ARCADIS Design & Consultancy for natural and built assets

Ford Motor Company

FOCUSED FEASIBILITY STUDY

Ramapo Paint Sludge Site- Operable Unit 1 (OU-1), Rockland County, New York, Site No. 3-44-064

December 2017

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Ramapo Paint Sludge Site- Operable Unit 1 (OU-1), Rockland County, New York, Site No. 3-44-064

Prepared for:

Ford Motor Company

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ACRONYMS AND ABBREVIATION

ARARs	Applicable or Relevant and Appropriate Requirements
Arcadis	Arcadis of New York, Inc.
BAA	Benzo(a)anthracene
BAP	Benzo(b)pyrene
BBF	Benzo(b)fluoranthene
CCR	Construction Completion Report
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
DER-10	Technical Guidance for Site Investigations and Remediation
ECs	Engineering Controls
FFS	Focused Feasibility Study
Ford	Ford Motor Company
GRAs	General Response Actions
ICs	Institutional Controls
Indeno	Indeno(1,2,3-cd) pyrene
IRM	Interim Remedial Measure
NYSDEC	New York State Department of Conservation
OU-1	Operable Unit 1
PPM	Parts Per Million
RAOs	Remedial Action Objectives
SCGs	Standards, Criteria and Guidance
SCOs	Soil Cleanup Objectives
USEPA	United States Environmental Protection Agency
VOCs	Volatiles Organic Compounds

1 INTRODUCTION

On behalf of the Ford Motor Company (Ford), Arcadis of New York, P.C. (Arcadis) has prepared this Focused Feasibility Study (FFS) for the North of Ramapo Well Field designated as Operable Unit 1 (OU-1) of the Ramapo Paint Sludge Site located in Ramapo, New York (the Site, Figure 1). This FFS has been prepared following the implementation of an Interim Remedial Measure (IRM) for OU-1 in 2013 and 2014 and as documented in the Construction Completion Report (CCR) for the IRM dated August 2016 and approved by the New York Department of Environmental Conservation (NYSDEC) on December 20, 2016. This IRM work was completed in accordance with the Order of Consent and Administrative Settlement issued by the NYSDEC on March 2006, and the IRM Work Plan dated August 24, 2012 and approved by NYSDEC on October 23, 2012.

1.1 Report Organization

This FFS outlines three remedial action alternatives (after the IRM was implemented in 2013-2014) that meet the remedial action objectives (RAOs) developed for OU-1, screens these alternatives against nine evaluation criteria to expose the strengths and weaknesses of each and identifies the most likely alternative for implementation. The FFS is organized as follows:

- Section 2 presents information regarding the Site characteristics and provides information regarding the scope and results of previous remedial investigation and actions conducted at OU-1.
- Section 3 presents the Applicable or Relevant and Appropriate Requirements (ARARs) and RAOs for OU-1.
- Section 4 presents the General Response Actions (GRAs) applicable to OU-1 based on technologies and process options.
- Section 5 presents the development of three remedial alternatives by combining remedial technologies.
- Section 6 presents a detailed evaluation of the remedial alternatives for OU-1 using the nine criteria identified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) 300.430(e)].
- Section 7 presents a summary of recommended alternative.
- Section 8 presents the references used in this report.

Data to supplement these sections is presented in the tables, figures, and appendices attached.

2 SITE BACKGROUND AND SUMMARY

2.1 Site Location and History

The North Ramapo Well field area designated as OU-1 is approximately 40-acres in size located predominantly in the Town of Ramapo with a small portion (two acres) located in the Village of Hilburn (Figure 2). The Site is primarily undeveloped, but has a history of industrial use. The Town of Ramapo owns the land, with easements granted to United Water New York, Inc. (United Water) for operation of five water-supply wells.

2.2 Previous Interim Remedial Measures at OU-1

The IRM consisted of the excavation, removal, transportation and disposal of paint sludge and impacted soil discovered during investigatory work conducted in 2009. The investigatory work identified paint sludge and impacted soil in the southern-most portion of OU-1 and indicated that volatile organic compounds (VOCs) and inorganics were detected at concentrations above NYSDEC Unrestricted Use soil cleanup objectives (SCOs). The IRM was conducted at OU-1 in 2013 with the site restoration completed in April 2014.

IRM activities consisted of mobilization and site preparation; excavation and removal of paint sludge and impacted soil; collection of confirmatory soil samples and test pits; site restoration; material handling and off-site transportation and disposal; and, reporting. Paint sludge and impacted soil was excavated to depths ranging between 1 foot and 10 feet below ground surface (bgs) until no evidence of paint sludge was noted. Once the impacted material was removed, confirmatory soil samples were collected and compared to the NYSDEC restricted residential SCOs and protection of groundwater SCOs.

Figures illustrating the limits of paint sludge and impacted soil removed and locations of confirmatory soil samples collected following the excavation and removal activities are provided as Figures 3 and 4. A summary of the confirmatory soil samples exceeding the NYSDEC unrestricted and restricted residential SCOs is provided in Tables 1**.** NYSDEC unrestricted SCOs are presented in this FFS as required by the NYSDEC DER-10/Technical Guidance for Site Investigation and Remediation (DER-10).

A total of 41,007 tons of paint sludge and impacted soil was excavated and disposed of at approved off-site disposal facilities. Following collection of confirmatory samples, the Site was backfilled to grade with certified clean fill meeting the NYSDEC restricted residential SCOs. A total of 28,881 tons of fill materials was used to backfill the excavated areas and a total of 5,200 tons of topsoil was used for site restoration. A restrictive covenant was then established for the limits of OU-1 by the Town of Ramapo on April 24, 2014 to limit the use of the Site to “Restricted Residential”. Additional details regarding the activities associated with this IRM are presented in the CCR dated February 2015.

3 STANDARDS, CRITERIA AND GUIDANCE, AND REMEDIAL ACTION OBJECTIVES

RAOs have been established to select and evaluate remedial alternatives that will protect human health and the environment; consider the requirements of the NYSDEC Standards, Criteria, and Guidelines (SCGs); provide practical, cost-effective remediation; and utilize permanent remedies to the extent possible which can be expedited as required. Site- specific RAOs were developed based on the impacted media, the extent of identified impacts, and geologic and hydrogeologic conditions at OU-1.

3.1 Identification of ARARs

Regulatory SCGs are divided into three categories: chemical-specific, action-specific, and location-specific applicable or relevant and appropriate requirements (ARARs). In order to be classified as an ARAR, federal and/or state laws must meet one of the following two requirements: (1) applicability or (2) relevance and appropriateness (USEPA, 1994). “Applicable” requirements are “those cleanups standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance [40 C.F.R. 300.5].” “Relevant and appropriate” requirements are “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that, while not ‘applicable’ to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at a site that their use is well suited to the particular site [40 C.F.R. 300.5].”

3.1.1 Chemical-Specific ARARs

Chemical-specific requirements establish health or risk-based concentration limits or ranges for specific hazardous substances in various environmental media. These standards provide media cleanup levels or a basis for calculating cleanup levels for constituents of concern (COCs). Chemical-specific standards are also used to indicate an acceptable level of discharge, to determine treatment and disposal requirements for a particular remedial activity, and to assess the effectiveness of a response action. The potential chemical-specific ARARs are presented in Table 2.

3.1.2 Location-Specific ARARs

Location-specific requirements set restrictions on the types of response activities that can be performed based on specific site characteristics or location. Location-specific standards provide a basis for assessing restrictions during the formulation and evaluation of Site-specific remedies. Response actions may be restricted or precluded based on siting laws for hazardous waste facilities and based on proximity to man-made features such as landfill, disposal area, and/or local historic buildings. Potential location-specific standards are included in Table 3.

3.1.3 Action-Specific ARARs

Action-specific requirements set controls or restrictions on the design, implementation, and performance of waste management actions. These standards specify performance levels, actions, or technologies and specific levels for discharge of residual chemicals. They also provide a basis for assessing the feasibility and effectiveness of the remedial alternatives. The potential action-specific standards identified for remedial action are presented in Table 4.

3.2 Remedial Action Objectives

OU-1 is currently used by United Water as a public water supply well field, and zoned by the Town of Ramapo as Restricted Residential. The future for OU-1 will be open space or park; therefore, the Remedial Action objectives (RAOs) established for OU-1 are as follows:

- Prevent ingestions/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatizing from contaminants in soils.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

3.3 Identification of Chemicals of Concern

Sediment, surface-water, and groundwater has not been identified as impacted with COCs generally associated with paint sludge. Paint sludge and impacted soil was the media targeted during implementation of the IRM and the associated COCs exceeding the applicable Unrestricted Use SCOs are:

- VOCs – Acetone, 2-butanone (MEK), ethylbenzene, toluene and xylene;
- SVOCS – Benzo(a)anthracene (BAA), benzo(a)pyrene (BAP), benzo(b)fluoranthene (BBF), chrysene, and indeno(1,2,3-cd) pyrene (Indeno); and,
- Inorganics – Arsenic, barium, copper, lead, manganese, nickel, selenium and zinc.

VOCs and inorganic COCs are consistent with historical data associated with paint sludge. SVOCs have not been historically associated with paint sludge.

3.3.1 COC Observations

Based on a review of the analytical data from soil samples collected after completion of the IRM, four samples representing existing conditions exceed restricted-residential SCOs:

- BAA, BAP, BBF, and Indeno were identified in excess of the restricted residential SCOs of 1 part per million (ppm), 1 ppm, 1 ppm and 0.5 ppm at PE-P1-Cell0-5SW (1-1.5'). Concentrations of BAA, BAP, BBF, and Indeno were 1.33 ppm, 1.24 ppm, 1.77 ppm, and 0.701 ppm, respectively;

- BBF and Indeno were identified in excess of the restricted residential SCOs of 1 ppm and 0.5 ppm at PE-P1-East-5SW (1-1.5')F. Concentrations of BBF and Indeno were 1.33 ppm, 1.24 ppm, 1.09 ppm, and 0.565 ppm, respectively;

- Arsenic was identified in excess of the restricted residential SCO of 16 ppm at PE-WSA-1B (0.5-1') at a concentration of 25 ppm and at PE-WSA-3B (0.5-1') at a concentration of 46.5 ppm; and,

- Manganese was identified in excess of the restricted residential SCO of 2000 ppm at PE-P1-West-13B(5.0-5.5) at a concentration of 3100 ppm and at PE-P1-West-14SW(3.5-4.0) at a concentration of 3050 ppm.

The PAH exceedance is marginally above the standard and may be attributed to frequent flooding events associated with the Ramapo River at the Site. The elevated arsenic concentrations were located in the waste storage area where no paint sludge was observed; however, construction and demolition debris from homes constructed during the early 20th century and slag from mining was observed. Both home construction and mining slag are not related to Ford operations. Manganese is a naturally occurring chemical and exceedances were at a sufficient depth below the soil cover. Results of confirmatory soil sample exceedances of unrestricted, protection of groundwater, and restricted residential SCOs are provided on Table 1.[1]

3.4 Identification of Cleanup Goals

In this FFS, the risks, and hazards for the current and future anticipated use of the Site (restricted residential) are anticipated to be within acceptable levels. The goal of the GRAs conducted in this area is to maintain current land use while being protective of public health and the environment for the current and reasonably anticipated future land use.

3.5 Area of Attainment

The RAOs are to be obtained for OU-1 for the area within the metes and bounds defined by the restrictive covenant placed on the Site by the Town of Ramapo (Appendix B). The metes and bounds are defined as the property boundary identified on Figure 2.

[1] Summary tables of existing conditions analytical data have been prepared for the Proposed Remedial Action Plan (PRAP). The summary tables list the number of exceedances for each applicable constituent in the 0-2 foot interval out of the total number of samples in this interval exceeding the restricted-residential soil cleanup objectives (SCOs) and unrestricted SCOs. Additionally, a summary table has been prepared listing the number of unrestricted SCO exceedances for each constituent out of the total amount of samples collected from the site for all depth intervals. Refer to Appendix A.

4 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

4.1 General Response Actions

GRAs are categories of remedial actions that may be implemented alone or in combination to satisfy the remediation goals. Appropriate GRAs are developed based on the Site-specific: RAOs; conditions; and, COCs. Potential response action technologies and process options are identified and evaluated based on technical feasibility. The retained process options are screened based on effectiveness, implementability, and cost to determine which process options should be used in the development of the Remedial Actions.

4.2 Identification of General Response Actions

The GRAs are broad categories of response actions that could be selected to achieve the RAOs established for the Site. Potential GRAs that may be used to meet the RAOs at OU-1 include:

- No Further Action;
- Institutional Controls;
- Engineering Controls; and
- Removal and Disposal

4.2.1 No Further Action

No Further Action alternative is evaluated to establish a baseline for the comparison of the remaining alternatives. No additional response action of any kind would be employed at the Site under this category.

4.2.2 Institutional Controls

Institutional controls (ICs) are a GRA used to control activities at a Site and limit exposure to impacted media. Institutional controls are administrative in nature and include zoning restriction and/or environmental easements to limit the future land use of a site. The implementation of ICs would not cause any reduction in the volume, toxicity, or mobility of contamination; however, if any contamination remains at a site, ICs may be necessary to limit the potential for exposure. In such cases, ICs restrict land use and minimize the potential for exposure without addressing the contaminated media; therefore, ICs are generally used in tandem with other GRAs to form the overall remedy for a site.

4.2.3 Engineering Controls

Engineering controls (ECs) are mechanisms to contain or stabilize contamination or ensure the effectiveness of a GRA. ECs consist of engineered caps and fencing/barriers with posted signs. An engineered cap is a technology in which a cap of some media (soil, geosynthetic liner, etc.) is installed to eliminate direct exposure pathways, limit the migration of constituents via storm water run-off or erosion, and/or reduce the potential leaching to the groundwater by reducing precipitation infiltration. Engineered

caps that are properly installed offer long-term protection and limit exposure, erosion, and recharge. The use of an EC requires an IC in the form of environmental easements.

4.2.4 Removal and Disposal

Removal and disposal can be achieved by employing standard excavation and construction equipment to remove the entire footprint of impacted material. The Site would then be backfilled with certified clean fill or otherwise regraded to prevent accumulation of surface water and assure positive drainage. Although removal would yield a site area free of any unacceptable potential risks or hazards associated with impacted material, removal can have significant impact on the ecological systems at the Site due to the removal of habitat.

4.3 Technology Screening

None of the GRAs were determined to be infeasible; however, because institutional controls, alone, would not provide protection against direct contact with impacted material at the soil surface, this technology was not developed as an alternative by itself.

5 DEVELOPMENT OF REMEDIAL ALTERNATIVES

Remedial Actions must achieve the RAOs identified for OU-1. Remedial Actions were developed by evaluating GRAs and screening against three key criteria: effectiveness, implementability, and cost. Of these criteria, implementability and effectiveness of the technology are the most critical. The three alternatives to be considered as part of this FFS are as follows:

- Alternative 1 – No Further Action (without Site Management)
- Alternative 2 – No Further Action with Site Management and ICs
- Alternative 3 – Full Removal

5.1 Alternative 1- No Further Action (without Site Management)

The No Further Action (without Site Management) alternative is evaluated to establish a baseline for the comparison of the remaining alternatives. No additional response action of any kind would be employed at the Site under this category.

5.2 Alternative 2- No Further Action with Site Management and ICs

Under Alternative 2, no further action with Site Management and ICs is evaluated for the Site. This assumes that the existing soil cover will act as a site management control which will be monitored through the implementation of a Site Management Plan, and ICs consisting of an environmental easement to be established by the NYSDEC to restrict the use of the Site to Restricted Residential Use. This is in addition to the existing restrictive covenant placed on the Site by the Town of Ramapo. The environmental easement will be limited to land use restrictions and compliance with the Site Management Plan, as groundwater and vapor intrusion restrictions are not anticipated. Site management and land use restrictions should be sufficient to limit the exposure to soil exceeding the Unrestricted Use SCOs that may remain at the Site.

5.3 Alternative 3- Full Removal and Disposal

Full removal and disposal is evaluated and would require the entire footprint within the property boundary outside the area previously remediated during the IRM work be excavated. Full removal and disposal would consist of excavation of all soil to 2 feet bgs or to the groundwater table, whichever comes first. This action would effectively remove soil exceeding the Unrestricted Use SCOs and therefore allow Unrestricted Use of the Site. Excavated soil would be disposed off-site at appropriate, permitted disposal facilities.

Following the excavation and removal activities, certified clean fill would then be imported as backfill and the Site would be graded to blend in with the surrounding area and promote positive drainage. The Site would not necessarily be restored to the original grade. For cost-estimating purposes, the volume of certified clean fill for import is estimated to be equivalent to the volume disposed off-site at approved facilities.

ICs and ECs will not be required under this alternative.

6 ANALYSIS OF REMEDIAL ALTERNATIVES

6.1 Evaluation Criteria

The DER-10 lists nine criteria against which each remedial alternative must be assessed. The first two criteria are threshold criteria that must be met by each alternative. The next six criteria are the primary balancing criteria upon which the analysis is based. The final criterion is referred to as a modifying criterion and is applied after the subsequent public comment period to evaluate state and community acceptance. The acceptability or performance of each remedial alternative against the criteria is evaluated individually so that relative strengths and weaknesses may be identified. The two thresholds and six primary balancing criteria upon which the analysis is based include:

- Overall Protection of human health and the environment;
- Compliance with SCGs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume through treatment;
- Short-term effectiveness;
- Implementability;
- Cost Effectiveness; and,
- Land Use.

The modifying criterion of state and community acceptance will be evaluated following comments on the Proposed Plan and will be described in the Record of Decision (ROD). This modifying criterion is not addressed in this FFS.

6.1.1 Overall Protection of Human Health and the Environment

This criterion addresses the extent and manner in which the remedial alternative achieves protection of human health and the environment over time. Protection of human health and the environment is met if each human health and ecological exposure pathway identified in the risk assessment as potentially resulting in adverse effects is eliminated, reduced to an acceptable level, or controlled through treatment or ECs and ICs.

