

# **Revised Final Perimeter Air Monitoring Plan for Soils Remediation**

**Landfill Operable Unit  
Tonawanda Landfill Vicinity Property  
Erie County, New York**

May 2019

Contract: W912QR-12-D-0010  
Delivery Order: W912P418F0049

Prepared for:



U.S. Army Corps of Engineers  
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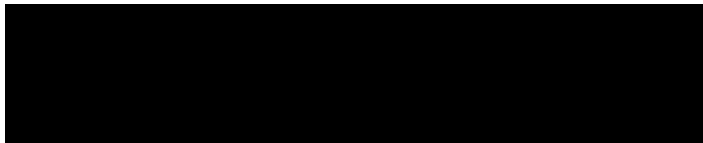
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**STATEMENT OF INDEPENDENT TECHNICAL REVIEW**

**Final  
Perimeter Air Monitoring Plan for Soils Remediation  
Tonawanda Landfill Vicinity Property, Erie County, New York  
U.S. Army Corps of Engineers  
Buffalo District**

Plexus Scientific Corporation has completed the preparation of the Final Perimeter Air Monitoring Plan. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing U.S. Army Corps of Engineers policy.

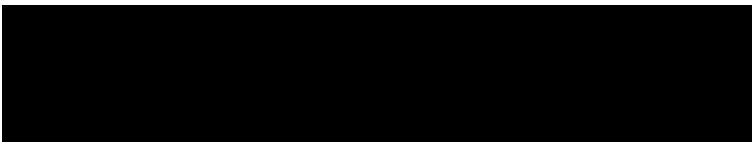
Significant concerns and explanation of the resolutions are documented within the project file. As noted above, all concerns resulting from independent technical review of the project have been considered.



Project Manager

05/15/2019

Date



Independent Technical Review Team Leader

05/15/2019

Date

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## **ACRONYMS AND ABBREVIATIONS**

ACGIH	American Conference of Governmental Industrial Hygienists
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
ALI	Annual Limit on Intake
APP	Accident Prevention Plan
ARAR	Applicable or Relevant and Appropriate Regulation
E-BAM	Environmental Beta Attenuation Monitor
BRP	Backfill and Restoration Plan
CFR	Code of Federal Regulations
CHP	Certified Health Physicist
COC	constituent of concern
CRZ	Contamination Reduction Zone
CZ	Contamination Zone
DAC	Derived Air Concentration Limit
EZ	Exclusion Zone
ft <sup>3</sup> /min	cubic foot per minute
FUSRAP	Formerly Utilized Sites Remedial Action Program
HPT	Health Physics Technician
LPM	liters per minute
MED	Manhattan Engineer District
μCi/mL	microcurie per milliliter
mg/m <sup>3</sup>	milligram per cubic meter
OU	Operable Unit
PAMP	Perimeter Air Monitoring Plan
PAMR	Perimeter Air Monitoring Report
pCi/g	picocuries per gram
Plexus	Plexus Scientific Corporation
PM	Project Manager
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
RSO	Radiation Safety Officer
RSP	respirable suspended particulates
RPP	Radiation Protection Plan
SAP	Sampling and Analysis Plan
SOW	Scope of Work
SSHO	Site Safety Health Officer Ra-226      radium 226
SSHP	Site Safety and Health Plan
SZ	Support Zone
Th-230	thorium 230
TLV	Threshold Limit Values
TSP	total suspended particulates
UFP-QAPP	Uniform Federal Policy – Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers
USNRC	U.S. Nuclear Regulatory Commission

## **ACRONYMS AND ABBREVIATIONS (CONTINUED)**

U-234	uranium 234
U-235	uranium 235
U-238	uranium 238

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## 1.0 INTRODUCTION

Plexus Scientific Corporation (Plexus) was awarded a contract to provide soils remediation at the Landfill Operable Unit (OU; also referenced as the “site”) at the Tonawanda Landfill Vicinity Property (TLVP), in the Town of Tonawanda, in Erie County, New York. Contract Number W912QR-12-D-0010, Delivery Order Number W912P418F0049 was issued by the U.S. Army Corps of Engineers (USACE) – Buffalo District, under the USACE’s Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to identify, investigate, and clean up or control sites previously used by the Atomic Energy Commission and its predecessor, the Manhattan Engineer District.

