOD***	***9.41***
	13.5-16.0	***S7***	***15.0-17.5***	***< LOD***	***8.03***	***295.62***	***55.88***	***< LOD***	***11.98***	***551.03***	***26.5***	***< LOD***	***10.15***	***< LOD***	***11.24***	***130.33***	***57.95***	***< LOD***	***4.39***	***< LOD***	***8.81***
		S8	***17.5-20.0***	***< LOD***	***8.76***	***409.22***	***62.53***	***< LOD***	***13.48***	***344.32***	***27.74***	***< LOD***	***10.9***	***< LOD***	***12.01***	***98.69***	***62.79***	***< LOD***	***4.53***	***< LOD***	***9.64***
6/29/2017	B208	S1	0.0-2.5	< LOD	9.13	303.54	59.86	< LOD	13	107.12	35.15	15.48	8.15	< LOD	11.91	< LOD	81.53	< LOD	4.05	< LOD	9.83
		S2	2.5-5.0	< LOD	11.96	190.63	51.75	< LOD	11.24	43.91	15.85	37.58	10.09	< LOD	11.12	< LOD	86.25	< LOD	4.08	< LOD	8.63
		S3	5.0-7.5	< LOD	9.07	225.26	61.1	< LOD	13.34	106.11	16.71	< LOD	11.07	< LOD	11.95	< LOD	85.2	< LOD	4.78	< LOD	10.29
		S4	7.5-10.0	< LOD	10.17	266.05	55.8	< LOD	12.04	199.59	19.47	17.15	8.59	< LOD	12.26	< LOD	82.28	< LOD	5.13	< LOD	9.34
		S5	10.0-12.5	< LOD	9.79	215.3	61.67	< LOD	13.75	88.79	17.39	12.57	8.25	< LOD	12.04	< LOD	90.43	< LOD	4.65	< LOD	9.85
	Lab	***S6***	***12.5-15.0***	***< LOD***	***7.46***	***< LOD***	***68***	***< LOD***	***9.73***	***241.79***	***20.6***	***< LOD***	***10.09***	***< LOD***	***12.75***	***100.6***	***58.01***	***< LOD***	***4.5***	***< LOD***	***7.47***
	13.5-16.0	***S7***	***15.0-17.5***	***< LOD***	***8.76***	***346.15***	***78.38***	***< LOD***	***17.74***	***141.04***	***35.96***	***< LOD***	***10.73***	***< LOD***	***12.09***	***< LOD***	***86.26***	***< LOD***	***4.68***	***< LOD***	***13.71***
		S8	***17.5-20.0***	***< LOD***	***9.15***	***484.35***	***61.34***	***< LOD***	***12.9***	***256.02***	***27.47***	***< LOD***	***12.14***	***< LOD***	***11.48***	***< LOD***	***91.8***	***< LOD***	***4.34***	***< LOD***	***9.76***

TABLE 1B. SOIL SAMPLE XRF FIELD SCREENING RESULTS - 200 SERIES BORINGS
Central Plating Site
Walpole, New Hampshire

Date	Boring	Sample	Depth (ft.)	As (Arsenic)	As +/-	Ba (Barium)	Ba +/-	Cd (Cadmium)	Cd +/-	Cr (Chromium)	Cr +/-	Pb (Lead)	Pb +/-	Hg (Mercury)	Hg +/-	Ni (Nickel)	Ni +/-	Se (Selenium)	Se +/-	Ag (Silver)	Ag +/-
NH DES Env-Or 600 Soil Remediation Standard (SRS)				11		1,000		33		130/1,000		400		7		400		180		89	
6/29/2017	B209	S1	0.0-2.5	< LOD	13.32	118.44	57.69	< LOD	12.45	75.18	32.73	52.05	11.43	< LOD	12.47	< LOD	85.2	< LOD	4.71	< LOD	9.81
	MW201?	S2	2.5-5.0	< LOD	8.47	< LOD	110.2	< LOD	16.45	61.16	15.72	< LOD	10.77	< LOD	12.89	< LOD	91.37	< LOD	5.33	< LOD	12.64
		S3	5.0-7.5	< LOD	7.71	122.11	47.76	< LOD	10.72	57.99	29.85	< LOD	10.32	< LOD	11.56	< LOD	81.9	< LOD	4.49	< LOD	8.39
		S4	7.5-10.0	10.09	6.1	117.05	60.16	< LOD	12.89	124.05	17.05	< LOD	10.2	< LOD	13.51	< LOD	94.11	< LOD	4.81	< LOD	9.8
		@	8.5	< LOD	8.51	148.97	46.42	< LOD	10.11	75.97	31.94	< LOD	10.88	< LOD	12.08	94.36	60.13	< LOD	4.66	< LOD	7.94
		@	9.0	< LOD	10.38	99.18	50.72	< LOD	10.66	231.27	38.97	14.72	9.49	< LOD	14.26	< LOD	96.35	< LOD	5.77	< LOD	8.27
		S5	10.0-12.5	< LOD	8.36	210.85	57.6	< LOD	12.45	73.76	15.65	< LOD	10.32	< LOD	11.77	91.44	57.53	< LOD	4.7	< LOD	9.5
		S6	12.5-15.0	< LOD	8.54	114.22	60.32	< LOD	13.58	100.58	15.74	< LOD	11.4	< LOD	12.39	< LOD	86.26	< LOD	4.78	< LOD	10.32
		S7	15.0-17.5	< LOD	8.1	120.21	49.33	< LOD	10.8	400.7	22.7	< LOD	11.66	< LOD	13.17	104.09	62.24	< LOD	4.98	< LOD	8.09
		@	16.0	< LOD	9.69	233.14	51.25	< LOD	11.25	694.84	26.9	< LOD	12.52	< LOD	13.38	209.66	76.07	< LOD	5.19	< LOD	8.45
		S8	17.5-20.0	< LOD	7.94	< LOD	87.81	< LOD	12.7	283.95	20.43	< LOD	10.35	< LOD	12.25	< LOD	84.95	< LOD	5.19	< LOD	9.76
		S9	***20.0-22.0***	***< LOD***	***8.46***	***214.29***	***71.8***	***< LOD***	***15.16***	***740.99***	***58.28***	***< LOD***	***10.8***	***< LOD***	***11.2***	***89.07***	***58.06***	***< LOD***	***4.4***	***< LOD***	***11.8***
		S10	22.0-24.0	< LOD	8.83	372.92	56.62	< LOD	12.13	125.12	41.03	< LOD	11.86	< LOD	11.58	96.39	63.82	< LOD	4.83	< LOD	9.45
		@	21.0	< LOD	8.3	< LOD	76.4	< LOD	11.15	376.06	21.49	< LOD	11.81	< LOD	11.66	< LOD	75.71	< LOD	4.4	< LOD	8.93
		@	22.0	< LOD	9.51	337.12	60.17	< LOD	12.79	172.17	25	< LOD	11.16	< LOD	11.39	187.14	67.98	< LOD	5.02	< LOD	9.68
6/29/2017	B211	S1	0.0-2.5	< LOD	15.61	245.12	56.72	< LOD	12.95	1241.1	68.66	77.65	13.24	< LOD	12.5	< LOD	89.82	< LOD	4.95	< LOD	9.88
		S2	2.5-5.0	< LOD	12.9	254.36	58.85	< LOD	12.69	946.41	61.31	52.44	11.15	< LOD	11.84	< LOD	82.51	< LOD	4.52	< LOD	9.7
		S3	5.0-7.5	< LOD	8.61	86.4	56.16	< LOD	12.7	341.31	21.51	< LOD	10.88	< LOD	11.49	< LOD	79.82	< LOD	4.15	< LOD	9.38
		S4	7.5-10.0	< LOD	8.24	163.24	78.96	< LOD	17.48	374.13	22.15	< LOD	11.04	< LOD	11.65	< LOD	84.47	< LOD	4.41	< LOD	13.22
		S5	10.0-12.5	< LOD	7.95	289.18	57.18	< LOD	12.41	46.49	17.06	< LOD	10.22	< LOD	10.87	< LOD	80.45	< LOD	4.04	< LOD	9.32
		S6	12.5-15.0	< LOD	10.7	521.76	63.16	< LOD	13.26	326.91	47.63	< LOD	13.09	< LOD	12.63	< LOD	101.33	< LOD	4.68	< LOD	10.05

Notes:

1 - Concentrations and SRS are in parts per million (milligrams/ kilogram).
2 - LOD - Limit of Detection (lower limit); < = less than.
3 - Instrument degree of measurement accuracy indicated by +/- value by metal and sample.
4 - Sample depth is in feet below ground surface.
5 - Sampling indicate in bold and italics was submitted for laboratory analyses for one or more parameters.
6 - Values highlighted in yellow exceed the SRS for that metal.
7 - Cr SRS is 130 for hexavalent Cr and 1,000 for trivalent Cr; for exceedence designation, Cr is inferred to be trivalent.
8 - 100-series borings: Table included Copper (Cu) and Zinc (Zn); with no siginificantly elevated concentrations detected. The 200-series borings had detected levels of Cu ranging from 172.42 (+/-33.47) to <LOD (33.81-21.11), and Zn at 164.47 (+/-23.58) to <LOD (20.03-10.11).

TABLE 2. SOIL SAMPLE ANALYTICAL RESULTS
Central Plating Site
Walpole, New Hampshire

Area of Concern	**NH DES Soil Remediation Standards (SRS)**	**NH DES RCMP Method 1 NH S-1 Standards**	**NH DES RCMP Method 1 NH S-2 Standards**	**NH DES RCMP Method 1 NH S-3 Standards**	**US EPA Regional Screening Levels (RSLs) for Soil**		**AOC 1**														
Sample Location							B108-S1	B108-S5	B109-S1	B110-S5	B111-S4	B112-S5	B201-S4	B202-S5	B202-S6	B203-S6	B203-S7	B204-S4	B204-S5	B205-S5	DUP-03
Sample Depth (feet bgs)							0-2.5 ft	10-12.5 ft	0-2.5 ft	10-12.5 ft	7.5-10 ft	10-12.5 ft	7.5-10 ft	10-12.5 ft	12.5-15 ft	12.5-15 ft	15 ft	7.5-10 ft	10-12.5 ft	10-12.5 ft	(B205-S5)
Sample Date					**Residential**	**Industrial**	8/12/2015	8/12/2015	8/12/2015	8/12/2015	8/12/2015	8/12/2015	6/30/2017	6/30/2017	6/30/2017	6/30/2017	6/30/2017	6/30/2017	6/30/2017	6/30/2017	
Volatile Organic Compounds (VOCs)	Concentrations in mg/kg						Concentrations in mg/kg														
Methylene chloride	0.1	0.1	0.1	0.1	11	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Toluene	100	100	100	100	5,000	45,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Ethylbenzene	120	120	140	140	5.4	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Trichloroethene	0.8	0.8	0.8	0.8	0.91	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
p/m-Xylene	500	500	1,000	1,500	590	2,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
o-Xylene	500	500	1,000	1,500	690	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Xylenes, Total	500	500	1,000	1,500	NS	NS		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Acetone	75	75	75	75	61,000	630,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
n-Butylbenzene	110	110	110	110	3,900	51,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
sec-Butylbenzene	130	130	130	130	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Isopropylbenzene	330	330	330	330	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
p-Isopropyltoluene	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	5	5	5	5	3.6	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
n-Propylbenzene	85	85	85	85	85	3,400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1,3,5-Trimethylbenzene	96	96	96	96	780	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1,2,4-Trimethylbenzene	130	130	130	130	62	260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
All other VOCs	Various	Various	Various	Various	Various	Various	NA	NA	NA	NA	NA	NA	NA					NA	NA	NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	Concentrations in mg/kg						Concentrations in mg/kg														
Acenaphthene	340	340	340	340	3,400	33,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Acenaphthylene	490	490	490	490	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	77	77	77	77	2,300	22,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Phenanthrene	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Anthracene	1,000	1,000	2,500	5,000	17,000	170,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	960	960	2,500	5,000	2,300	22,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	720	720	2,500	5,000	1,700	17,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1-Methylnapthalene	NS	NS	NS	NS	18	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	1	1	4	52	0.15	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	120	120	360	5,200	15	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo[b]fluoranthene	1	1	4	52	0.15	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo[k]fluoranthene	12	12	36	52	1.5	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo[a]pyrene	0.7	0.7	0.7	0.7	0.015	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Dibenzo[a,h]anthracene	0.7	0.7	0.7	0.7	0.015	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno[1,2,3-cd]pyrene	1	1	4	52	0.15	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
All other SVOCs	Various	Various	Various	Various	Various	Various	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Total Cyanide	Concentrations in mg/kg						Concentrations in mg/kg														
Cyanide	22	22	100	100	2.7	12	NA	NA	NA	NA	NA	NA	NA					NA	NA	NA	
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Concentrations in mg/kg						Concentrations in mg/kg														
TPH-DRO	10,000	10,000	10,000	10,000	NS	NS	NA	NA	NA	NA	NA	NA	NA					NA	NA	NA	
Metals	Concentrations in mg/kg						Concentrations in mg/kg														
Arsenic	11	11	11	47	0.39	1.6	**34**	9.7	10	6.5	11	8.3						3.19	NA	BDL(0.097)	
Barium	1,000	1,000	2,500	5,000	15,000	190,000	71	18	50	19	16	31						16.5	NA	53	
Cadmium	33	33	280	280	37	450	1.5	BDL (0.03)	0.9	0.06 J	BDL (0.03)	BDL (0.32)						3.15	NA	2.2	
Chromium, Total	NS	NS	NS	NS	NS	NS	17,000	2,000	440	450	2,500	1,400	939	1,560		456	239	415	NA	3,920	
Chromium, Hexavalent	130	130	130	130	0.29	5.6	**2,800**	**230**	80	14	**1,900**	**210**	**420**	**180**		**150**	72.5	100	NA	**450**	**330**
Chromium, Trivalent	1,000	1,000	2,500	5,000	120,000	1,800,000	**14,200**	**1,770**	360	436	600	**1,190**	519	**1,380**		306	167	315	NA	**3,470**	
Copper	NS	NS	NS	NS	3,100	41,000	220	37	120	43	20	280						NA	NA	NA	
Lead	400	400	400	400	400	800	160	BDL (0.09)	220	BDL (0.1)	6.7	44						6.54	NA	146	
Mercury	7	7	52	52	23	310	0.32	0.016 J	0.08	BDL (0.02)	BDL (0.02)	BDL (0.02)						BDL(0.02)	NA	0.41	
Nickel	400	400	2,500	3,100	1,500	20,000	75	20	120	18	7.4	40						50.3	NA	181	
Selenium	180	180	1,600	1,600	390	5,100	BDL (0.13)	BDL (0.13)	BDL (0.13)	BDL (0.15)	BDL (0.12)	BDL (0.13)						BDL(0.114)	NA	0.2	
Silver	89	89	690	690	390	5,100	BDL (0.09)	BDL (0.09)	BDL (0.09)	BDL (0.1)	BDL (0.08)	0.23 J						BDL(0.125)	NA	BDL(0.131)	
Zinc	1,000	1,000	2,500	2,500	23,000	310,000	98	27	56	30	14	38						NA	NA	NA	
SPLP Metals	Concentrations in mg/L						Concentrations in mg/L														
Cadmium	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA									
Chromium	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA			0.313		2.26	NA	BDL(0.002)	NA	
Nickel	NS	NS	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA									