6.1.2 Compliance with SCGs

This criterion addresses whether the remedial alternative conforms to officially promulgated SCGs. The potential chemical-specific, location-specific, and action-specific ARARs are discussed in Section 3.1.

6.1.3 Long-term Effectiveness and Permanence

The long-term reliability and effectiveness criterion addresses the degree, extent, and way the remedial alternative continues to protect human health and the environment in terms of residual risk remaining at the Site after the RAOs have been met. This criterion considers the residuals following completion of the actions, expected duration of the response action, and the degree of controls required to ensure protectiveness of the response action.

6.1.4 Reduction of Toxicity, Mobility, or Volume of Wastes

This criterion relates to the extent to which remedial alternatives permanently reduce the toxicity, mobility, and volume of contaminants present at the Site. Factors for this criterion include the degree of permanence of the remedial action, the amount of hazardous materials destroyed, and the type and quantity of residuals remaining after treatment.

6.1.5 Short-Term Effectiveness

Short-term effectiveness addresses the effects of the remedial alternative during construction and implementation until the RAOs are met. This criterion considers the protection of the community and workers, including the air-quality effects and hazards from excavation, transportation, and on-site treatment. In addition, the expected length of time for completion of the remedial action is considered.

6.1.6 Implementability

The technical and administrative feasibility of implementing each remedial alternative and the availability of services and materials are addressed by this criterion. This criterion also considers the degree of coordination required by the regulatory agencies, successful implementation of the remedial action at similar sites, and research to realistically predict field implementability.

6.1.7 Cost Effectiveness

This criterion addresses the capital costs, the operation and maintenance costs, and the present worth analysis of costs anticipated for the implementation of the response action. A remedy is cost-effective if its costs are proportional to its overall effectiveness. Capital costs include cost for design and implementation of the response action including legal fees, license or permit costs, start-up costs, and contingency allowances. Operation and maintenance costs consist of costs associated with post construction activities necessary to properly operate, maintain, and monitor a given response action.

A detailed present-worth cost was developed for each alternative. The opinions of probable cost presented in this FS were developed in accordance with vendor quotes and previous project costs. The opinions of probable cost presented in this report were prepared with an anticipated accuracy range of +50 to -30 percent.

6.1.8 Land Use

This criterion is an evaluation of the current, intended and reasonably anticipated future use of the site and its surroundings, as it relates to an alternative or remedy, when unrestricted levels would not be achieved. The evaluation considers the following land use factors:

- Current use and historical and/or recent development patterns;
- Consistency of proposed use with applicable zoning laws and maps;
- Brownfield opportunity areas;
- Consistency of proposed use with applicable comprehensive community/municipality master plans;
- Proximity to real property currently used for residential use and to urban, commercial, industrial, agricultural and recreational areas;

- Any written and oral comments submitted by members of the public on the proposed use as part of citizen participation activities;
- Environmental justice concerns;
- Federal or state land-use designations relating to the property;
- Whether the population growth patterns and projections support the proposed use;
- Accessibility to existing infrastructure;
- Proximity of the site to important cultural resources and natural resources;
- Potential vulnerability of groundwater to contamination that might migrate from the site, including proximity to wellhead protection and groundwater recharge areas and other areas identified by the state comprehensive groundwater remediation and protection program;
- Proximity to floodplains;
- Geography and geology; and,
- Current institutional controls applicable to the Site.

6.2 Individual Analysis of Alternatives

Table 5 presents the individual analysis of alternatives for the Site and provides a detailed analysis of the relative strengths and weaknesses for each of the remedial alternatives when compared to the threshold and primary balancing criteria. Note that Alternative No. 1 - No Action is intended to serve as a baseline by which to compare the risk reduction effectiveness of other potential alternatives during the comparative analysis. In the No Action Alternative, no remedial actions would be performed, and no efforts would be undertaken beyond the IRM activities implemented in 2013 and 2014.

6.3 Comparative Analysis of Remedial Alternatives

Each of the remedial actions were evaluated on an individual basis presented in Table 6. This section provides a comparative analysis of the expected performance of each alternative relative to the other alternatives to identify their respective advantages and disadvantages. To compare the Remedial Actions, ratings of poor, adequate, good, or excellent were assigned to each of the evaluation criteria used in the analysis of the alternatives.

Ratings were assigned based on a subjective appraisal of the degree to which each alternative met the criteria. The ratings and overall score for each alternative are presented in Table 6

6.3.1 Overall Protection of Human Health and the Environment

Alternative 1 provides no protection to human health and the environment as no ICs will be established for remaining soil exceeding the Unrestricted Use SCOs, therefore, this alternative is rated as poor. Alternative 2 uses ICs with ECs (Cover-In-Place) to restrict access to the area which provides protection to human health and the environment. Alternative 2 is therefore rated as good. Alternative 3 offers the highest level of protection to human health and the environment because it removes soil exceeding the Unrestricted Use SCOs from the Site, but relocates the soil to a different location off-site. Based on this information, Alternative 3 is rated good.

6.3.2 Compliance with SCGs

All the alternatives will meet location-specific and action-specific ARARS. Alternative 1 does not address any possible remaining soil exceeding the Unrestricted Use SCOs at the Site while Alternative 2 takes actions to limit exposure, so these alternatives are rated as poor and good, respectively. Alternative 3 removes soil exceeding the Unrestricted Use SCOs, which would meet the chemical-specific ARARs for soils, and this results in a rating of excellent.

6.3.3 Long-Term Reliability and Effectiveness

Alternative 1 is not effective or reliable for the long-term since no ICs are established and no monitoring is performed. Alternative 2 does provide a higher level of effectiveness by restricting land use and periodic inspections to ensure protection against direct contact. Alternative 3 removes soil exceeding the Unrestricted Use SCOs from the Site, which is the most effective in eliminating the potential for exposure. Therefore, ratings for long-term reliability and effectiveness for the alternatives are as follows: Alternative 1 – poor; Alternative 2 – good; and, Alternative 3 - excellent.

6.3.4 Reduction of Toxicity, Mobility, or Volume of Wastes

Alternative 1 does not contribute to the reduction in the toxicity, mobility, or volume of the soil exceeding the Unrestricted Use SCOs that will remain at the Site with no ICs. Alternative 2 does not reduce the volume of the soil exceeding the Unrestricted Use SCOs, however, it reduces the toxicity and mobility through the restriction of land use and physical barriers. Alternative 3 reduces the toxicity, mobility, and volume of soil exceeding the Unrestricted Use SCOs remaining at the Site, however, it will relocate the soil to another location. Therefore, the alternatives are rated as follows: Alternative 1 – poor; Alternative 2 – adequate; and, Alternative 3 – good.

6.3.5 Short-Term Effectiveness

Alternatives 1 and 2 would minimize exposure to workers, surrounding communities, and the environment by completing limited to no additional work at the Site. Therefore, Alternatives 1 and 2 are rated as excellent. Alternative 3 consists of the removal of soil exceeding Unrestricted Use SCOs followed by the placement of backfill. Due to the additional handling and transportation of material, there is greater potential for exposure to COCs by workers, surrounding communities, and the environment in the short term. Therefore, Alternative 3 is rated as adequate.

6.3.6 Implementability

Alternatives 1 and 2 are the most readily implementable alternatives. Alternatives 1 and 2 are rated as excellent. Alternative 3 requires preparation and specific use of various health and safety measures that will need to be addressed prior to and during implementation of the alternative, as well as measures to be employed during the work; therefore, Alternative 3 is rated as poor.

6.3.7 Cost Effectiveness

There is no cost associated with Alternative 1, and the alternative is not considered to be effective; therefore, Alternative 1 is rated as adequate. Costs for Alternative 2 consist of the implementation of the Site Management Plan and is therefore, rated as excellent. The cost for Alternative 3 is significantly greater than Alternatives 2, without a commensurate rise in effectiveness; therefore, Alternative 3 is rated as poor. The estimated costs for Alternatives 2 and 3 are presented in Tables 7 and 8.

6.3.8 Land Use

Alternative 1 does not comply with current or anticipated land uses (restricted residential) as no ICs are in-place for the possible soil exceeding the Unrestricted Use SCOs that could remain at the Site, and it is therefore rated as adequate. Alternatives 2 and 3 provide additional protection to the community. Alternative 2 permits restricted residential development under a future use scenario and Alternative 3 would allow Unrestricted Use at the Site; therefore Alternatives 2 and 3 are rated as good and excellent, respectively.

7 SUMMARY OF RECOMMENDED ALTERNATIVES AND NEXT STEPS

The recommended remedy for OU-1 of the Ramapo Paint Sludge Site was determined based on an evaluation of the threshold and primary balancing criteria consistent with DER-10 and 6 NYCRR Part 375. Based on evaluation of the response actions and the screening criteria, the recommended remedial alternative for this Site is Alternative 2. Alternative 2 consists of utilizing the existing soil cover with execution of ICs.

7.1 Establishing Site Management and ICs

ICs will consist of an environmental easement to be established by the NYSDEC to limit land use of the Site to Restricted Residential Use and comply with the Site Management Plan. This is in addition to the existing restrictive covenant placed on the Site by the Town of Ramapo.

7.1.1 Developing Site Management Plan

A Site Management Plan will be developed for the Site in accordance with the NYSDEC DER-10. The Site Management Plan will outline:

- Previous Investigations and Remedial Actions;
- ICs and ECs Plan;
- Monitoring and Sampling Plan;
- Operation and Maintenance Plan;
- Periodic Assessment/Evaluations; and,
- Reporting Requirements.

As Site activities are currently restricted through a scheduled 5-year site restoration monitoring program, there are currently controls in place for monitoring the ICs at the Site. The end of this site restoration monitoring will likely coincide or be completed prior to approval of the Site Management Plan for the Site; therefore, the status of the ecological site restoration should be reviewed during preparation of the SMP to determine if monitoring beyond the initial 5-year window must be completed as part of the SMP.

8 REFERENCES

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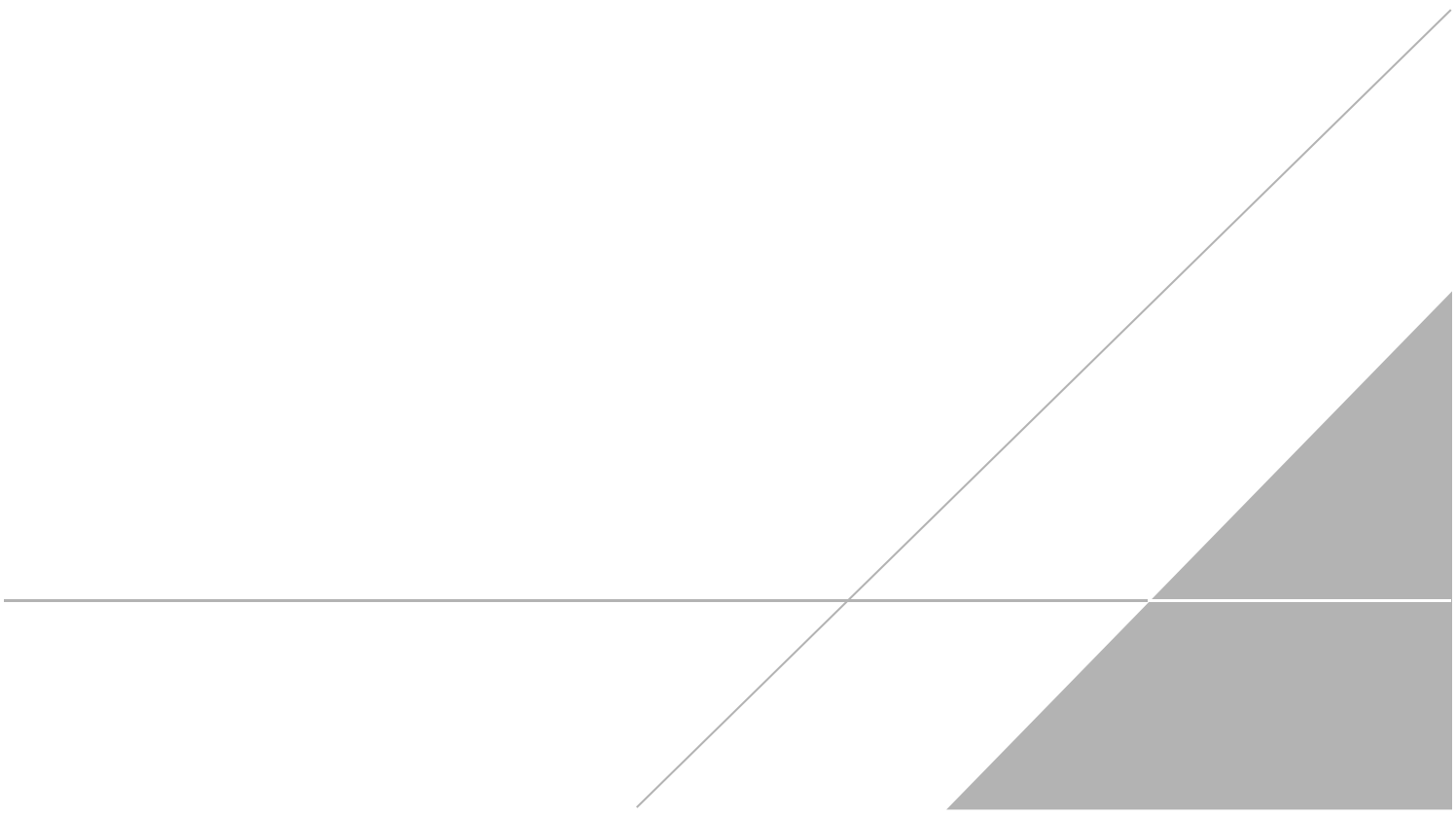
TABLES



Ramapo Paint Sludge Site - Operable Unit 1
Rockland County, NY
FOCUSED FEASIBILITY STUDY

TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P1-CELL0-5SW (1.0-1.5)	PE-P1-CELL5-4B(8.0-8.5)	PE-P1-CELLO-7B (2.0-2.5)	PE-P1-EAST-2SW (2.0-2.5)	PE-P1-EAST-3B (8.0-8.5)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	12/10/2013	2/25/2013	11/20/2013	4/30/2013	5/6/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0058	<0.0028	<0.0049	<0.0025	<0.0028
Acetone	0.05	100	0.05	mg/kg	<0.006	<0.002	<0.0051	<0.0018	<0.002
Ethylbenzene	1	41	1	mg/kg	<0.00023	<0.00031	<0.00041 J	<0.00028	<0.00031
Toluene	0.7	100	0.7	mg/kg	<0.00019	<0.00012	<0.00016	<0.00011	<0.00012
Total Xylenes	0.26	100	1.6	mg/kg	<0.00023	<0.002	<0.0049	<0.00015	<0.00016
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	***1.33***	<0.011	0.0472	0.254	<0.011
Benzo(a)pyrene	1	1	22	mg/kg	**1.24**	<0.01	0.0432	0.235	<0.01
Benzo(b)fluoranthene	1	1	1.7	mg/kg	***1.77***	<0.011	0.0569	0.256	<0.011
Chrysene	1	3.9	1	mg/kg	***1.36***	<0.011	0.0502	0.258	<0.011
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	**0.701**	<0.012	0.024 J	0.152	<0.011
Metals									
Arsenic	13	16	16	mg/kg	6.3	2.9	5.8	4.4	4.5
Barium	350	400	820	mg/kg	157	42	201	114	233
Copper	50	270	1720	mg/kg	30.4	9.8	26.4 J	26.9	18.5
Lead	63	400	450	mg/kg	**250**	**75.7**	**239**	**93.2**	**304**
Manganese	1600	2000	2000	mg/kg	945	315	634 J	485	552
Nickel	30	310	130	mg/kg	16.8	12.5	22.7	17.2	16
Selenium	3.9	180	4	mg/kg	0.61 B	<0.26	***4.5***	0.47 B	1.7 B
Zinc	109	10000	2480	mg/kg	**123**	37	94.1 J	56.4	90.3

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestricted)
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwater (POG)
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use (Restricted)
B	Result is between the method detection limit and the reporting limit.
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blank contamination.

