

Appendix N

Environmental Monitoring Plan

**Mill Seat Landfill Expansion
Facility ID No. 8-2648-00014**

Town of Riga, New York



APPENDIX N Environmental Monitoring Plan



February 2015

6 NYCRR Part 360 Permit Application

For the Proposed Mill Seat Landfill Expansion
303 Brew Road
Town of Riga, Monroe County, New York
Facility ID No. 8-2648-0014

Hydrogeologic Report

APPENDIX N
Environmental Monitoring Plan

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Glossary of Terms and Acronyms

6 NYCRR Part 360 Permit Application – In order to modify, the County must demonstrate compliance with the design, construction, operation, and closure requirements of 6 NYCRR Part 360 to demonstrate the expansion’s compliance with current regulations.

6 NYCRR Part 360 – NYSDEC’s solid waste management regulations, codified at 6 NYCRR Part 360 (Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York), effective May 12, 2006.

AMSL – Above Mean Sea Level

ASP – Analytical Services Protocol

B&L – Barton & Loguidice, D.P.C.

County – Monroe County, New York.

CMP – Contingency Monitoring Plan

CSS – Critical Stratigraphic Section

dB – decibel

DO – Dissolved Oxygen

DQO – Data Quality Objective

DQR – Data Quality Reviews

ELAP – Environmental Laboratory Approval Program

EMP – Environmental Monitoring Plan

fasl -- feet above sea level

fbgs -- feet below ground surface

FEIS -- Final Environmental Impact Statement

FIDs -- fracture intensification domains

ft/day – feet per day

GEI - GEI Consultants, Inc. (P.C.)

GWSS – Groundwater suppression system

Hydrogeologic Investigation Area – The area studied for bedrock and groundwater characteristics for siting the Proposed Landfill Expansion. This area stretches across the Proposed Site over the existing monitoring well network and various borings, test pits, and piezometers installed as part of previous and current hydrogeologic investigations. This area stretches north to the existing landfill infrastructure, south across Bovee Road to the Proposed Wetland Mitigation Area, and is bounded to the east and west by Wetlands RG-7 and RG-5, respectively and the Proposed Wetland Mitigation Area property boundaries.

LEL – Lower explosive limit

Leq – Equivalent continuous sound pressure level

LFG – Landfill gas

LFGTE Facility – Landfill gas to energy facility

mg/L – milligram per liter

MCDES – Monroe County Department of Environmental Services

MCDOH – Monroe County Department of Health

MCDPW – Monroe County Department of Public Works

Mill Seat Landfill – Currently permitted landfill and associated operations.

MS/MSD – Matrix Spike/Matrix Spike Duplicate

MSW – Municipal solid waste

NAPLs – Non-Aqueous Phase Liquids

NELAC – National Environmental Laboratory Accrediting Council

NIST – National Institute of Standards and Technology

NYCRR – New York Official Compilation of Codes, Rules and Regulations

NYGWQS – New York Groundwater Quality Standards as provided in Technical and Operational Guidance Series (TOGS) 1.1.1 and in 6 NYCRR Part 703

NYSDEC – New York State Department of Environmental Conservation

NYSDOH – New York State Department of Health

Permitted Footprint – The existing 98.6 acres of the Permitted Site allocated for solid waste disposal within a double composite liner system.

Permitted Site – The land on which the Permitted Footprint and associated support features (including buildings and structures, stormwater ponds, access roads, and borrow areas) is located, and the land included as part of the Landfill Lease Agreement. The Permitted Site totals 485 acres.

PM10 – Particulate matter 10 microns

PQL – Practical Quantitation Limit

Proposed Footprint – The 118.3 acres allocated for solid waste disposal within the proposed double composite liner system in addition to and directly adjacent to the Permitted Footprint.

Proposed Landfill Expansion – The addition of a contiguous footprint to the south of the Permitted Footprint. This defined term is specific to the Proposed Footprint of an additional 118.3 acres, 39.2 acres of overlay onto the Permitted Footprint, and any support features (stormwater management structures, access roads, LFG collection and control infrastructure, and leachate conveyance infrastructure).

QA/QC – Quality Assurance/Quality Control

QAPP – Quality Assurance Project Plan

RQD – Rock Quality Designation

RPD – Relative Percent Difference

S – Surface water monitoring locations

SAP – Site Analytical Plan

SED – Sediment monitoring locations

SOPs – Standard Operating Procedures

SPDES – New York State Pollutant Discharge Elimination System

SRP – Stormwater Retention Pond

SWMF – Solid Waste Management Facility

TSP – Total suspended particulate matter

ug/L – microgram per liter

USEPA – United States Environmental Protection Agency

WMNY – Waste Management of New York, LLC operates the Mill Seat Landfill under a lease agreement with Monroe County.

WQAV – Water Quality Action Value

1. Introduction

This document presents the updated EMP for the Mill Seat Landfill and Proposed Landfill Expansion and is submitted with a 6 NYCRR Part 360 Permit Application for lateral expansion of the Mill Seat Landfill. The EMP provides information necessary to monitor the environmental conditions for the Mill Seat Landfill and the Proposed Landfill Expansion. The development of this EMP is based on a detailed understanding of site conditions obtained from several hydrogeologic studies completed at the Mill Seat Landfill and environmental monitoring data gathered from over 15 years of routine monitoring of landfill systems and environmental media including groundwater, surface water, liquids in landfill systems, ambient air, and noise, performed in accordance with regulatory requirements. The EMP is a stand-alone document but should be read in context with the Hydrogeologic Report (GEI, 2015) for which this document is a component of (i.e., referred to as Appendix N in the Hydrogeologic Report). The EMP was prepared to be consistent with regulations in 6 NYCRR Part 360-2.11(c).

1.1 EMP Organization

Section 1.0 provides general background information for the Mill Seat Landfill and the Proposed Landfill Expansion. Section 2.0 summarizes geologic and hydrogeologic conditions and describes the CSS for the Mill Seat Landfill and Proposed Landfill Expansion. Section 3.0 describes the environmental monitoring program for groundwater, surface water/sediment, landfill systems (including leachate, groundwater suppression, and storm water), ambient air and noise. Section 4.0 presents procedures to evaluate data obtained by the monitoring program. Section 5.0 presents the SAP. Section 6.0 describes laboratory QA/QC and Section 7.0 discusses the data quality review, reporting and recordkeeping procedures.

1.2 Site Background

The Permitted Site is located on 485 acres of land on Brew Road in the Town of Riga, Monroe County, New York (Figure 1) and is owned by the County but operated by WMNY under the landfill's SWMF Permit I.D. 8-2648-0014. The Permitted Footprint is centrally located on approximately 100 acres, with the remaining acreage used for internal roadways, buffer areas, and support facilities (Administration and Maintenance Buildings, retention ponds, leachate collection and pump stations, a Scale House, LFGTE Facility). The Mill Seat Landfill is a state-of-the-art SWMF that is comprised of a double composite liner system with a primary and secondary leachate collection system. The Mill Seat Landfill is receiving MSW, non-hazardous industrial solid waste, and biosolids. The Proposed Footprint is shown on Figure 2 with soil borings, test pits, piezometers, and monitoring wells used to characterize the area.

The remainder of this section summarizes landfill construction of the Permitted Footprint and environmental monitoring performed to comply with regulations in 6 NYCRR Part 360-2.11(c). This section also describes construction, fill progression and environmental monitoring for the Proposed Landfill Expansion.

Permitted Footprint

The Permitted Footprint was developed in a series of Stages, Stage I through Stage IV. Stage IV, located southwest of the pre-existing Stages, is the final remaining landfill Stage to receive waste. All Stages are constructed of multiple double-lined subcells, which are configured to generally drain outwards from the center of the perimeter of the Permitted Footprint. All subcells are gravity drained to perimeter manholes and leachate conveyance piping with the exception of Stage IV. Leachate from Stage IV drains into a common sump and utilize a shared side riser pumping station that removes leachate into the gravity conveyance header along the perimeter of the Permitted Footprint. The leachate is conveyed by the header piping system to pump stations which pump the leachate to the leachate control building for storage in the leachate storage tanks or transfer to the Mill Seat Pump Station. The Mill Seat Pump Station then pumps the leachate to the County's Pure Waters District for final treatment and disposal.

Environmental Monitoring for the Permitted Footprint

In October 1989, the MCDPW prepared an EMP for the Mill Seat Landfill to provide the framework for compliance with the conditions of 6 NYCRR Part 360-2.11(c). The EMP is a resource and a reference document that identifies the specific solid waste management requirements for the Mill Seat Landfill. Prior to the operation of the Mill Seat Landfill in April 1993, the MCDPW revised the October 1989 EMP in November 1989 and September 1990. The EMP was subsequently modified in 2000 and 2003 by O'Brien & Gere and by AMEC Geomatrix in 2011 to achieve environmental monitoring objectives during landfill operations. The 2011 EMP included monitoring of the following:

- Groundwater on-site and off-site;
- Surface water and sediment in adjacent wetlands;
- Hotel Creek surface water and sediment;
- Noise;
- LFG;
- Airborne particulates; and
- Landfill systems including leachate in the primary and liquid in the secondary leachate collection systems, groundwater suppression system {GWSS} drains, and discharge from storm water retention ponds

The environmental monitoring program is implemented on a quarterly basis; however, the first quarter (winter months from January through March) is excluded with an EMP modification and NYSDEC approval in correspondence to the County in 1997 and 1998.

Proposed Landfill Expansion

Construction of the Proposed Landfill Expansion will proceed in a southward progressive manner with the first Stages (designated Stage V) constructed adjacent to the southern boundary of the Permitted Footprint. Portions of Stage V construction will overlap onto the existing Permitted Footprint and will require relocation of the storm water retention pond DP-2 and mitigation of Wetland RG-6. The progression of various Stages of the Proposed Landfill Expansion is shown on Figure 3. The volume of each Stage and/or Subcell and the corresponding estimated site life is shown in the table below.