Soils at the site are contaminated with FUSRAP-related constituents of concern (COCs): radium-226 (Ra-226), thorium-230 (Th-230), and total uranium (U<sub>total</sub>), which consists of uranium-234 (U-234), uranium-235 (U-235), and uranium-238 (U-238) isotopes. An overview summary of measured COC results for the site are presented in **Table 1-1**.

**Table 1-1. Landfill OU COC Measured Results Summary<sup>1</sup>**

COC	Minimum (pCi/g)	Maximum (pCi/g)	Arithmetic Mean (pCi/g)	Geometric Mean (pCi/g)
Ra-226	1.06	3,485	142	9.8
Th-230	0.75	4,300	26	4.2
U-238	0.86	2,048	121	14.5
pCi/g = picocurie per gram 1) Source: Attachment 1.3 – TLVP Contamination Range of Excavation Areas (USACE, 2018).				

Additional information for the soils remediation project, including site location, site background, site topography and drainage, nature and extent of contamination, and selected remedy are presented in the Site Operations Plan (Plexus, 2019a).

### 1.1 Purpose and Scope

The purpose of the Perimeter Air Monitoring Plan (PAMP) is to establish procedures for measuring, documenting, and responding to potential airborne contaminants at the perimeter of the site and within the work areas during remedial activities. Meteorological monitoring will also be conducted during remedial activities to record general weather conditions, including wind speed, wind direction, relative humidity, and air temperature. Perimeter air monitoring will be used to alert Plexus of the need to implement corrective actions to reduce the potential for community exposure to COCs above established values. Work area air monitoring will be conducted to evaluate the potential exposures to site workers. Perimeter and work area air monitoring will be performed using a combination of real-time (continuous and nearly instantaneous) monitoring and sampling/laboratory analyses. Mobile monitoring will also be performed throughout the site to supplement perimeter and work area monitoring and to monitor other site activities.

### 1.2 Air Monitoring Values

Air monitoring values are tiered based on the measurement location and contaminant of concern, as shown in **Table 1-2**. The air monitoring values will be used unless background data indicates that they are not practicable, any modifying of the air monitoring values will be

performed in consultation with the USACE.

**Table 1-2. Air Monitoring Values**

Contaminant of Concern	Location	Response Level <sup>A</sup>	Action Level (ALARA) <sup>B</sup>	Air Limit	Units	Reference
RSP	Work Area	0.3	0.6	3.0	mg/m <sup>3</sup>	1
TSP	Perimeter	0.1	0.2	1.0	mg/m <sup>3</sup>	1
Radioactivity (Gross Alpha/Beta)	Work Area	6E-13	1.2E-12	6.0E-12	μCi/mL	2
	Perimeter	ND	3E-13	1.5E-12 <sup>C</sup>	μCi/mL	2
Th-230	Work Area	6E-13	1.2E-12	6.0E-12	μCi/mL	2
	Perimeter	ND	3E-13	1.5E-12 <sup>C</sup>	μCi/mL	2
<p>mg/m<sup>3</sup> = milligrams per cubic meter  μCi/mL = microcurie per milliliter  ND = Not Detectable. 10% of the action limit is below the minimum detectable concentration  RSP = respirable suspended particulate  TSP = total suspended particulate  A) 10% of Air Limit.  B) 20% of Air Limit.  C) Adjusted effluent limit to account for ~700-hour project duration and a conservative estimate of 5% occurrence factor for dust emissions.  1) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), 2015.  2) 10 Code of Federal Regulations (CFR) 20, Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage" for thorium 230 (Th-230), used as most conservative surrogate for activity of all radionuclides combined.</p>						

## **2.0 METEOROLOGICAL MONITORING**

A meteorological monitoring station will be deployed to measure general weather conditions during the soils remediation project. The location of the meteorological monitoring station is presented on **Figure 3-1**. A Davis Instruments, Inc. Vantage Pro 2, or equivalent, will be utilized to record general weather conditions, including wind direction, wind speed, relative humidity, and air temperature. This instrument will be deployed during mobilization to gather baseline data and will continue operating for the duration of the soils remediation project.

