**Emerging Contaminants Sampling Plan**
**Oil City / Carousel Center (Destiny) Sites 6, 8 and 9 (C734134, C734136, C734137)**

- In accordance with the NYSDEC Request for Sampling Emerging Contaminants (April 10, 2018), and pursuant to subsequent correspondence with NYSDEC Region 7 personnel regarding groundwater gradients and available wells, three wells on Site 6, two wells on Site 8 and two wells on Site 9 were selected for sampling to provide representative on-site locations and upgradient sampling points. The well locations are shown on the attached figure.

- No private wells exist in the area and public water is supplied to the surrounding area;

- The constituents that will be analyzed for are 1,4-dioxane, by EPA Method 8270 SIM, and the EPA Method 537 analytes identified on the attached method description provided by Alpha Analytical Laboratories;

- Alpha Analytical Laboratories is ELAP certified for Method 8270 and PFOA/PFOS in drinking water. Category B Electronic Data Deliverables will be provided;

- The PFAS sample will be collected prior to the 1,4-dioxane sample and the PFAS containers kept separate;

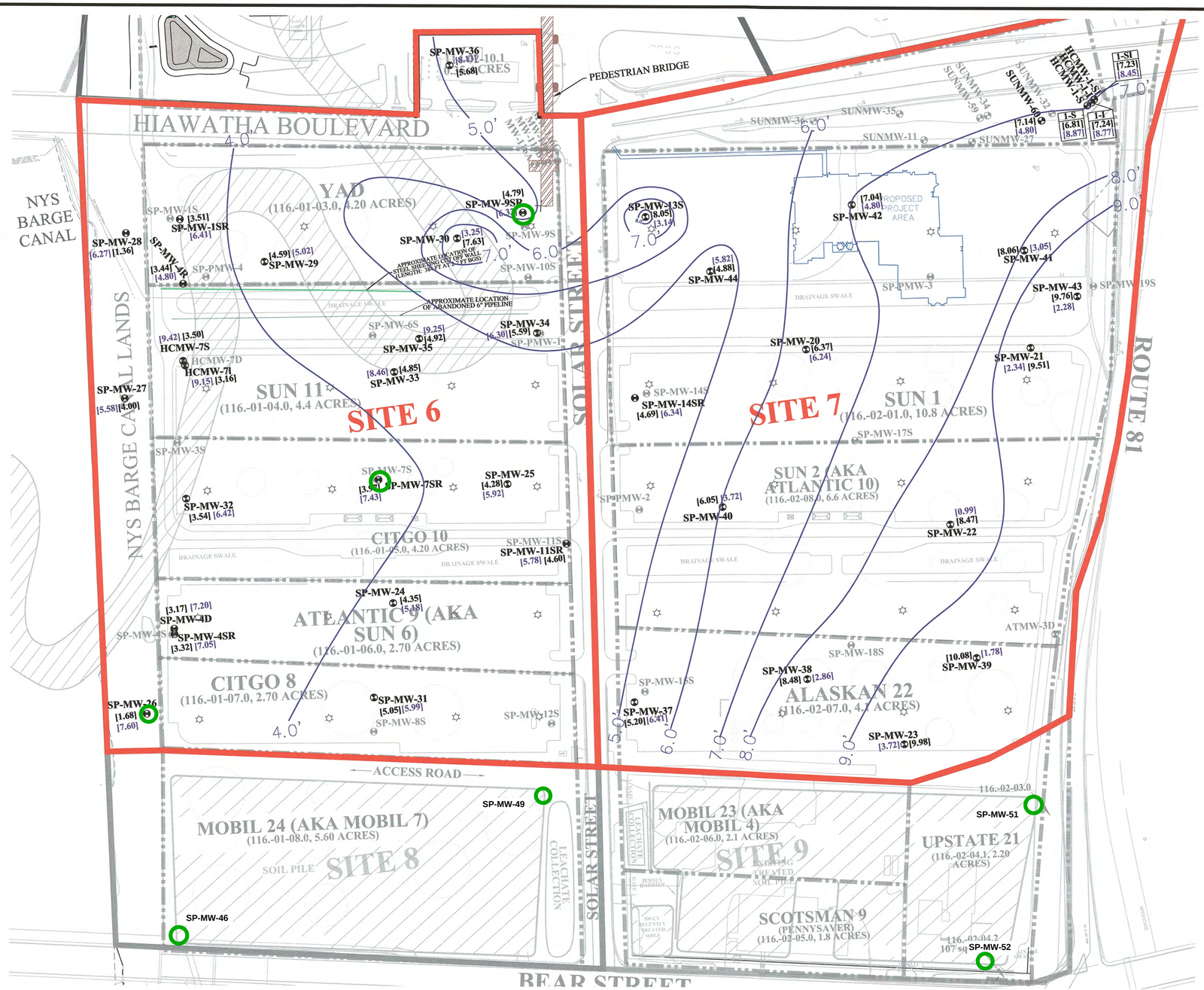
- Total well depth will be measured in each well and compared to the as-built depth. If more than 1-ft of accumulated silt is present in the well, the silt will be removed to 1 foot or less, prior to sampling;