Stage Development	Acreage	Capacity (CY)	Projected Site Life (Years)*
V-A and VI-A	12.6	1,300,031	1.3
V-B	8.6	2,745,316	2.8
VI-B	13.4	3,940,766	4.1
VII	20.8	4,918,311	5.1
VIII	21.5	5,355,175	5.5
IX-A	21.6	5,769,094	5.9
IX-B	19.8	5,859,366	6.0
Totals	118.3	29,900,000	30.7

* Based on a waste acceptance rate of 776,000 tons per year at a density of 0.80 tons/CY

The initial Proposed Landfill Expansion construction will consist of developing Stages V-A and VI-A located off the southeast corner of the Mill Seat Landfill. It is estimated that construction of the first double composite liner system extension will commence in 2016. Leachate collected from individual Stages of the Proposed Landfill Expansion will be conveyed to Pump Station No. 4 which will be constructed on the north side of the Permitted Footprint. A GWSS will be constructed beneath each stage of the double composite liner system to ensure that the maximum elevation of groundwater is not less than five (5) feet from below the double composite liner system. Pore water drainage will flow via gravity to the side riser building where it will be pumped to the storm water retention ponds. Storm water for the Proposed Landfill Expansion will be collected in two (2) storm water retention ponds (SRP-7 and SRP-8) constructed on the east and south side of the Proposed Footprint.

Environmental Monitoring for the Proposed Landfill Expansion

The Proposed Landfill Expansion will require modification of the 2011 EMP. Additional groundwater monitoring and landfill system monitoring will be required to adequately monitor the Mill Seat Landfill and Proposed Landfill Expansion to comply with 6NYCRR Part 360. The

remainder of this EMP will address monitoring needs for monitoring the Proposed Landfill Expansion and Mill Seat Landfill. It is important to note that fill progression as described above will occur over a period of decades. As a result, the monitoring well network described in Section 3.0 will be installed in phases as fill progression occurs south of the Permitted Footprint to monitor the Proposed Landfill Expansion.

2. Hydrogeologic Setting

The geologic and hydrogeologic discussions presented in this EMP provide a brief description of regional and site conditions. Detailed discussions of the geological conditions are presented in the Hydrogeologic Report for Proposed Landfill Expansion (February, 2015) and in earlier hydrogeologic studies conducted in support of the Mill Seat Landfill.

2.1 Regional Geology and Hydrogeology

The Mill Seat Landfill is situated within the Erie-Ontario Lowlands physiographic province. The region consists of broad plains of relatively low relief, underlain by gently south-southwestward dipping sedimentary bedrock of the early Paleozoic age. The regional bedrock is covered by a veneer of glacially derived sediments that exhibit four (4) distinct glacial successions during the Pleistocene Era. The most visible landforms produced by glacial advances and retreat in the northern portion of central New York State are drumlins. Drumlins shape the topographic landscape in the southern portion of the County as elongated hills. Geologic deposits from drumlin formation occur in the area of the Permitted Footprint and Proposed Footprint.

Bedrock units in western New York strike east-west and dip south-southwest at an angle of 1° to 2° (50 to 80 ft./ mile). Bedrock in the southern portion of the County consists of rock units of the Upper Silurian Salina Group. The bedrock formations contain evaporite lithology (gypsum and halite {salt}) with interbedded dolomite, shale, and mudstone. The Syracuse and Vernon Formations of the Salina Group outcrop in southern Monroe County. Bedrock surface exposures are limited to areas where excavations and streams and creeks have cut through glacial sediment to expose bedrock surfaces.

The bedrock underlying the Permitted Footprint and Proposed Footprint consists of the Vernon Formation. The Vernon Formation is typically a dolomitic shale with dolostone interbeds and has been further subdivided into three (3) units as follows:

- Vernon C Unit (includes a dolostone marker bed known as the CB Horizon)
- Vernon B Unit
- Vernon A Unit

Historic study of the Mill Seat Landfill area prior to site development (H&A, 1989) correlated the site bedrock strata to regional bedrock formations outcropping and subcropping in Monroe, Genesee and Livingston Counties within 15 miles of the Mill Seat Landfill. This was accomplished using correlated salt bed mapping cross-sectional data from Rickard (1969) with rock core description information and litho-density gamma ray logs from deep exploratory well P8S (previously abandoned by H&A) located beneath the Permitted Footprint. This work

correlated the upper 100 feet of bedrock beneath the Permitted Site to regional correlative members within the Vernon Formation. Based on rock core descriptions and gamma ray log information, it was determined that the Proposed Site, including the Proposed Landfill Expansion, overlies the Vernon C Unit of the Vernon Formation.

2.2 Local Geology and Hydrogeology

Glacially-derived materials cover sedimentary bedrock in the Proposed Landfill Expansion and the area surrounding the Mill Seat Landfill. Principal geologic units encountered within the limits of the Mill Seat Landfill and Proposed Landfill Expansion include:

- Isolated surficial sand and gravel deposits
- Coarser grained till
- Dense lodgment till
- Shale and limestone/dolostone bedrock

The greatest natural thickness of unconsolidated materials occurs in the central eastern portion of the Proposed Footprint near Brew Road. Science Hill, located outside the Proposed Footprint near the intersection of Brew and Bovee Roads south of the Proposed Landfill Expansion, is a drumlin with over 40 feet of unconsolidated material. Areas having no or a thin cover of unconsolidated material occur in the southwestern portion of the investigation area in the wetland area of Hotel Creek and along Bovee Road west of the Science Hill drumlin.

The surficial bedrock in the area of the Mill Seat Landfill is the Vernon Formation (C-Horizon). The bedrock is composed of an interbedded shale and limestone/dolostone that frequently exhibits a high degree of weathering near its top and where shale is more prevalent than limestone. In most areas, the weathered bedrock is sufficiently soft to be recovered by a split-spoon sampler and was excavated during test pit excavation. The weathered bedrock is described as a gray to olive brown shale with interbedded clay and resistant layers of limestone. The weathered bedrock zone was typically one (1) to three (3) feet thick and as much as ten (10) feet thick in the south central portion of the Proposed Footprint.

The hydrogeology of the Permitted Footprint and the Proposed Footprint has been characterized as consisting of four (4) designated flow zones and include the following:

- **Water Table:** occurring in the shallow unconsolidated materials generally within seven (7) to ten (10) feet of the ground surface.
- **B Zone:** consisting of the lowermost portions of the unconsolidated overburden and a portion of the upper weathered bedrock.

- **A Zone:** consisting of unweathered portions of the Vernon Shale bedrock generally between 15 and 30 feet below the top of bedrock.
- **Z Zone:** consisting of deeper bedrock intervals generally between 30 and 80 feet below the top of bedrock.

Water Table - Unconfined groundwater conditions are present in the Proposed Landfill Expansion area. When compared to the Mill Seat Landfill, the thicker section of low permeability glacial material in the Proposed Landfill Expansion area allows water table conditions to occur. The geometric mean hydraulic conductivity of the unconsolidated deposits beneath the Proposed Landfill Expansion area is 3.7×10^{-6} cm/s. Below the existing Permitted Footprint, the water table was generally eliminated during the excavation of overburden materials for base grade construction and installation of the GWSS. As landfill development extends into the Proposed Footprint, the relocation of Wetland RG-6, removal of overburden material, and construction of the double composite liner system will eliminate vertical recharge. As a result, the water table in the Proposed Footprint will be lowered to levels corresponding to the B-Zone.

B-Zone – Refers to groundwater occurring in the lower till and shallow weathered bedrock that flows laterally away from the Permitted Footprint and the Proposed Footprint. The saturated thickness of the B-Zone is variable ranging from approximately 15 to 20 feet within the low hydraulically conductive soil located in the central portion of the Proposed Footprint and thins to the south. The B-Zone groundwater flow direction, as shown on Figure 4, is to the northeast and east beneath the Permitted Footprint, east across much of the Proposed Footprint, and southerly toward Wetland RG-5 and Hotel Creek in the extreme southernmost portion of Proposed Landfill Expansion area. Flow is generally horizontal. A geometric mean hydraulic conductivity value of 1.06×10^{-3} cm/s was calculated for wells screening the B-Zone.

A-Zone – Refers to groundwater occurring in bedding plane fractures and vertical and high angle joint sets in the upper 30 feet of bedrock (Vernon Formation). The A-Zone is characterized as the approximate upper 30 to 40 feet of bedrock in the Permitted Footprint and Proposed Footprint. The groundwater flow direction in the A-Zone is shown on Figure 5. A-Zone groundwater elevations are highest in the west-central portion of the Proposed Footprint near monitoring well MW-SEA-1A. From this groundwater high, A-zone groundwater flow is northeasterly beneath the Permitted Footprint and easterly to south easterly across the Proposed Footprint. No definitive vertical groundwater flow direction was observed in bedrock below the Proposed Footprint and flow is generally horizontal. The geometric mean hydraulic conductivity of the A-Zone is 1.0×10^{-3} cm/s.

Z-Zone – Refers to groundwater occurring in deeper, generally unweathered, competent bedrock having lower fracture frequency. Z-Zone groundwater is designated as groundwater flowing in bedrock 40 feet or deeper below the top of bedrock beneath the Permitted Footprint and the

Proposed Footprint. The groundwater flow direction in the Z-Zone is northeasterly beneath the Mill Seat Landfill and easterly beneath the Proposed Footprint as shown on Figure 6. A geometric mean hydraulic conductivity value of 2.09×10^{-4} cm/s was calculated for Z-Zone wells at the Permitted Footprint and the Proposed Footprint. The water chemistry data for the Z-Zone wells show that background groundwater quality in the deeper bedrock contains higher levels of naturally occurring constituents (i.e., primarily bromide, boron, potassium, sodium, chloride and sulfate) than B-Zone and A-Zone groundwater.

Groundwater Usage

The area near the Permitted Site is now serviced with municipal water provided by Monroe County Water Authority. Water lines were constructed in the area during the early 1990s and most of the domestic wells in the area were either decommissioned or are unused. The Monroe County Water Authority conducts inspections once every five (5) years at residential properties where groundwater wells are used for residential irrigation.

Three (3) off-site domestic wells were historically monitored as part of the overall environmental monitoring plan for the Mill Seat Landfill. The current environmental monitoring program has demonstrated that the double composite liner system design incorporated into the Mill Seat Landfill from original construction has been protective of groundwater quality. Based on the distance the domestic wells are from the Mill Seat Landfill, the demonstrated performance of the engineered landfill using double composite liner systems, and comprehensive monitoring network indicating no adverse impacts to groundwater quality at the Mill Seat Landfill, the monitoring of off-site domestic wells will only be needed as a contingency should impacted water quality occur at the Mill Seat Landfill Facility.

2.3 Critical Stratigraphic Section

The CSS below a solid waste facility is defined in 6 NYCRR Part 360 as all stratigraphic units into which contaminants that theoretically escape from the facility might reasonably be expected to enter and cause contamination. For the Permitted Site, previous hydrogeologic investigations defined the CSS as “groundwater flow in the unconsolidated glacial deposits and upper 30 to 40 feet of bedrock.” The detection monitoring well network at the Mill Seat Landfill monitors two (2) distinct sections of the CSS:

- A Zone wells – screened to monitor the lower portion of the CSS, generally between 15 to 30 feet below the top of bedrock; and
- B Zone wells – screened to monitor the upper portion of the CSS that includes the overburden and a portion of the weathered upper bedrock surface.

