FIFTH FIVE-YEAR REVIEW REPORT FOR CORTESE LANDFILL SUPERFUND SITE SULLIVAN COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York
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LIST OF ABBREVIATIONS & ACRONYMS

AS	Air Sparge
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
HHRA	Human-Health Risk Assessment
ICs	Institutional Controls
ISCO	*In-Situ* Chemical Oxidation
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
MNA	Monitored Natural Attenuation
ng/L	Nanograms per Liter
NYSDEC	New York State Department of Environmental Conservation
NAPL	Nonaqueous-Phase Liquid
O&M	Operation and Maintenance
OM&M	Operation, Maintenance, and Monitoring
OU	Operable Unit
PFOA	Perfluorooctanoic Acid
PFAS	Polyfluoroalkyl Substances
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SVE	Soil Vapor Extraction
SVOCs	Semivolatile Organic Compounds
SVI	Soil Vapor Investigation
UU/UE	Unlimited Use and Unrestricted Exposure
VOCs	Volatile Organic Compounds

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Cortese Landfill Superfund Site		
EPA ID: NYD980528475		
Region: 2	**State:** NY	**City/County:** Narrowsburg, New York

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Mark Granger
Author affiliation: EPA
Review period: 9/10/2016 - 2/22/2021
Date of site inspection: 9/24/2020
Type of review: Statutory
Review number: 5
Triggering action date: 9/9/2016
Due date *(five years after triggering action date)*: 9/9/2021

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR for the Cortese Landfill Superfund site pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the site. The triggering action for this statutory FYR is the signature date of the last review, which was September 9, 2016. The FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The work at the site has been divided into four operable units (OUs). OU1, which was completed in 1996, addressed the removal of more than 5,000 drums and associated contaminated soil above the water table from the drum-disposal areas of the landfill. OU2, which involved the capping of the landfill, was completed in 1998. OU3 involves the groundwater contamination at and downgradient of the landfill. Monitoring relative to OU3 is ongoing. OU4 addresses the source contamination present below the water table beneath the former drum-disposal areas. Active treatment relative to OU4 was completed in 2017; a Remedial Action Report for OU4 was completed in 2020. Because the OU1 excavations removed the targeted contaminated materials from the vadose zone, OU1 is not addressed in this FYR. OUs 2, 3, and 4, which are in the operation and maintenance (O&M) phase, are part of this review.

The Cortese Landfill Superfund site FYR was led by Mark Granger, the EPA Remedial Project Manager (RPM). Participants included Kathryn Flynn (EPA hydrogeologist), Lora Smith-Staines, Ph.D. (EPA human-health risk assessor), Michael Clemetson (EPA ecological risk assessor), and Larisa Romanowski (EPA community involvement coordinator). The Cortese Landfill Potentially Responsible Party (PRP) Group was notified of the initiation of the FYR. The FYR began on July 27, 2020.

Site Background

The Cortese Landfill site, located within the Town of Tusten (Hamlet of Narrowsburg), Sullivan County, New York, is bounded to the northeast by a steep bedrock escarpment and to the southwest by a Norfolk Southern railroad embankment. The landfill-side of the railroad embankment and areas to the southeast, east, and northeast are wooded. Along the western perimeter of the landfill is an unpaved road. The unpaved road, which is between the landfill and the railroad embankment, is used by Norfolk Southern employees for access to the railroad tracks. The property encompasses approximately 3.75 acres of land owned by the John Cortese Construction Corp. and another 1.53-acre parcel along the northern margin of the Cortese property owned by the Town of Tusten, which

purchased the property from Mr. Cortese in 1973 (see **Appendix A, Figure 1**). Areas south of the landfill are seasonally flooded as a result of perched water conditions. In addition, there are several small wetlands in the immediate vicinity of the landfill. The Delaware River is located approximately 400 feet west of the landfill.

Six residences are located between the railroad embankment and the Delaware River. The residences are connected to the Narrowsburg public water supply. The water supply is currently provided by three wells, one of which is located approximately 750 feet northwest of the landfill. These wells are hydraulically upgradient or sidegradient of the site and are, thus, not affected by site-related contamination. The National Park Service classifies the Delaware River in the vicinity of the site as a "Wild and Scenic River." The river in this area is used primarily for recreational boating and fishing.

Appendix B, attached, summarizes the documents utilized to prepare this FYR.

For more details related to site background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the site, please refer to:

https://semspub.epa.gov/src/collections/02/SC/NYD980528475

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Following the listing of the site on the National Priorities List, the New York State Department of Environmental Conservation (NYSDEC) oversaw the performance of a remedial investigation (RI) from 1987-1989. The results revealed numerous volatile organic compounds (VOCs), most notably toluene, semivolatile organic compounds (SVOCs)(primarily, polycyclic aromatic hydrocarbons), and metals detected at varying concentrations in site media.

In 1990, after NYSDEC and a PRP, SCA Services, Inc., which had transported wastes to the site, were unable to agree upon appropriate investigative actions, NYSDEC transferred the lead to EPA. EPA subsequently oversaw SCA Services, Inc.'s completion of a test pit program (1991), an ecological assessment (1992), RI field work, including the sampling of surface soil, subsurface soil, sediment, surface water, and groundwater (1993), an RI report (1994), a baseline human health risk assessment (HHRA) and ecological risk assessment (1994), and a feasibility study (FS) report (1994).

The HHRA concluded that an unacceptable risk existed for hypothetical future residents' consumption of groundwater. This risk was, primarily, driven by vinyl chloride and arsenic concentrations in groundwater. The ecological assessment concluded that ecological receptors could be at risk from exposure to contaminants if the site was not remediated.

Response Actions

A Record of Decision (ROD) was signed in 1994 (1994 ROD). The ROD addressed OU1 (the former drum disposal area), OU2 (the landfill cap), and OU3 (groundwater contamination at and downgradient of the landfill). The remedial action objectives (RAOs) specified in the 1994 ROD were:

- restore the aquifer as a potential source of drinking water by reducing contaminant levels downgradient of the landfill to federal and state Maximum Contaminant Levels (MCLs);
- reduce or eliminate the potential for migration of contaminants downgradient of the landfill;
- reduce or eliminate the potential for vadose-zone source areas to release hazardous compounds to groundwater;
- reduce or eliminate any site-related contaminant load on the Delaware River, the embayment, and White's Pond; and
- reduce or eliminate site-related contaminant seeps along the bank of the Delaware River.

The 1994 ROD selected remedy included:

- removal and off-site treatment and/or disposal of the intact-drum disposal areas on the landfill property. Any contaminated soil beneath these drum disposal areas may potentially be removed at this time as well;
- construction of a low permeability cover system over the landfill meeting the requirements of 6 NYCRR Part 360 (Part 360 cap);
- regrading and storm-water management improvements at the landfill;
- extraction and treatment of contaminated groundwater at the site;
- discharge of treated groundwater to the existing Town of Tusten wastewater treatment plant outfall, Delaware River, or reinjection to groundwater;
- implementation of institutional controls (ICs) to protect the integrity of the landfill cover system and to reduce the potential future use of groundwater within the plume area;
- implementation of long-term maintenance of the landfill cap and operation and maintenance of the groundwater extraction and treatment system; and
- long-term groundwater and surface water monitoring to evaluate remedy effectiveness.

A ROD/ROD Amendment, signed in 2010 (2010 ROD/ROD Amendment), modified the OU3 (groundwater) remedy that selected a remedy and addressed source contamination present below the water table beneath the former drum-disposal areas (OU4). The RAOs specified in the 2010 ROD/ROD Amendment were:

- reduce or eliminate the potential for saturated source areas to release contaminants to groundwater;
- restore the aquifer downgradient of the landfill as a potential source of drinking water by reducing contaminant levels to the federal and state MCLs; and
- reduce or eliminate the potential for migration of contaminants downgradient of the landfill.

The modified remedy included the following components:

- air sparging (AS) of the source areas for approximately seven years to remove a significant quantity of the petroleum hydrocarbons and other VOCs;
- collection and discharge to the atmosphere after aboveground treatment, if necessary, of the extracted vapors from the AS wells using soil-vapor extraction (SVE) wells;
- amendment additions, such as ozone, to the AS/SVE system for the final phase of the AS/SVE period;
- employment of a subsurface-stabilization period for up to five years after the AS/SVE program has been completed;
- subsequent application of in-situ chemical oxidation (ISCO), if necessary, potentially including a surfactant enhancement, to address the remaining more recalcitrant source materials;
- monitored natural attenuation (MNA) of the groundwater contamination downgradient from the landfill perimeter; and
- long-term monitoring.