Legend:

AOC - Area of Concern (identified in report text)
bgs = Below Ground Surface
mg/kg = milligrams per kilogram
NS = No Standard
BDL( ) = Below laboratory detection limit shown in parenthesis
NA = Not Analyzed
J = estimated concentration detected above laboratory detection limit, but below laboratory reporting limit

NOTES:

1 - Xylenes SRS listed are for total xylenes (mixed isomers).
2 - NH DES Env-Or 600 Soil Remediation Standards, updated June 1, 2015.
3 - NHDES Risk Characerization and Management Policy (RCMP) standards were updated February 2013.
4 - US EPA Regional Screening Levels, updated January 2015.
5 - Bold type font and boxed value indicates concentration exceeds the NH DES SRS.
6 - Concentration values shaded orange indicate RCMP Method 1, NH S-3 standard is exceeded.

TABLE 2. SOIL SAMPLE ANALYTICAL RESULTS
Central Plating Site
Walpole, New Hampshire

Area of Concern	**NH DES Soil Remediation Standards (SRS)**	**NH DES RCMP Method 1 NH S-1 Standards**	**NH DES RCMP Method 1 NH S-2 Standards**	**NH DES RCMP Method 1 NH S-3 Standards**	**US EPA Regional Screening Levels (RSLs) for Soil**									**AOC 2**			**AOC 3**			**AOC 4**
Sample Location							B206-S3	B206-S6	Dup-01	B207-S6/S7	DUP-02	B207-S8	B208-S6/S7	B102-S7	B106-S6	B209-S9	B114-S1	B115-S1	B116-S1	B107-S1
Sample Depth (feet bgs)							5-7.5 ft	12.5-15 ft	(B206-S6)	13.5-16 ft	(B207-S6/S7)	17.5- 20 ft	12.5-17.5 ft	15-17.5 ft	12.5-15 ft	20-22 ft	0-2.5 ft	0-2.5 ft	0-2.5 ft	0-2.5 ft
Sample Date					**Residential**	**Industrial**	6/30/2017	6/30/2017		6/30/2017		6/30/2017	6/30/2017	8/12/2015	8/12/2015	6/30/2017	8/12/2015	8/12/2015	8/12/2015	8/12/2015
Volatile Organic Compounds (VOCs)	Concentrations in mg/kg						Concentrations in mg/kg													
Methylene chloride	0.1	0.1	0.1	0.1	11	53	NA	NA		NA		NA	NA	BDL (0.05)	BDL (0.07)	NA	BDL (0.054)	BDL (0.052)	BDL (0.049)	BDL (0.051)
Toluene	100	100	100	100	5,000	45,000	NA	NA		NA		NA	NA	BDL (0.0082)	BDL (0.012)	NA	BDL (0.0096)	BDL (0.0092)	BDL (0.0087)	BDL (0.0091)
Ethylbenzene	120	120	140	140	5.4	27	NA	NA		NA		NA	NA	BDL (0.0058)	BDL (0.008)	NA	BDL (0.0062)	BDL (0.006)	BDL (0.0057)	BDL (0.0059)
Trichloroethene	0.8	0.8	0.8	0.8	0.91	6.4	NA	NA		NA		NA	NA	BDL (0.0057)	BDL (0.0079)	NA	0.5	BDL (0.0059)	BDL (0.0056)	0.044 J
p/m-Xylene	500	500	1,000	1,500	590	2,500	NA	NA		NA		NA	NA	BDL (0.009)	BDL (0.012)	NA	BDL (0.0097)	BDL (0.0093)	BDL (0.0088)	BDL (0.0092)
o-Xylene	500	500	1,000	1,500	690	3,000	NA	NA		NA		NA	NA	BDL (0.0078)	BDL (0.011)	NA	BDL (0.0084)	BDL (0.0081)	BDL (0.0077)	BDL (0.008)
Xylenes, Total	500	500	1,000	1,500	NS	NS	NA	NA		NA		NA	NA	BDL (0.0078)	BDL (0.011)	NA	BDL (0.0084)	BDL (0.0081)	BDL (0.0077)	BDL (0.008)
Acetone	75	75	75	75	61,000	630,000	NA	NA		NA		NA	NA	BDL (0.047)	BDL (0.065)	NA	BDL (0.051)	BDL (0.049)	BDL (0.046)	BDL (0.048)
n-Butylbenzene	110	110	110	110	3,900	51,000	NA	NA		NA		NA	NA	BDL (0.0052)	BDL (0.0072)	NA	BDL (0.0056)	BDL (0.0054)	BDL (0.0051)	BDL (0.0054)
sec-Butylbenzene	130	130	130	130	NS	NS	NA	NA		NA		NA	NA	BDL (0.0056)	BDL (0.0077)	NA	BDL (0.006)	BDL (0.0058)	BDL (0.0055)	BDL (0.0057)
Isopropylbenzene	330	330	330	330	NS	NS	NA	NA		NA		NA	NA	BDL (0.0047)	BDL (0.0065)	NA	BDL (0.0051)	BDL (0.0049)	BDL (0.0046)	BDL (0.0048)
p-Isopropyltoluene	NS	NS	NS	NS	NS	NS	NA	NA		NA		NA	NA	BDL (0.0057)	BDL (0.0079)	NA	BDL (0.0061)	BDL (0.0059)	BDL (0.0056)	BDL (0.0058)
Naphthalene	5	5	5	5	3.6	18	NA	NA		NA		NA	NA	BDL (0.0063)	BDL (0.0087)	NA	BDL (0.0068)	BDL (0.0065)	BDL (0.0062)	BDL (0.0064)
n-Propylbenzene	85	85	85	85	85	3,400	NA	NA		NA		NA	NA	BDL (0.005)	BDL (0.0069)	NA	BDL (0.0054)	BDL (0.0052)	BDL (0.0049)	BDL (0.0051)
1,3,5-Trimethylbenzene	96	96	96	96	780	10,000	NA	NA		NA		NA	NA	BDL (0.0065)	BDL (0.009)	NA	BDL (0.007)	BDL (0.0068)	BDL (0.0064)	BDL (0.0067)
1,2,4-Trimethylbenzene	130	130	130	130	62	260	NA	NA		NA		NA	NA	BDL (0.0064)	BDL (0.0089)	NA	BDL (0.0069)	BDL (0.0067)	BDL (0.0063)	BDL (0.0066)
All other VOCs	Various	Various	Various	Various	Various	Various	NA			NA			NA	BDL (Various)	BDL (Various)	NA	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)
Polynuclear Aromatic Hydrocarbons (PAHs)	Concentrations in mg/kg						Concentrations in mg/kg													
Acenaphthene	340	340	340	340	3,400	33,000	NA	NA		NA		NA	NA	NA	NA	NA	0.089 J	BDL (0.036)	BDL (0.036)	NA
Acenaphthylene	490	490	490	490	NS	NS	NA	NA		NA		NA	NA	NA	NA	NA	0.2	0.16	0.13 J	NA
Fluorene	77	77	77	77	2,300	22,000	NA	NA		NA		NA	NA	NA	NA	NA	0.140 J	BDL (0.051)	BDL (0.050)	NA
Phenanthrene	NS	NS	NS	NS	NS	NS	NA	NA		NA		NA	NA	NA	NA	NA	1.9	0.14	0.12	NA
Anthracene	1,000	1,000	2,500	5,000	17,000	170,000	NA	NA		NA		NA	NA	NA	NA	NA	0.54	0.078 J	0.060 J	NA
Fluoranthene	960	960	2,500	5,000	2,300	22,000	NA	NA		NA		NA	NA	NA	NA	NA	4.3	0.330	0.27	NA
Pyrene	720	720	2,500	5,000	1,700	17,000	NA	NA		NA		NA	NA	NA	NA	NA	3.2	0.31	0.25	NA
1-Methylnapthalene	NS	NS	NS	NS	18	73	NA	NA		NA		NA	NA	NA	NA	NA	0.066 J	BDL (0.053)	BDL (0.052)	NA
Benzo(a)anthracene	1	1	4	52	0.15	2.1	NA	NA		NA		NA	NA	NA	NA	NA	***1.7***	0.15	0.1	NA
Chrysene	120	120	360	5,200	15	210	NA	NA		NA		NA	NA	NA	NA	NA	2	0.190	0.15	NA
Benzo[b]fluoranthene	1	1	4	52	0.15	2.1	NA	NA		NA		NA	NA	NA	NA	NA	***2.3***	*0.26*	*0.22*	NA
Benzo[k]fluoranthene	12	12	36	52	1.5	21	NA	NA		NA		NA	NA	NA	NA	NA	0.79	0.11	0.085 J	NA
Benzo[a]pyrene	0.7	0.7	0.7	0.7	0.015	0.21	NA	NA		NA		NA	NA	NA	NA	NA	***1.4***	*0.19*	*0.15*	NA
Benzo(g,h,i)perylene	NS	NS	NS	NS	NS	NS	NA	NA		NA		NA	NA	NA	NA	NA	1	0.15	0.12 J	NA
Dibenzo[a,h]anthracene	0.7	0.7	0.7	0.7	0.015	0.21	NA	NA		NA		NA	NA	NA	NA	NA	*0.31*	*0.08 J*	*0.072 J*	NA
Indeno[1,2,3-cd]pyrene	1	1	4	52	0.15	2.1	NA	NA		NA		NA	NA	NA	NA	NA	*0.94*	0.14	0.12 J	NA
All other SVOCs	Various	Various	Various	Various	Various	Various	NA	NA		NA		NA	NA	NA	NA	NA	BDL (Various)	BDL (Various)	BDL (Various)	NA
Total Cyanide	Concentrations in mg/kg						Concentrations in mg/kg													
Cyanide	22	22	100	100	2.7	12	NA	NA		NA		NA	NA	BDL (0.28)	BDL (0.3)	NA	NA	NA	NA	0.29 J
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Concentrations in mg/kg						Concentrations in mg/kg													
TPH-DRO	10,000	10,000	10,000	10,000	NS	NS	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Concentrations in mg/kg						Concentrations in mg/kg													
Arsenic	11	11	11	47	0.39	1.6	3.36			2.58	2.6		4.4	7.2	**12**	3.81	**12**	7	8	10
Barium	1,000	1,000	2,500	5,000	15,000	190,000	13.3			16.6	20.6		34.4	13	93	34.5	52	50	37	67
Cadmium	33	33	280	280	37	450	0.38 J			1.72	2.12		0.734	0.84	BDL (0.04)	0.853	0.99	6.3	1.8	BDL (0.03)
Chromium, Total	NS	NS	NS	NS	NS	NS	217			711	786		79.6	210	38	257	44	23	26	17
Chromium, Hexavalent	130	130	130	130	0.29	5.6				**320**				80	BDL (0.22)		BDL (0.18)	BDL (0.17)	BDL (0.17)	BDL (0.18)
Chromium, Trivalent	1,000	1,000	2,500	5,000	120,000	1,800,000				391				130	38		44	23	26	17
Copper	NS	NS	NS	NS	3,100	41,000	NA			NA			NA	57	34	NA	84	120	140	33
Lead	400	400	400	400	400	800	14.4			12.6	15.4		11.8	BDL (0.47)	BDL (0.53)	5.44	280	60	69	130
Mercury	7	7	52	52	23	310	BDL (0.02)			BDL (0.02)	BDL (0.02)		BDL (0.02)	BDL (0.02)	BDL (0.02)	BDL (0.02)	0.15	0.15	0.16	0.24
Nickel	400	400	2,500	3,100	1,500	20,000	14.8			93.4	112		29.7	77	33	30	71	51	32	15
Selenium	180	180	1,600	1,600	390	5,100	BDL (0.111)			0.43	0.596		0.157	BDL (0.14)	BDL (0.16)	BDL (0.128)	BDL (0.12)	BDL (0.12)	BDL (0.12)	BDL (0.13)
Silver	89	89	690	690	390	5,100	BDL (0.122)			0.233	0.321		BDL (0.12)	BDL (0.09)	BDL (0.1)	BDL (0.140)	BDL (0.08)	0.13 J	0.28 J	BDL (0.9)
Zinc	1,000	1,000	2,500	2,500	23,000	310,000	NA			NA			NA	28	77	NA	240	490	360	94
SPLP Metals	Concentrations in mg/L						Concentrations in mg/kg													
Cadmium	NS	NS	NS	NS	NS	NS		0.002 J	0.008			BDL (0.001)	BDL (0.001)							
Chromium	NS	NS	NS	NS	NS	NS	NA	0.104	0.126	NA		1.3				NA				
Nickel	NS	NS	NS	NS	NS	NS		0.034	0.125			BDL (0.004)	0.004 J							