- Sampling will be done using low flow methodology using a peristaltic pump with polypropylene tubing. Water quality parameters, including pH, conductivity, temperature, dissolved oxygen (DO), and turbidity will be measured every 5 minutes during sampling. A minimum of 1 L will be purged between readings, and the sample will be collected after stabilization is achieved (three successive readings within: ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for redox, and ±10% for turbidity and dissolved oxygen) and/or once three (3) well volumes have been purged. Water levels will be made before and after sampling to document drawdown. All sampling equipment, including the water level meter, will be deconned between wells utilizing PFAS-free distilled water;

- A letter report will be submitted to DEC upon completion of the field work and validation of the data; and

- The July 2018 version of DEC's Emerging Contaminant Sampling Guidance is attached for reference. It is noted that the required MDL for 1,4-dioxane has been increased from 0.28 ug/l to 0.35 ug/l.

- One set of quality control samples will be submitted to the laboratory with the field samples. The QC set will consist of one field duplicate, one field blank, one equipment blank, one matrix spike, and one matrix spike duplicate.




## LEGEND

| | |
|---|---|
| SP-MW-42 ⊗ | MONITORING WELL |
| [4.80] | GROUND WATER ELEVATION (AS OF JUNE AND JULY 2013.) |
| [4.80] | DEPTH TO WATER (AS OF JUNE AND JULY 2013.) |
| ——— | GROUND WATER CONTOUR |
| ○ | WELLS TO BE SAMPLED FOR EMERGING CONTAMINANTS |

| NO. | DATE | RECORD OF WORK | DRN | CKD |
|---|---|---|---|---|
| | | | | |

| PROJECT | |
|---|---|
| PROJ. MGR: | FRP |
| PROJ. NO.: | 15209 |
| PREPARED BY: | JCK |
| DRAFTED BY: | JCK |
| CHECKED BY: | |
| APPROVED BY: | |
| DATUM: | |
| CONTOUR INTERVAL = | FEET |

0 25 50 100 200

1"=100'

SITES 6 & 7

*GROUNDWATER ELEVATION CONTOURS*

DESTINY USA

CITY OF SYRACUSE — ONONDAGA CO., NY

SPECTRA ENVIRONMENTAL GROUP, INC.
19 British American Blvd
Latham, N.Y. 12110

| DATE: | 2/11/16 | SCALE: | 1"=100' | DWG. NO. | RIR | FIGURE: | 5 |
|---|---|---|---|---|---|---|---|

## MODIFIED METHOD 537 - PFAS

Alpha Analytical utilizes solid phase extraction (SPE) with liquid chromatography and tandem mass spectrometry (LC/MS/MS) protocols for PFAS analysis of aqueous samples. Alpha will run EPA Method 537 Rev 1.15 (incorporating the EPA Technical Advisory 815-B-16-021) for these samples. Select branched and linear PFAS isomers are properly quantified during analysis and can be reported with a reporting limit of 2 ng/L.

Alpha Analytical holds both DOD ELAP and NELAC certification for both Method 537 as well as our proprietary LC/MS/MS isotope dilution method.

| ANALYTE<br>Perfluoroalkylcarboxylic Acids (EPA Methos 537) | ACRONYM | CAS | Reporting Limit, ng/l |
|---|---|---|---|
| Perfluorohexanoic acid | PFHxA | 307-24-4 | 2.0 |
| Perfluoroheptanoic acid | PFHpA | 375-85-9 | 2.0 |
| Perfluorooctanoic acid | PFOA | 335-67-1 | 2.0 |
| Perfluorononanoic acid | PFNA | 375-95-1 | 2.0 |
| Perfluorodecanoic acid | PFDA | 335-76-2 | 2.0 |
| Perfluoroundecanoic acid | PFUnA | 2058-94-8 | 2.0 |
| Perfluorododecanoic acid | PFDoA | 307-55-1 | 2.0 |
| Perfluorotridecanoic acid | PFTrDA | 72629-94-8 | 2.0 |
| Perfluorotetradecanoic acid | PFTA | 376-06-7 | 2.0 |
| Perfluorobutanesulfonic acid | PFBS | 375-73-5 | 2.0 |
| Perfluorohexanesulfonic acid | PFHxS | 335-46-4 | 2.0 |
| Perfluorooctanesulfonic acid | PFOS | 1763-23-1 | 2.0 |
| N-methyl perfluorooctanesulfonamidoacetic acid | NMeFOSAA | 2355-31-9 | 2.0 |
| N-ethyl perfluorooctanesulfonamidoacetic acid | NEtFOSAA | 2991-50-6 | 2.0 |

## MODIFIED METHOD 8270 SIM W/ISOTOPE DILUTION – 1,4-dioxane

Superior chromatographic performance and greater sensitivity is achieved when Method 8270 is modified for 1,4-dioxane specifically with the mass spectrometer operated in the selected ion mode incorporating the isotope-dilution technique for greater analytical certainty. Isotope dilution techniques incorporate a deuterated form of the target analyte (1,4-dioxane-d8), which is spiked into every sample to act as a target-specific internal standard that is incorporated into the sample quantitation to normalize extraction recoveries. This approach also has the advantage of having no interference from chlorinated solvents as samples can be analyzed from sites with high concentrations of VOCs present with no dilutions required.

