From: Robbins, Kenneth <KRobbins@trccompanies.com>
Sent: Tuesday, June 11, 2019 2:04 PM
To: Spellman, John (DEC)
Cc: Siet, Ken; Connors, Brian D. (bdco)
Subject: Request for Extension - Remedial Design / Remedial Action Plan for Chevron Former Asphalt Facility, Troy, NY

Mr. Spellman,

TRC is requesting a 14-day extension to submit the Remedial Design / Remedial Action Work Plan for the Chevron Former Asphalt Facility located on Water Street in Troy, NY (Site 442029B). Under the Order on Consent and Administrative Settlement executed for the site, Chevron is required to submit a Work Plan within 60 days of electing to respond to the Department's request for a Work Plan [II.B.1(b)].

A 14-day extension to the original target submittal date of June 14, 2019, would result in a revised target submittal date of July 1, 2019. Please acknowledge the Department's approval of the extension at your earliest convenience.

Thank you.

Sincerely,

Ken

Kenneth Robbins, PE, LSRP
Senior Engineer

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Please note that our domain name and email addresses have changed

Remedial Design / Remedial Action Work Plan

Former Chevron Asphalt Company
Troy Asphalt Facility
7 Water Street
Troy, New York 12180
NYSDEC Site No. 4-42-029B
Index No. A4-0808-13-06

June 2019

Prepared For:

Chevron Environmental Management Company
Perth Amboy, NJ 08861

Submitted To:

New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233

Prepared By:

TRC
41 Spring Street
New Providence, NJ 07974

TRC

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1.0 Introduction

1.1 Purpose and Organization of the Report

TRC Engineers, Inc. (TRC), has prepared this Remedial Design / Remedial Action Work Plan (RD/RA Work Plan) for the Former Chevron Asphalt Company site (Site No. 4-42-029B), located at 7 Water Street, Troy, NY (the Site). The Site is currently inactive and occupies approximately nine acres located on the west side of Water Street directly south of the SR378 Bridge Bridge. This RD/RA Work Plan was completed in accordance with New York State Department of Conservation (NYSDEC) Technical Guidance for Site Investigation and Remediation (DER-10) and the Order on Consent (effective date December 2, 2013) to implement remedial actions (the Remedy) described in a Record of Decision (ROD) issued by NYSDEC in March 2019.

In 2013, a Remedial Investigation (RI) was completed for Chevron Environmental Management Company (Chevron) by TRC to investigate the nature and extent of surface and subsurface soil contamination. The findings of the investigation are presented in a January 2015 RI Report, which was approved by NYSDEC. Subsequent soil and groundwater sampling and a visual inspection and delineation of surficial tar/asphalt impacts at the Site were completed in 2017, and the results are presented in a Focused Feasibility Study (FFS) Report, which was approved by NYSDEC in 2018 prior to issuance of the ROD.

This RD/RA Work Plan describes remedial design (RD) and remedial action (RA) activities to be undertaken to implement the Remedy described in the ROD. This RD/RA Work Plan has been organized into eight sections as follows:

- Section 1 – Provides a brief site history and selected remedy. Note, in accordance with DER-10, since the Site RI Report has been approved by NYSDEC a detailed discussion of previous investigations and the nature and extent of contamination is not included in this RD/RA Work Plan.
- Section 2 – Describes the remedial design scope and deliverables.
- Section 3 – Identifies permitting and regulatory requirements.
- Section 4 – Describes activities necessary to implement the Remedy.
- Section 5 – Describes post-remedial construction site management activities.
- Section 6 – Schedule to complete RD activities.
- Section 7 – A listing of references used for preparation of this report.
- Section 8 – Certification by New York State-licensed professional engineer.

A pre-design investigation will not be performed and is therefore not discussed in this RD/RA Work Plan.

1.2 Site Background

1.2.1 Site Description

The Site is located at 7 Water Street in the City of Troy, Rensselaer County, New York as shown on **Figure 1**. Troy is located approximately 12 miles northeast of the City of Albany. The Site is

currently inactive and occupies approximately nine acres located on the west side of Water Street. The Site boundaries are shown on **Figure 2** and are described in the 2013 Order on Consent.

Based on the City of Troy Official Zoning Map, the Site is located within a zone classified as "Waterfront Trade District" (WTD). The purpose of this District, based on the "Zoning Ordinance of the City of Troy, New York" included in Chapter 285 of the City of Troy Charter, is to continue to permit the important industrial uses predominantly located on the South Troy Waterfront by retaining and upgrading industrial facilities.

A series of railroad tracks were present along the shoreline and have apparently been removed and/or buried by fill. The historic aerial photograph review conducted for the RI showed that the Site was filled in the mid-1930s, prior to Chevron's purchase of the property.

A portion of the Site is situated underneath the SR378 Bridge which traverses the property in an east-west direction. The northern boundary of the Site runs east-west and coincides with the mid-point of the bridge. There are bridge footings located on the Site. A major buried gas main runs beneath the SR378 Bridge, and crosses beneath the Hudson River at this location.

The nearest surface water body is the Hudson River, located to the west, immediately adjacent to the Site. A small creek, known as Wynannts Kill (also known as Burden Creek) outfalls to the Hudson River approximately 1,200 feet north (upstream) of the Site.

1.2.2 Site History

American Bituminous, and subsequently Chevron Asphalt Company, produced and stored asphalt and other road construction materials for sale to the surrounding community. The facility was operational from 1953 to approximately 1999. The facility obtained refined asphalt by barge or rail, stored the asphalt in large aboveground storage tanks (ASTs) and subsequently loaded the asphalt into the customers' tanker trucks.

Asphalt received from barges was unloaded at an off-Site dock located approximately 350 feet north (upstream) of the Site. The dock was leased from King Fuels. Asphalt was moved from barges to storage tanks through a series of heated pipes that maintained the asphalt at sufficiently high temperature such that the material would flow. The asphalt was transferred from the ASTs through pipes to above ground loading racks, which then dispensed the product into the customers' tanker truck. All of the piping used in this system was above ground.

An asphalt emulsion mixing process was performed in a building at the southern end of the Site. The purpose of the emulsion operation was to blend asphalt and water, and through the addition of an emulsifying agent, such as fatty acids, promote the emulsification and keep the emulsified asphalt stable. The emulsion agents and blended products were stored in ASTs adjacent to the emulsion building. The aboveground storage tanks have been demolished and Site investigation and RI activities have been conducted around the former ASTs.

Chevron's asphalt facility operations resulted in the generation of limited amounts of process wastewater consisting primarily of non-contact boiler blowdown water. Chevron operated on-Site boilers to create steam to keep asphalt transfer pipes and storage tanks heated. The boiler blowdown water consisted of water and any dissolved constituents in the water. Petroleum or

similar types of constituents would not be expected to be found in non-contact boiler blowdown water.

1.3 Physical Characteristics

1.3.1 Topography and Surrounding Land Use

The Site is situated on a relatively flat terrace adjacent to the east bank of the Hudson River. A steep slope (shale outcrop) rises to the east of the Site. The terrace upon which the Site is situated was gradually built up prior to Chevron's ownership in the early part of the 20th century by extensive filling with slag, cinders, ash, brick, gravel, and other materials. Various types of brick and construction debris are present along the shoreline of the Hudson River adjacent to the Site. Historic photographs show the former shoreline of the Hudson River as a gentle slope that was built up over time through the addition of fill material. Currently, the riverbank slope extends about 22 feet down from the upland area of the Site to the edge of water.

The Site is bordered to the west by the Hudson River; to the east by River Road, railroad tracks, and a wooded area; to the north by the former King Fuels property; and the south by the former Vinci Oil property. The properties surrounding the Site include a former manufactured gas plant (MGP) site located north and upstream of the Site, and a previously remediated disposal area located downstream and south of the Site.

1.3.2 Site Geology and Hydrogeology

The Site ground surface consists of gravel, iron slag, coal slag, masonry and brick fragments, coarse sand, demolition debris and other artificial fill with little to no organic constituents. The thickness of this fill ranges from less than 5 feet to approximately 40 feet. This fill is ubiquitous in this area. The fill overlies a sequence of unconsolidated deposits including alluvium (primarily silt with varying amounts of sand, clay, and organic matter), glaciofluvial outwash (sand and gravel), glaciolacustrine deposits (silt, stiff gray clay, and fine sand), and thin, discontinuous lenses of glacial till. These various unconsolidated units do not form continuous layers under the Site; they occur as layers and lenses of varying thicknesses that are interbedded with each other.

The glaciofluvial outwash forms the greater part of the unconsolidated sequence, with thickness as great as 40 feet. The alluvium is absent in many places and reaches thicknesses of 18 feet in others; the same is true of the glaciolacustrine deposits. The till, where present at the bottom of the sequence directly over bedrock, forms lenses with a maximum observed thickness of 5 feet.

According to the Geologic Map of New York, Hudson-Mohawk Sheet (New York State Museum, 1970), the bedrock under the Site consists of Utica Shale, Canajoharie Shale and/or Normanskill Shale belonging to the Lorraine, Trenton and Black River Groups. These Groups date from the Upper to Middle Ordovician Period and range to approximately 4,500 feet in thickness.

Groundwater is encountered in the lower portions of the fill and within the native unconsolidated material underlying the fill. The water table occurs at approximately 20 to 30 feet below ground surface (bgs). Based on water levels measured in four on-Site monitoring wells (MW-1 through MW-4) during the RI, groundwater appears to flow to the west, toward the Hudson River.

1.4 Remedial Action Objectives

The RAOs for the Site, as documented in the ROD are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent discharge of contaminants to surface water.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

1.5 Standards, Criteria, and Guidance

Standards, criteria, and guidance (SCGs) consist of chemical-specific promulgated standards and criteria that are directly applicable or that are relevant and appropriate, as well as applicable guidance to which a selected remedy must conform. Exhibit A of the ROD presents a comparison of analytical results of soil and groundwater samples collected at the Site to chemical-specific SCGs. Results of analyses of soil samples were compared to Unrestricted Use and Commercial

Use Soil Cleanup Objectives (SCOs) listed in NYSDEC Part 375-6.8(b). Results of analyses of groundwater samples were compared to Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (Class GA Values) listed in NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1, NYSDEC Part 703 Surface Water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code.