Legend:

AOC - Area of Concern (identified in report text)	bgs = Below Ground Surface
mg/kg = milligrams per kilogram	NS = No Standard
BDL( ) = Below laboratory detection limit shown in parenthesis	NA = Not Analyzed
J = estimated concentration detected above laboratory detection limit, but below laboratory reporting limit	

NOTES:
1 - Xylenes SRS listed are for total xylenes (mixed isomers).
2 - NH DES Env-Or 600 Soil Remediation Standards, updated June 1, 2015.
3 - NHDES Risk Characerization and Management Policy (RCMP) standards were updated February 2013.
4 - US EPA Regional Screening Levels, updated January 2015.
5 - Bold type font and boxed value indicates concentration exceeds the NH DES SRS.
6 - Concentration values shaded orange indicate RCMP Method 1, NH S-3 standard is exceeded.

TABLE 2. SOIL SAMPLE ANALYTICAL RESULTS
Central Plating Site
Walpole, New Hampshire

Area of Concern	**NH DES Soil Remediation Standards (SRS)**	**NH DES RCMP Method 1 NH S-1 Standards**	**NH DES RCMP Method 1 NH S-2 Standards**	**NH DES RCMP Method 1 NH S-3 Standards**	**US EPA Regional Screening Levels (RSLs) for Soil**		**AOC 5**	**AOC 6**				**AOC 7**		**AOC 8**		
Sample Location							B113-S5	B103-S5	B103-S7	B104-S9	B105-S10	B101-S5	B111-S5	Sump 1	Sump 2	Sump 3
Sample Depth (feet bgs)							10-12.5 ft	10-12.5 ft	15-17.5 ft	20-22.5 ft	22.5-25 ft	10-12.5 ft	10-12.5 ft	na	na	na
Sample Date					**Residential**	**Industrial**	8/13/2015	8/12/2015	8/12/2015	8/13/2015	8/13/2015	8/13/2015	8/12/2015	8/13/2015	8/13/2015	8/13/2015
Volatile Organic Compounds (VOCs)	Concentrations in mg/kg						Concentrations in mg/kg									
Methylene chloride	0.1	0.1	0.1	0.1	11	53	BDL (0.049)	NA	BDL (0.058)	BDL (0.069)	BDL (0.063)	BDL (1.2)	BDL (0.12)	*0.12 J*	BDL (0.14)	BDL (0.20)
Toluene	100	100	100	100	5,000	45,000	BDL (0.0087)	NA	BDL (0.01)	BDL (0.012)	BDL (0.011)	0.78 J	BDL (0.021)	BDL (0.019)	BDL (0.026)	BDL (0.036)
Ethylbenzene	120	120	140	140	5.4	27	BDL (0.0057)	NA	BDL (0.0067)	BDL (0.008)	BDL (0.0073)	*15*	0.75	BDL (0.012)	BDL (0.017)	BDL (0.024)
Trichloroethene	0.8	0.8	0.8	0.8	0.91	6.4	BDL (0.0056)	NA	BDL (0.0066)	BDL (0.0079)	BDL (0.0072)	BDL (0.13)	BDL (0.12)	BDL (0.012)	BDL (0.016)	BDL (0.023)
p/m-Xylene	500	500	1,000	1,500	590	2,500	BDL (0.0088)	NA	BDL (0.01)	BDL (0.012)	BDL (0.011)	51	BDL (0.021)	BDL (0.019)	BDL (0.026)	BDL (0.037)
o-Xylene	500	500	1,000	1,500	690	3,000	BDL (0.0077)	NA	BDL (0.009)	BDL (0.011)	BDL (0.0099)	9.8	BDL (0.018)	BDL (0.017)	BDL (0.023)	BDL (0.032)
Xylenes, Total	500	500	1,000	1,500	NS	NS	BDL (0.0077)	NA	BDL (0.009)	BDL (0.011)	BDL (0.0099)	61	BDL (0.018)	BDL (0.017)	BDL (0.023)	BDL (0.032)
Acetone	75	75	75	75	61,000	630,000	BDL (0.046)	NA	BDL (0.054)	BDL (0.065)	BDL (0.06)	BDL (1.1)	BDL(0.11)	0.69 J	BDL (0.14)	BDL (0.19)
n-Butylbenzene	110	110	110	110	3,900	51,000	BDL (0.0051)	NA	BDL (0.006)	BDL (0.0072)	BDL (0.0066)	3.9	0.44	BDL (0.011)	BDL (0.015)	BDL (0.021)
sec-Butylbenzene	130	130	130	130	NS	NS	BDL (0.0055)	NA	BDL (0.0064)	BDL (0.0077)	BDL (0.007)	1.8	0.3	BDL (0.012)	BDL (0.016)	BDL (0.023)
Isopropylbenzene	330	330	330	330	NS	NS	BDL (0.0046)	NA	BDL (0.0055)	BDL (0.0065)	BDL (0.006)	3.3	0.28	BDL (0.010)	BDL (0.014)	BDL (0.019)
p-Isopropyltoluene	NS	NS	NS	NS	NS	NS	BDL (0.0056)	NA	BDL (0.0066)	BDL (0.0079)	BDL (0.0072)	2.5	0.44	BDL (0.012)	BDL (0.016)	BDL (0.023)
Naphthalene	5	5	5	5	3.6	18	BDL (0.0062)	NA	BDL (0.0073)	BDL (0.0087)	BDL (0.008)	***8.3***	0.58	BDL (0.014)	BDL (0.018)	BDL (0.026)
n-Propylbenzene	85	85	85	85	85	3,400	BDL (0.0049)	NA	BDL (0.0058)	BDL (0.0069)	BDL (0.0063)	9.4	0.58	BDL (0.011)	BDL (0.014)	BDL (0.02)
1,3,5-Trimethylbenzene	96	96	96	96	780	10,000	BDL (0.0064)	NA	BDL (0.0076)	BDL (0.009)	BDL (0.0082)	21	0.25 J	BDL (0.014)	BDL (0.019)	BDL (0.027)
1,2,4-Trimethylbenzene	130	130	130	130	62	260	BDL (0.0063)	NA	BDL (0.0074)	BDL (0.0089)	BDL (0.0081)	69	4.4	BDL (0.014)	BDL (0.019)	BDL (0.026)
All other VOCs	Various	Various	Various	Various	Various	Various	BDL (Various)	NA	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)
Polynuclear Aromatic Hydrocarbons (PAHs)	Concentrations in mg/kg						Concentrations in mg/kg									
Acenaphthene	340	340	340	340	3,400	33,000	BDL (0.038)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	490	490	490	490	NS	NS	BDL (0.035)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	77	77	77	77	2,300	22,000	BDL (0.053)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NS	NS	NS	NS	NS	NS	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	1,000	2,500	5,000	17,000	170,000	BDL (0.031)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	960	960	2,500	5,000	2,300	22,000	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	720	720	2,500	5,000	1,700	17,000	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnapthalene	NS	NS	NS	NS	18	73	BDL (0.055)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	1	4	52	0.15	2.1	0.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	120	120	360	5,200	15	210	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	1	1	4	52	0.15	2.1	*0.16*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	12	12	36	52	1.5	21	0.09 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	0.7	0.7	0.7	0.7	0.015	0.21	*0.12 J*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NS	NS	NS	NS	NS	NS	0.089 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo[a,h]anthracene	0.7	0.7	0.7	0.7	0.015	0.21	*0.068 J*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	1	1	4	52	0.15	2.1	0.097 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
All other SVOCs	Various	Various	Various	Various	Various	Various	BDL (Various)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide	Concentrations in mg/kg						Concentrations in mg/kg									
Cyanide	22	22	100	100	2.7	12	NA	BDL (0.23)	NA	BDL (0.29)	BDL (0.3)	NA	NA	**79**	**780**	**48**
Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Concentrations in mg/kg						Concentrations in mg/kg									
TPH-DRO	10,000	10,000	10,000	10,000	NS	NS	478	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Concentrations in mg/kg						Concentrations in mg/kg									
Arsenic	11	11	11	47	0.39	1.6	NA	6.6	NA	**13**	7	NA	NA	**110**	**100**	**190**
Barium	1,000	1,000	2,500	5,000	15,000	190,000	NA	25	NA	47	13	NA	NA	140	280	**2,500**
Cadmium	33	33	280	280	37	450	NA	BDL (0.03)	NA	0.95	BDL (0.04)	NA	NA	3.2	0.59	4
Chromium, Total	NS	NS	NS	NS	NS	NS	NA	13	NA	31	8.6	NA	NA	13,000	6,100	15,000
Chromium, Hexavalent	130	130	130	130	0.29	5.6	NA	BDL (0.17)	NA	3.1	BDL (0.22)	NA	NA	**330**	BDL (0.28)	**370**
Chromium, Trivalent	1,000	1,000	2,500	5,000	120,000	1,800,000	NC	13	NA	27.9	8.6	NA	NA	**12,670**	**6,100**	**14,630**
Copper	NS	NS	NS	NS	3,100	41,000	NA	13	NA	37	13	NA	NA	9,100	5,100	14,000
Lead	400	400	400	400	400	800	NA	BDL (0.42)	NA	BDL (0.5)	BDL (0.1)	NA	NA	**9,000**	**75,000**	**6,800**
Mercury	7	7	52	52	23	310	NA	BDL (0.02)	NA	BDL (0.02)	BDL (0.02)	NA	NA	0.8	0.56	0.96
Nickel	400	400	2,500	3,100	1,500	20,000	NA	14	NA	50	16	NA	NA	**13,000**	**4,400**	**18,000**
Selenium	180	180	1,600	1,600	390	5,100	NA	BDL (0.13)	NA	BDL (0.15)	BDL (0.16)	NA	NA	2.6	0.2	0.22
Silver	89	89	690	690	390	5,100	NA	BDL (0.08)	NA	BDL (0.1)	BDL (0.1)	NA	NA	4.9	2.4	1.8
Zinc	1,000	1,000	2,500	2,500	23,000	310,000	NA	30	NA	55	22	NA	NA	**1,300**	710	**1,200**
SPLP Metals	Concentrations in mg/L						Concentrations in mg/kg									
Cadmium	NS	NS	NS	NS	NS	NS	NA					NA	NA			
Chromium	NS	NS	NS	NS	NS	NS	NA					NA	NA			
Nickel	NS	NS	NS	NS	NS	NS	NA					NA	NA			

