# TENORM REUSE WORK PLAN
**for**
# AREA I
# High Tech Manufacturing Hub at RiverBend
# NYSDEC SITE No. V00619-9

## 1339 SOUTH PARK AVENUE, BUFFALO, NY 14220

May 2016 0330-015-002

Prepared for:

**FORT SCHUYLER MANAGEMENT CORPORATION**

Prepared by:

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## CERTIFICATION

I, Thomas H. Forbes, P.E., certify that I am currently a NYS registered professional engineer and that this TENORM Reuse Work Plan (TRWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the 6NYCRR Part 380 Variance prepared by NYSDEC for Area I, High Tech Manufacturing Hub at RiverBend property (Area I Site).

**License No.:** 070950-1 **Date:** 5-2-2016

**Registration State:** New York **SEAL:**

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# AREA I
# High Tech Manufacturing Hub at RiverBend
# NYSDEC SITE NO. V00619-9
# Buffalo, New York

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## APPENDICES

# 1.0 INTRODUCTION

This work plan presents the details for the reuse of technology-enhanced naturally occurring radioactive material (TENORM) at the portion of the property known as Area I for the High Tech Manufacturing Hub at RiverBend property (to be referred to as "Area I" or "Site"). This TENORM Reuse Work Plan (TRWP) has been prepared on behalf of Fort Schuyler Management Corporation (FSMC), the Site owner, in conformance with the 6NYCRR Part 380 Variance (Variance) prepared by New York State Department of Environmental Conservation (NYSDEC) for the Site.

FSMC prepared and submitted a 6 NYCRR Part 380 Variance Request[1] (Variance Request) to NYSDEC. As discussed in the Variance Request, there are locations at the Site that fill placement will be required to bring the Site to design grade. FSMC would like to use low-level TENORM material stockpile at the Site with concentrations less than 15 picocuries per gram (pCi/g) Ra-226 as fill. The work discussed in this TRWP will be conducted in accordance with the NYSDEC Voluntary Cleanup Program (VCP, Site No. V00619-9) and Variance issued by NYSDEC.

The Site, also referred to as Area I (Former Republic (LTV) Steel Plant parcel), is approximately 87 acres in size and is currently being redeveloped with a 1.2 million square foot solar panel manufacturing facility (Solar City) scheduled to open in 2017. Area I is a parcel associated with a larger VCP Site known as Steelfields Ltd (aka RiverBend LLC). This RiverBend LLC property also consists of Area II (Former Donner-Hanna Coke Plant parcel) and Area III (Former Republic (LTV) Warehouse parcel). The work discussed in this TRWP is for Area I only.

## 1.1 Background

The Area I Site is approximate 87-acres in size and currently undergoing redevelopment was historically owned and operated by Republic Steel and its successor, LTV Steel Company. Area I was used for steel production from 1906 through the late 1980s. During the majority of the active steel manufacturing operations, the plant employed two (2) blast furnaces where molten iron was produced. The molten iron was subsequently converted to steel in two (2) basic oxygen furnaces.

[1] 6 NYCRR Part 380 Variance Request Letter, High Tech Manufacturing Hub at RiverBend, 1339 South Park Avenue, Buffalo, NY 14220. Prepared by Benchmark Environmental Engineering & Science, PLLC for NYSDEC.

A byproduct of the production of iron and steel is slag. Blast furnace slag (i.e., iron slag) is generally comprised of the non-metallic components separated from mined iron ore during smelting in a blast furnace. Steel furnace slag is the product that is developed simultaneously with steel, where lime and oxygen are added to remove impurities. It consists of calcium silicates and combined oxides of iron, calcium and other metals. The slag material present in the subsurface at Area I is the source of the low-level TENORM, which resulted from the processing and co-processing of the NORM-containing ores and mined materials incorporated into the iron and steel manufacturing processes.

Radium (chemical symbol Ra) is a naturally-occurring radioactive metal. Its most common isotopes are Radium-224, Radium-226, and Radium-228. It occurs at low levels in virtually all rock, soil, water, plants, and animals. The primary isotope identified at the Site is Radium-226.

FSMC, a subset of the College of Nanoscale Science and Engineering (CNSE) a NYS Agency, is the RiverBend LLC property owner which includes the Area I Site. LPCiminelli Inc. (LPC) working for FSMC is the project developer and construction manager responsible for construction activities at the Site. Site redevelopment activities began in June 2014 and have been on-going since that time. Site activities have included: excavation and installation of foundations and site utilities; building pad construction; installation of structural steel, installation of the building shell and interior building components. The subsurface soil/fill excavation and soil/fill generation activities were overseen by NYSDEC and environmental consultants working for LPC since the start of the project (CHA: June 2014 through July 2015, and TurnKey Environmental Restoration, LLC: August 2015 through current).

In March 2015, LPC was notified that a truck load of material slated for recycling potentially contained material with radiologic isotopes as identified by the recycling facilities radiological monitors. The truck and its contents were returned to the Site and staged. This incident was the first time LPC became aware of any radiologic information for the Site to date. LPC notified the NYSDEC of the incident and met with NYSDEC at the Site to conduct initial testing and to discuss a path forward. LPC contracted a New York State Department of Health (NYSDOH) licensed radiological testing subcontractor, Greater Radiological Dimensions (GRD), to assist with evaluating the potential concern.

GRD conducted gamma radiation and isotopic readings survey of staged material and open excavation areas throughout the Site, background surveys, collected dose rate data, and provided Site Specific Radiation Awareness Training for the site workers.

Subsurface activities completed during redevelopment were subject to the Site Management Plan[2] (SMP), specifically the Soil/Fill Management Plan within the SMP, as required by the VCP. During the redevelopment activities, various materials (topsoil, soil/fill, concrete, slag, petroleum impacted soil/fill, and metal recyclable materials) have been generated and managed in accordance with the SMP, which has included off-site landfill disposal, recycling of appropriate materials and on-site reuse of acceptable soils/fill material. At the time the initial SMP was developed, there was no indication that TENORM was present at the Site. This TRWP will address TENORM reuse requirements. Additionally, as a requirement of the Variance, the existing SMP will be revised using the NYSDEC latest template and include TENORM.

Once the TENORM was identified, subsurface soil/fill materials generated at the Site by redevelopment activities were field screened within the excavator bucket using a Ludlum Model 2221 Ratemeter/Scaler with a sodium iodide scintillator (2x2 meter) to detect gamma radiation in counts per minute (cpm). For purposes of gamma-screening, a radiological activity threshold of 12,000 cpm (approximately two (2) times measured background) was established, to assess the excavated materials. Materials excavated and screened at levels below the 12,000 cpm threshold were deemed reusable as backfill at the Site. Materials excavated and screened at levels greater than 12,000 cpm were stockpiled in a TENORM staging area in the southwestern portion of the Site. The volume of stockpile is approximately 50,000 cubic yards (CY) and is the material subject to this TRWP.

In general, the subsurface conditions at the Area I Site and areas proposed for reuse of the TENORM consist of fill characterized by slag, brick, iron ore, limestone, gravel and soil as well as former concrete building foundations and slabs.