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### 3.0 PERIMETER AIR MONITORING

Perimeter air monitoring will be conducted at five locations for the soils remediation project. Four locations will be situated at each of the cardinal directions (i.e., north, south, east, and west) around the active excavation areas. One location will be situated at an off-site location, identified by the USACE. The perimeter air monitoring locations situated at each of the cardinal directions will be adjusted as the project progresses, based on the location of active excavation areas. The project is currently planned to begin at Area H and progress west to Area A, with work occurring at clusters of excavation areas where possible. As work continues, the perimeter air monitoring locations will be adjusted to ensure the best configuration to monitor potential emissions throughout the duration of the project. The conceptual perimeter air monitoring locations are presented on **Figure 3-1**. Each perimeter air monitoring location will consist of:

- A real-time monitor to measure and record the concentrations of total suspended particulate (TSP); and
- A high-volume sampler to collect samples (i.e., filters) for radioactivity analysis.

The perimeter air monitoring locations, including one off-site location, will be setup during mobilization to establish baseline conditions for TSP/radioactivity over a period of three days prior to the start of clearing and grubbing activities. Real-time monitoring for TSP is described in Section 3.1, and radioactivity monitoring is described in Section 3.2. Baseline radioactivity monitoring will also include the collection and submittal of two samples (i.e., filters) with the highest, long-lived alpha/beta activities (measured on site) for laboratory analysis. The laboratory analysis of samples for radionuclide COCs are described in the Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP; Plexus, 2019b). The values established by the baseline laboratory samples will be used to evaluate the values of samples collected for laboratory analysis during remedial activities.

#### 3.1 Total Suspended Particulate

An Environmental Beta Attenuation Monitor (E-BAM), manufactured by Met One Instruments, or equivalent, will be used to measure and record TSP concentrations. The E-BAM, or equivalent, will operate continuously throughout the work day at a flow rate of approximately 17 liters per minute (LPM) (0.6 ft<sup>3</sup>/min) using an integral flow meter, pressure sensor, and ambient temperature sensor. TSP concentration measurements will be updated every minute and recorded for averaging over a 15-minute interval. The E-BAM, or equivalent, will continuously upload recorded data to an online database for storage and tracking of TSP concentrations in real-time. If the air monitoring values presented in **Table 1-2** are exceeded, an alarm notification will be sent and appropriate corrective actions will be implemented, as presented in Section 6.0.

#### 3.2 Radioactivity

Perimeter air monitoring locations will be equipped with a high-volume sampler, operating at approximately 150 LPM and equipped with a fixed particulate filter that is exchanged once per work shift. The filter will be subsequently counted on site for gross alpha and beta radioactivity. For a full work shift, air samples will be collected over approximately nine hours, sampling beginning prior to the start of remedial activities each day. Each filter will be counted for two-minutes using an on-site alpha/beta scintillation counter, such as a Ludlum Model 2929 scaler interfaced with a Ludlum Model 43-10-1 alpha/beta scintillation detector mounted above a

sample holder assembly or equivalent detection/sample counting instrument. Filters will be collected and counted each day once the remedial activities have been completed for the day. The filters will then be held and counted again on site 24 hours later to allow for additional decay of short-lived radon progeny that may be present on the filters. The results from the multiple radiation measurements will be used with the modified Kusnetz method to account for longer-lived radon and thoron activity (U.S. Nuclear Regulatory Commission (USNRC), 2002). The contribution from background, as determined by the baseline monitoring, will be subtracted from the result and used to make a final determination of the net long-lived airborne concentrations. This airborne calculation will be compared to the air monitoring values to determine if corrective action is required, as presented in Section 6.0.

If evaluation of monitoring data indicates that ongoing, non-site related activities are having an adverse impact on determining accurate net, long-lived activity, then additional background air samples may be collected in an effort to update background and account for changes in airborne conditions at the site. Net long-lived gross activity on a filter that exceeds the air limit presented in **Table 1-2** will be reported to the Radiation Safety Officer (RSO) who will consult with the Project Certified Health Physicist (CHP) and USACE to determine if the filter should be submitted to the off-site laboratory for radionuclide COC analyses. The laboratory analysis of samples for radionuclide COCs are described in the UFP-QAPP (Plexus, 2019b). The purpose of the laboratory analysis result is to provide an evaluation of potential radiation exposure and to account for the specific radiation dose conversion factors associated with each radionuclide COC.