Legend:

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mg/kg = milligrams per kilogram	NS = No Standard
BDL( ) = Below laboratory detection limit shown in parenthesis	NA = Not Analyzed
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TABLE 3. GROUNDWATER ELEVATION AND SELECTED FIELD PARAMETERS

Former Central Plating Site
Walpole, New Hampshire

Monitoring Well I.D.	Date	Reference Elevation (feet)	Depth to Water from Ref. Elev. (feet)	Ground Elevation (feet)	Depth to Water from Grade (feet)	Ground Water Elevation (feet)	pH (S.U.)	Dissolved Oxygen (ppm)	Specific Conductivity (mS/cm)	Notes
SH-1	1-Sep-15	397.95	13.12	398.25	13.42	384.83	6.51	0.34	1.977	Green purgewater, petroleum odor
	17-Jul-17		14.82		15.12	383.13				Not Sampled
SH-2	1-Sep-15	397.03	21.82	397.49	22.28	375.21	6.57	1.25	0.873	Slow Recharge
	17-Jul-17	397.01	19.04	397.49	19.52	377.97	6.08	0.65	1.943	
SH-3	1-Sep-15	397.20	18.63	397.44	18.87	378.57	6.78	6.61	0.592	Slow Recharge
	17-Jul-17									Not Sampled/Found
SH-4	1-Sep-15	397.28	12.67	397.68	13.07	384.61	7.12	2.99	2.607	Slow Recharge
	17-Jul-17		12.17		12.57	385.11				Not Sampled
MW101	1-Sep-15	397.77	16.10	398.24	16.57	381.67	6.14	3.34	2.176	Slow Recharge
	17-Jul-17		14.08		14.55	383.69				Not Sampled
MW102	1-Sep-15	397.45	18.91	397.73	19.19	378.54	6.01	6.46	1.615	Slow Recharge
	17-Jul-17		16.04		16.32	381.41	5.50	7.26	1.909	
MW103	1-Sep-15	397.54	18.74	397.78	18.98	378.80	7.03	3.82	0.671	Slow Recharge
	17-Jul-17		17.38		17.62	380.16				Not Sampled
MW104	1-Sep-15	397.26	22.17	397.61	22.52	375.09	6.69	0.51	0.966	
	17-Jul-17		19.19		19.54	378.07	6.36	2.66	1.099	
MW105	1-Sep-15	397.43	22.25	397.74	22.56	375.18	6.63	5.20	1.158	
	17-Jul-17		19.23		19.54	378.20				Not Sampled
MW201	1-Sep-15	NI	NI	NI	NI	NI	NI	NI	NI	
	17-Jul-17	397.43	19.53	397.74	19.84	377.90	5.60	4.87	1.815	
MW202	1-Sep-15	NI	NI	NI	NI	NI	NI	NI	NI	
	17-Jul-17	395.62	18.17	396.04	18.59	377.45	5.71	7.43	2.924	

NOTES:

1 - Reference elevation is the highest point of the PVC riser pipe at each location, relative to an assumed datum of 400 feet for the NW corner of the top of a transformer pad located east of the Wastewater Treatment Building.
2 - Depth to ground water measured using an electronic water level indicator.
3 - For pH, S.U. = Standard Units.
4 - For Dissolved Oxygen, ppm = parts per million.
5 - For Specific Conductivity, mS/cm = milliSiemens per centimeter.

TABLE 4. GROUNDWATER SAMPLE ANALYTICAL RESULTS

Central Plating Site
Walpole, New Hampshire

				AOC 2			AOC 6							AOC 7				QA/QC
LOCATION	**SAMPLING DATE**	**NH DES Ambient Groundwater Quality Standards (AGQS)**	**US EPA Maximum Contaminant Levels (MCLs)**	MW102	SH-4	MW201	MW103	MW104	MW105	SH-2	GW-DUP1	SH-3	MW202	MW101	SH-1	IW-001	FIELD BLANK	Between SH-2 and GW-DUP1 (Relative Percent Difference)
Volatile Organic Compounds (VOCs)				Concentrations in µg/L														%
Chloroform	9/1/2015	70	NS	BDL (0.16)	BDL (0.16)	NI	BDL (0.16)	0.56 J	BDL (0.16)	BDL (0.16)		BDL (0.16)	NI	BDL (4)	BDL (3.2)			
1,2-Dichloroethane	9/1/2015	5	5	BDL (0.16)	BDL (0.16)	NI	1.6	3.8	0.88	BDL (0.16)		BDL (0.16)	NI	BDL (3.3)	BDL (2.6)			
Benzene	9/1/2015	5	5	BDL (0.16)	BDL (0.16)	NI	4	4.4	4.1	BDL (0.16)		BDL (0.16)	NI	**20**	**15**			
Toluene	9/1/2015	1,000	1,000	BDL (0.16)	BDL (0.16)	NI	BDL (0.16)	BDL (0.16)	BDL (0.16)	BDL (0.16)		BDL (0.16)	NI	97	67			
Ethylbenzene	9/1/2015	700	700	BDL (0.17)	BDL (0.17)	NI	BDL (0.17)	BDL (0.17)	BDL (0.17)	BDL (0.17)		BDL (0.17)	NI	510	640			
Trichloroethene	9/1/2015	5	5	BDL (0.18)	BDL (0.18)	NI	BDL (0.18)	BDL (0.18)	0.33 J	BDL (0.18)		BDL (0.18)	NI	BDL (4.4)	BDL (3.5)			
Methyl tert butyl ether	9/1/2015	13	NS	2.5	BDL (0.16)	NI	5.8	**56**	8.3	12		BDL (0.16)	NI	**77**	**63**			
m,p-Xylene	9/1/2015	10,000 $^{(1)}$	10,000 $^{(1)}$	0.33 J	BDL (0.33)	NI	BDL (0.33)	BDL (0.33)	BDL (0.33)	BDL (0.33)		BDL (0.33)	NI	2,900	2,100			
o-Xylene	9/1/2015	10,000 $^{(1)}$	10,000 $^{(1)}$	BDL (0.33)	BDL (0.33)	NI	BDL (0.33)	BDL (0.33)	BDL (0.33)	BDL (0.33)		BDL (0.33)	NI	900	290			
Total Xylenes	9/1/2015	10,000	10,000	0.33 J	BDL (0.33)	NI	BDL (0.33)	BDL (0.33)	BDL (0.33)	BDL (0.33)		BDL (0.33)	NI	3,800	2,600			
Styrene	9/1/2015	100	100	BDL (0.36)	BDL (0.36)	NI	BDL (0.36)	BDL (0.36)	BDL (0.36)	BDL (0.36)		BDL (0.36)	NI	18 J	18 J			
Acetone	9/1/2015	6,000	NS	BDL (1.0)	BDL (1.0)	NI	BDL (1.5)	BDL (1.5)	BDL (1.5)	BDL (1.5)		3.4 J	NI	BDL (36)	BDL (29)			
2-Hexanone	9/1/2015	NS	NS	BDL (0.52)	BDL (0.52)	NI	BDL (0.52)	BDL (0.52)	BDL (0.52)	BDL (0.52)		0.77 J	NI	BDL (13)	BDL (10)			
n-Butylbenzene	9/1/2015	260	NS	BDL (0.19)	BDL (0.19)	NI	BDL (0.19)	BDL (0.19)	BDL (0.19)	BDL (0.19)		BDL (0.19)	NI	8.6 J	9 J			
Isopropylbenzene	9/1/2015	800	NS	BDL (0.19)	BDL (0.19)	NI	BDL (0.19)	0.31 J	BDL (0.19)	BDL (0.19)		BDL (0.19)	NI	20	30			
Napthalene	9/1/2015	20	NS	BDL (0.22)	BDL (0.22)	NI	BDL (0.22)	BDL (0.22)	BDL (0.22)	0.53 J		BDL (0.22)	NI	**40 J**	**280**			
n-Propylbenzene	9/1/2015	260	NS	BDL (0.17)	BDL (0.17)	NI	BDL (0.17)	BDL (0.17)	BDL (0.17)	BDL (0.17)		BDL (0.17)	NI	23	58			
1,3,5-Trimethylbenzene	9/1/2015	330	NS	BDL (0.17)	BDL (0.17)	NI	BDL (0.17)	BDL (0.17)	BDL (0.17)	BDL (0.17)		BDL (0.17)	NI	210	160			
1,2,4-Trimethylbenzene	9/1/2015	330	NS	BDL (0.19)	BDL (0.19)	NI	BDL (0.19)	BDL (0.19)	BDL (0.19)	BDL (0.19)		BDL (0.19)	NI	**720**	**650**			
Tert-Butyl-Alcohol	9/1/2015	49	NS	BDL (0.9)	BDL (0.9)	NI	BDL (0.9)	13	BDL (0.9)	BDL (0.9)		BDL (0.9)	NI	BDL (22)	BDL (18)			
Tertiary-Amyl Methyl Ether	9/1/2015	140	NS	BDL (0.28)	BDL (0.28)	NI	BDL (0.28)	0.82 J	BDL (0.28)	BDL (0.28)		BDL (0.28)	NI	BDL (7)	BDL (5.6)			
All Other VOCs	9/1/2015	Various	Various	BDL (Various)	BDL (Various)	NI	BDL (Various)	BDL (Various)	BDL (Various)	BDL (Various)		BDL (Various)	NI	BDL (Various)	BDL (Various)			
Total Cyanide				Concentrations in µg/L														%
Cyanide	9/1/2015	200	200	3 J	4 J	NI	1 J	3 J	4 J	2 J		2 J	NI	5	4 J			
Dissolved Metals				Concentrations in µg/L														%
Arsenic	9/1/2015	10	10	**11.2**	BDL (2)	NI	BDL (2)	BDL (2)	BDL (2)	3 J		BDL (2)	NI	BDL (2)	BDL (2)	NS		
	7/17&18/2017			BDL (2)	NS	BDL (2)	NS	3 J	NS	BDL (2)	BDL (2)	NS	BDL (2)	NS	NS	BDL (2)		NC
Barium	9/1/2015	2,000	2,000	111	106	NI	62.2	68.9	27.8	45.9		24.7	NI	188	132	NS		
	7/17&18/2017			9 J	NS	11	NS	23	NS	46	45	NS	396	NS	NS	47		2.2
Cadmium	9/1/2015	5	5	**19.3**	BDL (0.7)	NI	BDL (0.7)	**6.7**	BDL (0.7)	**7.3**		BDL (0.7)	NI	BDL (0.7)	BDL (0.7)	NS		
	7/17&18/2017			**31.52**	NS	12	NS	1.56	NS	**5.32**	**5.13**	NS	0.09 J	NS	NS	BDL (0.05)		3.64
Chromium	9/1/2015	100	100	**5,714**	2.6 J	NI	11.1	23.3	7.5	9.9 J		BDL (2)	NI	3.4 J	3 J	NS		
	7/17&18/2017			**5,270**	NS	**1,650**	NS	60	NS	21	21	NS	BDL (2)	NS	NS	BDL (2)		0.00
Copper	9/1/2015	1,300	1,300	3.4 J	11.3	NI	2 J	3.9 J	4.2 J	3.8 J		4.1 J	NI	2.5 J	2.8 J	NS		
	7/17&18/2017			NA	NS	NA	NS	NA	NS	NA	NA	NS	NA	NS	NS	NA		NA
Lead	9/1/2015	15	15	BDL (2)	BDL (2)	NI	BDL (2)	BDL (2)	BDL (2)	BDL (2)		BDL (2)	NI	4 J	BDL (2)	NS		
	7/17&18/2017			3 J	NS	3 J	NS	BDL (3)	NS	4 J	3 J	NS	3 J	NS	NS	**31**		NC
Mercury	9/1/2015	2	2	BDL (0.06)	BDL (0.06)	NI	BDL (0.06)	BDL (0.06)	BDL (0.06)	BDL (0.06)		BDL (0.06)	NI	BDL (0.06)	BDL (0.06)	NS		
	7/17&18/2017			BDL (0.06)	NS	BDL (0.06)	NS	BDL (0.06)	NS	BDL (0.06)	BDL (0.06)	NS	BDL (0.06)	NS	NS	BDL (0.06)		NC
Nickel	9/1/2015	100	NE	**1,120**	7.8 J	NI	BDL (4)	**106**	12	**148**		BDL (4)	NI	6.7 J	14.7 J	NS		
	7/17&18/2017			**1,390**	NS	**621**	NS	**109**	NS	**301**	**298**	NS	BDL (2)	NS	NS	3 J		1
Selenium	9/1/2015	50	50	BDL (3)	BDL (3)	NI	BDL (3)	BDL (3)	BDL (3)	8 J		BDL (10)	NI	BDL (3)	9.6 J	NS		
	7/17&18/2017			BDL (4)	NS	BDL (4)	NS	BDL (4)	NS	BDL (4)	BDL (4)	NS	BDL (4)	NS	NS	BDL (4)		NC
Silver	9/1/2015	100	100 $^{(2)}$	BDL (2)	BDL (2)	NI	BDL (2)	BDL (2)	BDL (2)	BDL (2)		BDL (2)	NI	BDL (2)	BDL (2)	NS		
	7/17&18/2017			BDL (4)	NS	BDL (3)	NS	BDL (3)	NS	BDL (3)	BDL (3)	NS	BDL (3)	NS	NS	BDL (3)		NC
Zinc	9/1/2015	NE	5,000 $^{(2)}$	BDL (7)	17.6 J	NI	BDL (7)	BDL (7)	BDL (7)	BDL (7)		7.3 J	NI	BDL (7)	10.6 J	NS		
	7/17&18/2017			NA	NS	NA	NS	NA	NS	NA		NS	NA	NS	NS	NA		NA
Per- and Poly-Fluorinated Alkyl Substances (PFAS)				Concentrations in µg/L														%
Perfluorobutanoic Acid (PFBA)	7/17&18/2017	NE	NE	0.00805	NA	NA	NA	NA	NA	0.00884	0.00695	NA	NA	NA	NA	NA	BDL (0.00185)	NC
Perfluoropentanoic Acid (PFPeA)	7/17&18/2017	NE	NE	0.0108	NA	NA	NA	NA	NA	0.00841	0.0088	NA	NA	NA	NA	NA	0.000144 J	NC
Perfluorobutanesulfonic Acid (PFBS)	7/17&18/2017	NE	NE	0.059	NA	NA	NA	NA	NA	0.0126	0.0138	NA	NA	NA	NA	NA	BDL (0.00185)	9.09
Perfluorohexanoic Acid (PFHxA)	7/17&18/2017	NE	NE	0.0491	NA	NA	NA	NA	NA	0.0262	0.0269	NA	NA	NA	NA	NA	0.000185 J	2.64
Perfluoroheptanoic Acid (PFHpA)	7/17&18/2017	NE	NE	0.00501	NA	NA	NA	NA	NA	0.0042	0.00444	NA	NA	NA	NA	NA	BDL (0.00185)	NC
Perfluorohexanesulfonic Acid (PFHxS)	7/17&18/2017	NE	NE	0.237	NA	NA	NA	NA	NA	0.234	0.246	NA	NA	NA	NA	NA	BDL (0.00185)	5
Perfluorooctanoic Acid (PFOA)	7/17&18/2017	0.070 $^{(1)}$	NE	**0.0802**	NA	NA	NA	NA	NA	**0.07**	**0.0761**	NA	NA	NA	NA	NA	0.000096 J	8.35
Perfluorononanoic Acid (PFNA)	7/17&18/2017	NE	NE	0.00037	NA	NA	NA	NA	NA	0.0006	0.000718	NA	NA	NA	NA	NA	BDL (0.00185)	NC
Perfluorooctane sulfonate (PFOS)	7/17&18/2017	0.070 $^{(1)}$	NE	**7.08**	NA	NA	NA	NA	NA	**1.62**	**1.24**	NA	NA	NA	NA	NA	0.00207	26.57