Based on hydrogeologic studies in the Proposed Landfill Expansion area, the definition of the CSS for the active Mill Seat Landfill described above applies to the Proposed Landfill Expansion area. This conclusion is based on the following observations:

- RQD values increase and fracture frequency decreases in bedrock core retrieved from the deepest wells and geometric mean hydraulic conductivity values calculated from rising head tests are an order of magnitude higher in B-Zone and A-Zone wells (upper 30 to 40 feet of bedrock) compared to deeper Z-Zone wells which indicates preferential groundwater flow in B-Zone and A-Zone well depths.
- Pumping test results for P-8S at the Mill Seat Landfill during the H&A investigation (1989) indicated that groundwater flowing at the bedrock/overburden interface was not in strong hydraulic communication with deeper sections of the pumping well (Z-zone well equivalent).
- Groundwater flow in bedrock is nearly horizontal with little to no vertical component of flow which is demonstrated by very low vertical head gradients.
- Average linear groundwater flow velocity in the Z-Zone bedrock is about 75% lower than the A-Zone flow velocity.
- Deeper bedrock background groundwater chemistry (Z-Zone wells) is substantially elevated in naturally occurring cations (boron, calcium, magnesium, potassium and sodium) and anions (chloride and sulfate) when compared with shallower (B-Zone and A-Zone) groundwater for wells more distant from wetland areas, indicating little mixing between the shallow and deeper bedrock groundwater.

In the unlikely scenario where leachate leakage occurs in either the Mill Seat Landfill or the Proposed Landfill Expansion, the dissolved phase constituents present in leachate would migrate very slowly in low permeability till. Seepage velocities calculated for the groundwater flowing in the till were calculated to flow at a rate of a few inches per year. Attenuation to soil particles and organic matter in the till would further retard the rate of constituent migration. Investigation data indicates water in the till flows toward the upper weathered bedrock (B-Zone). If constituents reached the bottom of the till, they would travel laterally in the B-Zone. Dispersion and diffusion could allow constituents to migrate laterally downward into shallow bedrock groundwater (A-Zone). Groundwater flow in bedrock is uniform and predominantly horizontal. Flow vectors are upward near the wetland areas east of the Permitted Site as evidenced by artesian flow conditions in some existing wells located closest to Wetland RG-7. Dissolved phase constituents present in the A-Zone would not migrate vertically deeper based on essentially horizontal hydraulic gradients measured between the A-Zone and Z-Zone wells and a much greater horizontal flow component. Water quality deeper than 40 feet in the bedrock would not be affected by a hypothetical release of leachate from the Mill Seat Landfill.

3. Environmental Monitoring Program

The following sections describe the environmental monitoring program for the Mill Seat Landfill Facility inclusive of the Mill Seat Landfill and the Proposed Landfill Expansion. The monitoring program describes sampling and monitoring of environmental media. Sampling locations are shown on Figures 7 and 8 and listed in Table 1. The frequency of monitoring is also identified in this section. Where a sampling frequency of quarterly is described, it refers to a frequency of three (3) times per year where the first quarter (winter months from January through March) is omitted at the Mill Seat Landfill (see Section 1.2). Sampling procedures are described in the Site Analytical Plan presented in Section 5.0.

3.1 Groundwater Monitoring

3.1.1 *Groundwater Monitoring Network Description*

The groundwater monitoring network consists of a series of well clusters located around the perimeter of the Permitted Footprint (see Figure 7). Referred to as “M” wells, each cluster incorporates a minimum of one (1) well screened across the overburden-bedrock interface (M-B series wells) and one (1) well screened in the approximate bottom 15 feet of the CSS of the site (M-A series wells). In addition, several well clusters consist of a third, deeper bedrock well (M-Z series wells). With development of the Proposed Landfill Expansion, existing wells associated with the Permitted Footprint M-2A, -2B, and -2Z as well as monitoring wells M-7A and -7B will require decommissioning prior to construction of Proposed Landfill Expansion Stages V-A and Stages VI A & B, respectively. Wells comprising the monitoring network for the Permitted Footprint are summarized on Table 1.

The Proposed Landfill Expansion will require installation of new groundwater monitoring wells to monitor the CSS. Monitoring wells to be installed to monitor groundwater quality at the Proposed Landfill Expansion area are summarized in Table 1 and their proposed locations shown on Figure 7. Monitoring well installation will be conducted in accordance with 6 NYCRR Part 360 2.11(a)(8)(ii), “Construction of Monitoring Wells and Piezometers”.

As discussed in Section 2.2, groundwater in the B-Zone and A-Zone, which comprise the CSS, flows in a northeast direction below the Permitted Footprint. Below the northern and central portions of the Proposed Landfill Expansion (Stages V through VIII), groundwater flows directly east toward Wetland RG-7 and gradually flows in a southeast direction toward the groundwater discharge area associated with Wetland RG-5 and Hotel Creek south of Stage IX. Because the Proposed Landfill Expansion will be constructed in a series of Stages which will take decades to complete (see fill progression schedule in Section 1.2), the monitoring well installations comprising the monitoring network in the Proposed Landfill Expansion would also be phased

with landfill construction. For any Stage of landfill development, monitoring wells must be installed a minimum of one (1) year prior to Stage construction and placement of waste in order to complete the needed collection of background water quality data (see Section 3.1.2). For example, monitoring wells associated with Proposed Landfill Expansion Stages VIII and IX would not be installed until detailed design packages are being prepared for Stage construction. The sequence of monitoring well installation in the Proposed Landfill Expansion area is shown on Table 1.

Water level data collection is an important component of the EMP. The water level data will be used to verify horizontal groundwater flow directions and demonstrate vertical hydraulic gradients between designated flow zones. Therefore, water levels in Z-zone wells and several other wells will be monitored with the Permitted Site and the Proposed Landfill Expansion area during groundwater sampling events (see Section 3.1.4).

3.1.2 Existing (Background) Groundwater Quality Monitoring

The hydrogeologic investigation (report dated February 2015) preliminarily characterized existing groundwater quality in the Proposed Landfill Expansion area. The results found that the groundwater below the Proposed Footprint was similar to water quality characterized in the area of the Permitted Footprint. Before landfill construction and deposition of waste can occur in the Proposed Footprint, a more comprehensive assessment of existing groundwater quality associated with staged landfill construction in the Proposed Landfill Expansion area is required. The assessment will be completed for well installations coincident with staged landfill construction (see Table 1). At a minimum of one (1) or two (2) years before Stage construction, monitoring wells designated to monitor a particular Stage (see Section 3.1.1) will be installed. Each well will be sampled and analyzed on a quarterly basis for the 6NYCRR Part 360 Expanded Parameter List and a minimum of three (3) times for the 6NYCRR Part 360 Baseline Parameter List (see Section 3.1.3 for sample analyses). Analytical data will establish background water quality prior to waste placement. Upon completing these sampling events and determination of Water Quality Action Values (discussed in Section 4.1.1), waste placement in the Stage can occur.

3.1.3 Operational Groundwater Quality Monitoring

Groundwater samples will be collected from monitoring wells identified on Table 1 to monitor groundwater quality of the CSS during landfill operation. Sampling and analysis of groundwater during landfill operation will consist of two (2) quarters of sampling for the 6NYCRR Part 360 Routine Parameter List and one (1) quarter of sampling 6NYCRR Part 360 Baseline Parameter List. The baseline parameter monitoring program will be rotated quarterly. Consistent with prior monitoring of the Permitted Footprint, no sampling activities will occur during the winter quarter (January - March).

As additional Stages are constructed in the Proposed Landfill Expansion area, the fill progression will proceed southward. The *Engineering Report* describing the fill progression plan shows filling and shaping of the southern portion of the Permitted Footprint through completion of Stage VI-B construction. At that time, the sampling frequency of wells monitoring the Permitted Footprint (see Table 1 for list) will be modified. The monitoring frequency will be reduced to a semi-annual basis (i.e., Second Quarter and Fourth Quarter). The parameter list will include one (1) event for the 6NYCRR Part 360 Routine Parameter List and one (1) event for the 6NYCRR Part 360 Baseline Parameter List and will rotate annually.

3.1.4 Water Level Monitoring

Water level measurements will be taken in monitoring wells during sample collection at wells used to monitor operational groundwater quality. In addition, water levels in other wells and piezometers identified in Table 1 will be used to assess horizontal groundwater flow direction and calculate vertical hydraulic gradients at monitoring well clusters. The frequency of water level monitoring will be coincident with groundwater sample collection.

3.1.5 Monitoring Well Decommissioning

As various stages of landfill construction in the Proposed Landfill Expansion area, existing monitoring wells and piezometers not specified for operational monitoring will be decommissioned in accordance with 6NYCRR Part 360. Monitoring wells will be decommissioned by overdrilling, pulling and tremie grouting to surface with a cement/bentonite grout. A decommissioning plan will be provided to the NYSDEC prior to the removal of piezometers and monitoring wells.

3.2 Landfill System Monitoring

Landfill systems in the Mill Seat Landfill and Proposed Landfill Expansion will be monitored for protection of groundwater and surface water. Landfill systems include the leachate collection systems (primary and secondary), groundwater suppression systems, and storm water retention ponds.

3.2.1 Leachate Collection Systems

The Permitted Footprint is constructed with a double composite liner system that collects and conveys leachate out of the landfill Stage. A double composite liner system construction will be used in the Proposed Landfill Expansion (i.e. double composite liner). Leachate samples to be collected from the Mill Seat Landfill (depending on flow) include:

- Stage 1 - Primary leachate - The primary leachate collection system of Stage 1 (L1 Stage 1) will be sampled from the clean out port at Manhole 37P.

- Stage 1 - Secondary leachate - If flow is observed, the secondary leachate collection system of Stage 1 (L2 Stage 1) will be sampled from the clean out port at Manhole 37S
- Stage 2 and 3 - Primary leachate - The primary leachate collection system of Stage 2 and 3 (L1 Stage 2 - 3) will be sampled from the clean out port at Manhole 38P.
- Stage 2 and 3 - Secondary leachate - If flow is observed, the secondary leachate collection system of Stage 2 and 3 (L2 Stage 2 - 3) will be sampled from the secondary lateral outfall at the wet well located at Pump Station 1.
- Stage 4 – Primary leachate – The primary leachate collection system of Stage 4 (S4A-P) will be sampled from the Pump #1 sample tap in the Stage 4 Leachate Riser House
- Stage 4 – Secondary leachate – If flow is observed, the secondary leachate collection system of Stage 4 (S4A-S) will be sampled from the secondary line sample tap in the Stage 4 Leachate Riser House.