Ramapo Paint Sludge Site - Operable Unit 1
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P1-EAST-5B (1.5-2.0)	PE-P1-EAST-5SW (1.0-1.5) F	PE-P1-WEST-13B (5.0-5.5)	PE-P1-WEST-14SW(3.5-4.0)	PE-P1-WEST-1B(5.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	6/20/2013	7/22/2013	6/3/2013	6/12/2013	3/28/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0026	NA	<0.0028	<0.0027	<0.0023
Acetone	0.05	100	0.05	mg/kg	<0.0019	NA	<0.0019	<0.0019	<0.0016
Ethylbenzene	1	41	1	mg/kg	<0.00029	NA	<0.00041 J	<0.0003	<0.00025
Toluene	0.7	100	0.7	mg/kg	<0.00012	NA	<0.0016	<0.00012	<0.0001
Total Xylenes	0.26	100	1.6	mg/kg	<0.00015	NA	<0.0019	<0.00016	<0.00013
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.16	0.81	<0.011	<0.011	<0.01
Benzo(a)pyrene	1	1	22	mg/kg	0.151	0.844	<0.01	<0.01	<0.0098
Benzo(b)fluoranthene	1	1	1.7	mg/kg	0.23 J	**1.09**	<0.011	<0.011	<0.011
Chrysene	1	3.9	1	mg/kg	0.205	0.92	<0.012	<0.011	<0.011
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	0.0954 J	**0.565**	<0.012	<0.011	<0.011
Metals									
Arsenic	13	16	16	mg/kg	5.2	NA	4.1	3.4	5
Barium	350	400	820	mg/kg	107 J	NA	36.9	76.1	44.8
Copper	50	270	1720	mg/kg	28.2 J	NA	12.8	15.6	22.8
Lead	63	400	450	mg/kg	**78.2**	NA	4.4	3.9 B	12.2
Manganese	1600	2000	2000	mg/kg	680 J	NA	***3100***	***3050***	1430
Nickel	30	310	130	mg/kg	17.9	NA	19.5	16.1	**43.4**
Selenium	3.9	180	4	mg/kg	0.98 B	NA	0.56 B	2.7	0.58 B
Zinc	109	10000	2480	mg/kg	74	NA	43.4	31.4	61.6

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

Ramapo Paint Sludge Site - Operable Unit 1
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P1-WEST-6B(7.0-7.5)	PE-P1-WEST-7SW (3.0-3.5)	PE-P1-WEST-8B(7.0-7.5)	PE-P2-CELL-1B (8.0-8.5)	PE-P2-CELL-2B (9.5-10)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	4/4/2013	5/30/2013	4/29/2013	11/26/2013	12/3/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0021	<0.0026 J	<0.0093 J	<0.0045	0.0269
Acetone	0.05	100	0.05	mg/kg	<0.0015	<0.0018	<0.02 J	<0.0047	***0.257 EDJ***
Ethylbenzene	1	41	1	mg/kg	<0.0011	<0.00029	0.126 J	0.00024 J	***1.27 D***
Toluene	0.7	100	0.7	mg/kg	<0.00046 J	<0.00011	<0.0551 J	<0.00015	***0.945 D***
Total Xylenes	0.26	100	1.6	mg/kg	<0.0084	<0.00015	**1.03**	0.0018	***9.58 D***
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	<0.012	0.0143 J	<0.011	<0.011	<0.011
Benzo(a)pyrene	1	1	22	mg/kg	<0.011	<0.011	<0.01	<0.011	<0.011
Benzo(b)fluoranthene	1	1	1.7	mg/kg	<0.013 J	<0.012	<0.011	<0.012	<0.012
Chrysene	1	3.9	1	mg/kg	<0.013	0.0163 J	<0.011	<0.012	<0.012
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	<0.013	<0.012	<0.011 J	<0.012	<0.012
Metals									
Arsenic	13	16	16	mg/kg	5.1	5	2.2	5.4	6.3
Barium	350	400	820	mg/kg	117	168	28.8	81.7	**652**
Copper	50	270	1720	mg/kg	20.1 J	21.8	11.8	16.7	15.2
Lead	63	400	450	mg/kg	**128**	**129**	3.8	9.8	***829***
Manganese	1600	2000	2000	mg/kg	565 J	617 J	261 J	**1890**	364
Nickel	30	310	130	mg/kg	20.3	17.7	14.4	26.2	18.8
Selenium	3.9	180	4	mg/kg	0.78 B	<0.29	<0.26	<0.27	<0.27
Zinc	109	10000	2480	mg/kg	74.3 J	77.8	36	44.9	83.6

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

Ramapo Paint Sludge Site - Operable Unit 1
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P2-EAST-3SW(4.5-5.0)	PE-P3-CELL47-3B(6.0-6.5)	PE-P3-CELL50-3SW (1.5-2.0)	PE-P3-CELL50-4B (3.0-3.5)	PE-P3-CELL50-4B (3.0-3.5)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						DUP-111913
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	5/17/2013	3/20/2013	11/19/2013	11/19/2013	11/19/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0028	<0.0033	<0.0048	<0.0044	<0.0043
Acetone	0.05	100	0.05	mg/kg	<0.002	***0.0559***	<0.0049	<0.0046	<0.0044
Ethylbenzene	1	41	1	mg/kg	<0.00031	0.122	<0.00019	<0.00018	<0.00017
Toluene	0.7	100	0.7	mg/kg	<0.00012	0.00066 J	<0.00015	<0.00014	<0.00014
Total Xylenes	0.26	100	1.6	mg/kg	<0.00016	0.0898	<0.00019	<0.00018	<0.00017
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	<0.012	<0.015	0.42	0.0415	0.0334 J
Benzo(a)pyrene	1	1	22	mg/kg	<0.012	<0.014	0.429	0.0418	0.0355 J
Benzo(b)fluoranthene	1	1	1.7	mg/kg	<0.013	<0.015	0.551	0.0587	0.0441
Chrysene	1	3.9	1	mg/kg	<0.013	<0.015	0.46	0.0477	0.0371
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	<0.013	<0.016	0.249	0.0269 J	0.0195 J
Metals									
Arsenic	13	16	16	mg/kg	2.4	7.5	4.6	4.9	7.3
Barium	350	400	820	mg/kg	62	98	95.7	92.1	76.1
Copper	50	270	1720	mg/kg	**63.7**	35.1	33.4	19.5	21.9
Lead	63	400	450	mg/kg	4.6	10.4	**97.8**	**63.1**	**69.2**
Manganese	1600	2000	2000	mg/kg	444	365	487	562	553
Nickel	30	310	130	mg/kg	21.9	23.2	14	11.5	12.3
Selenium	3.9	180	4	mg/kg	<0.29	0.3 B	<0.28	0.34 B	<0.29
Zinc	109	10000	2480	mg/kg	44.9	51.5	71	66.5	67.8

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P3-EAST-11B (6.0-6.5)	PE-P3-EAST-12B (6.5-7.0)	PE-P3-EAST-14B(4.0-4.5)	PE-P3-EAST-2B(6.5-7.0)	PE-P3-EAST-6B(3.0-3.5)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	7/1/2013	7/2/2013	7/3/2013	5/13/2013	6/26/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0027	<0.22	<0.0029	<0.21	<0.003
Acetone	0.05	100	0.05	mg/kg	<0.0019	<0.16	<0.0021	<0.15	<0.0021
Ethylbenzene	1	41	1	mg/kg	<0.0003	<0.024	<0.00032	<0.024	<0.00033
Toluene	0.7	100	0.7	mg/kg	<0.00012	<0.0096	<0.00013	<0.0094	<0.00013
Total Xylenes	0.26	100	1.6	mg/kg	<0.00016	**0.338**	<0.00017	<0.012	<0.00017
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.0277 J	0.0534	<0.014	<0.015	<0.013
Benzo(a)pyrene	1	1	22	mg/kg	<0.012	<0.014	<0.013	<0.014	<0.012
Benzo(b)fluoranthene	1	1	1.7	mg/kg	<0.013	<0.015	<0.014	<0.015	<0.013
Chrysene	1	3.9	1	mg/kg	0.0252 J	0.064	<0.014	<0.016	<0.013
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	<0.013	<0.016	<0.015	<0.016	<0.013
Metals									
Arsenic	13	16	16	mg/kg	**14.7**	7.6	9.5	5.9	2.1 B
Barium	350	400	820	mg/kg	50.9	157	110	137	55.9
Copper	50	270	1720	mg/kg	12.4	45.3	36.6	**56.1**	13.5
Lead	63	400	450	mg/kg	14.2	18.7	50.8	16.7	5.7
Manganese	1600	2000	2000	mg/kg	708	857	942	377	91.5
Nickel	30	310	130	mg/kg	15.1	**31.3**	27.9	**30.3**	13.5
Selenium	3.9	180	4	mg/kg	<0.32	<0.37	<0.33	0.98 B	0.6 B
Zinc	109	10000	2480	mg/kg	48.7	84	**542**	77.5	**473**

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

Ramapo Paint Sludge Site - Operable Unit 1
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		PE-P3-EAST-9SW(0.5-1.0)	PE-WSA-1B (0.5-1)	PE-WSA-2B (0.5-1)	PE-WSA-3B (0.5-1)	SS-P2-13B (0.5-1.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	7/26/2013	12/13/2013	12/13/2013	12/13/2013	7/17/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0029	<0.0042 J	<0.0043 J	<0.0046 J	<0.0027
Acetone	0.05	100	0.05	mg/kg	<0.0021	<0.0043 J	<0.0045 J	<0.0048 J	0.0253
Ethylbenzene	1	41	1	mg/kg	<0.00032	<0.00017 J	0.0004 J	<0.00018 J	<0.0003
Toluene	0.7	100	0.7	mg/kg	<0.00013	<0.00013 J	<0.00014 J	<0.00015 J	<0.00012
Total Xylenes	0.26	100	1.6	mg/kg	<0.00017	0.00019 J	0.0033 J	0.00042 J	<0.00016
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.0499	<0.01	0.0197 J	<0.011	0.0354 J
Benzo(a)pyrene	1	1	22	mg/kg	0.0513	<0.0096	0.0187 J	<0.01	0.0285 J
Benzo(b)fluoranthene	1	1	1.7	mg/kg	0.0675	<0.01	0.0219 J	<0.011	0.0436 J
Chrysene	1	3.9	1	mg/kg	0.058	<0.011	0.0169 J	<0.011	0.0421
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	0.0415	<0.011	0.0269 J	<0.012	0.0216 J
Metals									
Arsenic	13	16	16	mg/kg	5	***25***	5.1	***46.5***	4.6
Barium	350	400	820	mg/kg	333	10.1 B	45.7	9.2 B	70.7 J
Copper	50	270	1720	mg/kg	19.6	<12 UB	7.6	<0.086	22.4 J
Lead	63	400	450	mg/kg	**88.4 J**	3.1	**177**	3.2	**112**
Manganese	1600	2000	2000	mg/kg	586	550	795	667	682 J
Nickel	30	310	130	mg/kg	14.7	2B	2.7B	1.2B	21.7
Selenium	3.9	180	4	mg/kg	0.59 B	0.43B	0.5B	0.42B	<0.32
Zinc	109	10000	2480	mg/kg	78.7 J	29.8	49.5	20	55.1 J

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

Ramapo Paint Sludge Site - Operable Unit 1
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		SS-P2-19B (0.5-1.0)	SS-P2-2B(0.5-1.0)	SS-P2-8B (0.5-1.0)	SS-P2-1B (1.0-1.5)A	SS-WSA-10B (0.5-1.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	7/17/2013	7/15/2013	7/16/2013	7/24/2013	8/14/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0028	<0.0027	<0.0026	NA	***0.161***
Acetone	0.05	100	0.05	mg/kg	<0.0019	0.0315	<0.0018	NA	***0.419 DJ***
Ethylbenzene	1	41	1	mg/kg	<0.0003	<0.00029	<0.00028	NA	<0.00028
Toluene	0.7	100	0.7	mg/kg	<0.00012	<0.00012	<0.00011	NA	0.0032
Total Xylenes	0.26	100	1.6	mg/kg	<0.00016	<0.00016	<0.00015	NA	0.0012
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	<0.01	0.0377 J	0.0501	NA	0.523
Benzo(a)pyrene	1	1	22	mg/kg	<0.0098	0.0348 J	0.0462	NA	0.468
Benzo(b)fluoranthene	1	1	1.7	mg/kg	<0.011 J	0.0522	0.0612	NA	0.572
Chrysene	1	3.9	1	mg/kg	<0.011	0.0445	0.0621	NA	0.545
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	<0.011	0.0253 J	0.0363	NA	0.314
Metals									
Arsenic	13	16	16	mg/kg	4.1	4.5	5	NA	5.6
Barium	350	400	820	mg/kg	54.1 J	61.3	64.9 J	NA	146
Copper	50	270	1720	mg/kg	19.4 J	30.5	30.9 J	NA	**58.3 J**
Lead	63	400	450	mg/kg	29.6	**75.2**	**98.8**	**236**	**196**
Manganese	1600	2000	2000	mg/kg	779 J	531	476 J	NA	892 J
Nickel	30	310	130	mg/kg	19.9	16.8	16.9	NA	14.7
Selenium	3.9	180	4	mg/kg	<0.27	<0.3	<0.28	NA	<0.29
Zinc	109	10000	2480	mg/kg	54.3J	78.7	63.4J	NA	**171J**

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
NA	Not Analyzed
NS	No Standard
R	Rejected Result
UB	Result non-detected at the listed value due to associated blan

Ramapo Paint Sludge Site - Operable Unit 1
Rockland County, NY
FOCUSED FEASIBILITY STUDY

TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		SS-WSA-13B (0.5-1.0)	SS-WSA-15B (0.5-1.0)	SS-WSA-17B(0.5-1.0)	SS-WSA-18B(0.5-1.0)	SS-WSA-19B(0.5-1.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	8/15/2013	8/15/2013	8/16/2013	8/16/2013	8/16/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0025	<0.0026	<0.0027	<0.003	<0.0024
Acetone	0.05	100	0.05	mg/kg	<0.0018	<0.0018	<0.0019	<0.0021	<0.0017
Ethylbenzene	1	41	1	mg/kg	<0.00028	<0.00029	<0.0003	<0.00033	<0.00027
Toluene	0.7	100	0.7	mg/kg	<0.00011	<0.00011	<0.00012	<0.00013	0.00038 J
Total Xylenes	0.26	100	1.6	mg/kg	<0.00015	<0.00015	<0.00016	<0.00017	<0.00014
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.468	0.344	0.175	0.169	0.244
Benzo(a)pyrene	1	1	22	mg/kg	0.474	0.346	0.19	0.179	0.242
Benzo(b)fluoranthene	1	1	1.7	mg/kg	0.625	0.46	0.271	0.254	0.349
Chrysene	1	3.9	1	mg/kg	0.539	0.392	0.22	0.202	0.292
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	0.356	0.283	0.15	0.143	0.192
Metals									
Arsenic	13	16	16	mg/kg	8.1	6.3	8.6	10.7	6.7
Barium	350	400	820	mg/kg	131	205	98.8	70.4	242
Copper	50	270	1720	mg/kg	**50.9**	**55.5**	37.9	34.3	36.6
Lead	63	400	450	mg/kg	**225**	**175**	**230**	**104**	**144**
Manganese	1600	2000	2000	mg/kg	1400	686	1010	935	898
Nickel	30	310	130	mg/kg	16.3	14.6	14.7	17.6	16
Selenium	3.9	180	4	mg/kg	<0.32	<0.29	<0.27	<0.55	<0.3
Zinc	109	10000	2480	mg/kg	**124**	102	82.5	67.5	88.6

NOTES:

<	Not Detected
Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
B	Result is between the method detection limit and the reportin
J or JN	Estimated Result
mg/kg	Milligrams per kilogram
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		SS-WSA-20B(0.5-1.0)	SS-WSA-21B(1.0-1.5)	SS-WSA-21B(1.0-1.5)	SS-WSA-22B(1.0-1.5)	SS-WSA-23B(1.0-1.5)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**				DUP(082613)		
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	8/16/2013	8/26/2013	8/26/2013	8/26/2013	8/26/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0025	<0.0024	<0.0024	0.016 J	<0.0026
Acetone	0.05	100	0.05	mg/kg	<0.0018	0.0222	0.0236	***0.236 EJ***	<0.0018
Ethylbenzene	1	41	1	mg/kg	<0.00028	<0.00026	<0.00027	<0.00024	<0.00028
Toluene	0.7	100	0.7	mg/kg	<0.00011	<0.0001	<0.00011	0.00099	0.00043 J
Total Xylenes	0.26	100	1.6	mg/kg	<0.00015	<0.00014	<0.00014	<0.00013	<0.00015
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.175	0.0788	0.0793	0.22	0.231
Benzo(a)pyrene	1	1	22	mg/kg	0.168	0.101	0.085	0.258	0.269
Benzo(b)fluoranthene	1	1	1.7	mg/kg	0.237	0.157	0.104	0.339	0.365
Chrysene	1	3.9	1	mg/kg	0.199	0.105	0.0906	0.267	0.286
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	0.131	0.0762	0.046	0.177	0.183
Metals									
Arsenic	13	16	16	mg/kg	5.9	6.9	7.8	6.2	6.3
Barium	350	400	820	mg/kg	124	57.3	51.3	70.6	81.5
Copper	50	270	1720	mg/kg	**60.9**	33.3	**56.3**	42.5	**52.4**
Lead	63	400	450	mg/kg	**119**	**105**	**89.7**	**144**	**140**
Manganese	1600	2000	2000	mg/kg	694	747	646	729	680
Nickel	30	310	130	mg/kg	14.2	16.7	15.4	16.5	15.6
Selenium	3.9	180	4	mg/kg	<0.28	0.45B	0.81B	0.45B	0.59B
Zinc	109	10000	2480	mg/kg	98.3	62.6	58	98.4	**118**

NOTES:

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Shade	Result exceeds the 375-6.8(b) NYS Restricted Residential Use
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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		SS-WSA-24B(1.0-1.5)	SS-WSA-25B(1.0-1.5)	SS-WSA-2B (0.5-1.0)	SS-WSA-3B (0.5-1.0)	SS-YP-1B (1.5-2.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**						
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	8/27/2013	8/27/2013	8/14/2013	8/14/2013	8/28/2013
VOCs									
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0025	<0.0027 J	0.0055 J	<0.0026	<0.0026
Acetone	0.05	100	0.05	mg/kg	0.0075 J	0.0383 J	0.0377	<0.0018	<0.0018
Ethylbenzene	1	41	1	mg/kg	<0.00028	0.0036 J	<0.00028	<0.00028	<0.00028
Toluene	0.7	100	0.7	mg/kg	<0.00011	0.00097 J	0.00055 J	0.00049 J	<0.00011
Total Xylenes	0.26	100	1.6	mg/kg	<0.00015	0.0283 J	<0.00015	<0.00015	<0.00015
SVOCs									
Benzo(a)anthracene	1	1	1	mg/kg	0.104	0.349	0.477	0.213	0.0832
Benzo(a)pyrene	1	1	22	mg/kg	0.111	0.329	0.472	0.199	0.0701
Benzo(b)fluoranthene	1	1	1.7	mg/kg	0.145	0.39	0.654	0.276	0.0807
Chrysene	1	3.9	1	mg/kg	0.131	0.37	0.519	0.233	0.0903
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	0.0644	0.182	0.382	0.151	0.0351 J
Metals									
Arsenic	13	16	16	mg/kg	8.6	6.2	7.1	4.4	3.8
Barium	350	400	820	mg/kg	72	128	72.4	58.4	69.2
Copper	50	270	1720	mg/kg	**50.7**	46.5	**66.8 J**	**56.8 J**	**62.8**
Lead	63	400	450	mg/kg	**128**	**193**	**158**	**102**	**64.5**
Manganese	1600	2000	2000	mg/kg	793	545	668 J	371 J	552
Nickel	30	310	130	mg/kg	15.6	23.2	16.9	14.1	15.2
Selenium	3.9	180	4	mg/kg	<0.29	1.6B	<0.3	<0.28	1.2B
Zinc	109	10000	2480	mg/kg	**122**	**151**	**127J**	**125J**	58.2

