

# DEPARTMENT OF ENVIRONMENTAL CONSERVATION SITE NO. 5-16-008 <u>Construction Work Plan</u> Saranac Lake Gas Company Site Village of Saranac Lake, New York Contract No. D010663

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SUBMITTED BY:

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May 2, 2018

# **Construction Work Plan**

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- Appendix F Trudeau Mining Permit

# SECTION 1 – INTRODUCTION

#### 1.1 GENERAL

This Construction Work Plan has been prepared by LAND Remediation, Inc. (LRI) to provide explanations on various project components in support of the implementation of the Remedial Action at Saranac Lake Gas Company, Inc. Site in the Village of Saranac Lake, New York (the Site). This Construction Work Plan describes the various work elements in more detail and outlines the anticipated means and methods for executing the project. Construction activities will be completed for the remedial action by LRI, for the New York State Department of Environmental Conservation (NYSDEC). This Site Operations Plan has been prepared in accordance with the following documents:

- **Technical Specifications** •
- Drawings •
- Addendum 1, 2 and 3 •

This Construction Work Plan describes the objectives of the Remedial Action and the following essential elements of work:

- Work Plan Preparation •
- Waste Characterization
- **Pre-Mobilization Activities** •
- Mobilization .
- Sediment and Erosion Control .
- Clearing and Grubbing .
- Temporary Access Roads and Equipment Pads •
- Site Facilities and Security •
- Site Preparation .
- Establish Work Zones .
- Protection of Adjacent Properties and Utilities •
- Impacted Groundwater Handling, Collection, Treatment and Discharge •
- **Dewatering Procedures** .
- **Construction Water Management** .
- Temporary Brandy Brook By-Pass System •
- Material Staging Area(s) •
- Excavation Support System(s) •
- Brandy Brook Excavation .
- Brandy Brook Restoration .
- Turbidity Controls and Monitoring •
- Dredging and Backfilling
- Transportation and Disposal of Materials .
- Winter Shutdown .
- Equipment Decontamination Areas •

- Site Restoration
- Storm Drain Cleaning
- Demobilization
- Air Monitoring Procedure identified in the Air Monitoring Plan (AMP) and Health and Safety Contingency Plan (HASP)
- Project Schedule

This Construction Work Plan also incorporates a schedule for completion of work elements, identifies key members of the project team, and presents a general site layout figure with the associated facilities and equipment during construction.

# **1.2 REMEDIATION OBJECTIVES**

The main goal of this remedial action is to address the requirements of the selected remedy presented in the ROD and the Bid Specifications documents. As outlined in the ROD the remedial action objectives for the site are:

- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.
- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.
- 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, marine and aquatic food chain.
- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.
- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).
- Restore sediments to pre-release/background conditions to the extent feasible.

Based on the Design Documents and Bid Specifications, the elements of the selected remedy for Operable Units OU-2 and OU-3 at the Saranac Lake Gas Site include:

### OU-2 Remedy

- Installation of soil and sediment support facilities including soil/sediment containment and Processing Area;
- Select clearing;
- Temporary diversion of Brandy Brook surface water in active work zones within the remediation area);
- Excavation of MGP-impacted soil and sediment;
- Remove and replace driveway crossing culverts along the Brandy Brook excavation limits;
- Conduct verification sampling;
- Conduct post-excavation survey;
- Cleaning of storm drain piping that conveys Brandy Brook under Lake Flower Avenue;
- Dewatering and stabilization of excavated soil and sediment;
- Transportation and offsite disposal of MGP-impacted soil and sediment at an approved disposal facility;

- Treatment and discharge to surface water of dewatering and construction water removed from the excavation area;
- Site restoration in accordance with an approved restoration plan;
- Periodic winter inspections over the winter period to ensure erosion and sediment BMPs are in good condition and operating and the Site is stable; and
- Conduct as-built survey.

### OU-3 Remedy

- Installation of dredge support facilities including a hopper barge Sediment Unloading Area and a Temporary Fabric Structure (TFS) Processing Enclosure;
- Installation of turbidity curtain, buoys, and warning lighting around dredge area;
- Select clearing and demolition of existing features;
- Protection of existing headwalls and retaining walls located adjacent to the dredge limits;
- In-situ stabilization of impacted upland soil along a section at the southeast end of Pontiac Bay;
- Dredging of MGP-impacted sediment;
- Dewatering and stabilization of dredged sediment;
- Conduct post-dredge bathymetry survey;
- Transportation and offsite disposal of MGP-impacted sediment at an approved disposal facility;
- Treatment and discharge to the surface water of dewatering and construction decant water removed from the dredged sediments;
- Backfill dredged area with clean sand and gravel;
- Upland site restoration including the town owned property (Ice Palace parcel), public boat launch property and Pontiac Bay shoreline to replace and/or repair existing features in accordance with restoration plan;
- Some restoration may have to occur in the spring of 2019;
- Periodic winter inspections over the winter period to ensure erosion and sediment BMPs are in good condition and operating and the Site is stable;
- Conduct post-backfill bathymetry and as-built surveys.

# 1.3 SCOPE OF WORK

The following is the overall scope of work to be completed during the remedial action in accordance with the approved Bid Specifications dated November 2017 and Addenda 1-3:

- Approximately 20,265 cubic yards of MGP-impacted soil and sediment that exceed soil cleanup objectives will be dredged and excavated. For soil contaminated with VOCs, SVOCs, metals and pesticides that do not fail the Toxicity Characteristic Leaching Procedure (TCLP), will be managed as non-hazardous waste. Soils containing greater than 0.50 mg/l of Benzene, will be managed as MGP Exempt waste and sent for thermal treatment. The final excavation limits will be sampled for the site constituents and results will be used to define the limits of the excavation.
- Approximately 30,000 tons of soil will be shipped to a non-hazardous landfill for disposal to a NYCRR Part 360 permitted landfill.
- Approximately 3,340 tons of soil/sediment will be shipped for low temperature thermal desorption.
- ISS of approximately 3,400 square foot area.

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- Performance of Health and Safety procedures for the duration of the construction activities.
- Provide site services including trailers, restrooms, decontamination facilities, off-site scale, and temporary structure with air handling system.
- All excavations will be backfilled with offsite material to properly regrade the site to meet the final grading contours.
- All disturbed areas will be restored with topsoil or stone and either seed mixture and plantings in compliance with the contract specifications.
- Monitoring wells will be abandoned during remedial activities.
- Installation of groundwater containment, treatment, testing and discharge of treated effluent to Lake Flower via Brandy Brook or direct discharge to the lake.

# 1.4 ORGANIZATIONAL STRUCTURE AND PROJECT TEAM

This remedial action for the Saranac Lake Site will be completed by a team comprised of several organizations and agencies including; NYSDEC, MACTEC (Engineer) and LRI. LRI will be responsible for the execution of the remedial action including all dredging, excavation, backfilling, ISS, transportation, disposal, and restoration activities at the Site. LRI has selected a project team to efficiently complete the remedial action. An Organization Chart has been provided in Appendix A. The project organization, roles, and responsibilities are summarized below. Resumes of LRI personnel are provided in Appendix A.

### **NYSDEC**

NYSDEC will ultimately be responsible for all aspects of the construction including securing contracts, contract modifications and change orders, payment, final review of documents prior and communication with the public. The contact information for NYSDEC's key personnel during the project includes:

Mr. Michael Mason, P.E. and Mrs. Sarah Saucier, PM New York State Department of Environmental Conservation Division of Environmental Remediation 625 Broadway Albany, New York 12233-7014 Phone - (518) 402-9814 E-Mail: <u>Michael.Mason@dec.ny.gov</u> <u>Sarah.Saucier@dec.ny.gov</u>

### MACTEC

MACTEC is providing engineering oversight and construction management services for NYSDEC. MACTEC will manage the project from the quality of work, contract administration and communications. MACTEC will provide the initial review and communications prior to documents being finalized. MACTEC is under contract to NYSDEC as the design engineer and will be responsible for reviewing all documents prepared by LRI (i.e., this Construction Work Plan, Health and Safety Plan, Preliminary Schedule, Traffic Control Plan, Temporary Fabric Structure, Marine Resuspension Plan, Construction Water Management Plan, Storm Water Pollution Prevention Plan, Sampling Plan and Quality Assurance/Quality Control Plan along with future construction submittals, and other submittals related to execution of project) to confirm compliance with the design performance requirements. During the performance of construction activities, MACTEC will provide full-time construction observation and documentation on behalf of NYSDEC. The contact information for MACTEC's key person during the remedial action project includes:

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Mark Stelmack, Project Manager Mark Peters MACTEC 511 Congress Street Portland, ME 04101 Phone: (207) 775- 5401 Email: Mark.Stelmack@woodplc.com Mark.Peters@woodplc.com

### LAND Remediation, Inc.

LRI will ultimately be responsible for the preparation of this Construction Work Plan, Health and Safety Plan, Preliminary Schedule, Traffic Control Plan, Temporary Fabric Structure, Marine Resuspension Plan, Construction Water Management Plan, Storm Water Pollution Prevention Plan, Sampling Plan and Quality Assurance/Quality Control Plan and other construction submittals, and implementation of remedial construction activities. LRI is under contract to NYSDEC to implement the construction activities and will be responsible for implementing these activities in accordance with the Technical Specifications, Design Drawings, Contract, this Construction Work Plan, and applicable Federal, State, and local laws and regulations. All documents prepared by LRI will be submitted to NYSDEC and MACTEC for their review and approval. The contact information for LRI's key personnel during the Remedial Action project includes:

Keith A. Decker, Project Director Will Lindheimer Lisa Gorton, Project Manager , Site Supervisor Minda Murray, Health and Safety Manager LAND Remediation, Inc. 74 Hudson River Road Waterford, NY 12188 Phone: (518) 229-7214 – Keith's cell # (518) 937-0437 – Will's cell # Email: kad@land-remediation.com wpl@land-remediation.com lag@land-remediation.com

- Project Director Mr. Keith Decker will act as the Project Director and has over 30 years of hands-on construction management experience involving public and private sector projects. As an LRI's Project Director, he is responsible for the overall project, including personnel and subcontractor staffing and/or procurement, health and safety requirements, materials and equipment procurement, cost and schedule control.
- Project Manager Mr. Will Lindheimer will serve as Project Manager. Mr. Lindheimer will be on-site on a
  regular basis and be in contact with the site superintendent as it relates to day-to-day operations, control of

site personnel, production, and quality control. Mr. Lindheimer has the site experience with large remediation projects and has developed the site excavation approach for this project.

- Project Manager/Quality Control Mrs. Lisa Gorton. P.E. will serve as assistant Project Manager and Quality Control Officer. Mr. Gorton has over 20 years' experience in the environmental field and has extensive experience in the MGP sector and dredging sector.
- Site Superintendent Mr. Michael Evens will serve as Site Supervisor and will be on-site and manage the site personnel and will be responsible for executing the construction activities on-site. The site superintendent will maintain communications with the Project Manager to insure enough resources are available to complete the project in the required time frame.
- Health and Safety Manager Mrs. Minda Murray will serve as the Health and Safety Manager. Mrs. Murray has over 17 years' experience in providing H&S support for various remedial investigation and remedial action projects across the northeast. Mrs. Murray will be in communication with the Health and Safety Officer onsite. Mrs. Murray will assist in the proper execution of the daily H&S requirements including air monitoring for organic vapors and dust, proper decontamination procedures, and proper PPE levels for all site workers conducting work activities with impacted material.
- Health and Safety Officer TBD will serve as the Health and Safety Officer and will be on-site every day • executing the site safety and air monitoring program. The Health and Safety Officer will report to Mrs. Murray and will consult with her on field activities and documentation.

#### 1.5 WORK PLAN FORMAT AND CONTENT

This Construction Work Plan identifies the functional and technical requirements of the project, and includes; procedures for specific remedial action work items, figures, additional plans, contact information, and disposal facility and transporter information. The information regarding the Saranac Lake Gas Site work plan is organized as follows:

- Section 2.0: Site Description (site location, site description, and site history)
- Section 3.0: Site Management Plan (Mobilization, Facilities, Site Preparation, Specific Work Items, • Excavation, Transportation and Disposal, Backfill, Restoration)
- Section 4.0: Air Monitoring Program
- Reporting and Documentation (General Reporting Procedures) Section 5.0: •
- Section 6.0: Implementation Schedule
- Site Figures Figures: •
- Appendices: (Supplemental Information)

# SECTION 2 – SITE DESCRIPTION

#### 2.1 SITE LOCATION AND DESCRIPTION

The Site, a former manufactured gas plant (MGP) facility, is in a residential setting off Payeville Lane in the Village of Saranac Lake, Essex County. (Figure 2-1). The Site has been separated into three Operable Units (OUs). This Construction Work Plan only relates to work on Brandy Brook (OU-2) and Pontiac Bay (OU-3).

The Site facility, OU01, is approximately 4.5 acres in size and is located east of and adjacent to the Adirondack Scenic Railroad right of way. Residential properties border OU01 to the north, east, and part of the west side, and North Country Community College soccer fields and facilities border OU01 to the south. An access road extends from Payeville Lane west to OU01. The Site and surrounding area is serviced by public water; groundwater is not believed to be used as a source of drinking water. Currently, OU01 is a vacant lot with an open, unoccupied one-story brick building.

Brandy Brook (OU02) flows through OU01 and continues in a northerly direction for approximately 1,000 feet, then turns to the west and flows for 700 feet, where it discharges to Pontiac Bay in Lake Flower. The section of the brook that turns to the west is culverted under a railroad crossing and culverted again under four driveway crossings and below Slater Avenue and Lake Flower Avenue. The driveway crossings range from 8 to 20 feet long and the culverted section below Slater Avenue and Lake Flower Avenue is approximately 250 feet long. The brook channel is approximately 3 to 5 feet wide. The bottom is scoured fine to medium sand, with pockets of mucky organic material in low lying depositional areas. In places of high water flow and where flow through the brook is more channelized, the bottom of the brook is comprised of predominantly gravel and cobbles. The channel is well entrenched with undercut banks for nearly its entire length. Trees, branches, woody debris, and detritus were observed in the stream channel in multiple locations along the brook.

OU03 includes Pontiac Bay and an adjacent area within Lake Flower. Pontiac Bay (approximately 4 acres) is located along the northeast portion of Lake Flower adjacent to the intersection of Lake Flower Avenue, Brandy Brook Road, and River Street. Lake Flower is a Class A designated water body.

#### 2.2 SITE HISTORY

From the late 1800s to approximately the 1940s, the site was used for manufacturing lighting gas via coal gasification for the Village of Saranac Lake. The operations consisted of two gas holders, a purifier, retort operations, along with coal storage areas and offices. No original structures exist on site today with the exception of a raised concrete storage pad and concrete foundation for one of the gas holders. The past activities at the site have resulted in contamination, both on and off-site.

# Section 3 – Site Management Plan

# 3.1 SOIL BORINGS AND WASTE CHARACTERIZATION SAMPLES

Prior to mobilization activities LRI may elect to collect soil/sediment samples from soil borings at various locations across the site for waste characterization. These samples will be collected using a Geoprobe® Macrocore barrel driven with a slide hammer along Brandy Brook. Based on discussions with the disposal facility 4-5 samples from this area will be collected for waste characterization. The actual number will be pre-characterization samples will be confirmed with disposal facility as part of the Pre-Characterization Sampling Plan. The areas will be segmented and composited to create a representative sample. A sample will be collected for analysis for every 1,500 cubic yards which is in compliance with disposal facilities requirements. The exterior of the Macrocore® sampler will be decontaminated between segment locations. Each sample will be retrieved in the barrel of the Macrocore® in a dedicated acetate liner. Each composite sample created will be sent to the laboratory for analysis for waste characterization (Full TCLP analysis). Results will be submitted to the NYSDEC/Engineer for review. All sampling activities will be in strict compliance with the site- specific Sampling and Analysis Plan (SAP). Sediment samples will be sampled in a similar fashion from a boat. Sample locations will be chosen based on dredge depth areas and composited into 5-6 composite samples. The samples along with the historic sampling results will be provided to the landfill for approval. It is anticipated that 3-4 samples will be collected to create each composite sample for laboratory analysis. During sampling if any material is sampled that appears to be different from other samples, this sample or samples will be kept separate and analyzed with similar samples, if collected, and analyzed for waste characterization. The goal being to identify any potential areas that may require segregation and management, such as material destined as D018 for thermal treatment.

# 3.2 PRE-MOBILIZATION ACTIVITIES

### 3.2.1 WORK PLAN PREPARATION

LRI has prepared this Construction Work Plan, the Site-Specific Health and Safety Plan, the Sampling Plan as part of the project submittals. These plans will cover the means and methods on how the project will be executed.

### 3.2.2 WASTE ACCEPTANCE

LRI will utilize the results of the waste samples collected as described in Section 3.1 and the existing analysis for approvals of the soils/sediments for disposal at the respective disposal facilities. This will allow LRI to complete the needed waste profile forms and obtain the required approvals from the disposal facilities prior to initiation of the remedial construction activities commencing. The pre-approvals will allow the project soils to be shipped immediately without delay once the disposal facilities criteria have been achieved. Additional waste characterization samples, if needed, will be collected once project commences to supplement any additional facility requirements.

# 3.2.3 UTILITY NOTIFICATIONS

Prior to any construction activities, Dig Safely New York will be notified, and all on-Site underground utilities will be marked in the work areas. Underground and above ground utilities that could affect or be affected by construction activities will be identified prior to the initiation of any intrusive soil activities. Locations of all utilities will be marked out by an independent company (UFPO/DIGSAFE). When all utility locations have been identified LRI and the Utility

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Companies will review the locations and determine if any utilities will be in conflict with the proposed excavation limits. If any utility conflicts are identified, LRI, NYSDEC, MACTEC and the appropriate utility company will discuss what actions will need to be taken. LRI will provide documentation from utilities that utility lines have been cleared in the work area.

### 3.2.4 MONITORING WELL DECOMMISSIONING

There are three (3) piezometers and one (1) monitoring well that fall within the limits of the excavation that will be decommissioned during the remedial action as part of the excavation activities. Monitoring wells that do not need to be decommissioned and fall outside the excavation areas will be protected. The monitoring wells that are above grade will be clearly identified by taking wood stakes and flagging to create a visual marking. The bottom of the wells will be punched out, the well tremie grouted and well materials will attempt to be pulled in accordance with Technical Specification 33 11 53 and NYSDEC Policy CP-43. A Well Abandonment Form will be completed for each well and piezometer. Debris generated from the abandonment will be classified for disposal based on the surrounding soil classification. Debris will be staged for disposal once soil has been generated and disposed with the contaminated soil.

### 3.2.5 SURVEY CONTROL PLAN

Based on the varies types of work being performed at OU-2 and OU-3, there are different types of survey being performed. The OU-2 Brandy Brook work will include conventional survey techniques using GPS equipment to document pre-construction conditions, work progress and final site conditions. The work at OU-3 Pontiac Bay will include both topographic and hydrographic survey work. The work associated with the ISS work will include the use of GPS integrated with the excavator mixer to document vertical and horizontal limits treated. The survey tasks that will be completed as part of this project include:

- Pre-excavation survey
- Excavation layout survey
- Pre-dredge/debris bathymetric survey
- Limits of any installed barrier/demarcation layer(s)
- Interim dredge survey
- Post-excavation survey
- Sample location survey
- Post-dredge bathymetric survey
- Post-backfill bathymetric survey
- As-built Surveys

# 3.2.5.1 Survey Procedures

LRI will work with Mr. Nathan Burrows, L.S., license # 050724-1 of S Y Kim Land Surveyor, PC (S Y Kim) a New York State-registered professional surveyor to complete a pre-excavation surveys. A copy of Mr. Burrows license is provided in Appendix B of this document. The general survey plan for this project is to track and record the site conditions before, during and post construction. The first step is to calibrate to the horizontal and vertical control provided by the engineer. Should the control be determined to be out of tolerance SY Kim will notify LRI and the engineer to the discrepancies. SY Kim will record and map the pre-construction site to document features such as topography, structures, above ground utilities and any other features that may affect construction operations.

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During construction LRI will schedule SY Kim to locate and document excavation areas and fill areas to be utilized in the calculation of volumes. Volume calculations will be provided to LRI monthly. After construction is complete SY Kim will provide post-construction mapping showing the restored site.

The survey equipment that may be used for this project are as follows:

- 1. Trimble SPS 930 Robotic Total Station using SCS900 Data Collection Software (Calibration Cert provided in Appendix B).
- 2. Trimble 985 GPS Base and Rover using SCS900 Data Collection Software
- 3. Trimble GCS Machine Control Software

All mapping will be completed in Autodesk Civil 3D 2018, data processing will be completed in Trimble Business Center. All data and field conditions are stored with in SCS900 Data Collection Software. Raw Survey data will be available upon request.

#### 3.2.5.2 **Pre-Excavation Survey**

The survey will be performed to provide general Site layout and verify and stake out the excavation limits. The surveyor will record existing elevations at the provided control points on the Contract Drawings. LRI will also prepare a pre-excavation survey prior to starting construction activities to verify existing conditions. The survey will also be used to build a site model to be programmed into the excavator and dozer for excavation and backfilling to control and maintain grades. Copies of the pre-excavation survey will be provided as a submittal as defined in Technical Specification 01 71 23 – Field Engineering and Surveying.

#### 3.2.5.3 **Excavation Layout Survey**

LRI will prepare a survey with all the individual grids across the excavation area to track excavation depths. Surveyors will maintain a vertical tolerance of 0.01 foot for general excavation and 0.01- foot horizontal control. LRI will prepare a tabular summary of the pre- and post-excavation elevations according to the grid point system. This will be reviewed by the Engineer prior to backfilling to ensure that the excavation design depths have been achieved. A drawing will be provided that shows the original elevations and the final excavation elevations. This survey will also include any structures encountered that are left in place, piping that remains or is capped in place, and any other structures or components. LRI will work with S Y Kim and will maintain a Global Positioning System (GPS) for confirming site conditions. Initially a 3D surface model of the site will be created that incorporates all the existing grades and features. This model will be further refined to create individual work tasks within the system. Tasks developed can be starting elevations in each cell based on the grid created. Then new tasks will be created for bottom excavations elevations, backfill elevation of re-use soil, backfill elevation of imported clean fill and final site features.

#### 3.2.5.4 **Pre-Dredge/Debris Bathymetric Survey**

LRI will perform a pre-dredge survey using multibeam hydrographic technology. This survey along with diving the deeper areas and shallow water visual observations from diver(s) will also serve to identify any subaqueous debris that may be present. This hydrograph will be compiled and submitted as part of the pre-mobilization activities.

# 3.2.5.5 Limits of Installed Barrier/Demarcation

During the course of the project if areas are encountered that cannot be excavated due to structures being present, LRI will install a demarcation barrier of Aquablok. Depending on whether this material is placed on upland areas or subaqueous areas will dictate the type of survey performed. On upland areas the corners of the demarcation area will performed using GPS. If performed in the bay, the area will be surveyed with the GPS on the excavator to document the coordinates.

## 3.2.5.6 Interim Dredge Survey

Interim dredge surveys will be collected by the excavator to confirm the dredge depths have been achieved prior to moving locations. Periodic interim surveys will be performed with single beam hydrograph for confirming the excavator data.

### 3.2.5.7 **Post-Excavation Survey**

Post-excavation surveys will be performed using Trimble GPS system and working in conjunction with the licensed surveyor to periodically confirm excavation depths. All data collected will be accumulated and incorporated into final as-builts.

### 3.2.5.8 Sample Location Survey

LRI will document sample IDs and sample locations utilizing Trimble GPS system. All locations and sample IDs will be collected in the data collector and incorporated into a final as-built drawing.

### 3.2.5.9 Post-Dredge and Post-Backfill Bathymetric Survey

LRI will perform a post-dredged post-backfill survey using multibeam hydrographic technology. This survey will also serve as the final survey for dredge depth. This hydrograph will be compiled and submitted as part of the final asbuilts.