Leachate samples to be collected from the constructed Stages in the Proposed Landfill Expansion area (depending on flow) will include samples collected from sample taps of the sideriser pump systems housed in the associated leachate riser house for the following:

- Stage V – Primary leachate (S5A&B-P) and Secondary leachate (S5A&B-S)
- Stage VI – Primary leachate (S6A&B-P) and Secondary leachate (S6A&B-S)
- Stage VII – Primary leachate (S7-P) and Secondary leachate (S7-S)
- Stage VIII – Primary leachate (S8-P) and Secondary leachate (S8-S)
- Stage IX – Primary leachate (S9A&B-P) and Secondary leachate (S9A&B-S)

Leachate system samples are summarized in Table 1. Leachate system samples will be collected on a semi-annual basis (two times per year) and analyzed for the 6NYCRR Part 360 Expanded Parameter List.

3.2.2 Groundwater Suppression Systems

GWSS samples will be collected from gravity flowing discharge points located around the perimeter of the Permitted Footprint (estimated flow rate will be recorded) (designated GW 9 through GW 38) and from the riser house associated with groundwater pumped from the Stage IV underdrain (S4A-U). In the Proposed Footprint, a GWSS will be installed beneath the various Stages during construction. Each GWSS will convey collected groundwater to piping associated with a riser house which will be pumped to the storm water drainage system.

Groundwater samples will be collected from the riser house associated with Stage V through Stage IX designated S5A&B-U through S9A&B-U.

Groundwater samples collected from the operational GWSS will be obtained quarterly, coincident with the monitoring well sampling schedule, with two (2) quarters of sampling for the 6NYCRR Part 360 Routine Parameter List and one (1) quarter of sampling 6NYCRR Part 360 Baseline Parameter List. The baseline parameter monitoring program will be rotated quarterly.

Table 1 summarizes groundwater samples to be collected from the GWSS.

3.2.3 Storm Water Retention Ponds

Two (2) storm water retention ponds (sample IDs: DP-1 and DP-2) are associated with the Mill Seat Landfill. A third storm water retention pond (sample ID: DP-3) was temporarily operational during early stages of Stage IV but has since been decommissioned. Landfill construction in the Proposed Landfill Expansion area will require relocation of the storm water retention pond south of the Permitted Footprint to an area east of the Proposed Footprint (designated as SRP-8) and construction of a storm water retention pond situated at the south side of the Proposed Footprint designated SRP-7 (see Figure 4). Operational monitoring will require the sampling of storm water discharge from each of the three (3) storm water retention ponds (sample IDs: DP-1, SRP-7, and SRP-8) at the gabion structure at the pond's outfall (Figure 7). When flowing, samples will be collected on a quarterly basis and analyzed for parameters consistent with those for groundwater.

3.3 Surface Water/Sediment Monitoring

Surface water and sediment samples will be collected from seven (7) locations in adjacent wetlands and Hotel Creek. Surface water/sediment sampling locations are shown on Figures 7 and Figure 8. Surface water sites include:

- S1 Location in Hotel Creek receiving recharge from Wetland RG-5 near Rt. 490
- S2 Downstream location from the Proposed Landfill Expansion in Hotel Creek
- S3 Wetland RG-7
- S4 Wetland RG-7
- S5 Downstream location from SRP-8 discharge to Hotel Creek
- S6 Drainage area near leachate holding tanks
- S8 Far downstream location in Hotel Creek

Note: Artesian source (A1) was historically referred to as S7

Surface water site S8 in Hotel Creek was historically requested by the Natural Resources Department of the NYSDEC and has been a permit condition for permit renewal applications. In addition to Routine and Baseline sampling conducted in Hotel Creek, monitoring will consist of daily recording of stream temperature from April through December and weekly monitoring for

Dissolved Oxygen on a weekly basis from April through October and monthly in November and December.

Surface water samples will be analyzed quarterly for the 6NYCRR Part 360 Routine Parameter List and 6NYCRR Part 360 Baseline Parameter List as dictated by the groundwater sampling schedule. Sediment samples will be collected at each sampling location when surface water samples are collected and analyzed for the parameter list presented in Section 5.

3.4 Ambient Air Quality Monitoring

Outdoor ambient air quality monitoring has been conducted at the Permitted Site to meet the guidelines specified in 6 NYCRR Part 360-1.14 - Operational requirements for all solid waste management facilities and 6 NYCRR Part 360-2.17 - Landfill operation requirements. Specifically, these regulations are concerned with fugitive dust emissions and impacts from decomposition gases. These regulations were promulgated so landfill activities would not have an adverse impact on public health and safety, the environment, or natural resources.

Ambient air quality monitoring, which includes particulate and explosive gas monitoring, will be conducted at locations shown on Figure 7. To obtain the most representative results, the wind at the time of sampling (prevailing winds) will dictate the placement of monitoring equipment to properly monitor ambient air derived from the Proposed Site. The frequency of ambient air monitoring will be as follows:

- Downwind working face (WF-AA) - Quarterly
- Northern property boundary (N-AA) - Annually
- Eastern downwind area (E-AA) - Annually
- Southern downwind area (S-AA) - Annually
- Western property boundary (W-AA) (typically upwind direction) - Annually

Particulate Monitoring:

To comply with 6NYCRR Part 360-1.14 - Operational requirements for all solid waste management facilities, the requirement states:

“dust must be effectively controlled so that it does not constitute a nuisance or hazard to health, safety, or property. The facility owner or operator must undertake any and all measures as required by the department to maintain and control dust at and emanating from the facility.”

Fugitive dust monitoring will involve quantifying air-borne particulates (dust) in air consistent with dust monitoring protocols specified in NYSDEC DER-10 for Community Air Monitoring Programs using battery-powered, real time particulate monitors. The portable particulate

monitors will have capabilities to monitor simultaneously for total suspended particulate matter (TSP) and respirable particulate matter 10 microns (PM10). Monitoring will be conducted at the locations shown on Figure 7 and at the frequency specified above. Monitoring will be performed for an eight-hour (8-hour) period during working hours and will avoid monitoring on days when precipitation is forecast. Monitoring methods are described in Section 5.

Explosive Gas Monitoring:

In addition to dust, 6 NYCRR Part 360-2.17- Landfill operation requirements states that,

“decomposition gases generated within a landfill must be controlled to avoid hazards to health, safety, or property.”

To meet this requirement, LFG generated at the Mill Seat Landfill is collected and used as feedstock to generate electric power at the LFGTE Facility. LFG collection will also occur in the Proposed Landfill Expansion. To assess the adequacy of LFG collection, explosive gas monitoring will be conducted using an explosive gas monitor. The explosive gas monitoring will include operation of functional dedicated methane alarms at on-site structures including the Administrative Building, Scale House and Maintenance Building, and pump stations and testing for explosive gas each circumstance where site personnel are required to enter a manhole. Explosive gas monitoring in ambient air will be conducted at monitoring location stations shown on Figure 7 using portable explosive gas meters. Monitoring methods are described in Section 5.

3.5 Ambient Noise

Noise monitoring will be performed to establish if noise levels at the Mill Seat Landfill and Proposed Landfill Expansion are in compliance with 6 NYCRR Part 360-1.14 (p) - Operational Requirements for All Solid Waste Management Facilities. Noise monitoring will be conducted quarterly at the six (6) monitoring stations shown on Figure 7. Monitoring will be performed by field staff using a hand held sound level meter. Noise level monitoring will evaluate the equivalent continuous sound pressure level (Leq) measured in decibels (dB). Noise level monitoring methods are described in Section 5.

4. Data Evaluation

This section describes methods to evaluate environmental monitoring data during EMP implementation. Section 5.1.2 identifies reference documents for data comparison criteria described in this section.

4.1 Groundwater

The proposed methods to evaluate groundwater quality at the Permitted Footprint and Proposed Footprint are based on landfill design, detailed understanding of the hydrogeological conditions, and the assessment of groundwater quality data gathered from historical groundwater monitoring. The data evaluation procedures described herein have been previously used to monitor the Permitted Footprint and are consistent with requirements specified in 6NYCRR Part 360.

4.1.1 *Background Monitoring*

Background water quality will be established in the Proposed Landfill Expansion for each monitoring well used to monitor water quality prior to waste placement in Stages V through IX. As described in Section 3.12, new monitoring wells will be installed in the Proposed Landfill Expansion area to monitor specific Stages as landfill construction progresses. Each monitoring well will be sampled a minimum of four (4) times quarterly, once for the Expanded Parameter List and a minimum of three (3) times for the Baseline Parameter List, prior to waste placement. The data collected will be used to calculate a mean concentration for each constituent using all available background monitoring data. Natural and seasonal variability will produce varying concentrations of naturally occurring constituents. Therefore, the standard deviation from the mean will also be determined for each constituent. Water Quality Action Values (WQAVs) will be established for each constituent for each well by adding three (3) standard deviations to the mean concentration. Data from as many sampling events as possible will be used to develop the WQAVs prior to waste placement in the constructed Stage. WQAVs will be used to evaluate operational groundwater monitoring data.

4.1.2 *Operational Monitoring*

Groundwater chemistry at the Permitted Footprint and in the Proposed Landfill Expansion area will continue to be evaluated using intra-well comparisons, a procedure in which chemistry of a sample collected from each monitoring well is evaluated in relation to its own historical data. Operational groundwater monitoring using intra-well data comparisons is common practice and is fully supported by the NYSDEC and USEPA. In addition, intra-well data comparisons are more effective than upgradient to down-gradient comparisons at sites such as the Mill Seat

Landfill where groundwater chemistry is spatially variable both laterally and vertically. Spatial chemical variability at the Permitted Site is caused by the presence of natural mineralized salts and evaporites in bedrock (cations and anions such as sodium potassium, boron, chloride, bromide, and sulfate), upward hydraulic gradients near Wetlands RG-5 and RG-6 that allow higher salt content groundwater to migrate upward into shallower groundwater, and the use of rock salt for application on roads and highways near the Mill Seat Landfill. Natural geochemical variability must be accounted for by the data evaluation methodology. Therefore, intra-well data comparison has been proven effective in adequately monitoring groundwater at the Permitted Footprint for more than two (2) decades.

This data evaluation method primarily supports the assessment of naturally occurring inorganic constituents in groundwater. Since leachate contains low concentrations of organic chemicals as well as inorganic constituents, the detection of organic chemicals in groundwater will be a leading indicator of a release of leachate to groundwater.