NOTES:

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TABLE 1. Post-IRM Activities Analytical Data Table for Soil

Sample ID	**375-6.8(a)**	**375-6.8(b)**	**375-6.8(b)**		SS-YP-2B (1.5-2.0)	SS-YP-3B (3.5-4.0)
Duplicate Parent ID	**NYS**	**NYS**	**NYS**			
Sample Date	**Unrestricted**	**Restricted**	**POG**	**Units**	8/28/2013	8/29/2013
VOCs						
2-Butanone (MEK)	0.12	100	0.12	mg/kg	<0.0023	<0.0025 J
Acetone	0.05	100	0.05	mg/kg	<0.0016	<0.0018
Ethylbenzene	1	41	1	mg/kg	<0.00025	<0.00028
Toluene	0.7	100	0.7	mg/kg	<0.0001	<0.00011
Total Xylenes	0.26	100	1.6	mg/kg	<0.00013	<0.00015
SVOCs						
Benzo(a)anthracene	1	1	1	mg/kg	<0.01	<0.012
Benzo(a)pyrene	1	1	22	mg/kg	<0.0098	<0.011
Benzo(b)fluoranthene	1	1	1.7	mg/kg	<0.011	<0.012
Chrysene	1	3.9	1	mg/kg	<0.011	<0.012
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2	mg/kg	<0.011	<0.012
Metals						
Arsenic	13	16	16	mg/kg	3.1	5
Barium	350	400	820	mg/kg	23	118
Copper	50	270	1720	mg/kg	**74.1**	33.7
Lead	63	400	450	mg/kg	**131**	**89.7**
Manganese	1600	2000	2000	mg/kg	367	557
Nickel	30	310	130	mg/kg	13.6	14
Selenium	3.9	180	4	mg/kg	1B	<0.3
Zinc	109	10000	2480	mg/kg	86.9	107

NOTES:

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Bold	Result exceeds the 375-6.8(a) NYS Unrestricted Use (Unrestri
Italic	Result exceeds the 375-6.8(b) NYS Protection of Groundwate
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TABLE 2. POTENTIAL CHEMICAL-SPECIFIC ARARs AND TBC GUIDANCE

Media	Authority	Requirement	Requirement Synopsis
Soil/Sediments	Federal Criteria, Advisories, and Guidance	USEPA Regional Screening Levels (RSLs)	These values are concentrations corresponding to fixed levels of risk (i.e., a hazard quotient of 1 or a lifetime cancer risk of 10E-6, whichever occurs at a lower concentration) in water, air, fish tissue, and soil.
		USEPA Revised Interim Soil Lead Guidance for CERCLA sites and RCRA Corrective Action Facilities (OSWER Directive 9355.4-12)	The screening level for lead in soil for residential use is 400 mg/kg.
	State Criteria, Advisories, and Guidance	NYSDEC Technical Guidance for Screening Contaminated Sediments	These values include lowest and severe effect levels for sediments.
		NYSDEC Restricted Use Soil Cleanup Objectives (NYCRR Part 375-6.4)	These values include restricted and unrestricted use soil cleanup objectives.
Surface Water/ Groundwater	Federal Regulatory Requirement	Federal Ambient Water Quality Criteria (AWQC)	These values protect aquatic life and human health and associated with 95 carcinogens and noncarcinogens.
	State Criteria, Advisories, and Guidance	NYSDEC Surface Water and Groundwater Quality Standards (GWQS) (NYCRR Part 703)	The screening level is GWQS Class A for comparison to the Ramapo River.

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TABLE 3. POTENTIAL LOCATION- SPECIFIC ARARs and TBC GUIDANCE

Authority	Requirement	Requirement Synopsis
Federal Regulatory Requirement	**Flood plains**	
	Resource Conservation and Recovery Act (RCRA) – Location Standards (40 CFR 264.18)	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain. The facility must be designed, constructed, operated, and maintained to avoid washout by a 100-year flood, unless waste may be removed safely before floodwater can reach the facility or no adverse effects on human health and the environment would result if washout occurred.
	Executive Order 11988: Floodplain Management (40 CFR 6, Appendix A)	Federal agencies are required to reduce the risk of flood loss, to minimize the impact of floods, and to restore and preserve the natural and beneficial values of floodplains.
	Aquifer Recharge Protection	
	Water Pollution Control Act, Section 309 (c) (Fed. Reg. 2946-2948, Jan. 24,1984).	This regulation restricts activities, such as landfill, surface impoundment, waste pile, injection well, or land treatment, over the unconsolidated quaternary aquifer or recharge zone or streamflow source zone of such aquifer.
	Fish and Wildlife	
	Fish and Wildlife Coordination Act (16 USC 661 et seq., 40 CFR 6.302)	Actions that will impact fish and wildlife must include action to protect affected fish and wildlife resources. This law prohibits diversion, channeling, or other activity that modifies a stream or river and affects fish or wildlife.
	Migratory Bird Treaty Act (16 USC 703 *et seq*)	Actions taken or funded which result in the killing, hunting, taking, or capturing or any migratory birds, part, nest, or egg is unlawful.
	Endangered Species Act (Rare, Threatened, or Endangered Species)	
	Endangered Species Act (16 USC 1531 et seq., 50 CFR 402)	This law requires that action be taken to conserve endangered or threatened species. In addition, actions must not destroy or adversely modify critical habitat.

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TABLE 3. POTENTIAL LOCATION- SPECIFIC ARARs and TBC GUIDANCE

Authority	Requirement	Requirement Synopsis
State Regulatory Requirement	**Flood plains**	
	NYSDEC Floodplain Management Criteria For State Projects (NYCRR Part 502)	This regulation insures that the use of State lands and the siting, construction, administration and disposition of State-owned and State-financed facilities are conducted in ways that will minimize flood hazards and losses.
	Endangered Species Act (Rare, Threatened, or Endangered Species)	
	NYSDEC Endangered and Threatened Species of Fish and Wildlife (NYCRR Part 182)	This regulation stipulates that no person shall take or engage in any activity that is likely to result in a take of any species listed as endangered or threatened.

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TABLE 4. POTENTIAL ACTION-SPECIFIC ARARs AND TBC GUIDANCE

Authority	Requirement	Requirement Synopsis
Federal Regulatory Requirement	**Air Quality**	
	Clean Air Act (40 CFR 50, 60, and 61)	Engineering controls are required to reduce fugitive dust emissions while performing remedial activities, including continuous application of dust suppressants before, during, and after excavation.
	National Primary and Secondary Ambient Air Quality Standards (40 CFR 50)	Appropriate engineering controls are required to reduce emissions associated with excavation and transportation.
	Remedial Measures	
	Institutional Controls – 40 CFR 300.430(a)(a)(iii)(D)	EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short- and long-term management to prevent or limit exposure to hazardous substances, pollutant, or contaminants. Institutional controls may be used during implementation of the remedial action and, where necessary, as a component of the completed remedy
	Occupation Safety and Health Administration	
	Occupational Safety & Health Administration (29 CFR 1910)	These regulations specify the 8-hour time-weighted average concentration for various organic compounds and the training requirements for workers.
	Occupational Safety & Health Administration (29 CFR 1926)	These regulations specify the type of safety equipment and procedures to be followed during site remediation. Safety measures, such as personal protective equipment, are required to protect workers engaged in on-site work during implementation of remedial actions.
	Transportation and Disposal	
	RCRA – Identification and Listing of Hazardous Waste (40 CFR 261)	This regulation provides guidance for classifying wastes as hazardous under RCRA.
	U.S. Department of Transportation Rules for Transportation of Hazardous Materials (49 CFR 107, 171.1 – 172.558)	This regulation provides requirements for transportation of hazardous waste.

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TABLE 4. POTENTIAL ACTION-SPECIFIC ARARs AND TBC GUIDANCE

Authority	Requirement	Requirement Synopsis
State Regulatory Requirement **State Regulatory Requirement**	**Air Quality**	
	New York Air Quality Management Plan (6 NYCRR Part 200)	This plan addresses attainment and maintenance of national ambient air quality standards (NAAQS), incorporates potential climate change mitigation strategies, reduction of air toxics, increased visibility, reduced acid deposition and considers Environmental Justice (EJ) concerns.
	Remedial Measures	
	NYDEC, Presumptive/Proven Remedial Technologies, DEC-16, 6 NYCRR section 375-1.8	This document provides descriptions of generally accepted presumptive/proven remedial technologies for use in New York State.
	NYDEC, Institutional Controls- A Guide to Drafting and Recording Institutional Controls, DER-33	This Program Policy provides an overview of the drafting and recording of Institutional Controls (ICs) for remedial programs in DEC's Division of Environmental Remediation.
	Transportation and Disposal	
	New York Waste Transporter Permits, Management of Specific Hazardous Waste and Land Disposal Restrictions (Chapter IV, P. 364, P. 374 and P. 376)	Solid waste (IDW) for off-site transportation must obtain proper written approval from the State prior to transporting the waste. Once approved, the transporting vehicle has to be properly registered to handle the waste with appropriate placard. On- and off-site storage, treatment, and disposal requirements for solid waste, treatment residues, contaminated soils and contaminated groundwater are specified as administrative requirements for the remediation of contaminated sites.
	New York Hazardous Waste Management Regulation (6 NYCRR Parts 370 to 375 and 376)	This regulation provides for the prevention, abatement, and control of contamination by addressing the generation and disposal of hazardous substances, and it authorizes the regulation of storage, treatment, transportation, and disposal of hazardous materials, controlled hazardous substances, and low level nuclear waste.
	Erosion and Sediment Controls	
	New York Standards and Specifications for Erosion and Sediment Control Regulations	An erosion and sediment control plan must be approved by the Rockland County Soil Conservation District.
	Ramapo NY, Sediment and Erosion Control and Stormwater Management Provision (2-2008)	This regulation establishes design criteria for stormwater control from construction activities, such as maintained pre-development runoff characteristics and reduction of stream channel erosion, sedimentation, and pollution.

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TABLE 5. SUMMARY OF REMEDIAL ACTION ALTERNATIVES

Alternative		Description	Overall Protection of Human Health and the Environment	Compliance with SCGs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and Volume through Treatment	Short-Term Effectiveness	Implementability	Cost	Land Use
1	No Further Action (without Site Management)	No remediation to be employed at the site beyond actions already implemented during IRM activities.	Not protective of human health and the environment	Not compliant with chemical-specific ARARs; Compliant with location-specific ARARs; and, action-specific ARARs do not apply.	Not an effective or permanent alternative.	Does not reduce the toxicity, mobility, or volume of COCs through treatment.	Not an effective alternative.	No implementability concerns.	$0	Does not meet land use concerns.
2	No Further Action with Site Management and ICs	No remediation to be employed at the site beyond actions already implemented during IRM activities. Implementation of Site Management Plan and execution of ICs.	Protective of human health and the environment through land-use restrictions and physical barriers.	Chemical-specific ARARs at concentrations exceeding the NYSDEC Unrestricted Use SCOs will be left on-site; however will be controlled through physical barriers and land use restrictions. Location- and action-specific ARARs will be met.	Long-term effectiveness and permanence are provided by maintaining land-use restrictions and physical barriers.	Does not reduce the volume of the soil exceeding the Unrestricted Use SCOs, however, it reduces the toxicity and mobility through the restriction of land use and physical barriers.	Reduces potential exposure through use of physical barriers and land use restrictions; does not pose any additional exposure pathways to the community, workers, or environment in the short-term.	No further activities would be required to be implemented.	$464,772	Does not meet unrestricted use guidelines.
3	Full Removal and Disposal	Removal and off-site disposal of all remaining soil exceeding the NYSDEC Unrestricted Use SCOs. Fill materials would be placed back in the excavated areas to promote positive drainage, followed by the placement of topsoil for vegetation. Vegetation would be re-established or other stabilization implemented as appropriate.	Protective of human health and the environment through removal of all of the remaining soil exceeding the NYSDEC Unrestricted Use SCOs.	Chemical-, Location- and action-specific ARARs will be met.	Effective and permanent long term solution.	Reduces the volume of contaminants; however, volume is transferred off-site.	The potential for direct contact with the remaining soil exceeding the NYSDEC Unrestricted Use SCOs and dust generation during implementation poses additional potential risk to the community, workers, or environment in the short-term. Engineering controls may be required to mitigate the potential for additional short-term risks.	Challenges is the movement of large volumes of remaining soils exceeding the NYSDEC Unrestricted Use SCOs off-site and large equipment will be needed for long periods of time.	$30,829,200	Meets unrestricted use guidelines.

Acronyms:
ARAR: Applicable or Relevant and Appropriate Requirement
COC: Constituents of Concern
ICs: Institutional Controls
IRM: Interim Remedial Measure
NYSDEC: New York State Department of Environmental Conservation
SCOs: Soil Cleanup Objectives

Notes:
1. Costs provided herein are the projected present-worth of the alternative solely provided for the comparison of remedial alternatives. Costs for the recommended alternative will be refined prior to implementation.

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TABLE 6. COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

	1	2	3
Criteria	No Further Action (without Site Management)	No Further Action with Site Management and ICs	Full Removal and Disposal
Threshold Criteria			
Overall Protection of Human Health and the Environment	Poor	Good	Good
Compliance with SCGs	Poor	Good	Excellent
Balancing Criteria			
Long-Term Reliability and Effectiveness	Poor	Good	Excellent
Reduction of Toxicity, Mobility, or Volume through Treatment	Poor	Adequate	Good
Short-Term Effectiveness	Excellent	Excellent	Adequate
Implementability	Excellent	Excellent	Poor
Land Use	Adequate	Good	Excellent
Criteria Ranking	Poor	Excellent	Good
Associated Costs	$0	$464,772	$30,829,200
Cost Effectiveness	Adequate	Excellent	Poor
Overall Rating	Poor	Excellent	Poor

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TABLE 7. ENGINEERING ESTIMATE - NO FURTHER ACTION WITH SITE MANAGEMENT AND ICS

Task #	Task	UNIT RATE	QTY	UNITS	COST
1.0	**Operation and Maintenance (O&M) Cost***				
1.01	Final Engineering Report: Environmental Easement & Site Management Plan	$29,600	Lump Sum	1	$29,600
1.02	Annual Inspection and Management (Once Per Year)	$1,500	Each Year	30	$45,000
1.03	Site Cleanup and Weed Control (Once Per Year)	$5,000	Each Year	30	$150,000
1.04	Biennial Reporting ($2,500 every 2 Years)	$1,250	Each Year	30	$37,500
1.05	Repairs to Engineering Controls ($15,000 every 5 Years)	$3,000	Each Year	30	$90,000
		Task 1 - O&M Cost			**$352,100**
2.0	**Management and Project Support Cost**				
2.01	Project Management, Engineering and Technical Support (10% of O&M Costs)	10.00%	Lump Sum	1	$35,210.00
		Task 2 - Management Cost			**$35,210**

*All yearly cost are prepared on a present value interest rate of 2.0%.