Results of previous investigations identified several petroleum-related volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) at concentrations above SCGs in soil and groundwater. The metal arsenic was detected at concentrations above SCGs in soil as well. Additionally, tar/asphalt and purifier waste constituting nuisance conditions, as defined in NYSDEC Commissioner Policy 51 *Soil Cleanup Guidance* (CP-51) has been observed in soil.

1.6 Selected Remedy Overview

Results of the investigations, presented in the RI Report and this FFS Report, indicate there are no complete exposure pathways to contaminants exceeding SCGs in groundwater. Therefore, only remediation of soil is required. The Remedy described in the ROD consists of removal and off-site disposal of soils exhibiting tar/asphalt impacts to varying depths, removal and off-site disposal of one localized area of purifier solids, covering of soils impacted with concentrations of chemicals of concern (COC) above Commercial Use SCOs, and Site restoration activities. Existing vegetative growth will remain undisturbed as part of the Site cover. An environmental easement will limit the use of the Site to commercial uses only. Additionally, a Site Management Plan (SMP) will be developed to document soil management and Site inspection and maintenance requirements. Additional details regarding the Remedy are described in the ROD.

2.0 Remedial Design Scope

The RD for the Remedy will consist of this RD/RA Work Plan, an Intermediate Design, a Pre-Final Design, and a Final Design. This RD/RA Work Plan includes the attached site-specific Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP), and Quality Assurance Project Plan (QAPP) as described in Section 2.1. Design drawings and performance specifications establishing requirements for implementing the Remedy will be prepared and submitted for NYSDEC approval subsequent to NYSDEC approval of this RD/RA Work Plan.

2.1 Supporting Documents

2.1.1 Health and Safety Plan

The HASP included in Appendix A describes activities to be performed to protect on-Site personnel and area residents from physical, chemical, and all other hazards encountered during RD, implementing the Remedy, and site management activities. The Contractor will be required to submit a Construction HASP (CHASP) in accordance with the RD for TRC approval prior to mobilization to the Site.

2.1.2 Community Air Monitoring Plan

The CAMP, prepared in accordance with NYSDEC DER-10, presented in Appendix B establishes monitoring requirements and threshold values for fugitive dust emissions and VOC measurements. The Contractor will be required to perform all intrusive work in compliance with the CAMP.

2.1.3 Quality Assurance Project Plan

The QAPP, prepared in accordance with NYSDEC DER-10, presented in Appendix C addresses sample analysis and data handling through all stages of implementing the Remedy. The QAPP includes a detailed description of TRC's quality assurance, quality control, and chain of custody procedures that will be followed for all waste characterization sampling. Sample collection and analysis performed in accordance with the RD will conform to applicable provision of the QAPP. The Contractor will be required to submit a Construction QAPP (CQAPP) in accordance with the RD for TRC approval prior to mobilization to the Site.

2.2 Site Restoration Plan

Areas of the Site disturbed during implementation of the Remedy, and not covered with the Site cover as described in the ROD, will be restored to pre-disturbed conditions. Restoration activities may include backfilling, placement of geotextile matting to control soil erosion, and native shrub and tree plantings. Restoration requirements will be included in subsequent RD documents.

2.3 Intermediate (60%) Design

The Intermediate (60%) Design for the Remedy will be submitted for NYSDEC comment and will contain the following:

- Preliminary construction drawings
  - Title Sheet
  - Plan view of horizontal limits of remediation and restoration
  - Conceptual layout of soil erosion controls and shoreline stabilization materials
  - Construction and restoration details
  - Notes for construction
- Preliminary list of performance specifications detailing the following contractor requirements:
  - Documentation and reporting
  - Excavated material management
  - Soil erosion control
  - Stormwater management
  - Air monitoring
- Proposed revisions to the Remedial Action schedule, if any.

2.4 Pre-Final (95%) Design

The Pre-Final (95%) Design for the Remedy will be submitted for NYSDEC comment. The Pre-Final Design will be a continuation and expansion of the Intermediate Design, will incorporate NYSDEC comments, and will contain the following:

- Construction drawings
- Performance specifications
- Site Monitoring Plan (SMP)

The SMP will be prepared utilizing the applicable NYSDEC template.

2.5 Final (100%) Design

The Final (100%) Design will include the components of the Pre-Final Design, completed to include NYSDEC comments.

2.6 Community Involvement

A public meeting was held on February 20, 2019, which included a presentation of the RI and FS activities for the Site as well as a discussion of the Proposed Remedial Action Plan (PRAP). The public comment period for the PRAP ended on March 2, 2019 and a responsiveness summary of comments is included in the ROD. At NYSDEC's request TRC will assist in the preparation of applicable fact sheets describing upcoming remedial action activities and announcing achievement of cleanup requirements for NYSDEC's distribution to the Site contact list at the appropriate time.

2.7 Roles and Responsibilities

TRC Project Manager
The TRC Project Manager will be the main TRC contact for the project and will be responsible for ensuring that the project is being implemented in accordance with this RD/RA Work Plan and RD. The TRC Project Manager is responsible for ensuring that these practices, policies, objectives and procedures are communicated to, and understood, implemented, and adhered to by all personnel. The TRC Project Manager, will be the focal point for contact with the NYSDEC Project Manager and other regulatory personnel and will be directly supported by the Field Team Manager, the TRC Quality Assurance (QA) Manager, and where appropriate, the Laboratory Manager and/or the Laboratory QA Manager. Kenneth Robbins, P.E., will serve as the TRC Project Manager for the Site.

TRC Quality Assurance Manager
The TRC Quality Assurance (QA) Manager will ensure that all elements of the QAPP are followed. Where QA or quality control (QC) issues arise, the TRC QA Manager will be contacted by the Project Manager, Field Team Manager or Laboratory QA Manager, depending on the nature of the issue, for guidance and resolution. The TRC QA Manager will report directly to the TRC Project Manager and shall remain independent from all data generators and users. Elizabeth Denly will serve as the TRC QA Manager for this project.

TRC Field Team Manager
The TRC Field Team Manager will be responsible for overseeing field activities on a day-to-day basis. The TRC Field Team Manager will ensure that all field work is conducted in accordance with the approved work plans and this RDWP. Should potential issues arise, the TRC Field Team Manager will contact the TRC Project Manager, TRC QA Manager, or Laboratory QA Manager, as appropriate.

TRC Site Safety Officer
The TRC Site Safety Officer will be responsible for ensuring all field activities are being implemented in accordance with the HASP and when necessary, evaluating new hazards and operation changes. The Site Safety Officer has the authority to correct all noncompliance situations immediately and to stop work in cases of immediate danger. Due to the limited amount of equipment anticipated to be on-Site during implementation of the Remedy the roles of the TRC Field Team Manager and TRC Site Safety Officer may be fulfilled by the same person.

Surveying Contractor
The surveying subcontractor is responsible for supplying all services (including labor), equipment, and material required to perform surveys of the Site and sampling locations. The earthwork subcontractor, described below, will subcontract land surveying services.

Laboratory Manager
As identified in the QAPP, Eurofins TestAmerica, Albany, (TestAmerica) will perform laboratory analyses of waste characterization samples during remedial activities. The Laboratory Manager will generally be responsible for ensuring that the laboratory follows the laboratory QAPP and all laboratory standard operating procedures (SOPs). These responsibilities are more fully discussed in the QAPP.

Laboratory Quality Assurance (QA) Manager

The Laboratory QA Manager is generally responsible for the day-to-day oversight and review of all QA/QC and for overall technical operation and stewardship of the Environmental Laboratory and will be required to ensure that laboratory staff follows the Laboratory QA Manual (QAM) and SOP requirements. These responsibilities are more fully discussed in the QAPP.

Laboratory Technicians

Laboratory technicians are responsible for performing all analyses in accordance with approved analytical methods to help control process variables and to determine compliance with the QAPP.

Earthwork Subcontractor

Entact, LLC (Entact) will serve as the earthwork subcontractor. The earthwork subcontractor is responsible for permits, licenses, clearances, and supplying all services (including labor), equipment, and material required to implement the Remedy, in addition to all maintenance and quality control of such equipment. The earthwork subcontractor will be responsible for following design specifications as well as decontamination, health and safety, and waste disposal procedures specified in this RD/RA Work Plan, HASP, RD, and in the bid package. Upon completion of the work, the earthwork subcontractor will be responsible for demobilizing all equipment.

3.0 Permitting and Regulatory Requirements

To implement the Remedy approvals would be needed to address disturbance within and adjacent to the tidal portion of the Hudson River. The Remedy includes soil removal, shoreline stabilization, grading, and site restoration activities. Anticipated federal and state permits and consultation that would likely be required are summarized in the table below.

Permit/Approval	Regulatory Agency	Reason Required
Section 404/Section 10 Permit	U.S. Army Corps of Engineers	Disturbance within a navigable waterbody and in any wetlands located along the shoreline of the Hudson River in the Project footprint.
Endangered Species Act Compliance	U.S. Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries Service	Older information indicates that this site may have the potential for the presence of the federally listed Northern Long-Eared Bat. The NOAA online mapper indicates the potential presence of the federally-listed short nose and Atlantic sturgeon.
Essential Fish Habitat (EFH)/Magnuson-Stevens Fishery Conservation and Management Act Compliance	NOAA Fisheries Service	The NOAA online mapper indicates the portion of the Hudson River in the vicinity of the Site is considered to be EFH for several fish species.
Article 15 Permit	NYSDEC	Disturbance within a traditionally navigable water.
Article 25 Permit	NYSDEC	Disturbance along the tidal Hudson River.
Water Quality Certification	NYSDEC	Required for any project that needs a USACE permit.
State Environmental Quality Review Act Compliance	NYSDEC	Required for any project requiring state permits or approvals.
Stormwater Permit for Construction Activity	NYSDEC	Required for land disturbance over 1 acre of land.
Natural Heritage Program Coordination	NYSDEC	Required for all project requiring state approvals.
Coastal Zone Consistency	New York State Department of State	Work with in New York's Coastal Zone.
National Historic Preservation Act of 1966 and the New York State Historic Preservation Act of 1980 Compliance	State Historic Preservation Office – NYS Parks Recreation and Historic Preservation	Required for any project requiring state or federal permits or approvals

To support the submission of a permit application to the U.S. Army Corps of Engineers, a wetland delineation of the site is required. The delineation will be done in accordance with the 1987 USACE Wetland Delineation Manual and appropriate regional supplement. A wetland delineation report summarizing the findings will be provided. As the design progresses to the 60% and 95% levels of completion, permit considerations will be reevaluated.