In addition to the 50,000 CY currently stockpiled, a small stockpile of TENORM (approximately 5,000 CY) and co-mingled material stockpile (approximately 1,000 CY containing TENORM and evidence of petroleum impacts) were also generated during the redevelopment project. Initial laboratory sample results from the small TENORM stockpile indicated that the Ra-226 concentrations were above 15 pCi/g and could not remain on-site. Therefore, the small stockpile of TENORM and co-mingled material stockpile were disposed of at an acceptable out-of-state landfill (Waste Management in Mahoning, Ohio). LPC's subcontractor Austin Masters Services (AMS) was responsible for the waste profiling and

[2] "Site Management Plan for Area I (Former Republic (LTV) Steel Parcel, Steelfields Site, Buffalo, NY (NYSDEC Site V00619-9)". Prepared for Steelfields LTD by TurnKey Environmental Restoration, LLC. April 2007.

landfill disposal of the small TENORM pile and co-mingled material. This work was completed in January and February 2016.

In order to determine if the TENORM material generated at the Site could be reused, NYSDEC requested FSMC prepare a Variance Request. The request was for a variance from 6 New York Codes, Rules and Regulation (NYCRR) Part 380-4.1(b) which states:

*There shall be no land disposal of radiological material subject to this Part except as authorized pursuant to this Part and any other applicable provisions of this Title.*

The NYSDEC also requested that a Residual Radioactive Material (RESRAD) Model be completed as submitted. The RESRAD is designed to estimate radiation doses and risks from Residual Radioactive materials and used to support development of a Radiological Impact Assessment (RIA).

RESRAD uses a pathway analysis method in which the relation between radionuclide concentrations in soil and the dose to a member of a critical population group is expressed as a pathway sum, which is the sum of the products of "pathway factors." Pathways are determined by the specified exposure scenario.

The RESRAD was used to evaluate the following five (5) potential exposure scenarios:

1. Industrial Worker – No Building Occupancy.
2. Groundskeeper
3. Recreational User
4. Future Industrial Worker – Building Occupancy
5. Future Construction Worker & Inadvertent Intruder

Two (2) potentially applicable comparative criteria were identified and used to compare the results of the RESRAD models:

- United State Nuclear Regulatory Commission (NRC) 10 CFR 20.1402- Radiological Criteria for Unrestricted Use.
- United States Environmental Protection Agency (EPA) issued OWER No. 9200.4-18[3].

The NRC 10 CFR Part 20 is the Standard for Protection Against Radiation. Part 20.1402 is the Radiological Criteria for Unrestricted Use, which states that a site will be

[3] USEPA. Office of Solid Waste and Emergency Response. OSWER No. 9200.4-18. Memorandum, Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination. August 22, 1997.

considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group[4] that does not exceed 25 millirem (mrem) per year, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). The 25 mrem per year was considered to be an applicable or relevant and appropriate requirement (ARAR).

OSWER No. 9200.4-18 indicates that if a dose assessment is conducted at a site, which has been completed for the Area I Site via the RESRAD models, then 15 millirem per year (mrem/yr) effective dose equivalent should generally be the maximum dose limit for humans. This level is consistent with levels generally considered protective in other governmental actions, particularly regulations and guidance developed by EPA in other radiation control programs.

Both criteria were considered Applicable or Relevant and Appropriate Requirements (ARAR) and "to-be-considered" comparative value (TBC) for comparison against the RESRAD model outputs in the absence of TENORM regulatory criteria or guidance in New York State and used in the RIA.

Based on the RESRAD models, the potential maximum dose levels range from 0.3 mrem/yr (Recreational User) to 7.8 mrem/yr (Future Construction Worker & Inadvertent Intruder in the placement area). The dose assessment conducted for the five (5) scenarios indicate that the proposed use of the low-level radiological material as fill material are below the proposed 15 mrem/yr (EPA) and 25 mrem/yr (NRC) levels that have been identified as TBC/ARAR.

Therefore it was proposed to re-use the low-level TENORM material based upon the modeled and demonstrated absence of significant adverse impact on the public health and safety and the environment. Specifically, low-level TENORM with concentrations less than 15 pCi/g as fill at specific locations of the Area I Site (see Figure 3), which will be placed under a 1 foot approved cover system and/or hardscape cover system (i.e., asphalt or other).

[4] Critical group is defined by the NRC as the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.

### *1.1.1 Reuse Approach*

As further described later in this TRWP, the TENORM will be relocated on-site to the proposed reuse fill areas, placed in 6-inch uncompact lifts, field screened to determine if material is acceptable for reuse (field measurements less than 12,000 cpm and analytical laboratory results less than 15 pCi/g). If acceptable, it will be compacted and subsequent TENORM placed. In areas of reuse, the TENORM thickness will not exceed 3 feet.

If unacceptable (field measurements greater that 12,000 cpm or analytical laboratory results greater than 15 pCi/g) the material will be evaluated, removed, and stage for out-of-state disposal.

After the designated grades are achieved in the proposed reuse areas, a demarcation layer will be placed over the top of the TENORM and the areas covered with 1 foot of acceptable soil/fill or covered with suitable hardscape as required under the VCP and SMP.

Any future subsurface activities at the Site would be subject to the updated SMP, which will be developed using NYSDEC latest template (August 2015).

## 1.2 Purpose and Scope

This TRWP presents the scope of work and planned approach for the TENORM reuse which includes the placement methods, field screening methods, remedial measures, confirmation analytical sampling, installation of a cover system, establishment of an Environmental Easement (EE), and implementation of the updated SMP during redevelopment and/or future activities to be conducted.

The scope of TRWP activities includes:

- Providing drawings for the Site that will show the proposed location(s) of the TENORM reuse areas, thicknesses and cover system information.
- Provide field screening methods and protocols to be used to evaluate the reuse of the TENORM after placement.
- Provide the confirmation analytical sampling methods and procedures.
- Cover system placement.
- Radiation.
- Establish and provide components of an Environmental Easement for the Site.
- Preparation of an updated SMP for the Site.

## 1.3 Project Organization and Responsibilities

Benchmark-TurnKey will provide oversight, community air monitoring, documentation of the TENORM reuse. Benchmark will prepare the updated SMP. LPC will be responsible for TENORM relocation, placement, compaction, and constructing the cover system. LPC subcontractor's Foit Albert Associates (FAA) will be responsible for survey controls for the placement area and to verify lift thicknesses; and GRD will be responsible for field screening the TENORM against acceptance criteria after placement. LPC will subcontract with a consultant that will be responsible for off-site disposal of TENORM identified above 15 pCi/g at an out-of-state facility that can accept the material based on the concentrations identified.

FSMC's environmental counsel will be responsible for providing the information needed to DEC for preparation of the Environmental Easement and filing the signed document with Erie County. The NYSDEC Division of Environmental Remediation (DER), will monitor the TENORM reuse actions to verify that the work is performed in accordance with the approved TRWP and the 6 NYCRR Part 380 Variance that was issued.

## 2.0 TENORM REUSE AND PLACEMENT AREA

The 50,000 CY TENORM stockpile is located along the southwestern portion of Area I (see Figure 3) in an area known as the "Toe of the Site". The estimated volume of material in the TENORM stockpile is based on a survey completed on February 3, 2016 by FAA. The TENORM, as discussed in Section 1.1, is present in the slag at the Site as a byproduct of the former production of iron and steel. As the Area I Site redevelopment activities where occurring (building foundation and utility excavations) both slag and other subsurface soil/fill were excavated simultaneously as subsurface conditions were not uniform. Therefore, the TENORM stockpile is a mix of slag and other subsurface soil/fill materials generated during excavation activities.