Legend:

AOC = Area of Concern (identified in report text)	QA/QC = quality assurance/quality control sample
µg/L = micrograms per liter	J = estimated concentration detected above laboratory detection limit, but below laboratory reporting limit
BDL( ) = Below laboratory detection limit shown in parenthesis	NS=No Standard NA=Not Analyzed NC=Not Calculated

Notes:

1 - AGQS is for total xylenes (mixed isomers); AGQS is for total PFOA and PFOS.
2 - MCL not established; value listed in table is the National Secondary Drinking Water Regulation (pertaining to cosmetic or aesthetic effects in drinking water).
3 - NH DES Env-Or 600 Ambient Groundwater Quality Standards (AGQSs), updated June 1, 2015.
4 - US EPA Maximum Contaminant Levels (MCLs), updated May 2009.
5 - **Bold** type font and boxed value indicates concentration exceeds the NH DES AGQS.
6 - Relative percent difference not calculated if the detected concentration is less than 5x the laboratory reporting limit.
7 - Sample IW-001, collected from a dug irrigation well located on Lot 51 was not field-filtered to remove particulates.

APPENDIX A-2

September 4, 2020
PFAS Assessment of a Portion of the Mascoma Bank Property

by
Ransom Consulting, LLC for the Town of Walpole

DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

PFAS ASSESSMENT OF A PORTION OF THE MASCOMA BANK PROPERTY

Central Plating Site
12 Westminster Street
Walpole, NH 03608

NH DES Site #: 199806071
Project Type: HAZWASTE
Project Number: 32266

Prepared For:

Town of Walpole
PO Box 729
34 Elm Street
Walpole, NH 03608
603.756.3672
Peggy Pschirrer
ppschirrer@walpolenh.us

PE/PG Stamp:

Prepared By:

Ransom Consulting, LLC
Pease International Tradeport
112 Corporate Drive
Portsmouth, NH 03801
603.436.1490
Steven F. Rickerich, P.G.
srickerich@ransomenv.com

September 4, 2020

RANSOM
Consulting, LLC

Consulting
Engineers
and Scientists

September 4, 2020 Project 201.05001.100

Peggy Pschirrer, Town Project Director
Town of Walpole
34 Elm Street
Walpole, New Hampshire 03608

Re: PFAS Assessment Data Submittal
Portion of Mascoma Bank Property, 53 Main Street
For the Central Plating Site (NH DES Site #199806071)
12 Westminster Street
Walpole, New Hampshire

Dear Ms. Pschirrer:

This correspondence and its attachments is the data submittal for the soil sample collection and analysis conducted for the grass strip of the Mascoma Bank property (Map 20, Lot 47 at 53 Main Street) that abuts the former Central Plating property at 12 Westminster Street. The work was completed as authorized in our signed Scope of Work dated June 19, 2020. Access to conduct soil sampling was granted by Mascoma Bank on June 16, 2020.

This data submittal includes: a copy of the site plan showing the soil sampling locations and sampling locations from previous investigations in Attachment A; and a summary table and the laboratory report in Attachment B.

On June 23, 2020, Ransom collected soil samples at four locations from the grass strip that bounds the west side of the Mascoma Bank-owned and Town of Walpole-leased parking lot, as shown on the attached figure. The west edge of this grass strip was bounded by the Central Plating industrial building prior to its demolition and removal, and the grass strip adjoins areas of known metals impacts (to soil and groundwater) and areas of documented per- and polyfluoroalkyl substances (PFAS) impacts (to groundwater).

Two soil samples, from 0 to 1 foot below grade and 1 to 2 feet below grade, were collected at each of four shallow test boring locations (MBHB1 through MBHB4) evenly spaced along the north-south long axis of the grass strip. The samples were collected using hand tools and analyzed for the presence of PFAS using Modified Method 537 with isotope solution. The work was conducted on the same date as pre-characterization sampling at the Central Plating Site and under separate agreement.

Perfluorooctane sulfonate (PFOS) was detected in seven of the eight soil samples at concentrations ranging between 0.00138 milligrams per kilogram (mg/kg) to 0.00469 mg/kg, all at concentrations below New Hampshire Department of Environmental Services (NH DES) Direct Contact Risk-Based (DCRB) Standard established for PFOS of 0.1 mg/kg established by the NH DES Environmental Health Program. No other PFAS compounds were detected.

Pease International Tradeport, 112 Corporate Drive, Portsmouth, New Hampshire 03801, Tel (603) 436-1490, Fax (603) 436-6037
400 Commercial Street, Suite 404, Portland, Maine 04101, Tel (207) 772-2891
12 Kent Way, Suite 100, Byfield, Massachusetts 01922-1221, Tel (978) 465-1822
60 Valley Street, Building F, Suite 106, Providence, Rhode Island 02909, Tel (401) 433-2160
2127 Hamilton Avenue, Hamilton, New Jersey 08619, Tel (609) 584-0090

www.ransomenv.com

One soil sample, MBHB3-S1, did not have PFOS detected above laboratory detection limits. No other PFAS compounds were detected above laboratory detection limits in any of the soil samples. In general, PFOS was detected at higher concentrations in the S2 samples (collected from the 1 to 2 foot depth interval) than in the S1 samples collected from the 0 to 1 foot depth interval.

No clean-up standard, either exposure-based or leaching-based, has been established for PFAS compounds by the NH DES.

In addition to the above laboratory analyses for PFAS, grab soil samples (from 0 to 2 feet below grade) were collected from each test boring location and field screened for the presence of metals using an x-ray fluorescence (XRF) analyzer. The following readings, in parts per million (ppm, equivalent to mg/kg), were recorded for chromium at each boring location:

MBHB1	MBHB2	MBHB3	MBHB4
Chromium (ppm)			
6,463 +/-259	1,183 +/-135	215 +/- 116	154 +/- 98

The chromium readings for the sample closest to the former plating line location at the Central Plating Site (a known area of elevated chromium and the target of remediation planning for that site) is inferred to exceed the NH DES Env-Or 600 Soil Remediation Standard for trivalent chromium and may exceed the hexavalent chromium standard. Note that field screening analyses is not typically as accurate as laboratory analyses.

Ransom recommends that the information documented in this data submittal should be considered in the Analyses of Brownfield Clean-up Alternatives/Remedial Action Plan currently being updated for the Central Plating Site.

For the Central Plating remediation project, Ransom has planned a step-wise approach to soils excavation such that laboratory analyses of excavation endpoint samples for total chromium and hexavalent will be conducted when XRF screening of the remaining soils document concentrations at 50% of an assigned 1,500 ppm field screening clean-up value (i.e. 750 ppm). It is anticipated that the revised/updated remedial action plan for Central Plating will include this clean-up approach for the impacted soils on the Mascoma Bank property area assessed as part of this work.

If you have any questions, or if we can be of further assistance, please call.

Sincerely,

Digitally signed by Steven F. Rickerich
Date: 2020.09.18 09:03:50 -04'00'

Jay P. Johonnett, P.E.
Project Engineer

Steven F. Rickerich, P.G.
Senior Project Manager/VP

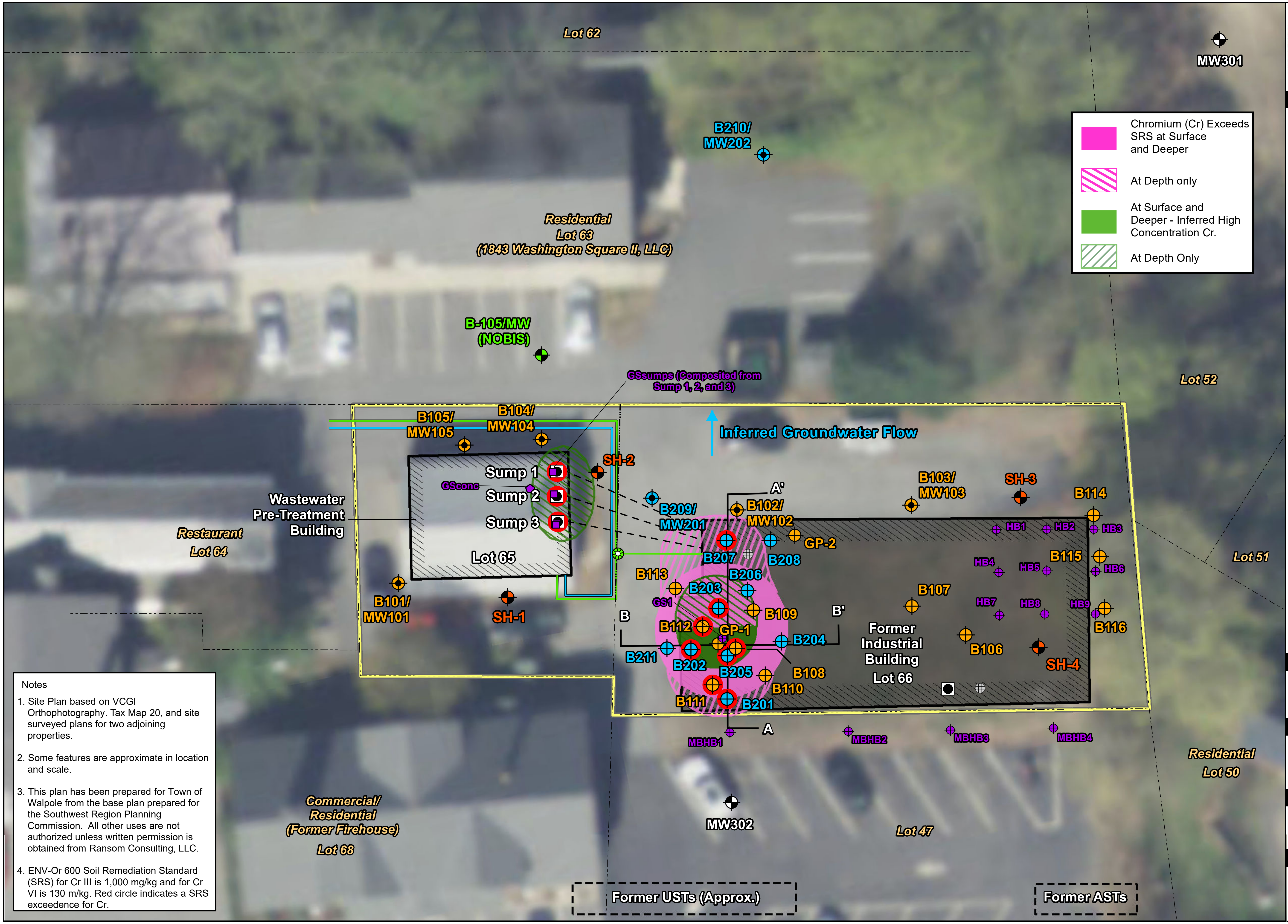
cc: Katie Dearborn, Mascoma Bank
Attachments