# 3.2.5.10 As-Built Survey

At the completion of the project LRI will submit electronic and hard copies of the Record surveys. The project record documents will include all the information from the excavation survey as well as slopes, backfill subgrades, final grade, cross sections of the brook newly installed subgrade and above grade features.

### 3.2.6 CONDITIONS ASSESSMENT AND DOCUMENTATION ACTIVITIES

LRI will perform a conditions assessment of the surrounding infrastructure within 50 feet of the sheet pile installation area. The conditions assessment will record current conditions with video and/or photographs to document any cracks or distressed features prior to construction. If cracks are identified, crack monitors can be installed on the cracks to monitor any movement during steel sheet pile installation. of the bridge to assess and document the pre- and post-construction structural and cosmetic condition of the bridge. A letter that documents the pre- and post-construction structural surveys will be provided to NYSDEC. The letters will contain text descriptions, photographs to document the conditions on and around the area.

In addition to the sheet pile location, other site related areas will be documented prior to work commencing. LRI along with the NYSDEC, MACTEC, NYSDOT and ARPS Representative will perform a pre-construction inspection to document the railroad condition. This will be video taped and/or photographed. There will also be a post-construction inspection of the railroad upon completion of work.

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Additional documentation of the work area, buildings, fencing, signage and other site features will be documented at OU-1 and the public boat launch area prior to construction activities commencing.

## 3.2.7 TEMPORARY UTILITIES

LRI will provide temporary utility services to each work area. The OU-1 area currently has electrical service available from an existing utility pole. LRI will work with our subcontracted electrician to provide power to the various components for OU-2 work. These include site trailer, by-pass pumping system, temporary groundwater treatment system and dewatering system. The work at OU-3 will require a service drop be brought over Route 86 into the site. This will include a temporary utility pole and transformers to provide sufficient power for the TFS, air handling systems, temporary groundwater treatment system and the office trailer. LRI will work with National Grid to provide this temporary power drop for site power.

### 3.2.8 BACKFILL MATERIALS

LRI will provide the source and location of each type of material for the project. LRI will submit the address of the various clean fill, topsoil and stone locations so that representative samples can be taken for analysis. The backfill materials will be submitted to the laboratory for chemical analysis and geotechnical testing in conformance with DER-10, Technical Guidance for Site Investigation and Remediation. The stone products will have grain size analysis submitted. The soil samples will be required to meet the requirements of 6 NYCRR Part 375 for unrestricted use and confirm to the requirements of Specification Section 31 00 00 – Earthwork.

### 3.2.9 DESIGN SUBMITTALS

There are a number of components that will require a NYS PE stamped design. These include:

- Excavation Support Design in Brandy Brook for the 9.5-feet deep excavation.
- Temporary Fabric Structure Design. •
- Dredge Bulkhead Design.

LRI will work with the a NYS licensed PE to complete the designs as part of the submittal process.

### 3.2.10 PERMITS

LRI anticipates that no permits would be required from the New York State Department of Environmental Conservation (NYSDEC), but will have to meet the substantive requirements of any permits. LRI would plan to treat the water and discharge it to the Lake Flower via direct discharge and discharge to Brandy Brook so no water discharge permit from the Village of Saranac Lake will be required. LRI will transmit a Construction Water Management Plan which will include a proposed monitoring program to be implemented in accordance with Specification 02 72 00. LRI will complete the Village of Saranac Lake Building Permit Package as a complete permit for the Village. This permit package will cover the TFS, electrical and other project related permit requirements. This permit package will include the TFS design documents.

#### 3.3 MOBILIZATION

The initial work efforts include submittal of this Construction Work Plan, Preliminary Progress Schedule, Health and Safety Plan, Sampling Plan and associated submittals. Upon approval of the various work plans and submittals,

mobilization activities will commence. It is anticipated that mobilization will begin on or before April 2, 2018. Figure 3-1 shows the anticipated site layout of the OU-3 work area and Figure 3-3 shows the general site layout of the OU-2 work area set up at OU-1.

All Project Team Members will be briefed on the Scope of Work and Project Schedule. Tasks will be assigned to project personnel and work will commence immediately. The crew will be familiar with the Health and Safety Plan and will be required to comply with its measures. All field crew members will be required to sign acknowledgement that they have reviewed, understand, and agree to comply with the requirements of the HASP.

As part of the mobilization activities, LRI or its' subcontractors will perform, tree clearing, Site set-up activities, layout staging areas, construct water handling facilities, install temporary facilities, place perimeter fencing, remove existing fencing, install sediment and erosion control measures, establish staging areas, install Site anti- tracking pad (i.e., a stoned egress pad intended to remove residual soils from site vehicles prior to leaving the site), vehicle and equipment decontamination area and complete any other activities that need to be performed prior to excavation commencing. In addition, heavy equipment necessary to perform the construction activities will be mobilized to the Site for the execution of the work.

The equipment decontamination pad will be constructed by placing a non-woven geotextile layer, 40 mil LLDPE liner, non-woven geotextile followed by stone and crane mats on the prepared surface. A sump will be placed in one end to provide a point to pump water from the decontamination pad.

# 3.3.1 TREE CLEARING AND PROTECTION

In preparation for the remediation activities the NYSDEC is clearing all trees greater than 3 inches in diameter from the active work areas. LRI will be required to clear all trees and brush smaller than 3 inches in diameter. To facilitate construction activities, existing trees and vegetation inside the work area will be removed and any other trees that fall within the work zone or support zone will be cut and chipped during initial mobilization activities. LRI will clear trees and other vegetation as required for Site access and the execution of work. LRI will minimize disturbance of vegetation outside of construction areas. Trees and shrubs will be kept separate from grubbed materials in order to not cross contaminate materials. Select trees with straight uniform trunks of 6 inches or greater will be salvaged for re-use during restoration activities. Grubbed material will be managed at the location the material is removed from the ground and classified based on the surficial soil in the area the grubbed material is located. Remaining trees and shrubs will be cut and/or chipped and material will be shipped off-site for recycling. Stumps will not be removed until erosion control measures are installed.

#### SITE FACILITIES AND SECURITY 3.4

In compliance with the Bid Specifications, two project trailers will be mobilized and set up on the site, one each for NYSDEC/Engineer and LRI. The NYSDEC/Engineers trailer will contain all the equipment listed in Technical Specification 01 52 13. LRI will utilize its trailer as a communication center for the Project Team. All key on-site Project Team Members will have cell phones so that they can be contacted at any time during the project. Site communication will be via two-way site radios. LRI will maintain enough two-way radios for the entire project team. however on-site communications shall follow proper chain of command. The proper chain of command will be that work-related issues will be provided to the Site Superintendent, all Health and Safety issues will be addressed with the Health and Safety Officer. Approximate location of office trailers is provided on Figure 3-1 and Figure 3-3. LRI will

make arrangements with National Grid and our electrical subcontractor to provide power to a new utility pole (installed by National Grid). The electrical contractor will pull power from the pole into a meter and local panel. The power will then be pulled from the electrical panel to each individual trailer. As the site is arranged there will be one trailer at the OU-1 location and one trailer at OU-3 location.

Wireless cellphone service will be provided to MACTEC. LRI will provide wireless internet service through a mobile hotspot. Site security will be obtained through the installation of an 8' high chain link perimeter fence at OU-3 area with privacy screen. LRI is proposing to install driven post fencing in order to support the privacy screen and the associated wind load that can occur. The fence will be located outside the work area along the upland perimeter of the site. The access gates to the fence will be locked during non-working hours. The fencing will be utilized to prevent unauthorized access to the construction work area. A visitor log will be maintained at the office trailer. Signage will be posted to direct visitors to the LRI office trailer to sign in and receive a safety orientation. The trailer at the OU-1 location will be inside the fenced in area of OU-1 and security measures will include locking all gates and working with the Saranac Lake Police Department to make them aware of the construction activities and to provide them LRI's contact information if any suspicious activities are observed.

#### 3.5 SITE PREPARATION

Several general site preparation activities will be performed by LRI prior to any intrusive dredging, sheet piling, soil excavation or grading activities, including utility clearances and identification, conduct survey of pre-excavation cutlines, installation of erosion controls, clearing and removal of any vegetation, preparation of a "clean" access area, and implementation of a traffic control strategy.

# 3.5.1 EROSION AND SEDIMENTATION CONTROLS

Erosion control measures shall be implemented in general accordance with the New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC, Division of Water, November 2016, approved site-specific Storm Water Pollution Prevention Plan (SWPPP) and Section 31 25 00. LRI will provide the details associated with the erosion and sedimentation controls in the SWPPP. Including the control measures (i.e., monitoring, inspection, maintenance and augmentation) associated with the use of silt fence, filter socks, turbidity curtains, mulch, hay bales, erosion control matting, temporary protective sheeting and temporary seeding. Erosion control measures must be in place prior to construction activities commencing. The overall objective is to prevent soil erosion and transport of sediments caused by the construction activities. Measures taken to control erosion and sedimentation shall be adequate to ensure that sediment is not transported to or from the Site by a storm event. Site-disturbing activities will be carefully conducted to minimize the exposure of unprotected soils, which are more erodible than undisturbed soils. Erosion and sediment controls are an integral part of the construction sequence and will be in place prior to commencing any intrusive soil activities. LRI will conduct all site activities to minimize the extent of unprotected soil and to protect as much of the natural vegetation as possible. In addition, LRI will minimize the time that soil is left unprotected. Erosion control and soil excavation activities will follow the construction sequencing to maximize the effectiveness of the erosion control strategy. Erosion and sediment controls will be installed at the locations shown on the Drawings and will be inspected and maintained at regular intervals in accordance with the SWPPP. The selection of additional specific erosion and sedimentation control measures during construction activities will depend on a number of parameters, including the type of construction activities, site topography, type of ground covers, and maintenance considerations. LRI will install silt fence, berms, turbidity curtains, and / or other erosion control devices as specified in the contract plans. The sediment and erosion controls will be inspected on a regular basis during

construction activities and repaired immediately if damage is observed until a final vegetated surface cover has been established in all areas. A surplus of silt fence will be kept on-site for additional controls or to repair damaged areas.

#### 3.5.1.1 **Stabilized Construction Entrances/Exits**

Stabilized construction entrances/exits to and from each Site will be constructed at locations indicated and per the construction details indicated on the design drawings. The stabilized construction entrances/exits will be constructed with non-woven geotextile placed on the existing ground surface and covered with 6 inches of 2-inch stone. The stabilized entrances/exits will be approximately 20 feet wide and 50 feet long. The stabilized construction entrance will be inspected periodically and the entrance to the Site will be kept clean of dirt and mud.

# 3.5.2 WORK AREA SECURITY

The type of work area security will depend on the type of construction activities being performed and the location of these activities. Security measures will be implemented by LRI and will consist temporary fencing with visual barrier. concrete barriers, locked gates, signage, warning tape, maintenance of sign in / sign out sheets, and practicing safe work procedures. The work area at OU-3 will be easier to secure based on the location and the ability to place fence around the site. The work area at OU-2 will be harder to manage and temporary safety fence may be used to deter non-project related personnel from walking down the railroad tracks from either the north or south of the active work area.

# 3.5.3 DUST AND ODOR CONTROL

During construction activities, dust control measures will be implemented. Fugitive dust as a result of any construction/excavation will be mitigated in accordance with the Health and Safety Plan (HASP) and the Air Monitoring Plan (AMP). Implementation of dust suppression will be determined by LRIs onsite Health and Safety Officer in compliance with the HASP and AMP. LRI will utilize a combination of vapor and odor suppression measures. Bio-Solve and Rusmar Foam will be used to spray materials that causes odors during sediment and soil handling activities. Dust will be controlled using water sprays. Vapor control will be managed through the odor control foam or Bio-Solve. Water will be applied to haul roads to control dust. The speed of on-site vehicles will be controlled to minimize dust. Stockpiles will be covered when not in use to control wind-blown dust generation. Paved surfaces will be swept to keep surface clean. Truck tires will be inspected prior to leaving the site to insure no soils are being tracked outside the site.

### 3.5.4 SANITARY WASTE COLLECTION

There is a potential for waste other than the soil and water being generated from the actual Site activities. These wastes include general trash, wood, debris, plastic, glass and paper. These materials can be generated from various operations, depending on the type of activity being performed. The quantity of waste is difficult to determine at this time, however the disposal of the waste streams can be determined in advance. Trash will be collected in a garbage cans and bagged for disposal off site in accordance with local codes and ordinances. Plastic fencing, if in good condition, will be rolled up and reused. Plastic sheeting used for covering excavations or stockpiles will be loaded into the off-site transport vehicles for disposal off-site. Any service to equipment will be properly performed to control any spillage during maintenance activities. Spill kit materials will be available on Site to deal with any unforeseen oil leaks during the course of the project. A dumpster will be provided on-site for other types of daily waste generated. Recycling will be performed for waste streams that are recycled locally.

# 3.5.5 CLEAN SUPPORT ZONES

In order to maintain access to impacted areas, support zones and roads will be established at various locations outside of the exclusion zone to move equipment, load soils and accept material deliveries. The stone access roads will be and established as work progresses to prevent the trucks from traveling on impacted material. Orange construction fence will be utilized to demarcate the exclusion and clean zones at specific locations of the site. Truck wheels and equipment tracks will be inspected for visual impacts prior to tracking areas outside of the support zone however will not require decontamination as they will be loaded and staged within the 'clean' support zones.

# 3.5.6 SITE MAINTENANCE

The Site will be maintained in a professional manner at all times during construction. Stone Roadways for transport vehicles and water spray will prevent dust emissions at the site. The site will be neat, kept clean, and appear organized during construction operations. During off work hours, the site will be secured through a locked perimeter fence with all stockpiles properly covered and clean fill stockpiles neatly graded to prevent odors or dust emissions. Trash dumpsters will be utilized on-site for collection of trash.

# 3.5.7 Project Identification and Signage

LRI will provide a 4' x 8' project sign that identifies the requirements outlined in Technical Specification 01 58 00. The project sign will be mounted on the fence at the entrance to OU-1 and OU-3. Additional signage will include warning signs posted along the perimeter of the site and signage on buoys in the water to warn of construction activities.

# 3.6 ESTABLISH WORK ZONES

Each operable unit will consist of three zones, the Exclusion Zone, Contamination Reduction Zone and Support Zone. Temporary chain link fence will be used to secure the Site at OU-3 and orange safety fence will be utilized for areas associated with OU-2. The existing fence around OU-1 will provide security for operations located off Payeville Lane. Orange construction fence will be used to delineate work areas and perimeter of the Exclusion Zone. The exclusion zone may be modified as work activities are completed.

The work area Contamination Reduction Zone (i.e., the area immediately outside the Exclusion Zone) will be used as a primary decontamination area for equipment and personnel. Orange construction fence fastened to tee post will be used to delineate the perimeter of the Contamination Reduction Zone. At a minimum the contamination Reduction Zone will be a three feet buffer around the Exclusion Zone.

The Support Zone is the area where project support can be rendered without contact with contamination. This area is located outside the Contamination Reduction Zone. During the course of the project the zones will change based on which cell is being excavated. Trucks will be loaded in this area previously described as the 'clean' support area. This area will also be used for field offices and storage of materials and equipment.

# 3.7 PROTECTION OF ADJACENT PROPERTIES AND UTILITIES

In an effort to minimize disturbance to adjacent properties, LRI intends on using the minimum space required to construct the support areas, water treatment plant, on-site scale and decontamination stations. LRI does not plan to stage contaminated soil outside the limits of excavation and would plan to keep all soils within the excavation areas for direct loading.

LRI understands the sensitivity in working on privately owned property and will take the necessary precautions and actions to prevent damage, injury, or loss to the Work or public and private property, including:

- Storage of equipment, supplies, and materials in an orderly, safe manner to limit interference with progress of the Work or work of other company employees, utility service companies, or the Village's operations.
- Suitable storage for materials subject to damage by exposure to weather, theft, breakage, etc.
- Frequent cleanup of refuse, scrap materials, and debris from construction operations, necessary to maintain • the site in a safe and orderly condition.
- Provision of barricades and fencing to protect pedestrian and traffic around openings, excavations, and other hazardous areas.

LRI will obtain consent before entering or occupying privately-owned land except on easements provided for construction. The property damaged by construction operations will be restored to condition equal to existing conditions before construction.

#### 3.8 **TEMPORARY ACCESS ROADS**

LRI will construct temporary access roads at OU-2 and OU-3. The temporary access road at OU-2 and OU-3 will be constructed utilizing separation fabric placed on grade and 4-6" of crushed stone placed above the separation fabric. The road will continue off the stabilized construction entrance and go to the soil staging location. This access road will provide a clean corridor for the over the road transport vehicles to enter and exit the site without tracking over the impacted soil. The transport trucks will remain clean while being loaded with impacted material thereby decreasing the amount of decontamination required before exiting the site. Polyethylene sheeting or liner will be used around the transport vehicles while being loaded, to prevent impacted material from spilling onto the clean haul road. While onsite and after loading of impacted material, transport vehicles will be properly covered and tarped and then proceed to the decontamination pad. Prior to leaving the site, all transport vehicles will be inspected to insure no soil is on the outside of the trucks. The trucks will be decontaminated, if required, at the main decontamination pad(s). The stabilized access road at OU-3 will enter from the public boat launch and pass through the TFS. Large overhead doors on either side of the structure will provide passage for transport vehicles to enter the building, be loaded and exit the building without having to turn around. The temporary road will continue to the stabilized construction exit.

The OU-2 Brandy Brook remediation will be conducted along and in close proximity to the to the existing railroad. LRI is planning to install crane mats adjacent to and over the rail ties and rails. This will create a crane mat road over the railroad tracks that will be utilized to transport contaminated soils and sediment back to the OU-1 area for staging and load-out. This access road will also be utilized to haul clean fill to the excavated areas for backfilling and topsoil placement. LRI will work with the NYSDOT and Adirondack Railway Preservation Society (ARPS) on the temporary access along the railroad.

# **3.9 TRAFFIC AND SITE ACCESS CONTROL PLAN**

LRI has prepared this Traffic and Site Access Control Plan for the Saranac Lake Project. The site has two main work areas that are separated and distinct areas. During the construction approximately 33,000 tons of soil/sediment will be

dredged, excavated and transported off-site for disposal. The primary volume of sediment will be generated from the dredging of Pontiac Bay with the remainder of material being generated from the remediation of Brandy Brook. In both work areas material will be transported to staging areas for loading and shipment off-site. The areas will also require backfilling with clean imported material. A dust control plan has been developed and will be implemented during onsite activities to ensure dust levels are below acceptable levels. Dust control measures will include tracking pad, sweeping and application of water for dust suppression.

This Traffic and Site Access Control Plan has been prepared to assist in traffic flow into and out of the sites, to identify impacts, access routes, traffic flows from the two work areas, traffic control procedures, and community safety during the trucking activities. In addition, emergency responders will be informed regarding the location of the truck routes and safety measures described in this plan.

The purpose of this plan is to provide a description of protocols to assist in traffic control and safety during construction activities at the Site. The Traffic and Site Access Control Plan includes specific information about truck travel routes. truck operator certifications, flagging, perimeter road signage and barricades associated with activities at and around the Site during the construction activities. The following sections describe information on truck safety measures, travel routes and tracking, truck operator requirements, and recordkeeping procedures.

### 3.9.1 IMPACTS TO ON-SITE AND OFF-SITE TRAFFIC

LRI will also implement a traffic control strategy for access to and exit from the site for transport trucks hauling contaminated soil and for clean fill being delivered to the site. This project is unique in that there are two different work zones. The work area off Payeville Lane for work associated with the remediation of Brandy Brook, which will also include work along Brandy Brook Road and the work associated with the dredging of Pontiac Bay. LRI will also construct temporary access roads into the site to minimize dust generation from truck traffic as well as eliminating cross contamination. LRI will try to eliminate the trucks coming in contact with the soil to minimize the amount of decontamination required prior to leaving the site.

The work associated with Brandy Brook will have minimal impacts on-site during the remediation of the brook from the OU-1 area to the railroad culvert. This work will take place off the village streets and be isolated on the railway and the OU-1 site. Trucks leaving the site will take Payeville Lane to Pine Street and turn left onto Pine Street. Trucks will follow Pine Street to the stop sign and make a left onto Brandy Brook to Route 86, trucks will continue straight past the OU-3 site and turn right onto Church Street, then a right on Route 3 and head to the off-site scale on Route 3 outside of the Village of Saranac Lake. Trucks delivering clean fill will follow the same route into the site off Payeville Lane. The on-site impacts of work associated with Brandy Brook will be during the remediation of the work from the railroad culvert to the 2 – 24-inch storm pipes that flow under Slate Ave and discharge into Pontiac Bay. This work will require traffic control along Brandy Brook Road due to the excavation of the brook along the street, including backfilling, new box culvert installation and restoration activities. These activities will also impact the residences that properties are within the work limits. LRI will work with the property owners to maintain access to their properties during all phases of work. This may include temporary crossings using road plates over the work area. During this work, it is anticipated that trucks will be loaded and material shipped back to the staging area for off-site disposal. If material is dry enough direct loading could occur to eliminate the need to transport material back to the staging area. Either way flaggers will be used to direct traffic when work is taking place within the street or shoulder of Brandy Brook Road. Signage, barrels and barricades will also be utilized to direct traffic and create a safe work zone for LRI to conduct operations.

The work associated with the dredging will be more complicated based on the flow of traffic on Route 86 through the village. The on-site impacts will be the boat launch area and the sharing of space. Since one entry way into the boat launch is planned, this access point at certain times could be congested with traffic from construction operations and from recreational use of the boat launch area. It is also anticipated that there will be initially much interest and viewing of operations as the project gets underway. To control the flow of traffic on-site, barrels, cones and temporary fencing will be established to direct recreational traffic to the boat launch area and construction related traffic to the site.

Construction signage will be posted in either direction notifying the public of the construction work and the construction entrance and exit. Flaggers will be utilized to direct traffic into and out of the site. This will include all phases of work. from mobilization to demobilization. Some phases will have heavier traffic than others, with the loading out of sediment and the importing of backfill being the highest traffic situations.

The off-site impacts will mostly be related to the entering and exiting of the site. LRI would plan to have most of the truck traffic enter from Route 3, make a left onto Route 86 then enter the site. Leaving the site trucks would turn left and take Route 86 to Church Street and back to Route 3. This would be the least disruptive to the flow of traffic. Deliveries of equipment, TFS and other construction related equipment would most likely come from Route 73, to Route 35 to Route 86 into the village. These transport vehicles would be crossing the street to enter the site. These vehicles based on the size and load will require traffic to be flagged and stopped to allow trucks to make the turn into the site. This would be very short-term impacts to the flow of traffic. Pedestrian traffic will be provided the right of way.

The project will also include marine impacts to the local fishing and recreational boating community. LRI will establish a silt curtain outside of the dredging limits. The silt curtain floating boom will be bright yellow in color and will be marked with signage and buoys with lights to notify the marine craft of the work area.

### 3.9.2 TRAFFIC ROUTES

Figure 3-3 shows anticipated truck routes for the trucks hauling contaminated soil and for clean fill deliveries. Trucks delivering or transporting material off-site will follow the established truck routes through the village. Transporters will be provided with a map depicting the truck route. Truck drivers found not adhering to the established truck route will be removed from the project.

### 3.9.3 ANTICIPATED TRAFFIC FLOW RATES

Based on production rates LRI is anticipating approximately 500 tons per day generated from the dredging operations. The trucks heading to the landfill can make two trips per day per truck, so this is equivalent to 14 loads per day or 7 trucks making two trips each. The anticipated production rates from Brandy Brook is approximately 265 tons per day or approximately 8 trucks per day. This would also be 4 trucks making two trips per day. The same tonnage would be imported on a daily basis. The Brandy Brook backfill would be delivered to the OU-1 site and staged for moving to the work areas. This will be sometimes overlapping with importing material since the work will be done in stages with excavation being completed and then backfill commencing. The importing of material at Pontiac Bay will be performed after the dredging is complete.