Analytical data obtained for groundwater samples collected during landfill operational monitoring (inclusive of the Permitted Footprint and Proposed Footprint) will be evaluated through constituent-specific comparisons to:

- Organic and inorganic constituent detections above Class GA groundwater quality standards and guidance values presented in TOGS 1.1.1 (TOGS Standard)
- WQAVs established during background monitoring of the Permitted Footprint. WQAVs will be established for each proposed well installed to monitor the Proposed Expansion using a minimum four (4) quarters of background water quality data plus subsequent monitoring data available for the well prior to waste placement in the Proposed Landfill Expansion
- Significant increasing chemical constituent concentration data trends either related or unrelated to overall background changes to water quality as observed on time-series plots and the pattern of well trilinear Piper Plots and/or Stiff diagrams changes

If a constituent concentration (non-organic) is above the TOGS standard and WQAV, then the constituent in question will be evaluated for naturally increasing concentrations due to changing background chemistry. If background chemistry has not substantially changed, the well in question will be re-sampled to increase the reliability of the data within 14 days after notification of the NYSDEC. If an organic detection above TOGS standard is determined not to be related to laboratory analytical bias (i.e., false positive), the well will be re-sampled. The re-sampling analyte list will be discussed and agreed upon with the NYSDEC prior to sampling. An evaluation of the geochemical conditions in the secondary leachate collection systems and in GWSS will be immediately undertaken to assess a potential relationship between the anomalous

detection and a potential geochemical change in the landfill system. The re-sampling results will be provided to the NYSDEC within 14-days of receiving re-sampling analytical data.

4.1.3 Alternative Source Demonstration

If re-sampling confirms the condition described in Section 4.1.2 where a constituent concentration is detected above the TOGS standard, above WQAVs, and background constituent concentrations remain stable, further investigation into the cause of the detection will be undertaken. This assessment, known as an Alternative Source Demonstration, will address potential causes of the condition such as changing background conditions, changes due to landfill construction, issues with conveyance piping for leachate and LFG, and issues associated with storm water runoff that are conditions not associated with an integrity issue of landfill liner system and necessitate assessment monitoring (as described in Section 4.1.4. If such a condition is determined to be the cause of the anomalous detected conditions, a report will be completed and submitted to the NYSDEC that describes the results of the geochemical evaluation and the Alternative Source Demonstration.

4.1.4 Assessment Monitoring

Assessment monitoring will be undertaken following the confirmation of the anomalous condition described above. Assessment monitoring will be concurrent with any actions taken during the Alternative Source Demonstration. Assessment monitoring will involve expanding the analytical parameter list from the Routine Parameter List to either the Expanded List or Baseline List depending on the nature of the anomalous detection. For example, if organic chemicals are of concern, then the Expanded Parameter List will be used for the next two (2) quarterly sampling events. If the nature of the anomalous detection is related to inorganic constituents, then the Baseline Parameter List will be used for the next two (2) quarterly sampling events. Nearby wells may be included in the assessment monitoring program should the nature of the anomalous detection suggest an expanded assessment of groundwater chemistry is warranted. The selection of the assessment monitoring parameter list and identification of wells to be included in the assessment monitoring program will be discussed with the NYSDEC. The assessment monitoring results will be documented in the quarterly monitoring reports. Assessment monitoring will be discontinued if the source of the anomalous detection is found to be unrelated to landfill activities or corrective actions address the anomalous detections and water quality returns to pre-condition levels.

4.1.5 Contingency Monitoring

A contingency water quality monitoring program will be developed if:

- The Alternative Source Demonstration does not identify the cause of the anomalous detection; and

- Assessment monitoring continues to confirm the existence of the anomalous condition.

Contingency monitoring efforts under this plan will focus on characterizing the nature and extent of the release and initiate an analysis of corrective actions. Depending on the nature and magnitude of the condition causing the anomalous detections in groundwater, the assessment of groundwater quality farther downgradient from the Permitted Footprint and Proposed Footprint may be warranted. Under conditions requiring implementation of contingency monitoring, a written CMP will be prepared describing a scope of work with sampling and analysis activities to be undertaken to address the anomalous conditions. The CMP will be provided to the NYSDEC for approval prior to implementation. Any additional wells installed to support contingency monitoring will be analyzed twice within 14 days for the Expanded Parameter List to assess existing water quality. Results will be provided to the NYSDEC as outlined in the CMP. Contingency monitoring could also include, but not be limited to: monitoring of additional monitoring wells for an expanded list of parameters; more frequent monitoring of landfill systems (i.e., secondary leachate collections systems, GWSS); additional monitoring of surface water (i.e., nearby wetlands, Hotel Creek); monitoring of off-site selected domestic wells; and systems installed for corrective action.

4.2 Surface Water and Sediment

The results of surface water quality sampling and analysis will be compared with historical data from the same sampling point using one (1) or more of the following: time series plots, Piper Plots, and/or Stiff Diagrams to assess overall changes in surface water quality. Data tables will include comparisons to New York State surface water quality standards and guidance values and New York State Sediment Guidance.

4.3 Landfill Systems

4.3.1 Leachate

Data for samples collected from the primary and secondary leachate collection system will be evaluated for overall changes in leachate quality. Sample results will be compared with historical data using time series, Piper Plots, and/or Stiff Diagrams to assess overall changes in leachate water quality, as required.

4.3.2 Groundwater Suppression System

Data for samples collected from the GWSS will be evaluated for overall changes in quality. Sample results will be compared with historical data using time series, Piper Plots, and/or Stiff Diagrams and New York State groundwater standards and guidance values to assess overall changes in surface water quality.

4.3.3 Storm Water Retention Ponds

The results of water quality sampling and analysis from retention ponds will be compared with historical data from the same sampling point using time series, Piper Plots, and/or Stiff Diagrams to assess overall changes in surface water quality. Data tables will include comparisons to New York State surface water quality standards and guidance values.

4.4 Ambient Air Monitoring

4.4.1 Particulate Monitoring

To assess whether a decrease in ambient air quality has occurred in the area of the Mill Seat Landfill and Proposed Landfill Expansion, the PM₁₀ particulate air quality data will be compared to an action level of 150 ug/m³ (15 minute average). TSP particulate air quality data will be compared to an action level of 250 ug/m³ (8-hour average). While conservative, these shorter-term intervals will provide a real-time assessment of on-site air quality to assess adequacy of landfill operational procedures that promote site health and safety and protection of the public.

4.4.2 Explosive Gas

Explosive gas monitoring focuses on measuring the % of the LEL for methane. The NYSDEC will be notified in accordance with 6 NYCRR Part 360-2.17(f)(3) - Landfill operation requirements if explosive gas is present in excess of 25% of the LEL in structures both on-site and off-site, excluding components of the LFG control recovery system, and/or the LEL at the property boundary.

4.4.3 Noise

Noise levels at the Mill Seat Landfill and Proposed Landfill Expansion will be recorded at noise monitoring stations described in Section 3.5. Leq data will be compared to acceptable noise levels for the facility boundary during landfill working hours, as specified by 6NYCRR Part 1.14(p) - which is Leq 57 dB.

5. Site Analytical Plan

This section of this EMP constitutes the SAP as required under 6NYCRR Part 360-2.11(d) and is subdivided into three (3) subsections and is consistent with the regulations and guidance in TAGM SW-96-09 Development and Review of Site Analytical Plans:

- Data Quality Objectives
- Analytical Quality Assurance/Analytical Quality Control
- Field Sampling Procedures

Laboratory procedures and data quality review are discussed in Sections 6.0 and 7.0, respectively.

5.1 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support the goals of the monitoring program and are determined based upon the end use of the data. The end use of the data collected under this monitoring plan will be to document or monitor the functional performance of the Mill Seat Landfill and Proposed Landfill Expansion systems and to demonstrate to the regulatory agency that there is no adverse impact to the environment related to operation. The users of the data include regulatory agencies, landfill owner, landfill operator and the public (i.e. interested parties and environmental professionals). The DQOs will be met by establishing standardized field and lab procedures. Given that most of these procedures are specified within the regulations, the DQOs are essentially already established by the NYSDEC and will thus be attained by following the regulations. The goals of the various components of the regulations designed to meet the DQOs are discussed below.

5.1.1 *Monitoring Programs*

The primary objective of monitoring program implementation is to demonstrate that landfill operations are not adversely impacting environmental media. A monitoring program has been established to meet this objective.

Existing Water Quality

The goal for Existing Water Quality monitoring (also referred to as background water quality) is to collect and analyze representative groundwater samples such that the data can be used to establish a benchmark for comparison to future sampling events. The collected data will be processed and evaluated for both spatial and temporal variability and will be used to establish WQAVs as described in Section 4.1.1.

Operational Water Quality

The goal of the operational water quality monitoring program is to collect and analyze samples and evaluate the resulting data to determine if groundwater quality at a particular sample location has changed through landfill operation activities. The methods used to evaluate impacts to groundwater are described in Section 4.1.2.

Landfill Systems

The goal of monitoring landfill systems is to assess potential changes in: leachate quality; liquid quality in secondary leachate collection systems; groundwater quality in underdrains and storm water quality discharged from storm water retention ponds. Understanding the quality of liquids in landfill systems is important since it is the primary source of potential impact to site media.

Surface Water/Sediment

The goal of the surface water/ sediment quality monitoring program is to collect and analyze samples to determine if surface water/sediment quality has changed through landfill operation activities.

Ambient Air

The goal of ambient air monitoring is to ensure that particulates (dust) and LFG does not pose a health hazard during landfill operations and to comply with landfill operations regulations in 6NYCRR Part 360.

Noise

The goal of noise monitoring is to ensure compliance with landfill operations regulations in 6NYCRR Part 360-1.14.

5.1.2 Regulatory Programs and Standards

This EMP is written in accordance with 6NYCRR Part 360-2.11(c) and (d) and forms the basis for the environmental monitoring program for the Mill Seat Landfill and Proposed Landfill Expansion. The most current New York State Ambient Water Quality Standards and Guidance Values will be used, in part, to provide a comparative basis for the evaluation of the results of the environmental monitoring program. Applicable water quality regulations, standards, and criteria include:

Groundwater Monitoring Results

- Official Compilation of Codes, Rules, and Regulations of the State of New York, Chapter X, Division of Water Resources, Article 2, Part 703.5 (Classes and Quality Standards for Ground Waters as Applicable to Class GA Waters).
- Maximum Contaminant Levels (MCL's) as established under 40 CFR Part 141 (Safe Drinking Water Act).