ATTACHMENT A

Site Plan

PFAS Assessment Data Submittal
Portion of Mascoma Bank Property, 53 Main Street
For the Central Plating Site (NH DES Site #199806071)
12 Westminster Street
Walpole, New Hampshire

Ransom Consulting, LLC
Project 201.05001.100



🟪	Chromium (Cr) Exceeds SRS at Surface and Deeper
▨	At Depth only
🟩	At Surface and Deeper - Inferred High Concentration Cr.
▨	At Depth Only

Notes

1. Site Plan based on VCGI Orthophotography. Tax Map 20, and site surveyed plans for two adjoining properties.
2. Some features are approximate in location and scale.
3. This plan has been prepared for Town of Walpole from the base plan prepared for the Southwest Region Planning Commission. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.
4. ENV-Or 600 Soil Remediation Standard (SRS) for Cr III is 1,000 mg/kg and for Cr VI is 130 m/kg. Red circle indicates a SRS exceedence for Cr.

RANSOM
Consulting, LLC

Legend & Notes

- Site Boundary
- 300 Series Monitoring Well
- 200 Series Soil Boring/Monitoring Well
- 200 Series Soil Boring
- Previously Existing Monitoring Well
- Soil Boring
- Boring/ Monitoring Well
- Hand Soil Boring
- Pulverized Concrete Sample
- Sump Residue Sample
- 1,400 (Cr Concentration mg/kg)
- (W) Waste Sample
- Former Sump
- Former Floor Drain
- Sewer Manhole
- Sewer Line
- Water Line
- Lot Line (Approximate)
- A—A' Cross-Section

Scale & Orientation

0 10 20

1 inch = 20 feet

Prepared For

Town of Walpole
34 Elm Street
Walpole, New Hampshire

Site Address

Central Plating Site
12 Westminster St.
Walpole, New Hampshire

201.05001 | Sept 2020

Figure 1

Mascoma Bank Property
PFAS Assessment

X:\Ransom_NewEngland\NewHampshire\Walpole_NH\CentralPlatingSite\CPS_WalpoleNH-F3_SoilDist.mxd

ATTACHMENT B

Summary Table and Laboratory Analytical Results

PFAS Assessment Data Submittal
Portion of Mascoma Bank Property, 53 Main Street
For the Central Plating Site (NH DES Site #199806071)
12 Westminster Street
Walpole, New Hampshire

Ransom Consulting, LLC
Project 201.05001.100

TABLE 1: SOIL SAMPLE LABORATORY ANALYTICAL RESULTS
Mascoma Bank Property
53 Main Street
Walpole, New Hampshire

Sample Location	**NH DES Direct Contact Risk-Based (DCRB)S-1 Standard**	**NH DES DCRB S-2 Standard**	MBHB1-S1	MBHB1-S2	MBHB2-S1	MBHB2-S2	MBHB3-S1	MBHB3-S2	MBHB4-S1	MBHB4-S2
Sample Depth (feet bgs)			0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2
Per- and Polyfluoroalkyl Substances (PFAS) (mg/kg)										
Perfluorobutanoic Acid (PFBA)	NE	NE	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluoropentanoic Acid (PFPeA)	NE	NE	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorobutanesulfonic Acid (PFBS)	NE	NE	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorohexanoic Acid (PFHxA)	NE	NE	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluoroheptanoic Acid (PFHpA)	NE	NE	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorohexanesulfonic Acid (PFHxS)	0.1	0.9	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorooctanoic Acid (PFOA)	0.2	1.3	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorononanoic Acid (PFNA)	0.1	0.9	nd(0.00104)	nd(0.00115)	nd(0.000967)	nd(0.000991)	nd(0.000976)	nd(0.00102)	nd(0.000972)	nd (0.00101)
Perfluorooctane sulfonate (PFOS)	0.1	0.6	0.00198	0.0036	0.00138	0.00294	nd(0.000976)	0.00199	0.00414	0.00469

Legend:

bgs = Below Ground Surface
NE = None established
mg/kg = milligrams per kilogram
nd( ) = none detected, detection limit (the reporting limit) is shown in parenthesis

NOTES:

1 - PFHxS, PFOA, PFNA, and PFOS "standards" are Direct Contact Risk-Based (DCRB) Standards for PFAS developed by NH DES Environmental Health Program, updated 12/11/2020, utilizing NH DES Risk Characterization and Management Policy (RCMP) methodology. Exposure scenarios are for S-1 (residential) and S-2 (maintenance worker). These DCRB "standards" have not been adopted under Env Or 600.

2 - Bold type font and boxed value indicates concentration exceeds the NH DES DCRB standard (none indicated).

ANALYTICAL REPORT

Lab Number:	L2026721
Client:	Ransom Consulting, Inc. 112 Corporate Drive Pease International Tradeport Portsmouth, NH 03801
ATTN:	Steve Rickerich
Phone:	(603) 436-1490
Project Name:	CENTRAL PLATING
Project Number:	201.05001.100
Report Date:	07/06/20

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2026721-01	MBHB1 (0-1)	SOIL	WALPOLE, NH	06/23/20 10:45	06/24/20
L2026721-02	MBHB1 (1-2)	SOIL	WALPOLE, NH	06/23/20 10:50	06/24/20
L2026721-03	MBHB2 (0-1)	SOIL	WALPOLE, NH	06/23/20 10:55	06/24/20
L2026721-04	MBHB2 (1-2)	SOIL	WALPOLE, NH	06/23/20 11:00	06/24/20
L2026721-05	MBHB3 (0-1)	SOIL	WALPOLE, NH	06/23/20 11:05	06/24/20
L2026721-06	MBHB3 (1-2)	SOIL	WALPOLE, NH	06/23/20 11:10	06/24/20
L2026721-07	MBHB4 (0-1)	SOIL	WALPOLE, NH	06/23/20 11:15	06/24/20
L2026721-08	MBHB4 (1-2)	SOIL	WALPOLE, NH	06/23/20 11:20	06/24/20
L2026721-09	TRIP BLANK	WATER	WALPOLE, NH	06/23/20 00:00	06/24/20

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2026721-08: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 07/06/20

ORGANICS

SEMIVOLATILES

SAMPLE RESULTS

Lab ID:	L2026721-01	Date Collected:	06/23/20 10:45
Client ID:	MBHB1 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 19:50		
Analyst:	SG		
Percent Solids:	90%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	1.04	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	1.04	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.04	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	1.04	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.04	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.04	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.04	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.04	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.98		ng/g	1.04	--	1

Surrogate (Extracted Internal Standard)	**% Recovery**	**Qualifier**	**Acceptance Criteria**
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	110		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	117		65-151

SAMPLE RESULTS

Lab ID:	L2026721-02	Date Collected:	06/23/20 10:50
Client ID:	MBHB1 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 20:23		
Analyst:	SG		
Percent Solids:	84%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	1.15	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	1.15	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.15	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	1.15	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.15	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.15	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.15	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.15	--	1
Perfluorooctanesulfonic Acid (PFOS)	3.60		ng/g	1.15	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		65-151

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-03	Date Collected:	06/23/20 10:55
Client ID:	MBHB2 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 20:57		
Analyst:	SG		
Percent Solids:	93%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.967	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.967	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.967	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.967	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.967	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.967	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.967	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.967	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.38		ng/g	0.967	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	77		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	84		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	86		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	81		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	116		65-151

SAMPLE RESULTS

Lab ID:	L2026721-04	Date Collected:	06/23/20 11:00
Client ID:	MBHB2 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 21:14		
Analyst:	SG		
Percent Solids:	92%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.991	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.991	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.991	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.991	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.991	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.991	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.991	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.991	--	1
Perfluorooctanesulfonic Acid (PFOS)	2.94		ng/g	0.991	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	95		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	66		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		65-151

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-05	Date Collected:	06/23/20 11:05
Client ID:	MBHB3 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:

Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 21:31		
Analyst:	SG		
Percent Solids:	98%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.976	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.976	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.976	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.976	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.976	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.976	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.976	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.976	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.976	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	94		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		65-151

SAMPLE RESULTS

Lab ID:	L2026721-06	Date Collected:	06/23/20 11:10
Client ID:	MBHB3 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 21:47		
Analyst:	SG		
Percent Solids:	91%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	1.02	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	1.02	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.02	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	1.02	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.02	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.02	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.02	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.02	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.99		ng/g	1.02	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	95		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	81		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	112		65-151

SAMPLE RESULTS

Lab ID:	L2026721-07	Date Collected:	06/23/20 11:15
Client ID:	MBHB4 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 22:04		
Analyst:	SG		
Percent Solids:	95%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.972	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.972	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.972	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.972	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.972	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.972	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.972	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.972	--	1
Perfluorooctanesulfonic Acid (PFOS)	4.14		ng/g	0.972	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104		65-151

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-08	Date Collected:	06/23/20 11:20
Client ID:	MBHB4 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil	Extraction Method:	ALPHA 23528
Analytical Method:	134,LCMSMS-ID	Extraction Date:	07/01/20 09:10
Analytical Date:	07/05/20 22:20		
Analyst:	SG		
Percent Solids:	93%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	1.01	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	1.01	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.01	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	1.01	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.01	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.01	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.01	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.01	--	1
Perfluorooctanesulfonic Acid (PFOS)	4.69		ng/g	1.01	--	1

Surrogate (Extracted Internal Standard)	**% Recovery**	**Qualifier**	**Acceptance Criteria**
Perfluoro[13C4]Butanoic Acid (MPFBA)	82		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	86		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	**56**	Q	61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		65-151

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/05/20 19:00
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 07/01/20 09:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-08 Batch: WG1387937-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/g	1.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	1.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	1.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	1.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	1.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	1.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/g	1.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/g	1.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	1.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	102		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		65-151

Lab Control Sample Analysis
Batch Quality Control

Project Name: CENTRAL PLATING

Project Number: 201.05001.100

Lab Number: L2026721

Report Date: 07/06/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 Batch: WG1387937-2 WG1387937-3								
Perfluorobutanoic Acid (PFBA)	110		108		71-135	2		30
Perfluoropentanoic Acid (PFPeA)	102		102		69-132	0		30
Perfluorobutanesulfonic Acid (PFBS)	103		101		72-128	2		30
Perfluorohexanoic Acid (PFHxA)	108		113		70-132	5		30
Perfluoroheptanoic Acid (PFHpA)	111		113		71-131	2		30
Perfluorohexanesulfonic Acid (PFHxS)	105		108		67-130	3		30
Perfluorooctanoic Acid (PFOA)	90		94		69-133	4		30
Perfluorononanoic Acid (PFNA)	114		121		72-129	6		30
Perfluorooctanesulfonic Acid (PFOS)	113		113		68-136	0		30