4.0 Remedial Action

Entact will provide a Remedial Action Work Plan (RAWP) for TRC approval prior to mobilization to the Site. The RAWP will contain details regarding means and methods to implement the Remedy in accordance with the requirements of the RD. The primary elements of work to be performed by the Entact are described below.

4.1 Site Access

Entact's RAWP will provide details regarding Site access points, staging and laydown areas, off-Site trucking routes, on-Site staging areas and traffic control methods, and truck decontamination procedures to be followed during implementation of the Remedy.

4.2 Site Preparation

4.2.1 Pre-Construction Survey

Entact will perform a pre-construction survey of nearby structures to document existing conditions and establish requirements and controls to protect nearby structures.

4.2.2 Clearing

Clearing of existing vegetation along the streambank will be completed as part of mobilization activities. Vegetation will be removed as required at and above grade to provide unencumbered access for construction equipment. Vegetation in the southern portion of the Site subject to covering will not be disturbed.

4.2.3 Material Disposition

As part of earthwork required to implement the Remedy waste characterization samples will be collected and analyzed of all waste requiring off-Site disposal. Following disposal facility acceptance, excess material will be transported and disposed of in accordance with applicable rules and regulations. Entact will provide an Excavated Material Disposal Plan, including appropriate waste transporter and disposal facility permits, for TRC approval prior to transportation of waste off-Site for disposal.

4.2.4 Utilities

There is no utility service to the Site. Entact will be responsible for protecting the gas main that crosses the Site and providing temporary utility service during implementation of the Remedy.

4.2.5 Grading and Drainage

Best management practices for erosion and sediment control will be installed prior to ground intrusion. Site grading and drainage will not be modified during the Work. Stormwater will be allowed to infiltrate during implementation of the Remedy. Since soil disturbance is anticipated to be limited to less than one acre, a Stormwater Pollution Protection Plan (SWPPP) is not

required. Entact will provide an Erosion and Sediment Control Plan and Stormwater Management and Monitoring Plan for TRC approval in accordance with the RD.

4.2.6 Fencing Inspection and Repair

Prior to mobilization, TRC will inspect Site fencing and identify areas in need of repair or replacement in Entact's scope of work.

4.3 Upland Area Remediation

Remediation activities associated with the Upland Area consist of the following:

- Removal and off-Site disposal of soils impacted by tar and asphalt or exhibiting nuisance conditions, in accordance with NYSDEC CP-51, to a minimum depth of one-foot bgs and maximum of eight feet bgs; and

- Placement and maintenance of a one-foot cover meeting the requirements of NYSDEC Part 375-6.7(d) over exposed soils exhibiting concentrations of contaminants greater than Commercial Use Soil Cleanup Objectives (SCOs) in accordance with NYSDEC Part 375-6.8(b).

4.3.1 Excavation and Disposal

Soil located in the upland area that exhibits residual surficial asphalt/tar deposits will be removed. Approximately 30 locations of residual surficial asphalt/tar have been observed in discrete locations across the upland area, as shown on **Figure 2**. It is anticipated that approximately 25 square feet will be excavated at each surficial asphalt/tar location across the upland area and that all excavation depths will not exceed one foot. A total of approximately 30 cubic yards (CY) of asphalt/tar deposits and associated soil will be removed from the upland plateau area and transported off-Site for disposal. Limits of excavation will be determined by visual and olfactory indications and surveyed by a New York State-licensed surveyor. Soil removal activities excavations at each location will be advanced to a maximum depth of eight feet bgs based on observations. Benching and shoring will be implemented at each excavation as necessary. Entact will provide an Excavation Plan identifying means and methods to be implemented as well as an Excavated Material Disposal Plan identifying waste transporter and disposal facilities for NYSDEC approval.

4.3.2 Site Cover

The cover to be placed over soils exhibiting concentrations of contaminants greater than Commercial Use SCOs in the northern portion of the Site, as shown on **Figure 2**, will consist of a demarcation layer and one foot of gravel. Entact will provide adequate documentation that proposed cover material meets the requirements of NYSDEC Part 375-6.7(d) for Commercial Use for TRC approval.

Existing vegetative growth in the southern portion of the Site to be covered, as shown on **Figure 2**, will remain undisturbed to serve as the Site cover in that area.

4.4 Stream Bank Area Remediation

4.4.1 Excavation and Disposal

Soil located in the stream bank area that exhibits residual surficial asphalt/tar deposits will be removed to a depth of two feet bgs. Approximately 19,100 square feet of residual surficial asphalt/tar have been observed in discrete locations across the stream bank area, as shown on **Figure 2**. It is anticipated that a total of approximately 1,415 CY of asphalt/tar deposits and associated soil will be removed from the stream bank area and transported to an off-Site landfill for disposal. Limits of excavation will be determined by visual and olfactory indications and surveyed by a New York State-licensed surveyor. Disturbance of existing vegetation will be minimized. Entact will provide an Excavation Plan identifying means and methods to be implemented as well as an Excavated Material Disposal Plan identifying waste transporter and disposal facilities for TRC approval.

4.5 Reporting Activities

Entact will provide daily construction progress reports detailing, at a minimum, work performed, construction delays, deviations from the RD, requests for clarification, personnel/subcontractors on-site, safety incidents, CAMP exceedances and corrective actions, and follow-up on outstanding construction issues.

4.6 Site Restoration and Project Closeout

4.6.1 Site Restoration

Excavations in the upland area and greater than 20 feet from the top of the stream bank will be backfilled with clean fill meeting Commercial Use SCOs. Excavations within 20 feet of the top of the streambank will be backfilled with clean fill meeting Protection of Ecological Resources SCO. Prior to the placement of fill a demarcation layer will be installed in each excavation. The top six inches of disturbed vegetated areas will be backfilled with topsoil, covered with biodegradable erosion matting, and planted/seeded as appropriate to match existing conditions. Entact will prepare a Site Restoration Plan for TRC approval in accordance with the requirements of the RD.

4.6.2 Post-Construction Survey

Entact will provide as-built drawings showing the limits of all excavations and restoration activities. Additionally, a post-construction survey of nearby structures will be performed to document conditions.

4.6.3 Post-Construction Reporting

In accordance with DER-10 TRC will submit a Site Management Plan (SMP), described below, and a Final Engineering Report for NYSDEC approval upon completion of implementation of the Remedy.

5.0 Site Management

5.1 Environmental Easement

Subsequent to completion of remedial activities described in Section 4, an Institutional Control (IC) consisting of an environmental easement will be imposed upon the Site. The environmental easement will restrict use and development of the Site for commercial purposes, prohibit the use of Site groundwater for potable or process water without appropriate treatment, and require compliance with a NYSDEC-approved SMP, described below, including periodic certification of integrity and functionality of the Site cover and fencing.

5.2 Site Management Plan

As part of the RD, TRC will prepare a SMP that describes plans to implement, maintain, and enforce the ICs and Engineering Controls (ECs) at the Site for NYSDEC approval. TRC will prepare the SMP utilizing the template applicable for remedial projects managed by the NYSDEC. The SMP will include the following:

- Institutional and Engineering Control Plan;
  - Documentation of residual contamination;
  - Descriptions of inspection and management activities associated with the Site cover, Site fencing, restored stream bank, and tar/asphalt migration monitoring along the stream bank
- Descriptions of provisions of the environmental easement, as described above;
- An Excavation Plan addressing future excavations in areas of residual contamination;
- Soil vapor intrusion evaluation requirements for future Site construction; and
- Periodic review and certification requirements.

6.0 Schedule

Submittal of deliverables and implementation of the Remedy will follow the tentative schedule below.

Line	Description of Deliverable, Task	Included Supporting Deliverable	Deadline
1	RD/RA Work Plan	HASP, CAMP, QAPP	June 17, 2019 – 60 days from ROD issuance
Remedial Design			
2	Intermediate (60%) RD		90 days after receipt of NYSDEC comments on RD/RA Work Plan
3	Pre-final (95%) RD	SMP	45 days after receipt of NYSDEC comments on Intermediate RD
4	Final (100%) RD		20 days after receipt of NYSDEC comments on Pre-final RD
5	Preliminary Construction Schedule		30 days after NYSDEC approval of RD
6	Contractor Mobilization		In accordance with the Construction Schedule.

An updated construction schedule will be submitted to NYSDEC approximately 30 days prior to contractor mobilization.