Surface Water Monitoring Results

- Official Compilation of Codes, Rules, and Regulations of the State of New York, Chapter X, Division of Water Resources, Article 2, Title 6, Part 701, Classification and Standards of Quality and Purity.

Sediment Monitoring Results

- NYSDEC Technical Guidance for Screening Contaminated Sediments dated November 22, 1993 and January 2014 update

Landfill Operations

- 6NYCRR Part 360-2.17 Operational Requirements for All Solid Waste Management Facilities (applicable to leachate management, dust, landfill gas, noise)

5.1.3 Analytical Parameters and Detection Limits

The analytical parameters for liquids incorporated into this EMP have been subdivided into three (3) groups: Routine Parameters, Baseline Parameters and Expanded Parameters as defined by 6NYCRR Part 360-2.11(c). The analytical methods and detection limits for liquids to be employed for this EMP are presented in Table 2A through 2C. Table 2D presents the analytical methods and detection limits for sediment samples.

5.2 Analytical Quality Assurance/Analytical Quality Control

The following section presents and discusses the analytical objectives and procedures, which will be employed to meet the DQOs.

5.2.1 Analytical Goals and Protocols

The goal of the analytical program is to collect, document, and analyze the environmental samples in accordance with established methods and procedures such that the resulting data is representative of the sample matrix in the field and can be used for comparison to existing environmental conditions and standards. This goal will be accomplished through the assignment of qualified personnel, adherence to established quality control procedures, and the use of standardized methods and protocols for the collection, shipping, and analysis of the environmental samples.

5.2.2 Project Personnel and Responsibilities

The EMP will be implemented and managed by WMNY and the County under the regulatory authority of the NYSDEC. WMNY will be assisted by TestAmerica Laboratories, Inc. of Buffalo, New York (TestAmerica-Buffalo) or another approved sampling contractor, for the

collection and shipment of the samples to the laboratory. Analysis of the samples will be completed by TestAmerica-Buffalo or another laboratory-certified by the NYSDOH ELAP in accordance with the NYSDEC’s ASP.

The following shows affiliates and responsibility participation in this monitoring plan:

Responsibility	Current Affiliation
Program Management	WMNY – Market Area Engineer
Environmental Compliance and Sampling Manager	WMNY – Environmental Compliance Manager
Field Sampling	TestAmerica-Buffalo or approved contractor
Analytical Contact	TestAmerica-Buffalo or certified laboratory

If listed affiliate and responsibility change, a revised table will be provided to the NYSDEC.

5.2.3 Quality Control Procedures and Objectives for Measurement

To ensure that the data generated as a part of the EMP fulfills the needs of the DQOs, quality assurance practices will be maintained both in the field and in the laboratory. Quality control procedures and standards related to the field and laboratory are discussed in greater detail below.

Field Methodologies

It is essential to any monitoring program that samples (i.e., groundwater, surface water, leachate etc.) collected in the field and destined for laboratory analyses be representative of the conditions present at the time of sampling. To ensure sample representativeness and completeness, all sampling procedures will be completed in accordance with the Field Sampling Procedures (Section 5.3) and in Waste Management’s Environmental Media Sampling Procedures Version 1.0 dated March 2012 (Attachment A).

For field-generated data (e.g. temperature, specific conductivity, pH measurements and turbidity measurements), the accuracy and precision of the data will be within the limits of the field instrument. Field instruments will be calibrated, used, and maintained according to the instrument manufacturer's directions and those procedures described in this SAP and Waste Management’s Environmental Media Sampling Procedures.

Field Precision

The precision for field measurements is as follows:

pH meter - consecutive readings should agree within ± 0.2 pH units after the instrument has been field calibrated with standard buffers.

Conductivity meter - consecutive readings of a thermally stable sample should agree within $\pm 5\%$ after the instrument has been calibrated.

Thermometer - consecutive measurements of a given sample should agree to within ± 1 degree Celsius.

Eh Meter - consecutive readings should agree to within ± 0.25 millivolt (Mv). after meter calibration.

Dissolved Oxygen Meter - consecutive readings should agree to within ± 0.2 milligram/liter (mg/l) after meter calibration.

Turbidimeter - consecutive readings should agree to within $\pm 20\%$ after meter calibration.

Particulate Monitor - $\pm 0.1\%$ of reading or 0.001 mg/m^3 ,

Multi-gas - consecutive readings should agree to within $\pm 1\%$ LEL, after meter calibration.

Noise Meter - consecutive readings should agree to within ± 0.1 dB after meter calibration.

Field Accuracy

The objective for accuracy of field measurements is to achieve and maintain factory equipment specifications for the field equipment. Field measurements cannot be assessed for accuracy by spiking the medium with the analytical parameter and measuring the increase in response; therefore, these instruments can only be assessed for accuracy by the response to a known sample (such as calibration standard) used to standardize them. For example, the pH meter is calibrated with buffer solutions traceable to the NIST (formerly the National Bureau of Standards).

Laboratory Certification and Methodologies

TestAmerica-Buffalo is certified under the NELAC Program on an annual basis and audited every two (2) years by NYSDEC. As such all laboratory procedures utilized by TestAmerica have been pre-approved by the NYSDEC. Laboratory procedures will adhere to established analytical method protocols and TestAmerica's SOPs.

Parameters to be tested for as a part of this EMP include the 6NYCRR Part 360 (October 1993) Routine Parameters, Baseline Parameters and Expanded Parameters. Samples will be analyzed following the methods in the NYSDEC ASP or an equivalent method.

The analytical methods and laboratory PQLs are provided in Table 2A to 2D. The quality control procedures and objectives for measurement related to the laboratory are presented in TestAmerica's Laboratory Quality Assurance Manual in Attachment B. A discussion related to

some of these quality assurance measurements is provided below. The laboratory analysis plan is provided in Section 6.0.

Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range are common.

Analytical precision will be assessed by analyzing MS and MSD samples organics and matrix spike and laboratory duplicate samples (inorganics) and determining the RPD.

For all Part 360 Baseline and Expanded Parameter analyses a MS/MSD or laboratory duplicate pair will be collected at a frequency of not less than five (5) percent (one per twenty samples) or one (1) per sampling event, whichever is more frequent.

Total system precision, including field precision will be determined by analyzing duplicate samples collected in the field at the same location. The formula for calculating RPD is as follows:

$$RPD = \{ (V1 - V2) / (V1 + V2) / 2 \} \times 100$$

Where:

RPD	=	Relative Percent Difference.
V1, V2	=	The 2 values obtained by analyzing the duplicate samples or spike and spike recovery values.
V1-V2	=	The absolute value of the difference between the two measurements.
(V1+V2)/2	=	Concentration of analyte obtained by analyzing the sample duplicate or spike recovery.

Accuracy

Accuracy is a measure of the difference between a measured value and the "true" or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material and is expressed as the percent of the known quantity, which is recovered, or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for

any sample set. Sampling accuracy may be determined through the assessment of trip blanks (volatile organics only) for each sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte. The %R for a matrix spike is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

Where:

%R	=	Percent recovery
SSR	=	Concentration of analyte obtained by analyzing the sample plus the spike
SR	=	The background value; i.e., the concentration of the analyte obtained by analyzing the sample.
SA	=	Concentration of the analyte spike added to the sample.

Percent recovery of a laboratory control sample is determined by dividing the measured value by the known value and multiplying by 100.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Dedicated sampling devices will be employed whenever possible, and Waste Management's Environmental Media Sampling Procedures included in Attachment A will be followed. Analysis of trip blanks (volatile organics only) and method blanks will also be performed to monitor for possible sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. The analytical laboratory will follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Finally, samples will be taken and Chain-of-Custody (COC) procedures will be followed to document that contamination of samples has not occurred during container preparation,

shipment, and sampling. Details of COC, and blank/duplicate procedures will be discussed in sections to follow.

Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = (V/T) \times 100$$

Where: %C = Percent completeness
V = Number of measurements judged valid.
T = Total number of measurements.

Comparability

Comparability expresses the degree of confidence with which one (1) data set can be compared to another. The comparability of all data collected for this EMP will be ensured by:

Using identified standard methods for both sampling and analysis phases;

- Requiring traceability of all analytical standards and/or source materials to USEPA or NIST;
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validated flags be used at any time an analytical result is used for any purpose whatsoever.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

5.2.4 Standard Operating Procedures

Standard operating procedures for the field sampling are described Waste Management's Environmental Media Sampling Procedures included in Attachment A.

Standard operating procedures related to the laboratory have been pre-approved by the NYSDOH as part of the NELAP Certification of TestAmerica-Buffalo. All laboratory analytical procedures will be completed in accordance with ASP protocols. The laboratory analysis plan is provided below in Section 6.0.

5.3 Field Sampling Procedures

The following section describes the procedures for collecting and shipping samples for laboratory analysis. Groundwater, surface water and leachate sample collection will follow Waste Management's Environmental Media Sampling Procedures Version 1.0 (Appendix A).

5.3.1 Procedures Prior to Sampling

General procedures followed prior to sample collection at each sampling point are as follows:

1. Locate the sampling point.
2. Observe and record the condition of the sampling point and its surrounding area on a Field Information Form. Information to be noted includes:
 - The condition of monitoring point's identification sign;
 - Recent disturbance in vicinity of sampling point;
 - Condition of the security system for sampling point;
 - Well, tank, or manhole integrity including condition of any cement footing or protective casing. In addition, note physical surroundings, obstructions, or kinks in well casing, water in annular space, grease around top of well on threaded cap, etc.;
 - Weather conditions (i.e., wind direction when sampling for volatiles and note if sampling was performed downwind of an active area); and
 - Evidence of contamination.

Prior to groundwater well purging and sampling, an accurate water level measurement is taken with a portable, conventional electric probe indicator that is triple rinsed with deionized water before each use. A permanent datum is provided at each well location. The water level measurement is recorded on the Field Information Form. Additionally, if previous analytical results suggest the potential presence of NAPLs, the well will be checked for immiscible layers prior to evacuation using an oil water interface probe. Otherwise, any observations of floaters or sinkers will be noted on the field data sheet.

Wells which are not equipped with bladder pumps will have the total well depth determined at least once per year to ensure that the wells are not silting in. The annual readings will be provided in tabular format. Corrective action may be required on the well if it is determined that excessive siltation has occurred in a well.

5.3.2 Sample Collection

Groundwater Sampling

WMNY groundwater monitoring well sampling systems dedicate all purging and sampling equipment to each well, thus minimizing any potential cross-contamination between wells that may be otherwise incurred during conventional water sampling. Samples will be collected using dedicated QED sampling pumps following sampling procedures described in Appendix A.