Surrogate (Extracted Internal Standard)	*LCS %Recovery*	*Qual*	*LCSD %Recovery*	*Qual*	*Acceptance Criteria*
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		92		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104		100		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		104		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		91		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		89		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		105		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		97		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		84		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		109		65-151

Matrix Spike Analysis

Batch Quality Control

Project Name:	CENTRAL PLATING	***Lab Number:***	L2026721
Project Number:	201.05001.100	***Report Date:***	07/06/20

Parameter	***Native Sample***	***MS Added***	***MS Found***	***MS %Recovery***	***Qual***	***MSD Found***	***MSD %Recovery***	***Qual***	***Recovery Limits***	***RPD***	***Qual***	***RPD Limits***
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1387937-4 QC Sample: L2026721-01 Client ID: MBHB1 (0-1)												
Perfluorobutanoic Acid (PFBA)	ND	5.11	5.67	111		-	-		71-135	-		30
Perfluoropentanoic Acid (PFPeA)	ND	5.11	5.23	102		-	-		69-132	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	4.53	4.65	103		-	-		72-128	-		30
Perfluorohexanoic Acid (PFHxA)	ND	5.11	5.88	115		-	-		70-132	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	5.11	5.73	112		-	-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	4.66	5.62	121		-	-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	5.11	4.80	94		-	-		69-133	-		30
Perfluorononanoic Acid (PFNA)	ND	5.11	6.28	123		-	-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.98	4.73	7.24	111		-	-		68-136	-		30

Surrogate (Extracted Internal Standard)	***MS***		***MSD***		***Acceptance Criteria***
	% Recovery	***Qualifier***	***% Recovery***	***Qualifier***	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98				61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103				63-166
Perfluoro[13C4]Butanoic Acid (MPFBA)	100				60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	108				65-182
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109				65-151
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101				62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78				61-154
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103				70-151

Lab Duplicate Analysis

Batch Quality Control

Project Name: CENTRAL PLATING

Project Number: 201.05001.100

Lab Number: L2026721

Report Date: 07/06/20

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1387937-5 QC Sample: L2026721-02 Client ID: MBHB1 (1-2)						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/g	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/g	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	3.60	3.31	ng/g	8		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		99		60-153
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		108		65-182
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		103		70-151
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		100		61-147
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		97		62-149
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		106		63-166
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		101		62-152
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		82		61-154
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		105		65-151

INORGANICS
&
MISCELLANEOUS

SAMPLE RESULTS

Lab ID:	L2026721-01	Date Collected:	06/23/20 10:45
Client ID:	MBHB1 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:
Matrix: Soil

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**	**Date Prepared**	**Date Analyzed**	**Analytical Method**	**Analyst**
General Chemistry - Mansfield Lab										
Solids, Total	90.2		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-02	Date Collected:	06/23/20 10:50
Client ID:	MBHB1 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	83.9		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

SAMPLE RESULTS

Lab ID:	L2026721-03	Date Collected:	06/23/20 10:55
Client ID:	MBHB2 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:
Matrix: Soil

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**	**Date Prepared**	**Date Analyzed**	**Analytical Method**	**Analyst**
General Chemistry - Mansfield Lab										
Solids, Total	93.2		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

SAMPLE RESULTS

Lab ID:	L2026721-04	Date Collected:	06/23/20 11:00
Client ID:	MBHB2 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	91.9		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-05	Date Collected:	06/23/20 11:05
Client ID:	MBHB3 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	97.6		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-06	Date Collected:	06/23/20 11:10
Client ID:	MBHB3 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	91.4		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

Project Name:	CENTRAL PLATING	**Lab Number:**	L2026721
Project Number:	201.05001.100	**Report Date:**	07/06/20

SAMPLE RESULTS

Lab ID:	L2026721-07	Date Collected:	06/23/20 11:15
Client ID:	MBHB4 (0-1)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	95.3		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

SAMPLE RESULTS

Lab ID:	L2026721-08	Date Collected:	06/23/20 11:20
Client ID:	MBHB4 (1-2)	Date Received:	06/24/20
Sample Location:	WALPOLE, NH	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	92.7		%	0.100	--	1	-	06/29/20 11:20	121,2540G	CC

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	*Custody Seal*
A	Absent
C	Absent

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L2026721-01A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-01B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-02A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-02B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-03A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-03B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-04A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-04B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-05A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-05B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-06A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-06B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-07A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-07B	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		A2-TS(7)
L2026721-08A	Plastic 8oz unpreserved	A	NA		2.7	Y	Absent		A2-NH-537-ISOTOPE(14)
L2026721-08B	Plastic 2oz unpreserved for TS	C	NA		2.1	Y	Absent		A2-TS(7)
L2026721-09A	Plastic 250ml unpreserved	A	NA		2.7	Y	Absent		HOLD(14)

*Values in parentheses indicate holding time in days

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less

Data Qualifiers

than 5x the RL. (Metals only.)

R	- Analytical results are from sample re-analysis.
RE	- Analytical results are from sample re-extraction.
S	- Analytical results are from modified screening analysis.

REFERENCES

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. ID No.:**17873**
Facility: **Company-wide** Revision 17
Department: **Quality Assurance** Published Date: 4/28/2020 9:42:21 AM
Title: **Certificate/Approval Program Summary** Page 1 of 1

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
EPA TO-12 Non-methane organics
EPA 3C Fixed gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 6/25/20

ALPHA Job #: L2026721

ALPHA ANALYTICAL

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Ransom Consulting LLC
Address: 112 Corporate Dr
Portsmouth NH
Phone: 603-436-1490
Fax:
Email: srickerich@ransomenv.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Central Plating
Project Location: Walpole NH
Project #: 201.05001.100
Project Manager: Steve Rickerich
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☑ EMAIL
☑ ADEx ☐ Add'l Deliverables

Billing Information

☑ Same as Client info PO #: 12493

Regulatory Requirements/Report Limits

State /Fed Program
Criteria

Other Project Specific Requirements/Comments/Detection Limits:

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: PFAS 9 analytes	Total Solids	Sample Specific Comments	TOTAL # BOTTLES
26721-01	MBHB1 (0-1)	6-23-20	1045	S	JPT/MKH	✓	✓		2
-02	MBHB1 (1-2)		10:50	S					
-03	MBHB2 (0-1)		1055						
-04	MBHB2 (1-2)		1100						
-05	MBHB3 (0-1)		1105						
-06	MBHB3 (1-2)		1110						
-07	MBHB4 (0-1)		1115						
-08	MBHB4 (1-2)	↓	1120	↓	↓	↓	↓		↓

	PFAS 9 analytes	Total Solids
Container Type	P	P
Preservative	A	A

Relinquished By:	Date/Time	Received By:	Date/Time
	6/24/20 1449	AAL	6/24/20 1449
AAL	6/24/20 1930	Rob Maeto AAL	6/24/20 1930
Rob Maeto	6/24/20 2105		6/24/20 2105

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

T. Thuddle 6/25/20 0440
6/25/20 0440
6/25/20 0500

- AAL 6/25/20 05:00

FORM NO: 01-01 (rev. 14-OCT-07)

APPENDIX B

Laboratory Analytical Results

Remediation Pre-Characterization and
Analyses of Brownfield Cleanup Alternatives/Remedial Action Plan
Central Plating Site
12 Westminster Street
Walpole, New Hampshire

Ransom Consulting, LLC
Project 201.05001

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
EPA TO-12 Non-methane organics
EPA 3C Fixed gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

ALPHA ANALYTICAL

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

CHAIN OF CUSTODY

PAGE 1 OF 3

Date Rec'd in Lab: 6/25/20

ALPHA Job #: L2026697

Client Information

Client: Ransom Consulting LLC
Address: 112 Corporate Dr.
Portsmouth, NH
Phone: 603-436-1490
Fax:
Email: srickerich@ransomenv.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Central Plating
Project Location: Walpole, NH
Project #: 201.05001.003
Project Manager: Steve Rickerich
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:
Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☒ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info
PO #: 12491

Regulatory Requirements/Report Limits

State /Fed Program	Criteria
	Per QAPP

Other Project Specific Requirements/Comments/Detection Limits:

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: PFAS 9 analytes	Total Solids	Sample Specific Comments	TOTAL # BOTTLES
26697-01	HB1(0-1)	6-23-20	0845	S	MKH/JKS	✓	✓		2
-02	HB1(1-2)		0850						
-03	HB2(0-1)		0855						
-04	HB2(1-2)		0900						
-05	HB3(0-1)		0905						
-06	HB3(1-2)		0910						
-07	HB4(0-1)		0915						
-08	HB4(1-2)		0920						
-09	HB5(0-1)		0925						
-10	HB5(1-2)		0930						

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

	PFAS 9 analytes	Total Solids
Container Type	P	P
Preservative	A	A

Relinquished By:	Date/Time	Received By:	Date/Time
	6/24/20 1145		6/24/20 1145
AAL	6/24/20 1930	Rob Macdo	6/24/20 1930
Rob Macdonald	6/24/20 2105		6/25/20 2145
	6/25/20 0400	T. Hull	6/25/20 0400
AAL		T. Hull	6/25/20 0800

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

AAC - AAL 6/25/20 08:00

FORM NO: 01-01 (rev. 14-OCT-07)

ALPHA ANALYTICAL

CHAIN OF CUSTODY

PAGE 2 OF 3

Date Rec'd in Lab: 6/25/20

ALPHA Job #: L2026697

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Ransom Consulting LLC
Address: 112 Corporate Dr.
Portsmouth NH
Phone: 603-436-1490
Fax:
Email: Srickerich@ransomenv.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Central Plating
Project Location: Walpole NH
Project #: 201.05001.003
Project Manager: Steve Rickerich
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☒ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #: 12491

Regulatory Requirements/Report Limits

State /Fed Program:
Criteria: Per QAPP

Other Project Specific Requirements/Comments/Detection Limits:

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: PFAS 9 analytes	Total Solids	Sample Specific Comments	TOTAL # BOTTLES
-11	HB6(0-1)	6-23-20	0935	S	JRT/KH	✓	✓		2
-12	HB6(1-2)	↓	0940	↓	↓	↓	↓		↓
-13	HB7(0-1)		0945						
-14	HB7(1-2)		0950						
-15	HB8(0-1)		0955						
-16	HB8(1-2)		1000						
-17	HB9(0-1)		1005						
-18	HB9(1-2)		1010						
-19	GS1		1020						
-20	Soil Dup	↓	1025	↓	↓	↓	↓		↓

	PFAS 9 analytes	Total Solids
Container Type	P	P
Preservative	A	A

Relinquished By:	Date/Time	Received By:	Date/Time
AAL	6/24/20 1140	AAL	6/24/20 1140
AAL	6/24/20 1930	Rob Maurto AAL	6/24/20 1930
Rob Maeoto	6/24/20 2105		6/24/20 2105
	6/25/20 0400	Rob T.	6/25/20 0500

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

6/25/20 05:00

FORM NO: 01-01 (rev. 14-OCT-07)

ALPHA ANALYTICAL

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

CHAIN OF CUSTODY

PAGE 3 OF 3

Date Rec'd in Lab: 6/25/20

ALPHA Job #: L2026697

Project Information

Project Name: Central Plating
Project Location: Walpole NH
Project #: 201.05001.003
Project Manager: Steve Rickerich
ALPHA Quote #:

Report Information - Data Deliverables

☐ FAX ☑ EMAIL
☑ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #: 12491

Client Information

Client: Ransom Consulting LLC
Address: 112 Corporate Dr
Portsmouth, NH
Phone: 603-436-1490
Fax:
Email: srickerich@ransomenv.com

☐ These samples have been previously analyzed by Alpha

Regulatory Requirements/Report Limits

State /Fed Program:
Criteria: Per QAPP

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Other Project Specific Requirements/Comments/Detection Limits:

SAMPLE HANDLING

Filtration ____
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: PFAS 9 analytes	RCRA 8 Metals	Total Solids	Sample Specific Comments	TOTAL # BOTTLES
-21	GS Conc	6-23-20	1145	* X1	JPS/MKH	✓	✓	✓	* Pulverized concrete	4
-22	Conc Dup	↓	1150	* X1	↓	✓	✓	✓	* Pulverized conc.	4
-23	GS sumps		1220	SG		✓		✓		1
-24	Sumps Dup		1225	SG		✓		✓		1
-25	Equipment Blank Soil		0820	W		✓				2
-26	Equipment Blank Concrete		0825	W		✓				2
-27	Equipment Blank Sump	↓	0830	W	↓	✓				2
-28	Trip Blank					✓			* HOLD	1