The effectiveness of the source-area remedy was to be determined based upon the attainment of specific performance standards and cleanup goals for each step in the treatment process (*e.g.,* attainment of MNA performance monitoring standards, reduction in constituent concentrations and/or mass flux, *etc.*). Should the selected remedy fail to attain these standards and goals or should its implementation prove impracticable, then groundwater extraction and treatment was to be evaluated as the contingency remedy.

Negotiations between EPA and the PRP Group to carry out the remedial design (RD) and construction of the remedy selected in the 1994 ROD resulted in the entry of a Consent Decree in U.S. District Court in 1996. Negotiations between EPA and the PRP Group to carry out the RD and construction of the source-area remedy and modified groundwater remedy selected in the 2010 ROD/ROD Amendment resulted in the entry of a Consent Decree amendment in U.S. District Court in 2012.

Response Action Implementation

Removal Actions

From November 1995 through January 1996, concurrent with the initiation of the RD, the Town of Tusten conducted a removal action (pursuant to a removal order with EPA) whereby contaminated soils from two lagoons in an area south of the landfill were excavated and disposed of off-site and a 1,200-foot stormwater diversion channel was constructed along the eastern perimeter of the landfill. The stormwater diversion channel diverts most of the storm water toward the wetlands, thereby reducing infiltration into the landfill and, thus, leachate production.

OU1 (Former Drum-Disposal Areas)

In early 1996, approximately 300 drums filled with hazardous liquids, solids, and sludges were excavated from an area south of the landfill adjacent to the lagoons and disposed of off-site. The

broader drum removal component of the selected remedy, which was performed later in 1996, resulted in the excavation from the landfill of more than 5,000 drums, three tractor-trailer loads of hazardous sludge, and 50 dump-truck loads of contaminated soil.

OU2 (Landfill)

Construction of the cap component of the remedy was completed in 1998. A five-acre cap was placed over the landfill consistent with NYSDEC's Part 360 regulations (*i.e.*, geosynthetic, low-permeability liner and drainage components overlain by eighteen inches of cover soil and six inches of topsoil). A vegetative cover was established using a migratory-bird seed mix.

OU3 (Groundwater)

In scoping out the design of the OU3 groundwater extraction-and-treatment system, it was determined that there were logistical problems associated with its construction. These problems included space constraints related to siting the groundwater management system's infrastructure, as well as difficulties related to transmitting the treated effluent either beneath the railroad embankment to the Delaware River or to groundwater. In response to these concerns, after the completion of the cap, considerable efforts were devoted to discerning remedial approaches that would reduce the reliance on the full-scale groundwater extraction-and-treatment system contemplated in the 1994 ROD. These efforts took the form of investigations, studies, and bench- and field-scale pilot treatability testing. These activities resulted in the 2010 ROD/ROD Amendment that changed the OU3 groundwater remedy to MNA (with a groundwater extraction-and-treatment contingency) and created OU4 to address source contamination below the former drum disposal area.

New monitoring wells MW-19, MW-21, and MW-22 were installed in the downgradient area in 2013 to be included in the OU3 groundwater-monitoring network. The OU3 design was completed in 2013 and implemented shortly thereafter.

OU4 (Source Area Beneath Water Table)

While groundwater monitoring after the 1998 installation of the Part 360 cap (OU2) showed significant contaminant declines downgradient of the landfill, continued monitoring showed the decline to be leveling off at concentrations significantly above standards (predominantly, VOCs). The results of a 2001 shallow groundwater hot-spot investigation conducted along the downgradient perimeter of the landfill indicated the potential presence of chlorinated- and non-chlorinated-VOC nonaqueous-phase liquid (NAPL) in the saturated soils beneath the former drum-disposal areas (a primary area located beneath the landfill drum-disposal area and a small, secondary drum-disposal area located south of the landfill adjacent to the septage lagoons). Data from a source-area investigation performed in 2004 showed an area in the soils beneath the primary former drum-disposal area containing previously undocumented sorbed-phase and residual-phase (*i.e.,* NAPL) VOC contamination. Additional source characterization was conducted in 2007 to better evaluate the horizontal and vertical extent of this chlorinated- and non-chlorinated-VOC and petroleum-hydrocarbon source area and to provide data to support the selection and design of

potential *in-situ* source-area treatment technologies. Samples of soil, groundwater, and NAPL were collected in 2009 to conduct ISCO bench-scale treatability testing.

Soil-boring data collected in association with the installation of the AS wells in the secondary source area did not detect material that would constitute a source of contamination to groundwater (*i.e.,* the 1996 drum and lagoon soil-removal effort in conjunction with natural processes had eliminated the source material), obviating the need for AS and SVE in this area. The elimination of the need for treatment in the secondary source area was documented in a 2013 Explanation of Significant Differences for the site.

The RD for the primary source area continued following the treatability study and was completed in March 2012. Construction of the OU4 *in-situ* source-area treatment system began in December 2012 and was completed in September 2013. The effort included the construction of the AS and SVE systems, installation of vapor-phase granular activated carbon units for off-gas treatment, and construction of the amendment-addition/ISCO-injection system. After operating the system from September 2014 through October 2017, the data from the AS/SVE system showed that the mass of VOC contamination being removed declined markedly with time. Having met the site-specific mass-removal metric, the PRP Group requested that the AS/SVE system be turned off. See **Appendix A, Figure 2**, for a trend plot of the SVE effluent data. EPA approved the shutdown request with the understanding that groundwater conditions would be regularly evaluated against rebound metrics provided for in the 2012 RD.

Institutional Controls

The 1994 ROD called for the implementation of ICs to prevent the use of contaminated groundwater at and downgradient from the landfill and to protect the integrity of the Part 360 cap. With respect to groundwater, the entire town, including the affected downgradient area, has drinking water provided by public supplies. ICs in the form of local ordinances restrict the withdrawal of groundwater and prohibit the installation of private wells. Specifically, Local Law #1 restricts groundwater use near the site and Local Law #4 requires public water-supply connections anywhere within the Narrowsburg Sewer and Water District, including properties located downgradient from the site.

With respect to on-property ICs, an easement and a notice to successors in interest to protect the integrity of the cap have been put into place.

The ICs are evaluated in the annual reports as a component of the OU2 operation, maintenance, and monitoring (OM&M) plan. For this review period, ICs have remained in place and no contravention of cap-integrity restrictions were observed. **Table 1**, below, summarizes the implemented ICs.

Table 1: **Summary of Implemented Institutional Controls**

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs needed?	ICs called for in the decision documents?	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	Areas down-gradient of landfill property	Restrict groundwater use	Local Law #1 1996
Groundwater	Yes	Yes	Areas down-gradient of landfill property	Restrict groundwater use via requirement to hookup to public supply	Local Law #4 1998
Landfill cap and related facilities	Yes	Yes	John Cortese Construction Corp. portion of landfill property	Protect integrity of cap	Notice to Successors in Interest October 2015
Landfill cap and related facilities	Yes	Yes	Town portion of landfill property	Protect integrity of cap	Easement September 2016

Systems Operation/Operation & Maintenance

The OM&M plans for the site (*Operation and Maintenance Plan, Remedial Work Element I, Cortese Landfill Site, Narrowsburg, New York,* Golder, March 1997 and *Operation, Maintenance, and Monitoring Plan, Operable Unit 4 Source Areas Operation and Maintenance Plan, Cortese Landfill Site, Narrowsburg, New York, Revision 1,* Golder, July 2014) contain the procedures for inspecting and evaluating the landfill cap, operating and evaluating the AS/SVE systems, maintaining the groundwater monitoring well network, and performing long-term monitoring of groundwater and surface water. The MNA plan (*Monitored Natural Attenuation Remedial Design, Operable Unit 3 Downgradient Groundwater, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, May 2013)* presents the MNA-related monitoring downgradient from the landfill.

Repairs are to be made to the cap, AS/SVE systems, and monitoring network, as necessary, to control effects that might interfere with the performance of the remedy.

The site and related facilities are inspected at least annually as follows:

- the landfill cap is inspected for signs of erosion, excessive settlement, surface water ponding, woody growth, and stressed vegetation;
- the surface water drainage system is inspected for signs of erosion and/or siltation, woody growth, *etc.,* in the swales, constructed wetlands, and ditches;

- the landfill gas venting system is inspected for damage to the vents;
- the site is inspected for vectors and damage is reported;
- groundwater monitoring wells are inspected for ease of locating, operation of locks, damage/vandalism, and the condition of the surface seals;
- the site access gates and fence are inspected for operational locks, vandalism, and damage; and
- the site is inspected for debris, litter, and/or waste.

Groundwater is sampled tri-annually (spring, summer, and fall) for both OU3 and OU4. Surface water is sampled annually in the fall.

As was noted in the "Response Action Implementation" section, above, once the site-specific mass-removal metric was met, in 2017, the AS/SVE system was turned off with the understanding that groundwater conditions would be regularly evaluated against rebound metrics provided for in the 2012 RD.