# Groundwater Sampling for Emerging Contaminants

**July 2018**

Issue: NYSDEC has committed to analyzing representative groundwater samples at remediation sites for emerging contaminants (1,4-dioxane and PFAS) as described in the below guidance.

## Implementation

NYSDEC project managers will be contacting site owners to schedule sampling for these chemicals. Only groundwater sampling is required. The number of samples required will be similar to the number of samples where "full TAL/TCL sampling" would typically be required in a remedial investigation. If sampling is not feasible (e.g., the site no longer has any monitoring wells in place), sampling may be waived on a site-specific basis after first considering potential sources of these chemicals and whether there are water supplies nearby.

Upon a new site being brought into any program (i.e., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of groundwater as part of the standard "full TAL/TCL" sampling. Until an SCO is established for PFAS, soil samples do not need to be analyzed for PFAS unless groundwater contamination is detected. Separate guidance will be developed to address sites where emerging contaminants are found in the groundwater. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane, which already has an established SCO.

## Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html ,

The work plan should explicitly describe analysis and reporting requirements.

PFAS sample analysis: Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (ex. soil, sediments, and groundwater) are required, by DER, to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101.

Modified EPA Method 537 is the preferred method to use for groundwater samples due to the ability to achieve 2 ng/L (ppt) reporting limits. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve similar reporting limits, the project manager should discuss this with a DER chemist. Note: Reporting limits for PFOA and PFOS should not exceed 2 ng/L.

PFAS sample reporting: DER has developed a PFAS target analyte list (below) with the intent of achieving reporting consistency between labs for commonly reportable analytes. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. This list may be updated in the future as new information is learned and as labs develop new capabilities. If lab and/or matrix specific issues are encountered for any particular compounds, the NYSDEC project manager will make case-by-case decisions as to whether particular analytes may be temporarily or permanently discontinued from analysis for each site. Any technical lab issues should be brought to the attention of a NYSDEC chemist.

Some sampling using this full PFAS target analyte list is needed to understand the nature of contamination. It may also be critical to differentiate PFAS compounds associated with a site from other sources of these chemicals. Like routine refinements to parameter lists based on investigative findings, the full PFAS target analyte list may not be needed for all sampling intended to define the extent of contamination. Project managers may approve a shorter analyte list (e.g., just the UCMR3 list) for some reporting on a case by case basis.

1,4-Dioxane Analysis and Reporting: The method detection limit (MDL) for 1,4-dioxane should be no higher than 0.35 µg/l (ppb). Although ELAP offers certification for both EPA Method 8260 SIM and EPA Method 8270 SIM, DER is advising the use of method 8270 SIM. EPA Method 8270 SIM provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents.

## Full PFAS Target Analyte List

| Group | Chemical Name | Abbreviation | CAS Number |
|---|---|---|---|
| Perfluoroalkyl sulfonates | **Perfluorobutanesulfonic acid** | **PFBS** | **375-73-5** |
| | **Perfluorohexanesulfonic acid** | **PFHxS** | **355-46-4** |
| | Perfluoroheptanesulfonic acid | PFHpS | 375-92-8 |
| | **Perfluorooctanessulfonic acid** | **PFOS** | **1763-23-1** |
| | Perfluorodecanesulfonic acid | PFDS | 335-77-3 |
| Perfluoroalkyl carboxylates | Perfluorobutanoic acid | PFBA | 375-22-4 |
| | Perfluoropentanoic acid | PFPeA | 2706-90-3 |
| | Perfluorohexanoic acid | PFHxA | 307-24-4 |
| | **Perfluoroheptanoic acid** | **PFHpA** | **375-85-9** |
| | **Perfluorooctanoic acid** | **PFOA** | **335-67-1** |
| | **Perfluorononanoic acid** | **PFNA** | **375-95-1** |
| | Perfluorodecanoic acid | PFDA | 335-76-2 |
| | Perfluoroundecanoic acid | PFUA/PFUdA | 2058-94-8 |
| | Perfluorododecanoic acid | PFDoA | 307-55-1 |
| | Perfluorotridecanoic acid | PFTriA/PFTrDA | 72629-94-8 |
| | Perfluorotetradecanoic acid | PFTA/PFTeDA | 376-06-7 |
| Fluorinated Telomer Sulfonates | 6:2 Fluorotelomer sulfonate | 6:2 FTS | 27619-97-2 |
| | 8:2 Fluorotelomer sulfonate | 8:2 FTS | 39108-34-4 |
| Perfluorooctane-sulfonamides | Perfluroroctanesulfonamide | FOSA | 754-91-6 |
| Perfluorooctane-sulfonamidoacetic acids | N-methyl perfluorooctanesulfonamidoacetic acid | N-MeFOSAA | 2355-31-9 |
| | N-ethyl perfluorooctanesulfonamidoacetic acid | N-EtFOSAA | 2991-50-6 |

Bold entries depict the 6 original UCMR3 chemicals