7.0 References

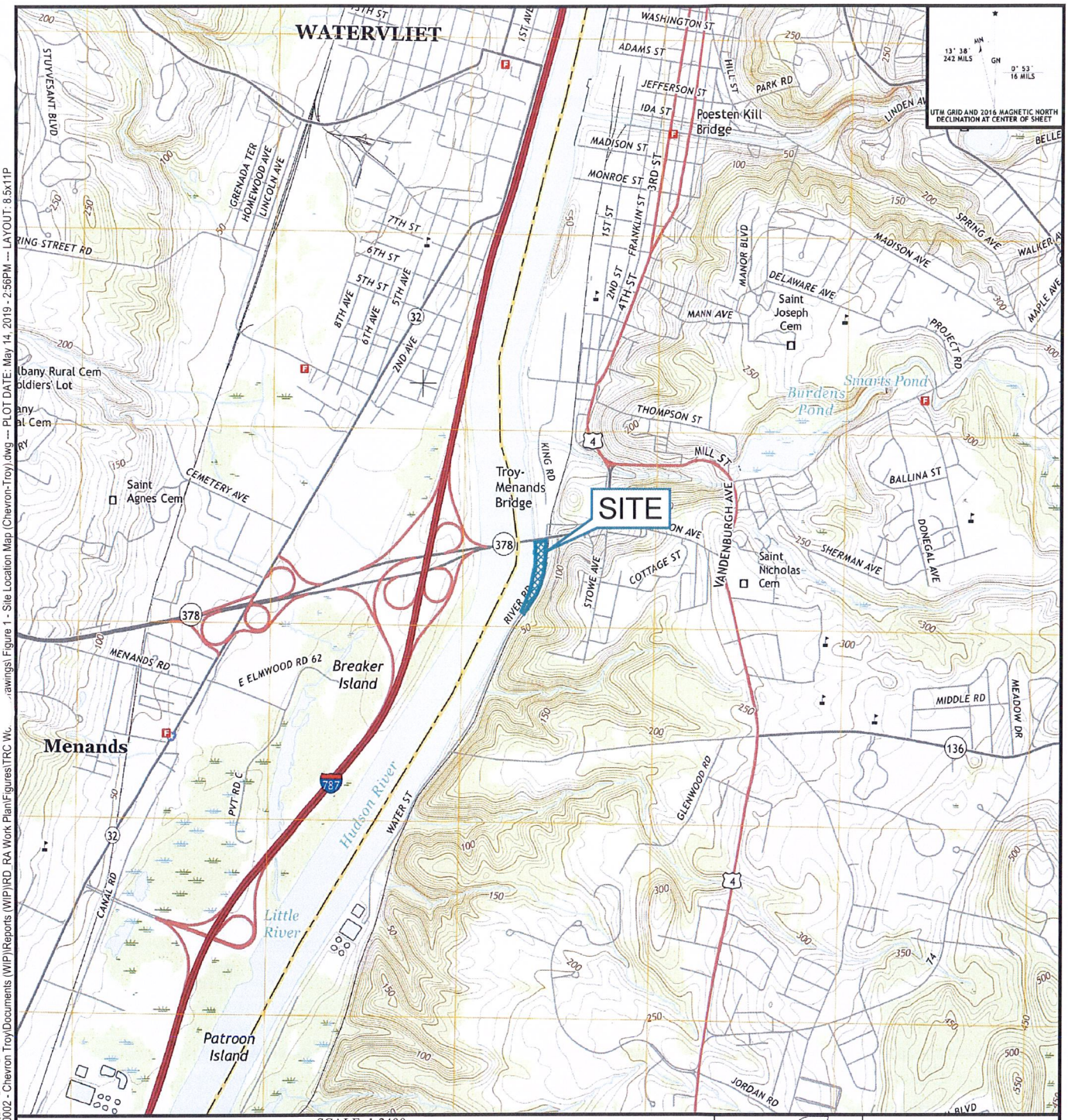
1. 6 NYCRR 375, Remedial Program Requirements.
2. 6 NYCRR 703, Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.
3. New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation, Record of Decision, Former Chevron Asphalt Company, Troy Asphalt Facility, NYSDEC Site No. 4-42-029B, March 2019.
4. NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation, May 2010.
5. NYSDEC. 2006. Title 6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives, NYSDEC, 15 pp.
6. TRC. 2018. Focused Feasibility Study Report, Former Chevron Asphalt Company, Troy Asphalt Facility, NYSDEC Site No. 4-42-029B (Finalized September 2018).
7. TRC. 2017. Feasibility Study Work Plan, Former Chevron Asphalt Company, Troy Asphalt Facility, NYSDEC Site No. 4-42-029B (Finalized March 2017).
8. TRC. 2015. Remedial Investigation Report, Former Chevron Asphalt Company, Troy Asphalt Facility, NYSDEC Site No. 4-42-029B (Finalized January 2015).
9. TRC RAVIV Associates, Inc. 2005. Facility Closure – Site Investigation Report, Troy Asphalt Facility, MOSF License No. 4-1540 (August 9, 2005).
10. NYSDEC and Chevron U.S.A. Inc., Order on Consent and Administrative Settlement, Index Number A4-0808-13-06, Site No. 442029B, effective date December 2, 2013.

8.0 Certification

I, Kenneth Robbins, certify that I am currently a NYS registered professional engineer and that this Remedial Design/Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Kenneth G. Robbins	6/26/2019	
NYS Professional Engineer #086988-1	Date	Signature

Figures



TRC
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New Providence, NJ 07974
Phone: 908.988.1700
www.TRCcompanies.com

PROJECT:

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
CHEVRON ASPHALT TERMINAL
TROY, NY 12832

TITLE:

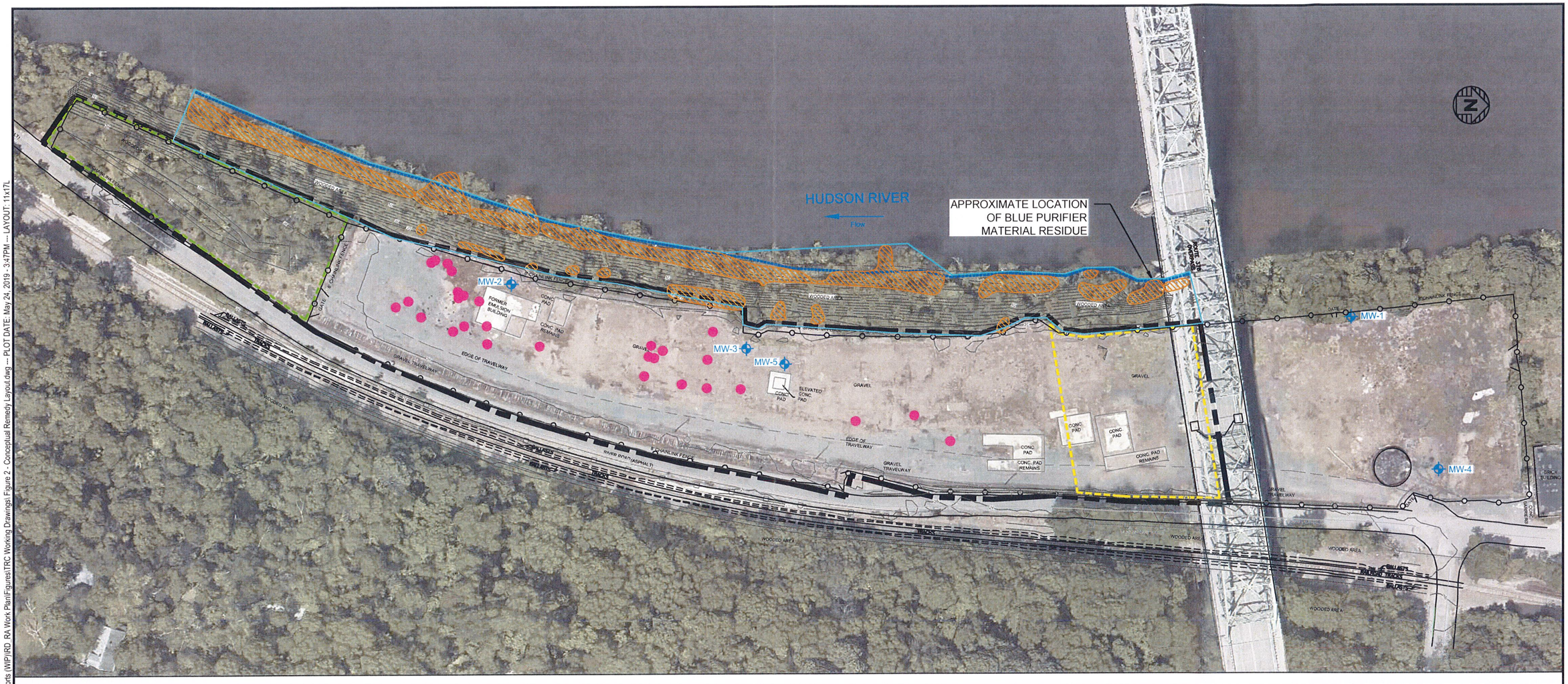
SITE LOCATION MAP

DRAWN BY:	H. DELGADO
CHECKED BY:	J. MIRANDA
APPROVED BY:	K. ROBBINS
DATE:	MAY 2019
PROJ. NO.:	336301.
FILE:	Figure 1 - Site Location Map (Chevron-Troy).dwg

FIGURE 1

8.5x11 --- ATTACHED DRAWING NAME: ...ice Files\Vision Project Folders\194098 phase 00002 - Chevron Troy\Documents (WIP)\Reports (WIP)\RD_RA Work Plan\Figures\TRC Wo... ...awings\ Figure 1 - Site Location Map (Chevron-Troy).dwg --- PLOT DATE: May 14, 2019 - 2:56PM --- LAYOUT: 8.5x11P

ATTACHED IMAGES: NY_Troy South_139384_1953_24000; NY_Troy_South_20180824_TM;



LEGEND (SYMBOLS NOT TO SCALE):

- SITE BOUNDARY (UPLAND PLATEAU)
- SURFACE ELEVATION CONTOUR (IN FEET)
- UTILITY POLE WITH OVERHEAD ELECTRIC
- CHAINLINK FENCE
- MW-X — EXISTING MONITORING WELL
- APPROXIMATE LOCATION OF ASPHALT / TAR (TO BE REMOVED)
- LOCATION AND EXTENT OF SURFICIAL ASPHALT / TAR RIVER BANK AREA TO BE REMOVED
- APPROXIMATE AREA OF PROPOSED SHORELINE STABILIZING MATERIALS
- APPROXIMATE LIMITS OF GRAVEL SITE COVER
- APPROXIMATE LIMITS OF EXISTING VEGETATIVE GROWTH TO FUNCTION AS SITE COVER
- APPROXIMATE LIMITS OF RESTORATION ACTIVITIES

SOURCES:

BASE MAP PREPARED FROM A FIELD SURVEY CONDUCTED BY M.J. ENGINEERING AND LAND SURVEYING, P.C. MAY 2013.
FORMER ABOVE-GROUND STORAGE TANK LOCATIONS FROM HISTORICAL CHEVRON DRAWINGS.