There are two (2) proposed TENORM reuse areas at the Site, as shown on Figure 2. These areas are:

1. Toe of the Site – This approximate 10 acres area is located in the southwestern portion of Area I and is proposed to be used as ancillary parking or greenspace. It is estimated that 49,000 CY of fill is needed to raise the grades in this area.
2. Field Trailer Area – This approximate 4.3 acres area is located in the eastern portion of Area I where the construction field trailers are currently located. This area will be used as access roadways and a parking lot. It is estimated that 20,000 CY of fill is needed to raise the grades in this area.

FSMC would also like to evaluate the site development plan and determine if there are other areas of the Area I Site that could be suitable for TENORM reuse, if necessary. These location(s) would be provided and discussed with NYSDEC prior to material placement.

The reuse placement thickness will not exceed 3 feet, which was used as the maximum placement thickness in the RESRAD model. The placement thickness of acceptable TENORM (field screening results of less than 12,000 cpm) will be 1 foot less than the required fill grade requirement to allow for the installation of 1 foot of acceptable cover material or hardscape cover system with associated subbase. Once the required TENORM placement elevation is reached and the required confirmatory samples have been collected, the demarcation layer (i.e., orange mesh or equivalent) will be placed prior to the cover system installation.

# 3.0 TENORM REUSE TECHNICAL APPROACH

## 3.1 TENORM Reuse Construction Tasks

### *3.1.1 Project Coordination/Kickoff Construction Meeting*

A project coordination/kickoff meeting will be held with key representatives of the Project Team before the reuse activities begin. Attendees at the meeting will include a representative from FSMC, LPC, FAA, Benchmark/TurnKey, and GRD that will be used during the project. The NYSDEC Project Manager will be notified of the meeting date and time and requested to invite those individuals from the Department they would like have present at the meeting or via teleconference. Agenda items will include:

- Project schedule
- Work sequencing
- Designation of responsibilities, contact personnel, and phone numbers
- TENORM Reuse Work Plan review
- Confirmatory sampling
- Project documentation requirements
- Import Materials/Cover System Installation
- Health and safety requirements
- Community air monitoring
- Temporary controls (dust suppression, storm water management)

Benchmark will prepare meeting minutes for distribution to attendees following the meeting.

### *3.1.2 Progress Meetings/Calls*

Progress meetings/calls will be conducted, as necessary, throughout the TENORM reuse and cover system installation construction period. NYSDEC will be provided the agenda prior to the meetings and have the opportunity to participate in meetings that will discuss substantial technical issues relative to reuse of TENORM. Progress meetings/calls will be attended by FSMC, LPC, Benchmark/TurnKey, FAA and GRD, as necessary. NYSDEC will have access to progress meetings notes.

### *3.1.3 Health and Safety Plan*

The existing Project Safety Plan (PSP)[5] dated February 4, 2015 will be used for the TENORM Reuse activities described herein. Attached to the PSP is the Health and Safety Plan (HASP)[6], for the RiverBend Site – Area I Redevelopment, dated May 22, 2014.

The PSP addresses health and safety with respect to general construction safety and the HASP provides guidance to workers performing intrusive activities where exposure to contaminated soil and/or fill material is possible. Collectively these documents will be the HASPs for TENORM reuse activities.

As required, LPC and/or consultant/contractor employees involved with the TENORM Reuse project are required to attend a Site health and safety orientation and Site Specific Radiation Awareness Training (provided by GRD), if they had not already received the training.

LPC will be responsible for site control and LPC has hired US Security to provide Site security.

TurnKey will perform of community air monitoring as required by the existing SMP during TENORM reuse placement, screening, sampling and cover system installation in addition to other ongoing Site redevelopment activities that may require air monitoring.

## 3.2 Temporary Facilities and Controls

### *3.2.1 Mobilization and Site Preparation*

The field equipment necessary for the implementation of this project is already present at the Site. LPC will mobilize the equipment to the work area for completion of the TENORM reuse project. The area will also be cleared of materials, equipment and other items, as necessary that would interfere with the placement of the TENORM.

As discussed in Section 3.2.4, the existing Site construction storm water controls will remain in effect during the TENORM reuse project.

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[5] "Buffalo High-Tech Manufacturing Innovation Hub @ RiverBend, 1339 South Park Avenue, Buffalo, NY 14220, Project Safety Plan". Prepared by LPCiminelli, Inc. February 4, 2015.

[6] "Health & Safety Plan, RiverBend Site – Area I Redevelopment, 1339-1341 South Park Avenue, Buffalo, New York, NYSDEC Site No. V00619-9. Prepared by CHA for LPCiminelli, Inc. May 20, 2014.

### *3.2.2 Construction Facilities*

The personnel involved in the TENORM Reuse work will utilize the existing project field trailers located on the eastern portion of the Area I Site.

### *3.2.3 Dust Suppression*

Dust suppression will be utilized, if necessary, during the TENORM reuse activities. Community air monitoring, as required by the SMP, will be completed. If the community air monitoring program (CAMP) thresholds are exceeded, dust suppression will be required on the surface of the work area to mitigate airborne dust formation and migration. Water can be sprayed across the surface of the work area as necessary to mitigate airborne dust formation and migration. Other dust suppression techniques that may be used to supplement the water spray include:

- Applying water on haul roads.
- Applying water prior to compaction.
- Restricting vehicle speeds on-site.

Reasonable attempts will be made to keep visible and/or fugitive dust to a minimum and adhere to particulate emissions limits identified in the Community Air Monitoring Plan (see Section 5.0).

### *3.2.4 Storm Water Management*

A Notice of Intent (NOI) was submitted for the redevelopment project on September 16, 2014 by LPC. A stormwater pollution prevention plan[7] (SWPPP) was also prepared for the Area I Site. The NOI was deemed accurate and complete, and the SWPPP was identified to be in substantive conformance with the requirements in the SPDES General Permit for Stormwater discharges from MS4 in a letter from NYSDEC to LPC dated September 17, 2014. The permit issued for the Site is NYR 10Y480.

Due to the permeable nature of the soil/fill material at the Site and its relatively flat topography, storm water ponding/runoff is not expected to pose a significant concern. Silt

[7] "Stormwater Pollution Prevention Plan (SWPPP) CNSE Buffalo High Tech Manufacturing Hub at RiverBend and Buffalo River Area of Concern, Habitat Restoration – RiverBend Phase II, City of Buffalo, Erie County, New York". Prepared by CHA for LPCiminelli Inc. August 2014.

fencing has been previously installed around the perimeter of the Site and will be maintained in accordance with the SWPPP, in addition to the required inspections. Therefore, storm water ponding/runoff is not expected to pose a significant soil particulate or contaminant transport pathway during TENORM reuse activities.

## 3.3 TENORM Stockpile Excavation, Transportation, & Placement

Material present in the stockpile will be excavated and placed into dump trucks for transportation to the reuse area at the Site. The materials will be placed on the ground and spread out to an approximate 6-inch uncompact lift using a bull dozer. The material will be spread out in approximate 15 foot wide windrows within the placement area. Each windrow will be divided into 50 foot long sections with stakes identifying the placement area. See Figure 4 for proposed TENORM layout and field screening plan.