Potential impacts on the site from climate change were assessed. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region near the site.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in **Table 2**, below.

Table 2: **Protectiveness Determinations/Statements From 2016 Five-Year Review**

OU	Protectiveness Determination	Protectiveness Statement
2	Protective	The **remedy at OU2** (cap) is protective of human health and the environment.
3	Protective	The **remedy at OU3** (downgradient groundwater) is protective of human health and the environment.
4	Protective	The **remedy at OU4** (source area) is protective of human health and the environment.
Sitewide	Protective	The **sitewide remedy** is protective of human health and the environment.

There were no recommendations in the previous FYR report.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification & Involvement

On September 22, 2020, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico

and the U.S. Virgin Islands including the Cortese Landfill site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, a notice of the commencement of the FYR was sent to the town of Tusten by email on January 6, 2021, with a request that the notice be posted in the town hall and on the town webpage. The purpose of the public notice was to inform the community that EPA would be conducting a FYR to ensure that remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the site.

Once the FYR is completed, the FYR report will be made available online (www.epa.gov/superfund/cortese-landfill) and at the site information repositories. The information repositories are maintained at the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York and at the Tusten-Cochecton Library, 198 Bridge Street, Narrowsburg, New York.

Data Review

Groundwater monitoring continues to be performed across the site as called for in the 2014 OM&M plan (OU4) and the 2013 MNA Plan (OU3). SVE effluent data was collected regularly for the duration of the operation of the treatment system (September 2014 through October 2017). Groundwater and SVE-effluent data are included in the annual environmental monitoring reports for the site (see **Appendix B, Reference List**). The results are summarized below.

OU4 (Source Area Beneath Water Table)

Groundwater monitoring data was collected on a triannual schedule for the review period (spring, summer, and fall). In the source area, there are seven groundwater monitoring wells sampled along a transect between the source area and the railroad tracks (see **Appendix A, Figure 3**). The groundwater data indicate that chlorinated and non-chlorinated VOCs, along with chlorinated benzenes, phenolic compounds, and 1,4-dioxane, are the most prevalent contaminants. The highest concentration of total VOCs in the source area during the review period was 880 micrograms per liter (µg/L), measured at former monitoring well EX-1 in July 2019. The highest concentration of total SVOCs in the source area during the review period was 600 µg/L, at monitoring well MW-10, in April 2019. While light nonaqueous phase liquid was observed at three wells in the source area in the past, it has not been detected since May 2016. Arsenic, iron, and manganese are present above background levels in most of the source-area monitoring wells; these metals are probably naturally-occurring and released from the aquifer solids by the reducing conditions in the source-area groundwater. See **Appendix A, Figure 4,** for a trend plot of the OU4 transect monitoring-well data.

Having met the OU4 active-treatment system operation Performance Criterion after three years of operation, EPA approved the shutdown of the AS/SVE system in 2017. With respect to potential rebound of contaminants in groundwater after this shutdown, the Performance Criterion for the OU4 remedy is achievement of a 90% reduction in the baseline mass discharge of total VOCs from the source area transect, as measured against the pre-treatment baseline mass flux at that transect.

See **Appendix A, Figure 2**, for transect locations. Per the protocol outlined in the 2012 RD, total VOC mass discharge was evaluated to determine whether the Performance Criterion was ever exceeded for two consecutive monitoring events following the shutdown. See **Appendix A, Figure 5** for a trend plot of total-VOC mass discharge since April 2014 with a comparison against the Performance Criterion. Those results show that mass discharge from the source area transect has not exceeded the Performance Criterion for two consecutive monitoring events since the end of active treatment operations that ceased in October 2017. In fact, the Performance Criterion has not been exceeded in any monitoring event since July 2016. The OU4 Performance Criterion has been achieved and sustained throughout this review period.

OU3 (Groundwater)

Groundwater monitoring data was collected biannually during the review period (spring and fall). Downgradient of the landfill, transect groundwater monitoring wells are located between the railroad tracks and the Delaware River (see **Appendix A, Figure 3**). VOC and SVOC compounds detected at these wells being similar to the compounds in the source area wells, but at lower concentrations, is an important line of evidence that MNA is occurring. Further lines of evidence regarding MNA include the presence trichlorobenzenes in the source area but monochlorbenzene downgradient, and the presence of the degradation products chloroethane and cis-1,2-DCE in the downgradient area. The highest total VOC concentration in OU3 during the review period was 380 µg/L at monitoring well MW-6A, sampled in October 2019. The highest total SVOC concentration in OU3 during the review period was 93 µg/L at MW-21 in April 2017. In general, total OU3 VOC concentrations continue to be relatively stable or are trending downward. Further, while contaminant concentrations during the last FYR period related to OU3 were approximately ten times lower than those associated with the OU4 source area, with steep declines in contaminant levels for OU4 due to the mass removal attributable to the effectiveness of the AS/SVE system, this ratio is now much lower for this FYR period (*i.e.,* maximum total concentrations at OU3 are now only about two times lower than those at OU4). See **Appendix A, Figure 6,** for a trend plot of the OU3 transect monitoring-well data.

Data collected from the public drinking-water supply well located closest to the site continues to show that site-related contamination is not affecting or threatening it. Data collected from monitoring wells located between the landfill plume and this hydraulically-sidegradient water supply well (*i.e.,* monitoring wells MW-5 and MW-3A/B) have historically confirmed that the public supply well is not affected by the plume.

Emerging Contaminants

Emerging contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) were analyzed per the request of NYSDEC in groundwater samples collected during the review period. While stable and consistent with historical results, 1,4-dioxane is present in monitoring wells in the source area (OU4) at concentrations exceeding the NYSDEC cleanup goal of 1 µg/L.[1] The highest concentration was at monitoring well MW-10 (590 µg/L, April 2019). In downgradient (OU3) groundwater, the concentration of 1,4-dioxane along the downgradient transect ranged from 8 to 17 µg/L (averaging 12 µg/L) in April 2019. While concentrations were notably lower than

[1] Note that the NYSDEC cleanup goal is not a performance standard per the 1994 or 2010 RODs.

those in the source-area wells, they exceed the NYS MCL. As with the source-area wells, concentrations were stable and consistent with historical results. PFAS compounds were analyzed in June 2019. The only PFAS contaminant that exceeded New York State's drinking water standard of 10 nanograms per liter (ng/L) was perfluorooctanoic acid (PFOA). The wells with PFOA exceedances were well EX-1 located in the source area at 73 ng/L and downgradient monitoring well MW-18B at 15 ng/L. PFAS compound 6:2 fluorotelomer sulfonate (there is no MCL or other screening level to compare this compound with) was detected in samples from downgradient monitoring well MW-3B (which is closest to the town drinking water well). Because the compound was also detected in upgradient monitoring well MW-4B at a similar concentration and was not detected in former extraction well EX-1 or monitoring well MW-18B, which are in the source area and downgradient plume, respectively, it was concluded that it is not site-related. Sampling for 1,4-dioxane occurs annually as part of the regular sampling program. EPA will continue to work with NYSDEC to determine if further sampling for PFAS is necessary.

Surface Water

Surface water samples from the Delaware River are collected during the fall monitoring event from upstream and downstream locations when the river is at low flow conditions. VOCs and SVOCs have not been detected in the downstream location since 2009.

Summary

The highest concentrations of VOCs and SVOCs are found in the shallow groundwater near the source area, but in the downgradient wells the contamination is found deeper in the intermediate zone of the aquifer. The data shows that the groundwater plume is bounded laterally to the north by monitoring well MW-5 and to the south by monitoring well MW-2A/B (see **Appendix A, Figure 3**). While the lateral extent of the plume remains stable, the magnitude of contaminant concentrations within these bounds has dropped sharply (more than an order of magnitude). Changes in this plume architecture in the context of effectively running the AS/SVE system are illustrated in **Appendix A, Figures 7 and 8**. The plume discharges into the Delaware River, but VOCs and SVOCs have not been detected in the downstream location under baseline-flow conditions since 2009. In addition, samples collected from the public drinking-water supply well located closest to the site continue to show that site-related contamination is not affecting or threatening the public drinking-water supply.

Site Inspection

An inspection of the site was conducted on September 24, 2020. In attendance were EPA RPM Mark Granger and Cristine Vinciguerra of Geosyntec, representing the PRP Group. The purpose of the inspection was to assess the protectiveness of the remedy. The cap, swales, treatment systems, fencing, vents, roadways, wetlands, monitoring wells, and other closure-related facilities were all in good repair at the time of the inspection.

V. TECHNICAL ASSESSMENT

QUESTION A: *Is the remedy functioning as intended by the decision documents?*

The 1994 ROD called for, among other things, the construction of storm-water management improvements, excavation and disposal of contaminated materials from the drum trenches and septage lagoons, installation of a Part 360 cap, and groundwater extraction and treatment. The OU1 drum-trench excavations removed the targeted contaminated materials from the vadose zone and, therefore, OU1 is not addressed in this FYR. Contamination remaining below the vadose zone in the landfill drum-trench area is addressed as OU4 (source areas). The purpose of capping of the landfill was to minimize the infiltration of rainfall and snowmelt into the landfill, thereby reducing the potential for contaminants leaching from the landfill into the groundwater and negatively impacting groundwater and surface-water quality. Capping was also intended to prevent direct contact exposure to contaminants. The landfill cap and storm-water-management aspects of the remedy have been successfully completed, are being appropriately maintained, and are functioning as intended.

The 1994 ROD and 2010 ROD/ROD Amendment identified a restoration goal for the aquifer downgradient of the landfill. This included MNA of the downgradient plume and AS/SVE and ISCO (if necessary) to address the source area beneath the former drum-disposal area. The AS/SVE remedy was completed and MNA is currently underway. These remedies are functioning as intended. The groundwater-monitoring data from OU3 and OU4 collected during the review period indicate that the highest concentrations of VOCs are found in the shallow groundwater near the source area, that contaminant levels have steeply declined there, that the plume architecture is sharply diminished, and that in the downgradient wells (where contamination is much lower) there is a continued downward trend (see **Appendix A, Figure 4** and **Figures 6 through 8)**. The 2010 ROD anticipated that MNA would take approximately 15 years. While difficult to predict at this time, it is clear that MNA has been well established, that degradation of primary contaminants is occuring, and that there is a continued downward trend in the downgradient wells, all favorable conditions toward meeting the groundwater cleanup objectives. In addition, samples collected from the public drinking-water supply well located closest to the site continue to show that site-related contamination is not affecting or threatening the public drinking-water supply.

On-property ICs to protect the integrity of the landfill cap are also in place. The off-property ICs in the form of local ordinances have been put in place that restrict the withdrawal of groundwater downgradient from the landfill for any purpose and prohibit the installation of private wells. These ICs are confirmed to be in place annually as part of O&M.

QUESTION B: *Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*

The exposure assumptions and toxicity values that were used to estimate cancer risks and noncancer hazards in the risk assessment supporting the 1994 ROD and the 2010 ROD/ROD Amendment for human health followed the *Risk Assessment Guidance for Superfund* used by EPA. The process that was used in the human-health risk assessment is still valid. While there are no

completed exposure pathways at the site, continued evaluation of groundwater downgradient of the landfill will be performed until groundwater cleanup levels are attained.

As noted in the HHRA, the greatest potential future carcinogenic risk and noncarcinogenic hazard attributable to the site are associated with the ingestion of contaminated groundwater. With respect to cleanup levels, the 1994 ROD and 2010 ROD/ROD Amendment selected state and federal MCLs as groundwater cleanup goals downgradient of the landfill. While some of these values may have changed since the time of the RODs, they remain valid. VOC concentrations appear relatively stable or are trending downward in downgradient groundwater in the last five years. While groundwater concentrations downgradient of the landfill continue to exceed MCLs, the remedial measures detailed in the 2010 ROD/ROD Amendment are expected to provide for restoration of the downgradient aquifer to drinking-water standards in the future.

No cleanup levels were selected for surface water in either of the decision documents. Nevertheless, VOCs and SVOCs have not been detected in surface water from the river in the last five years. Continued monitoring will be performed to evaluate site-related contaminant concentrations over time and to ensure that RAOs are being addressed.

Soil-vapor intrusion (SVI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. EPA sampled three of the six homes between the landfill and the Delaware River for SVI risk in 2007 and 2009. Ambient, subslab, and indoor air samples were collected and analyzed. It was concluded that a complete SVI pathway does not exist in any of the homes that were sampled. It is anticipated that as the source area continues to be depleted, any soil vapors will continue to decrease in concentration. Currently, the SVI pathway remains incomplete at the site.

From an ecological perspective, the remedy is functioning as intended for ecological receptors. Although the ecological risk-assessment screening and toxicity values used to support the 1994 ROD may not necessarily reflect the current values, the excavated-soil and the landfill-cap components of the remedy have eliminated the potential risk from soil contaminants to terrestrial receptors. Further, as VOCs and SVOCs have not been detected in the Delaware River sampling locations since 2009, the surface-water contaminant concentrations during the review period did not exceed ecological screening values. Consequently, the ecological exposure assumptions remain appropriate and, thus, the remedy remains protective of ecological resources.

In summary, the land use assumptions, exposure assumptions and pathways, cleanup levels, and RAOs considered in the decision documents remain valid. Although specific parameters may have changed since the time that the risk assessment was completed, the process that was used remains valid.

QUESTION C: *Has any other information come to light that could call into question the protectiveness of the remedy?*

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

As can be seen in **Table 3**, below, there are no recommendations for this FYR.

Table 3: Issues/Recommendations

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
01, 02, 03, and 04

OTHER FINDINGS

None

VII. PROTECTIVENESS STATEMENT

Table 4, below, presents the operable unit and sitewide protectiveness statements.

Table 4: Protectiveness Statements

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU2 (Cap)	**Protective**
Protectiveness Statement:	
The remedy at OU2 is protective of human health and the environment.	
Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU3 (Downgradient Groundwater)	**Protective**
Protectiveness Statement:	
The remedy at OU3 is protective of human health and the environment.	
Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU4 (Source Area)	**Protective**

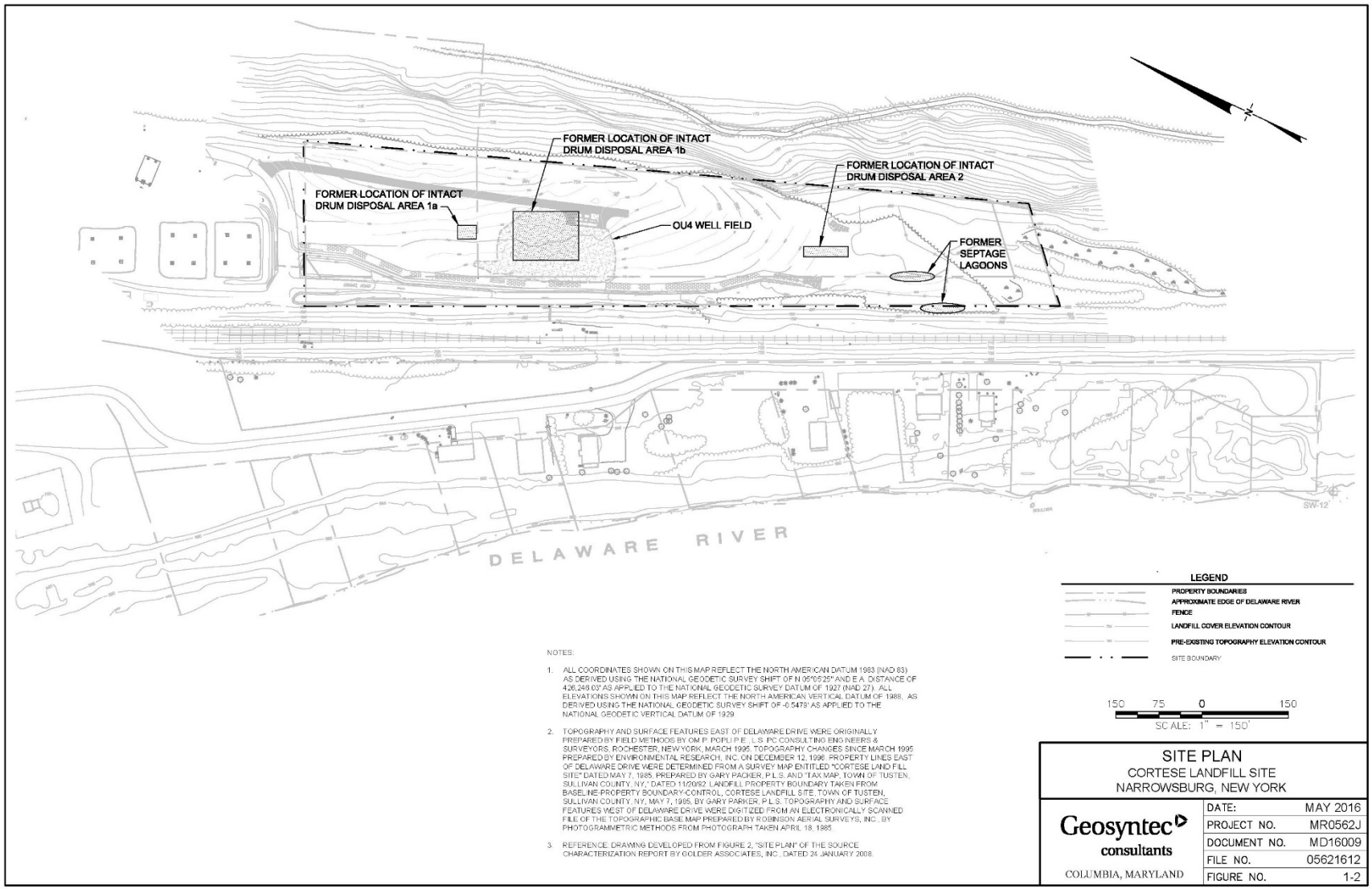
Protectiveness Statement: The remedy at OU4 is protective of human health and the environment.
Sitewide Protectiveness Statement
Protectiveness Determination: **Protective**
Protectiveness Statement: The sitewide remedy is protective of human health and the environment.

VIII. NEXT REVIEW

The next FYR report for the Cortese Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – FIGURES

Figure 1: Site Plan



NOTES:

1. ALL COORDINATES SHOWN ON THIS MAP REFLECT THE NORTH AMERICAN DATUM 1983 (NAD 83) AS DERIVED USING THE NATIONAL GEODETIC SURVEY SHIFT OF N 05°05'25" AND E A DISTANCE OF 426,248.07' AS APPLIED TO THE NATIONAL GEODETIC SURVEY DATUM OF 1927 (NAD 27). ALL ELEVATIONS SHOWN ON THIS MAP REFLECT THE NORTH AMERICAN VERTICAL DATUM OF 1988, AS DERIVED USING THE NATIONAL GEODETIC SURVEY SHIFT OF -0.5479' AS APPLIED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
2. TOPOGRAPHY AND SURFACE FEATURES EAST OF DELAWARE DRIVE WERE ORIGINALLY PREPARED BY FIELD METHODS BY OM P. POPLI P.E., L.S. PC CONSULTING ENGINEERS & SURVEYORS, ROCHESTER, NEW YORK, MARCH 1995. TOPOGRAPHY CHANGES SINCE MARCH 1995 PREPARED BY ENVIRONMENTAL RESEARCH, INC. ON DECEMBER 12, 1996. PROPERTY LINES EAST OF DELAWARE DRIVE WERE DETERMINED FROM A SURVEY MAP ENTITLED "CORTESE LAND FILL SITE" DATED MAY 7, 1985, PREPARED BY GARY PACKER, P.L.S. AND "TAX MAP, TOWN OF TUSTEN, SULLIVAN COUNTY, N.Y." DATED 11/20/92. LANDFILL PROPERTY BOUNDARY TAKEN FROM BASELINE-PROPERTY BOUNDARY-CONTROL, CORTESE LANDFILL SITE, TOWN OF TUSTEN, SULLIVAN COUNTY, NY, MAY 7, 1985, BY GARY PARKER, P.L.S. TOPOGRAPHY AND SURFACE FEATURES WEST OF DELAWARE DRIVE WERE DIGITIZED FROM AN ELECTRONICALLY SCANNED FILE OF THE TOPOGRAPHIC BASE MAP PREPARED BY ROBINSON AERIAL SURVEYS, INC., BY PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPH TAKEN APRIL 18, 1985.
3. REFERENCE: DRAWING DEVELOPED FROM FIGURE 2, "SITE PLAN" OF THE SOURCE CHARACTERIZATION REPORT BY GOLDER ASSOCIATES, INC., DATED 24 JANUARY 2008.

SITE PLAN
CORTESE LANDFILL SITE
NARROWSBURG, NEW YORK

Geosyntec consultants
COLUMBIA, MARYLAND

DATE:	MAY 2016
PROJECT NO.	MR0562J
DOCUMENT NO.	MD16009
FILE NO.	05621612
FIGURE NO.	1-2

Figure 2: Source-Area (OU4) SVE-Effluent Trend Graph

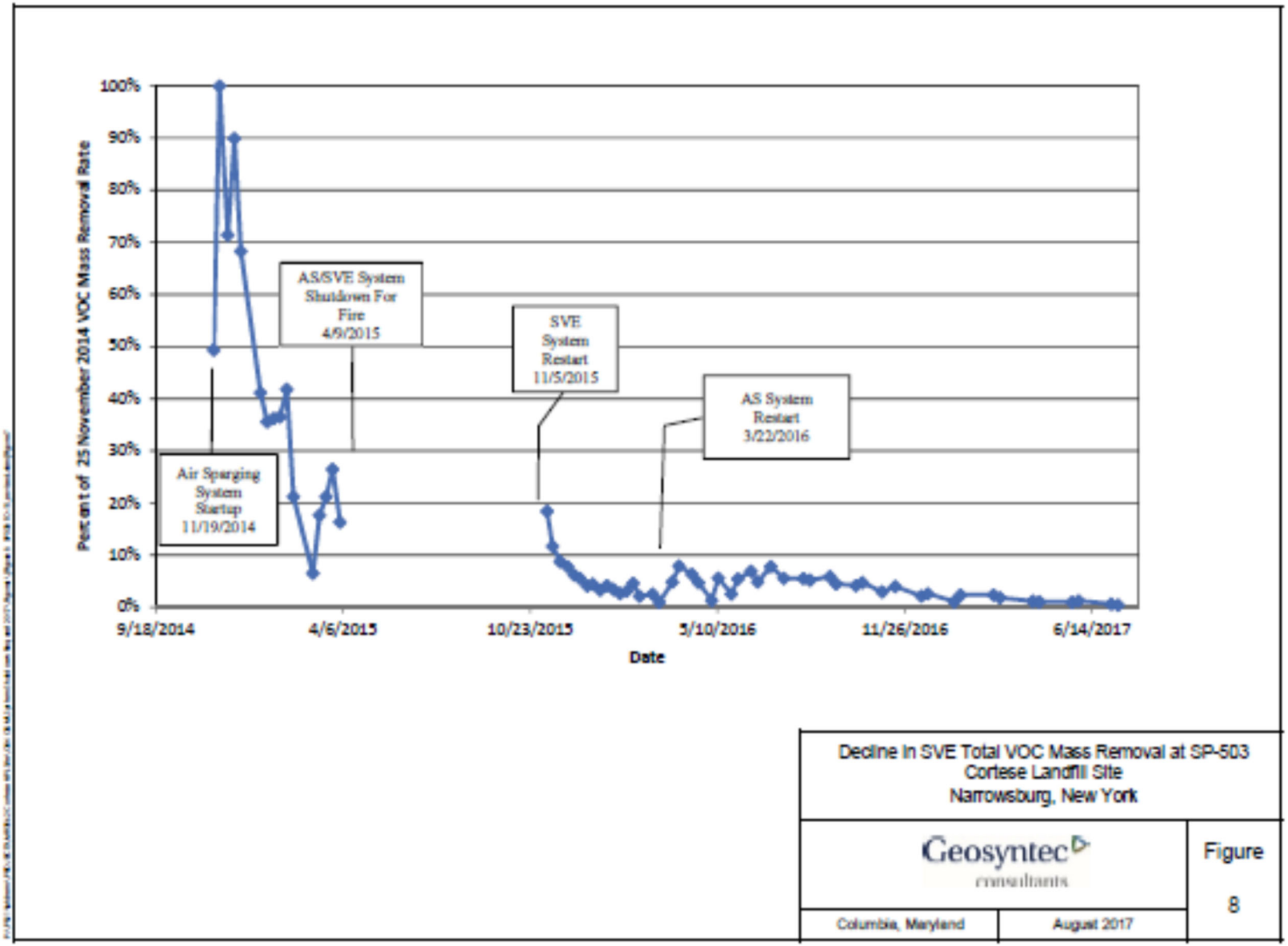
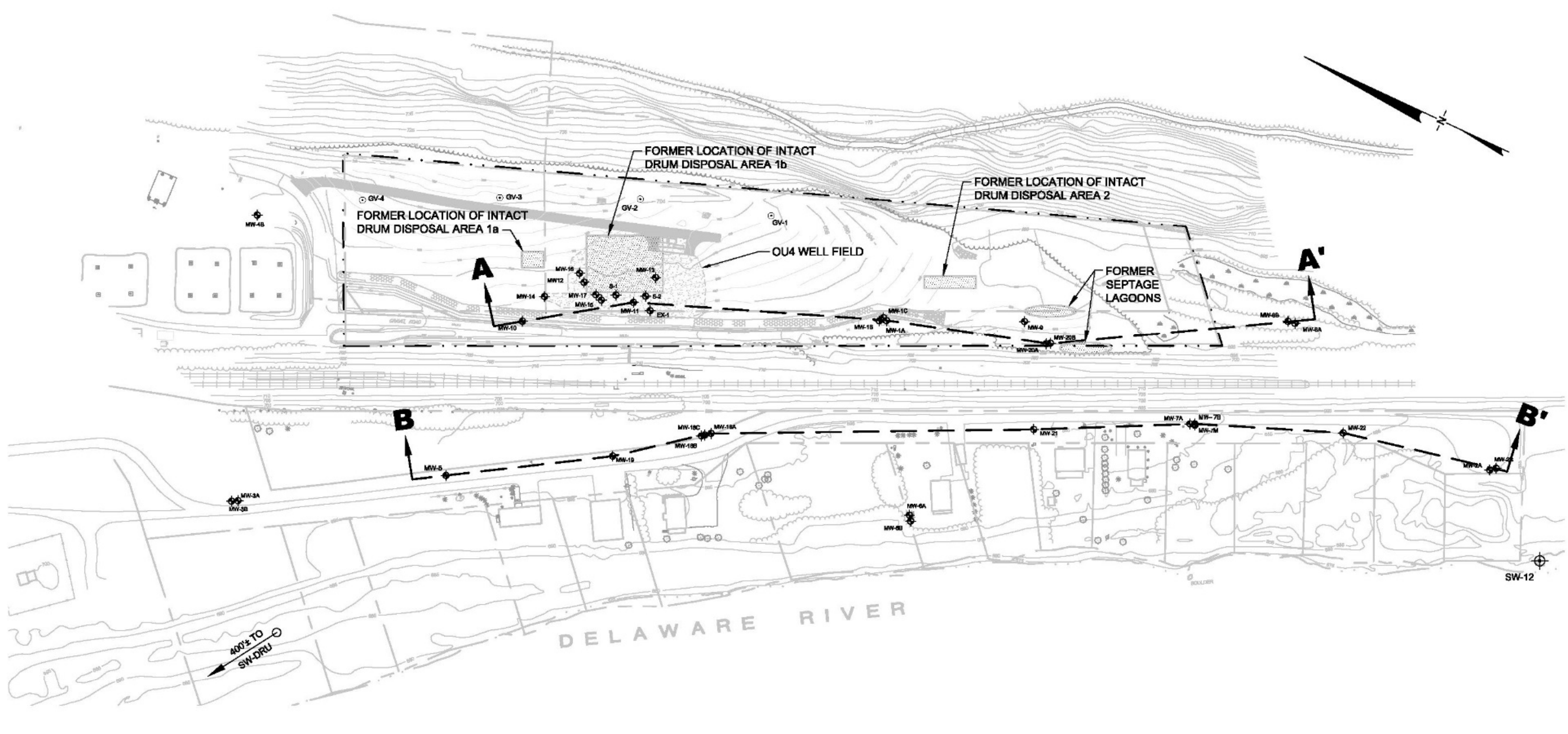


Figure 3: Monitoring Network



LEGEND

PROPERTY BOUNDARIES
APPROXIMATE EDGE OF DELAWARE RIVER
FENCE
LANDFILL COVER ELEVATION CONTOUR
PRE-EXISTING TOPOGRAPHY ELEVATION CONTOUR
GV-1 PASSIVE GAS VENT
MONITORING WELL
SW-DRU SURFACE WATER SAMPLE POINT
SITE BOUNDARY

NOTES:

1. MONITORING WELL LOCATIONS AND REFERENCE ELEVATIONS FOR WELLS INSTALLED PRIOR TO DECEMBER 2010 WERE PROVIDED BY THEW ASSOCIATES, P.E., L.S., PLLC IN DECEMBER 2010. MONITORING WELLS INSTALLED AFTER DECEMBER 2010 WERE SURVEYED BY FISHER ASSOCIATES IN FEBRUARY 2013.
2. SEE FIGURE 1-2 FOR OTHER FEATURE REFERENCES.
3. SEE APPENDIX C FOR CROSS SECTIONS A-A' AND B-B'.

150 75 0 150
SCALE: 1" = 150'

COMBINED OU3 AND OU4
PERFORMANCE MONITORING NETWORK
CORTESE LANDFILL SITE
NARROWSBURG, NEW YORK

Geosyntec consultants
COLUMBIA, MARYLAND

DATE:	MAY 2016
PROJECT NO.	MR0562J
DOCUMENT NO.	MD16009
FILE NO.	05621641
FIGURE NO.	4-1

Figure 4: Source-Area Wells (OU4) Transect Trend Graph

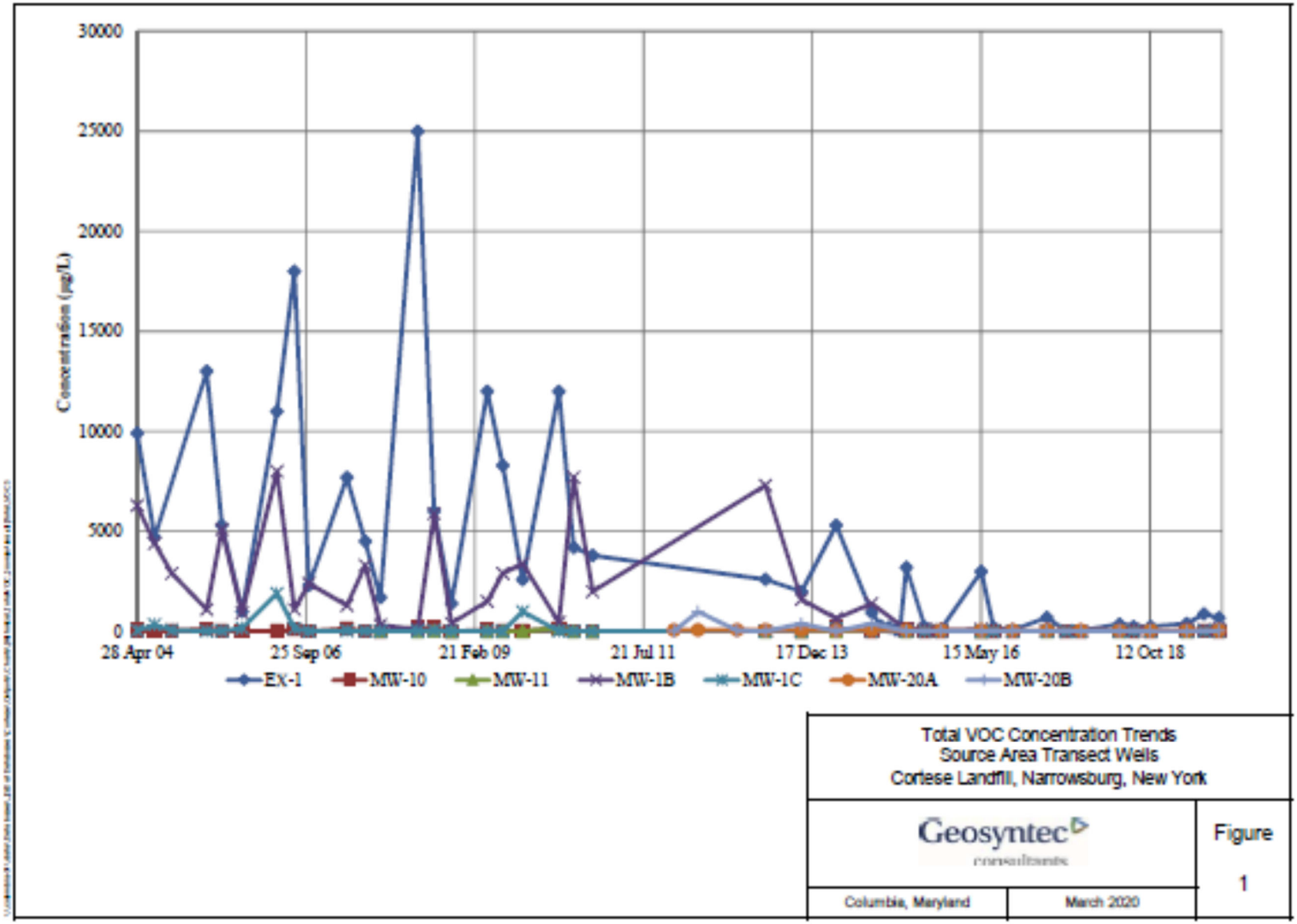
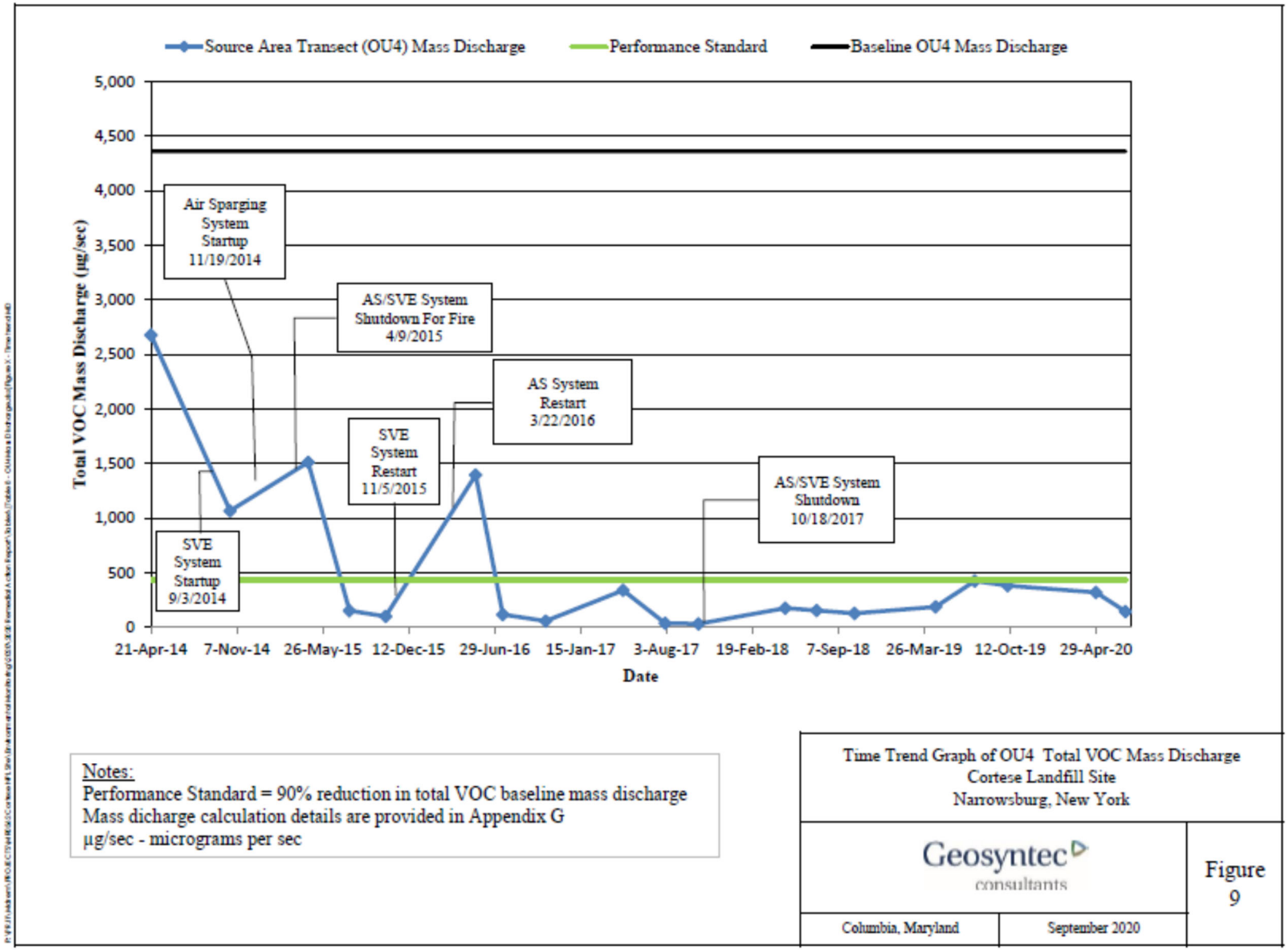


Figure 5: Trend Plot of Mass Discharge Since April 2014 with Comparison Against Performance Criterion



Notes:
Performance Standard = 90% reduction in total VOC baseline mass discharge
Mass dicharge calculation details are provided in Appendix G
µg/sec - micrograms per sec

Time Trend Graph of OU4 Total VOC Mass Discharge
Cortese Landfill Site
Narrowsburg, New York

Geosyntec consultants

Figure 9

Columbia, Maryland | September 2020

Figure 6: Downgradient Wells (OU3) Transect Trend Graph

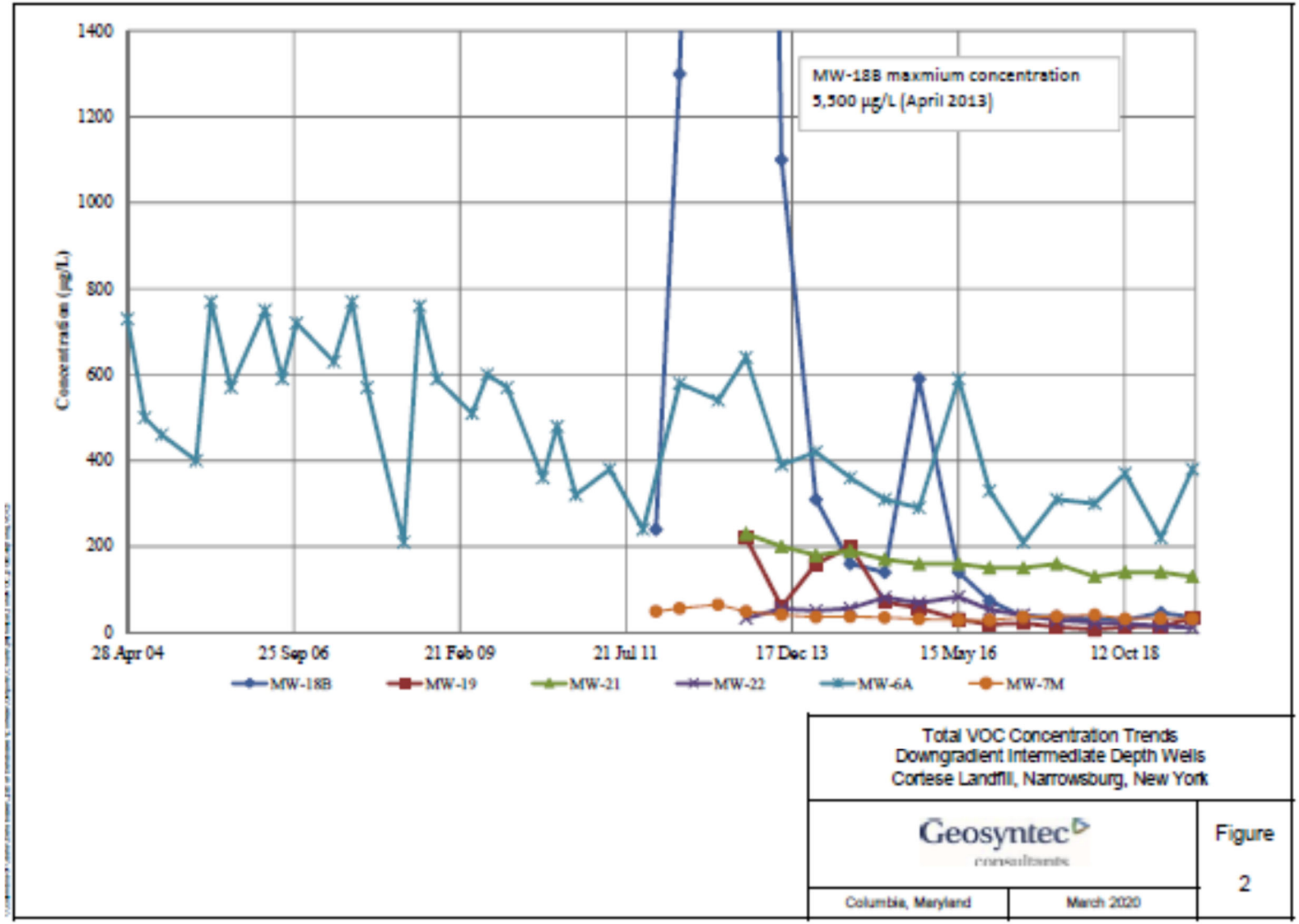


Figure 7: Plume Architecture (2013)

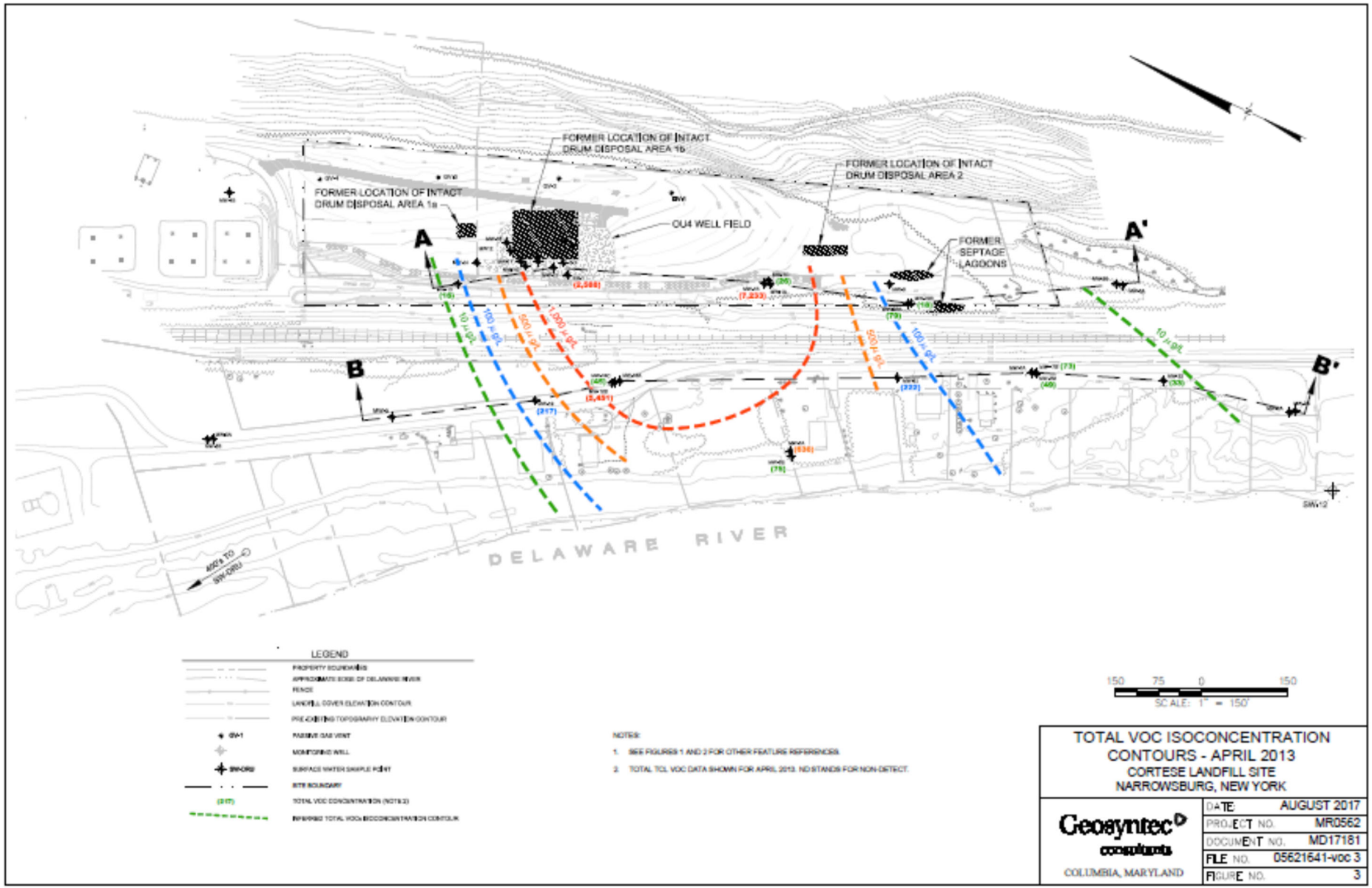
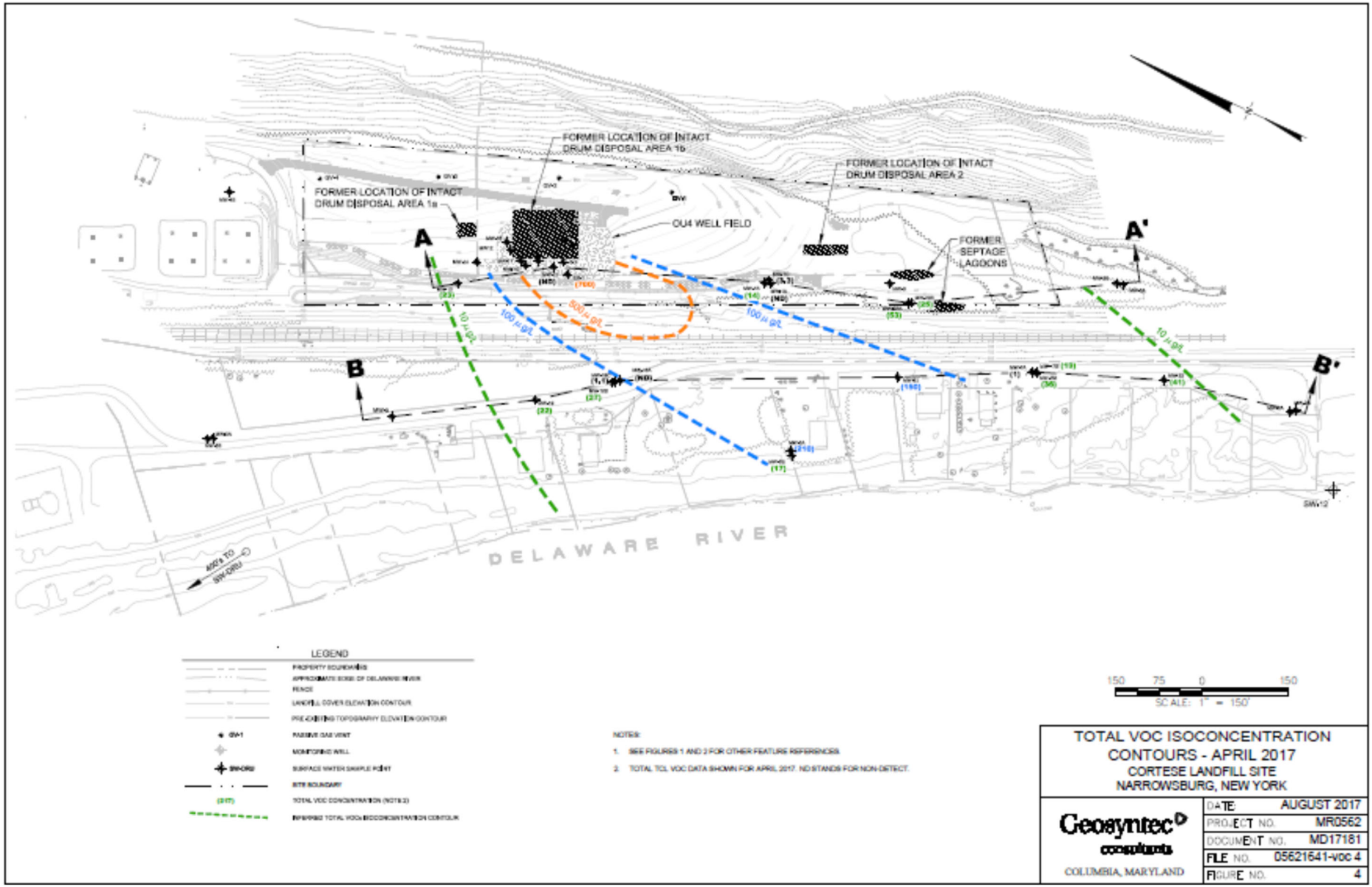


Figure 8: Plume Architecture (2017)



APPENDIX B – REFERENCE LIST

2015 Annual Report, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, May 2016.

2016 Annual Report, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, March 2017.

2017 Annual Report, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, March 2018.

2018 Annual Report, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, May 2019.

2019 Annual Report, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, March 2020.

Consent Decree for Remedial Design/Remedial Action, Cortese Landfill Site, U.S. vs. Allied Signal et al., Civil Action 96-CV-1513, USEPA, August 1995.

Consent Decree Amendment, Cortese Landfill Site, U.S. vs. Allied Signal et al., Civil Action 96-CV-1513, USEPA, September 2012.

Explanation of Significant Differences, Cortese Landfill Superfund Site, Town of Tusten, Sullivan County, New York, USEPA, September 2013.

Final Remedial Design Report, Operable Unit 4, Source Areas, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, March 2012.

Fourth Five-Year Review Report, Cortese Landfill Superfund Site, Sullivan County, Town of Tusten, New York, USEPA, September 2016.

Interim Source Area Remedial Action Report, Operable Unit 4 Source Areas, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, December 2013.

Monitored Natural Attenuation Remedial Design, Operable Unit 3 Downgradient Groundwater, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, May 2013.

Notification of Operable Unit 4 Active Treatment Suspension, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, October 2017.

Operation and Maintenance Plan, Remedial Work Element I, Cortese Landfill Site, Narrowsburg, New York, Golder, March 1997.

Operation, Maintenance, and Monitoring Plan, Operable Unit 4 Source Areas, Cortese Landfill Site, Narrowsburg, New York, Revision 1, Geosyntec, July 2014.

Quality Assurance Project Plan, OU3 and OU4 O&M, Cortese Landfill Site, Narrowsburg, New York, Geosyntec, May 2013.

Record of Decision, Cortese Landfill Site, Narrowsburg, Sullivan County, New York, USEPA, September 1994.

Record of Decision/Amendment to the Record of Decision, Cortese Landfill Superfund Site, Town of Tusten, Sullivan County, New York, USEPA, October 2010.

Revised Phase III Remedial Investigation Report, Cortese Landfill Site, Narrowsburg, New York, Golder, January 1994.