# 3.9.4 STREET CLEANING

LRI's goal is to not have to clean the streets and to not have material tracked onto the village streets. LRI will construct stone haul routes on-site with woven geotextile and crushed stone to provide clean haul routes for material importing and exporting of the contaminated sediment/soils. Water sprays will be used to control dust, as well as limiting truck

speeds on-site. Tracking pads will be constructed at the exit of the sites to help clean tires before leaving the site. LRI will construct decontamination pads at each location to clean vehicles tires, if needed, prior to leaving the site. During loading operation, the trucks will pull onto a piece of liner or poly sheeting to cover the ground so that any spillage during loading is collected on the liner and the liner swept clean prior to the truck advancing out of the loading area, further keeping the tires clean. If material does get tracked onto the village street, LRI will immediately sweep up and collect any material and place material back into the staging pad.

#### 3.10 **CONSTRUCTION WATER MANAGEMENT PLAN**

In compliance with the Technical Specifications, LRI is providing a two (2) modular temporary water treatment system to treat groundwater, decontamination water, decant water and water collected from precipitation events that is encountered during remediation activities and collectively classified as Construction Water. The work shall consist of mobilizing a 50-100 gallon per minute (gpm) treatment system for treating decant water from dredging operations. The second treatment system will be mobilized to OU-1 property for treating water associated with Brandy Brook remediation activities. The second treatment system will be a 250 gpm system. Each groundwater treatment system will be constructed within a lined secondary containment pad. Refer to Figure 3-1 and Figure 3-3 for the proposed locations.

LRI will construct, operate, maintain, and monitor the water treatment systems in accordance with limits and conditions set by the NYSDEC for surface water discharge. The water treatment systems will be constructed to treat water generated during remediation. Sources of water include, but are not limited to:

- Water from dewatering of soils (active or passive dewatering);
- Groundwater from excavation(s);
- Dredge decant water;
- Storm water run-off from contaminated areas: and. •
- Decontamination water and water from other miscellaneous sources. •

Water from the above sources is expected to contain a number of contaminants that must be removed prior to discharge to Brandy Brook and Lake Flower. The potential contaminants of concern include: total suspended solids (TSS), Dense and Light Non-Aqueous Phase Liquid (DNAPL and LNAPL), VOCs and SVOCs.

The groundwater treatment systems will be installed to treat contaminated groundwater collected from the areas listed above. The system will include (but may not be limited to) the following major components:

- Settling: •
- Oil/Water Separation;
- Bag Filters; •
- Activated Carbon; •
- Transfer pumps (various submersible and transfer); •
- Effluent Storage Tank (21,000-gallon Frac Tank); •
- Flow meter; and •
- Discharge point. •

The design maximum effluent discharge from the groundwater treatment system is 100 gpm for OU-3 and 250 gpm for OU-2. Additional details related to these components will be provided in the Construction Water Management Plan (CWMP). This is a performance-based system that will be demonstrated through start-up testing and routine monitoring to meet effluent discharge criteria. As such, process flow, anticipated contact times and treatment volumes will be managed to maintain the pace of work and quality of treatment. The prove-out and compliance sampling will be taken from the effluent storage tank, sampling ports will be installed on the effluent storage tanks for drawing samples. Additional sampling ports will be in the treatment train to periodically check samples between carbon vessels to determine if any initial breakthrough is starting to occur after the primary carbon polishing unit.

All electrical equipment, wiring and controls will be installed in accordance with the National Electric Code (NEC). All groundwater treatment equipment and process piping shall be installed with adequate clearances for maintenance and safe operation of the equipment and in conformance with all applicable codes and standards. The required supply of chemicals and materials used in the water treatment system will be ordered and staged appropriately prior to use in the processing equipment.

### **3.10.1 DEWATERING AND BY-PASS PROCEDURES**

#### 3.10.1.1 Phase 1 at OU-2 Brandy Brook Remediation Dewatering

Dewatering activities associated with Brandy Brook will be accomplished through a variety of means and methods. To assist in the dewatering of Brandy Brook a by-pass system will be installed. This bypass system will be constructed by installing a concrete pump station and trash screen to screen any debris from entering the pump station. The by-pass system will run continuously during working and non-work hours with a 6-inch submersible pump capable of 800 gpm pump discharging into a 12" HDPE line. As contingency a 12-inch high capacity Dry-Prime Diesel Trash pump with sound attenuation will be placed on a float system with automatic stop and start. The pump has approximately 7,000 gpm capacity at 10 feet of head. The system will be constructed with a 6" x 12" x 12" Wye with check valve such that both pumps are piped to the 12-inch discharge line. This by-pass system will intercept the flow of Brandy Brook and by-pass initially to the railroad culvert where the brook makes a 90-degree turn. The end of the pipe will have a flanged adapter for connecting the remaining section of pipe when that section of work is started. The discharge location will have a concrete leach tank structure with stone to act as an energy dissipator to minimize the discharge velocity and energy, especially during high flow events or storm events. Figure 3-2 and 3-3 depicts the dewatering and bypass setup. The by-pass system will be inspected several times per day to insure system is in good working order, no leaks or failures have developed, scouring is not occurring at the outfall, piping is not clogged or blocked, pump controls are set properly and in working order, piping is protected from construction equipment and power supply is functional and capable of maintaining continuous system operation.

LRI will work with Lockwood Remediation Technologies (LRT) to install a wellpoint dewatering system along the length of Brandy Brook. The wellpoints will be installed 10' on center to approximately 9' to 14' below grade, along the perimeter of OU-2 excavation area using direct-push drilling techniques. The well point pump will be set up at a location and elevation so that the header pipe is even with the suction point on the wellpoint pump. This is to ensure that the proper operation of the system is maintained and the vacuum requirements for the pump are met. The wellpoint system will discharge into two (2) 18,000-gallon weir tanks located at OU-1. The excavation dimensions vary but are approximately 1,600 linear feet. There will be approximately 320 wellpoints installed along with 3,200 linear feet of header pipe. The wellpoint pump will be an 8" electric vacuum pump with a 25-horsepower motor. The intent is

to operate the wellpoint system on each side of the brook as work progresses. Approximately 200 linear feet sections will be activated at a time to limit the amount of dewatering required. The area will be dewatered, excavated, backfilled and then the next section would be turned on and the previous section isolated off. This procedure will be followed along the entire length of the brook. Once the excavations are complete, temporary sand bags or steel plate will be installed as a temporary cofferdam. Any water that accumulates in the remediated area can be pumped to a filter bag and discharged to the surface outside the work area. If areas are identified during remediation that have surface water flowing into the work area, LRI will install a drainage swale or drainage trench to control the flow of water onto the site. The water will be directed to the north of the active work area or to the south into a completed area that can be pumped as clean water. This flow rate is not possible to estimate since it will be based on weather conditions, upwelling from beneath excavations and effectiveness of the wellpoint system.

During excavation activities water that accumulates in the excavations will be pumped from constructed sumps back to the clarification tank and treated in the temporary groundwater treatment system and discharged to the bypass system around the work areas. Dewatering sumps during excavation will help to minimize the moisture content of the soil and sediment. These dewatering sumps can consist of perforated pipe, stone and fabric. Due to the type of material present is likely that small dewatering points will drain the area. LRI will utilize 2-inch electric submersible sumps to maintain dry excavations. LRI would install enough sumps in each area to remove free draining water. LRI will have a laborer managing the dewatering activities to insure pumps are function and that water is not accumulating in the excavation.

Additional water may be generated during the staging of soils and sediments on the staging pad. Water generated from the staging pad will be pumped to the on-site temporary water treatment system for treatment prior to discharge.

Water generated from decontamination activities will be pumped to the on-site temporary water treatment system for treatment prior to discharge.

All waters generated, except for clean bypass water generated at the previously backfilled areas, will be introduced into the bypass system for pumping around the work area. This will include base flow bypass water, treated water from temporary water treatment system. The bypass flow and the dewatering water from the wellpoint system will greatly mix and dilute the treated water. Water from the wellpoint system should be clean after the initial startup since the brook is a gaining brook and water is flowing towards the brook.

Influent and effluent samples will be collected in accordance with the Generic Effluent Criteria for Surface Water Discharge and associated parameters and frequencies agreed upon with NYSDEC and Mactec.

### 3.10.2.1 Phase 2 at OU-3 Pontiac Bay Dewatering

Dewatering activities associated with Pontiac Bay dredging will include pumping and discharge of decant water and pumping and treating water that drains of the sediments while on the staging pad inside the TFS. Decant water will accumulate in the dredge hopper barges. LRI will install sumps in the hopper barges to allow an access point(s) to pump decant water from the hopper barges. A submersible pump will be placed inside the sump and pumped to the temporary water treatment system prior to discharge. The OU-3 discharge location will be through a perforated diffuser pipe extending from the shoreline 5-10 feet along the lake bed within the turbidity curtain contained areas. Water that accumulates in the staging pad will also be pumped to the temporary water treatment system for treatment prior to discharge. The sediment off-loading area will have a drip apron to collect any accumulated water or sediment

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that drips during the off-loading. This drip apron will be sloped to a sump for material to be pumped to the temporary water treatment system.

### 3.10.2 Construction Water Management

To the greatest extent possible, water as a result of precipitation will be prevented from entering open excavations by constructing temporary berms to divert water away from the excavations. Any water that enters an open excavation will be handled as contaminated water requiring treatment prior to discharge. Water which collects in the excavations as a result of groundwater intrusion shall be pumped from excavations as necessary when it impedes excavation, sampling, or affect the ability to achieve compaction of backfill soils.

During the excavation LRI will utilize a combination of pumps and vertical sumps to remove water and lower the groundwater to a depth below the excavation limits. The dewatering will facilitate drying the soils to meet the disposal facilities requirements.

Water pumped from excavations will be discharged to temporary water treatment system. The collected water will be treated using the on-site wastewater treatment system.

# 3.11 TEMPORARY BULKHEAD AND SEDIMENT OFF-LOADING AREA

In preparation for the dredging of Pontiac Bay LRI will construct a temporary steel sheet pile bulkhead and off-loading area. The structure will be constructed along the shoreline of Lake Flower by driving 15 pair of 30' long PZC-26 steel sheet pile. This wall will create the bulkhead for the off-loading excavator to sit to off-load the sediment from the hopper barges. The steel sheet pile will be driven with a Link Belt 330 excavator with a Movax SP-100 Sonic Sidegrip pile driver. As part of this structure and to support the TFS over the water, LRI will drive a series of 25-feet long H-Piles into the lake. These H-Piles will attach to the TFS arches and gable leg ends. The legs will be bolted to steel beams welded to the top of the H-Piles. The sediment off-loading area will be approximately 35 feet wide to accommodate the Flexi-Float platform. The Flexi-Float platform will be constructed of 3 - 10'x40'x5' high floats fastened together to create a hopper barge platform. Since the barge platform will be pulled into the structure for offloading, the gable end of the building will be modified to raise a few of the gable legs and build a steel truss system for the structure to be supported by, while providing an opening for the hopper barge platforms to be pushed into and be under the TFS for off-loading. LRI will also drive a 4-6 wood piles to act as guides or bumpers for directing the hopper barge to the off-loading area. The area will also require dredging to create draft for the hopper barge and push boat to be able to navigate to and from the structure. Once the bulkhead is constructed LRI will construct a drip apron. The drip apron will cover the swing radius of the hopper barge off-loading area and be designed to collect and drain for pumping material to the temporary water treatment plant. The drip apron will be constructed of steel plate and have a steel drip edge to keep material contained within the apron.

These are all temporary works and will be removed upon final completion of dredging and backfilling operations in Pontiac Bay. A separate design will be submitted for the bulkhead construction.

# 3.12 **TEMPORARY FABRIC STRUCTURE**

The Saranac Lake Gas OU-3 Site involves the dredging of approximately 14,950 cubic yards of impacted sediments. The Odor and Vapor Control Plan is required to control odors generated by the MGP soils, these odors can include Benzene, Toluene, Ethylbenzene and Xylene (BTEX) compounds as well as Naphthalene. Odor and vapor control

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shall primarily be performed by the use of a temporary clear span structure placed over the sediment off-loading, sediment processing and sediment loading area. This structure will be used in conjunction with air handling and treatment system this area. LRI will work with the vendor to mobilize, install and when complete dismantle the structure. A stamped engineering package will be provided under separate cover.

The temporary structure will have dimension of approximately 96' wide by 148' long or 14.200 square feet. Using a maximum height of 40 feet the structure and an average height of 20 feet, the structure has a total air space of approximately 284,000 cubic feet. At six air exchanges per hour the air handling system needs to move 1,704,000 cubic feet of air per hour. This volume of air, when divided by 60 minutes, would equate to approximately 28,400 cubic feet per minute (CFM). LRI's nominal design for the air handling system is approximately 40,000 CFM. The air handling system includes two (2) NB20 Systems as manufactured by TIGG Corporation of Pittsburgh, PA. The units are each capable of handling 20,000 CFM each. The exhausters or 20,000 cfm blowers and will have a combined horse power rating of 200 HP. Along with the air handling system, LRI will implement controls within the structure to limit emissions to the air handling system and extend the life of the carbon. These controls include tarping of stockpiles, use of Bio-Solve® and/or Rusmar® foam to control odors when odorous coal tar impacted sediment is encountered. Due to the limited data on the sediment concentration it is difficult to determine the carbon loading on the air handling and treatment equipment. Breakthrough of carbon is monitored by taking samples of the gas stream within the carbon bed at intermediate sample points. The samples are taken with a hand held PID, the indication that breakthrough is starting to occur will be positive results on the PID. Typically, the majority of the odors encountered during remediation of MGP waste are nuisance odors that do not register on the PID and dissipate readily. The loading of the carbon will depend on the amount of coal tar encountered that has significant volatile fractions remaining. TIGG's most recent experience has been that carbon last 3 months prior to seeing breakthrough. However, this is contingent on concentrations and the engineering controls implemented inside the structure.

### 3.12.1 INSTALLATION OF TEMPORARY FABRIC STRUCTURE

LRI proposes to use subcontractor All-Site Structures to install a 96' W x 148' Long TFS R29.2 M Series Fabric Structure, which will include standard calculation package for New York building permits, fabric curtain freight door 14' x 14', interior lighting package and (2) man doors. Air handling equipment will be supplied by TIGG, (2) NB20 air purification systems, each with 16,000 lbs of TIGG 5CR reactivated vapor phase carbon, two (2) 20,000 CFM air handler with two stage particulate filters, control panel (460) volt, supporting blower skid, and 20-inch stack. The air handling units will be placed along the western edge of the TFS.

LRI will supply the site preparation work to establish a level working platform and anchor system for the TFS foundation, crane, labor and equipment support to off-load and construct the TFS/air handling units. LRI will install H-pile/Beam section to serves as anchorage system to support the lake-side portion of the TFS structure.

# 3.13 MATERIAL STAGING AREA(S)

LRI is planning to potentially construct two (2) staging areas as part of this project. There will be a staging area constructed at OU-1 to support the remediation activities associated with the removal of sediment and soil from OU-2. The second staging area will be constructed under the TFS to support the dredging operations at OU-3. The staging areas will be constructed by first clearing the area of any debris that may be present. The staging areas will be constructed by sandwiching 40 mil LLDPE liner between non-woven geotextiles and may include a drainage fabric to facilitate dewatering. The surface will then be protected with dredged sediments from the preparation of the bulkhead

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and entry into the TFS. The staging pads will be equipped with a sump to pump any water that drains from the sediment during staging. The material will be blended, if required, on the staging pad to meet the disposal facility requirements. The staged material will be covered during periods that the stockpile is not active with material being added or material being loaded for off-site disposal.

#### 3.14 **EXCAVATION SUPPORT SYSTEMS**

The OU-2 remediation of Brandy Brook will require steel sheet piling to be installed at Station 10+68 to 11+35. LRI will prepare a PE stamped design for this excavation area. In order to protect the slope on the east side of the bank, this area will be protected by driving approximately 38 feet long steel sheet piles. The steel sheeting will be installed using a Link Belt 330 excavator equipped with the Movax SP-100 pile driver. This steel sheeting will provide excavation support for this 9.5-feet deep excavation. The western section of this area contains the headwall to the railroad culvert and this will be excavated by sloping away from the headwall. Once completed the steel sheet pile will be cut 3 feet beneath the ground surface and left in place. The remaining excavations will all be performed using benching and sloping methods. Vibration monitoring will be performed during installation of steel sheet piles. Vibration monitoring will be performed continuously during sheet pile installation and extraction at two locations. The peak particle velocity (PPV) as measured by a three-component seismograph shall not exceed 1.57 inches per second measured on the seismograph adjacent to the building or structure. If the vibration limits are exceeded at any time, sheet pile operations will cease and the conditions will be evaluated to determine the cause of excessive vibrations.

The excavation support systems will be submitted under a separate submittal package.

#### 3.15 **BRANDY BROOK EXCAVATION**

As mentioned in Section 3.11.1 above, LRI is planning on excavation of the Brandy Brook in approximate 200-foot sections. This is primarily due to the control of groundwater using the wellpoint systems. The plan is to perform excavation to the required depths, perform confirmation sampling and then backfill the areas prior to moving to the next excavation area. Excavation will be completed using a Link-Belt 350 Excavator equipped with GPS grade control. Excavated material may be loaded into off-road dump trucks for transport to the staging area. The off-road dump trucks will have water tight gates to prevent leakage or spillage during transport to staging area. Material will be excavated and loaded into the off-road truck directly from the excavation or from a stockpile created inside the excavation area, depending on the soil/sediment conditions.

Excavation will progress from upstream to downstream. The bypass system must remain for the duration of the excavation and restoration. LRI will use safe sloping and benching to maintain excavation stability. LRI intends to place the excavator on the bank and work from the west side of the brook. LRI will also utilize a Link Belt 350 Long Reach excavator for excavations in or around station 5+00 to 7+00 of the work. The long reach excavator has 60 feet of reach and will allow for material to be reached most of the way across the brook and wetland areas. Some crane matting will be performed to allow for excavator to reach the entire width of the creek in the wider areas.

All materials imported for creating access or becomes sacrificial will be managed by LRI at no additional expense to the Department.

#### **STORM DRAIN CLEANING PLAN** 3.16

LRI will subcontract a specialty contractor to clean the 2 – 24-inch storm drains and associated catch basins between the end of Brandy Brook and the mouth of Pontiac Bay. The cleaning scope of work includes approximately 2 - 225 linear feet of 24-inch storm drain pipe, 2 drainage manholes. The plan is to flush the material from the two storm drains into Pontiac Bay prior to completing dredging. There will be two turbidity curtains installed approximately 30 feet from the end of the storm drains. This area will be utilized to collect the sediments flushed from the storm pipes. The specialty subcontractor will provide a combination jetter/vacuum truck to clean and jet the storm drains. The cleaning will start at the most upstream leg of the storm drain system and worked downstream. All waste removed from storm drain system will be dredged during the dredging operation.

The storm drains, catch basins and manholes will be deemed clean by observing the flow of water into the structures. Once only clean water is observed the piping will be determined to be clean. The final inspection will be performed with MACTEC and NYSDEC to observe the conditions.

#### 3.17 **CONCRETE BOX CULVERT INSTALLATIONS**

As part of the Brandy Brook restoration activities, there will be four driveways to residents that will be restored using 6' x 4' open bottom box culverts. These box culverts and bottom footers will be pre-cast and shipped to the site. To properly install the box culverts, LRI will install stone bedding material for underneath the concrete footer. This will provide a level solid base for construction of the box culverts. The bedding under the box culvert must be able to support the full load of the installed box culvert, its contents, and the loading above the box culvert. The surface and subsurface water will be controlled so installation is performed under dry conditions. Furthermore, during and after installation, dewatering methods must be used to prevent the migration of bedding material and to prevent fines from getting into the groove. Any unsuitable or unstable materials below the plan foundation should be removed. Rocks within six inches of the box bottom will be removed. After the appropriate excavation is performed and the subgrade is proof rolled, the box culvert should be laid on compacted granular backfill to the specified lines and grades. The sections of the box culvert will be placed and pulled together and a 1" butyl gasket will be installed in each joint. Each end section will have two rows of #5 dowel bars 12-inches on center for the cast in place concrete curb. LRI will cast in place a 12-inch high by 6" wide curb on each end of each driveway. During construction LRI will coordinate with homeowners to provide temporary access to their homes. Temporary access can include the placement of steel road plates and crane mats over the brook.

The concrete culvers will be constructed using 5,000 psi concrete and will be designed for HS-20 loading. The box culverts will be lifted off the truck and placed onto the pre-cast footings.

#### 3.18 BRANDY BROOK AND BANK RESTORATIONS

Brandy Brook and the associated banks will be restored upon confirmation that the sampling has demonstrated clean up goals have been achieved. Since the turn-around-time on the post-excavation samples are expedited, it is anticipated that work will commence within approximately 48-72 hours from the sampling event. Restoration will begin upon approval from MACTEC and NYSDEC after approved confirmation samples are achieved in each cell. LRI intends to minimize the duration that excavations are left open to reduce the amount of construction water generated onsite. Subgrade fill will be installed to within one foot of finished grade outside the actual stream bed, and the stream bed will be left approximately 18-24 inches below grade. The details and cross section for the restoration are detailed in the C-402 through C-406 construction drawings. The subgrade fill material will be placed in one-foot lifts and compacted to meet the density requirements in the project specifications. Material will be placed using an excavator

equipped with GPS machine control and compacted with a vibratory trench roller or soil roller. Various surface finishes will be installed above the subgrade fill, as shown on the Drawings.

Streambed material will be a blend of two separate materials, as required by the Specifications. The streambed material will be proportioned and blended by Trudeau Sand & Gravel of Saranac Lake, NY. The material will be placed to the line and grade shown on the plans. Boulders will be imported from Trudeau Sand & Gravel and will be placed in the streambed and with an excavator in the approximate locations shown on the Drawings. Log Drops and Log Deflectors will be installed using logs from trees fell during clearing activities. The timbers will be prepared as required to provide a tight-fitting connection. Log Deflectors will be pinned together using rebar pins, as shown on the Drawings.

Stream banks will be restored using bio-engineering techniques as shown on the Drawings. Cobbles chocked with topsoil and vegetation will consist of cobbles mixed with topsoil and will be placed along the creek banks at the locations shown on the plans. Cobbles and topsoil will be blended onsite and placed in a single 12-inch lift. The rock with soil and vegetation areas will be seeded following installation of the plantings. Live stakes, shrubs and trees will be installed after the backfilling. Typically, these plantings are installed during the dormant season to ensure the highest rate of survival of the plants. Biodegradable fiber rolls will be installed at the toe of restored slopes to serve as erosion and sediment control as shown on the Drawings.

# 3.19 UPLAND DEBRIS HANDLING, MANAGEMENT AND DISPOSAL

LRI's approach to any debris encountered, is that the debris will be segregated for disposal. Woody material will be shipped off-site for recycling. Clean debris will be sent for disposal or recycling, contaminated material will be shipped off-site for proper disposal. Metal debris and tires will be segregated for recycling. Hard debris such as concrete, block, brick and asphalt will be sized for acceptance to the landfill. Processing of hard debris will include utilizing a pulverizer attached to a hydraulic excavator. Water spray will be utilized to control dust, if required. Once material has been sorted and sized, the material will be loaded out to the various disposal facilities for recycling or disposal.

# 3.20 MARINE RESUSPENSION CONTROLS

LRI has prepared Figure 3-1 that shows the resuspension controls to be deployed as part of this project. The resuspension controls include turbidity curtain deployed around the outer limits of the dredge area to protect Lake Flower from migration of resuspended sediments in the water column. Two rows of turbidity curtain will be deployed approximately 30 feet from the discharge location of the 2 - 24-inch storm drain lines. This will protect the dredging areas during the Brandy Brook remediation from contaminated sediments migrating into the previously dredged areas. The storm sewers will be cleaned prior to the final dredging near the discharge location of the storm drains lines. Also as part of the resuspension controls three buoy based turbidity monitors will be installed outside the turbidity curtain limits. There will be an upgradient, a downgradient and a background monitor.