During the TENORM placement, FAA will utilize the site survey controls elevations to verify and document the 6-inch uncompact lift thickness at three (3) locations within each 15 foot wide by 50 foot long windrow section: starting point of the placement area, 25 foot mark (midpoint), and 50 foot mark (end) as shown on Figure 4. Once the uncompact lift thickness is verified, it will be field screened/sampled (as discussed in Section 3.4).

In general, the majority of the TENORM reuse placement area will be covered with a 6-inch uncompact lift prior to placing the subsequent lifts. This will allow for the field screening and confirmatory sample results to be obtained prior to placing the next lift over the material. Once deemed acceptable, LPC will place two (2) consecutive 6-inch uncompact lifts prior to compacting the material, rather than compacting each individual 6-inch lift. After the compaction is complete, the elevation of the top of the compacted material will be measured and the next 6-inch uncompact lift will be placed. This process will continue until the required TENORM grades are achieved allowing for a minimum of 1 foot of acceptable cover material (as outlined in the SMP) or hardscape cover to be placed.

## 3.4 Field Screening & Analytical Confirmation Sampling

To verify that the TENORM placed is acceptable for reuse, the placed and uncompact material will be field screened by GRD and confirmatory samples for laboratory analysis will also be collected.

***Field Screening***

The field screening will be completed by GRD's radiation technician using a 2x2 meter (Ludlum Model 2221 Ratemeter/Scaler with a sodium iodide scintillator or equivalent) to measure the gamma radiation being emitted from the placed material in cpm. Personnel performing field screening measurements will either have one year's experience performing measurements where the radionuclides and nature/level of contaminants are similar to those of the Area I Site or will be under the direct supervision of an individual who has greater than five years of such experience.

After the TENORM is placed in a 6-inch uncompact lift, it will be field screened to determine if the material is under the accepted correlation for material reuse. The field screening will consist of collecting 1 minute measurements with the 2x2 meter at three (3) locations within each 50 foot by 15 foot windrow section (3 measurements every approximately 5 CY of placed material, see Figure 4). Locations for the 1-minute measurements will be selected based on a walkover scan of the windrow area and selected based on highest three (3) readings. As outlined in the Variance, placed material that is measured must be less than 12,000 cpm (accepted correlation: 12,000 cpm equates to 15 pCi/g) in order to be deemed acceptable for use as fill in approved placement areas.

If the 1 minute measurements are less than 12,000 cpm, the placed material is acceptable for reuse as placed. If placed material is measured to be greater than 12,000 cpm, it will be further evaluated, removed and staged for out-of-state disposal as discussed in Section 3.4.1.

***Confirmation Sampling***

In addition to field screening the placed material with the 2x2 meter, ten (10) confirmatory samples will be collected from the placed material to confirm the field correlation is accurate. Each composite sample will be made up of a five (5) point composite. The confirmation sampling locations will be based on the walkover survey/1-minute measurements collected previously and the sample composite locations will be based on the five (5) highest readings associated with the sample area. A minimum of four (4) of the composites will be collected from the top lift. The composite samples will be sent to Pace Analytical laboratory for Ra-226 analysis via EPA Method 901.1M. The results of the confirmatory samples from the top lift will be inserted in to the RESRAD model to demonstrate that exposure at the surface of the cover is protective of public health and

discussed in a section of a final construction completion detailing work completed under the variance.

To allow material placement to continue in a timely manner, the laboratory will use 6-day in-growth curves to estimate the concentration of Ra-226 after 6 days, rather than waiting the typical 21 days. This will allow the confirmatory analytical results to be received and reviewed prior to covering with the subsequent lifts. If the analytical results of the composite sample contains less than 15 pCi/g Ra-226, the next lift will be placed. If the analytical results are greater than 15 pCi/g, the material representative of the composite sample will be removed and staged for out-of-state disposal.

### *3.4.1* Unacceptable Field Screening & Confirmation Sampling

If the results of the 1-minute field screening measurement(s) are greater than 12,000 cpm, the material represented by the measurement is deemed unacceptable and will need to be delineated, removed from the placement area, staged in an area north of the Toe of the Site placement area as shown on Figure 4. TENORM unacceptable for reuse will be disposed of out-of-state.

To assess the extent of the unacceptable material, four (4) additional 1-minute measurements will be collected (north, south, east and west) around the unacceptable measures at half the distance between the unacceptable measurement and next adjacent acceptable measurement. If the four (4) 1-minute measurements are acceptable, the location of these delineation measurements identify the limits of the unacceptable material to be removed. If there are additional unacceptable measurements during the delineation, the location of the previously measured adjacent acceptable measurement will be used to represent the limit of the unacceptable material to be removed. If all five (5) of the initial 1-minute measurements are unacceptable, the entire approximately 14 CY (50 foot by 15 foot by 6-inch) uncompact lift will be removed from the placement area.

If the results of the five (5) point composite confirmation sample are above 15 pCi/g for Ra-226, the material represented by the composite sample will be removed and staged for out-of-state disposal.

At this time, the formal staging area for the unacceptable material has not been defined due to on-going construction activities at the Site. However, material deemed unacceptable

for reuse will likely be staged on the western portion of the Site, west of the current building location and the western Site property limits, and outside of the "Toe of the Site" reuse area.

## 3.5 Cover System Installation

After the TENORM has been deemed acceptable, compacted and achieved the required Site design grades, the demarcation layer and cover system will be installed as discussed in Section 4.0.

# 4.0 ENGINEERING & INSTITUTIONAL CONTROLS

The future use of the TENORM placement area(s) have not been finalized, therefore the final cover system is unknown, but will either be an acceptable 1 foot soil/fill cover or hardscape as outlined in the SMP.

## 4.1 Engineering Controls

### *4.1.1* Demarcation Layer

A demarcation layer will be placed over the TENORM after the design grades have been achieved in the placement areas of the Site and prior to placement of cover system material. Demarcation will be placed so to easily identify the underlying TENORM sub-grade fill from the cover system material, and prevent the potential for inadvertent removal of TENORM during potential future Site work. The demarcation material will be comprised of an orange plastic industrial netting material that will be rolled across the TENORM and overlapped by approximately 1 foot at the seams.

### *4.1.2* Cover System

If a soil/fill cover system is to be utilized over the TENORM, it will consist of a minimum of 1 foot of acceptable material meeting the criteria of the SMP.

If the cover system is a hardscape (i.e., asphalt cover for parking lot) it will be composed of the materials required to properly construct the hardscape for it end-use (i.e., asphalt parking lot with required sub-base for proper construction).

Cover system material(s) brought onto the Site, it will be done in accordance with the requirements of the SMP. The materials will be documented in the Construction Completion Report, further discussed in Section 6.3.

If excavation activities are required after construction of the cover system, they will be completed in accordance with the Excavation Work Plan appendix of the SMP.

### *4.1.3* Import Criteria

#### *4.1.3.1 General*

All materials proposed for import onto the Site must be approved by Benchmark and the NYSDEC. The criteria under which off-site material may be used as cover or backfill are presented in SMP.

#### *4.1.3.2 Quality Assurance Requirements*

In the event that the Site will have a 1 foot soil cover are part of the final cover system design, all imported soil sources, including general backfill soil and topsoil, will be subject to third-party testing to verify that they meet the quality assurance requirements specified below. The required specified number of samples will be submitted to an independent, NYSDOH ELAP-certified laboratory for analysis. Benchmark will be notified of the sampling and provided an opportunity to observe the sample collection work.

