SECOND FIVE-YEAR REVIEW REPORT FOR PETER COOPER CORPORATION (MARKHAMS) SUPERFUND SITE CATTARAUGUS COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

John Prince, Acting Division Director
Emergency and Remedial Response Division

June 13, 2018

Date

534011

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Chemicals of Concern
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
GWQS/GVs	Groundwater Quality Standards and Guidance Values
ICs	Institutional Controls
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYCRR	New York Codes of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
PRPs	Potentially Responsible Parties
PSDs	Performing Settling Defendants
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
SMP	Site Management Plan
UU/UE	Unlimited Use and Unrestricted Exposure

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 pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Peter Cooper Corporation (Markhams) Superfund Site (the site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The site consists of one operable unit (OU) that will be addressed in this FYR.

The Peter Cooper Corporation (Markhams) Superfund site FYR was led by Sherrel Henry, EPA Remedial Project Manager (RPM). Participants included Pietro Mannino (EPA Western New York Remediation Section Chief), Sharissa Singh (EPA Hydrogeologist), Nicholas Mazziotta (EPA Human Health Risk Assessor), Michael Clemetson (EPA Ecological Risk Assessor), and Michael Basile (EPA Community Involvement Coordinator (CIC)). Maurice Moore, representative for the New York State Department of Environmental Conservation (NYSDEC) also assisted in the preparation of this report. The relevant entities such as the potentially responsible parties (PRPs) were notified of the initiation of the FYR. The review began on 10/26/2017.

Site Background

The site is located off Bentley Road, approximately six miles south of the Village of Gowanda in the Town of Dayton, Cattaraugus County, New York (see Figure 1). The site is approximately 103 acres in size and is bordered to the northwest by Bentley Road, to the northeast by a wooded property and farm field, to the southeast by a railroad right-of-way, and to the southwest by hardwood forest. site access is restricted by a locked gate at the Bentley Road entrance. The majority of the site is characterized by mature hardwood tree cover, as well as open fields. The current land use for the surrounding property is rural, consisting of small farm fields, open meadows and forests. No structures are present on the property, with the exception of a natural gas wellhead located east of the access drive. These or similar uses are expected to continue well into the future.

The site was used for the disposal of wastes resulting from the manufacturing of animal glue and adhesives at the Peter Cooper Corporation (PCC) plant located in Gowanda, New York. The waste material has been shown to contain elevated levels of chromium, arsenic, zinc and several organic compounds.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Peter Cooper Corporation (Markhams)		
EPA ID: NYD980592547		
Region: 2	**State:** NY	**City/County:** Dayton/Cattaraugus

SITE STATUS	
NPL Status: Deleted	
Multiple OUs? No	**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): Sherrel Henry
Author affiliation: EPA
Review period: 9/25/2013 - 5/21/2018
Date of site inspection: 11/13/2017
Type of review: Statutory
Review number: 2
Triggering action date: 9/24/2013
Due date *(five years after triggering action date)*: 9/24/2018

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1993, EPA conducted a site inspection, which included the collection and analysis of soil and surface water samples from the site. Chromium and arsenic were detected in soils above background concentrations within the waste piles. On April 23, 1999, EPA proposed the site for inclusion on the National Priorities List (NPL) and the site was added to the NPL on February 3, 2000.

On September 29, 2000, EPA issued a Unilateral Administrative Order (UAO) to several PRPs to perform the Remedial Investigation/Feasibility Study (RI/FS) for the site, subject to EPA oversight. The PRPs performed the RI/FS from 2001 to 2006. The list of constituents detected in site media and considered to be chemicals of concern (COCs) at the site included: arsenic, total

chromium and hexavalent chromium (metal COCs). The results of the RI suggested that low concentrations of metal COCs can leach from the waste fill and into the groundwater. However, the data from native soil samples (nonwaste fill) collected below the waste fill indicated that metal COCs had not migrated substantially in native soil. Arsenic and chromium concentrations detected in the surface soil samples from the cover of the fill piles were above soil criteria. Metal COCs were reported to exceed the New York State Groundwater Quality Standards (GWQS) in groundwater monitoring well (MW) MW-2S for arsenic, chromium, and zinc. In the RI report, difficulties in obtaining representative samples from MW-2S were identified possibly due to the age of the well and construction materials. In September 2008 MW-2S was replaced with a new polyvinyl chloride (PVC) well, identified as MW-2SR. Site data indicate that transport of trace metals and organic compounds was not considered significant.

Based on the results of the RI report, a human health risk assessment (HHRA) was performed to evaluate the potential cancer risks and noncancer hazards resulting from exposure to chemicals in soil, groundwater, sediment and surface water at the site. The HHRA determined that if infiltration of rainwater through the waste/fill material were not curtailed, then the quality of site groundwater would continue to degrade, resulting in a potential future risk from groundwater ingestion. Risks above EPA benchmarks were not identified for the soil, surface water, or sediment exposure pathways assessed.

The HHRA evaluated the risks and hazards associated with groundwater in both the presence and absence of MW-2S. When the results from MW-2S were included, the reasonable maximum exposure (RME) cancer risk for the future industrial worker from ingestion of groundwater was 3 x 10^{-4} (three in ten thousand), exceeding the EPA target risk range (1 x 10^{-6} to 1 x 10^{-4}). Arsenic was the primary risk driver (2.4 x 10^{-4}). The noncancer Hazard Index (HI) for this pathway was 230, exceeding the EPA threshold of 1. The main contributors were iron (Hazard Quotient (HQ) = 94)) and thallium (HQ = 119). The noncancer hazard for the future construction worker also exceeded 1 with an HI of 5.2. The primary chemicals contributing to this HI were cadmium (HI = 1.9) and thallium (HI = 1.6). Cadmium and thallium, however, were only detected in MW-2S, which was subsequently determined not to be representative of site conditions as stated above.

When the results from MW-2S were removed from the risk evaluation, the RME cancer risk for the future industrial worker was 7 x 10^{-5}, within the EPA acceptable risk range. Excluding these data from the noncancer assessment yielded an HI of 8, primarily associated with hexavalent chromium (HQ = 1.2) and manganese (HQ = 5.9). Similarly, removal of the MW-2S data from the construction worker pathway reduced the HI below the threshold of unity.

A screening level ecological risk assessment (SLERA) was completed in 2006. The SLERA determined that only a minimal increased ecological hazard was present to avian omnivores and insectivores preying on invertebrates exposed to elevated COC concentrations at the site, with remaining ecological receptors at or within acceptable risk levels. The SLERA further indicated that the most significant risk is primarily due to direct soil/fill exposure. Considering the available data, the SLERA concluded that any ecological impact would be highly localized.

Response Actions

In 1989, interim remedial measures were performed by NYSDEC to remove a number of buried containers that had been disposed within an isolated area of the site. The containers reportedly held off-specification animal glues, Dextrin and oil. The containers and impacted soils were excavated and transported off-site to the BFI Niagara Landfill in Tonawanda, New York for disposal as a nonhazardous waste. One drum of animal glue was sent to Chemical Waste Management, Inc. in Model City, New York for disposal as hazardous waste, as the cost of the analysis required to demonstrate that the material was nonhazardous was deemed by PCC not to be cost-effective.

Remedy Selection

On December 1, 2006, remedial action objectives (RAOs) were developed to aid in the development and screening of remedial alternatives to be considered for the ROD. The RAOs for the site are:

- Reduce or eliminate any direct contact threat associated with the contaminated soils/fill.
- Minimize or eliminate contaminant migration from contaminated soils to the groundwater.

The major components of the selected remedy include the following:

- Consolidating the waste/fill piles into seven acres or less, followed by capping the consolidated wastes with a low permeability soil cover, consistent with the requirements of 6 New York Codes of Rules and Regulations (NYCRR) Part 360, including seeding with a seed mixture to foster natural habitat. Waste piles moved during consolidation will be replaced by native soil. Removal of waste/fill piles will insure that any remaining soil chemicals will be within background concentrations.

- Imposing Institutional Controls (ICs) in the form of an environmental easement/restrictive covenant filed in the property records of Cattaraugus County that will at a minimum require: (a) restricting activities on the site that could compromise the integrity of the cap; and (b) restricting the use of groundwater as a source of potable or process water unless groundwater quality standards are met.

- Developing a Site Management Plan (SMP) that provides for the proper management of all remedy components post-construction, such as ICs, and also includes: (a) monitoring of groundwater to ensure that, following the soil consolidation and capping, the contamination is attenuating and groundwater quality continues to improve; (b) an inventory of any site use restrictions; (c) necessary provisions for ensuring the easement/covenant remains in place and is effective; (d) provision for any operation and maintenance required of the components of the remedy; and (e) the owner/operator or entity responsible for maintenance of the site to complete and submit periodic

certifications concerning the status of the institutional and engineering controls for the site.

- Evaluating site conditions at least once every five years to ensure that the remedy continues to protect public health and the environment.

Status of Implementation

In 2007, EPA concluded consent decree (CD) negotiations with the performing settling defendants (PSDs) for the performance of the remedial design (RD), remedial construction, and operation, maintenance, and monitoring of the remedy selected in the ROD. On February 19, 2008, the CD was entered in United States District Court for the Western District of New York. Benchmark was approved as the supervising contractor to conduct the RD and construction work at the site.

The implemented remedy consists of a landfill cover system, a gas venting system, long-term operation and maintenance (O&M) of the cap and gas venting system, ICs, and implementation of a groundwater monitoring program.

Waste/fill consolidation involved relocation of the various waste/fill piles located at areas across the site into a single area. Waste/fill that was located within the consolidation footprint was graded and compacted to conform to the selected subgrade contouring. Waste/fill located outside of the selected consolidated footprint was excavated, hauled and compacted within the consolidated area. A total of approximately 40,000 cubic yards of waste/fill was consolidated and compacted. The waste fill consolidated area has a footprint of approximately four acres, with an average peak elevation (including cover soil) of 14 feet above surrounding grade (see Figure 2).

The final cover system was constructed to function with minimum maintenance, minimize infiltration, promote drainage, and minimize erosion. The cover system was installed from September 24 to October 14, 2008. The final landfill cap meets the grading requirements of 6 NYCCR Part 360 that specify that the barrier component of the cap have a slope of no less than four percent to promote positive drainage and no more than 33 percent to minimize erosion (see Figure 2). A conservation seed mixture was used to foster a natural habitat and minimize maintenance requirements. Passive gas-venting wells were installed through the waste/fill to relieve gas buildup beneath the cover system. EPA conducted a final inspection with NYSDEC and the Town on October 24, 2008. The site achieved construction completion status with the signing of the Preliminary Close-Out Report on November 25, 2008 and was removed from the NPL on September 20, 2010.