### 3.20.1 TURBIDITY CURTAINS

Turbidity curtains will be installed as shown on Figure 3-1. LRI will install Type 2 – Heavy Duty Permeable Curtain, with a 12-inch highly visible continuous yellow closed cell floatation boom. The turbidity curtain will be weighted with double 5/16-inch galvanized ballast chains. The installation of the turbidity curtain involves connecting, deploying and anchoring the curtain in the shown locations. The curtains will be delivered in 50 and 100 feet lengths, based on the water depth and the requirement to have a three-foot change in water depth and have the curtains rest on the bottom

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of the bay. Once the curtain is delivered the curtain will be laid out in sections based on the water elevations and the curtain configuration. Each section of curtain is attached using the steel grommets and lacing the sections together. Once the curtain is connected, LRI will install the curtain by towing the curtain into the lake using LRI's carpenter barge. Since the water is a relatively calm environment, the curtain may be able to be towed to the desired anchor location on the east side of the bay. Once anchored to the eastern shoreline, the crew will start anchoring the curtain into position outside the dredge limits. GPS will be used to insure anchoring is performed outside the dredge limits and that the curtain is located approximately 10 feet from the edge of the dredge limits around the outer perimeter. The curtain will be anchored using 22-lb Danforth type anchors. Each end of curtain will be anchored to the shoreline and then eight (8) anchors will be used to anchor the curtain. Anchors will be used at changes of curtain direction to anchor the curtain in place. Additional anchors will be added if movement is observed in the turbidity curtain during the work. The anchors will be shackled to the bottom of the curtain and then the anchor will be attached to a buoy. This will allow easy access to the anchor location and any changes that need to be made in curtain placement or reanchoring. Once the curtain is in place LRI will untie the reefing lines and unfurl the curtain to the desired depth based on the water depth. The reefing lines make it easy to make adjustments to the curtain over the course of the project.

Silt curtains will be inspected on a regular basis when the turbidity monitors are inspected or after storm events or if any other events could have caused damage or disturbance to the turbidity curtain.

### 3.20.2 TURBIDITY MONITORING

LRI will monitor for potential resuspension of disturbed sediments by utilizing three (3) real-time turbidity monitoring buoy systems. LRI is proposing to utilize the NexSens CB-450 Data Buoy with data logger, YSI 6- Series water quality sonde with temperature, conductance and turbidity sensors. Each data buoy will be equipped with two (2) - sondes. Each sensor will be placed at different depths, with one being 1-foot below the water surface and the other at approximately 1-foot above the bottom of the lake. The sondes are foul resistant and self-cleaning sensors. The monitors will be powered with solar power, be equipped with cellular telemetry, spare battery and LED beacon light. The system is anchored with a 70 lb anchor and moored to an 18.5" red mooring/marker buoy. upstream and another downstream of the work area, supplemented with a hand-held device for calibration of the buoys and monitoring at intermediate locations. The turbidity monitoring systems will be placed as shown in Contract Drawing C-107. The buoys can be readily moved as the work area moves, if needed to maintain consistency. A description of the equipment is provided in Appendix C.

The remote monitoring system will be setup to notify LRI of any pre-defined limits that are established to provide time for corrective measures if an elevation of turbidity is detected at the monitors. This initial pre-defined limit may be 25 NTU over the background levels. The turbidity action level is 50 NTU over background, which means the turbidity downstream of the work area cannot exceed the upstream turbidity by more than 50 NTU.

Prior to construction, a baseline for upstream and downstream turbidity will be established by conducting 24-hour monitoring for three consecutive days. The turbidity buoys each have their own solar panels, batteries, data loggers, and cellular modems to transmit data to a field computer in the job trailer, where it will be compiled and downloaded. The data loggers will be programmed to capture turbidity and velocity readings at 15 to 30-minute intervals, which will be averaged hourly for comparison to the 50 NTU standard. LRI's engineer will check the job trailer field computer at least four times a day during in-water remedial activities.

Each morning, the previous day's turbidity data will be downloaded and compiled into the daily field report. The data contained within these daily reports will be used to document compliance with the 50 NTU performance standard. If the one-hour average downstream turbidity exceeds the performance standard, the LRI engineer will evaluate if the exceedance was attributed to work area operations or an unrelated event (e.g., propeller wash from a passing boat). The lake will be checked for visual signs of turbidity, and the turbidity sonde hanging from the buoy will be checked for accumulation of biological material or floating debris, which could account for elevated readings. Turbidity curtains will also be checked for continuity, visible signs of damage, and visible turbidity emanating from the containment area. LRI's observations will be noted within the daily report, including visual observations for the presence of NAPL/sheens on the water surface outside the containment controls, or the presence of a saturated oil boom inside the containment area. Notifications will also be made to the MACTEC and NYSDEC onsite representatives. If a turbidity exceedance is determined not to be an anomaly, and is directly associated with remedial activities, contingency measures will be implemented, including evaluation and modification of dredging or sediment backfilling operations, and installation of additional turbidity curtains to enhance control. To ensure proper functionality of the turbidity monitoring equipment, LRI will follow a weekly schedule for cleaning and calibration. During these cleaning and calibration events, each buoy's sonde will be removed from the water and thoroughly cleaned with a brush, cloth, and lake water. Regular cleaning of the sondes is required due to potential accumulation of algae growth on the equipment. Once cleaned, the sonde will be placed back into the lake.

### 3.20.3 Contingency Measures

If during dredging or backfilling operations turbidity levels in the water column exceed 25 NTU above background, LRI will institute contingency measures. Contingency measures include but are not limited to:

- Reducing dredging production rates to slow down dredging operation;
- Reduce dredge cut depth, to insure sediment is not eroding out of the bucket during lifting through the water column;
- Reduce spillage during transfer from dredge bucket to hopper barge;
- Check water depth and insure prop wash is not being created;
- Check bucket to make sure it is not carrying sediment during the return phase through the water column;
- Place capping material uniformly and closer to the bottom to minimize material in the water column;
- If sheens are observed outside the work area, deploy secondary oil containment boom around the sheen area; and
- Maintain additional secondary oil containment boom, oil boom and sorbent pads and turbidity barrier on-site for deployment, if sheens are observed inside the work area.

LRI will maintain a jon boat for deploying personnel and additional contingency measures, if required.

# 3.21 DREDGE WORK PLAN

This section provides a discussion of the construction activities as they relate to the dredging of Pontiac Bay. This dredging work plan provides information as it relates to mobilization, set-up, dredging equipment to be utilized, sediment transport, dredge positioning and demobilization. Prior to dredging LRI will a bathymetric survey to establish the pre-dredge elevations and identify any debris that may be in the dredge area. The project calls for the dredging of approximately 14,950 cubic yards of MGP impacted sediment. Dredging will be conducted over an area of approximately 1.6 acres. LRI is planning to complete the dredging on one season. Sediments will be managed under two primary categories – Non-Hazardous waste and D018 exempt waste (>0.50 mg/l Benzene), based on historic site

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data from the lake sediments, Benzene did not appear to be prevalent in the dredge areas. If encountered the D018 waste will be managed separately and shipped off-site for thermal treatment.

### 3.21.1 Dredge Contractor

LRI will provide all dredging equipment and perform all dredging operations for this project. LRI is located at 74 Hudson River Road in Waterford, NY. Mr. Michael Evens will act as dredge superintendent and Mr. Evens's emergency contact number is (518) 844-3647. This number is also provided in the Health and Safety Plan. The backup emergency contact will be Mr. William Lindheimer, Mr. Lindheimer's emergency contact is (518) 937-0473.

### 3.21.2 Dredge Equipment

The following table provides a list of the dredge and support equipment to be utilized for this dredging project.

Equipment	Quantity	Activitty	Description
Dredge Platform	1	Dredging and Backfilling	40'x80' Flexi-Float Platform with Spuds
Hopper Barges	3	Dredging and Backfilling	30' x 40' Flexi-Float Platforms
Sealed Roll-Off Containers	6	Dredging and Backfilling	2 on each Hopper Platform
Link Belt 800 w/GPS	1	Dredging and Backfilling	Working off 60' x 80' Platform
Push Boats	3	Dredging and Backfilling	Maneuvering Dredge and Hopper Barges
Level Cut Clam Shell Bucket	1	Dredging and Backfilling	4.5 Cubic Yard Bucket
Carpenter Barge	1	Dredging and Backfilling	Project Support
Jon Boat	1	Turbidity Monitoring/Sheens	To perform inspections and response

# 3.21.3 MOBILIZATION OF DREDGE EQUIPMENT

Upon completion of the temporary bulkhead LRI will mobilize the dredge equipment. Dredge equipment will be mobilized from Waterford, NY to the Saranac Lake Site. Dredge platforms will be delivered on flatbed trucks and offloaded with the Link Belt 800 or a crane and placed in the water. Flexi-floats are a combination of portable, interlocking modular barges and attachments used for inland marine construction. LRI will utilize Series S-70 (7' hull depth) for the dredge platform and Series S-50 (5' hull depth) for the hopper barge platforms. The platforms are designed to be assembled in the water using tag lines, pry bar and a sledge hammer. The dredge platform will be equipped with spud wells, spuds and a hydraulic power pack to lift the spuds for moving the platform and anchoring the platform.

3.21.4 START-UP OPERATIONS

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Prior to dredging operation commencing the hydrographic survey will be converted to a surface file that will be entered into the GPS system of the Link Belt 800 excavator. The GPS system will be checked using the Trimble Base and Rover to compare accuracy of the bucket as it relates to the surface on shore. This will be performed on a regular basis to insure the accuracy of the dredging operation.

During loading and unloading of the Flexi-floats the floats will be inspected to ensure that the floats integrity has not been compromised or damaged in transit. All connections will be inspected, tag lines secured, equipment properly anchored to the dredge platform and the hopper barges with chains. All safety equipment, including spill control supplies, life jackets, rings will be placed on boats and dredge platform. The dredge platform will also have a portable toilet on board for the dredge crew as well as other ancillary equipment for dredging operations. All boats will have been recently serviced and inspected prior to delivery to the site.

# 3.21.5 Dredge Sequence

LRI has prepared Figure 3-5 to illustrate the dredge sequence. LRI is anticipating dredging approximately 400 cubic yards per day, or 2,000 cubic yards per week. LRI is anticipating approximately 40 cubic yards per hour for a 10-hour work day. LRI has anticipated 1 day per month of weather delays that would not allow work to be performed. No work on water will be performed during lightning storms. Based on work being in Pontiac Bay and protected from the main part of the lake, high wave action is not anticipated.

# 3.21.6 Dredge Equipment Descriptions

Cut sheets on the equipment are provided in Appendix D of this document.

LRI will utilize the Trimble real time kinematic global positioning system (RTK GPS) for controlling dredging depths and backfill placement. LRI will utilize this technology during the project to check dredge depths, then periodically will have surveyor perform bathymetric survey to confirm final contours have been achieved. Real time views of the dredger in plan and profile view displays the clamshell, design depths and color-coded Digital Terrain Model (DTM). The DTM highlights the high and low spots relative to grade and is updated in real time tracking the progress of the dredging work. The update follows the shape of the clamshell and is visible immediately in all the views. The system also shows the open/close status of the bucket. A built-in calibration procedure allows for easy calibration of the cable counters.

The dredge bucket will be utilized to make field checks on dredge cuts and to minimize over dredging. As described above the color-coded DTM will provide the dredge operator with the elevations required to achieve the desired dredge depths. The quality control will include the periodic checking of the GPS system with the Trimble Base and Rover to confirm accuracy of the dredge bucket and any corrections that need to be made to maintain the accuracy of the equipment.

LRI will utilize Trimble based dredge positioning system uploaded with the dredge model. Bucket survey data will be logged into a bucket data file for each dredge at final grade and are delineated by time and date. Period bathymetric (single-beam) survey work is completed to provide contractor quality control of bucket file data. Multi-beam survey events will be provided to document final dredge elevations prior to backfilling operations begin.

# 3.21.7 DAILY DEPLOYMENT AND INSPECTION

LRI will anchor the dredge platform in the work area that it is most currently working during overnight and weekends, unless weather dictates the dredge platform is moved closer to shore for mooring and tying off. Personnel will be

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shuttled to the barge each day and at the end of the day either on one of the push boats or one of the other boats onsite. The hopper barges will be moored off the dredge platform, one will be placed inside the building and the other will be moored to one of the steel piles placed in the water for structure support. Hopper barge platforms could be tied off together and moored to the steel H-piles supporting the fabric structure.

Each morning the equipment will be inspected for leaks or damage. Any vessel listing will be evaluated. Listing of the Flexi-float platforms would be an indication that water is accumulating inside one of the floats. This evaluation will determine that all equipment is Fit for Duty.

# 3.21.8 Description of Dredge Work Areas

LRI has prepared Figure 3-1 to illustrate the configuration of the equipment, TFS setup, unloading area, sediment stabilization area, loading of transport vehicles and general site layout of all equipment to be used for the dredging and backfilling operations.

# 3.21.9 DEBRIS SURVEY

As part of the initial hydrographic survey, this survey will identify any debris within the dredge limits. Depending on the size of the debris and the amount of the debris, LRI is likely to remove debris and place into the hopper barges for off-loading inside the structure. LRI does not anticipate encountering very large debris in this area, however if something larger is encountered LRI will evaluate means and methods to remove the debris and clear the dredge area.

# 3.21.10 UTILITIES

LRI does not anticipate any subaqueous utilities to be encountered within the dredge limits or the limits of site preparation. If utilities are identified that conflict with the dredging limits or work approach, the utility(ies) will be discussed with the owner of the utility to determine the size, construction and whether the utility is active. Once the information is obtained a decision can be made as to what do with any utilities encountered.

Utilities along Brandy Brook, specifically the sanitary sewer line will be supported as it is exposed. Support will include cribbing underneath the pipe to support it along its full exposed length.

# 3.21.11 Dredging Near Structures

During dredging in Pontiac Bay, LRI will slope away from the structure. The dredging will start at the top of the slope and work down the slope to eliminate the potential for sloughing of material to the bottom. LRI will follow the contract design for maintaining a safe distance from the structure prior to starting the slope. A similar approach will be performed when working along Brandy Brook to protect structures. Vibration monitoring is discussed in Section 3.16 of this work plan.

# 3.21.12 Dredging Sediment Transport

The transport of dredged sediment will be performed using three (3) - 30'x40' Flexi-float S-50 platforms. Each platform will be equipped with two (2) - 30 cubic yard watertight roll-off containers. Material will be placed into the roll-off containers and the hopper barges will be maneuvered and pushed to the off-loading area inside the TFS. Each 30 CY container will be filled with 20 CY of sediment, for 40 CY each trip. The hopper barge platform will draft 3.5 feet and leave 1.5 feet of freeboard on the platform. This will keep the platform stable. It will be important to evenly load the material and not overload one side or the other to keep the platform stable at all times.

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# 3.22 DREDGE MATERIAL MANAGEMENT AND PROCESSING PLAN

The Dredge Material Management and Processing Plan provides a description of the management of the dredged sediment following transport as discussed in Section 3.22.12 above. As shown on Figure 3-1 the sediment unloading and processing area will be within the TFS. Once the hopper barges are pushed into the TFS, the barge will be secured to the bulkhead or the associated piles. Free standing water will be pumped from the dredge sediment containers from sumps within the corner of the roll-off containers. This water will be piped directly to a dewatering bag inside a sealed roll-off container and then filtered water will be pumped to the frac tank for storage, prior to treatment. The dewatering of the sediments will take place during the off-loading operation. Dredged sediment will be off-loaded from the hopper barges using a Link Belt 600 material handler. The material handler has an elevated cab to allow the operator to see inside the hopper barges. The Link Belt 600 will be equipped with a 3-cubic yard bucket for off-loading the sediment. The off-loading of the sediment will take place over a drip apron constructed off the bulkhead. This drip apron will catch any water or sediment that drips during off-loading. The material on the drip pad will drain to a sump for pumping to the dewatering bag so that sediment is not introduced into the frac tank. The drip pad can also be hosed down to clean any material that does not drain or shoveled off into the staging area. The off-loading of the sediment barge will always be over the drip apron so that material is not dripped back into the lake.

The off-loaded sediment will be placed in a lined staging pad. The staging pad will be equipped with a sump to pump any accumulated water to the treatment system.

# 3.22.1 Dredge Material Management Equipment

The following table provides a list of the dredge material management equipment to be utilized for this material management operations.

Equipment	Quantity	Activitty	Description
Link Belt 600	1	Off-Loading Dredge Sediment	Elevated Cab and extended reach
Link Belt 350	2	Blending and Loading Sediment	Blending stabilizing agent and loading into off-site transport vehicles
Low-Pro Silo	1	Sediment Stabilization	Material will be delivered in bulk and stored in silo
BioSolve Equipment	1	Odor Control Activities	Use to spray BioSolve to control odors
Rusmar Foamer	1	Odor Control Activities	Use to spray foam if required
Temporary Fabric Structure	1	Odor Control	96'x148' Clear Span Structure
TIGG NB-20	2	Odor Control	Air handling units to control odors and provide clean air exchanges

# 3.22.2 Dewatering and Stabilization of Sediment

As described above LRI will allow material to initially dewater on the staging pad. This will be for water that readily drains from the sediment once sediment is deposited on the staging pad. LRI will also be actively stabilizing the material with additive. The percentage of additive will vary based on the variability of the material being dredged. Much of the material described in the dewatering pilot study was granular and dewatered readily. Some material contained finer organic silts which will require more effort to dewater. LRI will utilize a Low-Pro Silo to store material, the Low-Pro Silo utilizes an auger to deliver product. Material will be augered and discharged through a discharge hose to the mixing/blending area. LRI would utilize Calciment or Portland Cement as a stabilizing agent. The mixing of the stabilizing agent and the sediment will be performed with a Link Belt 350 or equivalent excavator. The material will be introduced into the sediment and folded into the wet sediment for assisting in drying the sediment and making it suitable for off-site shipment and disposal. LRI is anticipating no more than a 2% addition rate of stabilizing agent, some material may require a little more and some will require a bit less. The use of the auger delivery system and discharge hose it will minimize the dust generation. Since the product will be discharged from the discharge hose directly to the surface of the sediment it minimizes the amount of dust generated and material should flow onto the sediment versus being dropped onto the sediment pile. A Safety Data Sheets for the Calciment and Portland Cement are Provided in Appendix E. A flow chart of the process is provided in Figure 3-6.

# 3.22.3 MATERIAL MANAGEMENT

Once sediment has been off-loaded, dewatered and stabilizing agent added, if required, the material will be placed in one of two loading bins. Material will be placed in the loading bin using the Link Belt 350 excavator and staged for loading in off-site transport vehicles. LRI has planned to have material stockpiled for one day, prior to loading off-site. So this requires two piles to be in place, one pile is actively being loaded out, the second is allowing to further stabilize and allow the stabilizing agent to react and further dry the material. The active loading area will be managed with a second Link Belt 350 sized excavator. This loading area will consist of two roll-up doors on the TFS. A truck will enter the TFS with the truck already lined, the driver will stay inside the cab of his truck and the truck will be loaded. The truck will then be tarped and will exit out the opposite side of the building. As stated earlier approximately 14 loads per day will be shipped out of carrying sediment, this will be 7 trucks making two trips to the landfill. After material has been staged and after loading operations of the active pile, the piles will be covered with large tarps to control any odor generation. If odors are observed during loading or blending, odor suppressing spray and/or foam will be applied to control odors. The building ventilation system will also control odors and carbon monoxide buildup from the operations.

# 3.23 DREDGE AREA BACKFILL PLAN

# 3.23.1 Dredge Backfill Equipment

The following table provides a list of the dredge and support equipment to be utilized for this dredging project.

Equipment	Quantity	Activitty	Description
Dredge Platform	1	Dredging and Backfilling	60'x80' Flexi-Float Platform with Spuds
Hopper Barges	3	Dredging and Backfilling	30' x 40' Flexi-Float Platforms

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Sealed Roll-Off Containers	6	Dredging and Backfilling	2 on each Hopper Platform
Link Belt 800 w/GPS	1	Dredging and Backfilling	Working off 60' x 80' Platform
Push Boats	3	Dredging and Backfilling	Maneuvering Dredge and Hopper Barges
Level Cut Clam Shell Bucket	1	Dredging and Backfilling	4.5 Cubic Yard Bucket
Carpenter Barge	1	Dredging and Backfilling	Project Support
Jon Boat	1	Turbidity Monitoring/Sheens	To perform inspections and response

# 3.23.2 OU-3 BACKFILL MATERIAL SOURCE

All backfill materials for the project will be produced and provided by Trudeau Sand & Gravel, Inc. of 1115 NYS Route 3, Saranac Lake, NY 12983. Copies of Trudeau Sand & Gravel, Inc's permit and NYSDOT certification is provided in Appendix F. Trudeau Sand & Gravel has evaluated the project requirements and will meet the general required criteria per Section 31 00 00 – Earthwork. It is anticipated that some minor fluctuations in the sieves will be present in the local native material.

# 3.23.3 Delivery of Backfill Materials

It is anticipated that Trudeau Sand & Gravel will provide delivery of all materials to the project Site. The delivery methods will include dump trailers and tri-axle dump trucks. Trudeau Sand & Gravel is located at 1115 NYS Route 3, so the transport route will include Route 3 into the village and delivery via either Route 86 for bay backfill material or and Brandy Brook, to Pine Street, to Payeville Lane for OU-2 material. The OU-2 material will be delivered to the OU-1 on Payeville Lane. Temporary stockpiles will be covered with tarps to control any wind-blown dust. The traffic plan describes the traffic routes to and from each site.

# 3.23.4 Staging of Backfill Materials

In order to keep the project moving after dredging has been completed, LRI will setup a temporary stockpile east of the TFS. This will allow the temporary fabric structure to be dismantled and continue to backfill. The staging area is shown on Figure 3-1.

# 3.23.5 BACKFILL PLACEMENT

The backfill operation follows the same procedures as the dredging except in reverse. Material will be loaded onto the hopper barges and pushed to the backfill locations. Backfill material will be dug out of the hopper barges using the Link Belt 800 with the 4.5 cubic yard clam shell bucket. Material will be lowered into the water column and placed close to the bottom. This approach will minimize disturbance of the existing sediment while also minimizing turbidity. Each dredged area will be GPS modeled to the dredged depth and the final sediment elevation of the clean fill. The operator will be able to set the bucket on the bottom and check elevations. It is anticipated that each work area will be backfilled in lifts prior to moving to the next work area. The backfill elevations will be confirmed by bathymetric survey.

# 3.23.6 BACKFILL PRODUCTION

LRI is anticipating backfilling the dredging area at a production rate of approximately 400 cubic yards per day, or 2,000 cubic yards per week. LRI is anticipating approximately 40 cubic yards per hour for a 10-hour work day. LRI has

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anticipated 1 day per month of weather delays that would not allow work to be performed. No work on water will be performed during lightning storms. Based on work being in Pontiac Bay and protected from the main part of the lake, high wave action is not anticipated.

# **3.23.7 DEPLOYMENT AND INSPECTION**

LRI will anchor the backfill platform in the work area that it is most currently working during overnight and weekends. unless weather dictates the backfill platform is moved closer to shore for mooring and tying off. Personnel will be shuttled to the barge each day and at the end of the day either on one of the push boats or one of the other boats onsite. The hopper barges will be moored off the backfill platform, one will be placed along the bulkhead or moored to the H-Piles that were placed for the TFS.

Each morning the equipment will be inspected for leaks or damage. Any vessel listing will be evaluated. Listing of the Flexi-float platforms would be an indication that water is accumulating inside one of the floats. This evaluation will determine that all equipment is Fit for Duty.