	PFAS	RCRA	TS
Container Type	P	A	P
Preservative	A	A	A

Relinquished By:	Date/Time	Received By:	Date/Time
AAL	6/24/20 1144	AAL	6/24/20 1144
	6/24/20 1930	Rob Maas to AAL	6/24/20 1930
Rob Maas to AAL	6/24/20 2105		6/24/20 2105
	6/25/20 0400	T. Huddle	6/25/20 0400
Rec'd: T. Huddle	6/25/20 0800		

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

- AAL 6/25/20 05:00

FORM NO: 01-01 (rev. 14-OCT-07)

APPENDIX C

Remedial Cost Estimates Supporting Calculations

Remediation Pre-Characterization and
Analyses of Brownfield Cleanup Alternatives/Remedial Action Plan
Central Plating Site
12 Westminster Street
Walpole, New Hampshire

Ransom Consulting, LLC
Project 201.05001

Order of Magnitude Preliminary Cost Estimate - Brownfields Cleanup Project - Alternative: Excavate and Dispose of Soils with Remediation Standard Exceedances

	Quantity	Rate		Estimate	Lot 65	Lot 66	Notes
Additional Investigations? Excavations? (PFAS?)				?	$?	$?	
EPA Clean-up Grant Proposal or Revolving Loan Fund (RLF) Application Preparation				$ -			
Brownfields Programmatic Costs				$ 30,000	$ 15,000	$ 15,000	
Asbestos Abatement				$ 2,500			Addresses Hazardous Building Materials - Lot 65
Hazardous Materials Removal (Sump pits, selected concrete, wood)				$ 20,000			Clean sumps and dispose (some concrete, wood, sump contents)
Demolition				$ 40,000			35x28 ft one story garage building & conc. floor/foundation
			Total	$ 62,500	$ 62,500		
Lot 66 Cr (+ PFAS) Soils Remediation (Plating Line Release)			Calculated Costs add 15%	+ 15%			Adds 15% to caculated volumes to account for excavation slough, etc.
Lot 66							
	246 Tons	$335 per Ton	(portion as hazardous waste)	$ 94,915			Addresses plating lines hot spots
	387 Tons	$110 per ton	(portion as solid waste)	$ 48,920			(Lot 66)
			Total	$ 143,836		$ 143,836	
If all soil is hazardous, then add:				***$ 100,065***		$ 100,065	If TCLP Cr fails (i.e. hazardous waste) or if evolving PFAS disposal regulations are promulgated (this cost adjustment is not included in "Totals" and is provided for consideration and planning)
Excavation							
	661 Cubic Yards	$35 per CY		$ 26,609		$ 26,609	
(no allowance for sloping)							
Loading							
	440 Cubic Yards	$12 per CY		$ 6,073		$ 6,073	
Backfill (placed & compacted)							
	633 Tons	$30 per Ton		$ 21,842		$ 21,842	
	392 Tons	$15 per Ton	*(Without benching/sloping tonnage)*	$ 6,762		$ 6,762	
Lot 65 - Metals (+PFAS) Soils Remediation (Under Sumps)			Calculated Costs add 15%	+15%			Addresses inferred sump hot spots
Disposal							(Lot 65)
	216 Tons	$110 per Ton	(assumed soil is not hazardous waste)	$ 27,270	$ 27,270		
If soil is hazardous, then add:				***$ 55,779***	$ 55,779		
Excavation							
	193 Cubic Yards	$35 per CY		$ 7,768	$ 7,768		
(no allowance for sloping)							
Loading							
	154 Cubic Yards	$12 per CY		$ 2,125	$ 2,125		
Backfill (placed & compacted)							
	215 Tons	$30 per Ton		$ 7,418	$ 7,418		
	54 Tons	$15 per Ton	*(Without benching/sloping tonnage)*	$ 932	$ 932		
Subtotal					$ 123,012	$ 220,123	This Subtotal ***does not*** assume all soil is hazardous (potential add-on costs are shown in orange)
Engineering (assumed 16% of RPI + $20,000 lab costs) (RPI=remedial plan implementation costs)				$ 74,901	$ 29,682	$ 45,220	(big excavation 13 metals @ priority TAT & 5 PFAS, small ex. 5 metals & 5 PFAS, $10K stockpile, $3K air)
Groundwater Management Permit Application (assumes town-owned; no st. applic. fee)				$ 2,900	$ 1,450	$ 1,450	
Recordation/notification (for GMZ Lots)				$ 1,500	$ 750	$ 750	
Totals $ by Lot					**$154,894**	**$267,542**	
Total plus 20% contingency:					**$185,872**	**$321,051**	
Total plus additional cost if all soil is hazardous					**$241,651**	**$421,116**	
Estimated Ongoing Costs:							**These are additional estimated costs for groundwater monitoring:**
Permit Monitoring (years 1-5)							
(assumes 5 wells, 2x per year for 1st two years, RCRA metals + Ni + PFAS)				$ 17,460			
(assumes 5 wells, 1x per year for three years, RCRA metals + Ni + PFAS)				$ 13,095			
(assumes 2 Summary Reports)				$ 4,600	$ 7,031	cost/yr	
Permit Monitoring (years 6-10 and subsequent 5 yr permits, if needed)							
(permit renewal, assumes town-owned)				$ 1,750			
(assumes 5 wells, 1x per year for five years, RCRA metals + Ni + PFAS)				$ 21,825			
(assumes 2 Summary Reports)				$ 4,600	$ 5,635	cost/yr	
					$ 6,000		One Time Monitoring Well Decomissioning Cost

Central Plating Site

Order of Magnitude Preliminary Cost Estimate - Brownfields Cleanup Project - Alternative: Excavate and Dispose of Soils to Reduce Leaching Potential

Item	Qty	Units	Rate	Per	Remark	Estimate	Lot 65	Lot 66	Notes
Additional Investigations? Excavations? (PFAS?)						?	$?	$?	
EPA Clean-up Grant Proposal or Revolving Loan Fund (RLF) Application Preparation						$ -			
Brownfields Programmatic Costs						$ 30,000	$ 15,000	$ 15,000	
Asbestos Abatement						$ 2,500			Addresses Hazardous Building Materials - Lot 65
Hazardous Materials Removal (Sump pits, selected concrete, wood)						$ 20,000			Clean sumps and dispose (some concrete, wood, sump contents)
Demolition						$ 40,000			35x28 ft one story garage building & conc. floor/foundation
					Total	$ 62,500	$ 62,500		
Lot 66 Cr (+ PFAS) Soils Remediation (Plating Line Release)					Calculated Costs add 15%	+ 15%			Adds 15% to caculated volumes to account for excavation slough, etc.
Lot 66									
	246	Tons	$335	per Ton	(portion as hazardous waste)	$ 94,915			Addresses plating lines hot spots
		Tons	$110	per ton	(portion as solid waste)	$ -			(Lot 66)
					Total	$ 94,915		$ 94,915	
If all soil is hazardous, then add:						***$ -***			If TCLP Cr fails (i.e. hazardous waste) or if evolving PFAS disposal regulations are promulgated (this cost adjustment is not included in "Totals" and is provided for consideration and planning)
Excavation									
	359	Cubic Yards	$35	per CY		$ 14,450		$ 14,450	
		(no allowance for sloping)							
Loading									
	173	Cubic Yards	$12	per CY		$ 2,385		$ 2,385	
Backfill (placed & compacted)									
	246	Tons	$30	per Ton		$ 8,500		$ 8,500	
		Tons	$15	per Ton	*(Without benching/sloping tonnage)*	$ -		$ -	
Lot 65 - Metals (+ PFAS) Soils Remediation (Under Sumps)					Calculated Costs add 15%	+15%			Addresses inferred sump hot spots
Disposal									(Lot 65)
	216	Tons	$110	per Ton		$ 27,287	$ 27,287		
If soil is hazardous, then add:						***$ 55,813***	$?		
Excavation									
	193	Cubic Yards	$35	per CY		$ 7,752	$ 7,752		
		(no allowance for sloping)							
Loading									
	154	Cubic Yards	$12	per CY		$ 2,126	$ 2,126		
Backfill (placed & compacted)									
	215	Tons	$30	per Ton		$ 7,418	$ 7,418		
	54	Tons	$15	per Ton		$ 930	$ 930		
Subtotal							$ 123,012	$ 135,250	
Engineering (assumed 16% of RPI + AUR related costs + $9,500 lab costs) (RPI=remedial plan implementation costs)						$ 55,000	$ 27,500	$ 27,750	Includes specification prep, bid docs/management, field oversight/sampling, reporting
Groundwater Management Permit Application (assumes town-owned; no st. applic. fee)						$ 2,900	$ 1,450	$ 1,450	
Recordation/notification (for GMZ Lots)						$ 1,500	$ 750	$ 750	
Totals $ by Lot							**$152,712**	**$165,200**	
Total plus 20% contingency:							**$183,255**	**$198,240**	
Total plus additional cost if all soil is hazardous							**$239,068**	**$198,240**	

Estimated Ongoing Costs:

These are additional estimated costs for groundwater monitoring:

Item	Estimate	Lot 65		Notes
Permit Monitoring (years 1-5)				
(assumes 5 wells, 2x per year for 1st two years, RCRA metals + Ni + PFAS)	$ 17,460			
(assumes 5 wells, 1x per year for three years, RCRA metals + Ni + PFAS)	$ 13,095			
(assumes 2 Summary Reports)	$ 4,600	$ 7,031	cost/yr	
Permit Monitoring (years 6-10 and subsequent 5 yr permits, if needed)				
(permit renewal, assumes town-owned)	$ 1,750			
(assumes 5 wells, 1x per year for five years, RCRA metals + Ni + PFAS)	$ 21,825			
(assumes 2 Summary Reports)	$ 4,600	$ 5,635	cost/yr	
		$ 6,000		One Time Monitoring Well Decomissioning Cost

Central Plating Site

Present Worth Cost Calculation for Long-Term Monitoring

Year	Present Worth Cost Factor (P/F)	Annual Groundwater Management Permit Monitoring	Annual Subtotals		Totals	
0	1	$ 7,031	$ 7,031			
1	0.9524	$7,242	$6,897.21			
2	0.9070	$7,459	$6,765.48			
3	0.8638	$7,683	$6,636.54			
4	0.8227	$7,913	$6,510.40			
5	0.7835	$ 5,218	$4,088.12	(Adjust permit monitoring frequency @ Year 5)		
6	0.7462	$5,374	$4,010.30			
7	0.7107	$5,536	$3,934.10			
8	0.6768	$5,702	$3,858.84			
9	0.6446	$5,873	$3,785.50			
10	0.6139	$6,049	$3,713.37			
11	0.5847	$6,230	$3,642.64			
12	0.5568	$6,417	$3,573.25			
13	0.5303	$6,610	$3,505.19			
14	0.6139	$6,808	$4,179.46	At 15 years	Decomissioning	Total
15	0.5847	$7,012	$4,099.85	$76,231	$5,465	$81,697
16	0.5568	$7,223	$4,021.76			
17	0.5303	$7,439	$3,945.16			
18	0.5051	$7,662	$3,870.01			
19	0.4810	$7,892	$3,796.30			
20	0.4581	$8,129	$3,723.98			
21	0.4363	$8,373	$3,653.05			
22	0.4155	$8,624	$3,583.47			
23	0.3957	$8,883	$3,515.21			
24	0.3769	$9,149	$3,448.26	At 25 years	Decomissioning	Total
25	0.3589	$9,424	$3,382.58	$113,171	$4,597	$117,768
26	0.3418	$9,707	$3,318.15			
27	0.3256	$9,998	$3,255			
28	0.3101	$10,298	$3,193			
29	0.2953	$10,607	$3,132			
30	0.2812	$10,925	$3,072			
31	0.2678	$11,253	$3,014			
32	0.2551	$11,590	$2,957			
33	0.2429	$11,938	$2,900			
34	0.2314	$12,296	$2,845			
35	0.2204	$12,665	$2,791			
36	0.2099	$13,045	$2,738			
37	0.1999	$13,436	$2,685			
38	0.1904	$13,839	$2,634			
39	0.1813	$14,254	$2,584			
40	0.1727	$14,682	$2,535			
41	0.1644	$15,123	$2,487			
42	0.1566	$15,576	$2,439			
43	0.1491	$16,043	$2,393			
44	0.1420	$16,525	$2,347			
45	0.1353	$17,021	$2,303			
46	0.1288	$17,531	$2,259			
47	0.1227	$18,057	$2,216			
48	0.1169	$18,599	$2,173			
49	0.1113	$19,157	$2,132	At 50 Years	Decomissioning	Total
50	0.1060	$19,731	$2,091	$179,664	$2,788	$182,452

NOTES:

1. Present worth cost factors for rate-of-return of 5%.
2. Inflation assumed at 3%.
2. Assumes no NH DES permit fees (municipally owned).