## **4.0 WORK AREA AIR MONITORING**

Work area air monitoring will be conducted at each of the excavation areas during the soils remediation project. The excavation areas have been identified as Areas A through H and are presented on **Figure 3-1**. Upwind and downwind air monitoring stations will be deployed to evaluate respirable suspended particulate (RSP)/radioactivity levels that may be entering and/or exiting the work areas. The locations of the air monitoring stations will be selected on a daily basis, using careful consideration of current and forecasted meteorological conditions and scheduled activities for the day. The upwind location will be used to monitor potential airborne impacts (e.g., NORM) caused by other on-site or off-site activities unrelated to the excavation activities. The locations of the air monitoring stations will be recorded each day. Monitoring at each air monitoring station will be conducted by:

- A handheld real-time monitor to measure and record the concentrations of RSP; and
- A low-volume sampler to collect samples (i.e., filters) for radioactivity analysis.

A work area air monitoring location, with an upwind and downwind air monitoring station, will be setup during mobilization to establish baseline conditions for RSP/radioactivity levels over a period of three days prior to the start of clearing and grubbing activities. A conceptual illustration of work area monitoring is presented on **Figure 5-1**. Real-time monitoring for RSP is described in Section 4.1, and radioactivity monitoring is described in Section 4.2.

### **4.1 Respirable Suspended Particulates**

A MiniRam PDM-3, manufactured by MIE, or equivalent will be used to measure and record RSP concentrations. The MiniRam PDM-3, or equivalent, will be operated continuously when soil excavation activities are occurring in a given work area. RSP concentration measurements will be recorded for averaging over a 15-minute interval. Data collected by the real-time monitor will be evaluated against the air monitoring values presented in **Table 1-2**. If air monitoring values are exceeded, then corrective actions will be implemented, as presented in Section 6.0.

### **4.2 Radioactivity**

Work area monitoring stations will be equipped with a low-volume sampler, operating at approximately 30 LPM and equipped with a fixed particulate filter that is exchanged once per work shift. The filter will be subsequently counted on site for gross alpha and beta radioactivity. The filter analysis and reporting requirements for radioactivity measurements are the same as those identified for the perimeter air monitoring locations presented in Section 3.2.

### **4.3 Mobile Monitoring**

In addition to the air monitoring that will be conducted at the perimeter and at each of the excavation areas, a mobile RSP monitor will be utilized during the soils remediation project. This monitor will measure RSP levels at the perimeter of the work areas and other site locations to evaluate dust migration and control measures as needed. Data collected by the real-time monitor during mobile perimeter monitoring activities will be evaluated against the air monitoring values presented in **Table 1-2**. If air monitoring values are exceeded, then corrective actions will be implemented, as presented in Section 6.0.

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## **5.0 BREATHING ZONE AIR MONITORING**

Air monitoring for radioactivity in the breathing zone of site workers is not required, based on average soil concentrations (see **Table 1-1**) and using a published mass loading factor of 100 micrograms per cubic meter (USNRC, 1999). Using a highly conservative, worst-case exposure scenario, a maximum internal dose to a site worker is estimated to be less than 0.1% of the 10 CFR 20 Annual Limits on Intake (ALI) for Th-230. If assigning a dose becomes necessary due to measured air concentrations that exceed 10% of the ALI, then Plexus will use work area air monitoring results and conservative exposure assumptions to complete an assessment.

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## 6.0 CORRECTIVE ACTIONS

In the event an air monitoring result exceeds a value as listed in **Table 1-2**, field personnel will notify the Site Safety and Health Officer (SSHO) and others immediately at the time of the observation to initiate an investigation to determine the root cause of the event and to guide corrective actions that may be required to correct the issue. The SSHO and/or RSO will compare the sample results against the values in **Table 1-2**. Meteorological data (e.g., wind direction/speed, relative humidity, and air temperature) and gross alpha and beta results for the upwind air sampler will also be reviewed to evaluate the cause of the potential exceedance. A summary of the corrective actions is provided in **Table 6-1**.