Field measurements consisting of specific conductance, Eh, pH, turbidity, and groundwater temperature measurements will be measured and recorded after collection of the volatile sample. Procedures provided with the instruments will be used for calibration and testing. All results will be recorded on the Field Information Form.

For the field measurements of Eh, pH, specific conductivity, dissolved oxygen and turbidity, an appropriately calibrated meter such as a Cole Palmer ORPTESTR, Myron L (pH & sc), YSI Model 55 DO Meter and DRT-15C field turbidity meters (or similar) will be utilized. The frequency of calibration of all field parameter measuring equipment will be in accordance with the manufacturer's requirements. If the values obtained are not within the normal range, the WMNY Program Manager will be notified immediately as it may be necessary to resample. The initial sample will not be discarded. Additional samples may be requested by the WMNY Program Manager to ascertain the cause of abnormal readings.

The collected groundwater samples will not be filtered. However, in the event that the turbidity of the sample cannot be reduced to 50 NTUs through sampling techniques or well development, micropurging and/or collection, analysis of both filtered and unfiltered samples for metals parameters may be used. A standard 0.45 micro filter capsule will be used if filtering is required. Once the sample has been collected the sample point will be secured and all sampling disposables will be removed from the area and properly disposed. Samples requiring organic analysis will not be field filtered.

The groundwater parameters which are collected at any site are collected based upon their volatilization sensitivity. The following order is followed by TestAmerica-Buffalo.

1. Volatile Organics
2. Field Readings
3. Total Organic Carbon
4. Extractable Organics
5. Total Metals
6. Phenols
7. Cyanides
8. Wet Chemistry
9. Others

Notes:

- Other samples may be collected and analyzed in addition to those listed above.
- If the monitoring well is very turbid, collections of samples for metals shall be performed immediately after volatile organics to minimize the influence of turbidity.

Surface Water Sampling

Upon arrival at the sampling location the general condition of the sample location and its surroundings will be recorded on a Field information Form. In addition, general sampling point integrity, weather conditions, visible contamination, odors, and unusual surface conditions will be observed. Surface water samples will be obtained as grab samples. Samples will be obtained from near the water surface.

Surface water samples will not be collected during precipitation events. The sampling conditions will be evaluated by the sampling team immediately prior to sample collection. A suitable work area will be set up as close to the sampling station as possible. Individual sample containers will be filled in the same priority order as detailed for groundwater. Sample collection procedures are described in Appendix A.

Sediment Sampling

Upon arrival at the sampling location the general condition of the sample location and its surroundings will be recorded on a Field information Form. In addition, general sampling point integrity, weather conditions, visible contamination, odors, and unusual surface conditions will be observed. Sediment samples will be obtained from the upper five centimeters of sediment. Sediment samples at any location will be collected once the surface water sampling at the location has been completed. As with surface water samples, the sequence for collection of sediment samples will be from the most downstream location to the most upstream location.

Samples will be collected in such a manner as to minimize disturbance of the sediment and minimize washing of the sediment as it is retrieved through the water column. Due to the shallowness of the water column, sediment samples will be collected with a stainless steel spatula. The collected sediment will be placed into a stainless steel bowl and the water will be decanted from the bowl. The process will be repeated until sufficient volume is present to fill required sample jars. The sample material in the bowl will be homogenized. Because none of the samples will be submitted for analysis for volatile organic compounds, constituent loss due to volatilization is not a concern. If analysis is required for volatile organic compounds, a grab sample will be collected. Note the approximate percentages of organic matter and soil particles on the Field Information Form. The mixing bowl and all non-dedicated sampling equipment will be cleaned by washing with a non-phosphate detergent and rinsing with distilled/deionized water. Once the sample has been collected the sample point will be secured and all sampling disposables will be removed from the area and properly disposed.

GWSS Sampling

Upon arrival at the sampling location the general condition of the sample location and its surroundings will be recorded on a Field information Form. In addition, general sampling point integrity, weather conditions, visible contamination, odors, and unusual surface conditions will be observed. At the Permitted Footprint, GWSS discharge points gravity flow (where saturated conditions exist) to swales and surface water drainage ditches. Samples bottles will be placed beneath the flowing discharge point and direct filled. The bottle will not be overfilled to avoid loss of sample preservative. A maximum of three (3) gravity flowing GWSS underdrains will be sampled each quarter. GWSS samples collected from Stage IV through IX will be collected from sample ports in the discharge piping located in the riser housing for each Stage. Samples procedures consistent with those for leachate will be followed (see Appendix A). Specific conductance, pH, redox, and temperature measurements will be obtained in the field immediately following sample collection. Once the sample has been collected the sample point will be secured and all sampling disposables will be removed from the area and properly disposed.

Leachate Sampling

Leachate sampling procedures are described in Appendix A. Upon arrival at the sampling location the general condition of the sample location and its surroundings will be recorded on a Field information Form. Leachate samples will be collected from sample ports off of the sideriser piping at the leachate station pump house. Adequate time for venting between collecting landfill system samples should LFG be present. Leachate should be the last sample collected if pore water and secondary leachate collection systems are sampled.

Particulate Monitoring

Although 6NYCRR Part 360 requirements do not specify a need for particulate monitoring, the current EMP requires monitoring for both TSP and PM10 and was established in 1993 to address 6NYCRR Part 360-1.14(k) which states,

“Dust must be effectively controlled so that it does not constitute a nuisance or hazard to health, safety, or property. The facility owner or operator must undertake any and all measures as required by the department to maintain and control dust at and emanating from the facility.”

A battery-powered particulate monitor (i.e., TSI DustTrak DRX Aerosol Monitor) will be used to monitor PM10 and TSP downwind from the working face of the landfill. Particle measurements of TSP and PM10 will be recorded by the respective unit's data logger at a frequency of one minute intervals. While logging data, the units will display real-time dust measurements.

The monitoring units will be mounted on a tripod during the Mill Seat Landfill and Proposed Landfill Expansion operational hours. The real-time display on the monitor will be periodically observed to review particulate readings when occasional dust is observed generated by occasional truck traffic traveling to the working face on the haul road.

Monitoring of the working face and perimeter monitoring stations will occur over an 8-hour period during sampling.

Explosive Gas Monitoring

Explosive gas concentrations (LEL) at the active working face and perimeter monitoring stations will be performed using a Q-RAE Plus multi-gas meter, or equivalent. The meter utilizes catalytic compensated hydrocarbon sensor and microprocessor electronics to analyze and display explosive gas concentrations. Explosive gas readings (percent methane) will be recorded at five (5) minute intervals over a 15-minute period. Site buildings will be monitored by WMNY using continuous sensors with methane alarms.

Noise Monitoring

Field staff will conduct quarterly monitoring of noise levels at the Mill Seat Landfill and Proposed Landfill Expansion. The measuring instruments that can be used will be:

- Type 1 general purpose sound level meters,
- Type 2 sound level meters, or
- corresponding special sound level meters Type S1A or Type S2A.

The Casella CEL-63X Series sound monitor satisfies both ANSI/IEC Type 1 and 2 accuracy classifications and will be the preferable meter for monitoring. Monitoring of equivalent continuous sound pressure level in dB (Leq) will occur for 15 minutes at each station location during working hours. The average Leq (A-weighted) over the 15 minute interval will be recorded. Observations of environmental conditions should be noted in the field log book.

Field QC Sample

Field QC samples are used to monitor the reproducibility and representativeness of field sampling activities. The field QC samples are handled transported and analyzed in the same manner as the associated field samples. Field QC samples will include trip blanks, field duplicates and MS/MSDs. The quantity, field QC sample type and analysis are discussed in the Laboratory Analysis Plan in Section 6.0.

5.3.3 Sample Preservation, Shipment, and Holding Times

Since multiple analyses will be required, different types of containers and preservatives may be necessary. In these situations, multiple pre-labeled containers will be supplied by the laboratory for each sampling point. The appropriate preservatives will be provided in small vials during sample bottle preparation by the analytical laboratory. The volume requirements, containers, preservatives, and holding times for each parameter are listed in Table 3.

The appropriate sample bottles that have been prepared in the laboratory with the appropriate preservative will be used to collect samples from each location. Containers for collecting

samples for volatile organics analysis will be filled to slightly more than full before the septum and cap are placed on the container to ensure that it is free of head space (sampling personnel will check for air bubbles by inverting the container and tapping it). Following filling and capping the bottles will be inverted to mix the preservatives with the sample.

Immediately after collection, bottles will be placed in insulated shuttles or coolers with ice packs. Volatile organic containers will be arranged such that they do not come into contact with the ice packs. Executed Field Information Forms and Chain-of-Custody Forms will be placed inside the sample coolers and custody sealed. Samples will then be transported to TestAmerica-Buffalo, or other approved laboratory, and will arrive within 48 -hours of collection.

5.3.4 Chain-Of-Custody

At the time each sample is taken, a COC form will be completed by the sampler and placed in the sample chest. Upon transfer of sample possession to subsequent custodians, the COC form will be signed by the person taking custody of the sample container. Upon receipt of samples at the laboratory, the shipping container seal will be broken and the condition of samples, including temperature, will be recorded by the receiver. The COC forms will be included in the analytical report prepared by the laboratory and will be considered an integral part of that report.

As part of the COC procedure, each sample container will be labeled with the sample number and the parameter to be sampled.

All sampling procedures, measurements, and observations will be recorded on the COC forms, including the following information:

- Facility site name, sample point identification number, and other pertinent identifiers;
- Sample method (dedicated bailer or bladder pump, grab, composite, etc.);
- Type of sample and necessary treatment (e.g. filtering, if necessary);
- Sampler's identity and signature;
- Analytical requirements; and
- Other information required by Waste Management's sampling SOPs.

Upon receipt of the samples at the laboratory, the date and time of arrival will be noted on the COC forms. The laboratory receiver will verify that the seal is intact and custody has not been broken, and make note of sample bottle condition on the forms. These forms will be retained by the laboratory and returned with the results of the analysis.

6. Laboratory Analysis Plan

This section describes the procedures for laboratory analysis.

In accordance with 6NYCRR Part 360-2.11(d)(4)(i), TestAmerica is certified by NYSDOH, ELAP to perform ASP laboratory services in the State of New York. TestAmerica will maintain this certification through the analysis of performance samples and routine auditing by NYSDOH as required by ELAP. TestAmerica-Buffalo laboratory has established SOPs relating to the receipt, analysis and reporting of samples. A copy of TestAmerica's Laboratory Quality Manual is included in Attachment B. If a different laboratory is used, a copy of that laboratories quality assurance manual will be submitted to the NYSDEC.

6.1 Program Quality Assurance/Quality Control Procedures

Trip blanks, equipment blanks, field (aka blind) duplicates and matrix spike samples provide quality assurance/quality control measures for the monitoring program.

6.1.1 Trip Blanks

Trip blanks are a required part of the field sampling QA/QC program. They are used to detect contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit, or in the bottle preparation, sample log-in, or sample storage stages at the laboratory. Laboratory method blanks are used during the analytical process to detect any laboratory introduced contamination that may occur during analysis.

Trip blanks are samples of organic-free water (e.g. deionized) prepared at the laboratory. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Trip blank sample bottles must not be opened at any time during this process. Upon return to the laboratory, trip blanks will be analyzed using the same procedures and methods that are used for the collected field samples.

One (1) trip blank will be analyzed for each cooler containing samples to be analyzed for volatile organics. Coolers which do not contain samples for volatile organics analysis will not require a trip blank to be analyzed. The trip blanks will be prepared by the laboratory and placed in the coolers prior to sample collection.

6.1.2 Field Duplicates

Field Duplicate Samples are samples that are submitted from a split of the same sample media. Field duplicates will be used to assess the sampling and analytical reproducibility. Both samples

are collected utilizing the same methods and are submitted for the same laboratory analysis however different sample identification numbers are used.

For Routine, Baseline or Expanded Parameter analysis, field duplicate samples will be collected at a frequency of one (1) per every 20 samples or one (1) per event, whichever is more frequent. These samples will be collected from a randomly selected location, which is known to produce sufficient volumes of water.

6.1.3 Matrix Spike/Duplicate

MS/ MSD Samples are two (2) additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology.

For routine parameter analysis, one (1) matrix spike and one (1) matrix spike duplicate/laboratory duplicate sample will be analyzed per laboratory batch as required by the analytical methods.

For Baseline or Expanded Parameter analysis, one (1) matrix spike and matrix spike duplicate/laboratory duplicate will be collected at a frequency of one (1) per every 20 samples or one (1) per event, whichever is more frequent.

These samples will be collected from a randomly selected location. Groundwater sample locations will be collected from wells which are known to produce sufficient volumes of water.

6.2 Laboratory Quality Control Procedure

The laboratory quality control program has been audited, certified and approved by NYSDEC and describes the mechanisms the laboratory employs to ensure that all data reported meets or exceeds all applicable USEPA and NYSDEC requirements. It describes the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The laboratory quality manual and Test America-Buffalo laboratory SOPs outline the sampling, analysis, and reporting procedures used by the laboratory.

TestAmerica has established specific procedures and checklists for the receipt, storage, and handling of environmental samples to assure their integrity and security. These procedures are discussed in detail in the TestAmerica-Buffalo SOPs and include detailed chain-of-custody records, secured storage and laboratory areas, and the tracking of each sample from its receipt at the lab through data generation and reporting.

The acceptance criteria and frequency for both initial and continuing calibration of the analytical instruments used by TestAmerica are documented in the TestAmerica SOPs and are described in

NYSDEC ASPs. TestAmerica will complete internal data validation for Routine Parameters in accordance with NYDEC requirements.

DQR, or equivalent, are requests submitted to the laboratory to formally review results that differ from historical results, or that exceed certain permit requirements or quality control criteria. The laboratory prepares a formal written response to each DQR explaining the discrepancy. The DQR is the first line of investigation following any anomalous result.

Audits are an important component of the quality assurance program at the laboratory. Audits are conducted by the laboratory. Internal system and performance audits are conducted periodically to ensure adherence by all laboratory departments to the QAPP. External audits are conducted by accrediting agencies or states. These reports are transmitted to department managers for review and response. Corrective measures must be taken for any finding or deficiency found in an internal or external audit.

Corrective action will be necessary if precision or accuracy limits are outside the acceptable limits. In such an event, the following corrective actions may be employed, depending upon the particular situation.

- Calculations are rechecked.
- Sample handling, i.e., digestion, concentration, and/or extraction logs are checked for discrepancies in sample handling.
- Analyte concentration is reviewed to determine if it has severely influenced the reliability of the precision or recovery calculations.
- Instrument and method performance is verified by inspecting data on standard reference materials processed in the same data set.
- Quality control data on the other samples in the data set, including surrogate recovery, internal standards, etc., are reviewed to determine if the problem is method related or sample related.
- If original sample is available, the sample is assessed for homogeneity.
- If sample is unavailable and no explanation for poor quality control results can be determined, additional samples will be obtained. If additional sample is unavailable, the results are issued with a qualification as to their accuracy.

TestAmerica has established procedures and responsibilities for corrective actions as well as a summary of probable sources and suggested corrective actions. These are presented in the TestAmerica SOPs.

6.3 Practical Quantitation Limits (PQL)

WMNY proposes to utilize laboratory-specific PQLs as the reporting limits of applicable low-detection analytes (especially organics). The USEPA developed the concept of the PQL to

address the issue of analytical variability. The PQL concept was developed for compliance with the Safe Drinking Water Act (50 FR 46906, Nov. 13, 1985) where it is defined: "The PQL thus represents the lowest level achievable by good laboratories within specified limits during routine laboratory operating conditions."

Tables 2A through 2D provide the PQLs for laboratory analytes.

6.4 Analytical Methodologies

The analytical methods to be used for the analysis of each parameter are included in Table 3.

7. Data Quality Review, Reporting and Recordkeeping

Prior to submittal of a monitoring report to the NYSDEC, several data evaluation, reporting, and recordkeeping tasks will be implemented. The following sections describe the evaluation, reporting and recordkeeping procedures that are followed upon receipt of the analytical report.

7.1 Data Quality Review

Each analytical report received from the laboratory will undergo two (2) levels of quality management. These quality assessment procedures are described below.

7.1.1 *Initial QA/QC Checks*

Before the data are subjected to statistical analysis, WMNY will evaluate the data by examining the quality control information accompanying the data report from the laboratory. Relevant quality control data include measures of accuracy (percent recovery), precision (RPD), and sample contamination (blank determinations).

Data that fail any of these checks will be flagged for closer evaluation and a DQR. Results of the DQR will be submitted with the analytical data in the routine monitoring report. A brief summary of these relevant quality control data follows. A more complete description is contained in the laboratory QAPP.

Accuracy defines the relationship between the laboratory's measurements of a sample's concentration and the "true", but unknown concentration of the sample. Because the "true" concentration is unknown, accuracy must be measured indirectly by determining the percent recovery of a sample called the MS. The MS is analyzed under the same conditions as the groundwater sample and its concentration is determined. Because the MS has a known concentration its percent recovery can be calculated. It is assumed that the groundwater sample behaves exactly like the MS and thus the "true" concentration of the submitted groundwater sample can be back-calculated. Control criteria for percent recovery are taken from regulatory method requirements.

Precision is the assessment of the variability that can be expected in data that result from the analytical procedures employed. It provides a measure of the reproducibility which is estimated through duplicate measurements of a MS. Two (2) matrix spike samples are prepared as described above, a MS and a MSD. Both spikes are analyzed along with the unknown sample and the RPD between the two (2) spikes is determined. Control criteria for RPD are taken from regulatory method requirements.

The potential for sample contamination is assessed by measurements of "blank" samples. Blanks are samples of ultra-pure laboratory water that are not spiked with any analytes and are carried through the field sampling and laboratory environments. These samples are known as "field," "lab," and "equipment" blanks. It is assumed that any analytes that occur in the field or laboratory which might add to the concentration of the analyte in the sample will be picked up by the blank samples and measured. If any of the analytes of interest are found in the blank samples it is an indication of potential contamination of the unknown sample.

7.1.2 Data Validation

Analytical data will be reviewed by a validator that is not associated with the laboratory that is experienced and qualified in NYSDEC validations.

Five percent (5%) of the analytical data generated for groundwater sampling events for which Baseline or Expanded Parameters are analyzed will be validated. All the NYSDEC Category B QA/QC criteria for five percent (5%) of the samples will be reviewed.

Data will be validated consistent with the Waste Management's Environmental Media Data Validation Procedures and other EPA analytical methods used for sample analysis for the project. Qualifiers added to the data and the conditions for addition of the qualifiers are those specified in EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, "National Functional Guidelines for Inorganic Data Review", dated February, 1994, EPA-540/R-94-013.

7.1.3 Qualitative Data Evaluation

Following the initial QA/QC checks, all data will undergo a second level of review by graphing historical time trends and comparing new results with these historical trends to flag visual outliers or other anomalous data. If a clearly anomalous result is found, a DQR will be initiated with the laboratory to ascertain if laboratory error is involved. In addition, field information will be checked for anomalous occurrences or observations that might help to explain the outlier result.

7.2 Data Reporting Requirements

Data obtained from the environmental monitoring data will be reported to the NYSDEC within 90 days of concluding the sampling event (including DO and temperature monitoring as S-8 in Hotel Creek), unless more rapid reporting is required as a result of significant increases. The reporting of analytical data will be completed in accordance with 6NYCRR Part 360-2.11(c)(5)(iv).

The quarterly reports will include a review of site conditions, tables providing the data and comparisons to NYSDEC groundwater standards, the results of time series graphs and Piper,

Stiff and Ternary diagrams as appropriate, groundwater elevation data, any data quality issues determined by the laboratory or the outside independent data validator for a baseline event and conclusions regarding the presence/absence of significant increases. In addition, leachate quality data (semi-annual), underdrain water quality (for operating underdrains), surface water and sediment quality, ambient air monitoring, and noise monitoring will be submitted with each quarterly report.

An annual report will also be submitted which summarizes the data collected over the previous year, including discussions regarding observed changes in groundwater, surface water, leachate, etc. and will include potentiometric surface maps supporting evaluations of groundwater flow directions.

7.3 Data Record Keeping Requirements

All analytical data are maintained by the laboratory indefinitely. The laboratory ensures that, at each stage of a process where a permanent data record is required, security measures are in place to guarantee the integrity of the data. SOPs are in place for computer security, computer data storage and back-up. In addition, all raw chemical data provided by the laboratory will be available for review upon request.

8. References

AMEC Geomatrix, Inc., 2011. Environmental Monitoring Plan for the Mill Seat Landfill Facility, Revised May 2011.

GEI Consultants, Inc. P.C., 2015. Hydrogeologic Investigation Report – Proposed Mill Seat Expansion, February 2015.

O'Brien & Gere Engineers, Inc. 2003. Environmental Monitoring Plan for the Mill Seat Landfill Facility, September 2003.