The SMP was approved by EPA in July 2009. The purpose of the SMP is to assure that proper procedures are in place to provide for long-term protection of human health and the environment after remedial construction is complete. The SMP includes the following three main components:

- A post-remedial operation, maintenance and monitoring (OM&M) plan.
- A soil/fill management plan identifying proper management of any residual impacted subsurface soil/fill that might be encountered during redevelopment or post-remedial construction activities at the site, if undertaken.
- A description of the institutional and engineering controls incorporated into the remedy, including the mechanisms that will be used to implement, maintain, monitor and enforce the controls continually.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

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)
Landfill	Yes	Yes	Landfill	Imposing institutional controls in the form of an environmental easement/restrictive covenant restricting activities on the site that could compromise the integrity of the cap.	Environmental easement/restrictive covenants, placed on the real property on July 13, 2008.
Groundwater	Yes	Yes	Groundwater	Restrict the use of groundwater as a source of potable or process water unless groundwater quality standards are met.	Environmental easement/ restrictive covenants, placed on the real property on July 13, 2008.

Systems Operations/Operation & Maintenance

The Post-Remedial OM&M Plan, approved by EPA in June 2009, requires the inspection, monitoring and maintenance of the various components of the capping and closure system on a regular basis throughout the post-closure period. The frequency and scope of the monitoring and maintenance tasks are generally based on the post-closure monitoring and maintenance requirements stipulated under 6 NYCRR Part 360. Specifically, the activities currently include the following:

- Annual groundwater quality monitoring at four monitoring wells to ensure that the landfill cover systems continue to function to prevent groundwater contamination;
- Annual surface water sampling from a downgradient wetland to ensure that the landfill cover systems continue to function to prevent surface water contamination;
- Annual groundwater elevation monitoring at seven monitoring wells to determine if

changes occur in the direction of groundwater flow;
- Annual inspection of the condition of monitoring wells, including but not limited to working locks, adequate surface seals and protective casings, and sediment intrusion;
- Annual inspection of the landfill cover systems, with regard to the vegetative cover, settlement, stability and any need for corrective action;
- Annual inspection of access roads and gate to insure that no trespassing has occurred;
- Annual inspection of the landfill gas venting system to ensure that wells are intact and that there is no sign of stressed vegetation; and
- Submittal of annual reports summarizing the results of the OM&M activities.

All samples are analyzed for inorganic parameters, and NYSDEC Part 360 leachate indicator parameters.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented remedy for the Peter Cooper Corporation (Markhams) Superfund site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the implemented engineered and institutional controls are properly operated, monitored, and maintained.
Sitewide	Protective	The implemented remedy for the Peter Cooper Corporation (Markhams) Superfund site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the implemented engineered and institutional controls are properly operated, monitored, and maintained.

There were no issues and recommendations identified in the last FYR.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 2, 2017, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 31 Superfund sites in New York and New Jersey, including the Peter Cooper Corporation (Markhams) site. The announcement can be found at the following web address: https://wcms.epa.gov/sites/production/files/2017-10/documents/five_year_reviews_fy2018_final.pdf. In addition to this notification, a notice of the commencement of the FYR was sent to local public officials. The notice was provided to the Town on Dayton on November 2, 2017 with a request that the notice be posted on the Town's webpage. The purpose of the public notice was to inform the community that the EPA would be conducting the second FYR to ensure that the remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included the RPM and the CIC addresses and telephone numbers for questions related to the FYR process or the site. Once the FYR is completed, the results will be made available on EPA's Peter Cooper Corporation (Markhams) site webpage and at the local site repository located at the Town of Dayton, Town Building, 9100 Route 62 in South Dayton, New York. In addition, efforts will be made to reach out to stakeholders and local public officials to inform them of the results.

Data Review

The long-term monitoring program, which is being conducted by Benchmark under contract to the PSDs, includes the annual collection of groundwater samples and groundwater level measurements from selected wells; annual collection of surface water samples from Wetland F; annual inspection of the landfill cover system, groundwater monitoring wells, and the gas-venting system; monitoring the status of the institutional controls; and providing annual reports on these activities to NYSDEC and EPA. This FYR covers the sampling period from 2013 through 2017.

Groundwater Quality Data

The PSDs are required to perform groundwater sampling at the site to monitor groundwater flow and quality conditions to ensure that the selected remedy for the site continues to be protective of human health and the environment. Groundwater and surface water monitoring is being performed at the following network locations, where the "S" identifier indicates a shallow overburden monitoring well (see Figure 3):

- Upgradient monitoring well MW-9S.
- Perimeter downgradient monitoring wells MW-5S, MW-7S and MW-8S.
- Downgradient Wetland F (surface water).
- Monitoring wells MW-4S and MW-6S were sampled on two semi-annual monitoring events following construction of the landfill cover system. Based on the non-detectable

contaminant levels measured at these locations, it was determined that sampling from these monitoring wells would be discontinued.

Results of Inorganic (Metal) Analyses

The COCs identified in the ROD were arsenic, total chromium, hexavalent chromium and manganese. Four of the seven groundwater monitoring wells (MW-5S, MW-7S, MW-8S and MW-9S) and surface water from Wetland F were sampled semi-annually before May 2010 and thereafter on an annual basis for site-related metals (arsenic, total chromium, hexavalent chromium, iron and manganese).

Groundwater

Groundwater samples for this FYR period were collected in June 2013, June 2014, October 2015, October 2016 and October 2017. Groundwater samples were analyzed for total (unfiltered) metals, including arsenic, chromium, manganese, iron, and hexavalent chromium. Soluble (filtered) metals samples were collected and analyzed if turbidity was above 50 nephelometric turbidity unit (NTU). Samples were also analyzed for leachate parameters which included analysis of ammonia, nitrate, alkalinity, and total sulfide.

No COCs were detected above the GWQS in the upgradient monitoring well MW-9S during this FYR period.

Downgradient monitoring wells (MW-5S, MW-7S and MW-8S) contained manganese and/or iron at concentrations above GWQS. The maximum concentration of iron was detected at 129 mg/L in MW-7S. Since the turbidity value for MW-7S exceeded 50 NTU in June 2014, October 2015 and October 2016, additional samples were collected for dissolved metals. Analytical results indicate that iron exceeded GWQS in the filtered sample in October 2015 and 2016. The maximum concentration of manganese was detected at 2.6 mg/L in MW-5S in the June 2014 sampling event. The turbidity values for this well did not exceed 50 NTU during any of the sampling events so no additional filtered samples were collected for analysis.

In general, groundwater quality is similar to previous sample events and does not exhibit significant changes in metals concentrations. However, to allow for the evaluation of seasonal variability in the groundwater data, groundwater sampling and water level measurements will be performed on a rotational basis (once every 15 months), instead of annually. In addition, in order to evaluate the adequacy of the current 50 NTU threshold for metals, soluble metals (filtered samples) and total metal (unfiltered samples) will be collected for at least one sampling event during the next five-year review period. The difference between the concentrations of the filtered and unfiltered samples will then be compared to the sample turbidity measurements. If the comparison of the results indicates significant concentration differences at lower turbidity levels, then consideration will be given to reducing the current threshold.

Table 3 presents a summary of groundwater inorganic analytical results detected above GWQS in samples collected from monitoring wells for all sampling events.

Surface Water

Surface water samples were collected from Wetland F in June 2013, June 2014, October 2015 and October 2017. No samples were collected from Wetland F in October 2016 because the sample location was dry.

Analytical results indicate that iron and/or manganese concentrations exceeded GWQS in all of the samples collected during this FYR period. Although the exceedances appear to have increased over time, the concentrations are just slightly above GWQS and are similar to previous sample results.

Table 4 presents a summary of surface water analytical results collected from Wetland F and detected above GWQS.

Results of Leachate Indicator Parameters Analyses

The leachate indicator parameters included alkalinity, ammonia, nitrate, phenols and sulfide. The only leachate-related contaminants detected above GWQS were nitrate detected in MW-9S, 5S and 7S and ammonia detected in MW-5S.

Results from the June 2014 sampling event detected nitrate in monitoring well MW-9S at 13.7 mg/L, exceeding the GWQS of 10 mg/L. In the October 2016 and 2017 sampling events ammonia was detected in monitoring well MW-5S at 3.5 mg/L and 3.6 mg/L, respectively, exceeding the GWQS of 2 mg/L (see Table 3). Nitrate was also detected in October 2016 at 14.1 mg/L exceeding the GWQS of 10 mg/L in MW-5S.

June 2014 sampling events revealed detections of nitrate in upgradient monitoring well MW-9S at 13.7 mg/L, exceeding the GWQS of 10 mg/L (see Table 4). Leachate-related contaminants were not detected in any other monitoring wells during the other sampling events conducted during this FYR period. In addition, no leachate parameters were detected in surface water samples collected from Wetland F.

The results from the most current round of groundwater sampling (October 2017) compared to prior events indicate that there have been no significant changes in groundwater quality attributable to the landfill. Although groundwater at MW-5S indicates levels of ammonia slightly above the GWQS standard since 2015, no other site-related contaminants have been detected at concentrations that indicate there are adverse impacts to the groundwater from the landfill. It is noted that groundwater elevations at MW-5S are close to grade, and that the 2015-2017 samples were all collected in October (prior samples were typically collected in spring or late summer). It is possible that decaying leaves from surrounding mature trees may have contributed to ammonia detections at MW-5S.

Results of Groundwater Level Data Monitoring

The objective of the groundwater elevation monitoring program is to assess whether changes have occurred in the direction of groundwater flow. Based on the results of the groundwater

elevation monitoring performed from 2013 to 2017, regional groundwater flow across the site is to the southwest; however, the landfill has the highest elevation on-site and there appears to be radial flow across the landfill. During this FYR period there are no significant changes to the direction of groundwater flow and the monitoring well network is adequate for determining the groundwater gradient.

Results of Landfill Cover System Inspection

The landfill cover system is inspected for loss of slope, surface material erosion, insufficient vegetative cover growth, erosion of vegetative cover, and areas of surface settlement. The results of the inspections are reported in the post-closure field inspection reports which are generated by Benchmark annually and submitted to NYSDEC and EPA. The most recent inspection report, dated December 6, 2017, indicated that the cover system is in good condition.

Results of Gas Venting System Inspection

Passive gas-venting wells were installed through the waste/fill to relieve gas buildup beneath the cover system. Based on methane gas conditions measured during advancement of soil borings into the waste/fill during the RI, it was determined that gas venting to the atmosphere did not pose a health or fire risk. Gas vents are inspected annually for physical integrity. The most recent inspection report, dated December 6, 2017, indicated that the gas-vent monitoring system is intact and operational.

Site Inspection

The inspection of the site was conducted on November 13, 2017. In attendance were Sherrel Henry, EPA RPM, Maurice Moore, NYSDEC Project Manager, and Tom Forbes, PSD's Project Coordinator. The purpose of the inspection was to assess the protectiveness of the remedy.

In general, the final cover system appears in good condition, with the gas vent monitoring system intact and operational. Overgrown vegetation near and along access paths to the monitoring well locations was cut and will be re-mowed prior to the next sampling event.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

The primary objectives of the implemented remedy are to control the source of contamination at the site, to minimize the migration of contaminants into the groundwater, and to minimize any potential human health risks resulting from the exposure to contamination at the site. These objectives were accomplished by the installation of the landfill cap, the implementation of a groundwater monitoring program, and implementation of institutional controls. The landfill cap is well-maintained and operating as designed. On-site data continue to indicate no or low detections of manganese, iron, nitrate and sulfide.

The groundwater at the site is not currently used as a potable drinking water source. The PSDs continue to maintain the environmental easements/restrictive covenant on the property and any future redevelopment will be consistent with planned future land use and restrictions. Therefore, the remedy is functioning as intended by the decision document.

The landfill cover system was constructed to minimize storm water infiltration, vent landfill gases passively, provide a permanent barrier between the site's fill material and the land surface. In general, the landfill cover system is well-maintained and operating as designed. Groundwater monitoring data from each monitoring event continue to indicate that there is no significant impact by leaching from the containment cell area into the water table. In addition, no toxic metals (arsenic, chromium, hexavalent chromium) were detected above their representative GWQSs at any of the groundwater or wetland sample locations. On-site data continue to indicate no or low detections of manganese, iron, nitrate and sulfide.

Based on review of the groundwater monitoring data, surface water data, and the site inspection, the remedy is functioning as intended by the ROD.

IC Implementation

The ROD requires the implementation ICs. The ICs involve filing of an environmental easement and restrictive covenant to restrict the use of on-site groundwater as a source of potable or process water and to restrict activities on the site that could compromise the integrity of the cap.

ICs that have been established include an environmental easement and a restrictive covenant that preclude the use of groundwater as a source of potable or process water and restricts activities on the site that could compromise the integrity of the consolidation area cover. The environmental easement and restrictive covenant are included with the SMP. These items complete the institutional controls requirement of the ROD.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

There have been no changes in the physical condition of the site since the last FYR that would change the protectiveness of the remedy. The HHRA concluded that future consumption of groundwater by industrial workers would result in cancer risk and noncancer hazard exceeding EPA threshold criteria. The COCs identified in groundwater were arsenic, total chromium, hexavalent chromium and manganese when the calculated Exposure Point Concentrations (EPCs) included MW-2S and hexavalent chromium and manganese when MW-2S was not included in EPC calculations. Risk and hazard estimates resulting from exposures to trespassers, industrial workers, and construction workers were within EPA benchmarks for on-site soils, sediment and surface water; thus, no COCs were identified for these media.

The exposure assumptions, pathways, and receptors that were used to estimate the potential risks and hazards to human health followed the Risk Assessment Guidance for Superfund used by the

Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid as well.

The RAOs discussed in Section II remain valid. Although groundwater beneath the landfill is classified by New York State as "GA", indicating a potential potable water supply, the groundwater is not presently used as such. Environmental easements imposed ensure that site groundwater will not be used for any potable purposes in the future and that no activities conducted on-site will compromise the integrity of the cap in place as well. Land use at the site is not expected to change over the next five years.

Since surface soils did not pose an unacceptable risk under the industrial land use scenario and the selected remedy was designed to prevent exposure and reduce contaminant migration from the waste material into groundwater, soil-specific ARARs were not established for the site. There were no groundwater standards adopted for the site as well since the environmental easements established prohibit the use of groundwater for any potable use. Nevertheless, groundwater monitoring at the site indicates that all site-related COCs are not impacting groundwater above New York State GWQS. Manganese, not identified as a site COC, only marginally exceeds its respective GWQS (0.3 mg/L) and has remained within one order of magnitude of this value at all locations sampled for this FYR.

Changes in Toxicity Characteristics

Some of the toxicity values that were used in the HHRA have changed; however, the changes would not impact the remedial decision that was made for the site. EPA is currently evaluating arsenic and hexavalent chromium toxicity through the Integrated Risk Information System (IRIS) process that provides EPA’s consensus toxicity values. Any toxicity value updates for these chemicals will need to be addressed in a subsequent five-year review if the IRIS values are finalized.

Vapor Intrusion

In accordance with the 2015 OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (OSWER Directive 9200.2-154), the vapor intrusion pathway was not assessed since the site-related COCs are not volatile (i.e. metals) and because no residential or commercial structures exist within 100 feet from the site.

Ecological Risk

The SLERA conducted for the site and discussed in the 2006 ROD indicated that the most significant risk is primarily due to direct soil/fill exposure. Considering the available data, the SLERA concluded that any ecological impact would be highly localized. The soil excavation and capping associated with the remedial activity reduced exposures to ecological receptors.

Overall, based on the past remedial actions and ongoing monitoring at the site, the remedy remains protective under the industrial scenario.

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 would call into question the protectiveness of the remedy. There have been no changes at the site resulting from natural disasters or climate change impacts.

VI. ISSUES/RECOMMENDATIONS

This report did not identify any issue or make any recommendation for the protection of public health or the environment which was not included or anticipated by the site decision documents.

OTHER FINDINGS

In the December 6, 2017 Post-Remediation Groundwater Monitoring & Maintenance Report, the PSDs requested a reduction in the frequencies of the post-closure monitoring. The following are recommendations that were identified during the FYR and may improve management of O&M activities, but do not affect current and/or future protectiveness:

- Groundwater sampling and water level measurements will be performed on a rotational basis (once every 15 months, instead of annually, to allow for evaluation of seasonal variability in the data.
- Inspection will continue to be performed annually to verify the integrity of the containment cell cover and gas venting system.
- For at least one sampling event during the next five-year review period, soluble metals (filtered samples) and total metal (unfiltered samples) should be collected. The difference between the concentrations of the filtered and unfiltered samples should then be compared to the sample turbidity measurements to evaluate the adequacy of the current 50 NTU threshold. If the comparison results indicate significant concentration differences at lower turbidity levels, then consideration should be given to reducing the current threshold.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU1	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:*
Protectiveness Statement: The remedy is protective of human health and the environment.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:*

Protectiveness Statement: The remedy is protective of human health and the environment.

VIII. NEXT REVIEW

The next FYR report for the Peter Cooper Corporation (Markhams) Superfund site is required five years from the completion date of this review.

APPENDIX A-REFERENCE LIST

Documents, Data, and Information Reviewed in Completing the Five-Year Review:

Document Title, Author	Date
Record of Decision, Peter Cooper Corporation (Markhams) site, EPA	December 2006
EPA Guidance for conducting Five-Year Reviews.	June 2001
Five-Year Review Report for the Peter Cooper Corporation (Markhams) site, EPA	September 24, 2013
Post-Remedial Groundwater Monitoring & Maintenance Summary Report, PRP	June 2013 – June 2014
Post-Remedial Groundwater Monitoring & Maintenance Summary Report, PRP	October 2015 – October 2017

APPENDIX B-TABLES

Table 3: Summary of Groundwater Inorganic Compounds and Leachate Parameters Analytical Results Detected Above GWQS

Parameters	MW 5-S					MW-7S					GWQS
	06/24/13	06/24/14	10/27/15	10/26/16	10/20/17	06/24/13	06/24/14	10/27/15	10/26/16	10/20/17	
Total Inorganic Compounds (mg/L)											
Manganese	1.70	2.60	2.30	2.20	1.91	-	-	-	-	-	0.30
Iron	-	0.41	0.49	-	-	14.1	129	17.0	61.1	10.3	0.30
Leachate-Related Contaminants (mg/L)											
Ammonia)	NA	NA	NA	3.5	3.6	-	-	-	-	ND	2
Nitrate (as Nitrogen	NA	NA	NA	14.1	-	ND	ND	ND	ND	ND	10
Parameters	MW-8S					MW-9S					GWQS
	06/24/13	06/24/14	10/27/15	10/26/16	10/20/17	06/24/13	06/24/14	10/27/15	10/26/16	10/20/17	
Total Inorganic Compounds (mg/L)											
Manganese	1.40	1.70	1.50	1.9	0.64	-	-	-	-	-	0.30
Iron	ND	-	-	-	ND	-	0.31	-	-	-	0.30
Leachate-Related Contaminants (mg/L)											
Ammonia)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
Nitrate (as Nitrogen)	-	-	-	-	-	-	13.7	-	-	-	10

- Parameter detected below the GWQS
NA-Not Analyzed
ND-Parameter was not detected above lab reporting limits

Table 4: Summary of Groundwater Analytical Results Collected from Wetland F detected Above GWQS

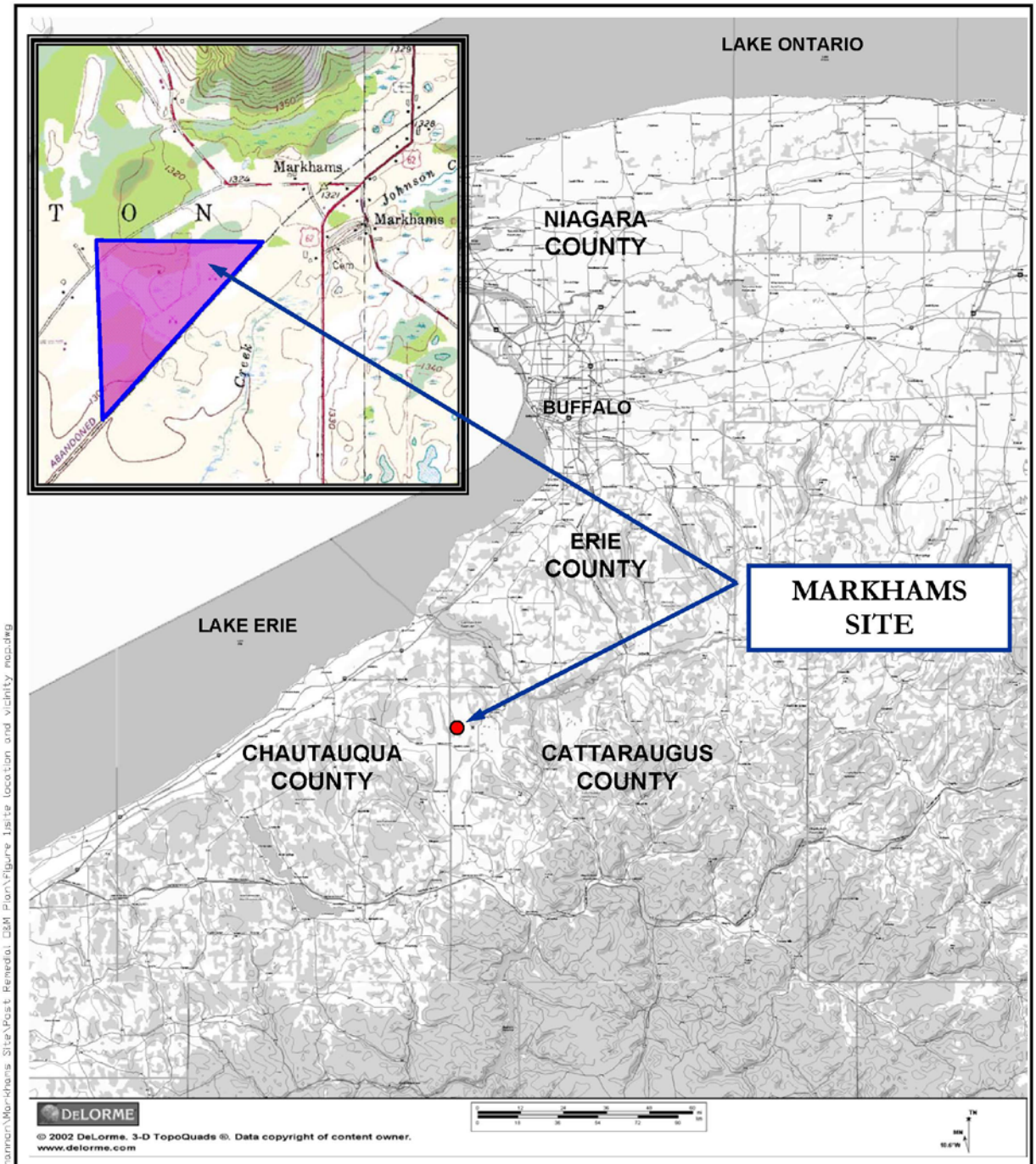
Parameter	Wetland-F					GWQS
	06/24/13	06/24/14	10/27/15	10/26/16	10/20/17	
Total Inorganic Compounds (mg/L)						
Manganese	2.90	0.76	2.50	(NW)	1.0	0.30
Iron	-	8.80	2.90	(NW)	1.0	0.30
Leachate-Related Contaminant (mg/L)						
Nitrate (as Nitrogen)	ND	ND	ND	(NW)	-	10
Sulfide, Total	ND	ND	ND	(NW)	-	0.05

NW-No Water present

ND- Parameter was not detected above lab reporting limits

APPENDIX C-FIGURES

FIGURE 1



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0021-003-400
DATE: JANUARY 2008
DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

POST-REMEDIAL OPERATION & MAINTENANCE PLAN

PETER COOPER MARKHAMS SITE
DAYTON, NEW YORK

PREPARED FOR
RESPONDENTS FOR PETER COOPER MARKHAMS SITE

FILEPATH=\CAD\Benchmark\Collier Shannon\Markhams Site\Post Remedial O&M Plan\Figure 1site location and vicinity map.dwg

Figure 2- Top of Final Grade

FIGURE 2

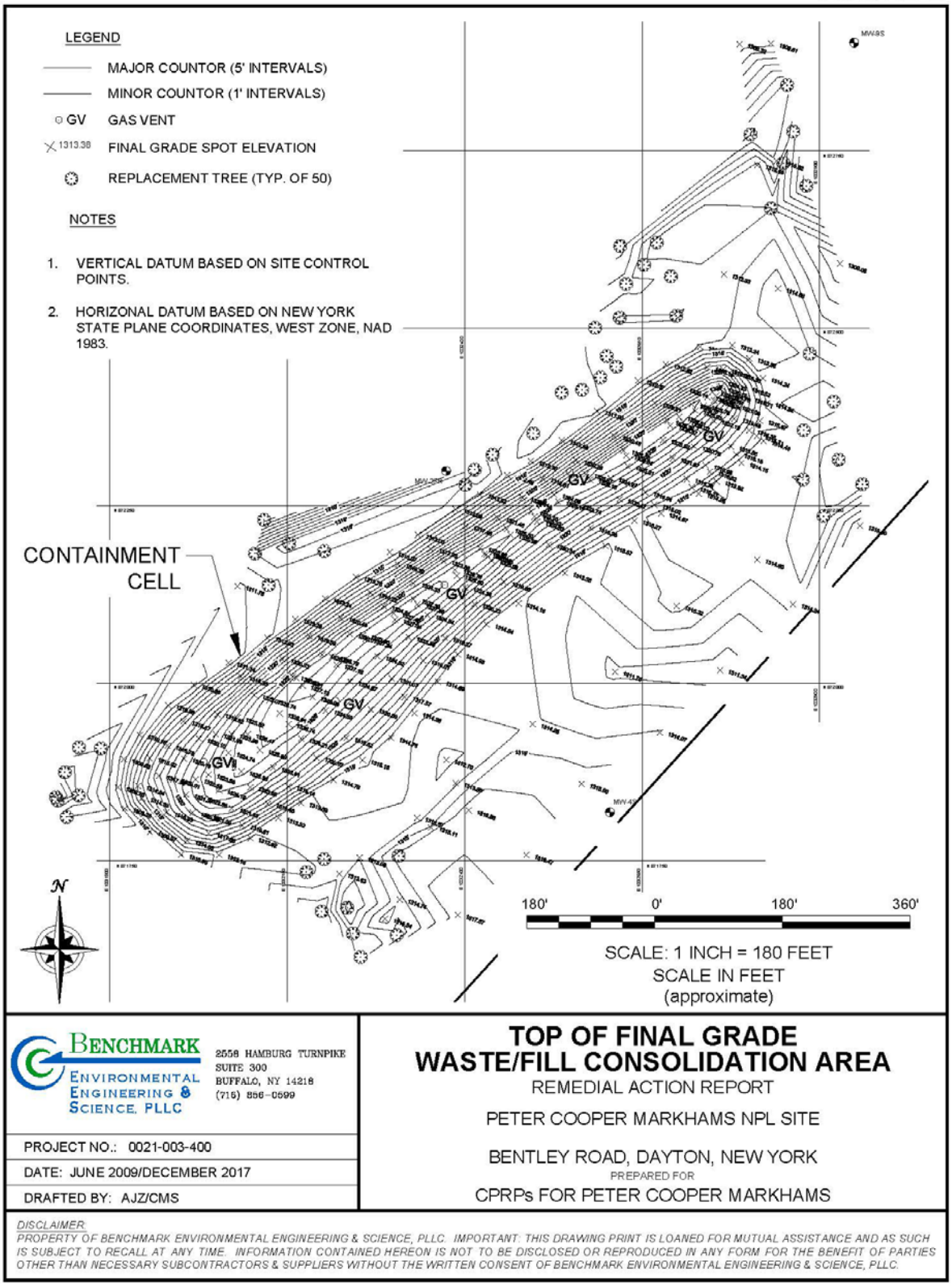


Figure 3- Site Plan & Monitoring Well Locations

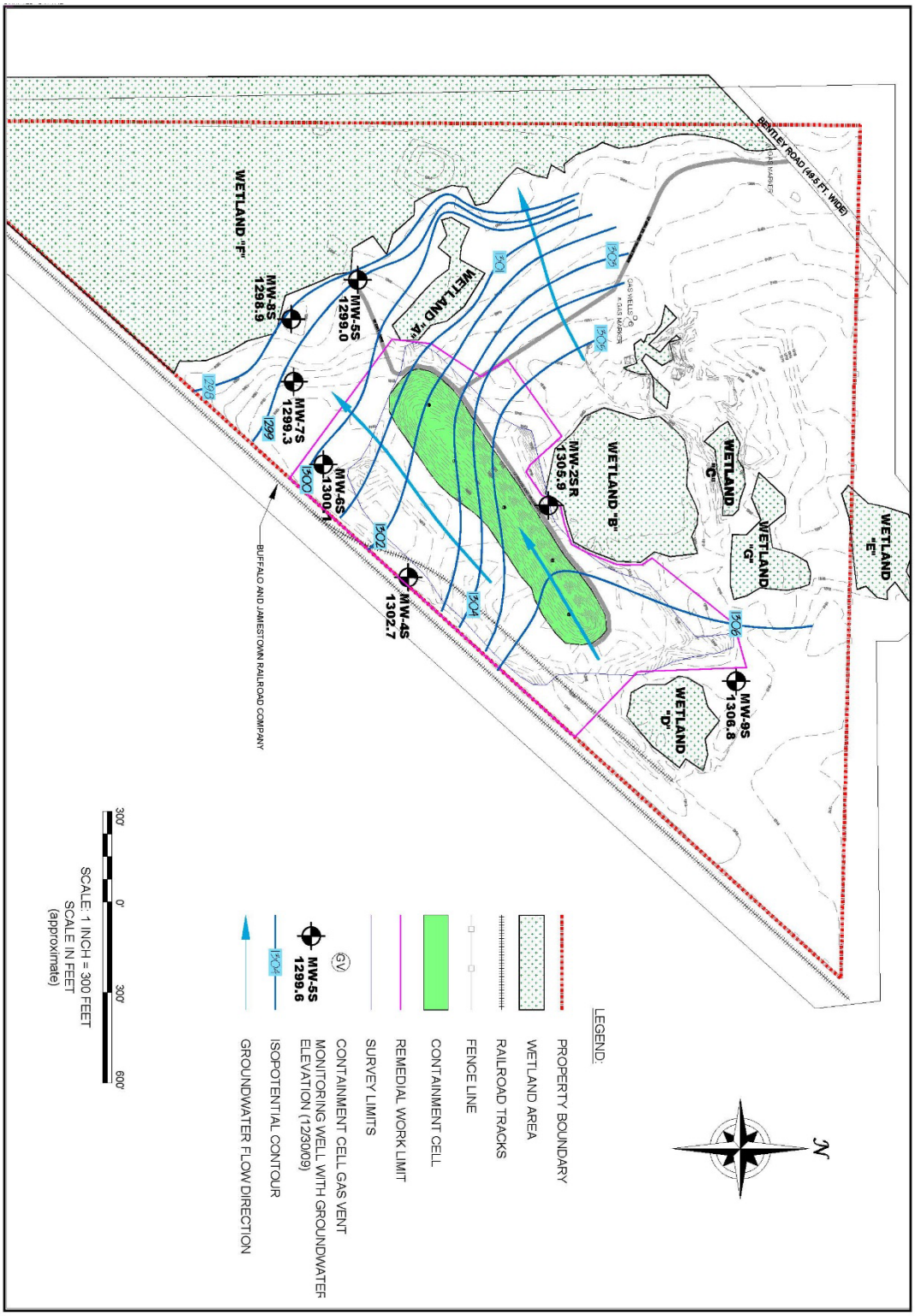


FIGURE 3

SITE PLAN & ISOPOTENTIAL MAP FOR OCTOBER 20, 2017

POST-REMEDIAL MONITORING

PETER COOPER MARKHAMS SUPERFUND SITE

DAYTON, NEW YORK

PREPARED FOR

CPRPs FOR PETER COOPER MARKHAMS

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NEW YORK 14218
(716) 856-0599

JOB NO.: 0199-001-100