As the work progresses and more data is gathered to allow a full understanding of the relationship between site operations and contamination-producing activities, Plexus may, in consultation with the USACE, revise these corrective actions, as appropriate.

Monitoring results will be immediately reported to the Site Superintendent and the USACE (i.e., COR and resident engineer) when exceedances of response and/or action limits have been confirmed to allow prompt evaluation and response to potential emissions. When necessary, the RSO, SSHO, PM, and USACE will decide when shutdown and startup criteria have been met.

**Table 6-1. Corrective Actions Summary**

Correction Action	Response Level <sup>A</sup> Exceedance	Action Level <sup>B</sup> Exceedance	Air Limit Exceedance
Response	<ul style="list-style-type: none"> <li>Report the elevated result to the SSHO/RSO (as appropriate).</li> <li>Investigate the cause of the event and determine if the result is caused by other activities on-site or offsite, including evaluation of upwind sample results.</li> <li>Evaluate and document DAC-hours if elevated levels are determined to be related to work activities.</li> </ul>	<ul style="list-style-type: none"> <li>Report the elevated result to the SSHO/RSO (as appropriate).</li> <li>Investigate the cause of the event, and determine if upwind activities are the source of the elevated result.</li> <li>Evaluate and document DAC-hours if levels are determined to be related to work activities.</li> <li>Determine if mitigation is required.</li> </ul>	<ul style="list-style-type: none"> <li>Report the elevated result to the Safety and Health Manager/CHP (as appropriate).</li> <li>Review notification requirements to determine if notification of off-site personnel and organizations is required. The SSHO will coordinate with on-site COR.</li> <li>Investigate the cause of the event and determine if mitigation is required.</li> <li>Follow up sampling.</li> </ul>
Mitigation	<ul style="list-style-type: none"> <li>None required.</li> <li>Review the upwind sampler to verify that the upwind results are acceptable.</li> <li>Exchange air filter (RSO discretion).</li> </ul>	<ul style="list-style-type: none"> <li>Deploy dust control measures if determined necessary to prevent sustained condition.</li> <li>Establish weather conditions where excavation and/or loadout is limited.</li> <li>Exchange air filter and add an additional air sampler in the area of interest if necessary. (RSO discretion).</li> </ul>	<ul style="list-style-type: none"> <li>Deploy dust control measures, including water dispersal.</li> <li>Move the excavator or container according to wind direction to minimize dust.</li> <li>Collect new air sample, including any additional samplers determined to be necessary to aid in the investigation. Assumes impact may be due to work activities.</li> </ul>

**Table 6-1. Corrective Actions Summary**

Correction Action	Response Level <sup>A</sup> Exceedance	Action Level <sup>B</sup> Exceedance	Air Limit Exceedance
Documentation	<ul style="list-style-type: none"> <li>Review all potential sources of dust and radioactivity that led to the measured value(s).</li> <li>Document the event and findings of the investigation and root causes. Results will be recorded in the field log book and reported to the USACE.</li> </ul>		
Follow Up	<ul style="list-style-type: none"> <li>Continue monitoring and evaluate follow-up air sample to see if levels have changed.</li> <li>Continue to evaluate and track DAC-hours, including trend analysis to ensure work activities are being conducted in a manner to ensure exposures are maintained below levels that may require bioassay monitoring.</li> <li>Include upwind and downwind results in the logbook. Results will also be included in weekly and monthly reports provided to the USACE.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and evaluate.</li> <li>Evaluate additional/follow-up air samples.</li> <li>Continue to evaluate document DAC-hours and verify mitigation measures are effective at keeping exposures below 200 DAC-hours and ALARA. If site conditions continue to result in levels above 200-DAC-hours, then evaluate the need for bioassay taking into account exposure duration and potential intakes as compared with ALI.</li> <li>Re-evaluate as site conditions change to determine if special (non-routine) bioassay monitoring is necessary based on expected exposure duration and effectiveness of mitigation measures.</li> </ul> <p>Continue mitigation measures (e.g., dust suppression) if required to stabilize site airborne condition. The need to continue mitigation measures will be dependent on follow-up sample results as well as whether or site conditions and/or weather or not site conditions dictate continued dust control.</p> <p>Include upwind and downwind results in the logbook. Results will also be included in weekly and monthly reports provided to the USACE.</p>	<ul style="list-style-type: none"> <li>Submit air filter to radiochemistry laboratory for isotopic analyses (RSO discretion with USACE approval).</li> </ul>
<p>A) 10% of Air Limit. Applicable to work area exceedances as noted in Table 1-2. B) 20% of Air Limit.</p>			