Operation and Maintenance Cost	**$352,100**
Management Cost	**$35,210**
Subtotal Cost	**$387,310**
20% Contingency	***$77,462***
Total Cost	**$464,772**

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TABLE 8. ENGINEERING ESTIMATE - FULL REMOVAL AND DISPOSAL

Task #	Task	UNIT RATE	QTY	UNITS	COST
1.0	**Site Preparation***				
1.01	Mobilization and Demobilization	$85,000	Lump Sum	1	$85,000
1.02	Remedial Construction Management Fees & Facilities Rental	$115,000	Lump Sum	1	$115,000
1.03	Health and Safety	$80,000	Lump Sum	1	$80,000
1.04	Utility Investigation	$11,000	Lump Sum	1	$11,000
1.05	Construction Surveying	$40,000	Month	7	$280,000
1.06	Furnish Erosion and Sediment Controls	$15,000	Lump Sum	1	$15,000
1.07	Furnish Stabilized Construction Entrance(s)	$2,500	Lump Sum	1	$2,500
1.08	Furnish Material Staging Area(s) & Support Zone(s)	$25,000	Lump Sum	1	$25,000
1.09	Furnish Temporary Access Road(s)	$5,000	Lump Sum	1	$5,000
1.1	Furnish Decontamination Pad(s)	$2,500	Lump Sum	1	$2,500
1.11	Site Security (Chain Link Fence)	$50,000	Lump Sum	1	$50,000
1.12	CAMP - Perimeter Air Monitoring System	$32,500	Month	7	$227,500
1.13	Odor Control System- Mobilization/Demobilization	$7,500	Lump Sum	1	$7,500
1.14	Odor Control System - Equipment Rental	$5,000	Month	7	$35,000
1.15	Furnish Long Duration Foam or Equivalent (Assumes 4 Drums/Week)	$15,000	Month	7	$105,000
1.16	Clearing & Grubbing	$250,000	Lump Sum	1	$250,000
1.17	Groundwater Treatment System - Mobilization/Demobilization	$60,000	Lump Sum	1	$60,000
1.18	Groundwater Treatment System - Equipment Rental	$20,000	Month	7	$140,000
h	Groundwater Treatment System - Transportation & Disposal of Spent Media (GAC, bag filters, etc.)	$8,000	Lump Sum	1	$8,000
		Task 1 - Site Preparation Cost			**$1,504,000**
2.0	**Remedial Excavation**				
2.01	Excavation & Handling of Soil Exceeding the NYSDEC Unrestricted Use Soil Cleaup Objectives	$30	Cubic Yards	97,300	$2,919,000
2.02	Soil - Waste Disposal Characterization Analysis (Assumes 1 per 500 tons) - 3 day TAT	$1,200	Each	200	$240,000
2.03	Post-Excavation Confirmatory Samples (1/5000 square feet of base)- 3 day TAT	$1,000	Each	300	$300,000
		Task 2 - Remedial Excavation Cost			**$3,459,000**
3.0	**Transportation & Disposal***				
3.01	Transportation & Disposal Coordination	$12,250	Month	7	$85,750
3.02	Furnish On-Site Scale	$7,000	Year	7	$49,000
3.03	Transportation of Soil- Non Hazardous	$53	Tons	155,600	$8,246,800
3.04	Disposal of Soil- Non Hazardous	$31	Tons	155,600	$4,823,600
		Task 3 - T&D Cost			**$13,205,150**
4.0	**Site Restoration**				
4.01	Furnish Clean Fill w/ Compaction Testing	$31	Tons	116,600	$3,614,600
4.02	Furnish Topsoil - 10-15% Organic Content	$50	Cubic Yards	24,400	$1,220,000
4.03	Furnish Permanent Seed	$2,160	Acre	31	$66,960
#REF!	Wetland Planting	$11,260	Acre	31	$349,060
		Task 4 - Site Restoration Cost			**$5,250,620**
5.0	**Operation and Maintenance Cost***				
5.01	Post Construction Restoration Monitoring	$6,500	Years	5	$32,500
5.02	Herbicide Application (for Invasive Species)	$3,000	Years	5	$15,000
5.03	Maintenance and Final Regulatory Release	$8,500	Years	5	$42,500
		Task 5 - O&M Cost			**$90,000**
6.0	**Management and Project Support Cost**				
6.01	Project Management, Engineering and Technical Support (10% of Construction Cost, Excludes T&D)	10.00%	Lump Sum	1	$1,040,400
6.02	Construction Management and Support/Oversite (10% of Construction Cost, Excludes T&D Cost)	10.00%	Lump Sum	1	$1,040,400
6.03	Project Closeout and Data-Validation (Completion Report/Final Engineering Report)	$100,000	Lump Sum	1	$100,000
		Task 6 - Management Cost			**$2,180,800**

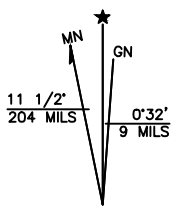
Construction Cost (Tasks 1, 2, and 4)	**$10,214,000**
T&D Cost (Task 3)	**$13,206,000**
Operations and Maintenance Cost (Task 5)	**$90,000**
Management Cost (Task 6)	**$2,181,000**
Subtotal Cost	**$25,691,000**
20% Contingency	***$5,138,200***
Total Cost	**$30,829,200**

FIGURES

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

SOURCE: USGS 7.5 MIN. SLOATSBURG QUADRANGLE, SLOATSBURG, NY–NJ. 1952, PARK RIDGE QUADRANGLE, PARK RIDGE, NJ–NY, 1955, RAMSEY QUADRANGLE, RAMSEY, NJ–NY, 1955, THIELS QUADRANGLE, THIELS, NJ–NY, 1955



UTM GRID AND 1955
MAGNETIC NORTH

SCALE IN FEET

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY:MAHWAH DIV/GROUP:ENVCAD DB:JG LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\ENVCAD\SYRACUSE\ACTIVE\NJ000602\0005\000003\OU-1\FFS\NJ602G01.dwg LAYOUT: 1 SAVED: 11/15/2016 2:59 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/18/2016 9:28 AM BY: STEINBERGER, GEORGE
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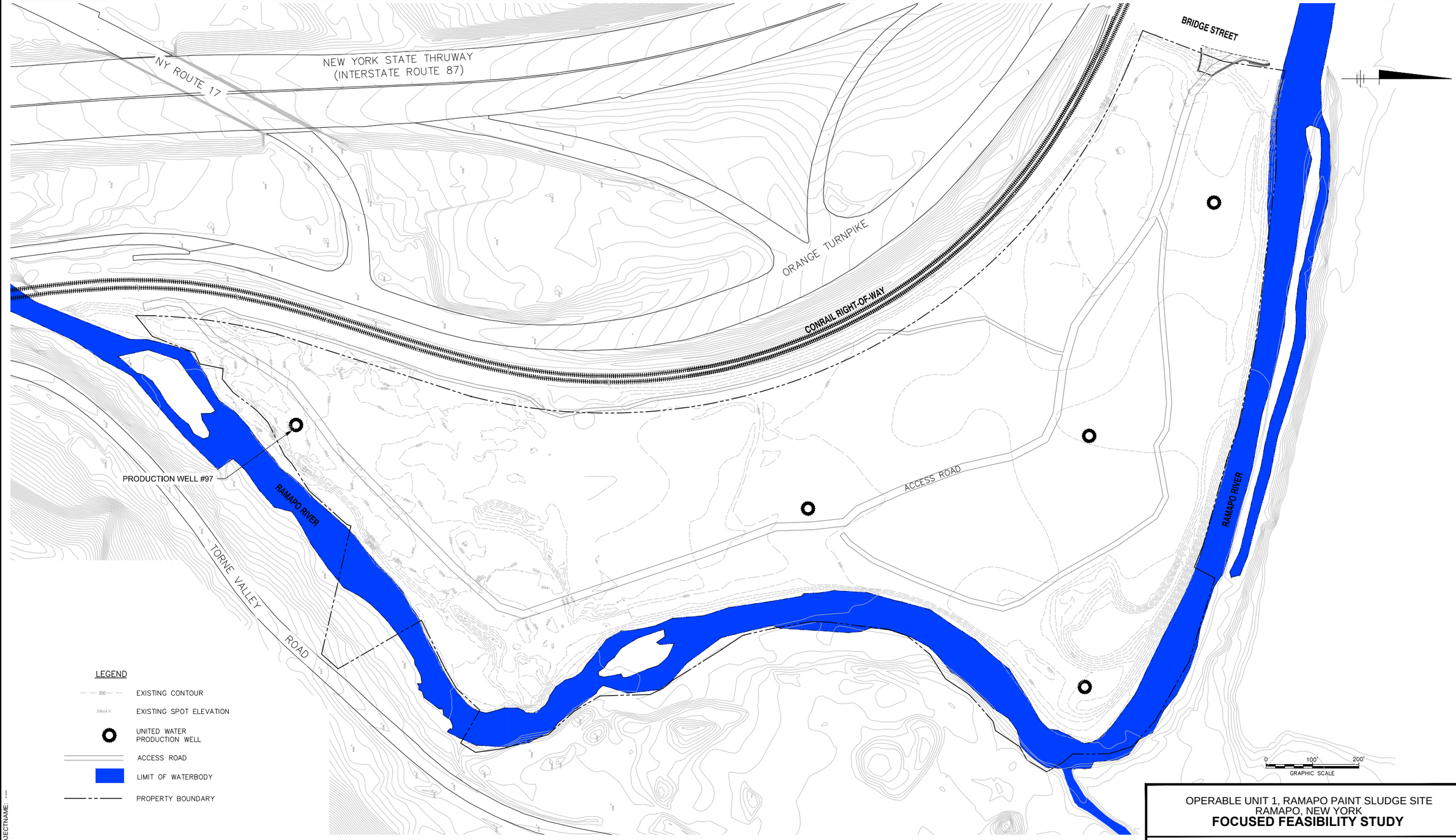

LEGEND

- EXISTING CONTOUR
- EXISTING SPOT ELEVATION
- UNITED WATER PRODUCTION WELL
- ACCESS ROAD
- LIMIT OF WATERBODY
- PROPERTY BOUNDARY

NOTE:

SITE AND RIVER BOUNDARY INFORMATION FOR OU-1 WAS PROVIDED BY BORBAS SURVEYING AND MAPPING, LLC SURVEYORS, FROM A CAD DRAWING NAMED "071005_2014-03-03_RESTORATION_SEND.dwg"

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

GENERAL SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY:FAIRLAWN-NJ DIV/GROUP:ENVCAD DB:G.STEINBERGER LD:J.GONZALEZ PIC:R.ELLIS PM:E.ZIMMERMAN TM:J.ROCKLIN LYR:ON=*;OFF=*REF*
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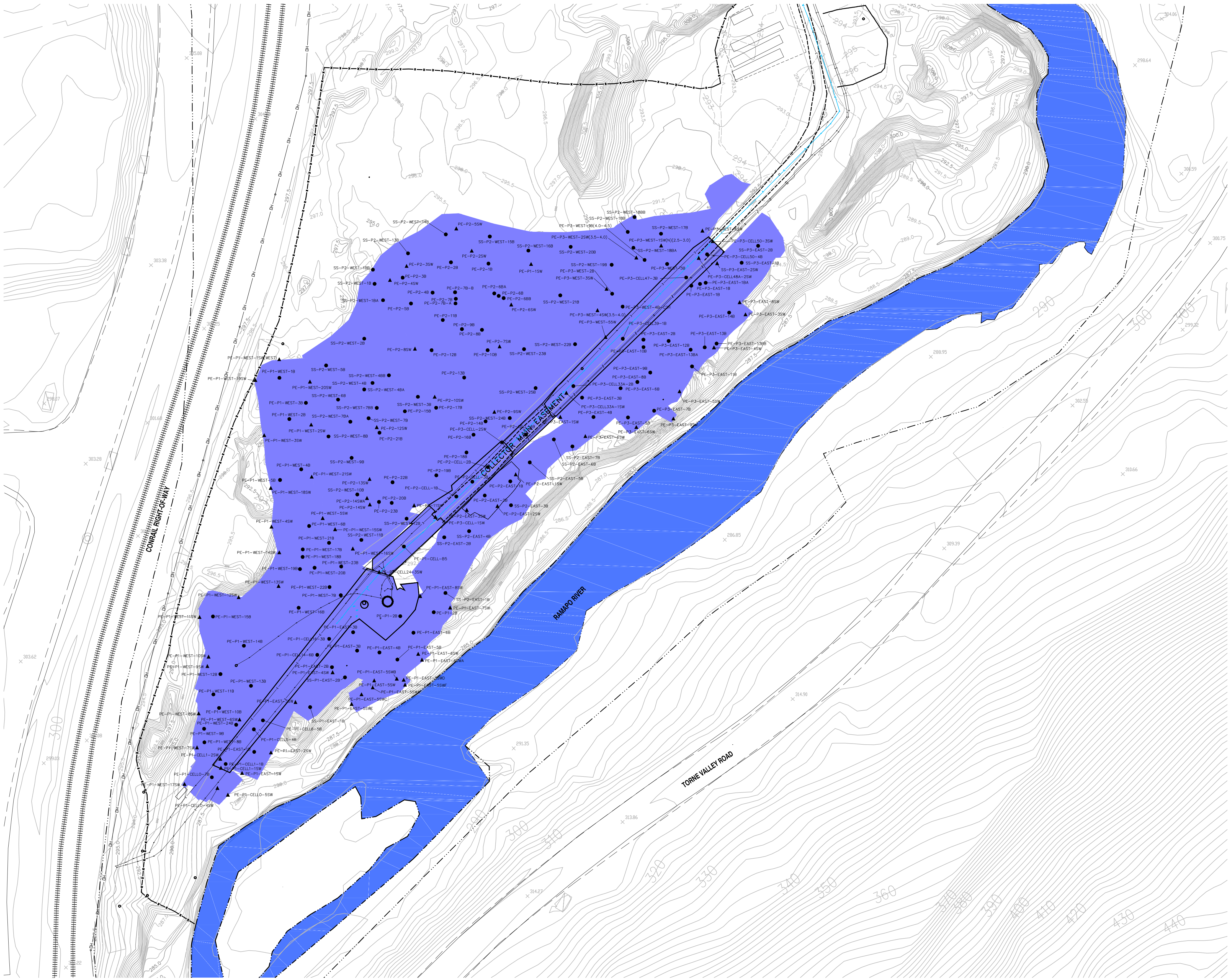
X-Restoration
NJ602X00



LEGEND

- ELEVATION CONTOUR
- UNITED WATER PRODUCTION WELL
- ACCESS ROAD
- LIMIT OF WATERBODY
- LIMIT OF INTERIM REMEDIAL MEASURE
- ● BOTTOM SAMPLE
- ▲ SURFACE SCRAPE SAMPLE

NOTE:

SITE AND RIVER BOUNDARY INFORMATION FOR OU-1 WAS PROVIDED BY BORBAS SURVEYING AND MAPPING, LLC SURVEYORS, FROM A CAD DRAWING NAMED "071005_2014-03-03_RESTORATION_SEND.dwg"

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

OU-1 FINAL LIMITS:
INTERIM REMEDIAL MEASURE

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY:FAIRLAWN-NJ DIV/GROUP:ENVCAD DB:G.STEINBERGER LD:J.GONZALEZ PIC:R.ELLIS PM:E.ZIMMERMAN TM:J.ROCKLIN LYR:ON=*;OFF=*REF*
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X-Excavation
NJ602X01
X-Restoration
X-Excavation Contours
NJ602X00

GATE

MASONRY BLOCK WALL

ACCESS ROAD

ACCESS ROAD

SS-YP-3B

SS-YP-4B

SS-YP-2B

SS-YP-1B

SS-WSA-24B

SS-WSA-23B

SS-WSA-4B

SS-WSA-22B

SS-WSA-5B

SS-WSA-8B

SS-WSA-21B

SS-WSA-3B

SS-WSA-25B

SS-WSA-15B

SS-WSA-2B

SS-WSA-10B

SS-WSA-1B

SS-WSA-7B

SS-WSA-14B

SS-WSA-20B

SS-WSA-6B

SS-WSA-19XB

SS-WSA-13B

SS-WSA-9B

SS-WSA-17B

SS-WSA-12B

SS-WSA-18B

SS-WSA-11B

SS-WSA-16B

LEGEND

- 306 — EXISTING CONTOUR LINE
- 100-YEAR FLOOD PLAN
- ACCESS ROAD
- RAILROAD TRACK
- LIMIT OF INTERIM REMEDIAL MEASURE
- BOTTOM SAMPLE

0 20' 40'
GRAPHIC SCALE

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

OU-1 FINAL LIMITS: INTERIM REMEDIAL MEASURE (MATERIAL STORAGE AREA)

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

CITY:FAIRLAWN-NJ DIVGROUP:ENVCAD DB:G.STEINBERGER LD:J.GONZALEZ PIC:R.ELLIS PM:E.ZIMMERMAN TM:J.ROCKLIN LYR:ON=*OFF=*REF*
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X-Excavation NJ602X01
X-Restoration NJ602X01
X-Excavation Contours NJ602X01
NJ602X00

NEW YORK STATE THRUWAY
(INTERSTATE ROUTE 87)

NY ROUTE 17

ORANGE TURNPIKE

CONRAIL RIGHT-OF-WAY

BRIDGE STREET

PS-1

PS-1

PS-2

COLLECTION MAIN / EASEMENT

PS-3

PS-3

PRODUCTION WELL #97

RAMAPO RIVER

RAMAPO RIVER

ACCESS ROAD

TORNE VALLEY ROAD

LEGEND

- ELEVATION CONTOUR
- UNITED WATER PRODUCTION WELL
- ACCESS ROAD
- LIMITS OF INTERIM REMEDIAL MEASURE
- LIMIT OF WATERBODY

NOTE:

SITE AND RIVER BOUNDARY INFORMATION FOR OU-1 WAS PROVIDED BY BORBAS SURVEYING AND MAPPING, LLC SURVEYORS, FROM A CAD DRAWING NAMED "071005_2014-03-03_RESTORATION_SEND.dwg"