All analyses will be in accordance with USEPA SW-846 methodology. The laboratory data package will be a Category A deliverable; however, the NYSDEC may request, at any time, to upgrade the deliverable to Category B.

Discrete grab samples will be collected for VOC analysis. For all other required analyses, a minimum of four (4) grab samples will be collected to form a single composite sample.

Target import criteria are the Site-Specific Action Levels (SSALs) established in the Site Management Plan.

## 4.2 Institutional Controls

The imposition of an Institutional Control in the form of an Environmental Easement will be granted to NYSDEC and recorded with the Erie County Clerk for the Site. The environmental easement will require compliance with the SMP, the IC/ECs placed on the Site, identify use restrictions (e.g., commercial and/or industrial) and restrict the use of groundwater as a source of potable and/or process water without New York State Department of Health approval.

# 5.0 COMMUNITY AIR MONITORING

Real-time community air monitoring will be performed by Benchmark-TurnKey during TENORM reuse activities at the Site, including excavation, grading, and cover system activities. Particulate and vapor monitoring will be performed downwind of the work area as outlined in the SMP. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC and follows procedures and practices outlined under DER-10 Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring) which have been included in Appendix A of this document.

# 6.0 RADIATION SAFETY MONITORING

Radiation safety monitoring will be performed by GRD during TENORM reuse activities at the Site, including excavation, grading, field screening, and cover system activities.

## 6.1 Personnel Monitoring

The dose rates and total dose from exposure to radiation and radioactive materials is expected to be significantly less than 1 milli-Sievert (100 mrem). Because of this anticipated low total dose, no individual personnel monitoring (either external or internal) will be completed. Personnel monitoring is required under NYCRR Code 16 specifications when radiation doses are expected to exceed 500 mrem.

## 6.2 Personal Protection Equipment

No specific personal protection equipment (PPE) will be required for radiological protection as part of this TENORM reuse project. PPE for construction safety purposes will be worn in accordance with the HASPs discussed in Section 3.1.3.

## 6.3 Equipment Monitoring

Surface measurements (before and after) will be made of construction equipment and personnel during the day to ensure TENORM levels are acceptable. Direct surface measurements of TENORM requiring restriction and decontamination of equipment are as follows (listed in Appendix A of NYSDOH Code 16):

- Alpha 20 dpm/100 cm2 removable
- Alpha 500/100 cm2 total
- Beta 1000 dpm/100 cm2 removable
- Beta 5000 dpm/100 cm2 total

## 6.4 Radiation Particulate Monitoring

In addition to the CAMP discussed in Section 5.0, radiation particulate monitoring will be conducted at the Site. Three (3) particulate air sample locations will be used to collect particulate with low-flow air pumps (F&J low volume pump or equivalent) from one (1) upwind and two (2) downwind locations of the TENORM reuse placement area. Particulate

in the air will be collected onto filter cassettes within the low-flow pumps that collect particulate as air is drawn in and passed through the cassettes. At the completion of the each work day, a Ludlum Model 2929 scaler (or equivalent) will be used to measure the alpha, beta/gamma radiation in counts per minute (cpm) associated with the particulate collected on the filters at the Site. The results of the particulate screening will be compared to the Occupational Values provided for Radium-226 on Table 1 of 10 CFR 20, Standard for Protection Against Radiation, Appendix B.

Based on the radiation particulate monitoring completed by GRD as part of the Area I Site redevelopment activities, the radiation particulate monitoring data has not exceeded background measurements, which are as follows.

- Alpha: less than 1 cpm
- Beta/Gamma: 40-50 cpm

# 7.0 DOCUMENTATION AND REPORTING

Benchmark-TurnKey will be on-site to document the TENORM reuse activities at the Site. Such documentation will include, at minimum, reports of construction activities, community air monitoring results, gamma radiation measurements, photographs and sketches, as necessary.

## 7.1 Construction Monitoring

Standard reporting procedures for Site activities will include preparation of a field activity reports and, when appropriate, problem identification and corrective measures reports. Appendix B contains sample project documentation forms. Information that may be included on the field activity report form includes:

- Activities and locations of construction work under way.
- Equipment and personnel working in the area, including subcontractors.
- A description of subsurface soil/fill encountered, CAMP results, placement of cover materials, including verification (certification) documentation.

The NYSDEC will be notified of problems requiring modifications to this TRWP or completing the construction item(s). Problem identification and corrective measures reports will provided to NYSDEC whenever major field problems are encountered and corrective measures are necessary and will be included as part of the Construction Completion Report (CCR). Changes or additions to the TRWP will also be noted in the CCR.

Photographic documentation of TENORM reuse activities will be prepared by Benchmark-TurnKey throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or special circumstances arise. Photographs will be provided in digital format.

## 7.2 Progress Reports

Benchmark-TurnKey will prepare and submit to NYSDEC monthly progress reports that include:

- Activities performed during reporting period.
- Results of tests or other pertinent data.
- Work scheduled for the upcoming reporting period.

- Other actions/information pertinent to the project.
- Percentage of completion, delays encountered or anticipated that may affect the schedule, and a description of efforts made to mitigate those delays or anticipated delays.

## 7.3 Construction Completion Report

A Construction Completion Report (CCR) will be prepared and submitted to the NYSDEC as part of the documenting the TENORM reuse activities. The report will be submitted within 60 days of completion of the work and will also be required to be submitted with the Periodic Review Report (PRR) which documents Site activities under for the VCP for the corresponding time period.

The CCR will be prepared to document that activities were completed in accordance with the TRWP and consistent with the requirements of Section 5.8 of DER-10 and include:

- Text describing the TENORM placement, field screening, confirmation sampling, and cover system installation activities performed.
- A description of any problems encountered, deviations from the TRWP, and associated corrective measures taken; and other pertinent information necessary to document that the Site activities were carried out in accordance with this TRWP.
- A Site map showing the extent of TENORM reuse activities, lift placement thicknesses, confirmatory sample locations, and type of cover system installed.
- Field Screening and laboratory analytical data.
- Copies of field activity reports and, if applicable, problem identification and corrective measure reports.
- A certification by a licensed NYS Professional Engineer in accordance with Section 1.5 of DER-10.

## 7.4 Site Management Plan

An updated Site Management Plan (SMP) will be prepared for the Site. It will be developed using the most recent NYSDEC SMP template (August 2015) to provide protocols and procedures to address soil/fill that may be excavated at the Site during future redevelopment and the maintenance of the cover system. The SMP will be developed to replace the current SMP which is currently being implemented as part of the Site redevelopment activities. This SMP was remain in effect until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36.