## **7.0 FIELD DOCUMENTATION AND REPORTING**

### **7.1 Field Documentation**

Plexus will maintain a field log book and document measurement device calibration field forms along with periodic data listings. Information to be recorded includes:

- A description of remediation activities associated with any elevated air monitoring measurements;
- Daily site maps showing the locations of each fixed and portable air monitoring station and hand-held monitoring locations for the day;
- Any corrective actions conducted due to elevated real time air monitoring concentrations;
- Sample media collection and receipt dates, conditions, and numbers;
- Copies of the chain-of-custody forms;
- Sampling equipment installation, operation, and removal dates;
- Sampling equipment calibration dates and results;
- General weather conditions;
- Any unusual situations that may affect the samples or sampling; and
- Start and stop times.

### **7.2 Reporting Requirements**

#### **7.2.1 Exposure Notification Plan**

Monitoring results will be immediately reported to the SSHO, RSO, Site Superintendent, and USACE (see **Table 7-1**) when air limits are exceeded to allow prompt evaluation and response to potential emissions that may affect site workers or the surrounding public. The SSHO, RSO, Site Superintendent, and USACE will decide when shutdown and startup criteria have been met.

**Table 7-1. Exposure Notification Contact List**

<b>USACE Personnel</b>	<b>Responsibility</b>	<b>Contact Information</b>
Frank D'Andrea	Contracting Officer	Office: (716) 879-4245
Bryan Miner	Contracting Officer's Representative	Office/Cell: (716) 397-8569
Jeff Rowley	Project Manager	Office: (716) 879-4395 Cell: (716) 430-4159
Emily Shoffstall	Project Engineer	Office: (716) 879-4153
Jeff Hall	Senior Engineer	Office: (716) 879-4272
Neil Miller	Health Physicist	Office: (716) 879-4274
Lisa Berta	Certified Health Physicist	Office: (716) 879-4325
Mark Legeza	Health Physicist	Office: (716) 879-4106

### **7.2.2 Weekly Data Summary**

Plexus will provide the USACE the following weekly data summaries and report:

- Maximum 15-minute average concentrations of real-time RSP/TSP measured at background, perimeter, and work area monitoring locations;
- Average 15-minute wind speed, wind direction, relative humidity, and air temperature data;
- Handheld instrument particulate matter data that triggered a response or action;
- Site activities, including monitoring results for gross alpha and beta filter samples and any values that exceeded the action levels or limits; and.
- Air monitoring station locations.

### **7.2.3 Monthly Data Summary**

Plexus will provide to USACE the following monthly data summaries in electronic format:

- Monthly maximum and average concentrations of RSP/TSP and gross alpha and beta measurements for perimeter and work area monitoring locations;
- If isotopic analyses are deemed necessary, then the monthly report will include maximum and average concentrations of individual radionuclide COCs;
- Site activities, including monitoring results for gross alpha and beta measurements and any values that exceeded the air monitoring values; and
- Perimeter and work area monitoring locations.

### **7.2.4 Final Report**

Plexus will prepare a Perimeter Air Monitoring Report (PAMR) at the conclusion of the perimeter air monitoring program. The PAMR will be included in the Construction Completion Report. The PAMR will provide:

- All real-time monitoring results with the relevant graphical and statistical evaluations;
- All sampling and analytical results with graphical and statistical evaluations;
- All meteorological data with graphical and statistical evaluations;
- A summary of air monitoring results above the air monitoring values, corresponding site activities, and corrective actions taken;
- Figures that identify perimeter and work area monitoring locations associated with each remediation area/phase; and
- Conclusions regarding the perimeter air monitoring program and the potential for exposure as described by the sampling results.

## **8.0 REFERENCES**

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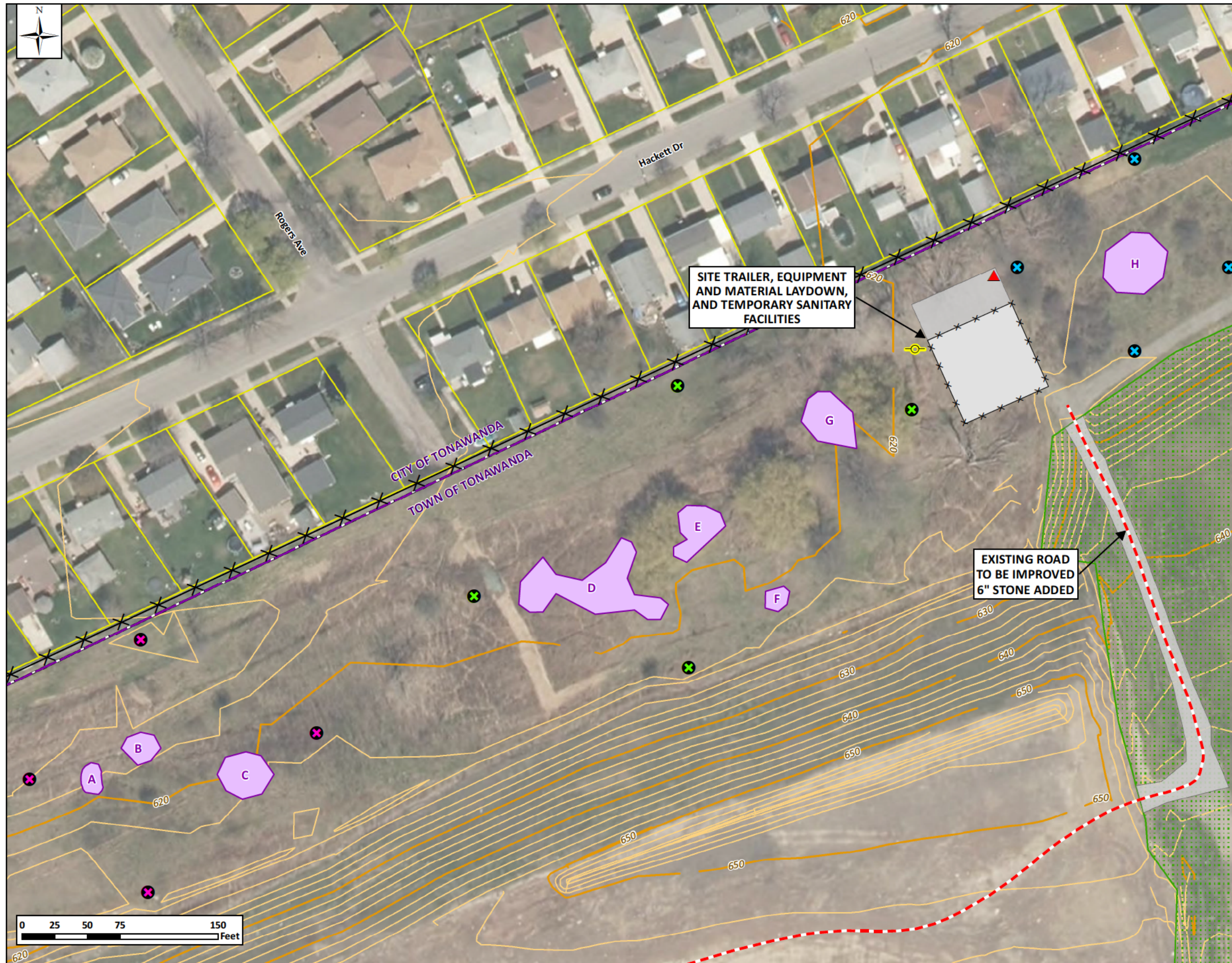