0 100' 200'

SCALE: 1"=100'
SHEET SIZE: 11' BY 17"

PROJECT:
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
CHEVRON ASPHALT TERMINAL
TROY, NY 12832

TITLE:
CONCEPTUAL REMEDY LAYOUT

DRAWN BY:	H. DELGADO	PROJ NO.:	336301
CHECKED BY:	J. MIRANDA		
APPROVED BY:	K. ROBBINS		**FIGURE 2**
DATE:	MAY 2019		

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FILE NO.: Figure 2 - Conceptual Remedy Layout.dwg

Appendix A
Site-Specific Health and Safety Plan

SITE-SPECIFIC HEALTH AND SAFETY PLAN
FOR
REMEDIATION ACTIVITIES

FORMER CHEVRON ASPHALT COMPANY
State Superfund Program Site No. 4-42-029B
7 Water Street
Troy, New York 12180

Prepared by:

TRC Engineers, Inc.
1430 Broadway, 10th Floor
New York, New York 10018

TRC Project Number: 336301

June 2019

DISCLAIMER

STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THESE SITES. THE HEALTH AND SAFETY GUIDELINES IN THIS HEALTH AND SAFETY PLAN WERE PREPARED SPECIFICALLY FOR THIS PROJECT AND SHOULD NOT BE USED ON ANY OTHER SITE OR PROJECT WITHOUT PRIOR RESEARCH AND EVALUATION BY TRAINED HEALTH AND SAFETY SPECIALISTS.

TABLE OF CONTENTS

Section **Page**

ATTACHMENTS

1.0 SITE INFORMATION

1.1 Introduction

The following is the Health and Safety Plan (HASP) for remediation activities at the Former Chevron Asphalt Company (Chevron) site located at 7 Water Street, Troy, New York 12180 (the "Site"). A detailed scope of work is described in the Remedial Design/Remedial Action (RD/RA) Work Plan.

The site-specific HASP was developed from Site visits and investigations, as well as appropriate project documents. Revisions and/or alterations to this HASP may become necessary as more information becomes available. Any proposed changes to this HASP will be approved by the Health & Safety Coordinator prior to implementation. All on-site personnel are required to read, review, and strictly comply with the HASP as well as sign the Health and Safety Plan Acceptance in **Attachment A**. It is the responsibility of the Project Manager or designee to ensure that the HASP is implemented and enforced.

1.2 Purpose

The Site remediation tasks and objectives include the prevention of the following: migration of contaminants into groundwater and surface water; direct contact with and/or ingestion of contaminated soils and asphalt/tar deposits; inhalation of or exposure to contaminants volatilizing from the soil and asphalt/tar deposits; and impacts to biota from ingestion/direct contact with soil and asphalt/tar deposits causing toxicity or impacts from bioaccumulation through the terrestrial food chain. Remedial measures described herein will be performed in accordance with this HASP and applicable federal, state, and local regulations.

1.3 Site Description and History

The Site is located approximately 12 miles northeast of the City of Albany and occupies approximately nine acres located on the west side of Water Street. The facility was operated by American Bituminous and subsequently Chevron Asphalt Company from 1953 to approximately 1999. The facility obtained refined asphalt by barge (located 350 feet north upstream the Site) or rail, stored the asphalt in large above ground storage tanks (ASTs) and subsequently loaded the asphalt into the customers' tanker trucks.

Previous investigations conducted at the Site include a Phase I Environmental Site Assessment (ESA) and Limited Phase II Environmental Site Investigation (ESI) prepared by Ecology and Environment, Inc. (E&E) in 1993; an Expert Report prepared by Dan Raviv Associates (predecessor of TRC) in 2001; Facility Closure – Site Investigation Report prepared by TRC

RAVIV Associates, Inc. in August 2015; a Remedial Investigation (RI) Report prepared by TRC in January 2015; a Feasibility Study Work Plan prepared by TRC in March 2017 and the results were included in a Supplemental Remedial Investigation Report prepared by TRC in November 2017; and a Focused Feasibility Study (FFS) Report prepared by TRC in September 2018.

Based on the results of previously investigation, the primary contaminants of concern include polycyclic aromatic hydrocarbons (PAHs) and arsenic in on-Site surface soil and PAHs in upland surficial deposits of asphalt/tar materials observed in the riverbank adjacent to the Site.

2.0 SCOPE OF WORK

Remedial activities to be implemented as part of the RD/RA Work Plan include:

- Remove and dispose contaminant source areas (e.g., tar, asphalt, and purifier waste deposit; and soils that create a nuisance condition as defined by CP-51 Section G), including:
    - All tar/asphalt and purifier waste deposits located in the Site area east of the top of the Hudson Riverbank (referred to as upland area), extending to a maximum depth of eight feet below grade surface (bgs).
    - All tar/asphalt deposits located in the Site area west of the top of the Hudson Riverbank (referred to as stream bank area), extending to a depth of approximately two feet bgs.
- Post-excavation documentation/confirmatory soil sampling in the area that exhibits elevated concentrations of PAHs or arsenic (indicative of tar/asphalt and/or purifier waste deposits).
- Construct a site cover that will allow for commercial use of the Site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs).
- Restore the vegetation in the stream bank area based on pre-existing conditions.

3.0 EMERGENCY AND TRC CONTACT NUMBERS

Ambulance: **911** Fire Department: **911**

Police Department: **911 (Capital Department, (518)-474-5331)**

Hospital: **St. Mary's Hospital**

Emergency Center No.: **(518) 268-5000**

Hospital Address: **1300 Massachusetts Avenue, Troy NY 12180**

HOSPITAL DIRECTIONS

NOTE: FOR ANY TYPE OF SERIOUS MEDICAL EMERGENCY, CALL 911 AND REQUEST AN AMBULANCE. NEW YORK CITY STREETS ARE OFTEN CONGESTED DUE TO HEAVY TRAFFIC, CONSTRUCTION AND DOUBLE-PARKED VEHICLES AND IT MAY BE DIFFICULT TO DRIVE TO THE EMERGENCY ROOM.

Refer to **Attachment B** for Hospital Route Direction with maps.

TRC Contacts

1. Project Manager

   Name: Kenneth Robbins

   Office/Division: New Providence, NJ

   Cell Phone: 973-271-3933

   Office Phone: 908-988-1677

2. Certified Industrial Hygienist

   Name: Ed Gerdts, CIH

   Office/Division: New York, NY

   Office Phone: 212-221-7822

3. National Safety Director

   Name: Mike Glenn

   Office/Division: Irvine, CA

   Office Phone: 949-727-7347

   Cell Phone: 949-697-7418

4. Office Safety Coordinator (OSC)

   Name: Ryan Jorrey

   Office/Division: Clifton Park, NY

Office Phone: 518-688-3102

Cell Phone: 315-868-4440

5. Work Care can provide assistance in providing first aid advice and directing an injured worker to non-emergency medical care. WorkCare is a service that provides 24/7 access to an Occupational Healthcare physician or clinician.

   Work Care Incident Intervention: 888-449-7787 (refer to **Attachment C)**

6. Human Resource Manager

   Name: Suzanne Micallef

   Office/Division: Administrative

   Office Telephone: 978-656-3628

Refer to **Attachment D** for emergency contact information.

4.0 HAZARD ASSESSMENT

4.1 Contaminants of Concern

Based on our understanding of the history of the Site and the results of previous environmental investigations performed at the Site, the following chemical hazards have been identified:

- The primary contaminants of concern in the on-Site surface soil includes PAHs and arsenic.
- In the riverbank adjacent to the site, the contaminant of concern are PAHs in upload surficial deposits of asphalt/tar materials.

Safety Data Sheets (SDS) for compounds of concern are provided in **Attachment E**.

4.2 Level of Protection

The Project Manager will continually evaluate levels of protection to be utilized by on-site personnel, with assistance from the Health & Safety Coordinator and the Industrial Hygienist. The levels of protection may be downgraded or upgraded, as necessary, with approval by the Project Manager.

5.0 ON-SITE OPERATION

5.1 First Aid Procedures for Chemical Exposures

EYE: If any chemicals come in contact with eyes, immediately wash the eyes with large amounts of water, occasionally lifting lower and upper lids. Get medical attention immediately.

BREATH: If person breathes large amounts of any chemicals, remove person to fresh air. If breathing has stopped, perform artificial respiration. Keep affected person warm and rested. Get medical attention as soon as possible.

SKIN: If any chemicals except those listed below come in contact with the skin, immediately wash skin with soap and water. Get medical attention promptly. If chemical penetrates clothing, immediately remove clothing and wash with soap and water.

SWALLOW: If any chemicals are swallowed get medical attention immediately

5.2 Chemical Hazards

Based on previous investigations completed at the Site, the presence of the following contaminants is expected in soil:

- Metals, specifically arsenic.
- VOCs, specifically PAHs.

5.3 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards, such as animals and their scat.

During Site operations, wild animals such as birds, rats, stray dogs or cats, raccoons, and other rodents and their scat may be encountered. Workers will use discretion and avoid all contact with wild animals and their scat. Avoid areas and habitats inside and outside work areas that are contaminated with scat. If unsafe conditions are noted (e.g., gross accumulations of scat or vermin infestations), work in these areas will be halted and reevaluated.

5.4 Physical Hazards

The physical hazards are anticipated to be low and are outlined in Table A-1 below.

TABLE A-1

PHYSICAL HAZARDS

HAZARD TYPE	KNOWN	POTENTIAL
Heat Stress/Cold Stress		X
Severe Weather (lightning, snow, sleet)		X
Excessive Noise		X
Facility Operations (machinery, structures)		X
Unstable ground (wet areas)		X
Site Operations (drilling, hand and power tool use)	X	
Heavy lifting/moving		X
Hazardous materials use & storage		X
Fire		X
Slips, trips, and falls	X	
Cuts, punctures		X

TRC personnel can avoid most of the hazards listed above including hand tools, hazardous materials use, slips, trips and falls, and punctures and cuts by remaining alert and performing safe work practices during all site activities. Other proper work practices are outlined below.

1. To avoid falling objects:
   - Do not walk or stand under suspended/overhead loads (including scaffolding).
   - Be aware of falling objects in the work area.
   - Secure overhead objects.
2. When using hand tools:
   - Hand tools will meet the manufacturer's safety standards.
   - Hand tools will not be altered in any way.
   - Makeshift tools will not be used.
   - At a minimum, eye protection will be used when working with hand tools.

- Wrenches, including adjustable, pipe, end and socket wrenches, will not be used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges and chisels, will be kept free of mushroom heads.
- Wooden handles will be free of splinters or cracks and secured tightly to the tool.

3. Overhead Wires and Underground Utilities:

   If contact is possible (i.e., ladder, equipment, crane lift, etc.) one or more of the following will be done:

   - Power sources will be disconnected by the utility;
   - Power sources will be shielded by the utility; and
   - Object will get no closure than 12' to prevent arcing.

4. Slips, Trips and Falls:

   - Proper lighting will be maintained at all times.
   - Walkways will remain clear and unobstructed at all times.
   - When possible, cords, hose lines, etc., will be raised to reduce or eliminate trip hazards.

5.5 Cold Stress

The single most important aspect of hypothermia (cold stress) is the fall in the deep core temperature of the body. Workers should be protected from exposure to cold so that the deep core temperature does not fall below 36°C (96.8°F). Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision-making, or loss of consciousness.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 35°C (95°F). This must be taken as a sign of danger to the workers and exposure to cold should be immediately terminated for all workers when severe shivering becomes evident. Useful physical, or mental work is limited when severe shivering occurs.

Since prolonged exposure to cold air at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided. Adequate insulating clothing to maintain core temperatures above 36°C must be provided to workers if work is performed in air temperatures below 4°C (40°F). In addition, it should be kept in mind that, the higher the wind speed and the

lower the temperature in the work area, the greater the insulation value of the protective clothing required.

To prevent cold stress, Contractor personnel will be encouraged to maintain an optimal level of physical fitness, and to maintain body fluids at normal levels. Workers will be encouraged to drink water before beginning work and frequently during the day. TRC personnel and subcontractors will be instructed to recognize symptoms of and measures to prevent cold stress prior to the commencement of field activities.

5.6 Noise

Approved hearing protection will be required in work areas involving heavy equipment, impact tools, drilling, etc. In general, hearing protection should be worn if an individual cannot be heard in a normal speaking voice at a distance of two feet.

5.7 Electrical Utility Hazards

TRC will implement the following subsurface utility clearance procedure:

- TRC will review available site plans for work involving activities at or near utilities.
- TRC's utility mark-out subcontractor will conduct a geophysical survey around all proposed intrusive locations to identify subsurface electric utilities and mark the centerline of underground lines.
- The drilling or excavation contractor will notify Dig Safely New York (via online form or phone call to 811)
- NYC One Call Center at (800) 272-4480, in accordance with Code 753, a minimum of 5 working days prior to any drilling or excavation on streets and sidewalks.

5.8 Mechanical Hazards

The mechanical hazards are anticipated to be associated with excavation activities and loading of trucks using a backhoe/excavator. The following precautions will be taken around construction equipment and excavations:

- Ensure the equipment operator is aware of the location of on-site personnel at all times to avoid potential injuries (e.g., maintain eye contact with the equipment operator). A spotter should be used to direct the movement of heavy equipment. A swing zone should be established with cones behind any excavators to prevent injury during movement of equipment.

- Exercise caution and wear protective equipment around the equipment to guard against crushing and pinching hazards. On-site personnel will maintain a distance (approximately 10 feet) from mechanical hazards associated with heavy equipment.
- Perimeter protection in the form of barricades is necessary for the protection of employees and subcontractor personnel and the public. Such protection will meet requirements set forth in 29 CFR 1926.
- All field team members working near/with equipment with emergency shut-off switches should be aware of the locations and situations when these switches should be used.

5.9 Air Monitoring Requirements

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Continuous monitoring and observations will be required for all intrusive work activity. A detailed description of the Community Air Monitoring Plan (CAMP) is provided as Appendix B to the RD/RA Work Plan.

OSHA Permissible Exposure Limit (PEL)

The OSHA PEL, for benzene, which will be used to determine the appropriate respiratory protection, is 1 part per million (ppm) over an 8-hour time-weighted average or 5 ppm over 15 minutes. This value is based upon the OSHA PEL for benzene, which, of the VOC constituents of petroleum compounds, has the lowest PEL.

Respiratory Protection

It is unlikely that respiratory protection will be required during implementation of the work plan. TRC's health and safety goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures before PPE is required. If air monitoring measurements indicate that levels of organic vapors have reached 5 ppm, workers will cease work in the area until levels of organic vapors have decreased. If necessary, modifications to work practices will be implemented to reduce or avoid generating elevated levels of organic vapors.

Respiratory protection for TRC's subcontractor may be required during tank cleaning activities. Any upgrade in respiratory protection will be coordinated with the Health & Safety Coordinator and the Industrial Hygienist. For operations that may require the use of a respirator, the TRC Project Manager (and Contractor equivalent) must verify that Field Personnel are medically

approved to use respiratory equipment, fit tested, and trained in the proper use of respirators. Only respirators that are NIOSH/MSHA1 approved are to be used.

Exposure Limits: The following tables summarizes anticipated concentrations and accepted exposure limits of chemicals potentially present at the Site.

Known or Suspected Chemicals/Contaminants	
Chemical/Contaminant of Concern	**OSHA Permissible Exposure Limit (PEL)**
Heavy metals – Arsenic	0.01 mg/m^3 (OSHA PEL for Arsenic, inorganic compounds)
PAHs, including Benzene	1 ppm

1 NIOSH – National Institute for Occupational Safety and Health; MSHA – Mine Safety and Health Administration

6.0 GENERAL SAFETY REQUIREMENTS

The general safety rules listed below apply to all TRC personnel present at the site.

- A tailgate health and safety meeting will be held with all field team members and subcontractors each day prior to the start of work.
- Adhere to all requirements of this health and safety plan (HASP).
- Wear protective clothing appropriate for the designated level of protection and decontaminate before entering clean areas when applicable.
- Use safety equipment in accordance with OSHA guidance and labeling instructions.
- Maintain safety equipment in good condition and proper working order and make sure that the equipment is calibrated prior to use.
- Immediately report unsafe acts or conditions to the Project Manager and OSC.
- Eating, drinking, and smoking are prohibited on site, except in designated areas.
- Maintaining a position upwind from intrusive activities is encouraged.
- The emergency shutoff switch should be demonstrated to be working prior to initiating excavation activities.
- An adequately stocked first-aid kit will be maintained at the work site.

Communication

TRC team members shall be equipped with cellular telephones. If an emergency occurs, and the team members are not in close proximity to each other, communication will occur via telephone.

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

It is anticipated that Level D PPE will be required. Level D protection is applicable when no respiratory protection and minimal skin protection is required. Level D can be used in the following circumstances:

- The atmosphere contains no known hazard
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals

The Level D recommended for this Site includes:

Level D Personal Protective Equipment	
Item	**Rationale/Notes**
Hardhat	Appropriately rated hard hats will be worn by personnel for protection against overhead hazards, including electrical.
Hearing protection	Hearing protection will be worn by all personnel exposed to more than 85 dB of sound during the workday.
Safety boots	Safety boots will be worn by all personnel during project work described in this HASP and at all times on site.
Eye protection (safety glasses)	Eye protection will be worn when personnel are exposed to flying debris, chemical vapors or particulates. Chemical splash goggles will be worn for protection against chemical gases, vapors or particulates. Safety glasses will be worn for protection against flying objects.
Safety vest	Utilize in areas in or near vehicular traffic of any kind on or off property.
Gloves	Gloves to be changed between samples to avoid cross-contamination. Nitrile chemically resistant gloves will be worn when handling sample bottles.
Kevlar work gloves	As indicated herein, use Cut and Abrasion Resistance Level 4 or Level 5 gloves when necessary for hand protection during field tasks.

If excessive ionizable organic vapors containing of VOCs are detected at or above the action levels (See Section 6.3), workers will cease work in the area until organic vapor levels decrease for Level D PPE. Odor suppression techniques (i.e., water misting and foam) will be used during excavation activities as necessary.

A basic first aid kit will be provided by the contractor and readily available on-Site in the event of an emergency.

A fire extinguisher should be present with the excavator. All personnel working on or around the excavator should know the location of and how to operate the fire extinguisher. TRC will confirm the location of the first aid kid and fire extinguisher during daily tailgate safety meetings.

8.0 DECONTAMINATION PROCEDURES

8.1 Minimization of Contact with Contaminants

During the completion of all Site activities, personnel should attempt to minimize the degree of contact with contaminated materials. This involves a conscientious effort to keep "clean" during Site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination. This may ultimately minimize the degree of decontamination required and the generation of waste materials from Site operations.

8.2 Personnel Decontamination Procedures

The following describes procedures to be employed for personnel decontamination.

PERSONNEL DECONTAMINATION PROCEDURES FOR LEVEL D PROTECTION	
1.	Decontaminate equipment used on-Site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) with moist towel.
2.	Use boot brush to remove soil from treads of shoes.
2.	Remove PPE and wipe down with moist towel.
3.	Remove gloves and deposit in waste container.
4.	If inner clothing has become contaminated, remove it and place it into a poly bag.
5.	Wash hands and face.

8.3 Decontamination Procedures

All liquids used in the decontamination procedure will be collected, stored, and disposed in accordance with federal, state, and local regulations. Personnel performing this task will wear the proper PPE as prescribed in the table in Section 7.

8.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination; wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment.

If the person cannot be moved because of the extent of the injury (a back or neck injury) provisions will be made to ensure that emergency response personnel are able to respond to victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with poly to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent chemical data.

8.5 Hand Held Equipment Decontamination

Hand held equipment includes all monitoring instruments, samples, hand tools, and field logbooks. To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident.

Decontamination procedures for sampling equipment, hand tools, etc. will include a moist towel wipe, as appropriate for the Site conditions.

9.0 REQUIRED PERSONNEL TRAINING

TRC field personnel will have the training outlined below before on-Site work activities:

Project Training Requirements				
(* required for all sites; but minimum recommended) Check "A" if training required for everyone, and check "T" if training required for specific task or per notations.				
A	**T**	**SUBJECT**	**REFERENCE**	
			29 CFR 1910	**29 CFR 1926 or Other**
☒	☐	HAZWOPER 40 hour	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-site	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher	1910.120	1926.65
☐	☒	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR[1]	1910.151	1926.23,.50
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☐	DOT / IATA Shipping Training	1910.1201	49 CFR 172.704
☒	☐	TRC Hand Protection Policy	1910.138	TRC Policy[2]
☒	☐	Defensive Driving	N/A	White Paper[3] TRC Manual[4]
Client-specific training: ☐ Not Applicable ☐ Specify				
Client-specific training: ☐ Not Applicable ☐ Specify				
Client-specific training: ☐ Not Applicable ☐ Specify				

Note:
* The OHSO shall have OSHA 8-hour supervisor training, in addition to 40-hour HAZWOPER.
1 Per the TRC Health and Safety Policy and Procedure Manual, each TRC project will have at least one certified CPR/first aid trained person on- Site at all times. All Project Managers, and anyone acting as the on-site Health and Safety Officer, must be current in First Aid/CPR.
2 TRC RMD Hand Protection Policy, August 2012
3 Guidelines for Employers to Reduce Motor Vehicle Crashes (joint white paper by NETS, NHTSA and OSHA)
4 TRC Driver and Vehicle Management Policy and Procedure Manual, Rev 1 (April 2012)

Project training requirements beyond those provided in the above table will require a HASP revision/upgrade or concurrence of the TRC Safety Director or Practice Safety Manager.

10.0 MEDICAL MONITORING

Medical monitoring will apply routinely to all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year (40 CFR 1910.120[f][2][i]). Said TRC field personnel will have the medical surveillance outlined in the table below prior to commencing on-site work activities.

Medical Surveillance Required			
*Baseline is minimum recommended.			
	29 CFR 1910	**29 CFR 1926 or Other**	**Notes**
☒ HAZWOPER Physical - Baseline	1910.120	1926.65	
☒ HAZWOPER Physical – Annual	1910.120	1926.65	
☐ HAZWOPER Physical - Biennial	1910.120	1926.65	
Client-specific drug testing[1]	☒ Not Applicable ☐ Specify		
Client-specific medical monitoring[1]	☒ Not Applicable ☐ Specify		
Site-specific medical monitoring:	☒ Not Applicable ☐ Specify		

Note:
[1] Client required drug testing or medical monitoring should be coordinated through the Project Manager.

TRC has a Drug and Alcohol-Free Workplace Policy. TRC may require employees or subcontractors to be tested upon reasonable suspicion, following accidents or incidents during work activities, or during travel to or from a project Site. Client policies may be stricter in regard to procedures following an accident. Project Managers must be aware of these and inform employees and subcontractors of any additional requirements.

11.0 TAILGATE SAFETY MEETINGS

A tailgate safety meeting will be conducted daily prior to commencement of the work day (see Daily Pre-Job Safety Briefing Form provided in **Attachment F**) or if site conditions change.

Topics covered by the tailgate safety meeting will include, but not be limited to:

- Scope of work and who will conduct each task
- Potential hazards for the scope of work
- Weather forecast
- PPE
- Emergency procedures and the route to the medical facility
- Site conditions and features
- Communication guidelines related to stakeholder engagement and visitors

Safety meetings will be held to address modifications to this HASP and any addenda prepared to supplement the HASP. Subcontractors and personnel present at the tailgate safety meeting shall be required to sign an acknowledgement form after each meeting.

12.0 OBSERVATIONS

Note that the Project Manager and/or OSC may notify field staff that their site activities may be the subject of Safety Observation, an integral part of the continuous improvement safety culture promoted at TRC. If subject to an observation, please note the following:

- The Observation will tend to focus on the highest risk activity (as a general example, drilling in a public right-of-way).
- Follow-up observations may be required, depending on prior data collected.
- The observer's preparation before visiting the site will be a review of the HASP, client-specific requirements, etc., and a review of the work scope with the Project Manager to ensure the context of the work is well understood in advance.
- Review items may include PPE, body use and positioning, work environment, operating procedures, and tools and equipment (see **Attachment H**).
- The observation should last between 30 and 60 minutes.

Observations will be documented on the form found in **Attachment H**. Both positive and negative observations are candidates for documentation and later discussion. The overarching goals are to identify and correct questionable practices, and to identify and promote good, safe and efficient practices. It is a data gathering process that will allow TRC safety specialists to identify root causes for safety issues in both categories to better inform policy decisions.

In addition, TRC may record a Safe Catch which is identification and mitigation of a condition that may have created a hazard if it were not identified. The Safe Catch documentation is provided in **Attachment I**.

13.0 INCIDENT REPORTING

In case of an incident, TRC personnel must report the incident immediately to their project manager/supervisor and/or OHSC, and client's representative, and follow the TRC Incident Response and Reporting Process (see **Attachment G**). Required forms must be completed within 24 hours following the incident. If the forms are unavailable, the incident shall be reported to the TRC Safety Director (Mike Glenn). Accident/injury/exposure information must be recorded per TRC policy (see **Attachment G**) and will be the basis of any accident/incident investigations.

14.0 ACKNOWLEDGEMENT

All TRC personnel operating under this HASP must read the HASP and sign the acknowledgment page in **Attachment A**.

15.0 SUBCONTRACTORS AND HEALTH AND SAFETY PLANNING

TRC personnel must provide the complete HASP to all subcontractors for their reference in advance of the work. Subcontractors must prepare their own site-specific HASP and provide evidence of HASP preparation before the start of site work to ensure that the subcontractor has an understanding of the safety hazards associated with the work that they are performing. Subcontractor HASPs are not required to be included unless contractually/client required, of is so desired by the Project Manager or OSC.

Attachment A
Health and Safety Plan Acceptance

SITE: Former Chevron Asphalt Company, 7 Water Street, Troy, NY

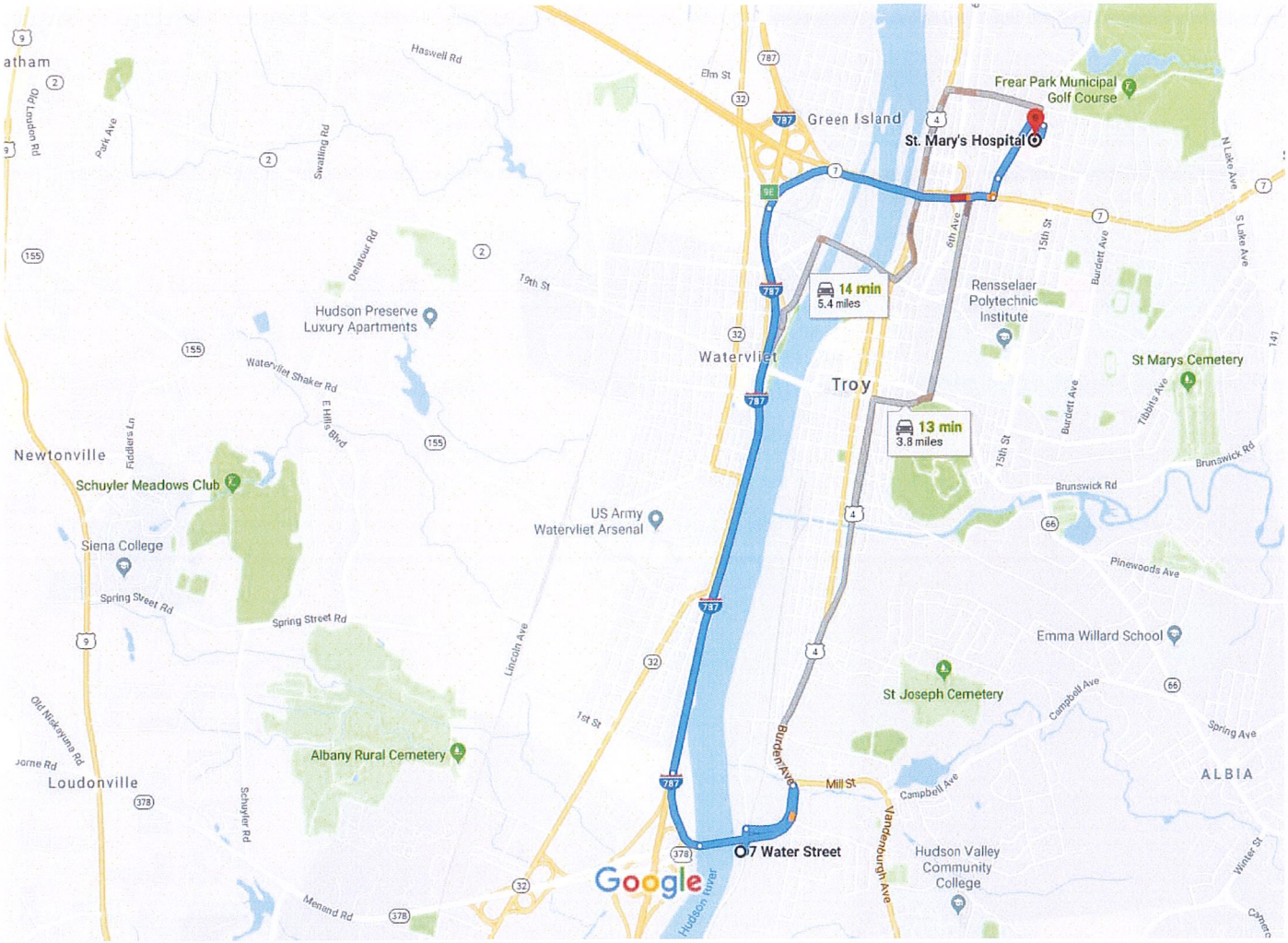
I have received a copy of the Health and Safety Plan for this site and have read, understand and will abide by the procedures set forth in this Health and Safety Plan and any amendments to this plan.

Printed Name	**Signature**	**Date**

Attachment B
Hospital Route

Google Maps 7 Water St, Troy, NY 12180 to St. Mary's Hospital

Drive 5.2 miles, 10 min



7 Water St

Troy, NY 12180

Get on I-787 N in Colonie from Water St and NY-378 W

4 min (1.3 mi)

1. Head north on River Rd/Water St

0.1 mi

2. Turn right onto Water St

0.3 mi

3. Sharp right onto NY-378 W/Burden Ave
   Continue to follow NY-378 W

0.6 mi

4. Use the right lane to take the Interstate 787 N ramp to Cohoes

0.4 mi

Continue on I-787 N to Troy

4 min (3.4 mi)

5. Merge onto I-787 N

2.4 mi

6. Use the right 2 lanes to take exit 9E to merge onto NY-7 E toward Troy/Bennington

1.0 mi

Take Oakwood Ave to Massachusetts Ave

2 min (0.4 mi)

7. Use the left 2 lanes to turn left onto 10th St

433 ft

8. Continue onto Oakwood Ave

0.3 mi

9. Turn right onto Massachusetts Ave

285 ft

10. Turn right to stay on Massachusetts Ave
    Destination will be on the right

213 ft

St. Mary's Hospital

1300 Massachusetts Ave, Troy, NY 12180

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Appendix B
Community Air Monitoring Program

COMMUNITY AIR MONITORING PLAN

In accordance with the Remedial Design/Remedial Action (RD/RA) Work Plan, this Community Air Monitoring Plan (CAMP) was developed to describe the procedures for real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area at the Site during ground intrusive work activities at the Former Chevron Asphalt Company located 7 Water Street, Troy, New York (referred to as the "Site"). The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

Community Air Monitoring Plan

Real-time air monitoring for VOCs and observations of particulate levels at the perimeter of the work areas will be completed during intrusive activities. Continuous monitoring and observations will be required during soil excavation activities. The downwind location will be just inside the fence line at the edge of the property.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of each designated work area on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated daily. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring will continue. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring will continue. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings will be recorded and will be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind locations of the borings at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will be stopped and a re-evaluation of activities will be initiated. Work will be able to be resumed provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

3. All readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

ODOR MONITORING AND MITIGATION PLAN

The purpose of this Odor Monitoring and Mitigation Plan is to detail the monitoring and, if necessary, mitigation of odor potentially generated during implementation of the RD/RA Work Plan. However, work activities will be performed to minimize the potential for generation of odor.

Odor Monitoring

Odor will be monitored within the work area and at the perimeter CAMP stations. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Odor or dust complaints from any owner or occupant of an adjacent or nearby property will be immediately addressed and managed by the Environmental Monitor in a manner equivalent to an exceedance of an air monitoring action level.

Odor Mitigation

All necessary means will be employed to prevent on- and off-Site nuisances. These measures may include: containerizing drill cuttings immediately and using tarps to cover exposed odorous soil (if encountered). Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps, except when materials are being removed or added, and during stockpile sampling. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: use of chemical odorants in spray or misting systems; and, use of staff to monitor odors in surrounding neighborhoods. It is anticipated that any nuisance odors developed during intrusive work can be corrected, without the use of a temporary containment structure equipped with appropriate air venting/filtering systems.

Appendix C
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the field activities described in the scope of work. The QAPP also describes specific *protocols* for field sampling, sample handling and storage, and laboratory analysis. The data generated from the analysis of samples will be used to document post-excavation soil conditions and post-remediation groundwater conditions.

Project Organization and Responsibility

A qualified person will coordinate and manage the sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. TRC will direct the sampling activities and coordinate laboratory and remedial activities. The TRC Project Quality Assurance (QA) Officer will be Elizabeth Denly and will report directly to the Project Manager, Kenneth Robbins.

A qualified person will provide oversight and technical support for the sampling and analytical procedures followed in this project. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The Project QA Officer is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Analytical data generated during performance of the work is anticipated to be limited to solid waste characterization sampling. Therefore, data validation will not be performed.

Laboratories used will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratories. The proposed laboratory for this project is EuroFins TestAmerica Laboratory in Buffalo, New York (ELAP Certification No. 10026) and Edison, New Jersey (ELAP Certification No. 11452). The laboratory will communicate directly with the Project Manager regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, temperature blanks, shipping coolers, and laboratory documentation.

QA Objectives for Data Management

New York State Analytical Services Protocol (ASP) Category B laboratory packages will be provided by the laboratory.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples (i.e., micrograms per kilogram (µg/kg) and/or milligram per kilogram (mg/kg)). Table 1A presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements, containers, and QA/QC samples.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses.

Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.).

Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end

uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy and precision.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs.

For quantitation limits for parameters associated with soil samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375 Unrestricted Use Criteria and Commissioner Policy 51 Tables 2 and 3 (CP-51).

The QA objectives are defined as follows:

- ***Accuracy*** is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

  Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being.

  The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. Table 2A summarizes the laboratory accuracy requirements.

- ***Precision*** is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

  Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative samples per matrix per analytical parameter. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are < 5x the quantitation limit, the criterion will be doubled.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil and groundwater analyses, laboratory precision will be assessed through the analysis of field duplicates.

- ***Completeness*** is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

  Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

  Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

- ***Representativeness*** is a qualitative parameter that expresses the degree to which data accurately and precisely represents either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

  Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Remedial Action Work Plan is followed and that proper sampling, sample handling, and sample preservation techniques are used.

  Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

- ***Comparability*** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plan are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

  Comparability is dependent on the use of recognized United Stated Environmental Protection Agency (USEPA) or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

Table 1A
Analytical Parameters, Methods, Preservation, Holding Time, and Container Requirements for Soil Samples

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	No. of QA/QC Samples	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container
Soil	TCL and CP-51 VOCs	Grab	26-30	Duplicate: 1/20	8260C	Sealed in EnCore® bag; Cool to 4° C	48 hours to extract: 2 EnCore® samplers extruded in 5 mL DI water and freeze vials to <-7°C; 1 EnCore® sampler extruded in 5 mL methanol and Cool to 40 C; 14 days to analysis	3 x 5 gram EnCore® samplers
Soil	TCL and CP-51 SVOCs	Grab	26-30	Duplicate: 1/20	8270D	Cool to 4° C	14 days to extract	8 oz glass jar
Soil	Copper and Total Chromium	Grab	10-12	Duplicate: 1/20	6010C	Cool to 4° C	180 days to analysis	8 oz glass jar
Soil	TAL Metals	Grab	16-20	Duplicate: 1/20	6010C	Cool to 4° C	180 days to analysis	8 oz glass jar
Soil	Mercury	Grab	16-20	Duplicate: 1/20	7471B	Cool to 4° C	28 days to analysis	8 oz glass jar
Soil	Total Cyanide	Grab	16-20	Duplicate: 1/20	SW 846 9012B	Cool to 4° C	14 days to extract	8 oz glass jar
Soil	TCL Pesticides	Grab	16-20	Duplicate: 1/20	8081B	Cool to 4° C	14 days to extract	8 oz glass jar
Soil	TCL Herbicides	Grab	16-20	Duplicate: 1/20	8151A	Cool to 4° C	14 days to extract	8 oz glass jar
Soil	PCBs	Grab	16-20	Duplicate: 1/20	8082A	Cool to 4° C	14 days to extract	8 oz glass jar

[1] A six-inch sampling interval is the targeted sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.
[2] Actual number of samples may vary depending on field conditions, sample material availability, and field observations.
[3] From date and time of sample collection

Table 2A
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
TCL and CP-51 VOCs	8260C	Soil	Surrogates / Rec. (%): 1,2-Dichloroethane-d4 78-135; 4-Bromofluorobenzene 67-126; Toluene-d8 73-121; Dibromfluoromethane 61-149	Surrogates: All samples, standards, QC samples	Field Duplicates RPD ≤50	Field Duplicates: One per 20 soil samples
TCL and CP-51 SVOCs	8270D	Soil	Surrogates / Rec. (%): 2-Fluorophenol 38-95; Phenol-d5 32-91; 2,4,6-Tribromophenol 10-103; Nitrobenzene-d5 37-94; 2-Fluorobiphenyl 38-95; Terphenyl-d14 24-109	Surrogates: All samples, standards, QC samples	Field Duplicates RPD ≤50	Field Duplicates: One per 20 soil samples
TAL Metals	6010C	Soil	Matrix Spikes: 75-125% recovery; Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch; Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
Mercury	7471B	Soil	Matrix Spikes: 75-125% recovery; Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch; Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
Total Cyanide	SW 846-9012B	Soil	Matrix Spikes: 75-125% recovery; Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Table 2A
Laboratory Data Quality Objectives: Precision and Accuracy: Soil Samples

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
				Laboratory Control Samples: One per 20 samples per laboratory analytical batch		
TCL Pesticides	8081B	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
TCL Herbicides	8151A	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples
PCBs	8082A	Soil	Matrix Spikes: 75-125% recovery Laboratory Control Samples: 80-120% recovery	Matrix Spikes: One per 20 soil samples per laboratory analytical batch Laboratory Control Samples: One per 20 samples per laboratory analytical batch	Field Duplicates RPD ≤20	Field Duplicates: One per 20 soil samples

Project Goals

The principal objectives of the Remedial Design/Remedial Action (RD/RA) Work Plan sampling program are to characterize solid waste for off-Site disposal.

Sampling Plan

Environmental sampling will include soil. Soil samples will be collected using disposable sampling equipment.

Soil Sampling

Soil samples will be collected in 2-ounce sterile scoops and placed in the sample bottles. EnCore® samplers will be used to collect soil samples for VOC analysis. Samplers will wear phthalate-free gloves such as nitrile (no latex will be used). Only clean instruments will be allowed to touch the sample.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters. Refer to Table 1A for a summary of QC sample preservation and container requirements.

Equipment blanks will consist of distilled water and will be used to check for potential contamination of the equipment (i.e., sterile scoops), which may cause sample contamination. Equipment blanks will be collected by routing the distilled water through the sampling equipment prior to sample collection. Equipment blanks will be submitted to the laboratory at a frequency of one per 20 samples. Refer to Table 1A for a summary of QC sample preservation and container requirements.

Sample Preservation and Containerization

The analytical laboratory will supply the containers for analytical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest USEPA's Specifications and Guidance for Contaminant-Free Sample Containers. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to USEPA specifications. Soil samples will be placed in chilled coolers immediately after collection.

Equipment Decontamination

Since disposable sampling equipment will be utilized, equipment decontamination procedures are not included in this QAPP.

Field Custody Procedures

Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of sample collection, and type of analysis.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

Data Management and Reporting

Since soil sampling is anticipated to be limited to waste characterization samples, data validation will not be performed. Results of waste characterization sampling will be included in the Final Engineering Report.