0 100' 200'
GRAPHIC SCALE

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

ALTERNATIVE 2
NO FURTHER ACTION WITH SITE MANAGEMENT AND ICs

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5

CITY:FAIRLAWN-NJ DIV/GROUP:ENVCAD DB:G.STEINBERGER LD:J.GONZALEZ PIC:R.ELLIS PM:E.ZIMMERMAN TM:J.ROCKLIN LYR:ON=*;OFF=*REF*
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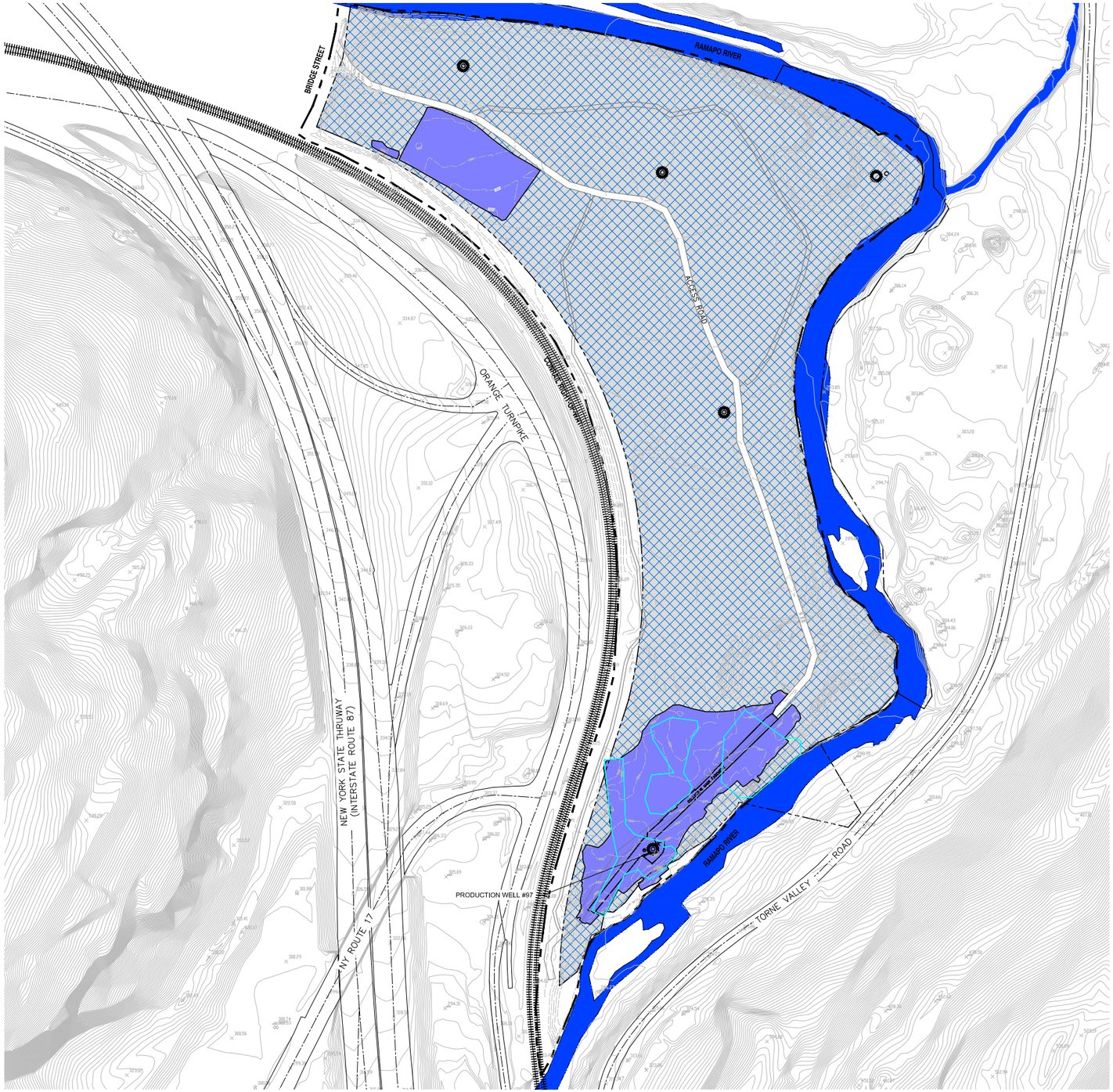
NJ602X01
X-Restoration
NJ602X00



LEGEND

- ELEVATION CONTOUR
- UNITED WATER PRODUCTION WELL
- ACCESS ROAD
- LIMIT OF WATERBODY
- FULL REMOVAL AREA
- LIMITS OF INTERIM REMEDIAL MEASURE

NOTES:

1. SITE AND RIVER BOUNDARY INFORMATION FOR OU–1 WAS PROVIDED BY BORBAS SURVEYING AND MAPPING, LLC SURVEYORS, FROM A CAD DRAWING NAMED "071005_2014–03–03_RESTORATION_SEND.dwg"
2. AREA OF FULL REMOVAL AREA – LIMITS OF IRM – ACCESS ROAD = 1,312,589 SQUARE FEET.

OPERABLE UNIT 1, RAMAPO PAINT SLUDGE SITE
RAMAPO, NEW YORK
FOCUSED FEASIBILITY STUDY

ALTERNATIVE 3
FULL REMOVAL AND DISPOSAL

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6

CITY:FAIRLAWN-NJ DIV/GROUP:ENVCAD DB:G.STEINBERGER LD:JGONZALEZ PIC:R.ELLIS PM:E.ZIMMERMAN TM:J.ROCKLIN LYR:ON=*;OFF=*REF*
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XREFS:
NJ602X01
X-Restoration
NJ602X00
IMAGES:
PROJECTNAME: ----

APPENDIX A

Proposed Remedial Action Plan Tables

Ramapo Paint Sludge Site - Operable Unit 1
Rockland County, NY
FOCUSED FEASIBILITY STUDY

APPENDIX A.Proposed Remedial Action Plan Tables
A.1. Soil Cover (0-2 feet below ground surface)

Detected Constituents	Concentration Range Detected (mg/kg)	Unrestricted Use SCO (mg/kg)	Frequency Exceeding Unrestricted Use SCO	Protection of Groundwater SCO (mg/kg)	Frequency Exceeding Protection of Groundwater SCO	Restricted Use SCO (mg/kg)	Frequency Exceeding Restricted SCO
VOCs							
2-Butanone (MEK)	ND-0.161	0.12	1 of 78	0.12	1 of 78	100	0 of 78
Acetone	ND-0.419	0.05	2 of 78	0.05	2 of 78	100	0 of 78
SVOCs							
Benzo(a)anthracene	ND-1.33	1	1 of 92	1	1 of 92	1	1 of 92
Benzo(a)pyrene	ND-1.24	1	1 of 92	22	0 of 92	1	1 of 92
Benzo(b)fluoranthene	ND-1.77	1	2 of 94	1.7	1 of 94	1	2 of 94
Chrysene	ND-1.36	1	1 of 92	1	1 of 92	3.9	0 of 92
Indeno(1,2,3-cd)pyrene	ND-0.70	0.5	2 of 94	8.2	0 of 94	0.5	2 of 94
Metals							
Arsenic	3.1-46.5	13	2 of 79	16	2 of 79	16	2 of 79
Copper	ND-74.1	50	11 of 79	1720	0 of 79	270	0 of 79
Lead	3.1-250	63	23 of 85	450	0 of 85	400	0 of 85
Zinc	1.9-123	109	7 of 79	2480	0 of 79	10,000	0 of 79

Ramapo Paint Sludge Site - Operable Unit 1
Rockland County, NY
FOCUSED FEASIBILITY STUDY

Appendix A. Proposed Remedial Action Plan Tables
A.2. Soil (Maximum depth of 9.5 feet below ground surface)

Detected Constituents	Concentration Range Detected (mg/kg)	Unrestricted Use SCO (mg/kg)	Frequency Exceeding Unrestricted Use SCO	Protection of Groundwater SCO (mg/kg)	Frequency Exceeding Protection of Groundwater SCO	Restricted Use SCO (mg/kg)	Frequency Exceeding Restricted SCO
VOCs							
2-Butanone (MEK)	ND-0.161	0.12	1 of 228	0.12	1 of 228	100	0 of 228
Acetone	ND-0.419	0.05	4 of 228	0.05	4 of 228	100	0 of 228
Ethylbenzene	ND-1.27	1	1 of 225	1	1 of 225	41	0 of 225
Toluene	ND-0.945	0.7	1 of 225	0.7	1 of 225	100	0 of 225
Xylene (total)	ND-9.58	0.26	3 of 227	1.6	1 of 227	100	0 of 227
SVOCs							
Benzo(a)anthracene	ND-1.33	1	1 of 237	1	1 of 237	1	1 of 237
Benzo(a)pyrene	ND-1.24	1	1 of 237	22	0 of 237	1	1 of 237
Benzo(b)fluoranthene	ND-1.77	1	2 of 239	1.7	1 of 239	1	2 of 239
Chrysene	ND-1.36	1	1 of 237	1	1 of 237	3.9	0 of 237
Indeno(1,2,3-cd)pyrene	ND-0.70	0.5	2 of 239	8.2	0 of 239	0.5	2 of 239
Metals							
Arsenic	2.2-46.5	13	3 of 227	16	2 of 227	16	2 of 227
Barium	ND-652	350	1 of 226	820	0 of 226	400	1 of 226
Copper	ND-74.1	50	13 of 222	1720	0 of 222	270	0 of 222
Lead	3.1-829	63	32 of 233	450	1 of 233	400	1 of 233
Manganese	91.5-3,100	1,600	3 of 225	2,000	2 of 225	2,000	2 of 225
Nickel	ND-43.4	30	3 of 225	130	0 of 225	310	0 of 225
Selenium	ND-4.5	3.9	1 of 225	4	1 of 225	180	0 of 225
Zinc	1.9-542	109	10 of 225	2480	0 of 225	10,000	0 of 225

APPENDIX B

Operable Unit 1 Restrictive Covenant

Paul Piperato, County Clerk
1 South Main St., Ste. 100
New City, NY 10956
(845) 638-5070

Rockland County Clerk Recording Cover Sheet

Received From :
MICHAEL L KLEIN ESQ
237 ROUTE 59
SUFFERN, NY 10901

Return To :
MICHAEL L KLEIN ESQ
237 ROUTE 59
SUFFERN, NY 10901

Method Returned : MAIL

First GRANTOR
RAMAPO TOWN OF

First GRANTEE
-RESTRICTIVE COVENANT

Index Type : Land Records
Instr Number : 2014-00010781 **Orig Instr #:** 2014-00007775
Book : **Page :**

Type of Instrument : Corrected Restrictive Covenant
Type of Transaction : Declaration
Recording Fee: $140.00

Recording Pages : 20

Recorded Information

State of New York

County of Rockland

I hereby certify that the within and foregoing was recorded in the Clerk's office for Rockland County, New York

On (Recorded Date) : 04/24/2014

At (Recorded Time) : 2:19:00 PM

Paul Piperato, County Clerk

Doc ID - 032625830020

State of New York (County of Rockland): SS:
I, PAUL PIPERATO, County Clerk and Clerk of the Supreme and County Courts, Rockland County, DO HEREBY CERTIFY that I have compared this copy with the original thereof filed or recorded in my office on 4/24/14 and the same is a correct transcript thereof, IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal.

6/9/14

Paul Piperato County Clerk & Clerk of the Supreme County Courts Rockland County

This sheet constitutes the Clerks endorsement required by Section 319 of Real Property Law of the State of New York

Entered By: NYROCKLANDUSER23 Printed On : 04/24/2014 At: 2:23:13PM

File Number: 2014-00010781 Seq: 1

RESTRICTIVE COVENANT
(CORRECTED)

THIS RESTRICTIVE COVENANT is made the 24 day of April, 2014 by the Town of Ramapo, a New York municipal corporation with offices at 237 Route 59, Suffern, New York 10901.

WHEREAS, the New York State Department of Environmental Conservation ("NYSDEC") and Ford Motor Company ("Ford") have entered into an Order on Consent and Administrative Settlement, Index #A3-0536-1205 in which Ford is required to investigate and remediate Site#344064, which includes Operable Units "OU-1", "OU-2" and "OU-3" located in the Town of Ramapo, and

WHEREAS, the Town of Ramapo is owner in fee of a parcel of land located in the Town of Ramapo, County of Rockland, State of New York identified on the Tax Map of the Town of Ramapo as Section 47.07 Block 1 Lot 4 being a portion of the property acquired by deed dated December 18, 2003 from Ramapo Land Co., Inc. to the Town of Ramapo recorded in the Rockland County Clerk's Office as Instrument #2003-98570,and being more particularly described in Appendix "A", attached to this declaration and made a part hereof, hereinafter referred to as "OU-1"; and

WHEREAS, the Town of Ramapo is owner in fee of a parcel of land located in the Town of Ramapo, County of Rockland, State of New York identified on the Tax Map of the Town of Ramapo as Section 39.19 Block 1 Lot 7.2 acquired by deed dated January 11, 2008 from Ramapo Land Co., Inc. to the Town of Ramapo recorded in the Rockland County Clerk's Office as Instrument #2008-3980and being more particularly described in Appendix "B", attached to this declaration and made a part hereof, this parcel, along with the portion of the parcel described below, may be hereinafter referred to cumulatively as "OU-2";and

WHEREAS, the Town of Ramapo is owner in fee of a parcel of land located in the Town of Ramapo, County of Rockland, State of New York identified on the Tax Map of the Town of Ramapo as Section 47.11 Block 1 Lot 2 acquired by deed dated September 29, 2010, from Stone Industries, Inc. to the Town of Ramapo recorded in the Rockland County Clerk's Office as Instrument #2010-33982, a portion of which, being more particularly described in Appendix "C", attached to this declaration and made a part hereof, said portion along with the parcel described above may be hereinafter referred to cumulatively as "OU-2"; and

WHEREAS, the parcels described in Appendix "A", Appendix "B" and Appendix "C" re hereinafter referred to as "the Property"; and

WHEREAS, the Town of Ramapo and Ford have entered into a Cooperation, Access and Settlement Agreement dated October 5, 2012 (the "Agreement") which grants Ford access to OU-1 and OU-2for doing work approved or to be approved by the NYSDEC to remediate the sites pursuant to the Order on Consent; and

WHEREAS, subparagraph 3.1(c) of the Agreement requires the Town of Ramapo to "Adopt appropriate use restrictions of the Town Site [OU-1 and OU-2], by dedication as public parkland of by use restriction or modify local zoning requirements for the Town Site[OU-1 and OU-2] to be subject to Restricted Residential Standards under applicable Environmental Laws, in a manner acceptable to NYSDEC."; and

WHEREAS, OU-1 and OU-2 are properties having zoning designations under the Town of Ramapo Zoning Law as "R-40" on which, in addition to other uses, it is permitted as of right to construct single family detached residences on lots having a minimum of 40,000 square feet, and

WHEREAS, the Town of Ramapo wants to impose certain use restrictions on OU-1 and OU-2 limiting in perpetuity the use of the properties to "restricted residential use" as defined in NYSDEC regulations, 6 NYCRR 375-1.8(g)(2)(ii), despite the otherwise permitted uses of these properties under the R-40 zoning designation,

NOW THEREFORE, the Town of Ramapo imposes a restrictive covenant prohibiting the use of the Property for vegetable gardens (although community vegetable gardens may be permitted with NYSDEC approval) and single family housing, and such other uses as may be prohibited under the category of "restricted residential use" pursuant to 6 NYCRR 375-1.8(g)(2)(ii) as may from time to time be amended, or its successor regulation or law.

This restrictive covenant shall run with the land and bind the Town of Ramapo and all future owners of the Property.

This restrictive covenant corrects and supersedes the restrictive covenant dated March 21, 2014 filed in the Rockland County Clerk's Office on March 24, 2014 as Instrument No. 2014-7775 ~~12928~~. This Corrected Restrictive Covenant replaces Appendix "C" with a metes and bounds ~~75~~ description and a survey both dated March 31, 2014 prepared by J. Peter Borbas.

IN WITNESS WHEREOF, the undersigned has executed this instrument.

Christopher P. St. Lawrence
Supervisor

State of New York)
)ss.:
County of Rockland)

On the 24st day of April in the year 2014, before me, the undersigned, personally appeared Christopher P. St. Lawrence, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public

MICHAEL LESLIE KLEIN
Notary Public, State of New York
No. 4897742
Qualified in Rockland County
Commission Expires May 31, 2015

Record and Return to:
Michael L. Klein, Esq.,
Town Attorney, Town of Ramapo
237 Route 59
Suffern, NY 10901

APPENDIX "A"

(OU-1)

BORBAS SURVEYING & MAPPING

Environmental Site Mapping ◦ Hazardous Materials and Waste Surveys
Aerial Control and GPS Surveys ◦ Topographic and Existing Condition Surveys
Remote Sensing and GIS ◦ Hydrographic/Bathymetric Surveys ◦ ALTA/ACSM Certified Surveys
Transportation and Right of Way Surveys ◦ Deformation and Structure Monitoring Surveys

Serving New Jersey, New York, Pennsylvania and Delaware

Description of the Ramapo Paint Sludge Site – OU-1
Lot 4 Block 1 Sheet 47.07 in the Township of Ramapo
And Lot 1.3X Block 1 Sheet 47.11 in the Village of Hillburn,
Rockland County, New York.

BEGINNING at a point in the assumed easterly line of Bridge Street (50' wide private road) where the same is intersected by the extension of the northerly line of lands now or formerly of CSX Railroad (formerly Erie Railroad), said point being the beginning point of instrument ID 2003-00078068 recorded in the Rockland County Clerk's Office on October 23, 2003; and from said beginning point runs thence

1. Along the assumed easterly line of Bridge Street, North 21° 01' 17" East 185.73 feet to an angle point in same; thence
2. Continuing along the same to a point on the approximate high water mark on the southerly side of the Ramapo River, North 08° 31' 16" East 135.70 feet; thence through lands now or formerly of Ramapo Land Co., Inc. and along the approximate high water mark on the southerly side of the Ramapo River, the following 8 courses and distances:
3. South 75° 07' 03" East 53.32 feet to a point; thence
4. South 85° 38' 31" East 77.36 feet to a point; thence
5. South 89° 40' 39" East 92.75 feet to a point; thence
6. South 83° 03' 30" East 380.01 feet to a point; thence
7. South 78° 11' 29" East 172.26 feet to a point; thence
8. South 71° 07' 18" East 77.48 feet to a point; thence
9. South 74° 26' 48" East 191.03 feet to a point; thence
10. South 68° 17' 37" East 49.89 feet to a point; thence
11. Leaving the approximate high water mark on the southerly side of the Ramapo River, North 28° 04' 55" East 50.16 feet crossing the Ramapo River to a point on or near the northerly side of the Ramapo River, thence the following 30 courses and distances on or near the northerly and easterly side of the Ramapo River:
12. South 72° 45' 20" East 188.72 feet to a point; thence
13. South 60° 17' 20" East 146.62 feet to a point; thence

14. South 48° 23' 15" East 74.49 feet to a point; thence
15. South 17° 07' 15" East 52.73 feet to a point; thence
16. South 00° 36' 50" East 78.90 feet to a point; thence
17. South 41° 18' 50" East 25.58 feet to a point; thence
18. South 30° 50' 07" East 41.98 feet to a point; thence
19. South 31° 00' 20" West 49.73 feet to a point; thence
20. South 60° 49' 20" West 33.17 feet to a point; thence
21. South 33° 47' 20" West 62.42 feet to a point; thence
22. South 74° 37' 20" West 20.54 feet to a point; thence
23. South 48° 32' 20" West 77.16 feet to a point; thence
24. South 33° 18' 20" West 61.69 feet to a point; thence
25. South 57° 49' 20" West 62.42 feet to a point; thence
26. South 38° 57' 20" West 63.95 feet to a point; thence
27. South 19° 15' 20" West 42.53 feet to a point; thence
28. South 06° 47' 20" West 128.29 feet to a point; thence
29. South 01° 49' 20" West 40.67 feet to a point; thence
30. South 10° 19' 40" East 80.34 feet to a point; thence
31. South 12° 49' 40" East 68.88 feet to a point; thence
32. South 34° 01' 40" East 54.81 feet to a point; thence
33. South 32° 14' 40" East 124.85 feet to a point; thence
34. South 39° 50' 40" East 26.39 feet to a point; thence
35. South 25° 20' 40" East 31.48 feet to a point; thence
36. South 01° 35' 40" East 107.76 feet to a point; thence
37. South 30° 39' 40" East 64.68 feet to a point; thence
38. South 41° 47' 40" East 75.30 feet to a point; thence
39. South 17° 34' 40" East 100.57 feet to a point; thence
40. South 07° 41' 40" East 61.63 feet to a point; thence

41. South 32° 06' 20" West 37.86 feet to a point; thence

42. By a line across the Ramapo River, North 59° 43' 10" West 81.89 feet, to a point near the northwesterly side of the Ramapo River, said point witnessed with a capped iron found 0.33 feet West and 0.32 feet South and witnessed with a disk found 0.1 feet East and 1.1 feet South of the terminus of this course; thence the following 3 courses near the northwesterly side of the Ramapo River.