## **FIGURES**

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- Map Key:**
- Municipal Boundary
  - Meteorological Station
  - Initial Perimeter Air Monitoring Location
  - Perimeter Air Monitoring Location - Alternative 1
  - Perimeter Air Monitoring Location - Alternative 2
  - Planned Area of Excavation
  - Equipment Laydown and Temporary Fence
  - Additional Haul Road
  - Topographic Contour (10 ft interval)
  - Topographic Contour (2 ft interval)
  - Parcel Boundary
  - Capped Area
  - Existing Fenceline
  - Approximate Utility Pole Location

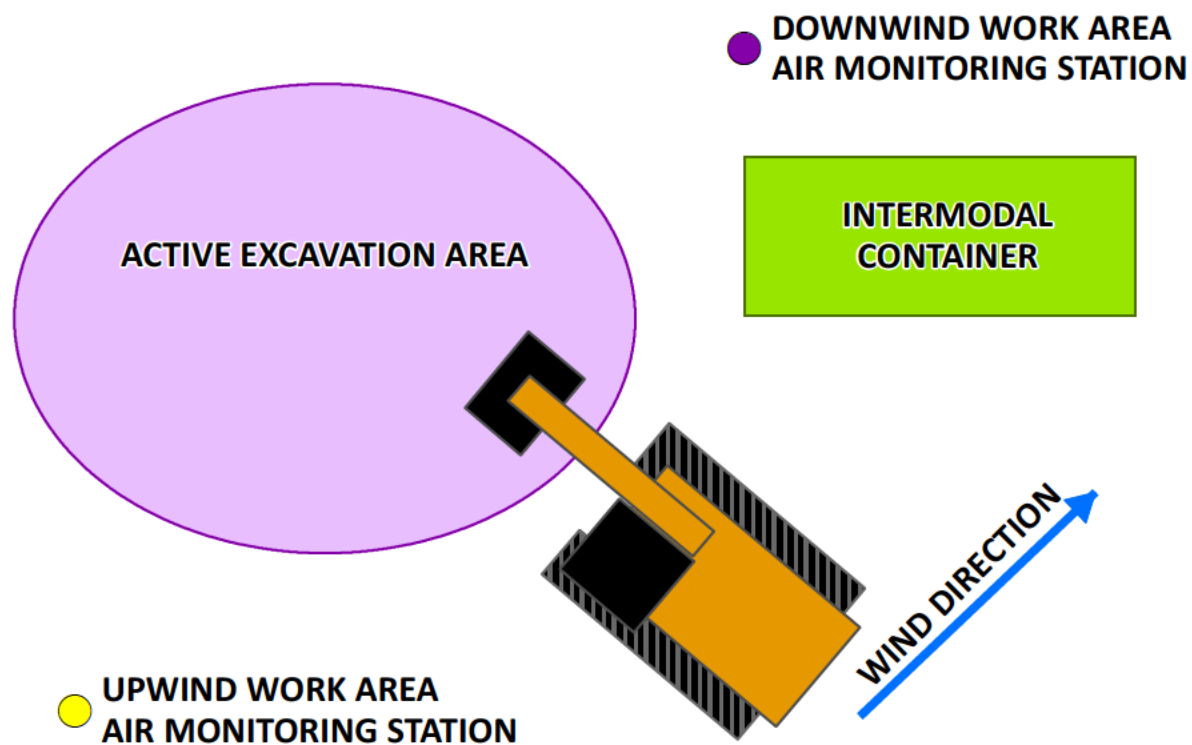
Created By: Betsy Bouton  
Date: May 2019

**FIGURE 3-1**

**Conceptual Meteorological  
and Perimeter  
Air Monitoring Locations**

Perimeter Air Monitoring Plan for  
Tonawanda Landfill Vicinity Property  
Soil Remediation, FUSRAP,  
Erie County, New York





Created By: Betsy Bouton Date: May 2019	<b>FIGURE 5-1</b>
<b>Conceptual Illustration of Work Area Air Monitoring</b>	
Perimeter Air Monitoring Plan for Tonawanda Landfill Vicinity Property Soil Remediation, FUSRAP, Erie County, New York	