## 7.5 Corrective Measures Plan

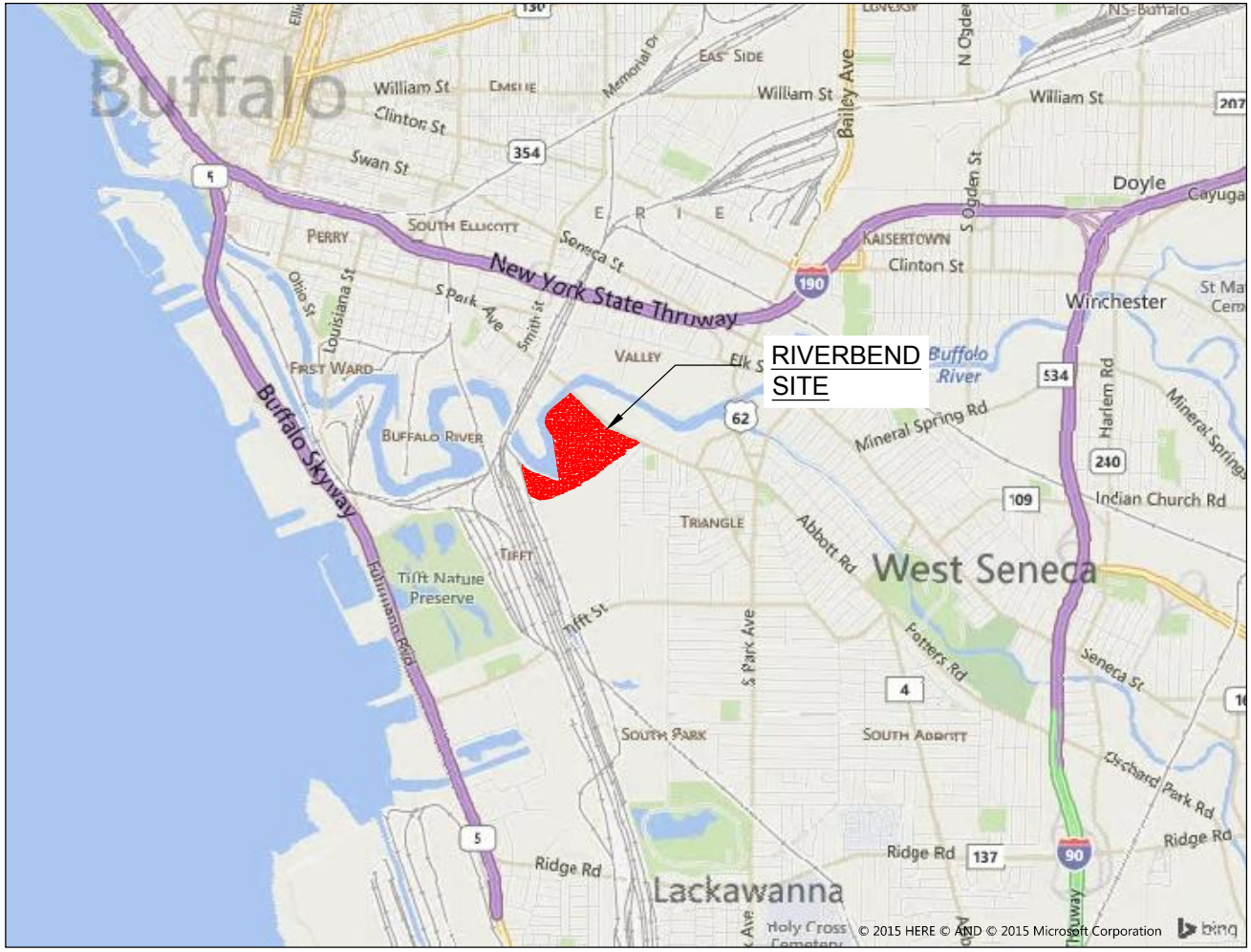
If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Plan will be submitted to the NYSDEC for approval. This Plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Plan until it is approved by the NYSDEC.

# 8.0 PROJECT SCHEDULE

TENORM reuse activities at the Site are expected to begin in late May 2016, with NYSDEC approval of the TRWP. The equipment and labor force to implement the TRWP is already on-site. The NYSDEC Project Manager will be notified seven (7) days in advance of the start of field activities related to the TENORM placement activities.

# FIGURES

F:\CAD\TurnKey\LPCiminelli Construction\TENORM Work Plan\Figure 1; Site Locus.dwg


APPROXIMATE SCALE 1" = 5,000 FEET

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0330-015-002

DATE: FEBRUARY 2016

DRAFTED BY: RFL

# LOCUS PLAN

TENORM REUSE WORK PLAN

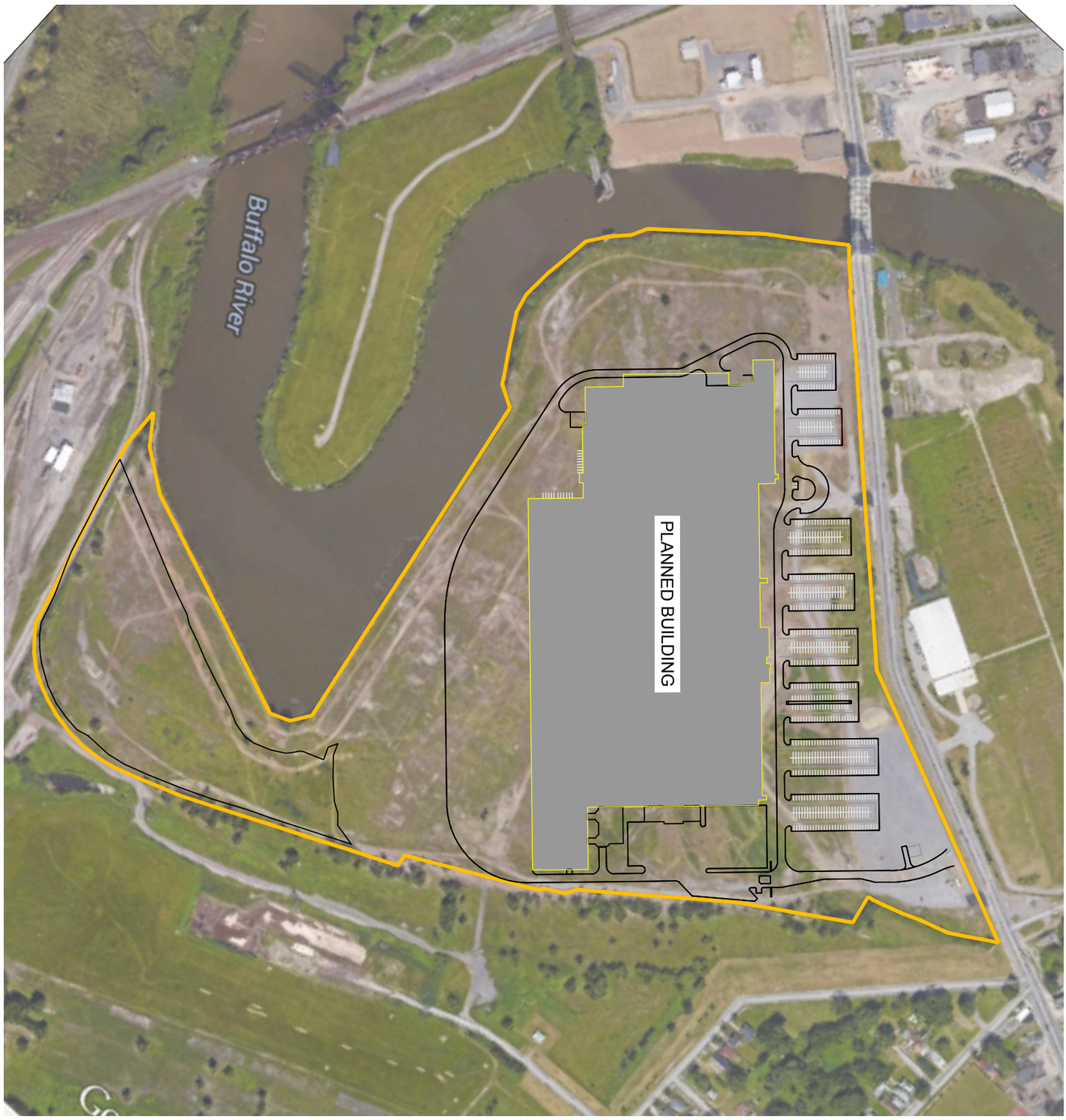
HIGH TECH MANUFACTURING HUB AT RIVERBEND
1339 SOUTH PARK AVENUE BUFFALO, NEW YORK 14220