43. South 43° 13' 50" West 68.58 feet to a point, said point witnessed with a capped iron found 1.1 feet South of the terminus of this course; thence

44. South 59° 24' 20" West 46.83 feet to a , said point witnessed with a capped iron found 0.9 feet South of the terminus of this course; thence

45. South 64° 03' 20" West 118.95 feet to a point, said point witnessed with a disk found 0.2 feet West and 0.7 feet South of the terminus of this course; thence

46. Crossing the Ramapo River, South 30° 16' 06" East 208.15 feet to a point on the northwesterly Right of Way line of Torne Valley Road, said point witnessed with a capped iron found 0.1 feet East and 0.1 feet South and witnessed with a disk found 0.5 feet West and 0.9 feet South of the terminus of this course; thence

47. Along the northwesterly Right of Way of Torne Valley Road, South 41° 50' 55" West 47.86 feet to a point on the dividing line between the Town of Ramapo and the Village of Hillburn; thence

48. Along the dividing line between the Town of Ramapo and the Village of Hillburn, North 77° 09' 09" West 283.82 feet crossing the Ramapo River to a point, said point witnessed with an iron pipe found 0.07 feet North and 0.21 feet West of the terminus of this course; thence the following 13 courses northwesterly of the Ramapo River through Lot 1.3X, Block 1, Sheet 47.11 in the Village of Hillburn:

49. South 18° 44' 27" West 9.72 feet to a point; thence

50. South 41° 53' 35" West 109.26 feet to a point; thence

51. South 57° 45' 44" West 69.12 feet to a point; thence

52. South 46° 43' 57" West 23.32 feet to a point; thence

53. South 63° 44' 12" West 79.97 feet to a point; thence

54. South 46° 33' 15" West 35.47 feet to a point; thence

55. South 37° 23' 32" West 63.69 feet to a point; thence

56. South 50° 31' 46" West 37.56 feet to a point; thence

57. North 84° 30' 13" West 22.25 feet to a point; thence

58. South 11° 39' 14" West 51.50 feet to a point; thence

59. South 65° 53' 35" West 26.17 feet to a point; thence

60. South 21° 12' 33" West 98.18 feet to a point; thence

61. South 51° 20' 10" West 57.59 feet continuing through and along the same to a point in the easterly right of way of the CSX Railroad (formerly Erie Railroad); thence

62. Northeasterly along a curve to the right, not tangent to the previous course, having a radius of 1,136.36 feet a central angle of 15° 32' 24", a chord of North 07° 30' 11" East 307.27 feet for an arc length of 308.21 feet to a point; thence,

63. Still along the easterly side of said Railroad, not tangent to the previous course, North 17° 49' 10" East 440.00 feet to a point in same; thence

64. Northwesterly along a curve to the left, not tangent to the previous course, having a radius of 1,217.26 feet a central angle of 81° 22' 03", a chord of North 26° 44' 20" West 1,587.02 feet for an arc length of 1,728.67 feet to a point; thence

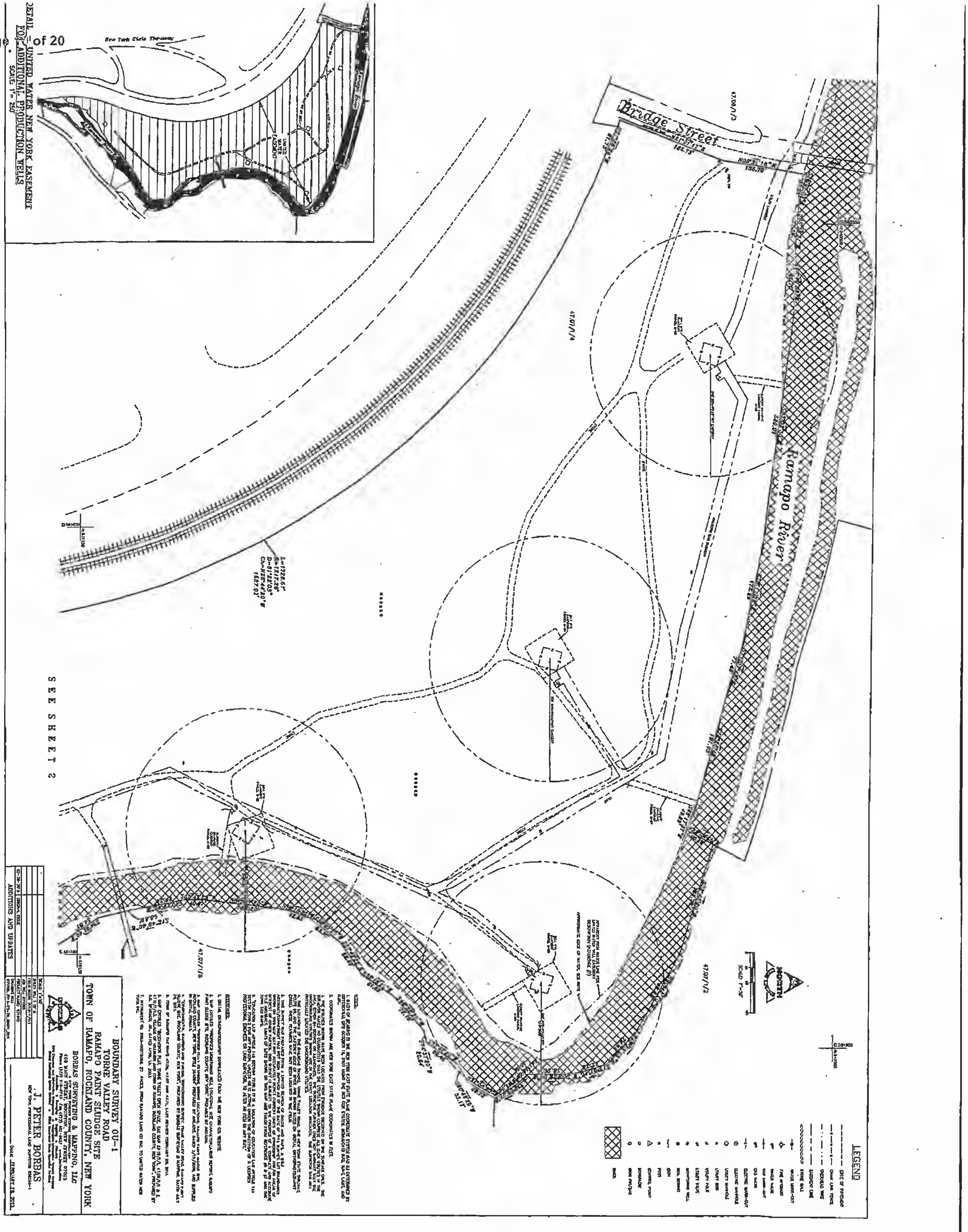
65. Still along the easterly side of said Railroad, North 67° 25' 24" West 81.73 feet to the point or place of BEGINNING.

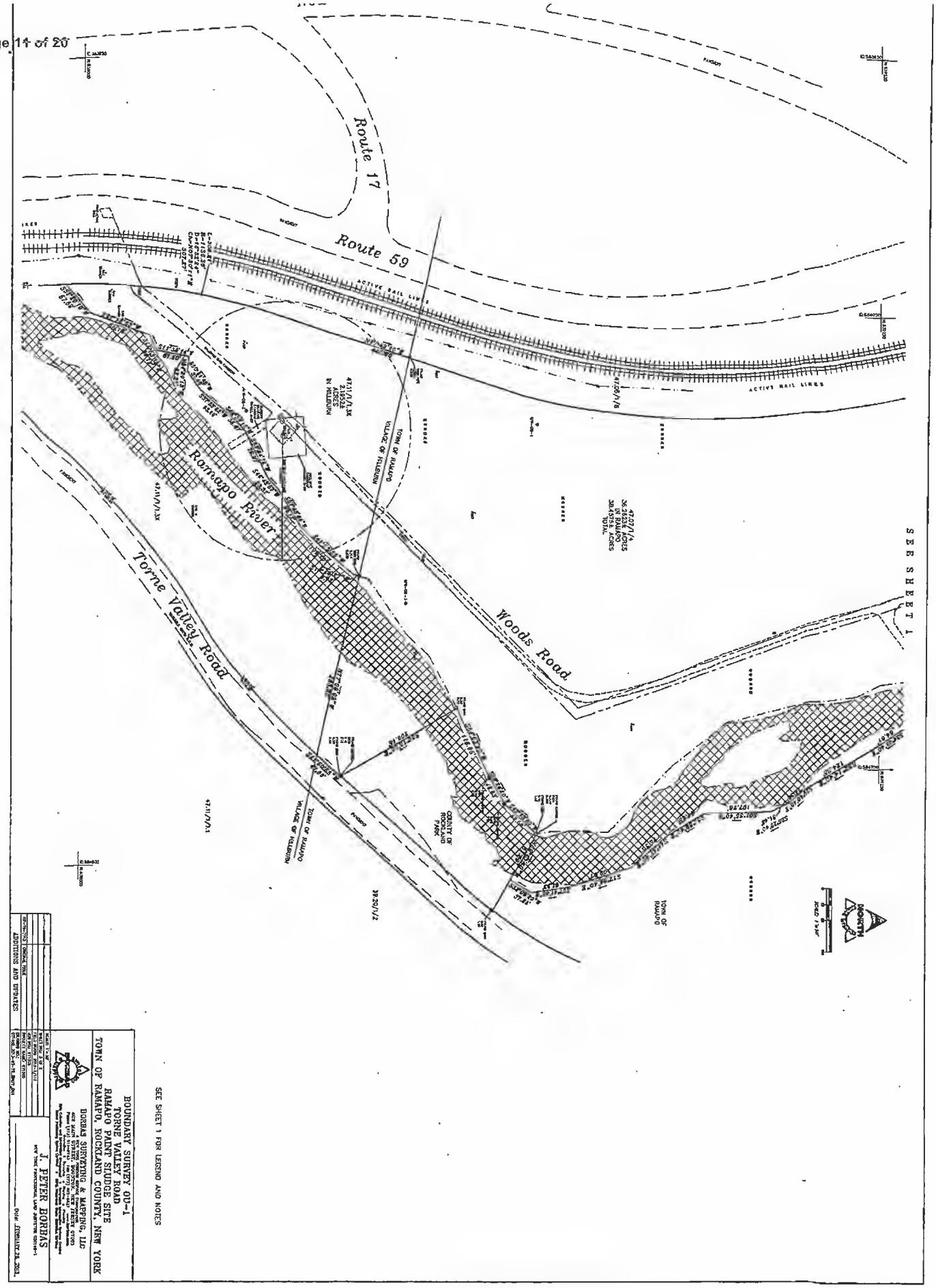
Containing 38.4575 acres of land, more or less.

This description is in accordance with a map entitled "Boundary Survey OU-1, Torne Valley Road, Ramapo Paint Sludge Site, Town of Ramapo, Rockland County, New York", prepared by Borbas Surveying and Mapping, LLC, J. Peter Borbas, dated February 28, 2013.

J. Peter Borbas
New York Professional Land Surveyor 050566-1
March 21, 2014

P:\LP\2007\10\071005\Documents\OU-1 Description\071005_2014-03-20_Metes and Bounds


DETAIL - UNITED WATER NEW YORK EASEMENT
FOR ADDITIONAL PRODUCTION WELLS
SCALE: 1" = 250'
New York State Thruway
Bridge Street
Ramapo River
SEE SHEET 2
LEGEND
ADDITIONS AND UPDATES
BOUNDARY SURVEY OU-1
TORNE VALLEY ROAD
RAMAPO PAINT SLUDGE SITE
TOWN OF RAMAPO, ROCKLAND COUNTY, NEW YORK
BORBAS SURVEYING & MAPPING, LLC
J. PETER BORBAS


Route 17
Route 59
ACTIVE RAIL LINES
Ramapo River
Torne Valley Road
Woods Road
SEE SHEET 1
SEE SHEET 1 FOR LEGEND AND NOTES
BOUNDARY SURVEY OU-1
TORNE VALLEY ROAD
RAMAPO PAINT SLUDGE SITE
TOWN OF RAMAPO, ROCKLAND COUNTY, NEW YORK
BORBAS SURVEYING & MAPPING, LLC
J. PETER BORBAS
ADDITIONS AND DELETIONS

APPENDIX "B"

(OU-2 NORTH)

BORBAS SURVEYING & MAPPING

Environmental Site Mapping ◦ Hazardous Materials and Waste Surveys
Aerial Control and GPS Surveys ◦ Topographic and Existing Condition Surveys
Remote Sensing and GIS ◦ Hydrographic/Bathymetric Surveys ◦ ALTA/ACSM Certified Surveys
Transportation and Right of Way Surveys ◦ Deformation and Structure Monitoring Surveys

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Description of the Ramapo Paint Sludge Site – OU-2 North
Lot 7.2 Block 1 in the Township of Ramapo
Rockland County, New York.

BEGINNING at a point in the westerly line of Torne Valley Road (variable width Right of Way) where it is intersected by the dividing line between Tax lots 7.2 and 2, Block 1, said point being the beginning point of deed instrument ID 2008-00003980 recorded in the Rockland County Clerk's Office on January 25, 2008 having New York East State Plane Coordinate value North 841712.56 and East 585492.35, and runs thence:

1. Along the dividing line between Tax lots 7.2 and 2, Block 1, North 64° 10' 02" West 317.75 feet to a point along the west side of the Torne Brook; thence the following 34 courses and distances along the said dividing line along the west side of the Torne Brook:
2. North 17° 25' 14" East 68.70 feet to a point; thence
3. North 17° 35' 10" East 57.56 feet to a point; thence
4. North 15° 31' 13" East 37.77 feet to a point; thence
5. North 14° 26' 36" East 69.65 feet to a point; thence
6. North 06° 08' 20" East 88.69 feet to a point; thence
7. North 18° 40' 04" East 28.77 feet to a point; thence
8. North 32° 42' 01" East 43.52 feet to a point; thence
9. North 35° 13' 31" East 21.34 feet to a point; thence
10. North 29° 42' 38" East 43.40 feet to a point; thence
11. North 65° 39' 44" East 33.19 feet to a point; thence
12. North 48° 16' 00" East 30.89 feet to a point; thence
13. South 73° 19' 46" East 42.51 feet to a point; thence
14. North 52° 46' 59" East 99.32 feet to a point; thence
15. North 47° 54' 09" East 42.25 feet to a point; thence
16. North 37° 07' 31" East 57.74 feet to a point; thence

17. North 36° 29' 10" East 44.84 feet to a point; thence

18. North 26° 56' 12" East 31.34 feet to a point; thence

19. North 08° 19' 06" East 32.55 feet to a point; thence

20. North 26° 09' 00" West 44.02 feet to a point; thence

21. North 03° 49' 18" West 23.21 feet to a point; thence

22. North 29° 04' 28" East 22.00 feet to a point; thence

23. North 39° 56' 02" East 21.64 feet to a point; thence

24. North 60° 44' 39" East 77.56 feet to a point; thence

25. North 31° 24' 06" East 49.65 feet to a point; thence

26. North 54° 20' 43" East 64.08 feet to a point; thence

27. North 31° 37' 47" East 12.56 feet to a point; thence

28. North 09° 31' 03" East 82.00 feet to a point; thence

29. North 02° 47' 14" West 42.80 feet to a point; thence

30. North 08° 46' 48" East 38.75 feet to a point; thence

31. North 37° 49' 41" East 82.78 feet to a point; thence

32. North 30° 24' 52" East 56.12 feet to a point; thence

33. North 42° 49' 29" East 85.73 feet to a point; thence

34. North 46° 34' 07" East 88.35 feet to a point; thence

35. North 47° 25' 40" East 84.27 feet to a point in the southerly line of lands now or formerly of Consolidated Edison and Orange and Rockland Utilities; thence.