#### 3.24 MATERIAL HANDLING AND MANAGEMENT

Prior to placement of fill, analysis of the borrow source will be provided as a submittal to the Engineer for approval in compliance with Technical Specifications 02300. Prior to backfilling, the excavations will be inspected for standing water. Standing water will be pumped off to the temporary water treatment system. The backfilled areas will then be compacted in 12-inch lifts. Soil will be compacted using an 8-ton roller and compaction testing will be performed every as specified in the Contract Documents. Backfill will be supplied from local sources and local drivers will provide delivery to the site. Backfilling operations will follow the excavation schedule. Backfill of an area will be completed after a post excavation survey of the area has been performed. Backfill will be placed after any confirmation soil samples have been collected and the analysis approved by NYSDEC and the Engineer. Areas not requiring confirmation sampling will be backfilled as soon as practicable. Backfill operations are expected to occur promptly upon the completion of excavation to minimize open excavations and prevent both run on and run off.

A stabilized construction entrance will be constructed at the backfill truck entry/exit location for the backfill trucks to run on prior to leaving the site in order to remove and minimize any clean soil being tracked from the site. All backfill trucks exiting the site will be closely monitored to ensure that soil, although clean backfill, is not being tracked onto the local roadways. LRI is sensitive to the public perception of soil being tracked onto public roadways and will take the necessary precautions to keep the local roadways clean and free of soil being tracked off-site

#### 3.25 TRANSPORTATION AND DISPOSAL

This section describes waste disposal procedures that will be implemented at the Saranac Street Gas Site, including manifest package and tracking of waste shipments. LRI will provide a single source of contact for all environmental regulatory matters involving transportation and disposal of impacted material. This person will be responsible for the identification and classification of all hazardous and non-hazardous waste; proper labeling, packaging, and placarding of waste; completion of all waste profiles, manifests, and bill of ladings; maintaining and tracking disposal facility weight slips, and any other transportation and disposal form.

It is estimated that approximately 33,700 tons of material will be generated. This waste material will be disposed of at permitted solid waste landfill(s) and a permitted thermal treatment facility for D018 MGP exempt waste.

Waste materials will be loaded into off-site transportation vehicles from stockpiles at OU-1 and OU-3 work areas. Each transportation vehicle will have transporters permit pursuant to the provisions set forth in 6NYCRR Part 364 and all other applicable state regulations. Manifesting and transportation of all hazardous waste will be in accordance with 6 NYCRR Part 372 and 40 CFR Part 263. LRI will be responsible for providing complete and accurate manifests for the signature of the Respondents or their authorized representative. The completed manifest will accompany all shipments of waste while in transit at all times. Transportation of non-hazardous regulated waste will be in accordance with Federal Department of Transportation (DOT) regulations 49 CFR 172 and will be transported under a standard non-hazardous manifest. Analytical results will be used to characterize the waste prior to excavation and loading. All transport vehicles (non-hazardous and exempt hazardous) will be weighed at the off-site scale and at the disposal facility to track the quantity / mass of soil removed from the site. The certified disposal facility weight tickets will be collected and tracked by LRI and provided to the Engineer.

- Off-site Transportation Vehicles All trucks will be covered with tarps prior to leaving the site. All trucks will be required to display appropriate placards and possess NYSDEC hauler permits prior to loading. Containers will be inspected prior to loading and prior to leaving the site. All off-site transportation vehicles will travel on temporary stone access roads located on-site to minimize the vehicle contacting potentially impacted material. All transport vehicles will be properly inspected and decontaminated, if required, before leaving the site for transport to the disposal facility. In the event of a spill or discharge of waste during off-site transportation, the transporter will take immediate action to protect human health and the environment. The appropriate action will include but not be limited to the following: notify local and state authorities, dike the spill area if necessary, and barricade spill area to prevent human contact.
- Waste Classification Impacted material will be excavated and handled as three separate waste disposal types; solid waste material and debris, D018 MGP exempt and non-hazardous soils and sediment.
- Disposal Facilities Non-hazardous soil will be transported and disposed of at one or more of the following facilities: Franklin County Landfill in Constable, NY; Clinton County Landfill located in Morrisonville, NY; and ESMI of New York. The disposal facilities will supply a weekly accounting of the loads of waste received, including Manifest numbers, bill of lading numbers, load weights as received, truck identification information, and receipt date. LRI will be responsible for resolving any discrepancies between loads shipped and received. LRI will maintain a daily log of the quantity of soil transported offsite, classification of waste, number of loads transported, and the corresponding facility certified weight tickets.

#### 3.26 **IN-SITU STABILIZATION WORK PLAN**

This submittal is intended to outline the In-Situ Stabilization (ISS) process, equipment, materials, construction methods, and quality control relative to the work at the Site. LRI is performing the work in accordance with the Technical Specifications and has developed an approach based on the project goals and LRI's experience with performing ISS.

LRI's work will include the following:

- Mobilization of soil mixing equipment;
- Pilot Study: •

- Excavation of Overburden:
- Underground Storage Tank Removal; •
- Staging of Overburden;
- ISS mixing equipment;
- Sampling of ISS matrix; •
- Placing Overburden over stabilized material; and
- Demobilization and general site cleanup •

Sections of this submittal include:

- Schedule
- Stabilization/Treatment Method •
- ISS Mixing Equipment
- ISS Sequence
- Materials
- Quality Control

# 3.26.1 Schedule

A schedule for the activities related to the ISS implementation is provided in Submittal 003.

# 3.26.2 Stabilization/Treatment Method

LRI will start the stabilization in the area closest to the shoreline of Pontiac Bay. Although the design calls for a full depth ISS along this area, LRI will make a shallow pre-cut to control swell from entering the surface water. The treatment method will be in through the introduction of dry Portland Cement (PC) onto the surface of the ISS area and the material blended with an Alpine Mixer. The Alpine Mixer is a transverse mixer with twin-drums mounted to a Link Belt 490 or equivalent machine. The Alpine Mixer head is equipped with injection piping for either dry or wet additives. Based on the proximity of the ISS area in relation to the bay, it is anticipated that there will be significant water present in the subsurface. The introduction of a wet grout material into the already wet environment could potentially create a very week mixture and could lead to a very low strength matrix. Using the dry mix method, LRI can add water if needed, to create an optimal blend for meeting the desired characteristics. The initial cells will be approximately 6 feet wide and 10 feet long to perform the initial Pilot Test and demonstrate the mix design meets the project goals of 40 psi Unconfined Compressive Strength (UCS) as measured by ASTM D1633-00. Three cells will be mixed to demonstrate the method and performance. One sample from the center of each column will be collected in accordance with ASTM C-39 for UCS.

LRI is proposing that an 8% by weight addition of PC will be added to the soil to meet the project requirements. Bulk PC will be delivered in pneumatic trucks and off-loaded into a 30-ton Low Pro Silo. The silo is equipped with a bag house to control dust during delivery of dry product. The silo will deliver dry product through an auger system. LRI will utilize a volume conversion of dry product to dry weight for measuring the dry product addition. LRI will auger PC into a rock box and a second excavator will take level buckets of dry product and place on mix cell. The excavator equipped with the Alpine Mixer will then mix the dry product with the soil from top to bottom until the entire soil column is homogenized. The rate of advancement will be a function of the type of soils encountered and if any debris exists.

The second excavator will be on-site to deal with any subsurface debris that is encountered, this debris is likely to be removed and staged for disposal, depending on the type of debris encountered. During mixing the column will be monitored for water content, the first columns along the bay are not anticipated to have a need for water addition, however later columns will be evaluated during mixing to ensure that proper homogenization is occurring. If water addition is required, water will be added to the mixture at the surface or through the Alpine Mixer to keep the soil/cement properly homogenized. LRI typically uses a mix ratio of 1:1 for PC to water. During the full-scale implementation, there will be less overburden soils present and mixing will be starting at or slightly below groundwater elevations. Water content of the native material will be monitored to ensure proper mixing.

The basic cell configuration varies, with some cells being a little larger due to the shape of the ISS area. LRI will prepare a figure and table that will provide the size, depth, volume, mass and quantity of PC for each cell. The sequence of mixing cells may not follow a sequence, the actual mixing sequence will be based on how cells mix and react with adjoining cells. The initial precut will be completed to a depth of approximately 5-feet below ground surface (bgs). The platform for the excavator to work will be kept elevated to keep the excavator dry and stable. The Link Belt 490 will operate on the surface outside of the pre-cut. This will keep the tracks clean and out of soil/PC mix.

A small cavity is then excavated from within the precut cell limits. The material from this cavity is then used to construct small berms (typically 2' high) along the cell perimeter to maintain the dry mixtures. Cement will be added from the bucket of the excavator to minimize dust generation. The cell cavity is only excavated two additional feet deep inside the cell limits so not to affect the precut side wall stability slopes. During active excavation BioSolve or odor suppressing foam will be used to control odors, if present. Foam or BioSolve will be on standby anytime excavation activities are occurring.

If during ISS additional containment is required due to swell volume, then the pre-excavation soil can be utilized to create additional containment to prevent overtopping of swell material.

Once the precut is excavated and berms are created, dry additives are discharged to on the surface of the cell. Grout is created by mixing the dry additives with the undisturbed soil and groundwater. Mixing is completed in 1-2' lifts from the top of the cell to the bottom of the cell to the cell perimeter and advanced to the target depth. Once the target depth is reached, the cell is thoroughly mixed to the cell limits (both horizontal and vertical) until a consistent homogenous mixture is created. Samples will be collected for confirmation of a consistent homogenous mix in addition to the specified QA/QC samples which will be collected in a grout sampler that can take a discreet 5-ft long core sample from a specific interval. It is anticipated that groundwater within the cell will be sufficient to create a fluidized mix. The cement will be monitored during each cell addition to approximate the total tonnage delivered to each cell. It is anticipated that approximately 210 tons of Portland Cement will be utilized during the ISS.

LRI is anticipating approximately 240 CY per day of ISS.

After the ISS work is complete, the top of the ISS monolith will be cut to -5 feet bgs or the original pre-cut elevation to allow for the overburden material to be placed and compacted back into the ISS treatment area.

Upon completion of the ISS work equipment that had come into contact with the contaminated material will be decontaminated. Waste generated from the decontamination will be managed based on waste stream generated. Equipment will be cleaned using high pressure power washer.

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The pre-excavation cuts will be performed in advance of the cell being treated. Pre-cut soil will be staged outside the ISS area(s) for reuse and backfilling over the ISS monolith.

At the end of each work day the excavator stick and boom are washed off to minimize grout build up on the components. This washing of the excavator components may also take place during the day if excessive buildup is noticed. The equipment will be decontaminated at the end of the ISS work one of the decontamination pads.

# 3.26.3 ISS Equipment

The following table provides a list of the ISS and support equipment to be utilized for the ISS component of the project.

Equipment	Quantity	Activitty	Description
Link Belt 490 with GPS	1	ISS Mixing	Excavator
Alpine Mixer	1	ISS Mixing Attachment	Attaches to Excavator
Link Belt 350	1	Pre-Cut, ISS Cut, Backfill	Excavator
Low Pro Silo	1	Portland Cement Storage	30-Ton capacity

# 3.26.4 QUALITY CONTROL PLAN

LRI provides the following Quality Control Plan (QCP) to help guide the monitoring, inspection, surveying, recording, and documentation of the work described above. This QCP outlines Quality Control testing procedures to be followed during the project.

# 3.26.4.1 Monitoring of Work

The monitoring of the work encompasses a number of different tasks as they relate to the ISS work, these include monitoring; progression of work; depth of ISS; batch parameters; performance criteria; and geotechnical monitoring.

As stated earlier LRI will utilize a Global Positioning System (GPS) on-site to track the progressive of work. The site will be initially modeled using GPS and the model will be input into the GPS system on the excavator. This will allow the operator to visually see on the monitor what portion of the ISS is currently being mixed and what depths have been achieved. The Site Superintendent will consult with the operator to confirm that the cell is complete. Each cell will be labeled with a unique number. This unique number will be tracked in a spread sheet along with amount of soil in the cell, PC added, top of ISS and bottom of ISS. The coordinates will be field checked and verified each day to insure proper calibration and positioning is maintained. This information will be incorporated into the daily reports.

LRI will utilize a Trimble GPS system integrated into the excavator to maintain horizontal and vertical control. The Trimble® GCS900 Grade Control System with dual GPS will be installed on the Alpine Mixer. The system uses two GPS receivers and solid-state angle sensors to measure the precise 3D position of the mixer head.

Once the treatment elevation has been confirmed, the equipment operator will place mixer head at various locations at the bottom of the cell and record the elevation within the data collector. This information is down loaded from the

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excavator by way of a flash drive and provided to the surveyor to be incorporated into the site data package which in turn is used as a bottom of ISS as-built.

The ISS mixture will be batch mixed in the soil cell by the addition of dry additives at the surface of the cell. In-situ field conditions may warrant a change in mix design depending on the water content of the soil. If this is the case, LRI will discuss with the Engineer for approval to alter the mix design. Each cell mixed is tracked on the ISS Daily Report, which will provide a total mass of PC added to each cell.

LRI will collect verification ISS samples at a frequency of one set for every 500 cubic yards mixed in accordance with the Technical Specification 31 32 13 and tested for UCS in accordance with ASTM D1633. Three (3) cylinder samples will be collected from each cell, each set of samples shall consist of a 3-inch diameter by 6-inches long sample specimens (cylinders) of homogenized solidified soils obtained from the ISS monolith at a location determined by the Engineer. Samples will be shipped to the laboratory for holding and analysis. Samples will be sent to Atlantic Testing Laboratories in Canton, NY. ISS treated material shall achieve a UCS of not less than 40 psi at 28 days. Some initial sampling in the field can be checked using a pocket penetrometer to get a rough idea of how the initial material is curing and estimated psi range.

One sample will be for testing, one sample as an extra sample if an anomaly is observed with first sample and the other will be provided to the Engineer. LRI may elect to check a sample sooner to see how the ISS matrix is curing. Samples will be shipped to the laboratory for holding and analysis. An air operated sampler will be used to collect discreet samples, if the ISS matrix is fluidized enough to allow for collection of samples.

# 3.26.5 UNDERGROUND STORAGE TANK (UST) REMOVAL

During the excavation for the pre-ISS cut the UST is likely to be encountered. Once encountered the tank will be evaluated. Any associated piping will be cut and plugged. The interior of the tank will be inspected to see if any product is present or water/oil is present. Material inside the tank will be vacuumed into drums or a vacuum truck depending on the quantity of material. Once emptied the interior of the tank will be checked for Lower Explosive Limits (LEL), if needed the UST will be degassed with Nitrogen gas or Dry Ice (CO<sub>2</sub>). Once deemed safe LRI will access the tank and clean interior of any residuals. The tank will be loaded for off-site disposal to a licensed steel recycling facility.

#### WINTER SHUTDOWN PLAN 3.27

LRI may prepare the site for the winter shutdown from December 2018 through April 15, 2019, however these dates may be shift based on site conditions and under the discretion of NYSDEC and LRI. A winter shutdown plan will be provided by LRI for Engineer review and approval as described in Section 01 74 17. The work will be scheduled so that all the open excavations have been cleared and backfilled and all intrusive work is secured and covered. A site inspection will be performed with LRI, Engineer and NYSDEC to document that the protection and controls have been installed. The perimeter of the site will be secured with the perimeter fence. All signage will be checked to insure the site is posted to keep non-project related individuals out of the work areas. Erosion and sediment controls will be inspected and additional measures installed to protect the site during the winter season.

The site facilities will not be maintained over the winter shutdown period. A weekly inspection will be performed by a qualified LRI staff member to insure the site is secure and to document conditions. LRI will notify local law enforcement prior to the winter shutdown period to make them aware that activities are being suspended over the

winter shutdown period and that if any suspicious activities are observed to notify LRI. LRI will provide contact information to law enforcement officers.

The Winter Shutdown Plan will be implemented upon completion of the remediation activities after December 2018 activities. The Winter Shutdown Plan is recommended that restored areas and erosion control features be inspected every 7 days or 24 hours after a storm event of 0.5 inches of rain or the equivalent volume of snow. The site will be inspected, photograph documentation and reported back to the Engineer. If any serious damage is observed the Engineer will be notified immediately for evaluation. Based on the conditions, some repairs will need to be made within 48 hours of the findings to insure contaminated soil does not erode into the creek or tributary or outside the limits of work.

Findings shall be summarized in inspection reports, including photographs to document observed conditions. Reports shall include recommendations for repair of erosion, if necessary. Inspection reports shall be submitted to the Engineer and NYSDEC.

Necessary repairs to mitigate erosion shall be made immediately to prevent further loss of sediment. Replantings, if necessary, shall be made at the time of year suitable for the particular plant species.

The Winter Shutdown plan will incorporate supplemental erosion and sediment control needs during the potential winter shutdown period.

# 3.27.1 Site Inspection

Inspection of the Site will include observations of the soil area, vegetation, fences, brook and slopes along Pontiac Bay, and general conditions of the Site. The site inspection form (to be provided in the SWPPP) will be filled out for each inspection. Along with the site inspection a letter report will be prepared as a cover to the inspection list along with a photographic log to document conditions.

During the weekly inspections the Site will be walked and areas of deterioration, water erosion, subsidence or ponding will be evaluated. Installed erosion, sediment and stormwater controls shall be inspected to determine if measures are adequate to protect against sedimentation and migration of contamination. Any deterioration or vandalism will be reported and repaired.

No plowing will take place on the work areas.

#### **EQUIPMENT DECONTAMINATION AND PROCEDURES** 3.28

All equipment will be decontaminated prior to delivery to the site. All non-disposable equipment used during implementation of the remedial construction activities will be decontaminated before being removed from the Site. If equipment is in contact with this material, equipment decontamination will be performed in the designated on-site decontamination area. All material used in equipment washing including, but not limited to, detergent solution, rinseate, rinse water, towels, disposable equipment, and polyethylene sheeting, will be collected in the on-site storage container for disposal.

Upon completion of all construction activities, all heavy equipment exiting the Contaminant Reduction Zone that has been in contact with contaminated soil will be properly decontaminated on the main decontamination pad. Additional decontamination procedures are discussed in the HASP. All equipment will be inspected prior to being demobilized

from the project Site. The decontamination pad shall be constructed of a 40-mil liner sandwiched between 16 oz nonwoven geotextile layers with stone and crane mats as a tracking surface.

Equipment will be decontaminated using a combination of dry cleaning to remove bulk solids from the tracks and bucket of the excavator(s). Once bulk soil has been removed, the tracks, under carriage and bucket will be cleaned using high pressure water. All water will be pumped from the decontamination pad to the storage tank.

# 3.28.1 Decontamination Procedures

The procedures for decontamination include the loaded trucks traveling on clean access roads. During loading the trucks will be staged on polyethylene to keep the tires clean and then follow these decontamination procedure:

- 1. Remove loose dry soil from the exterior truck body using brooms and/or other hand implements.
- 2. Sweep the staging area liner clean of loose soil that has fallen outside of the truck/excavator bucket during loading.
- 3. Proceed to the stabilized construction entrance using a defined route over clean on-site access roads.
- 4. Sweep the staging area liner clean, as required, in preparation of the next truck to be loaded.

Trucks will be required to pass through the on-site decontamination pad for rinsing with high pressure water if additional decontamination measures are warranted based on the following conditions:

- 1. Wet soil creates a film on the vehicle due to work during wet weather conditions.
- 2. A vehicle drives outside the defined clean access route onto contaminated soil.

# 3.28.2 EXCLUSION ZONE

This zone, commonly known as the Hot Zone, is where there will be direct contact with the potentially contaminated material. The level of PPE required shall be based on hazard, Site condition and air monitoring performed. The outer boundary of the Exclusion Zone, called the Hotline, shall be delineated with caution tape or safety fence. Modification to the size and boundary of the exclusion zone will be made in the field based on operation and wind directions. The primary Exclusion Zone location will be along the inside perimeter of the excavation during intrusive activities. The exclusion zone shall also include the inside of trailers on waste transport vehicles. The drivers of the transport vehicle will be instructed to take the appropriate precautions when tarping and un-tarping the transport vehicle(s).

# 3.28.3 CONTAMINANT REDUCTION ZONE

This zone, commonly known as the Warm Zone, is where workers and equipment shall be decontaminated. This shall minimize the spread of contaminants from the Exclusion Zone into clean areas. The contamination reduction zone will be located in front of or next to the Exclusion Zone so that personnel exiting the exclusion zone can conveniently stop at the Contaminant Reduction Zone for decontamination.

Decontamination is the process of removing or neutralizing potentially harmful contaminants that have accumulated on personnel and equipment in order to reduce the spread of contamination outside the work area. Decontamination is critical to the health and safety of Site workers and it protects the community by minimizing the off-site migration of

# Construction Work Plan

contaminants. One of the most important aspects of controlling contaminated material migration is the prevention of the spread of contamination. Good contamination prevention will minimize employee and public exposure. All personnel leaving the Exclusion Zone must be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone. The decontamination process is composed of a series of steps performed in a specific sequence. The basic concept is that more heavily contaminated items will be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items.

# 3.28.4 Equipment Contamination Reduction Zone

Nearly all contractor hardware (not consumable) is considered to be recoverable. As such, they will be decontaminated using the proper equipment, (i.e. brushes, sprayers, detergent). Should equipment become heavily soiled, then the use of a water sprayer and/or scrapers and brushes shall be used before being decontaminated. In general, the high-pressure sprayer will be used for cleaning equipment: every effort will be made to remove adhering material with brushes and the sprayer.

# **3.28.5** Personnel Contamination Reduction Zone

As workers leave the Exclusion Zone they approach the first station where they will place their equipment and tools. After the workers place their equipment and tools down, they will proceed to the second station where all outside protective clothing is washed off and rinsed. This area shall consist of tubs and long handle brushes. The first tub will consist of water with a detergent for cleaning and a second tub will be a clean rinse tub. The tubs will be placed in a containment area so that spillage from the decontamination water does not occur. Disposable PPE will be placed into containers for disposal. Items that are not disposable will be scrubbed, including over boots. This personnel decontamination area will be moved as the work progresses or there may be cases where multiple decontamination areas are established based on work activities.

- Dewatering Procedures LRI will utilize submersible pumps and flexible hose for removing water. •
- Equipment Decontamination Water Water utilized for decontamination of equipment shall be supplied by potable water from hydrant or brought on-site in small poly tank. All water utilized in equipment decontamination pumped to tank.
- Personnel Decontamination Water Water shall be potable water supplied from onsite or the hydrant source. Potable water may be stored onsite in small poly tanks or 55-gallon drum and be readily available in designated areas where personnel decontamination will occur. Each local personnel decontamination area will have drums for storing used personnel protective equipment (PPE), tubs for washing and rinsing boots, boot racks for storage of boots, and fresh PPE. Water resulting from personnel decontamination activities shall be collected, pumped to a storage tank, and either treated on site and discharged or disposed off-site as construction water. Solids generated from decontamination activities will be incorporated into the contaminated soils for disposal off-site.

#### 3.29 SITE RESTORATION ACTIVITIES

Upland Area Restoration will consist of various surface finishes, including gravel area restoration and access road, rip rap drainage swale, upland area topsoil and seed, and riparian area topsoil, seed, and plantings.

The rip rap drainage channel to the North of the site will be installed following backfilling of the area. A geotextile separation fabric will be installed above the subgrade fill and 12 inches of rip rap will be placed to the line and grade shown on the plans.

There is approximately 80,000 square feet of gravel surfaces to be installed, including the gravel area restoration and gravel access road. The gravel restoration will consist of an 18-inch profile, including gravel subbase and gravel base. The subgrade fill will be brought up to 18 inches of finished grade using a GPS equipped bulldozer and compacted in accordance with the project Specifications. The gravel subbase will be spread in a uniform 12-inch lift above the subgrade fill and compacted using a vibratory roller. The gravel base will be installed in a single 6-inch lift above the compacted subbase material.

Upland areas outside of the gravel restoration areas will receive 4 inches of topsoil above the subgrade fill. The topsoil will be placed and tracked in with a GPS equipped Dozer. The topsoil areas will be hydroseeded per the Specifications.

Riparian areas identified on the Drawings will be restored by placing 12 inches of topsoil and riparian seed mix above the subgrade fill. The topsoil will be placed in a single lift and tracked in with a CAT D5 dozer equipped with fully automated GPS machine control to ensure accuracy. LRI will employ a landscaping subcontractor to furnish and install plantings, in accordance with the Landscaping Plan on Drawing 19 of 23. Trees and shrubs will be maintained for 1 year from the date of Substantial Completion in accordance with Specification 32 93 00, Part 1.08.

Existing chain-link fence will be removed during excavation activities. LRI anticipates sending the existing fencing materials offsite for recycling. New chain-link fence and gate will be installed at the locations shown on the Drawings following completion of backfilling and surface restoration. LRI will use a subcontractor to install the fencing and gate.

#### 3.30 DEMOBILIZATION

Based on the current project schedule there may be two demobilization events during the course of implementing the site remediation. The demobilization would take place prior to the winter shutdown period after the completion of the first season of work. As part of this demobilization activity the heavy equipment would be decontaminated and demobilized off-site. The second phase of work will start in May 2019.

The second demobilization will be a complete demobilization from the site and will include removal of all equipment, facilities and other material that has been brought on-site by LRI or any of our subcontractors. The final demobilization will take place upon completion of site restoration activities and all punch list items have been addressed. A final walk through of the site will be performed with NYSDEC and a letter will be issued that all punch list items have been addressed.

# Section 4: Air Monitoring Program

# 4.1 INTRODUCTION

This Air Monitoring Program has been prepared in accordance with the following documents:

- Specification 00003 Minimum Requirements for Health and Safety and
- Approved Site-Specific Health and Safety Plan.

# 4.1.1 DUST EMISSION RESPONSE PLAN

A New York State action level of 100 ug/m3 for particulate matter above background will be used to determine whether modifications to given processes are required. If the action level is exceeded, real-time monitoring of the upwind background level will commence immediately using the same portable monitor. If the site particulate measurement is greater than 100 ug/m3 above the upwind background level, or if dust is observed leaving the work site, dust suppression techniques (i.e., misting surfaces with water or covering open piles) will be implemented to reduce the generation of fugitive dust. If the action level of 100 ug/m3 above background is exceeded, the NYSDEC on-site representative will be notified. All work will be in accordance with the DER-10. If this action level is exceeded one or more of the following engineering controls will be implemented:

- Applying water on haul roads;
- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly tarped containers;
- Restricting vehicle speeds to 5 mph;
- Covering piles after excavation activity ceases;
- Closing excavations as soon as practicable; and
- Construction vehicle wash down.
- Atomizing water sprays may be used to prevent overly wet conditions. Given the size of the site and the
  resulting ease of keeping excavated areas moist, it is expected that these dust suppression measures will
  prevent fugitive dust from exceeding the environmental action level.

If the dust suppression techniques do not lower particulates to an acceptable level, or if extreme wind conditions occur, work will be suspended until additional corrective measures are implemented or the extreme wind conditions subside.

Water shall be applied (sprinkled) as needed by pumping devices, sprinkling systems, or water trucks to control dust during the active portions of the project. Water shall be applied as required based on dust monitoring levels and visible dust. All dust suppressant dispensing equipment shall meet applicable safety and licensing regulations. Weather conditions will also be considered in selecting and implementing dust control measures.

# 4.1.2 SITE SPECIFIC CONSTRUCTION ACTIVITIES AND DUST CONTROL PROCEDURES

There are three construction activities that may increase the potential for fugitive dust generation. These are:

excavation

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- truck traffic, and •
- site grading •

#### 4.1.2.1 **Excavation and Hauling Activities**

All excavated materials stockpiled on site will be maintained to minimize dust generation. Soil pile surfaces shall be moistened if dust is being generated from the pile(s). Adequately secured tarps, plastic or other material shall be used if required to further reduce dust emissions. Any material requiring off-site disposal will be handled in accordance with applicable regulation and shipped off-site as soon as possible.

#### 4.1.2.2 **Truck Traffic**

Prior to land clearing/earth moving activities, water shall be applied by means of truck(s), hoses and/or sprinklers as appropriate to minimize dust emissions. Haul vehicles transporting soil into or out of the site shall be covered. In situations where soil is encountered that contain concentrations of contaminants that make the material potentially hazardous a combination of measures could be implemented to reduce the risk of odor and dust suppression. Dust suppression can be mitigated by having a technician applying a mist in the work area to eliminate dusting problems.

When extreme wind conditions make dust control ineffective, as a last resort, excavation may need to be suspended.

#### 4.1.2.3 **Site Grading**

During grading with on-site soils or off-site backfill materials, water will be applied as needed by misting and water spraying to control dust. Vehicles entering or exiting the construction area shall travel at a speed that minimizes dust emissions.

All visibly dry, disturbed, soil surface areas of operation and roadways shall be watered to as necessary to control dust emissions during site operations. Paved roads shall be cleaned if the amount of dirt tracked-out of the operation area has the potential to cause dust emissions. Unpaved driveways may be graveled to reduce dust emissions.

#### SECTION 5: **REPORTING AND DOCUMENTATION**

#### 5.1 **GENERAL REPORTING AND DOCUMENTATION PROCEDURES**

During the project duration a significant amount of project reporting and documentation will be conducted. LRI's Site Superintendent will be responsible for maintaining accurate and complete records during the construction activities. The following is a list of the reports and documentation that will be coordinated:

- Submittals All submittals including manufacturer information for specific products utilized will be generated • and submitted in compliance with submittal requirements as specified in Section 01 33 00. LRI will provide copies of all submittals to the Engineer. LRI would propose that the submittals be done in electronic format to promote a "Green" project.
- Daily Report A daily report will be used to document daily on-site activities.
- Sign In / Out Log A daily sign in / out log will be maintained in the field office trailer for all personnel working • or present at the Site.
- As-Built A drawing of the existing conditions will be provided in conformance with Section 01 71 23, Sub part 1.04 E.
- The Project Record Documents will be maintained in accordance with Section 01 78 00. •

# SECTION 6: IMPLEMENTATION SCHEDULE

#### 6.1 **SCHEDULE OVERVIEW**

Upon approval by NYSDEC of this Construction Work Plan and Contract Approval, mobilization activities may commence. It is anticipated that mobilization will be in the beginning of April 2018. The following project and implementation schedule is presented as a preliminary schedule. Actual field conditions may affect the start date for mobilization activities.

Schedules will be updated on a regular basis and two-week look-ahead schedules will be provided at each week's project meeting.

# **FIGURES**

- Figure 2-1 Site Location Map
- Figure 3-1 Dredging Site Layout OU3
- Figure 3-2 Brandy Brook OU2 Conceptual Site Layout
- Figure 3-3 Brandy Brook and Site Support Area OU2 Conceptual Site Layout
- Figure 3-4 **Transportation Routes**
- Figure 3-5 Dredge Sequence
- Figure 3-6 **Dredge Sediment Process Flow Diagram**









**1.** Red line represents the route from OU-1 to and from disposal and

2. Green line represents the truck route to and from OU-3.

3. These routes are meant to represent the disposal and backfill routes

4. Other routes will be used for equipment mob/demob based on





# MATERIAL MANAGEMENT LEGEND:

- 1. Agent is Calciment or Portland Cement
- 2. Water will be tested in effluent tank to establish treatment parameters have been achieved.
- 3. Debris if clean can be shipped as solid waste.
- 4. Disposal facility is landfill or thermal treatment depending on waste characterization results.



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# Discharge to Effluent Tank Surface Water Transport to **Disposal Facility**

# FIGURE 3-6

# DREDGED SEDIMENT PROCESS FLOW DIAGRAM

# **Appendix A – Organizational Chart and LRI Personnel Resumes**



# **NYSDEC Saranac Lake Gas Company Site**

## **PROJECT ASSIGNMENT**

**Project Director** 

## YEARS OF EXPERIENCE

27

## **EDUCATION**

BS/1985/Chemistry/State university of New York at Fredonia

SPECIAL TRAINING HAZWOPER 40-Hour **HAZWOPER Refresher 8-Hour HAZWOPER Supervisor 8-Hour Project Manager Training** Managing Multiple Projects Training Contractor Quality Control (ACOE) **OSHA 10-Hour Construction Safety** CS/LE - Authorized Entrant CS/LE - Attendant CS/LE - Entry Supervisor **Respiratory Protection Training Hearing Protection Training** Lockout/Tagout General Excavation Safety Training Trench/Excavation Safety Training Fire Extinguisher Training

Confined Space Entrant Attendant & Supervisor

Hazard Communication (US) /WHMIS (Canada)

# Keith Decker

**Project Director** 

Mr. Decker has more than 27 years of experience in environmental remediation, project management, and client relations. He is expert at the evaluation of remedial alternatives, project estimating and start-up, and coordination of remediation projects; and has extensive experience in contaminated soil excavation and treatment, in-situ soil treatment, hydraulic and mechanical dredging of sediments, groundwater treatment, and underground storage tank removals. Mr. Decker specializes in the development and implementation of innovative waste disposal and treatment options and in the design and oversight of large soil/sediment removal projects. Other areas of experience include building decontamination, remedial investigation and site closure. His project sites have included former manufactured gas plants, a military base, a petroleum distribution facility, and various industrial/commercial manufacturing sites.

# **REPRESENTATIVE PROJECTS**

**Central Hudson Gas & Electric, Former MGP Site, Kingston, NY.** Project Director under design/build program involving the installation of permanent bulkhead, in-situ stabilization of upland soils, installation of temporary containment wall to support dredging, and dredging and capping of sediments within Rondout Creek.

Knolls Atomic Power Laboratory, Niskayuna, NY. Project Director for this PCB remediation project at this Department of Energy facility in Niskayuna, NY. Project requires the excavation of soils at this former electrical substation. The groundwater at the site is only 2 feet below the surface and is also influenced by the new electrical substation that was built adjacent to the old substation. LAND Remediation proposed as part of a performance based proposal to install an ISS cut off wall outside the limits of the excavation area to divert groundwater away from the excavation areas. LAND Remediation installed a 4' diameter auger mixed wall on the south and eastern boundary of the site to intercept groundwater. The soil was mixed to the top of a hard till layer to provide a groundwater cutoff. The site will be excavated in the spring after a winter shutdown. LAND Remediation installed the vertical overlapping columns with our ABI Mobilram.

**Nepera Superfund Site, Maybrook, NY.** Project Director for the excavation of 42,000 tons of pyridine and benzene contaminated soil, set up and operate a temporary 250-gpm groundwater treatment system. Project involved the excavation of this site that was formerly utilized to dispose of waste water from a facility that produced pyridine related compounds. Approximately 500,000,000 gallons of water was disposed of at this site in unlined lagoons. LAND Remediation was originally the second place bidder on this project, however after a few months the construction company that started the project was not invited back to complete the project. LAND Remediation



developed an approach to continue this project and incorporate the current condition of the site. This included a very large excavation that had filled with approximately 1,000,000 gallons of water. Water was treated on-site and discharged through a SPDES discharge permit to the local creek. An on-site borrow source was used for backfill along with soils that were excavated, tested and able to be reused if the contaminant concentrations were below the site cleanup levels. A demarcation layer was placed at the bottom of the excavation, which was the top of rock surface and the area was treated with an Oxygen Releasing Compound, (ORC) prior to backfilling. The ORC is being added to treat the down gradient plume through bioremediation.

# National Grid, Hiawatha Blvd., Syracuse, NY.

Project Director for this In-Situ Stabilization project in Syracuse, NY. Project involved the stabilization of approximately 13,500 cy of MGP impacted and Solvay Waste impacted soils and sludges. LAND Remediation self-performed the ISS work utilizing our custom made grout plant and silos. Project also included the rerouting of a gas and water main and the installation of storm sewer catch basins and piping. Restoration included construction of granite curbing, paving and hydroseeding of the disturbed areas. Project was completed on-time and under budget.

**Mercury Refining, Colonie, New York.** Project manager managing the disposal of ~200 drums of investigation derived waste from this Region 2 Superfund Site. Site is currently being investigated.

# **Confidential Client, Lagoon Biocell Design,**

**Maybrook, New York.** Project manager for design of a biocell for the treatment of contaminated soils associated with former waste lagoons. Managing development of a preliminary, pre-final, and final design in accordance with the remedial design and remedial action framework developed by the USEPA.

# ESC, Tri-Cities Barrel Superfund Site Remedial Design & Implementation, Binghamton, New York.

Project Manager for the excavation of approximately 50,000 cubic yards of contaminated soils and sediments at this Region 2 Superfund Site in Port Crane, NY. Coordinated daily site activities with subcontractors and other on-site personnel. Project work includes dewatering of excavated sediments, backfilling of several excavated areas, and characterization and transport of excavated material for off-site treatment and disposal. Wetlands impacted by remedial activities will be restored and

inspected for two years to ensure establishment of the planted vegetation.

# AFCEE, Groundwater Treatment System Design & Build, Plattsburgh AFB, New York. Project manager for the design and construction of a 500-gpm integrated groundwater treatment system. Managed an alternate innovative design that saved several

hundred thousand dollars and eliminated large outdoor settling ponds. Work consisted of redesigning the building and providing a comprehensive treatment system design with layout, P&ID, electrical, and mechanical drawings. The entire plant is integrated and controlled by a PLC and is capable of being operated remotely off-site. Site is being cleaned up under the EPA Region 2 RCRA Corrective Action Program.

**Stauffer Management, Low Temperature Thermal Desorption, Skaneateles Falls, New York.** Project manager for the implementation of a pilot demonstration test to treat 1,000 cubic yards of soils contaminated with volatile organic compounds at this former manufacturing facility. Site is being cleaned up under the EPA Region 2 RCRA Corrective Action Program.

# Mattiace Petrochemical Superfund Site, Remediation, Glen Cove, New York. Quality control manager for the design and installation of a combined vapor extraction/groundwater treatment system consisting of 30 vapor extraction wells and eight groundwater extraction wells. The system was designed to be fully automated and controlled via a telemetry system, and capable of extracting 1,600 cfm at 12" Hg. Prepared a plan that focused on all aspects of the removal and evaluation process to deal with potentially high hazard drums that may be encountered during excavation activities. Site was remediated under the EPA Region 2 oversight.

#### Knolls Atomic Power Lab, D3/D4 Yard Remediation Niskawuna New York Provident

**Remediation, Niskayuna, New York.** Project manager for the excavation of soils associated with the existing and former utility trenches. Provided overall project management, cost control, client interface and subcontractor management. Project involved the removal and replacement of utility lines to support the construction of a new building in the location of the contaminated soils. This project was challenging due to the constraints of working within a secure DOE facility. EPA Region 2 RCRA Corrective Action Program.



# William Lindheimer

**Operations Manager** 

Mr. Lindheimer is an environmental engineer with 20 years of experience in soil and groundwater remediation. He has expertise in the execution of large-scale construction projects including design-build projects, serving as a key member of design-build teams in an effort to provide the most cost effective solution to difficult remediation projects. Recently he has managed and supervised the remediation of several major sites in the Northeast, all complex in nature and requiring extraordinary attention to detail, strong technical background and an ability to bring innovation to the field. Mr. Lindheimer has expertise in materials handling and the processing of contaminated materials, including stabilization, solidification, chemical treatment, and thermal treatment. He has practical and hands-on experience in the installation of steel sheetpiling cofferdam systems and sediment removal. His past project experience includes remedial construction oversight; remedial design; interim remedial management; operations, maintenance & monitoring services; remedial investigation; and feasibility studies.

# **REPRESENTATIVE PROJECTS**

**Central Hudson Gas & Electric, Former MGP Site, Kingston, NY.** Project Operations Manager under design/build program involving the installation of permanent bulkhead, in-situ stabilization of upland soils, installation of temporary containment wall to support dredging, and dredging and capping of sediments within Rondout Creek.

**Central Hudson Gas & Electric, Newburgh Manufactured Gas Plant Site, Newburgh, NY.** Project manager for design and construction of a temporary watertight sheet pile barrier wall and temporary water treatment plant. Managing preparation of work plans for submission to the NYSDEC remediation of the former gas holder and tar tank.

National Grid, Smith Avenue Former MGP Phases 1 and 2, Troy, New York. Heavy Civil/Dredging. Operations Manager responsible for the overall execution of remedial efforts at National Grid's former manufactured gas plant located within an active high-pressure gas maintenance facility and the USACE federal lock approach. Remedial components include; installation of a rock berm with the Hudson River to stabilize an existing lock approach wall, removal of a 90-foot diameter gas holder under a temporary fabric structure from behind the failing bulkhead, installation of battered and vertical micropiles to support a newly constructed relieving platform, installation of new lock approach secant wall, demolition of the existing lock approach wall and mechanical dredging of Hudson River sediments. Management of water and soils to permitted disposal facilities.



# PROJECT ASSIGNMENT

**Operations Manager** 

# YEARS OF EXPERIENCE

17

# EDUCATION

BS/1996/Environmental Engineering; Rensselaer Polytechnic Institute

# PROFESSIONAL REGISTRATIONS

Engineer-In-Training; NY

# SPECIAL TRAINING

HAZWOPER 40-Hour

HAZWOPER Refresher 8-Hour

HAZWOPER Supervisor 8-Hour

OSHA 10-Hour Construction Safety

CS/LE - Authorized Entrant

CS/LE - Attendant

CS/LE - Entry Supervisor

**Respiratory Protection Training** 

Hearing Protection Training

Lockout/Tagout

General Excavation Safety Training

Trench/Excavation Safety Training

Fire Extinguisher Training

Confined Space Entrant Attendant & Supervisor

Hazard Communication (US) / WHMIS (Canada)

# National Fuel Gas, Former Gastown MGP Site, ISS/Dredging Project. Tonawanda, NY. Operations

Manager for this design/build project that included the stabilization of 12,000 cubic yards of NAPL-impacted soils up to a depth of 25' below ground surface. Prior to ISS mixing, LAND separated, abated (asbestos), and demolished three large structures, installing internal bracing within the adjacent buildings to support continued used by active tenants. Mixing was performed under uncertain subsurface conditions, as the holder was underlying a pre-existing building and had not been fully characterized. Nearly 1,000 tons of concrete and piping debris were removed successfully during the ISS bucket mixing, allowing for full mix depths to be achieved. A concrete compression ring wall was installed (self-performed) around the holder prior to ISS bucket mixing to stabilize the holder walls and contents for removal during later phases of the project. The holder compression ring structure is currently being utilized as a repository for dredge sediments to remain on-site as a permanent feature of the ISS monolith. This approach eliminated the need for the management and off-site transport and disposal of MGP-impacted sediments, representing a substantial overall cost savings. Mechanical dredging of the Erie Canal (Tonawanda Creek) performed under USACE NWP 38 is currently being self-performed by LAND.

# **Buffalo Riverkeeper, River Bend Habitat**

**Restoration, Buffalo, NY.** Sheeting/Soil Removal Project. Project Manager for the restoration under USEPA grant funding for the restoration of the shoreline along the Buffalo River within the Riverbend Commerce Park within the South Buffalo Brownfield Opportunity Area. Project included the eradication of invasive species, impacted soil removal to an on-site staging area, construction of soil burrito wrapped sloping, planting of over 1200 trees and shrubs. Project is coming to completion as scheduled and budgeted.

National Grid, Schermerhorn Creek Bypass MGP Site, Schenectady, NY. Project Manager for the installation of 1200 lf box culvert system to divert a creek that traversed through National Grid's service station property. Installation of 2400lf of sheet piling and bracing, installation of a 60,000 gpm passive pump station to divert the creek during installation of the culvert system.

# National Grid, Coal Gas Plant Remediation, Utica,

**NY**. Project Manager, project components included installation of sheeted coffer cells to support excavations up to 32 feet deep, removal of 60,000 tons of impacted soils, a majority of which was

approved for landfill disposal. Installation of 60' deep dewatering wells to support soil removal and installation, operation of a 250-gpm water treatment system. Restoration of upland and wetland areas.

National Grid, Harbor Point PAH Soils, Utica, NY ISS Project. Project Manager for the stabilization of 106,000 cubic yards of PAH impacted soil. LAND Remediation is self-performing the ISS of impacted soils and has provided value engineering to ISS soils to minimize the volume of soil requiring off-site disposal. Areas that require excavation due to being in wetlands will be excavated in the dry once the area has been treated and has cured. The approach greatly reduced the groundwater treatment system requirements and allowed LAND Remediation to provide a smaller less complex system. The project will provide a cost savings of at least \$1,000,000 over the original design.

# National Grid, Smith Street, Herkimer, NY, ISS

**Project.** Project Manager for the stabilization of MGPimpacted soil. LAND Remediation provided an alternate approach to deal with this site that was likely to produce 200 gpm of water and proposed to sheet pile the excavation then to stabilize the material within the sheet pile cell to cut off groundwater flow and any upward gradients. LAND Remediation designed the approach and depths of ISS. Soils were stabilized to 26 feet bgs, then the upper stabilized material was removed to meet the requirements of the ROD. The site had contamination deeper than the original excavation depth, however due to groundwater the decision document allowed for excavation to 16 feet bgs. The remedy offered removal as well as stabilization of material below the groundwater table to minimize any future groundwater impacts.

# Brown & Caldwell / National Grid, King Fuels Site,

**Troy, NY ISS Field Project.** Project Manager for the stabilization of MGP impacted soil. LAND Remediation was retained to demonstrate the ability to perform insitu stabilization of soil down to 30 feet below ground surface using excavator mixing. Work was performed under extremely harsh winter conditions.

# Kodak, East Greenbush, NY Landfill Closure.

Project Manager for the construction of a 7 acre RCRA cap to close this hazardous waste landfill. As part of the construction 11,000 cubic yards of waste was excavated from around the perimeter of the landfill and consolidated in the footprint of the landfill. Approximately 120 anomalies were required to be investigated and excavated in Level B PPE supplied air. Approximately 40 buried drums were encountered that needed to be over packed.



# Matthew Warren

Senior Project Manager

## **PROJECT ASSIGNMENT**

Manager - Construction

# YEARS OF EXPERIENCE

20

# **EDUCATION**

BA/1995/ Saint Michael's College

# SPECIAL TRAINING

40-Hour HAZWOPER/Refresher

8-hour Supervisor OSHA 10-Hour Safety Respiratory Protection Training

10- hour OSHA Construction Safety and Health

Mr. Warren brings 20 years of project management in self-perform construction and design engineering consultation. Matt has managed large scale construction projects under highly publicized remedial programs involving multiple public and private stake holders. His projects have contained diverse scopes involving infrastructure, site construction and environmental remediation on projects that included sediment dredging/ capping, demolition, earth support systems and related soil and water treatment. Remedial projects Mr. Warren has managed contained multiple contaminants including manufactured gas plant waste (MGP), polychlorinated biphenyl (PCB), and mercury (Hg).

# **REPRESENTATIVE PROJECTS**

# Onondaga Lake Nine Mile Creek/ Geddes Brook Remedial Design,

**Syracuse, NY.** Technical Director/Manager, key member of remedial design team operating in the role of advocate and alliance partner with the owner that developed a sediment removal and habitat restoration design from concept (Feasibility Study) through NYSDEC approval of 100% design. Collaborated with engineering group to integrate construction planning into sediment dredging, capping and related work scope. Led efforts focused in acquisition of access permits from multiple public and private stakeholders (CSX Railroad, Onondaga County, NYSDOT, etc.) Directed preconstruction procurement efforts (Parsons, 2007-2010)

# Nine Mile Creek Remediation, Syracuse, NY.

Project Manager - Self Perform Remedial Construction, mechanical dredging of approximately 60,000 cubic yards of mercury impacted sediment from an active river system. The multi-phase project needed to be carefully sequenced to create a series of intricate water diversions allowing crews to perform the removal action. Spoils were solidified, hauled over public roads, and consolidated in an on-site landfill built for the project. Strict water and air quality standards were imposed upon the project and never exceeded throughout construction. Restoration included construction of diverse habitat on the channel and bank slopes which required close consultation with U.S. Fish and Wildlife, NYSDEC and local stakeholder groups. (Parsons, 2012-2015)

## **Geddes Brook Remediation, Syracuse, NY.**

Project Manager Self Perform Remedial Construction, instream and floodplain excavation of approximately 100,000 cubic yards of mercury impacted material that was consolidated in an on-site landfill built as part of the project. Due to the unstable geotechnical nature of the excavated material, an extensive solidification operation was conducted to manage the sediments prior to containment in the consolidation area. The design, construction and operation of a 250 gpm water treatment plant to support the removals and landfill construction was also a key element of the project. The final restoration resulted in an extensive and highly technical engineered wetland /E6 channel system which was constructed in a design/ build delivery and incorporating involvement of multiple regulatory agencies. (Parsons, 2010-2012)

# **Onondaga Lake Habitat Capping, Syracuse, NY.**

Project Manager, developed implementation approach and managed the construction of a complicated lake capping project. Shallow lake depths prevented deep draft capping equipment from accessing locations which required placement of an organic habitat cap. The solution consisted of a multi-layered floating HDPE mat "road" installed up to1100 feet from shore to access the placement zones with excavators and track driven haul trucks. Staging of the road was precisely calculated, accounting for equipment reach and capping area. An intricate pully system was constructed to facilitate the floating road movement. The finished project met all design requirements and provided a cost savings to the original design plan of hydraulic capping. (Parsons, 2015-2016)

# Willis, Semet and West Wall Barrier Wall Interim Remedial Measures, Syracuse, NY.

Construction Manager/Quality Assurance Officer, 3-year, phased installation of 6000 lineal feet of sealed joint sheet pile. Sheet lengths up to 70 feet were driven from land and water-based barges providing a cut off from contaminated groundwater. Collection trenches and pumping systems were installed in extremely unstable soil conditions requiring intricate shoring and sheeting designs to manage groundwater and trench stability. Other project elements included placement of a manufactured lightweight fill material and demolition of a bridge which partially served as a cradle system for a crucial public sewer forcemain. (Parsons, 2007-2010)

# United Technologies/ Carrier Corp., TR3 Barrier Wall and Saunders Creek Design, Syracuse, NY.

Project Manager, preliminary design and self-perform remedial construction of 500 lineal feet of a groundwater control barrier wall consisting of steel sheeting and a directionally drilled collection system. Multiple wall utility penetrations required deep excavations in access challenged locations. (AECOM, 2016-2017)

# General Electric, Housatonic River Upper Half-Mile Remediation, Pittsfield, MA.

Construction Manager/ Site Supervisor, impacted river sediment removal action conducted in an urban environment. Sediments were removed with standard excavation equipment from within dewatered sheet pile cells. Other project elements included waterloo source control sheeting, soil stabilization injection grouting, water handling/ de-watering and riverbank restoration. (Maxymillian Technologies, 2007-2010)

# Wellesley College Remediation, Wellesley, MA.

Construction Manager/ Site Supervisor, Large scale earth moving remediation of approximately 450,000 cy of soil and sediments impacted with heavy metals, cyanide and hexavalent chromium. Earthmoving methods involved mechanical dredging and capping of portions of a reservoir and high production land-based excavation and backfill. Other components of the construction included an on-site landfill construction, installation of a floating walking path, an architectural stone spillway and a large wetland restoration. (Maxymillian Technologies, 2001-2002)

# General Electric, Allendale School Property Removal Action, Pittsfield, MA.

Site Supervisor, excavation and disposal of approximately 42,000 cubic yards of PCB impacted material from a highly publicized Superfund site. The removal area was located on elementary school grounds in a dense residential neighborhood. Strict air and noise monitoring limits were imposed during remedial activities. The project operated on an accelerated schedule to ensure that the work was completed before the start of the school year. (Maxymillian Technologies, 1999)

# Massachusetts DOT- Highway Division, Route 7 Bridge Reconstruction

Site Supervisor, heavy highway bridge and road reconstruction. The bridge was partially demolished and rebuilt in phases to keep the traffic flow. Project involved deep pipe installation, water diversion, structural concrete installation, paving and erection of a temporary bridge. (Maxymillian Technologies, 2002)

# Lisa Gorton, PE

Senior Project Manager

## **PROJECT ASSIGNMENT**

Manager - Construction

# YEARS OF EXPERIENCE

22

# EDUCATION

BS/1995/Civil/Environmental Engineering; Clarkson University

## PROFESSIONAL REGISTRATIONS/ CERTIFICATIONS

Professional Engineer, New York State #088292

USACE Certified Quality Control Manager #LRB-01-12-00012

# SPECIAL TRAINING

40-Hour HAZWOPER/Refresher

8-hour Supervisor OSHA 10-Hour Safety Respiratory Protection Training

Hazard Communication (US)/WH-MIS (Canada) Short Course Dredge Engineering Best Management Practices, Texas A&M University (2005) Ms. Gorton is a Project Manager and Professional Engineer with 22 years of experience in environmental remediation including project management, design and field engineering, regulatory compliance and client relations. As a former remedial design engineer and NYSDEC project manager, Ms. Gorton has extensive experience as a lead regulating officer under the Nationwide Permit No. 38 design and construction process within the sediment and MGP remediation fields. Ms. Gorton's key project sites have included former manufactured gas plants in New York State, Federal Superfund Sediment Remediation Sites, and various NYSDEC Superfund and Spill Remediation Sites.

# **REPRESENTATIVE PROJECTS**

# MANUFACTURED GAS REMEDIATION PROJECTS

**Central Hudson Gas & Electric, Former MGP Site, Kingston, NY Project.** Construction Quality Control Manager under design/build program involving the installation of permanent bulkhead, In-Situ Stabilization of Upland Soils, Installation of temporary containment wall to support dredging and dredging and capping of sediments within Rondout Creek.

# National Fuel Gas, Former Gastown MGP Site, Tonawanda, NY.

**ISS/Dredging Project**. Remedial design and construction manager, a design/build project included extensive coordination with the Engineer of Record, NYSDEC and permitting authorities to develop from a 75% to 100% design within a four-month window. Project components include the in-situ stabilization of 12,000 cubic yards of NAPL impacted soils up to a depth of 25' below ground surface. Prior to ISS mixing, LAND separated, abated (asbestos) and demolished three large structures; installation of internal bracing within the adjoining buildings was necessary to support continued use by active tenants. Nearly 1,000 tons of concrete and piping debris was extracted during the ISS bucket mixing process allowing for full mix depths to be achieved. Prior to bucket mixing, LRI installed (39) 8-foot diameter ISS augured columns to form a compression ring wall around the gas holder structure. The holder structure and contents had been positioned under an existing building foundation and had not been fully characterized. LAND characterized and developed an ISS pre-treatment process to allow for the structure and contents to be removed for a dry inspection. Holder contents and structure were removed for thermal treatment. The compression ring wall structure and bottom grout plug remain as a permanent repository for dredge sediments. Sediments will remain on-site, stabilized as a permanent feature of the ISS monolith. This approach eliminated the need for the management high volumes of construction water and off-site transport and disposal of MGP-impacted sediments, representing a substantial overall cost and schedule savings for



the client. Mechanical dredging of the Erie Canal (Tonawanda Creek) performed under USACE NWP 38 is currently being self-performed by LAND. Project is located in a densely populated area along the E. Niagara Street and recreational bikeway on the Erie Canal. LAND implements an extensive pedestrian and commercial traffic control plan to ensure minimal disruption to existing business and recreational activity.

# Central Hudson Gas & Electric, Catskill MGP,

**Catskill, NY.** Construction Project Manager for upland and in- river remedial efforts associated with the Former Catskill MGP Site located in close proximity to downtown businesses and schools. Project scope included 1.) Installation of two secant walls (147 piles) along river shoreline and adjacent to a 3-story 100-year old structure 2.) Upland excavation, transport and disposal of 9000 cy of impacted soils and debris including on-site water treatment and discharge to Catskill Creek 3.) Dredging of 1,500 cy of MGP impacted sediments in winter (ice) condition. Developed and executed a water quality and flood contingency, community air monitoring and an extensive geotechnical monitoring programs (as subcontracted through GEI Consultants).

## National Grid, Smith Avenue Former MGP Phases 1 and 2, Troy, NY. Project Engineer

responsible for supporting engineering tasks related to remedial efforts including preparation of work plans, project material submittals, subcontract management soil and water compliance sampling and tracking, concrete and steel quality control tracking. Remedial components include; installation of a rock stabilization berm with the Hudson River along the existing lock approach wall, removal of a 90-foot diameter gas holder under a temporary fabric structure from behind the failing bulkhead, installation of battered and vertical micropiles to support a newly constructed relieving platform, installation of new lock approach secant wall, demolition of the existing lock approach wall and mechanical dredging of Hudson River sediments. Management of water and soils to permitted disposal facilities.

**Central Hudson Gas & Electric, Newburgh MGP Sediment Remediation.** Serving as NYSDEC's project manager and lead permitting agent under a Nationwide Permit No. 38 for the installation of 480 If of solder pile wall and dredging of 23,000 cy of MGP- impacted sediments with removal depths up to 20' below surface adjacent to sensitive shoreline infrastructure and capping. Installation, operation and maintenance of NAPL collection and temporary dewatering system.

# National Grid, Liberty Street Former MGP Site,

**Troy, NY.** Project Manager. Remedial components included; installation of two sheeted cells within Troy's Little Italy district, removal of tar tanks and surrounding soils for off-site transport and disposal. Site restoration included construction of a new Bocce Court and paved lot to support community markets and festivals.

# SEDIMENT REMEDIATION UNDER FEDERAL PROGRAMS – NYSDEC/NJDEP USEPA REGION 2 AND USACE INTERAGENCY AGREEMENTS

**New York State Department of Environmental Conservation, 3456 Oneida Street, Chadwicks,** NY. Serving as construction manager under LAND Remediation for the excavation, segregation and disposal of over 50,000 tons of TSCA/NON-TSCA PCB sediments and soils under New York State Superfund. Sediment remediation included rerouting of an unnamed tributary and excavation of Sauquoit Creek banks. LAND implemented a soil clean up verification program, collection of over 1500 soil and sediment samples and comprehensive community air monitoring program. An extensive restoration program was implemented installing coir logs, brush layering, 500 shrubs and trees, planting of wetland fringe area. Installation, operation and maintenance of a 200 gpm water treatment system treating 2.25 Million Gallons of water under a municipal storm system discharge permit.

New York State Department of Environmental Conservation, 34 Freeman's Bridge Road Soil Remediation Site, Glenville, NY. Serving as a design and construction manager under AECOM's stand-by contract for the on-site treatment of 99,000 cy of mixed TSCA/NON-TSCA soil and debris waste stream. Scope included excavation of combination of TSCA and non-TSCA soil layers that were segregated for either direct thermal, indirect thermal or off- site disposal. Approximately 21,000 tons of non-TSCA debris was shipped to a non-hazardous landfill. Destruction Removal Efficiency (DRE) testing was required for interim permitting, on-site water treatment and surface discharge of over 20


# Minda Murray

Health and Safety Officer

Ms. Murray is an environmental scientist with 13 years of experience. Her project experience includes remedial investigation; feasibility studies; interim remedial management; remedial construction oversight, and remedial construction project management. Over the past eight years she has focused on large-scale remediation projects performed at industrial sites throughout New York State. As her career has progressed she has moved from serving as an on-site health and safety officer to her current role as a health & safety manager and assistant project manager. She is experienced in working with on-site health and safety officers to ensure that corporate health and safety policies, as well as the policies and protocols set forth in the specific health and safety plans are properly implemented and maintained throughout the performance of the work. She has significant experience training employees and subcontractors on standard operating health and safety procedures and is adept at maintaining health and safety records. Ms. Murray is also experienced in implementing personnel and community air monitoring program; maintaining air-monitoring equipment, establishing monitoring locations on a daily basis according to local weather conditions, and then downloading and interpreting data in reference to site-specific and state agency guidance documents.

Ms. Murray's project experience also includes remedial investigation; feasibility studies; interim remedial management; and remedial construction oversight. Ms. Murray has also performed Phase I and Phase II environmental site assessment (ESA), field chemistry, and environmental sampling. Phase I ESAs were conducted consistent with ASTM Standard E1527 at various locations in and around the state of New York. Ms. Murray has experience with immunoassay field screening test kits for polychlorinated biphenyl compounds. She also has experience with collection of surficial and subsurface soil and water samples, sediment sampling, soil gas survey experience, ambient air monitoring, and microbiological.

#### **REPRESENTATIVE PROJECTS**

Central Hudson Gas & Electric, Former MGP Site, Kingston, NY. Safety Director under design/build program involving the installation of permanent bulkhead, in-situ stabilization of upland soils, installation of temporary containment wall to support dredging, and dredging and capping of sediments within Rondout Creek.

SPECIAL TRAINING HAZWOPER 40-Hour HAZWOPER Refresher 8-Hour **HAZWOPER Supervisor 8-Hour OSHA 10-Hour Construction Safety** CS/LE - Authorized Entrant CS/LE - Attendant CS/LE - Entry Supervisor **Respiratory Protection Training Hearing Protection Training** Lockout/Tagout General Excavation Safety Training Trench/Excavation Safety Training Fire Extinguisher Training Hazard Communication (US) /WHMIS (Canada) **Defensive Driving Awareness** Training Office Ergonomics Training First Aid and CPR **DOT Level 1 Shipper Aerial Lift Operation Training** Fall Protection Awareness **Electrical Safety Awareness Employee Substance Abuse Training** Supervisor Substance Abuse Training

**PROJECT ASSIGNMENT** 

YEARS OF EXPERIENCE

BS/1997/Environmental Science;

**LRI Corporate Safety** 

**EDUCATION** 

Marywood University

13



#### National Grid, Smith Avenue Former MGP Phases 1 and 2, Troy, NY, Heavy Civil/Dredging. Health and

Safety Manager. Remedial components include; installation of a rock berm with the Hudson River to stabilize an existing lock approach wall, removal of a 90-foot diameter gas holder under a temporary fabric structure from behind the failing bulkhead, installation of battered and vertical micropiles to support a newly constructed relieving platform, installation of new lock approach secant wall, demolition of the existing lock approach wall and mechanical dredging of Hudson River sediments. Management of water and soils to permitted disposal facilities.

National Grid, Hiawatha Blvd., Syracuse, NY. Health

and Safety Manager for this in-situ stabilization project in Syracuse, NY. Project involved the stabilization of approximately 13,500 cy of MGP impacted and Solvay Waste impacted soils and sludges. LAND Remediation was required to subcontract the CAMP to a third party as part of the clients program. Mrs. Murray managed the subcontractor who performed the CAMP monitoring and the work zone monitoring. The site safety officer reported to Mrs. Murray and forwarded daily air monitoring results. Mrs. Murray would frequent the site to ensure that LAND Remediation's procedures and policies were being implemented. Project was completed without any accidents or incidents.

Knolls Atomic Power Lab, D6 Yard Remediation,

**Niskayuna, NY.** Health and Safety Officer for the excavation of soils associated with the existing and former utility trenches. Provided CAMP monitoring and work zone monitoring. Project was performed inside a secure area of this DOE facility. Mrs. Murray was responsible for writing and implementing all the various safety requirements in order to operate inside this facility. Project involved the use of a slide rail system and excavation to a depth of 16 feet bgs. Project was completed without any incidents or accidents and received accolades from the facility for LAND Remediation's safe work practices.

#### National Grid, Sconondoa Street Manufactured Gas Plant Site Phase II Remediation, Oneida, NY.

Health and Safety Manager and Assistant Project Manager for remedial construction services for Phase II of the remedial design at a former manufactured gas plant (MGP) site. Scope of work involves excavation, transportation and disposal offsite for thermal treatment coal tar contaminated soil, installation of a water-tight sheetpile structure, backfill, and on-site temporary water treatment system, staging pads and facilities, and site restoration. Excavation areas include existing tailrace (surface water drainage channel) and portions of Oneida Creek.

New York State Electric and Gas, Former Saranac Street Manufactured Gas Plant Site Upland Remediation, Plattsburgh, NY. Health and safety manager for construction services of this former MGP site including installation of a concrete/bentonite wall to hold back water. Project includes soil excavation, evaluation, and backfill to restore the site inside the barrier walls. Responsible for preparation of safety plans for submission to the NYSDEC remediation of the former gas holder and tar tank and providing guidance to site supervisor with regard to safety activities on the site.

National Grid, Sconondoa Street Manufactured Gas Plant Site Phase I Remediation, Oneida, NY, Health and safety manager for construction services of Phase I of the remedial design at a former MGP site. Scope of work involves excavation, transportation and disposal offsite for thermal treatment of 12,800 cubic vards of contaminated soil, installation of a water-tight sheetpile structure, backfill, and on-site temporary water treatment system, staging pads and facilities, and site restoration. Excavation areas include former holder contents with excavation depths to 20 feet bgs. Responsible for preparation of safety plans for submission to the NYSDEC remediation and providing guidance to site supervisor and site safety officer with regard to safety activities, perimeter air monitoring, and work zone air monitoring on the site.

**Confidential Client, Creek Diversion and** 

Remediation, New Hartford, NY. Health and safety manager for tree clearing in the limits of disturbance in preparation for remediation activities along the Sylvan Creek. Trees had to be felled prior to March 31, 2008, which corresponded with the start of the Indiana bat roosting season as dictated by US Fish and Wildlife. Health and safety manager for the design and implementation of a site remedy to remove, transport, and dispose of 41,000 tons of non-hazardous soil and 4.100 tons of hazardous waste from under and near the groundwater treatment building and Sylvan Glen Creek at the Scully site. Services include stream relocation, soil excavation and removal, backfill operations, water treatment, site restoration, and operations and maintenance. Responsible for preparation of safety plans for submission to the NYSDEC remediation and providing guidance to site supervisor and site safety officer with regard to safety activities, perimeter air monitoring, and work zone air monitoring on the site.





## Mike Evens | Marine Operations Supervisor

Mike Evens is a seasoned field supervisor with 10 years of experience and the ability to execute and evaluate tasks while adapting to changing field conditions. Mr. Evens progressively worked his way into a site supervisor role through proven performance under LAND's design build programs with National Fuel Gas and Central Hudson Gas and Electric where he managed multiple crews under marine-based dredging and land-based ISS operations. Work on these projects was performed under USACE Nationwide Permit and NYSDEC Water Quality certification under compressed timeframes. Mike has also served as lead field engineer on several National Grid Remedial Manufactured Gas Plant Projects. Prior to joining LAND in 2014, Mike was employed with Tetra Tech EC.



# Pat Payne |Sheeting Supervisor

Pat Payne is a working site supervisor with 24 years of experience in general and environmental construction. Mr. Payne is a certified NYS DOT welder for structural and pipe welding. He most recently served as the site supervisor under National Grid's former Smith Avenue, Troy site, which included the replacement of the bulkhead/barrier wall at the USACE Federal Lock in Troy, New York. Mr. Payne is a highly qualified and versatile site foreman, having performed an abundance of diverse tasks within heavy civil/environmental construction. He has erected structural steel for new building construction, installed sheet pile and waler supports for designed shoring systems, installed

aboveground and underground storage tank facilities, installed and repaired bus and truck hydraulic lift systems, collected environmental samples for the purpose of site characterization, and completed numerous site restorations. Mr. Payne also has extensive experience in contaminated soil excavation, coordinating transport and disposal of impacted materials, construction of designed groundwater treatment systems, demolition of buildings/structures, and decommissioning of aboveground and underground storage tanks and hydraulic lifts. Mr. Payne has been and continues to be responsible for supervision and direction of on-site personnel includinig subcontractors, construction management, and health and safety at the project





## Evan Dzingle | Field Foreman – Marine

Evan Dzingle joined our LAND team in 2014 as a laborer and progressively worked his way into a marine operations labor foreman role. Most recently, Evan served as the lead foreman of marine operations at CHGE's Former Kingston MGP Site where he was responsible for managing the positioning of marine equipment, routine daily inspections and transfer of sediments for land-based management. Dredging was performed within Rondout Creek at the confluence with the Hudson River which required extensive coordination with recreational marine traffic, where a 50% reduction in the navigational channel was realized to facilitate dredging operations. Evan served as an assistant superintendent under National Grid's Smith

Avenue MGP Site, where he was responsible for managing in-river operations for the dredging of the USACE federal lock approach in Troy, NY and fabrication and installation of the fender system.



### Stan Posluszny | Lead Dredge Operator

Stan Posluszny is a heavy equipment operator with 15 years of experience in general and environmental construction. He has been a member of LAND's team since 2012 and most recently served as the lead dredge operator at CHGE's Kingston MGP Site, dredging of 25,000 cy of MGP impacted sediment and at the National Fuel Gas Former MGP Site – Erie Canal Dredging. Each of these jobs were completed as design / build efforts. Prior to these dredging jobs, Stan supported a large scale excavation under NYSDEC's superfund program which required the excavation and staging of TSCA and Non-TSCA

soils / sediments from based on a grid-based characterization program. Stan has working knowledge of dredge positioning systems which is integral to maintaining intimate connection with the quality control during the dredging and backfilling operations. Stan is versatile operator having served as a foreman supporting diverse tasks within heavy civil/environmental construction related to sheeting installation, water treatment and work around sensitive utilities.





## John May| Lead Dredge Operator

John is a heavy equipment operator with 20 years of experience in general and environmental construction. He has been a member of LAND's team since 2011 and most recently served as the lead dredge operator at National Grid's MGP Site, dredging of the federal lock approach in Troy, New York. Prior to these dredging jobs, John has supported a majority of LAND's large scale in-situ solidification programs under contract NYS MGP programs and has extensive working experience with Trimble

positioning systems. John is versatile operator having served as a foreman supporting diverse tasks within heavy civil/environmental construction related to sheeting installation, water treatment and work around sensitive utilities.

### Joseph Meyer, CSHO |Site Safety and Health Officer



Joe Myer is a certified health and safety professional uniquely qualified with former experience as a United States Coast Guard a maritime specialist, and site safety officer supporting heavy civil and electrical construction trade work. Joe is also OSHA 500 Trainer Certified. Under Joe's tenure with the USCG, Joe served as a Supervisor responsible for the enforcement of maritime law, training in safe operation and navigation of coast guard boats and training in towing, de-watering and engine casualty control. Prior to joining LAND, Joe worked for Selby & Smith, Malta, New York as

a health and safety officer developing job specific safety hazard analyses and conducting compliance evaluations of equipment, structures, and work in progress.

Mr. Myer joined LAND in 2016 serving as the Site Safety Officer under LAND's Kingston MGP project and recently at Brookhaven National Laboratory project sites. Joe would continue his role as Site Safety and Health Officer under BASF's project where he will be responsible for implementing daily safety meetings, preparation of lift plans, JSAs and work zone monitoring.



# **Appendix B – Surveyor License Certificate and GPS Calibration** Certificate

The University of the State of New York **Education Department** Office of the Professions **REGISTRATION CERTIFICATE** Do not accept a copy of this certificate

License Number: 050724-1 Certificate Number: 0000746

BURROWS NATHAN MICKLE **20 TROY AVENUE WYNANTSKILL** 

NY 12198-0000

is registered to practice in New York State through 04/30/2021 as a(n) LAND SURVEYOR

kuyellen Elis

COMMISSIONER OF EDUCATION

5 8000

DEPUTY COMMISSIONER FOR THE PROFESSIONS

This document is valid only if it has not expired, name and address are correct, it has not been tampered with and is an original - not a copy. To verify that this registration certificate is valid or for more information please visit www.op.nysed.gov.

LICENSEE/REGISTRANT

8.44 JTIVE SECRETARY

Certificate

#### TRIMBLE SPS930 1"/1" DR+ WITH SERIAL NUMBER 72614287 COMPLIES WITH THESE SPECIFICATIONS:

#### ANGLE MEASUREMENT

Accuracy (Standard deviation	
based on DIN 18723):	0.3 mgon - 3 cc (1")
Automatic level compensator	
Dual-axis with a working range of:	±100 mgon = 10 c (5.4

#### DISTANCE MEASUREMENT

Accuracy RMSE (without reflector)

(2 mm + 2 ppm) (0.0065 ft + 2 ppm)

Accuracy RMSE (with reflector)

(2 mm + 2 ppm) (0.0065 ft + 2 ppm)

#### RANGE

Range without reflector Towards Kodak Grey (18%):

1 m - 600 m (3.3 ft - 1,969 ft)

Range with reflector One prism: 0.2 ut - 5.500 m (0.7 ft - 18.045 ft) Range using Trimble prism \$71 125 021 Standard clear\*

The range is also dependent on atmospheric conditions and background radiation. \*Standard clear: No haze, overcast or moderate sunlight with very light heat shimmer.

imble instrument type Trimble P8930 1" 1" DR has been tested and complies with the or and specification. Tasts have been conducted aver established baselings and angular measurements have been achieved by testing at valibrated baselings at Trimble AB. Sweden. EDA Baselines a Trimble AB. Sweden, have been calibrated with the special Trimble mstrument which v calibrated of the Physikelisch Technische Bindesanstalt Brannochweig. Germany dur age documented decording to ISO 9001 2005.

Bengt Lundgren, Inspector 19/12/2017, Danderyd, Sweden



# Appendix C – NexSens CB-450 Turbidity Monitoring System

# **CB-450**

- Self-powered data logging buoy
- Wi-Fi, radio, cellular or satellite telemetry
- Supports a variety of environmental sensors
- Accommodates most environmental data loggers
- Rugged polymer-coated foam hull

The NexSens **CB-450** Data Buoy is designed for deployment in lakes, rivers, coastal waters, harbors, estuaries and other freshwater or marine environments. The floating platform supports both topside and subsurface environmental monitoring sensors including weather stations, wave sensors, thermistor strings, multi-parameter sondes, Doppler current profilers and other monitoring instruments.

The buoy is constructed of an inner core of cross-linked polyethylene foam with a tough polyurea skin. A topside 20" tall stainless steel tower includes three 10-watt 12 VDC unbreakable solar panels, and a center 10" ID x 19.5" tall data well accommodates batteries, data loggers, sensors, and more. Three 4" pass-through holes with female NPT bottom threads allow for quick connection of instrument deployment pipes and custom sensor mounts. The stainless steel frame supports both single point and multipoint moorings.

The **CB-450** Data Buoy is optimized for use with NexSens data loggers. Wireless telemetry options include Wi-Fi, spread spectrum radio, cellular and Iridium satellite. Compatible digital and analog sensor interfaces include RS-232, RS-485, SDI-12, VDC, mA, and pulse count. The top of the instrument well includes 8 pass-through ports for power and sensor interface. Each port offers a UW receptacle with double O-ring seal for a reliable waterproof connection.



# **CB-450**

# DATA BUOY

### specifications

Hull Dimensions	34" (86.36 cm) outside diameter; 20" (50.80 cm) tall
Tower Dimensions	20″ (50.80 cm) tall, triangular
Data Well Dimensions	10.3" (26.16 cm) inside diameter; 19.5" (49.53 cm) tall
Weight	145 lbs. (65.77 kg)
Buoyancy	450 lbs. (204.12 kg)
Hull Material	Cross-linked polyethylene foam with polyurea coating & stainless steel deck
Hardware Material	304 stainless steel
Mooring Attachments	1 or 2 point, ¾" eyenut
Solar Power	(3) 10-watt 12 VDC solar panels



### parts list

Part #	Description
CB-450	Data buoy with polymer-coated foam hull & (3) 10-watt solar panels, 450 lb. buoyancy
CB-A05-1	Battery harness with integrated solar regulator & (1) 28 A-Hr battery
CB-A05-2	Battery harness with integrated solar regulator & (2) 28 A-Hr batteries
iSIC-CB	iSIC data logger housed in CB-Series buoy lid enclosure
RTU-R-SS	Radio modem & antenna kit, 900 MHz
RTU-C	Cellular modem & antenna kit, multi-carrier
RTU-I	Satellite modem & antenna kit, Iridium
M550-P-Y	Solar marine light with pole mount & 1-3 nautical mile range, 15 flashes per minute, yellow
914M	Deployment pipe assembly with eye bolt & threaded male adapter, 4" schedule 80 PVC, 32" length
CB-WS-M	Lufft WS-Series weather sensor mount for CB-Series data buoys
CB-WX-M	Airmar WX-Series weather sensor mount for CB-Series data buoys





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#### nexsens.com



# 6-series multiparameter water quality sondes

long-term monitoring profiling & spot sampling sensor guide







Top photo: Mike Lizotte (left), YSI's US applications specialist, takes oxygen measurements to spot check sensor performance on a submerged monitoring platform in Biscayne Bay, Florida. Bottom: Rigor Ma (right), YSI China applications specialist, trains a customer on the operation of a continuous monitoring station in Xiamen, China.





# Why YSI?

For 60 years YSI, an employee-owned company, has pioneered the development of water quality sensors for use in natural waters.

# Our technology saves you

time: We know that meeting the global need for improved environmental monitoring requires fewer technical personnel and a lower cost of ownership. YSI provides turn-key monitoring solutions, easier to use and install equipment, and intuitive interfaces.

# Our reliability improves

efficiency: Successful monitoring efforts depend on accurate and defensible data. We deliver reliable instruments and continuously develop safeguards and system checks to ensure you obtain the highest quality data as quickly as possible.

Our employees understand your challenges: Our technical support staff has extensive field experience which helps them provide hands-on support for your monitoring challenges.

Our customers can reach us: We have 17 global offices and 300 employees on 5 continents.

Our experience is proven:

We have the largest installed base of multiparameter sondes with over 20,000 instruments in use worldwide.

[800.897.4151 US] +1 937 767 7241

# Choosing YSI helps you reduce operating costs without sacrificing data accuracy.

Environmental monitoring takes significant investments in time and money. This investment is jeopardized when something goes wrong. Our instruments are reliable and make your data collection as problem-free as possible.

Reduce labor costs through longer maintenance intervals and fewer system failures.

Do it right the first time with our easy-to-use software and superior technical support.

Obtain quality data through features such as zero calibrations on our oxygen sensors and postprocessing features in our software.

# multiparameter sondes for long-term monitoring

YSI's upgraded 6-Series family includes versatile, multiparameter sondes designed for real-time environmental monitoring and extended deployment.

# V2 Sondes

All Version 2 (V2) sondes accept our V2 optical sensors and have a rugged design for longterm monitoring. These sensors feature multiple anti-fouling components and long battery life to provide you with value for your budget.

Seven V2 sondes are offered with sensor payloads ranging from 5-9 sensors and multiple memory and power options to accommodate many different applications. In addition to the sensor options, YSI software calculates up to five additional parameters.



**Biofouling protection** Integrated wipers, copperalloy anti-fouling parts, and a nanopolymer solution significantly deter the growth of biological organisms – thus extending your deployments and reducing your operating costs.





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sensor suite



Source water







6920





cell for horizontal mapping



6600 V2 sonde features the largest sensor payload capability and longest battery life. Choose between 2 and 4 optical ports. The 6600 V2 and 6600EDS V2 are also available with a pH wiping system.



6920 V2 sonde is an economical, 15-parameter logging system; battery powered for long-term, in situ monitoring and profiling. Choose between 1 and 2 optical ports.

6600 V2-4 with four ports for any combination of these optical sensors: ROX dissolved oxygen, blue-green algae, turbidity, chlorophyll, or rhodamine

#### 6000MS V2

6000MS V2 sonde is our smallest V2 sonde, perfect for applications such as turbidity or oxygen monitoring. Accepts 1 optical sensor as well as conductivity, temperature, and depth.

- - -



6820 V2 sonde is a costeffective sampling system with up to 15-parameter reporting capability, ideal for profiling and spot-checking. Choose between 1 and 2 optical ports.

# multiparameter sondes for monitoring, sampling & logging

# 600 Sondes

YSI 600 sondes are designed for specific applications where a fewer number of parameters is required and size and easeof-use are of primary concern. All five 600 sondes offer a small and economical package for water quality sampling purposes.





**Compact 600 sondes** have diameters less than 2". The sensors are of the same high quality offered on YSI 6000 sondes.

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#### Applications (suggested uses but not limited to)





Source water monitoring

Spot



Short-term, unattended studies





Surface and groundwater monitoring

Water level r monitoring

#### 600 Sondes

**600LS** is our simplest sonde, designed for spot sampling level measurements and tide gauge measurements.



**600R** includes conductivity and temperature sensors and options to add pH and Rapid Pulse<sup>™</sup> dissolved oxygen. Ideal for large monitoring programs and educational applications.

The 600QS system includes a 600R, 650 display logger, field cable, and additional sensor options such as ORP and vented level.



#### 600XL and 600XLM

sondes are more versatile, ideal for water level monitoring as well as ground water and surface water monitoring. Both sondes include DO, temperature, and conductivity sensors and options to add pH or pH/ORP, depth, and vented level measurements. The XLM offers batteries for unattended, *in situ* monitoring.

The new **V2** version of both sondes has an optical sensor port.



#### **Data Analysis Software**

#### EcoWatch® for Windows®

Standard with all YSI sondes, EcoWatch software makes communication with water quality sensors simple. Includes sensor calibration and sonde configuration tools as well as basic graphing.



#### **AQUARIUS Time-Series**<sup>™</sup>

Optional for YSI sondes, AQUARIUS Time-Series software takes data processing to the next level. Includes advanced graphing tools, error detection and correction, and modeling capabilities.



# drinking water protection

Agriculture and well water

Reservoir monitoring Water towers and urban areas

# Drinking Water Sondes

Gather baseline knowledge and detect events with YSI drinking water sondes. These specialized sondes provide process and quality control throughout a distribution network, helping you deliver safe drinking water.

# 600DW-B

**600DW-B** sonde measures temperature, conductivity, pH, ORP, and free chlorine. Portable and powered by batteries or AC.

#### 6920DW

**6920DW** sonde measures parameters above plus turbidity. Portable and powered by batteries or AC.





# sonde interfaces

All YSI 6-Series sondes work with the versatile **650MDS** (Multiparameter Display System).

- Easily log real-time data, calibrate, and set up sondes for deployment
- Designed for reliable field use featuring a waterproof IP-67, impact-resistant case
- Upload data to a PC
- Optional barometer and GPS interface

### 6500 Environmental Process Monitor

6500 Environmental Process

**Monitor** continuously monitors DO, conductivity, temperature, and pH with uninterrupted data. The compact, cost-effective monitor will connect to any 6-Series multiparameter instrument. By replacing multiple instruments, it reduces labor for installation and operation. Includes 8 scaleable 4-20 mA current loop channels and 4 SPDT relays. Allows calibration in the field or lab.



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# YSI 6-series QUICK SELECT QUIDE

Features/Parameters	V2 Sondes			600 Sondes			Drinking Water		System			
	6600	6600EDS	6920	6820	600OMS	600R	600XL	600XLM	600LS	6920DW	600DW-B	600QS
Field-replaceable probes	•	•	•	•	•		•	•		•	•	
RS-232 & SDI-12 standard	•	•	•	•	•	•	•	•	•	•	•	•
Fits 2" wells					•	•	•	•	•		•	•
Internal memory	•	•	•	•	•	•	•	•	•	•	•	•
Internal power (batteries)	•	•	•					•		•	•	
Flow cell		<b>A</b>		. •		. •					. •	
Ammonium/ammonia*												
Blue green algae				. •								
Chloride*												
Chlorophyll		. •										
Conductivity	•	•	•	•	•	•	•	•		•	•	•
Depth				. •								- C. C. C.
Dissolved oxygen												
Dissolved oxygen, optical		. •										
Free chlorine												
Nitrate*				. •				<b>A</b>				
Open channel flow**									•			
ORP				. •							. •	- C. C. C.
PAR (Photosynthetically Active Radiation)												
рН		. •										- <b>1</b>
Resistivity**	•	•	•	•	•	•	•	•		•	•	•
Rhodamine		. •		. •								
Salinity	•	•	•	•	•	•	•	•		•	•	•
Specific conductance**	•	•	•	•	•	•	•	•		•	•	•
Temperature	•	•	•	•	•	•	•	•	•	•	•	•
Total dissolved solids**	•	•	•	•	•	•	•	•		•	•	•
Turbidity												
Vented level									•			

\* Freshwater only. \*\* Calculated parameters.

Standard ■ Customer Selectable ▲ Special Order
Available only on 6600 V2-2 ■ Available only on 6920 V2-1 or 6820 V2-1

Available only on 600XL V2 or 600XLM V2

# high accura

Quality data is the product of quality sensors and we have built our reputation on providing the highest performance, most reliable water quality sensors available. Our engineers give as much attention to sensor performance in the laboratory as they do to performance under the harshest environmental conditions for extended periods. Additionally, all YSI sensors are field replaceable, helping you with maintenance and unexpected situations.

#### Optical

Blue-green Algae

#### Our optical sensors, with integrated extended-deployment wipers, offer excellent performance. The copperalloy anti-fouling versions offer the longest deployment times in the industry—saving you time and money.

Additionally, useradjustable data filtering capabilities allow optimized response time or detection limits.

**ROX<sup>®</sup> Optical Dissolved Oxygen** The most reliable, accurate, and maintenancefree DO sensor available for worry-free oxygen measurement.

#### **Blue-green Algae**

Fluorescence sensors monitor blue-green algae biomass in freshwater or marine environments in real-time.

Turbidity Superior linearity, 1-, 2-, or 3-point calibration

options and excellent agreement with the industry standard benchtop instrument (Hach 2100AN).

Chlorophyll

Chlorophyll Accurately monitor total algal biomass without interference from turbidity, ambient light, or dissolved organics.

Rhodamine Conduct dyetracing studies (flow, transport, mixing) with this sensitive fluorescence sensor.

#### **Electrochemical**

#### Rapid Pulse DO

**Rapid Pulse<sup>™</sup> Dissolved Oxygen** The most advanced polarographic technology available, Rapid Pulse DO is virtually insensitive to flow rate and exhibits large range (0-50mg/L). EPA approved wipers available.

pH/ORP Excellent performance in cold and low ionic waters. Field-replaceable and includes integrated reference electrode. Fast Response sensor and Extendeddeployment versions with

pH/ORP

#### Ion-selective electrodes

Measure **ammonia**, nitrate, and chloride. Designed for short-term monitoring and spot sampling.

# Physical

method.

#### Integrated

Conductivity Superior linearity and easy one-point calibration.

**Temperature** Extremely accurate, field-replaceable temperature sensor.

#### **Depth & Vented Level**

Excellent accuracy through calibration to extremely high precision through temperature compensation over the entire operating range.

PAR Integrate the industry-standard LI-COR® PAR (Photosynthetically Active Radiation) sensor for biological studies. Wiped PAR also available.

Depth & Level

# **Typical performance specifications**

	Range	Resolution	Accuracy		
Rapid Pulse dissolved oxygen % air saturation	0 to 500%	0.1%	0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading		
<b>Rapid Pulse dissolved oxygen</b> mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ±2% of reading or 0.2 mg/L, whichever is greater; 20 to 50 mg/L: ±6% of reading		
<b>ROX optical dissolved oxygen</b> <sup>#</sup> % air saturation	0 to 500%	0.1%	0 to 200%: ±1% of reading or 1% air saturation, whichever is greater; 200 to 500%: ±15% of reading; relative to calibration gases		
<b>ROX optical dissolved oxygen</b> <sup>#</sup> mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ±1% of reading or 0.1 mg/L, whichever is greater; 20 to 50 mg/L: ±15% of reading; relative to calibration gases		
<b>Conductivity</b> <sup>+</sup>	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range-dependent)	$\pm 0.5\%$ of reading + 0.001 mS/cm		
Temperature	-5 to 50°C	0.01°C	±0.15°C		
рН	0 to 14 units	0.01 unit	±0.2 unit		
Shallow depth	0 to 9.1 m (0 to 30 ft)	0.001 m (0.001 ft)	±0.018 m (±0.06 ft)		
Medium depth	0 to 61 m (0 to 200 ft)	0.001 m (0.001 ft)	±0.12 m (±0.4 ft)		
Deep depth	0 to 200 m (0 to 656 ft)	0.001 m (0.001 ft)	±0.3 m (±1 ft)		
Vented level	0 to 9.1 m (0 to 30 ft)	0.001 m (0.001 ft)	±0.003 m (±0.01 ft)		
Open-channel flow	Calculated measurement, requires vented level				
Free chlorine	0 to 3 mg/L	0.01 mg/L	±15% of reading or 0.05 mg/L, whichever is greater		
ORP	-999 to +999 mV	0.1 mV	±20 mV in Redox standard solutions		
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater		
Nitrate/nitrogen*	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater		
Ammonium/ammonia/ nitrogen*	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater		
Chloride*	0 to 1000 mg/L	0.001 to 1 mg/L (range dependent)	±15% of reading or 5 mg/L, whichever is greater		
Turbidity <sup>#</sup>	0 to 1,000 NTU	0.1 NTU	±2% of reading or 0.3 NTU, whichever is greater in YSI AMCO-AEPA Polymer Standards		
Rhodamine WT <sup>#</sup>	0-200 μg/L	0.1 μg/L	±5% of reading or ±1 μg/L, whichever is greater		
Chlorophyll <sup># ++</sup>	<b>Range</b> Ο to 400 μg/L chl <i>α</i> Ο to 100 RFU	<b>Resolution</b> 0.1 μg/L chl <i>α</i> 0.1% FS; 0.1 RFU	<b>Linearity</b> R <sup>2</sup> > 0.9999 for serial dilution of Rhodamine WT solution from 0 to 500 μg/L		
<b>Blue-green algae</b> <sup>#</sup> phycocyanin	<b>Range</b> 0-280,000 cells/mL	<b>Detection limit</b> 220 cells/mL <sup>§</sup>	<b>Linearity</b> R <sup>2</sup> = 0.9999 for serial dilution of Rhodamine WT from 0 to 400 µg/L		
<b>Blue-green algae</b> <sup>#</sup> phycoerythrin	0-200,000 cells/mL	450 cells/mL <sup>§§</sup>	$R^2$ = 0.9999 for serial dilution of Rhodamine WT from 0 to 8 $\mu g/L$		
PAR	Range 400-700 nm waveband <b>Linearity</b> Max. deviation of 1%	Calibration ±5% Sensitivity Typically 3µA per 100	<b>Stability</b> <±2% change over 1 year 0 μmol s-1 m-2 in water		

# Depth rating for optical probes is 61 m (200 ft); depth rating for anti-fouling optical probes with copper-alloy probe housing is 200 m (656 ft). \* Freshwater only. Maximum depth rating of 15.2 m (50 ft). + Report outputs of specific conductance (conductivity correct to 25° C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algo-rithms found in *Standard Methods for the Examination of Water and Wastewater* (ed 1989). \*\* To maintain accuracy specification, flow must be at least 500 mL/min and pH should not change by more than ±0.3 units if mean pH is between 8.5 and 9.3. ++ Specification determined using monocultures of *Isochrysis sp.* and fluorometric extraction of chlorophyll a. Actual detection limits will vary depending on natural algae assemblage. § Estimated from cultures of *Microcystis aeruginosa.* §§ Estimated from cultures of *Synechococcus sp.* 

### **YSI** Environmental

Pure Data for a Healthy Planet.®



To order or for more information, contact YSI Environmental.

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(Yellow Springs facility)

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#### **Third-Party Verification** You Can Trust

YSI is the only company in its field to apply for and receive verification from the US EPA's Environmental Technology Verification Program. Independent tests on the YSI 6600EDS sonde and six sensors demonstrated the accuracy of YSI sensor technology when compared to established standards in saltwater and freshwater. Find information on performance characteristics of YSI water quality sensors at www.epa.gov/etv.\*







The Alliance for Coastal Technologies (ACT) has tested the YSI 6600EDS V2 and 6600 V2 sondes and 3 sensors under real-world conditions. Find evaluation reports at www.act-info.us.

YSI multiparameter sondes have achieved the UK Environment Agency MCERTS certification for continuous water monitoring. Find more information at www.mcerts.net.

\*Use of the ETV name or logo does not imply approval or certification of this product nor does it make any explicit or implied warranties or guarantees as to product performance.

Environmental Calculation Report					
YSI Inc. saved the following resources by using Utopia U2:XG paper, made with 30% recycled post-consumer waste:					
trees	energy	greenhouse gas	water	solid waste	
2	1.3 mil	617.45 lbs	659 gal	109 lbs	
	BTUs	CO <sub>2</sub>			





The YSI 650 Multiparameter Display System

# YSI 650 Multiparameter Display System

Rugged and Reliable Display and Data Logging System

Easily log real-time data, calibrate YSI 6-Series sondes, set up sondes for deployment, and upload data to a PC with the feature-packed YSI 650MDS (Multiparameter Display System). Designed for reliable field use, this versatile display and data logger features a waterproof IP-67, impact-resistant case.

- Compatible with EcoWatch® for Windows® data analysis software
- User-upgradable software from YSI's website
- Menu-driven, easy-to-use interface
- Multiple language capabilities
- Graphing feature
- Three-year warranty

# Feature-Packed Performance

#### Battery Life

With the standard alkaline battery configuration of 4 C-cells, the YSI 650 will power itself and a YSI 6600 sonde continuously for approximately 30 hours. Or, choose the rechargeable battery pack option with quick-charge feature.

#### **Optional Barometer**

Temperature-compensated barometer readings are displayed and can be used in dissolved oxygen calibration. Measurements can be logged to memory for tracking changes in barometric pressure.

#### **Optional GPS Interface**

Designed to NMEA protocol, the YSI 650 MDS will display and log real-time GPS readings with a user supplied GPS interfaced with YSI 6-Series sondes.

#### Memory Options

Standard memory with 150 data sets, or a high-memory option (1.5 MB) with more than 50,000 data sets; both options with time and date stamp.



A powerful logging display for your data collection processes The 650MDS can be used with YSI sondes for spot sampling as well as short-term data logging.

Supply a GPS with NMEA 0183 protocol, connect with the YSI 6115 kit, and collect GPS data along with water quality data.

Upload data from the 650 to EcoWatch® for instant data viewing.



www.ysi.com



#### To order, or for more information, contact YSI +1 937 767 7241 800 897 4151 (US) www.ysi.com

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YSI *incorporated* Who's Minding the Planet?"

## **YSI 650MDS Specifications**

Temperature	Operating Storage	-10 to +60°C for visible display -20 to +70°C
Waterproof Rating		IP-67 for both the standard alkaline battery configuration and for the rechargeable battery pack option
Connector		MS-8; meets IP-67 specification
<b>Dimensions</b> Weight w	Width Length rith batteries	4.7 in, 11.9 cm 9 in, 22.9 cm 2.1 lbs, 0.91 kg
Display		VGA; LCD with 320 by 240 pixels with backlight
Power	Standard Optional	4 alkaline C-cells with detachable battery cover Ni metal hydride battery pack with attached battery cover and 110/220 volt charging system
Communications		RS-232 to all sondes, for data transfer to PC, and for software updates
Optional GPS		NMEA 0183; requires user-supplied GPS and YSI 6115 Y-cable
Backlight		4 LEDs illuminating LCD; user-selectable
Keypad		20 keys, including instrument on/off, backlight on/off, enter, esc, 10 number/letter entry keys, 2 vertical arrow keys, 2 horizontal arrow keys, period key, and minus key
Warranty		3 years

Ordering Information	
650-01	Instrument, standard memory
650-02	Instrument, high memory
650-03	Instrument, standard memory, barometer
650-04	Instrument, high memory, barometer
6113	Rechargeable battery pack kit with 110 volt charger and adapter cable
616	Charger, cigarette lighter
4654	Tripod
614	Ultra clamp, C-clamp mount
5081	Carrying case, hard-sided
5085	Hands-free harness
5065	Form-fitted carrying case
6115	Y-cable for interface with user-supplied GPS system

The 650MDS can interface with any YSI sonde for • spot sampling

- short-term studies
- surface and ground water monitoring
- water level monitoring

Packaged together, the 600QS system includes a 600R conductivity sonde, 650MDS, field cable, and additional sensor options such as pH, dissolved oxygen, ORP, and vented level.