PREPARED FOR
FORT SCHUYLER MANAGEMENT CORPORATION

FIGURE 1

F:\CAD\TurnKey\LPCiminelli Construction\TENORM Work Plan\Figure 2; Aerial Riverbend.dwg

DATE: FEBRUARY 2016
DRAFTED BY: RFL




LEGEND:

PROPERTY BOUNDARY

PLANNED BUILDING

PLANNED ASPHALT (PARKING/ROADWAY)

N

SCALE: 1 INCH = 400 FEET
SCALE IN FEET
(approximate)

400' 0' 400' 800'

FIGURE 2

# AERIAL SITE PLAN

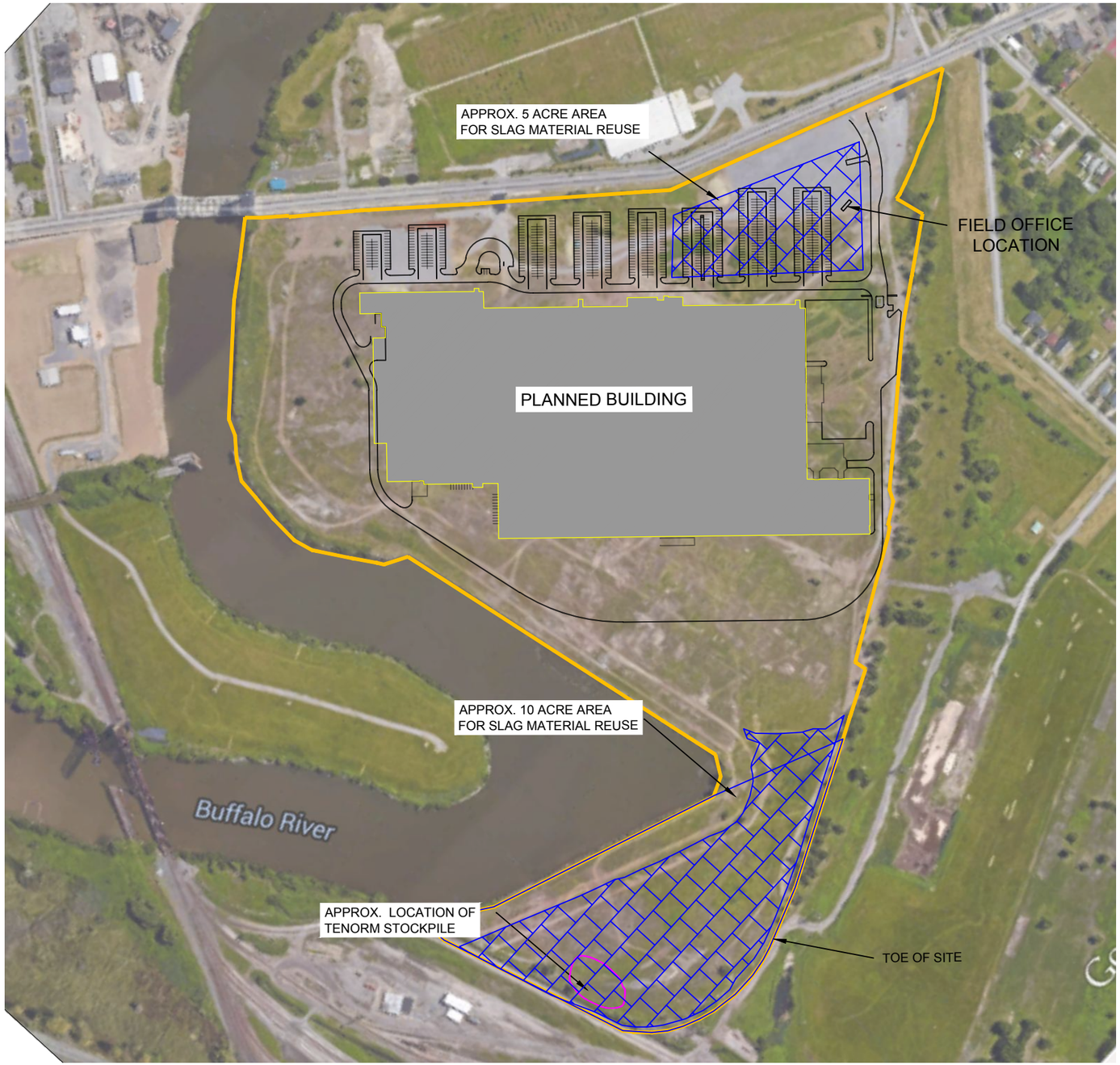
TENORM REUSE WORK PLAN

HIGH TECH MANUFACTURING HUB AT RIVERBEND
1339 SOUTH PARK AVENUE, BUFFALO, NEW YORK 14220

PREPARED FOR
FORT SCHUYLER MANAGEMENT CORPORATION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0330-015-002




LEGEND:

- PROPERTY BOUNDARY
- PLANNED BUILDING
- PLANNED ASPHALT (PARKING/ROADWAY)
- PLANNED SLAG MATERIAL REUSE AREA AND COVER SYSTEM

N

400' 0' 400' 800'

SCALE: 1 INCH = 400 FEET
SCALE IN FEET
(approximate)