36. Along said lands of Consolidated Edison and Orange and Rockland Utilities South 48° 37' 47" East 681.54 feet to an iron pipe found in the northwesterly line of Torne Valley Road; thence

37. Along the northwesterly line of Torne Valley Road on a curve to the right, not tangent to the previous course, having a radius of 974.99 feet, a central angle of 6° 46' 12" and a chord of North 85° 47'26 East 115.14 feet for an arc length of 115.20 feet to a point of reverse curvature; thence

38. Continuing on a curve to the left having a radius of 331.71 feet, a central angle of 50° 40' 19" and a chord of South 63° 50' 23" West, 283.91 feet for an arc length of 293.38 feet to a point of tangency; thence

39. Still along the northwesterly side of Torne Valley Road, South 38° 30' 09" West 209.55 feet to a point of curvature; thence

40. Still along the northwesterly side of Torne Valley Road, southwesterly, on a curve to the right having a radius of 989.72 feet, a central angle of 05° 59'22" and a chord of North 41° 29' 50" East, 103.41 for an arc length of 103.46 feet to a point of tangency; thence.

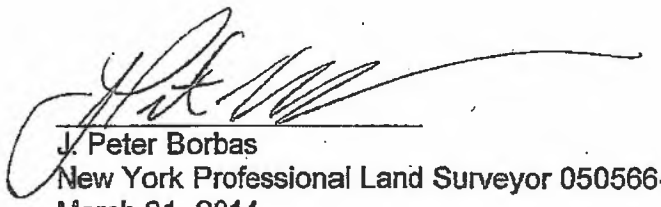
41. Still along the northwesterly side of Torne Valley Road, South 44° 29' 30" West 370.73 feet to a point of tangency; thence,

42. Still along the northwesterly side of Torne Valley Road, Southwesterly, on a curve to the left having a radius of 1,010.00 feet a central angle of 18° 39'33" and a chord of South 35° 09' 44" West, 327.47 for an arc length of 328.92 feet to a point of tangency; thence.

44. Still along the northwesterly side of Torne Valley Road, South 25° 49' 58" West 164.50 feet to the point or place of BEGINNING .

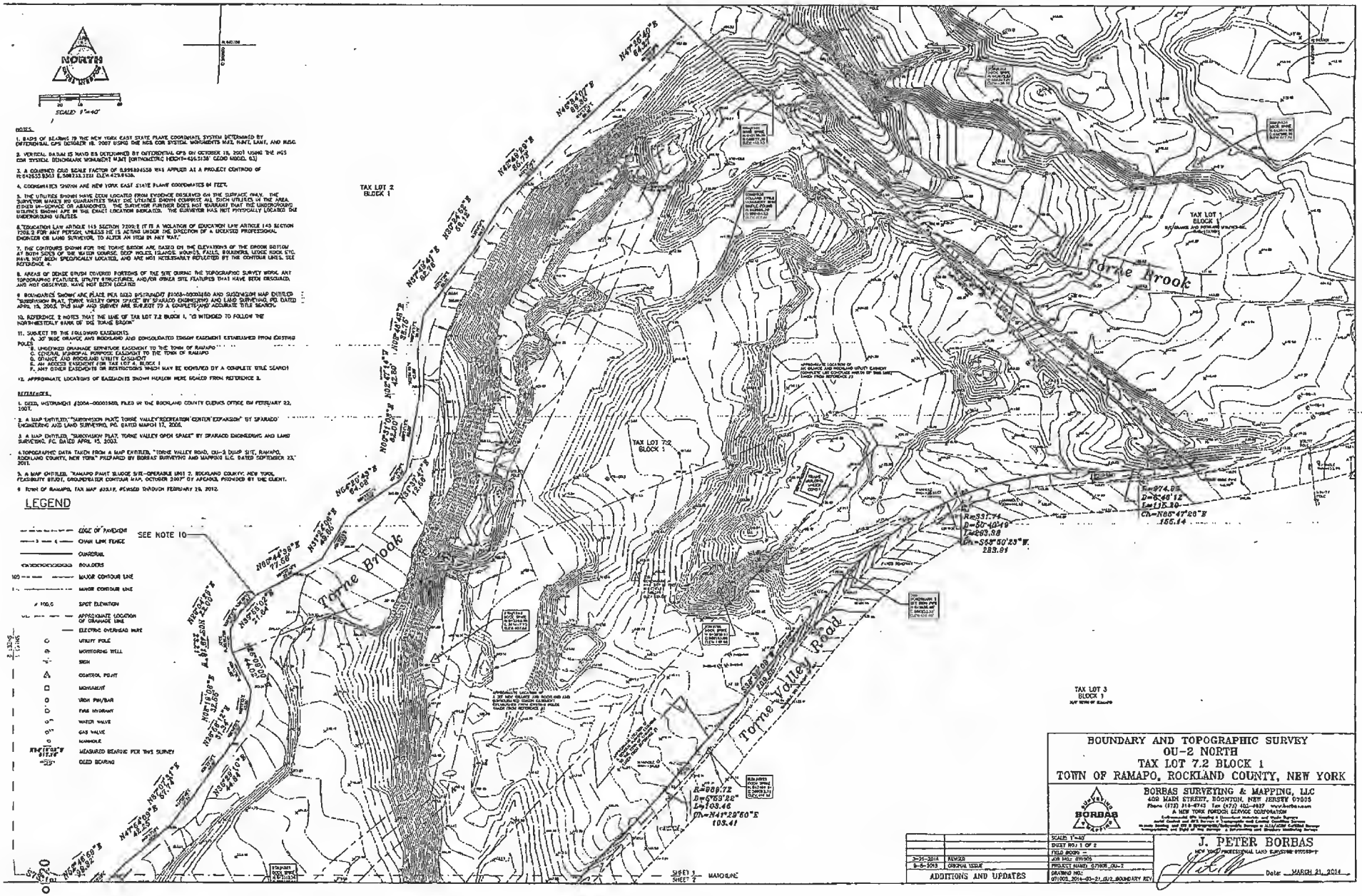
Containing 15.356 acres of land, more or less.

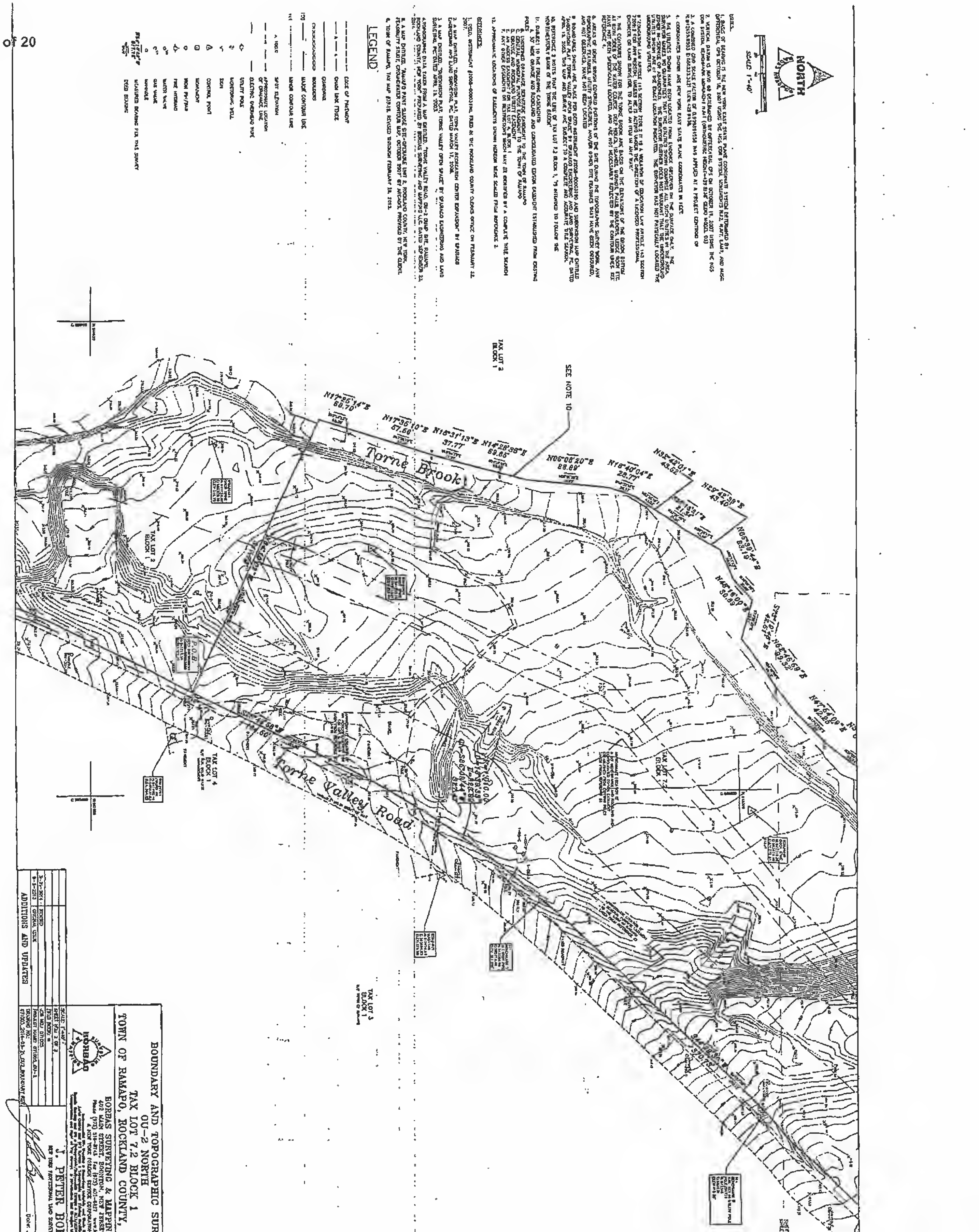
This description is in accordance with a map entitled "Boundary and Topographic Survey OU-2 North, Tax Lot 7.2 Block 1, Town of Ramapo, Rockland County, New York", prepared by Borbas Surveying and Mapping, LLC, J. Peter Borbas, dated September 5, 2013 and revised March 21, 2014.



J. Peter Borbas
New York Professional Land Surveyor 050566-1
March 21, 2014

P:\LP\2007\10\071005\Documents\OU-2\071005_2014-03-20_OU-2 Metes and Bounds.doc




Torne Brook
Torne Valley Road
LEGEND
BOUNDARY AND TOPOGRAPHIC SURVEY
OU-2 NORTH
TAX LOT 7.2 BLOCK 1
TOWN OF RAMAPO, ROCKLAND COUNTY, NEW YORK
BORBAS SURVEYING & MAPPING, LLC
J. PETER BORBAS
ADDITIONS AND UPDATES

APPENDIX "C"

(OU-2 SOUTH)

BORBAS SURVEYING & MAPPING

Environmental Site Mapping • Hazardous Materials and Waste Surveys
Aerial Control and GPS Surveys • Topographic and Existing Condition Surveys
Remote Sensing and GIS • Hydrographic/Bathymetric Surveys • ALTA/ACSM Certified Surveys
Transportation and Right of Way Surveys • Deformation and Structure Monitoring Surveys

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Description of the Ramapo Paint Sludge Site – OU-2 South
A portion of Lot 2 Block 1 in the Village of Hillburn
Rockland County, New York

BEGINNING at a point in the easterly line of Torne Valley Road (variable width Right of Way), said point being on the second course of the description of Lot 5, Stone Industries, Inc. Town of Ramapo, Rockland County, New York in deed instrument ID 2010-00033982 recorded in the Rockland County Clerk's Office on September 29, 2010. Said point being distant from the beginning of the second course along the easterly line of Torne Valley Road, on a curve to the right having a radius of 270.00 feet, a central angle of 09° 25' 37"a chord distance of 44.37 feet with a chord bearing of North 03° 48' 01" East for an arc length of 44.42', having New York East State Plane Coordinate value North 837673.4 and East 584132.5 and runs thence:

1. Along the easterly line of Torne Valley Road and the second course of said Lot 5, deed instrument ID 2010-00033982, on a curve to the right, having a radius of 270.00 feet, a central angle of 23° 56' 25" and a chord of North 20° 29'02 East 112.00 feet for an arc length of 112.82 feet to a point of compound curvature; thence

2. Continuing along the easterly line of Torne Valley Road and the third course of said Lot 5, deed instrument ID 2010-00033982, on a curve to the right having a radius of 1070.00 feet, a central angle of 22° 12' 32" and a chord of North 43° 33' 30" East, 412.16 feet for an arc length of 414.75 feet to a point; thence the following 9 courses are through Lot 2 Block 1:

3. Departing the easterly line of Torne Valley Road and the third course of said Lot 5, deed instrument ID 2010-00033982, South 21° 18' 34" West 31.01 feet to a point; thence

4. South 21° 16' 41" West 50.63 feet to a point; thence

5. South 23° 42' 39" West 63.79 feet to a point; thence

6. South 38° 21' 46" West 77.88 feet to a point; thence

7. South 31° 35' 47" West 39.64 feet to a point; thence

8. South 36° 51' 50" West 64.91 feet to a point; thence

9. South 44° 58' 52" West 71.62 feet to a point; thence

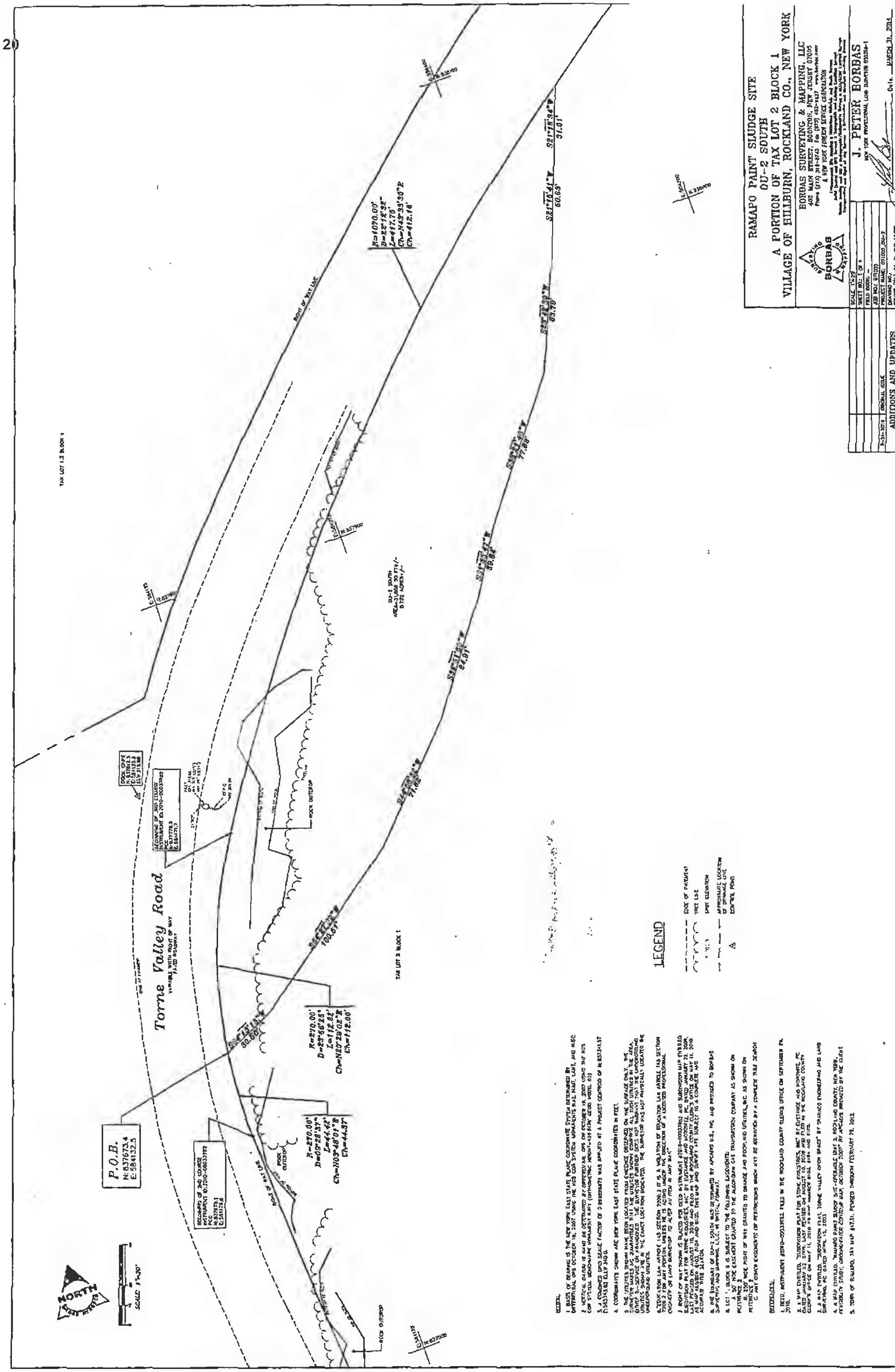
10. South 54° 27' 02" West 100.51 feet to a point; thence

11. South 64° 13' 15" West 30.50 feet to the point or place of BEGINNING.

Containing 0.732 acres of land, more or less.

This description is in accordance with a map entitled "Ramapo Paint Sludge Site, OU-2 South, A Portion of Tax Lot 2 Block 1, Village of Hillburn, Rockland County, New York", prepared by Borbas Surveying and Mapping, LLC, J. Peter Borbas, dated March 31, 2014.

J. Peter Borbas
New York Professional Land Surveyor 050566-1
March 31, 2014
P:\LP\2007\10\071005\Documents\OU-2\071005_2014-03-31_OU-2 South Metes and Bounds.doc


RAMAPO PAINT SLUDGE SITE
OU-2 SOUTH
A PORTION OF TAX LOT 2 BLOCK 1
VILLAGE OF HILLBURN, ROCKLAND CO., NEW YORK
BORBAS SURVEYING & MAPPING, LLC
J. PETER BORBAS
ADDITIONS AND UPDATES
Torne Valley Road
P.O.B.
N: 837673.4
E: 584132.5
LEGEND
NORTH
R=1070.00'
R=270.00'
TAX LOT 2 BLOCK 1
ROCK OUTCROP
RIGHT OF WAY LINE

Arcadis of New York, Inc.

17-17 Route 208 North

Fair Lawn, New Jersey 07410

Tel 201 797 7400

Fax 201 797 4399

www.arcadis.com