# PROPOSED TENORM REUSE LOCATION PLAN

TENORM REUSE WORK PLAN

HIGH TECH MANUFACTURING HUB AT RIVERBEND
1339 SOUTH PARK AVENUE, BUFFALO, NEW YORK 14220

PREPARED FOR

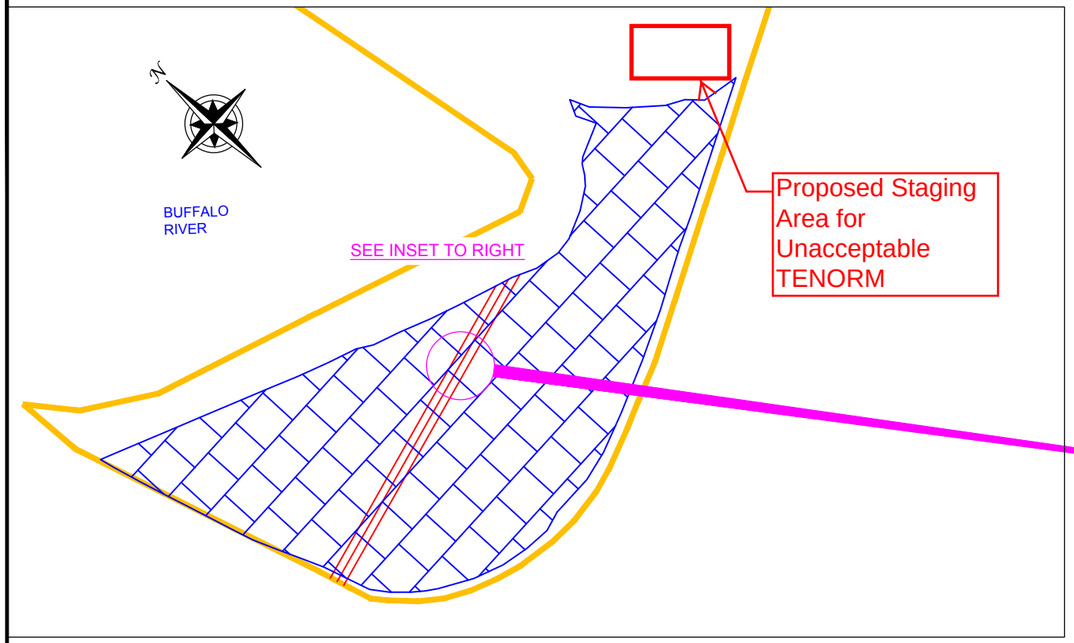
FORT SCHUYLER MANAGEMENT CORPORATION

**FIGURE 3**

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0330-015-002

DATE: FEBRUARY 2016
DRAFTED BY: RFL



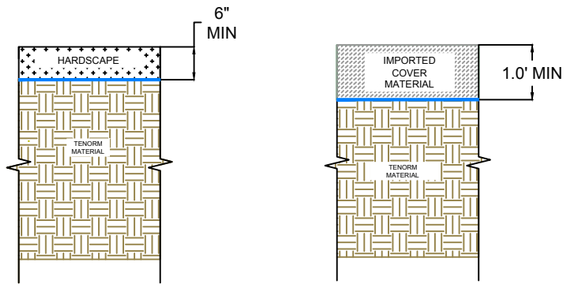

TENORM REUSE LOCATION AREA

APPROX. SCALE 1" = 300'

LEGEND:

- PROPERTY BOUNDARY
- SURVEY LOCATION TO VERIFY LIFT THICKNESS
- 2 — 1-MINUTE FIELD MEASUREMENT LOCATION
- PLANNED TENORM SLAG MATERIAL REUSE AREA AND COVER SYSTEM

COVER SYSTEM DETAILS:

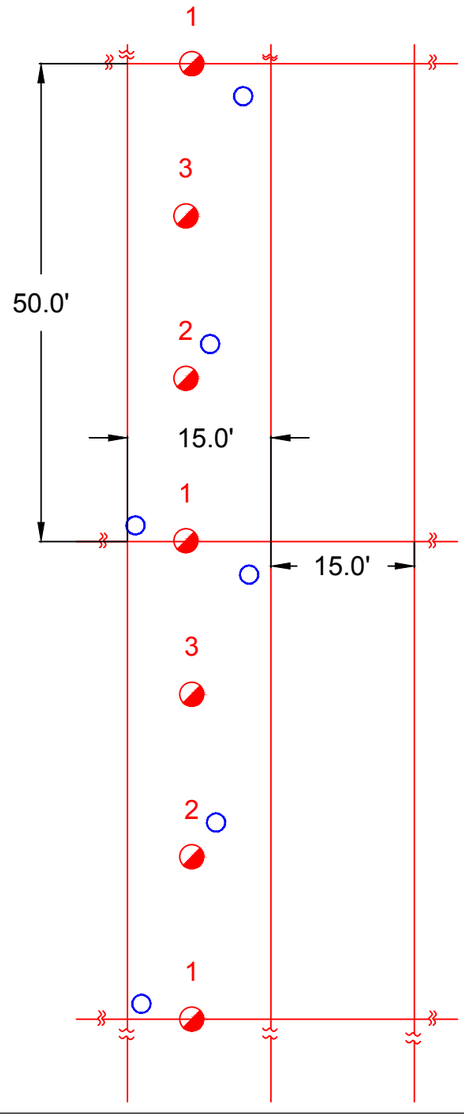



LEGEND:

DEMARCATION LAYER

NOTES:
HARDSCAPE MEANS BUILDING, PAVING, SIDEWALK, ETC

EXAMPLE WINDROW




INSET

NTS

DATE: FEBRUARY 2016
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0330-015-002

# PROPOSED TENORM LAYOUT AND FIELD SCREENING PLAN

TENORM REUSE WORK PLAN

HIGH TECH MANUFACTURING HUB AT RIVERBEND
1339 SOUTH PARK AVENUE, BUFFALO, NEW YORK 14220

PREPARED FOR

FORT SCHUYLER MANAGEMENT CORPORATION

**FIGURE 4**

# APPENDIX A

## COMMUNITY AIR MONITORING PLAN

## Appendix 1A
## New York State Department of Health
## Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

**Continuous monitoring** will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

**Periodic monitoring** for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

## Appendix 1B
## Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$^{o}$ C (14 to 122$^{o}$ F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

# APPENDIX B

## PROJECT DOCUMENTATION FORMS

BENCHMARK
Environmental
Engineering &
Science, PLLC

# INSPECTOR'S DAILY REPORT

Page _____ of _____

| | |
|---|---|
| CONTRACTOR: | JOB NO.: |
| CLIENT: | DATE: |

| | | | |
|---|---|---|---|
| LOCATION: | | DAY: Su M Tu W Th F Sa | |
| WEATHER: | TEMP: °F | START: | END: |

**WORK PERFORMED:**

| | |
|---|---|
| TEST PERFORMED: | QA PERSONNEL: |
| | SIGNATURE: |

BENCHMARK Environmental Engineering & Science, PLLC

# INSPECTOR'S DAILY REPORT

***(CONTINUED)*** Page ____ of ____

| CONTRACTOR: | JOB NO.: |
|---|---|
| CLIENT: | DATE: |

**MEETINGS HELD & RESULTS:**

**CONTRACTOR'S WORK FORCE AND EQUIPMENT**

| DESCRIPTION | H | # | DESCRIPTION | H | # | DESCRIPTION | H | # |
|---|---|---|---|---|---|---|---|---|
| Field Engineer | | | | | | Front Loader Ton | | |
| Superintendent | | | | | | Bulldozer | | |
| Laborer-Foreman | | | | | | DJ Dump Truck | | |
| Laborer | | | | | | Water Truck | | |
| Operating Engineer | | | Equipment | | | Backhoe | | |
| Carpenter | | | Generators | | | Excavator | | |
| Ironworker | | | Welding Equipment | | | Pad foot roller | | |
| Concrete Finisher | | | Roller | | | | | |
| | | | Paving Equipment | | | | | |
| | | | Air Compressor | | | | | |

**REMARKS:**

**REFERENCES TO OTHER FORMS:**

**SAMPLES COLLECTED:**

Sample Number:

Approx. Location of Stockpile:

No. of Stockpile

Date of Collection:

Weather:

Field Observations:

BENCHMARK Environmental Engineering & Science, PLLC

| DAILY LOG | DATE | | | |
|---|---|---|---|---|
| | REPORT NO. | | | |
| | PAGE | | OF | |

# CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

**WEATHER CONDITIONS:**

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

BENCHMARK Environmental Engineering & Science, PLLC

| DAILY LOG | DATE | | | |
|---|---|---|---|---|
| | REPORT NO. | | | |
| | PAGE | | OF | |

# PROBLEM IDENTIFICATION REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

**WEATHER CONDITIONS:**

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

*Linked to Corrective Measures Report No.* *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative