2016 Operations and Maintenance Report

Stauffer Management Company LLC Site
Town of Lewiston, New York

Stauffer Management Company

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Executive Summary

This report summarizes the operation and maintenance (O&M) activities performed at the Stauffer Management Company LLC (SMC) Site (Site) in Lewiston, New York for the reporting period of January 1, 2016 through December 31, 2016. This report also summarizes significant modifications to remedial operations during the reporting period and presents data that can be used to evaluate the effectiveness of the remedial systems, provides conclusions about the data, and offers recommendations for 2017 operations.

The SMC Site is located in the Town of Lewiston, New York, immediately north of the forebay of the Robert Moses Power Plant and is a former chemical manufacturing facility owned and operated by Stauffer Chemical Company. All structures associated with the former plant were demolished in the early 1980s. Stauffer Management Company LLC (SMC) manages the overall Site remediation and GHD Services, Inc. (GHD) provides day-to-day operation of the remedial operations. The remedial work is being done in accordance with New York State Department of Environmental Conservation (NYSDEC) Consent Order (CO) #B9-0137-86-04 effective July 19, 1993.

Currently, the active remedial operations consist of a bedrock groundwater extraction and treatment system, including deep bedrock and shallow bedrock extraction wells. A soil vapor extraction (SVE) treatment system for Area A of the Site has been shut off with the approval of NYSDEC, but remains operable. Two other SVE systems were decommissioned in 2001 and 2004.

The major chemicals of concern in the groundwater at the Site have been identified in the Site-Specific Parameter List (SSPL) as follows:

1. carbon disulfide
2. carbon tetrachloride
3. chloroform
4. methylene chloride
5. tetrachloroethene
6. benzene
7. chlorobenzene
8. toluene
9. trichloroethene

The groundwater extraction network consists of two deep bedrock groundwater extraction wells, three intermediate/deep bedrock extraction wells, three shallow bedrock extraction wells, and three overburden/shallow bedrock wells in Area A. The locations of the extraction wells are shown on Figure 1.5. Underground force mains with secondary containment convey recovered groundwater from the extraction wells to the treatment building.

Extracted groundwater is treated in two granular activated carbon (GAC) beds located in the treatment building. The treated water from the GAC units is discharged through the outfall to the New York Power Authority (NYPA) Forebay, located south of the Site. Treated water is discharged in accordance with effluent limits and sampling requirements set by NYSDEC. Due to the Site being operated under the CO, a State Pollutant Discharge Elimination System (SPDES) permit is not required.

Approximately 14.8 million gallons of groundwater were recovered from the Site in 2016 for subsequent treatment and discharge. This volume was approximately 9 percent lower than the amount extracted in 2015. Significant decreases in extraction rates of EW-5, EW-6 and EW-2 offset a significant increase in the extraction rates of EW-3 and EW-1 and were responsible for the lower system total in 2016. The total mass removed by the groundwater extraction system in 2016 was 2,758 pounds, which is 75 percent higher than that of 2015 (1,580 pounds). Significant increases in mass removal in extraction wells EW-6, EW-1, and EW-3 more than offset slight decreases in mass removal in a number of the other extraction wells. The increase in mass removal rate in EW-6 was due to significantly higher SPPL concentrations. Figures presenting groundwater potentiometric contours and chemical isocontours are presented in Section 7.0 for each water-bearing zone (WBZ) present at the Site, and are discussed in some detail in Sections 7.2 through 7.5. The figures indicate that the Site extraction wells are properly placed to contain, capture, and recover SSPLs present in the groundwater at the Site. The current configuration provides hydraulic capture across the Site and indicates that the extraction system continues to be effective at both hydraulic containment and mass removal.

No major updates were made to the groundwater treatment system in 2016.

For 2017, SMC will continue to focus remedial efforts on increased mass removal and removal efficiency (pound of VOC recovered per 1,000 gallons of groundwater extracted).

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1. Introduction

This report summarizes the operation and maintenance (O&M) activities performed at the Stauffer Management Company LLC (SMC) Site (Site) in Lewiston, New York for the reporting period of January 1, 2016 through December 31, 2016. This report also summarizes significant modifications to remedial operations during the reporting period. Finally, this report presents data that can be used to evaluate the effectiveness of the remedial systems, provides conclusions about the data, and offers recommendations for 2017 operations.

The O&M services were provided by GHD Services, Inc. (GHD) under contract to SMC. The O&M activities were performed in accordance with the "Operations and Maintenance Manual, Stauffer Management Company, Town of Lewiston, New York" (O&M Manual), dated August 2015.

1.1 Site Background

The SMC Site is located in the Town of Lewiston, New York, immediately north of the forebay of the Robert Moses Power Plant. Figure 1.1 presents the location of the Site, and Figure 1.2 presents the layout of the Site.

The Site is a former chemical manufacturing facility owned and operated by Stauffer Chemical Company. All structures associated with the former plant were demolished in the early 1980s. Stauffer Chemical Company was divested in 1987, and Atkemix Thirty Seven, a subsidiary of Stauffer Management Company, became the Site owner. In 2000, Stauffer Management Company and Atkemix Thirty Seven restructured into a limited liability company that is now known as SMC.

In 1995, in accordance with Consent Order (CO) #B9-0137-86-04, SMC initiated remedial construction for soil and groundwater. At that time, the Treatment Building was erected to house the Site groundwater treatment system and the soil vapor extraction (SVE) treatment system for Area A. A second SVE treatment system, Area C, was mounted in a trailer located off-Site, beyond the southeast corner of the Site property. SVE operations at Area C were discontinued in May 2004, and the Area C treatment system was decommissioned in July 2004. A third SVE system at Area T-4 was also installed in 1995, operated until 2000, and decommissioned in September 2001. Note that Area B was a historic landfill located beyond the southeast corner of the Site used for disposal of inert materials. Area B material was disposed off-Site and investigations determined no need for further remediation.

The major chemicals of concern in the groundwater at the Site have been identified in the Site-Specific Parameter List (SSPL) as follows:

1. carbon disulfide
2. carbon tetrachloride
3. chloroform
4. methylene chloride
5. tetrachloroethene

6. benzene
7. chlorobenzene
8. toluene
9. trichloroethene

These chemicals have historically been detected at varying concentrations in the groundwater, subsurface soils, seeps, and surface water run-off in the immediate vicinity of the Site.

1.2 Remedial Systems Descriptions

The remedial systems currently operable at the Site include:

1. Area A SVE system (Note that the Area A SVE system is currently turned off, but remains operable – see Section 2.1 below)
2. Bedrock groundwater extraction and treatment system, consisting of deep bedrock and shallow bedrock extraction wells

The SVE system located in Area T-4 was decommissioned in 2001, and the SVE system located in Area C was decommissioned in 2004.

The remedial systems are briefly described in the following sections.

1.2.1 Area A

Area A occupies approximately 136,500 square feet near the center of the property as shown on Figures 1.2 and 1.3. The remedial system at Area A is a combination of soil vapor and groundwater extraction and includes 39 SVE wells, 3 dual-phase groundwater/SVE wells, and a cover comprised of a polyvinyl chloride (PVC) geomembrane liner, a geotextile cushion, and stone.

Each SVE well is connected to one of four header pipes that each enter the Treatment Building and are connected to the vacuum blower housed in the north side of the building. The SVE piping is mounted on a uni-strut/pipe strap support system. The Area A SVE treatment system is comprised of a skid with a moisture separator tank, an in-line filter, a vacuum blower, a discharge silencer, and a condensate removal pump, all located in the Treatment Building. The heat exchanger and granular activated carbon (GAC) adsorption units are mounted separately on the concrete floor in the building.

1.2.2 Area C

Area C occupies approximately 19,350 square feet beyond the southeast corner of the Site property, as shown on Figures 1.2 and 1.4. Area C is the location of one of the landfills previously used by Stauffer Chemical Company.

Due to the success of the system and with the approval of New York State Department of Environmental Conservation (NYSDEC), operations at Area C were discontinued in May 2004, and the SVE system was decommissioned in July 2004. The SVE wells were plugged and abandoned in accordance with NYSDEC regulations in December 2004.

1.2.3 Area T-4

Area T-4 occupies approximately 11,500 square feet and is located southwest of the Treatment Building, as shown on Figure 1.2. The Area T-4 SVE system was decommissioned in September 2001 based on the success of the system and with the approval of NYSDEC.

1.2.4 Groundwater Extraction and Treatment System

The groundwater extraction network consists of two deep bedrock groundwater extraction wells (LR-66 and OW-3), three intermediate/deep bedrock extraction wells (EW-1, EW-2, EW-3), three shallow bedrock extraction wells (EW-4, EW-5, and EW-6), and three shallow dual-phase wells in Area A (DPA-201, DPA-202, and DPA-203). The locations of the extraction wells are shown on Figure 1.5.

Underground force mains with secondary containment convey recovered groundwater from the extraction wells to the Treatment Building. The groundwater treatment system is currently housed in the south side of the original Treatment Building and in the northwest addition to the building.

All groundwater from each of the extraction wells is pumped into the on-Site treatment system. The major components of the treatment system are listed below:

1. Solids Settling Tank: a 1,500-gallon cone-bottom tank installed in 2009 to provide solids settling prior to the influent water entering the carbon treatment system. This tank replaced a Non-Aqueous Phase Liquid (NAPL) Separator tank that had deteriorated. Phase separation is not required at the Site, as no NAPL has been observed since beginning system operation.
2. Carbon Feed Tank: a process tank used to accumulate water from the solids settling tank.
3. Carbon Feed Pump: pumps water from the carbon feed tank through the rest of the treatment system.
4. Bag Filters: groundwater is pumped through thirteen 10-micron bag filters (consisting of an eight-bag round filter vessel and a separate five-bag unit) operated in parallel to prevent solids from plugging the GAC.
5. GAC Beds: after the bag filters, the groundwater passes through two 10,000-pound GAC adsorption vessels operated in series. Note that the 10,000-pound GAC vessels were installed in 2014 as replacements for two 20,000-pound GAC adsorption vessels.

The treated water from the GAC units is discharged through the outfall to the New York Power Authority (NYPA) Forebay, located south of the Site. Treated water is discharged in accordance with effluent limits and sampling requirements set by NYSDEC. Due to the Site being operated under the CO, a State Pollutant Discharge Elimination System (SPDES) permit is not required.

2. Area A Remedial System O&M Activities

2.1 Summary of Area A Operations For 2016

The Area A SVE system was turned off and did not operate in 2016.

As discussed in the 2013 Annual Operations & Maintenance Report, in 2013 – early 2014 SMC performed an evaluation of historic and current Area A performance. The evaluation concluded that the operation of the SVE system had achieved the maximum amount of soil vapor removal reasonably attainable, and that any residual vapor-phase volatile organic compounds (VOCs) are being contributed from the contaminated groundwater that exists within and below the Area A treatment field.

A letter report summarizing the evaluation and a recommendation to discontinue operation of the Area A SVE system was submitted to NYSDEC on June 6, 2014. The agency responded to the request in a June 19, 2014 letter to SMC indicating that preparation and submittal of an Environmental Easement (EE) would first be required. On August 4, 2014, NYSDEC visited the Site to discuss Area A and other remedial operations. During the visit, NYSDEC agreed that the Area A blower could be kept off while the EE process was pending. Therefore, the system has been turned off since August 2014.

The final EE was signed by SMC on April 28, 2015 and by NYSDEC on August 24, 2015. The EE was filed in Niagara County on September 4, 2015. Upon submittal of a Site Management Plan (SMP) in 2017 and with subsequent approval, the Area A SVE system will be decommissioned. Note the SVE system is being maintained in operable condition.

2.2 Mass Removal – 2016

Since it was not operating, there was no contaminant mass removed from the Area A SVE system in 2016.

3. Area C Remedial System

Due to the success of the system, the former Area C SVE system was decommissioned in July 2004 with the approval of NYSDEC. The SVE wells were plugged and abandoned in accordance with NYSDEC regulations in December 2004.

4. Area T-4 Remedial System

Due to the success of the system, the former Area T-4 SVE system was decommissioned in September 2001 with the approval of NYSDEC.

Dual phase well T-4 (also known as DPT-261) was taken out of service as a SVE well in 2001. It remains as a monitoring well.

5. Groundwater Extraction System O&M Activities

5.1 2016 Extraction System Modifications

There were no extraction system modifications of note in 2016. Maintenance issues associated with each of the extraction wells are discussed in the sections that follow.

5.2 Summary of Operations – 2016

The bedrock groundwater extraction system operated in automatic mode throughout the reporting period, with visits to the Site two to three times per week to confirm pump operation, perform piping inspections, and complete other routine O&M activities.

Several maintenance activities were performed on the groundwater extraction system in 2016:

- Shallow bedrock air displacement pump EW-4 was inoperable for short periods in 2016 due to component replacements and a leak in the well's secondary containment line. The leaking copper section was replaced with high density polyethylene (HDPE) pipe.
- Intermediate bedrock extraction well EW-1 was pulled for cleaning during the Second Quarter 2016 after the flow rate decreased. When the flow rate decreased again late in the Third Quarter 2016, the EW-1 pumped was pulled and the pump and motor were replaced.
- The deep bedrock air displacement OW-3 pump was rebuilt during 2016.
- Note that following a 2015 well rehabilitation program at extraction wells EW-1, EW-2 and EW-3, those three primary extraction wells generally performed in an efficient manner throughout 2016.

In addition to the above, routine pump cleaning was performed on several other extraction wells throughout the course of the year.

5.3 Mass Removal –2016

5.3.1 Extraction Wells EW-1 through EW-6

Mass removal calculations for extraction wells EW-1 through EW-6 are summarized in Tables 5.1 through 5.6, respectively.

The mass removal of VOCs from groundwater for each extraction well was calculated using the annual flow volume and the results of the analytical data for the annual Site-wide groundwater monitoring event. The volume of groundwater pumped from the six extraction wells is summarized below.

Total Volume of Groundwater Extracted (Gallons) 2016 EW-1 through EW-6					
Extraction Well	***First Quarter***	***Second Quarter***	***Third Quarter***	***Fourth Quarter***	***2016 Total***
EW-1	304,743	256,263	370,222	307,861	1,239,089
EW-2	675,091	840,805	755,216	765,099	3,036,211
EW-3	742,427	961,989	851,654	787,187	3,343,257
EW-4*	75,000	75,000	75,000	75,000	300,000
EW-5	1,149,798	1,264,484	1,420,838	1,178,286	5,013,406
EW-6	477,405	171,551	197,898	597,238	1,444,092
Total gallons pumped	3,424,464	3,570,092	3,670,828	3,710,671	14,376,055
*Extracted volumes are estimated based on historical flow rates					

The total mass, in pounds, removed by the six extraction wells in 2016 is summarized below.

Total VOCs Removed (Pounds) 2016 EW-1 through EW-6	
Extraction Well	***2016 Total***
EW-1	549
EW-2	68
EW-3	256
EW-4	1
EW-5	39.5
EW-6	1345
Total Pounds of VOCs Removed	**2258.5**

The 2259 pounds of VOCs removed from groundwater by EW-1 through EW-6 in 2016 is an increase of 1359 pounds compared with 2015 (900 pounds of VOCs removed). The volume of groundwater extracted by EW-1 through EW-6 in 2016 (14.4 million gallons) was 8 percent lower than in 2015 (15.7 million gallons). The removal efficiency (pound of VOC recovered per 1,000 gallons of groundwater extracted) of the six extraction wells as a group increased from 0.0.06 to 0.157 between 2015 and 2016. The increase in removal efficiency in 2016 is due to higher SSPL concentrations at certain bedrock extraction wells, most notably at shallow bedrock extraction well EW-6. See Section 9.2 for a summary of mass removal by groundwater extraction on a year-to-year basis.

The three extraction wells responsible for the majority of the VOCs removed by the group are EW-1, EW-3 and EW-6, with EW-1 responsible for over 95% of the mass removal. The mass of VOCs extracted by EW-1 in 2016 increased from 300 pounds in 2015 to 549 pounds in 2016, an increase of 83 percent. Some of this mass increase can be explained by the fact that 2016 groundwater extraction from EW-1 increased by 251,060 gallons compared with 2015, an increase of 25 percent.

The removal efficiency of EW-1 increased to 0.44 pound VOC/1,000 gallons extracted in 2016 versus 0.30 pound VOC/1,000 gallons extracted in 2015.

The removal efficiency of EW-2 decreased between 2015 and 2016, from 0.06 pound VOC/1,000 gallons extracted in 2015 to 0.02 in 2016.

At EW-3, the removal efficiency increased between 2015 and 2016 (from 0.05 to 0.08 pound VOC/1,000 gallons extracted).

At EW-4, the removal efficiency remained the same between 2015 and 2016 (at 0.01 pound VOC/1,000 gallons extracted).

The removal efficiency also remained the same between 2015 and 2016 at EW-5, at 0.01 pound VOC/1,000 gallons extracted.

The removal efficiency of EW-6 increased significantly between 2015 and 2016, from 0.08 pound VOC/1,000 gallons extracted in 2015, to 0.93 in 2016. As mentioned above, the 2016 SSPL concentrations at EW-6 increased significantly compared to 2015.

Compounds removed by EW-1 through EW-6 in 2016 consisted of carbon tetrachloride (1,375 pounds, 61 percent of the total removed), carbon disulfide (544 pounds, 24 percent of the total), chloroform (299 pounds, 13 percent of the total), tetrachloroethene (24 pounds), methylene chloride (10 pounds), and trichloroethene (6 pounds). The final three SSPLs make up approximately 2 percent of the total compounds removed by EW-1 through EW-6. Section 9.2 provides historical breakdowns of the compounds removed by groundwater extraction since 1999.

For the group of six extraction wells, the mass of carbon tetrachloride removed in 2016 increased by 1,070 pounds compared with 2015, the mass of carbon disulfide removed in 2016 increased by 126 pounds compared with 2015, , and the mass of chloroform removed increased by 143 pounds. The cumulative mass of chlorobenzene, tetrachloroethene, trichloroethene, and methylene chloride removed in 2016 approximately doubled from 2015.

5.3.2 Area A Dual Phase Wells DPA-201, DPA-202, and DPA-203

Mass removal calculations for VOCs removed from shallow groundwater by DPA-201, DPA-202, and DPA-203 are summarized in Tables 5.7 through 5.9, respectively.

The mass removal of VOCs from groundwater for each dual phase well was calculated using the annual flow volume and the results of the analytical data for the annual Site-wide groundwater monitoring event. Note that the flow data for dual phase wells DPA-201 and DPA-203 were estimated for 2016 based upon previous years' results and technician observations that the pumps are operating normally (i.e., removing all of the available groundwater). The approximate volume of groundwater pumped from the three Area A dual wells is summarized below.

Total Volume of Groundwater Extracted (Gallons) 2016 DPA-201 through DPA-203					
Well No.	***1st Quarter***	***2nd Quarter***	***3rd Quarter***	***4th Quarter***	***System Total-2016***
DPA-201*	17,500	17,500	17,500	17,500	70,000
DPA-202	28,541	11,472	20,245	7,422	67,680
DPA-203*	4,500	8,000	7,000	7,000	26,500
				Total Gallons Pumped	164,180
*Extracted volumes are estimated based on observations and previous years' flows					

The above represents a 28 percent decrease in recovered groundwater by the dual phase wells between 2015 (63,174 gallons) and 2016. DPA-202 was mainly responsible for the decrease, as the volume extracted by the well in 2016 was approximately 45 percent lower than that removed in 2015 (123,388 gallons). All three of the DPA wells appear to be operating normally and removing the groundwater available to them.

The approximate total mass removed by the three dual wells is summarized below.

Total VOCs Removed (Pounds) 2016 DPA-201 through DPA-203	
Well No.	***2016 Total***
DPA-201	5
DPA-202	30.4
DPA-203	52.2
Total VOCs Removed in 2016 (pounds)	**87.6**

The 87.6 pounds of total VOCs recovered by DPA-201, DPA-202, and DPA-203 in 2016 represent a 45 percent decrease from 2015 (160 pounds recovered). The estimated removal efficiency of the three dual phase extraction wells as a group decreased, from 0.70 pounds VOC/1,000 gallons extracted in 2015 to 0.53 pounds VOC/1,000 gallons extracted in 2016.

The major compounds removed from groundwater by the three dual wells were carbon tetrachloride (70 pounds, 80 percent of the total recovered) and chloroform (13 pounds, 15 percent of total). Trace amounts of carbon disulfide, methylene chloride, tetrachloroethene and trichlorothene made up the last 5 percent of VOCs removed.

5.3.3 Area T-4 Extraction Well DPT-261 (T-4)

Extraction well DPT-261 (T-4) did not operate during 2016 due to a lack of recoverable water. Although there was sufficient water to sample T-4 during all of the quarterly groundwater sampling events, the automatic air-driven pump did not recover any measurable amounts of water for the year. Well T-4 recovers less than 0.1 gallons per minute (GPM) when it operates.

5.3.4 Extraction Well OW-3

The mass of SSPL compounds removed from groundwater by OW-3 is summarized in Table 5.10. The estimated volume of groundwater pumped from OW-3 in 2016 was 119,153 gallons, an increase of about 59 percent from 2015. A total of approximately 411 pounds of VOCs were removed from groundwater by OW-3 in 2016, a decrease of 103 pounds compared with 2015 (514 pounds).

The 2016 removal efficiency of OW-3 was 3.5 pounds VOC/1,000 gallons extracted, compared with a removal efficiency of 6.9 pounds VOC/1,000 gallons extracted in 2015. The compounds removed were carbon disulfide (377.6 pounds, 92 percent of the total recovered), carbon tetrachloride (23.8 pounds, 6 percent of total), chloroform (7.3 pounds, 2 percent of total), and tetrachloroethene (2.5 pounds, less than 1 percent of total).

5.3.5 Extraction Well LR-66

Former Lockport-Rochester monitoring well LR-66 was converted into a permanent groundwater extraction well in June 2005 and became operable on July 1, 2005.

The mass removal calculations for organic compounds removed from groundwater by LR-66 are summarized in Table 5.11. The estimated volume of groundwater pumped from LR-66 in 2016 was 180,000 gallons, down 27 percent from 2015 (248,070 gallons). A total of 0.7 pounds of VOCs was removed from groundwater by LR-66 in 2016, approximately 85% less than the amount removed in 2015 (4.7 pounds). The removal efficiency of LR-66 decreased from 0.02 pound VOC/1,000 gallons extracted in 2015, to 0.004 in 2016. The two compounds removed in 2016 were carbon tetrachloride (0.5pounds), and chloroform (0.2 pounds).

5.4 Routine Maintenance

The operational status of the extraction and dual phase wells is monitored during the weekly visits to the Site. The flows from each of the wells are recorded weekly in the O&M logbook. If the submersible pumps are not maintaining the desired drawdown, or if the dual pumps are not cycling properly, pump maintenance is performed.

All of the extraction wells have been tied into one of two leak detection systems. A leak in the force main of any well on either system will shut off all of the pumping associated with the system. In 2016, a leak was detected in the EW-4 force main during the second quarter and it was promptly repaired with no release from the containment system.

6. Groundwater Treatment System

6.1 Summary of Operations – 2016

The groundwater treatment system operated in the automatic mode in 2016 with at least weekly visits to the Site to perform system monitoring, inspections, and other routine O&M activities.

No major updates were made to the groundwater treatment system in 2016.

6.2 Maintenance, Inspection, and Monitoring Activities

6.2.1 Routine Treatment System Maintenance

Routine inspection and maintenance of the groundwater treatment system is performed weekly during visits to the Site. Routine weekly inspections and maintenance include:

1. General visual inspection of the treatment equipment for leaks, overflows, or malfunctions
2. Inspection of process-indicating instruments
3. Inspection of aboveground SVE piping
4. Recording operating conditions in logbook
5. Correction of operational problems
6. Replacement of bag filters, as indicated by differential pressure across the filters
7. Repair or replacement of damaged parts

All inspections are recorded in the O&M logbook.

The treatment system is shut down periodically to perform routine maintenance on the system components. The periodic maintenance shutdowns involved cleaning and inspection of the following:

1. Cone bottom tank
2. Carbon feed tank
3. Carbon feed pump
4. Bag filter housings

The carbon vessels are cleaned and inspected during routine carbon changeouts.

6.2.2 Treatment System Modifications

There were no treatment system modifications in 2016.

6.2.3 Groundwater Treatment System Process Monitoring

Samples for chemical analysis are collected routinely from the groundwater treatment system. Samples are collected weekly from the carbon interstage sampling point. The groundwater influent and system effluent are sampled monthly, at a minimum. Process monitoring sample analytical results are presented in Appendix A. Influent, carbon interstage, and effluent data are summarized in Tables A-1 to A-3, respectively.

The 2016 analytical data for the monthly influent groundwater samples are presented in Table A-1. The data indicate that typically only carbon tetrachloride, carbon disulfide, and chloroform are detected in high concentrations in the influent.

The 2016 analytical data for the weekly carbon interstage groundwater samples are presented in Table A-2. The data indicate that the results are generally non-detect or indicate low (< 50 ppb) total SSPLs except when breakthrough occurred.

Five carbon exchanges were performed in 2016, with one 10,000-pound bed exchanged each time, on the following dates:

- February 18, 2016
- April 14, 2016
- June 30, 2016
- August 25, 2016
- November 1, 2016

Note that for each of the five carbon exchanges performed in 2016, the lead carbon bed was exchanged and the former lag bed became the lead bed.

The 2016 analytical data for effluent samples collected from the groundwater treatment system are presented in Table A-3. Effluent samples are collected and analyzed monthly for SSPLs (VOCs), at a minimum, except when SSPLs indicative of breakthrough are detected in the weekly interstage samples. When that occurs, effluent samples are generally collected weekly as a conservative measure. Note that with one exception for one VOC in August, there were no SSPLs detected in any of the effluent samples collected during 2016. The one detection was a very low concentration of carbon disulfide in the effluent sample of August 22, 2016.

6.2.4 Additional Monitoring of Treated Effluent

In addition to the monthly effluent sampling and analysis for SSPLs, groundwater treatment system effluent samples are also collected on a quarterly basis. The list of quarterly parameters and associated discharge limits were originally established in a SPDES permit issued by the NYSDEC Division of Water (DOW) in 1995 when Facility groundwater treatment operations were beginning.

Since that time, Facility operations have been conducted in accordance with a July 19, 1993 CO issued by NYSDEC as part of the New York State Superfund program, with oversight by the agency's Division of Environmental Remediation (DER). With respect to Facility effluent discharge, the DOW does not have regulatory authority over discharge from a State Superfund Site. Instead, the DER is responsible for ensuring compliance with Facility effluent criteria and for approval of all submittals. For the SMC facility, DER requires monthly effluent sampling for SSPL compounds and quarterly effluent sampling for a combined list of SSPL compounds and other SPDES parameters. To differentiate it from the Facility's monthly effluent sampling, the quarterly sampling event is known as the "SPDES sampling" event.

Appendix B presents the quarterly SPDES sample results for 2016. Note that since the monthly effluent samples include analyses of the SPDES SSPLs (the required list of VOCs) on a more frequent basis than quarterly, the VOC component of the SPDES requirements is met by the monthly results shown on Appendix A-3. As noted above, with one minor exception, all VOC results were non-detect for 2016.

The First Quarter 2016 SPDES sampling event was inadvertently missed. The First Quarter 2016 was the first sampling event following an approved schedule change where there were no quarterly extraction well groundwater samples collected, and the sampling crew always collected the SPDES sample on the day of the extraction well sampling. In the absence of the extraction well-only event, the crew inadvertently missed collecting the semi-VOC and metals sample for the SPDES requirement. However, monthly VOC effluent samples were collected throughout the first quarter.

Appendix B presents the list of SPDES semi-volatile, metals and wet chemistry parameters, the associated discharge limits, and the analytical laboratory results of the 2016 quarterly SPDES sampling events for the Facility. Discharge limits are concentration-based with the exception of metals, for which mass limits have been established. To calculate average daily mass discharge rates, laboratory concentrations can be multiplied by the daily average effluent flow for the treatment system (reported using Table 9.2 of this Report) and converted into pounds per day. However, for 2016 (with one exception for selenium in November 2016), all of the metals results for the Facility SPDES sampling were non-detect. Therefore, the mass for the quarterly events in 2016 is shown as "<" (less than) the calculated number, which was determined using the reported detection limit for each metal.

As noted in Appendix B, there were no parameters detected in excess of the established discharge limitations, and with the exception of one de minimis concentration of selenium detected in November 2016, all of the effluent analyses were non-detect throughout 2016.

6.2.5 Groundwater Treatment System Performance Monitoring – 2016

On August 16, 2016, NYSDEC approved an SMC request to eliminate the quarterly extraction well-only sampling events that had been performed since the 1990s. Sampling of the Site-wide monitoring well network and each extraction well continues to be performed on an annual basis. The purpose of the groundwater monitoring is to evaluate progress of the groundwater extraction system in removing the SSPL compounds from the groundwater. The groundwater sampling data are used to develop concentration trends over time.

Groundwater samples are collected in accordance with established procedures and protocols in the Site Operations and Maintenance Manual. The samples are shipped to Columbia Analytical Services for analysis following Chain of Custody procedures. The laboratory sends the analytical results to GHD. The results are reviewed, collated, put into tabular form, sent to SMC for review, and included in the quarterly status reports to NYSDEC.

The annual Site-wide groundwater sampling event was performed between May 24 and June 10, 2016. The analytical results for the groundwater samples are presented in Appendix C.

6.2.6 Groundwater Treatment System Performance Monitoring – 2017

The currently scheduled annual sampling program for 2017

1. Annual Sampling: During 2017, an annual sampling is scheduled to be performed in May. Wells to be sampled include the 12 extraction wells plus the following 48 monitoring wells:

Site Monitoring Wells			
Upper Lockport Wells	***Lower Lockport Wells***	***Lockport/ Rochester Wells***	***Rochester Wells***
OW-11*	W-18L	W-19B	B-02
W-11	W-19A	LR-2*	R-16
W-16	W-23B*	LR-16	R-19
W-16L	W-48E	LR-67	R-68
W-17*	W-50L	LR-20	R-48
W-18R	W-60L*	LR-48	R-50
W-19D	W-65	LR-49	R-51
W-20	W-66L	LR-50	R-60
W-22	W-67L	LR-51	R-61*
W-23C	W-70L	LR-61	R-62
W-66		LR-62	R-66*
W-67		LR-69*	R-67
T-4*		OW-5	

Note: Wells marked with * will be removed from the annual groundwater sampling program.

Note that in a June 7, 2016 conference call with NYSDEC, GHD (on behalf of SMC) requested that a total of 9 monitoring wells be removed from the annual sampling schedule. On July 5, 2016, at the request of the agency, GHD provided NYSDEC with additional supporting documentation for the request. The wells proposed to be removed from the annual sampling event either do not respond to pumping of site extraction wells, are dry, or provide no meaningful information regarding plume delineation or contaminant distribution. Following several follow up discussions and email correspondences, NYSDEC indicated in February 2017 that it is has completed its review of the GHD/SMC request and that correspondence concerning the request is being prepared.

6.2.7 Facilities, Structures, and Grounds Maintenance

The facilities, structures, and grounds are inspected and maintained regularly as specified in the O&M Manual. These inspections are carried out during routine Site visits. These routine inspection tasks include checking the appearance of the grass, driveways, walkways, fencing, and lighting and containment areas. Inspections and maintenance tasks inside the Treatment Building include checking the appearance of walls, floors, ceiling, doors, walkways, emergency equipment, lights, sumps, and equipment support structures. Any problems or deficiencies are noted in the O&M logbook.

6.2.8 Unscheduled Maintenance

Unscheduled maintenance was performed at the Site as required in 2016. Examples of unscheduled maintenance activities performed are:

1. Pump maintenance or replacement
2. Extraction well riser pipe replacement

3. Equipment repair or replacement

Section 5.2 provides an overview of the 2016 unscheduled maintenance related to the extraction wells.

6.2.9 Monitoring Well Inventory

An inventory/inspection of the Site monitoring wells was performed in November 2016. A copy of the well inventory is included as Appendix D. The well inventory indicates that the wells are in generally good condition. One monitoring well (R-51) requires minor repairs that will be performed in spring 2017.

7. Groundwater Level Monitoring and Chemistry – 2016

Depth-to-groundwater measurements were recorded for all wells in May, August, and November 2016. Table 7.1 presents the measured groundwater levels for the three events. The May 2016 data were used to prepare potentiometric surface contour maps for each of the four water-bearing zones (WBZs). The WBZs include the Upper Lockport, the Lower Lockport, the Lockport/Rochester, and the Rochester. In addition to the potentiometric surface contours, chemical isocontour figures were prepared for each WBZ using groundwater data obtained during the May 2016 event.

The potentiometric surface contour maps and chemical isocontour figures are discussed in the following sections.

7.1 General

7.1.1 Groundwater Potentiometric Contours

Potentiometric surface contours were prepared for each WBZ based on the measured depths to groundwater in the May 2016 sampling event. Hydraulic containment was determined by evaluating the potentiometric contours, as well as considering the results of a detailed hydraulic monitoring program performed in 2000. The 2000 hydraulic monitoring program assessed the relationship between groundwater elevations in individual wells and their responses to pumping activity in the various Site WBZs using transducers installed in individual wells. The results of that program, including individual well hydrographs, were presented in the 2000 Annual Operations and Maintenance Report, March 2001.

Table 7.2 presents a summary of the monitoring wells and extraction wells classified by WBZ. The wells are classified under a specific WBZ if they are screened across or have open intervals in the specific WBZ. This classification was used to prepare the potentiometric surface contour maps for the May 2016 event.

During the preparation of potentiometric surface contours for the various WBZs, GHD noted that several monitoring wells did not appear to be hydraulically connected to the monitored WBZ. For

example, well W-17 in the Upper Lockport formation, well W-23B in the Lower Lockport formation, well LR-69 in the Lockport/Rochester formation, and well R-66 in the Rochester formation exhibited anomalous water levels and, therefore, were not used to create groundwater contours. Well W-23B showed hydraulic response to Lower Lockport pumping in the 2000 hydraulic monitoring program, while W-17, LR-69, and R-66 did not show response to pumping in their respective WBZs. A review of the stratigraphic logs for the latter two wells indicates that the Rochester WBZ at R-66 and the Lockport-Rochester WBZ at LR-69 are generally less fractured than in other areas of the Site; hence, hydraulic interconnection is lower at these two deep monitoring wells. The wells that are not used for contouring are noted on the various potentiometric contour figures.

In addition, water levels for the deep bedrock extraction wells (EW-1, EW-2, and EW-3, whose open intervals span the Lower Lockport, Lockport/Rochester, and Rochester WBZs) were adjusted to levels representative of the specific WBZ. This was done when the measured water level for the deep extraction well was significantly below the base of the designated WBZ (i.e. the Lower Lockport and Lockport/Rochester WBZs) or significantly below the water level elevations of the surrounding wells in a particular WBZ (i.e. the Rochester WBZ). The groundwater elevations in the immediate vicinity of the deep extraction wells are assumed to be at or near the base of the respective WBZ, since the WBZs at the extraction wells are essentially dewatered. However, for generating groundwater contours, these water levels were conservatively assumed to be lower than the lowest measured water level from the respective WBZs (but not lower than the base of the WBZ). This allows meaningful water level contours to be created for each WBZ in the regions around the deep extraction wells, while accounting for potential influences from extraction well operations and well and fracture efficiencies. These assigned values for EW-1, EW-2, and EW-3 have historically been assigned as indicated below. For 2016, no significant changes were observed in the aquifer levels (i.e., water level elevations in observation wells near an extraction well were not significantly lower than in previous years), so the historical values have again been used. The assigned values are:

Lower Lockport	545 feet mean sea level (MSL)
Lockport/Rochester	545 feet MSL
Rochester	490 feet MSL

Note that the assigned EW-1, EW-2, and EW-3 water level value for both the Lower Lockport and the Lockport/Rochester WBZs for purposes of plotting potentiometric contours is 545 feet MSL. This value reflects the fact that the lowest measured water level in both Lower Lockport and Lockport/Rochester WBZ hydraulically-connected monitoring wells was approximately 545 to 550 feet MSL.

For the Upper Lockport potentiometric contour maps, extraction wells EW-1, EW-2, and EW-3 were not used to generate contours, as these wells are not open in the Upper Lockport. Groundwater elevations for combined Upper and Lower Lockport extraction wells EW-4, EW-5, and EW-6 were adjusted to 570 feet MSL for contouring the Upper Lockport WBZ. The 570 feet MSL is a level very near the lowest measured water level in the Upper Lockport WBZ on Site. Actual water level elevations for EW-4, EW-5, and EW-6 were used for contouring the Lower Lockport WBZ.

7.1.2 Chemical Isocontours

Chemical isocontours for each WBZ were prepared using analytical data from the May 2016 semiannual groundwater monitoring event. Two figures were prepared for the May data: one for carbon disulfide concentrations, and a second for the sum of carbon tetrachloride and chloroform concentrations[1]. A logarithmic scale was utilized for the isocontour plots.

Note that the May 2016 groundwater analytical results for carbon disulfide and for the sum of carbon tetrachloride and chloroform are also shown on the Groundwater Potentiometric Surface Contour figures for the four WBZs. The analytical results are listed below each well that is monitored in the specific WBZ.

7.2 Upper Lockport Water-Bearing Zone

The Upper Lockport WBZ is the shallowest water-bearing fracture zone at the Site. The Upper Lockport WBZ consists of the base of the overburden and approximately the top 25 feet of the Lockport bedrock. This zone is generally highly fractured. Existing Site information indicates that the Upper Lockport WBZ pinches out and is not present on the western portion of the Site. DPA-201, DPA-202, DPA-203, EW-4, EW-5, and EW-6 extract groundwater from the Upper Lockport WBZ.

7.2.1 Groundwater Potentiometric Contours

Figure 7.1 presents the Groundwater Potentiometric Surface Contours for the Upper Lockport WBZ for the May 2016 event. Based upon the groundwater potentiometric surface contours, Upper Lockport groundwater flow is generally east to west through the middle of the Site. There is a very localized response to pumping from extraction wells EW-4, EW-5, and EW-6, which are completed in both the Upper and Lower Lockport WBZ. The 2016 potentiometric surface contours for the Upper Lockport WBZ are generally consistent with historical conditions.

7.2.2 Chemical Isocontours

The chemical isocontour plots for the Upper Lockport WBZ for May 2016 are presented on Figures 7.2 and 7.3. A review of these contours indicates that the only elevated carbon disulfide concentrations exist in the groundwater around DPA-202 and DPA-203 (Figure 7.2) located within Area A. Elevated levels of carbon tetrachloride and chloroform are present at both DPA-202 and DPA-203 and at W-18R, DPA-201, W-17, W-66 and W-67 (Figure 7.3). The mass loading calculations indicate that DPA-202 and DPA-203 were responsible for removing approximately 80 pounds of VOCs in 2016, primarily carbon tetrachloride and chloroform.

Note that there was only one detection of carbon disulfide in Upper Lockport wells west of Area A. Only three Upper Lockport monitoring wells had detectable levels of carbon tetrachloride and chloroform west of Area A. The highest of the three (W-66) had a concentration of 1,700 ppb (sum of carbon tetrachloride and chloroform) and the other two had much lower concentrations.

[1] Chemical concentrations of carbon tetrachloride and chloroform are combined (summed) for preparation of isocontour figures because chloroform is a breakdown (daughter) product of carbon tetrachloride.

The chemical isocontour plots for the Upper Lockport WBZ illustrate that DPA-202 and DPA-203 are well-placed to address the areas of elevated concentrations of the two main Site contaminants. The mass loading data indicate that these pumping wells are effective in recovering VOCs from the Upper Lockport WBZ.

A comparison of the 2016 Upper Lockport carbon disulfide isocontours (Figure 7.2) with those of 2015 indicates that the area of carbon disulfide-impacted groundwater stayed approximately the same with the exception of a western lobe of carbon disulfide due to an isolated detection at W-66. However, the concentrations in the center of the impacted area (specifically DPA-203) decreased significantly, and the concentration at DPA-202 went from non-detect to 1,100 ppb. A comparison of the 2016 Upper Lockport carbon tetrachloride plus chloroform (CTET+CHL) isocontours (Figure 7.3) with those of 2015 also indicates that the size of the impacted groundwater was nearly identical for both years; however, concentrations in DPA-203, in the center of the impacted area, decreased in 2016.

7.3 Lower Lockport Water-Bearing Zone

The Lower Lockport WBZ is the second bedrock WBZ identified at the Site. The Lower Lockport WBZ generally includes groundwater in the fractured bedrock from about 50 to 75 feet below top of rock.

EW-1 through EW-6 extract groundwater from the Lower Lockport WBZ.

7.3.1 Potentiometric Surface Contours

Potentiometric surface contours for the Lower Lockport WBZ for May 2016 are presented as Figure 7.4.

The groundwater potentiometric contours indicate that the VOCs in the Lower Lockport WBZ are being contained, captured on Site, and recovered by the groundwater extraction system. There are pronounced cones of depression around EW-4/EW-2 and around EW-3.

7.3.2 Chemical Isocontours

Chemical isocontours were prepared for the Lower Lockport WBZ for carbon disulfide (Figure 7.5) and carbon tetrachloride and chloroform combined (Figure 7.6). The chemical isocontour maps for carbon disulfide indicate areas of elevated concentrations in the Lower Lockport WBZ around monitoring well W-16L and extraction wells EW-5 and EW-6. Hydraulic monitoring data indicate that W-16L is within the capture zone of combined Upper and Lower Lockport extraction well EW-5 and deep extraction well EW-3. EW-6 is near the center of the Lower Lockport capture zone at the Site.

The chemical isocontour map for carbon tetrachloride and chloroform combined indicates an area of elevated concentrations around EW-6, and to a lesser extent around W-18L. Other nearby wells with elevated concentrations include: W-67L, EW-5 and EW-4. Mass loading concentrations for EW-4, EW-5, and EW-6 indicate that approximately 1330 pounds of carbon tetrachloride and chloroform were recovered from these wells in 2016. The 2000 hydraulic monitoring data indicate that Lower Lockport monitoring wells W-18L, W-23B, W-67L and W-70L respond to pumping activity

at the Site. The May 2016 surface contours and chemical isocontours illustrate that the existing groundwater extraction system is effective in containing and recovering SSPLs from the Lower Lockport WBZ.

A comparison of the 2016 Lower Lockport carbon disulfide isocontours (Figure 7.5) with that of 2015 indicates that the area of impacted groundwater stayed approximately the same in 2016 but that the concentrations in the center and northern edges of the area increased slightly. A comparison of the 2016 Lower Lockport CTET+CHL isocontours (Figure 7.6) with that of 2015 indicates that 2016 CTET and CHL concentrations increased significantly in several of the extraction wells; however, there was no significant change in the size and shape of the impacted area.

7.4 Lockport/Rochester Water-Bearing Zone

The Lockport/Rochester WBZ is the third WBZ encountered in the bedrock at the Site. The Lockport/Rochester WBZ is a slightly fractured WBZ at the base of the Lockport bedrock, and is at or near the contact with the Rochester shale. EW-1 through EW-3 and LR-66 extract groundwater from the Lockport/Rochester WBZ.

7.4.1 Potentiometric Surface Contours

Potentiometric surface contours were prepared for the Lockport/Rochester WBZ for May 2016 (Figure 7.7). A review of the contours under pumping conditions indicates that EW-1, EW-2, and EW-3 have a dramatic effect on the groundwater in this WBZ. In addition, the effect of LR-66 on groundwater recovery is evident. The direction of flow is from the Site perimeter inward toward the extraction wells. The pumping contours indicate hydraulic capture across the entire Site.

7.4.2 Chemical Isocontours

Chemical isocontour maps of the Lockport/Rochester WBZ were prepared from the May 2016 groundwater sampling data. Chemical isocontours for carbon disulfide are presented on Figure 7.8. Chemical isocontours for carbon tetrachloride and chloroform combined are presented on Figure 7.9.

The chemical isocontour plot for carbon disulfide indicates an area of high concentration in groundwater around LR-67 and OW-5, and adjacent well LR-62. Hydraulic monitoring has shown that there is a strong inward gradient from these wells toward the middle of the Site. Previous hydraulic monitoring activities indicate that both wells respond to pumping activity.

The chemical isocontour plot for carbon tetrachloride and chloroform indicates that an area of high concentrations exists around monitoring wells LR-2, LR-61, LR-16, and W-19B. Extraction well LR-66 also exhibits elevated CTET+CHL concentrations. Previous hydraulic monitoring has shown that LR-2, LR-61, LR-16, and W-19B all respond to pumping activity, and are situated within the cone of depression of extraction wells EW-2 and EW-3.

The chemical isocontour maps confirm that the existing groundwater treatment system is effective at containing and recovering VOCs from the Lockport/Rochester WBZ.

A comparison of the 2016 Lockport/Rochester carbon disulfide isocontours (Figure 7.8) with that of 2015 indicates that carbon disulfide concentrations generally increased to the east of Area A at LR-67 and OW-5, but decreased significantly in the same area at LR-62.. A comparison of the 2016 Lockport/Rochester CTET+CHL isocontours (Figure 7.9) with that of 2015 indicates that the concentrations of these two SSPLs increased at LR-2 and at LR-61 near the center of the impacted area and at W-19B. The overall extent of the CTET+CHL impacted area increased slightly in 2016.

7.5 Rochester Water-Bearing Zone

The Rochester WBZ is the fourth and deepest bedrock WBZ being remediated at the Site. EW-1 through EW-3 and OW-3 extract groundwater from the Rochester WBZ.

7.5.1 Potentiometric Surface Contours

The potentiometric surface contour for the Rochester WBZ is presented on Figure 7.10.

The potentiometric contours show a dramatic response to pumping with a strong inward gradient toward EW-1, EW-2, and EW-3. The pumping contours indicate that there is hydraulic containment within the Rochester WBZ across the Site.

7.5.2 Chemical Isocontours

Chemical isocontour maps of the Rochester WBZ were prepared from the May 2016 groundwater sampling data.

The carbon disulfide chemical isocontour map (Figure 7.11) shows two distinct areas of significantly elevated carbon disulfide in the Rochester WBZ Zone. The first area is around extraction well OW-3, which removed 378 pounds of carbon disulfide in 2016. Monitoring wells nearby OW-3 with elevated carbon disulfide concentrations are R-68, R-66, R-50, and B-02. All of these wells showed a response to pumping during the 2000 hydraulic monitoring program. The second area of elevated carbon disulfide is centered on monitoring wells R-67, R-61, and R-62 at the center and eastern side of the Site. These wells are all located relatively close to extraction well EW-3 and show a strong response to Rochester WBZ pumping.

As shown on Figure 7.12, carbon tetrachloride and chloroform are also found in very high concentrations around OW-3. OW-3 removed approximately 30 pounds of these two constituents during 2016. Other wells with high concentrations are R-68, R-66, R-50, B-02, and R-19. Each of these wells is in the capture zone, and the existing groundwater extraction has been demonstrated to be effective in removing VOCs from groundwater in the Rochester WBZ.

A comparison of the 2016 Rochester carbon disulfide isocontours (Figure 7.11) with that of 2015 indicates no significant changes in the size and shape of the impacted groundwater area, however the concentrations in wells adjacent to the center of the carbon disulfide plume showed significant decreases. A comparison of the 2016 Rochester CTET+CHL isocontours (Figure 7.12) with those of 2015 indicates that concentrations in OW-3 decreased significantly compared with 2015. There were no significant changes in the concentrations of these two SSPLs at other Rochester WBZ extraction and monitoring wells. The general size and shape of the impacted groundwater area was also unchanged.

8. North Side Well Gas and Groundwater Sampling

As approved by NYSDEC, the North Side well sampling program was discontinued in June 2004. However, in order to confirm that there are no groundwater impacts in this area, Upper Lockport bedrock monitoring well OW-11 continues to be sampled annually as part of the routine groundwater monitoring program. The results for OW-11 were non-detect for all SSPLs in 2016 (see Appendix C-2). OW-11 has not had detected levels of SSPLs since monitoring began in 1995. Figure 8.1 presents the locations of the North Side wells.

9. Summary of Mass Removal

Mass removals from groundwater have been reported for individual wells in previous sections of this report. This section presents combined mass removal estimates for the groundwater and SVE systems at the Site. It also compares the total estimated mass removed for soil vapor and groundwater extraction in previous years with that of 2016.

9.1 Summary of Mass Removal by Soil Vapor Extraction

Since the SVE system in Area A was shut down for calendar year 2016, there was no mass removed by the system.

SMC anticipates that the Area A remedial system will remain shut down and be permanently decommissioned following submission of the updated SMP in 2017 and the document's subsequent agency approval.

As a point of reference, Table 9.1 compares the compound-specific removal of SSPLs by the Area A SVE system between 2003 and 2014. Carbon tetrachloride and chloroform combined have comprised between 92 and 100 percent of the total vapor mass removed from Area A during this time. Tetrachloroethene has typically comprised the remainder of the mass removed.

9.2 Summary of Mass Removal by Groundwater Extraction

The mass removal of VOCs from groundwater by the eight bedrock groundwater extraction wells (EW-1 through EW-6, LR-66, and OW-3), and the dual wells (DPA-201, DPA-202, and DPA-203) was discussed in Section 5.0 of this report. The total volume of groundwater pumped from the Site in 2016 is summarized in Table 9.2. The total mass of VOCs removed from groundwater at the Site in 2016 is summarized in Table 9.3.

As Table 9.2 indicates, approximately 14.8 million gallons of groundwater were pumped from the Site and treated through the on-Site treatment system. This volume represents a 9 percent decrease compared to 2015 (16.3 million gallons).

Of the 14.8 million gallons extracted by the groundwater system in 2016, the bedrock extraction wells accounted for nearly 99 percent of the total, and the overburden dual phase extraction wells accounted for 1 percent of the total. EW-2, EW-3 and EW-5 accounted for 20.5, 22.5 and 34 percent, respectively, of the recovered groundwater. Other significant extraction wells included EW-6 (10 percent of the total recovered), EW-1 (8 percent), and EW-4 (2 percent).

As Table 9.3 indicates, the total number of pounds of VOCs recovered through groundwater extraction in 2016 was approximately 2,758 pounds. Of this mass removed, 33 percent was carbon disulfide, 53 percent was carbon tetrachloride, and 12 percent was chloroform. Tetrachloroethene, methylene chloride, and trichloroethene combined were approximately 2 percent of the total mass removed from groundwater in 2016.

Extraction well EW-6 accounted for 49 percent of the total VOC mass removed from groundwater in 2016, EW-1 accounted for 20 percent, OW-3 accounted for 15 percent, , EW-3 accounted for 9 percent, EW-2 accounted for 2.5 percent, and EW-5 accounted for 1.5 percent, DPA-203 accounted for 1.9 percent, and DPA-202 accounted for 1.1 percent. The other three extraction wells accounted for the remaining 0.2 percent of the total mass recovered from groundwater on Site.

The 2,758 pounds of total mass removed by groundwater extraction in 2016, compared to 1,580 pounds removed in 2015, represents a 75 percent increase in the total mass removed.

The removal efficiency (pound VOCs recovered/1,000 gallons of groundwater extracted) of the groundwater extraction system at the Site over the past 18 years is shown below:

Yearly Performance of Groundwater Extraction System

Year	***Pounds of VOC Recovered***	***Groundwater Extracted (1,000 gallons)***	***Removal Efficiency (pounds VOC recovered per 1000 gallons extracted)***
1999	4,250	10,310	0.41
2000	6,197	14,906	0.42
2001	10,270	17,327	0.59
2002	6,374	17,515	0.36
2003	6,710	19,276	0.35
2004	4,953	15,951	0.31
2005	4,898	15,496	0.32
2006	3,517	15,370	0.23
2007	3,672	16,545	0.22
2008	4,790	17,289	0.28
2009	2,754	14,416	0.19
2010	2,575	14,360	0.18
2011	2,502	13,310	0.19

Yearly Performance of Groundwater Extraction System			
Year	***Pounds of VOC Recovered***	***Groundwater Extracted (1,000 gallons)***	***Removal Efficiency (pounds VOC recovered per 1000 gallons extracted)***
2012	2,511	15,311	0.16
2013	1,801	16,200	0.11
2014	1,486	12,519	0.12
2015	1,580	16,297	0.10
2016	2,758	14,839	0.19
Total	**73,598**	**277,237**	
Annual Average	**4,089**	**15,402**	**0.26**

The above table illustrates that the removal efficiency of the groundwater extraction system has decreased from a high of 0.59 pound VOC recovered/1,000 gallons extracted in 2001 to its current removal efficiency of 0.19 The overall decrease is due to a general decline in groundwater concentrations over time, which indicates that the extraction system is remediating Site groundwater.

Table 9.4 compares the compound-specific removal of SSPLs by groundwater extraction for the past twelve years. In 2016, carbon tetrachloride and chloroform combined comprised 65 percent of the total mass removed, while carbon disulfide comprised 33 percent. Over the past 5 years, the percentage of carbon tetrachloride and chloroform combined has ranged between 33 percent and 65 percent, while the percentage of carbon disulfide has ranged between 33 and 66 percent. The amount of tetrachloroethene extracted in groundwater has remained constant at about 1 percent or less of the total mass recovered.

9.3 Summary of Mass Removal for the Site

The total mass removed by operation of the remedial systems at the Site in 2016 is summarized below:

Mass Removal by Remedial System - 2016			
Compound	***SVE***	***Groundwater Extraction***	***Site Total***
	(pounds per year)		
Benzene	0	0	0
Carbon Disulfide	0	922	922
Carbon Tetrachloride	0	1470	1470
Chlorobenzene	0	0	0
Chloroform	0	320	320
Methylene chloride	0	11	11
Tetrachloroethene	0	29	29
Toluene	0	0	0
Trichloroethene	0	6	6
Total VOC Removal:	**0**	**2,758**	**2,758**

The 2,758 pounds of VOCs removed from soil and groundwater at the Site is a 75 percent increase from 2015. This increase is due solely to a 1,178-pound increase in mass removed by the groundwater extraction system.

Of the 2,758 pounds of VOCs removed from soil and groundwater at the Site, 33 percent was carbon disulfide, 53 percent was carbon tetrachloride, and 12 percent was chloroform. These three compounds account for 98 percent of the total mass of VOCs removed from the Site in 2016.

The total mass of VOCs removed by the operation of the remedial systems at the Site over the past 18 years is summarized below:

Yearly Mass Removed by Remedial Systems			
Year	***Pounds of VOC Removed by SVE***	***Pounds of VOC Removed in Groundwater***	***Total Pounds of VOC Removed***
1999	1,221	4,294	5,515
2000	165	6,197	6,362
2001	154	10,269	10,423
2002	1,207	6,374	7,581
2003	937	6,710	7,647
2004	228	4,954	5,182
2005	1,954	4,899	6,853
2006	1,712	3,517	5,229
2007	2,348	3,672	6,020
2008	507	4,790	5,297
2009	108	2,754	2,862

Yearly Mass Removed by Remedial Systems			
Year	***Pounds of VOC Removed by SVE***	***Pounds of VOC Removed in Groundwater***	***Total Pounds of VOC Removed***
2010	251	2,575	2,826
2011	289	2,502	2,791
2012	250	2,511	2,761
2013	152	1,801	1,953
2014	22	1,486	1,508
2015	0	1,580	1,580
2016	0	2,758	2,758
Totals	**11,505**	**73,643**	**85,148**

Table 9.5 presents a breakdown of the compound-specific SSPL removal (in pounds per year) for the combined Site remedial systems (SVE and groundwater extraction). The table indicates that carbon tetrachloride and chloroform combined have accounted for 55 percent of the Site-wide recovered mass between 2006 and 2016, with carbon disulfide comprising another 43 percent.

10. Conclusions and Recommendations

This section presents conclusions regarding the 2016 O&M of the Site and presents recommendations for O&M in 2017. The conclusions and recommendations are presented for both of the active remediation systems at the Site.

10.1 Area A SVE Remedial System

The Area A SVE system was shut down and did not operate in 2016. The blower has been shut down since August 4, 2014.

SMC anticipates that the Area A remedial system will remain shut down and be permanently decommissioned following submission and approval of the updated SMP associated with the Environmental Easement that was approved and filed in 2015.

Therefore, once the updated SMP is approved, SMC will request that the Area A SVE wells and associated piping be decommissioned and demolished, such that the Area A remediation can be fully focused on groundwater extraction and treatment.

10.2 Bedrock Groundwater Extraction and Treatment System

10.2.1 Groundwater Extraction System

As discussed in Section 9.2, approximately 14.8 million gallons of groundwater were pumped from the Site for subsequent treatment and discharge. This volume was approximately 9 percent lower than the amount extracted in 2015. Significant decreases in extraction rates of EW-5, EW-6 and

EW-2 offset a significant increase in the extraction rates of EW-3 and EW-1 and were responsible for the lower system total in 2016.

The total mass removed by the groundwater extraction system in 2016 was 2,758 pounds, which is 75 percent higher than that of 2015 (1,580 pounds). Significant increases in mass removal in extraction wells EW-6, EW-1, and EW-3 more than offset slight decreases in mass removal in a number of the other extraction wells.

SMC will continue to focus on optimizing groundwater extraction rates and mass removal in 2017.

10.2.2 Groundwater Treatment System

Following the replacement of the two original 20,000-pound GAC vessels in mid-2014 with two 10,000-pound GAC units, no significant changes or updates were made to the treatment system in 2015 or 2016. The treatment system operated normally in 2016 and was shut down only briefly to perform routine maintenance and carbon changes.

Five carbon exchanges were performed in 2016, with one 10,000-pound bed exchanged each time, on the following dates:

- February 18, 2016
- April 14, 2016
- June 30, 2016
- August 25, 2016
- November 1, 2016

The carbon exchanges were prompted by breakthrough of SSPLs from the lead carbon bed to the lag carbon bed. Concentrations of SSPLs in the interstage samples returned to non-detect following each carbon exchange.

No significant treatment system changes are planned for 2017.

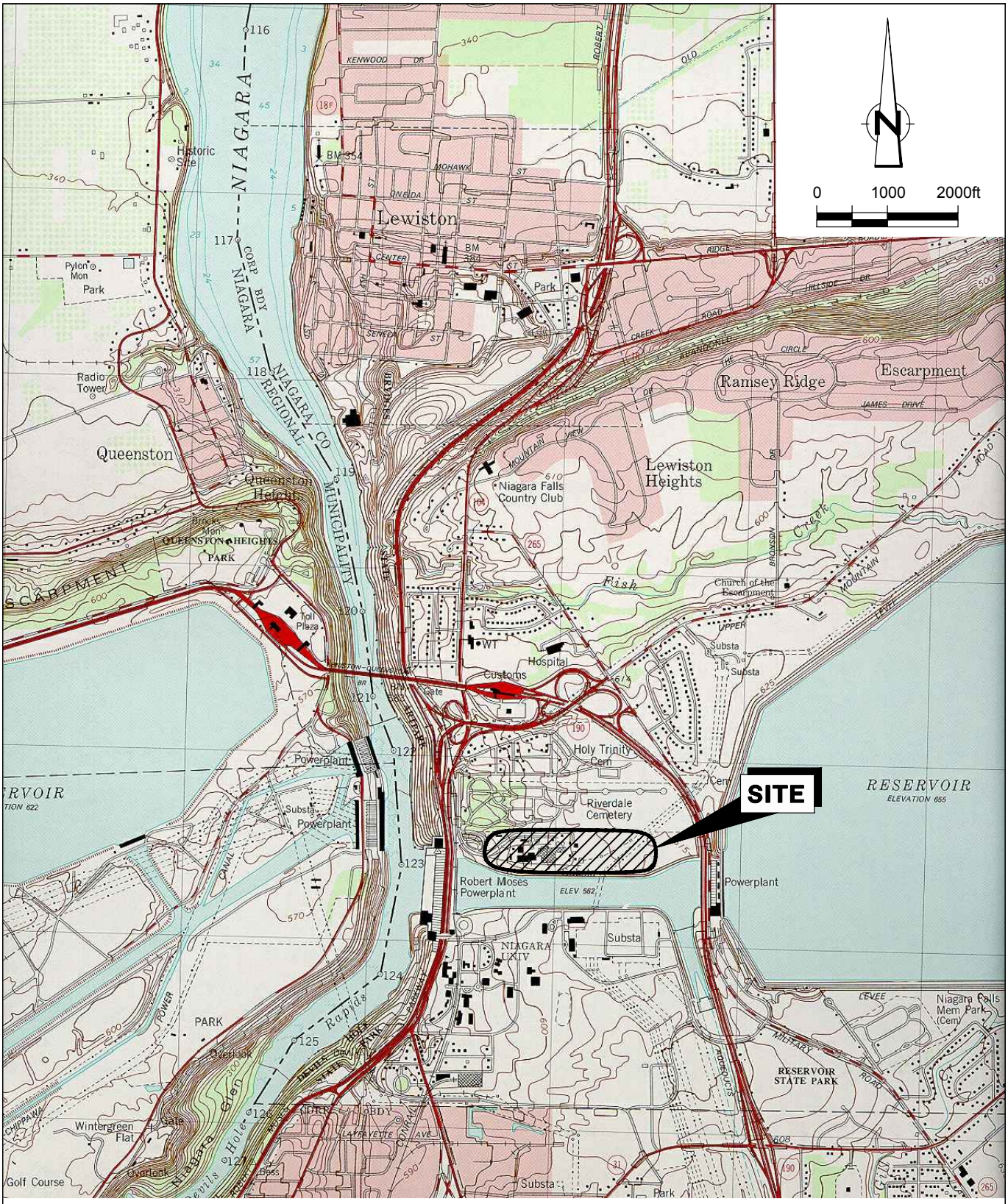
10.2.3 Groundwater Treatment System Performance Monitoring

System performance monitoring includes annual sampling of Site extraction and monitoring wells. The purpose of the groundwater monitoring is to evaluate progress of the groundwater extraction system in removing SSPL compounds from the groundwater.

Figures presenting groundwater potentiometric contours and chemical isocontours are presented in Section 7.0 for each WBZ present at the Site, and are discussed in some detail in Sections 7.2 through 7.5. The figures indicate that the Site extraction wells are properly placed to contain, capture, and recover SSPLs present in the groundwater at the Site. The current configuration provides hydraulic capture across the Site.

A comparison of 2016 isocontours for carbon disulfide and carbon tetrachloride/chloroform for each of the four water-bearing zones is discussed in Sections 7.2 through 7.5, and indicates that the size of the groundwater plume generally stayed the same for the four WBZs. However, increases in carbon disulfide and carbon tetrachloride/chloroform concentrations were noted at several wells near the center of the impacted areas. SMC expects that the 2015 well rehabilitation program will continue to increase both groundwater extraction and mass removal rates and will also have a positive effect on overall SSPL concentrations.

Figures



SOURCE: USGS

figure 1.1

SITE LOCATION
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

OW-10

TO OW-8
(350')

GROUNDWATER EXTRACTION WELL EW-1

GROUNDWATER EXTRACTON WELL OW-3

GROUNDWATER EXTRACTION WELL LR-66

TREATMENT BUILDING

GROUNDWATER
EXTRACTION WELL
EW-5

AREA A SVE SYSTEM

FORMER LANDFILL
AREA B

N

0 100 200ft

OW-9

OW-11

OLD LEWISTON ROAD (66' R.O.W.)

GRAVEL DRIVE

HEADER

EW1

EW2

EW3

EW4

EW5

EW6

P.V.C. DISCHARGE PIPE

APPROX. LOCATION OF 6" DIA. HYDROGEN LINE PERMANENT EASEMENT TO HOOKER CHEMICAL CORP., NEW YORK POWER AUTHORITY 204C, SEC. 1 FILED IN N.C.C.O. L.4468, P.25.

PERMANENT EASEMENT TO
NIAGARA MOHAWK
POWER CORPORATION

PERMANENT EASEMENT TO
NIAGARA MOHAWK
POWER CORPORATION

APPROXIMATE ALIGNMENT OF
EXISTING GROUT CURTAIN

GROUNDWATER
EXTRACTION WELL
EW-2

OUTFALL

FOREBAY

GROUNDWATER
EXTRACTION WELL
EW-3

GROUNDWATER
EXTRACTION WELL
EW-4

GROUNDWATER
EXTRACTION WELL
EW-6

AREA T-4
(DECOMMISSIONED)

FORMER LANDFILL
AREA C
(DECOMMISSIONED)

figure 1.2

SITE LAYOUT
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

GHD

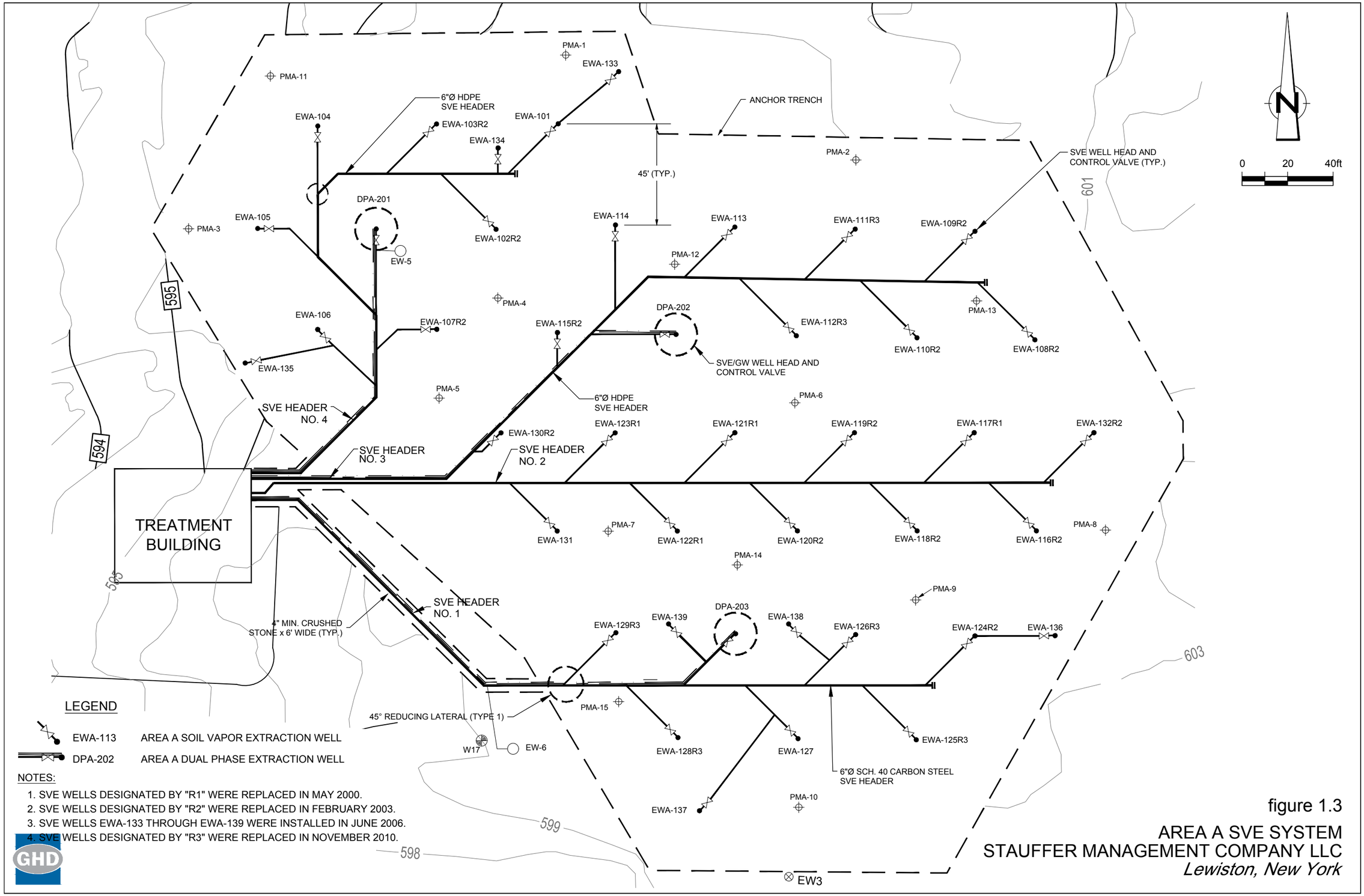


figure 1.3

AREA A SVE SYSTEM
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

06488-20(030)GN-BU003 MAR 11/2016

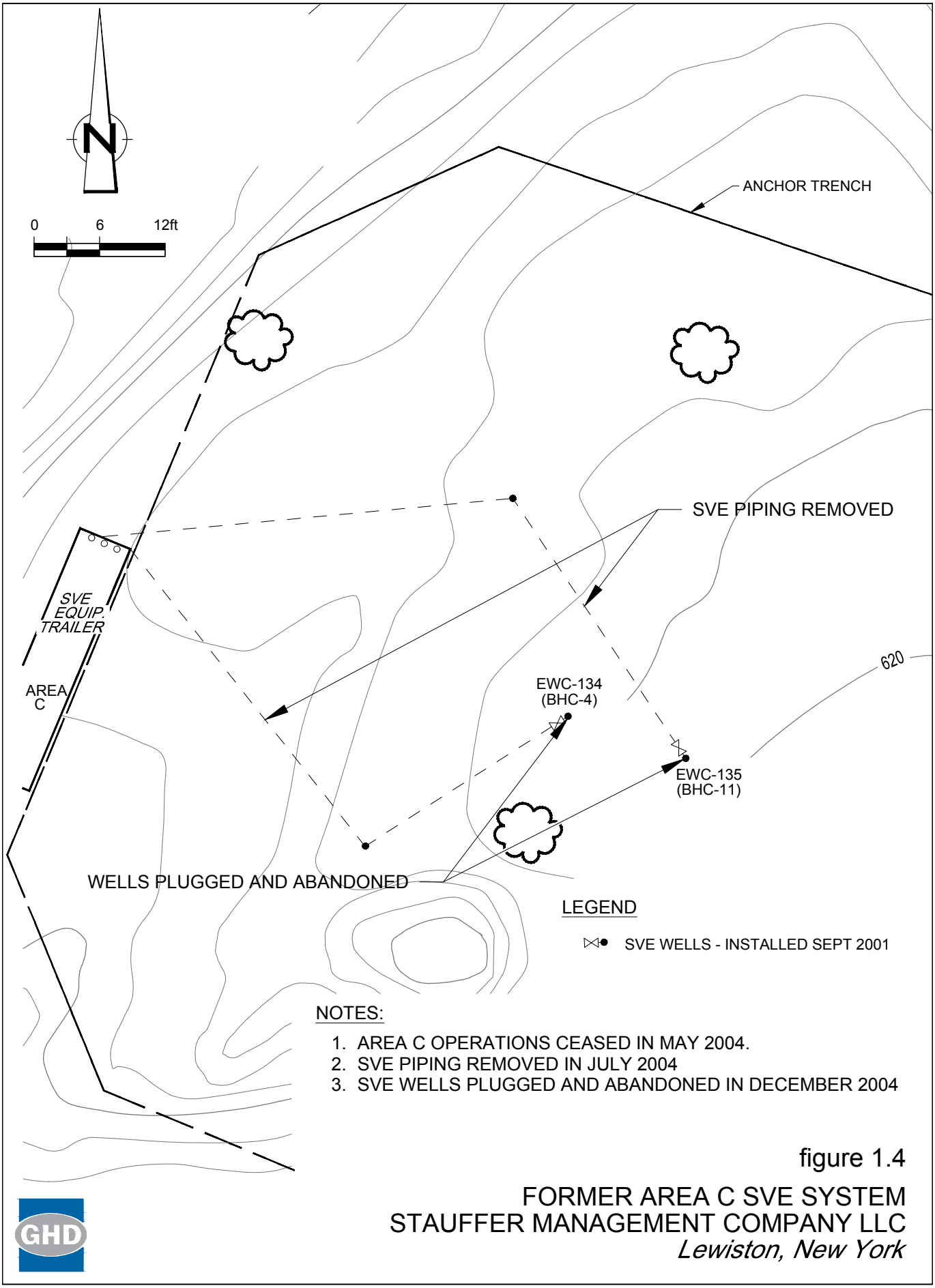


figure 1.4

FORMER AREA C SVE SYSTEM
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

ASPHALT DRIVE
GUIDE RAIL
R-68
LR-50
W-50
R50-95
W-20
OW-3
LR-20
ROADWAY
ASPHALT DRIVE
B-02
NYPA CONSTRUCTION TRAILER
EW-1
R-51
LR-51
CONSTRUCTION TRAILERS
GATE
W-66L
LR-66
W-66
R-66
HEADER
LR-16
W-16
R-16
W-16L
DPA-201
EW-5
DPA-202
STONE AREA
N
0 50 100ft
W-67L
W-67
R-67
LR-67
LR-49
HEADER
W-60L
R60-95
METAL BLDG.
DPA-203
EW-6
W-17
LR-69
DITCH
EW-2
LR-2
W-23B
W-23C
SVE SHELTER
EW-4
T-4
HEADER
EW-3
W65-95
OW5-89
TO W-11
6" P.V.C. EFFLUENT PIPE
LR61-95
R61-95
GRAVEL DRIVE
R48-95
W-48E
LR-48
GRAVEL DRIVE
STONE AREA
W-70L
W-18R
W-18L
VAULT
R62-95
LR62-95
W-22A
APPROXIMATE ALIGNMENT OF EXISTING GROUT CURTAIN
6' CHAIN LINK FENCE
24" C.M.P.
W-19D
W-19B
R19-95
W-19A
DISCHARGE TO FOREBAY
FOREBAY

LEGEND

W-66 ● MONITORING WELL
EW-2 ◪ GROUNDWATER EXTRACTION WELL
DPA-201 ◭ DUAL PHASE EXTRACTION WELLS

figure 1.5

EXTRACTION AND MONITORING WELLS
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

GHD

06488-20(030)GN-BU005 MAR 11/2016

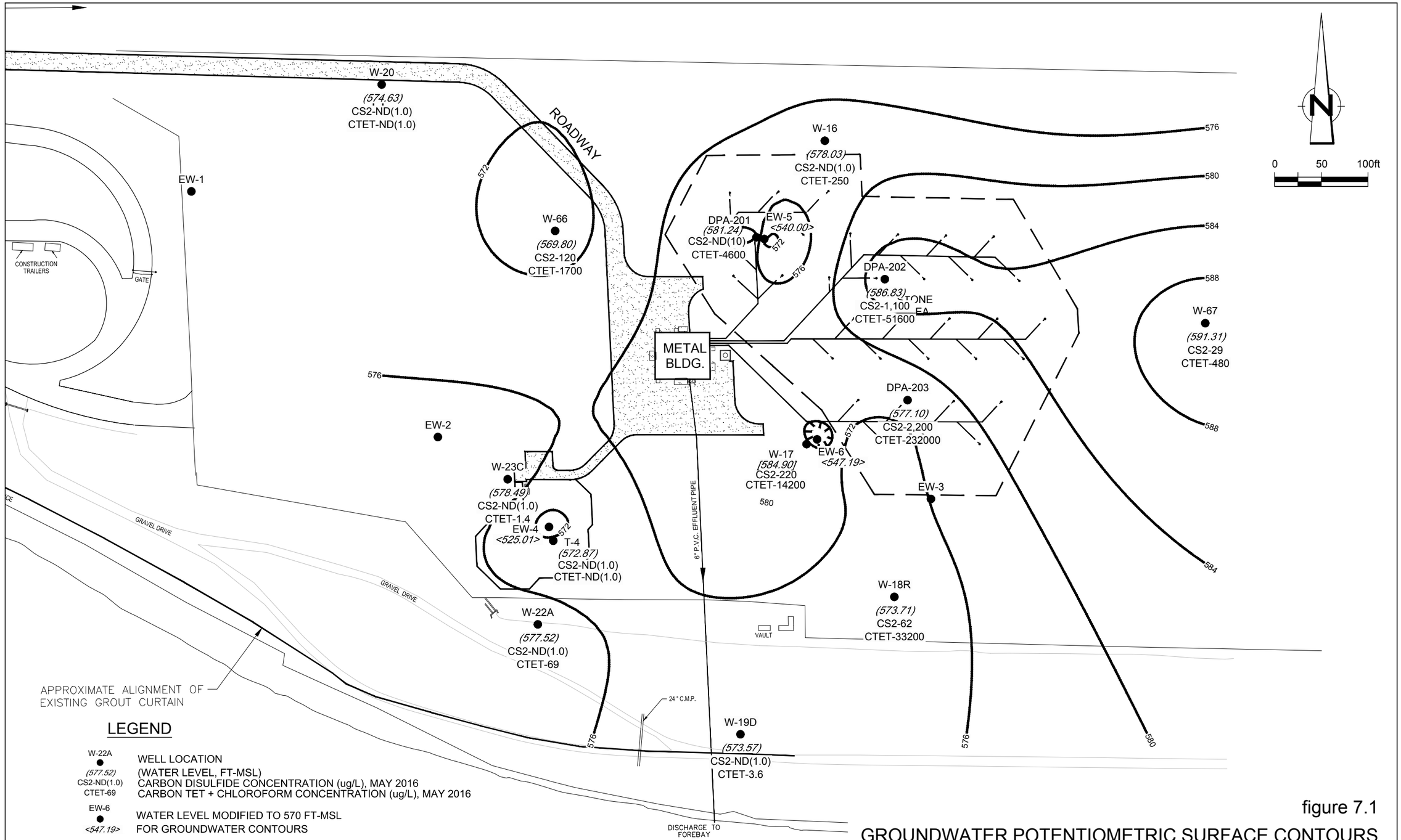


figure 7.1

GROUNDWATER POTENTIOMETRIC SURFACE CONTOURS MAY 2016 UPPER LOCKPORT WATER BEARING ZONE

Stauffer Management Company LLC

06488-20(030)GN-BU006 MAR 28/2017

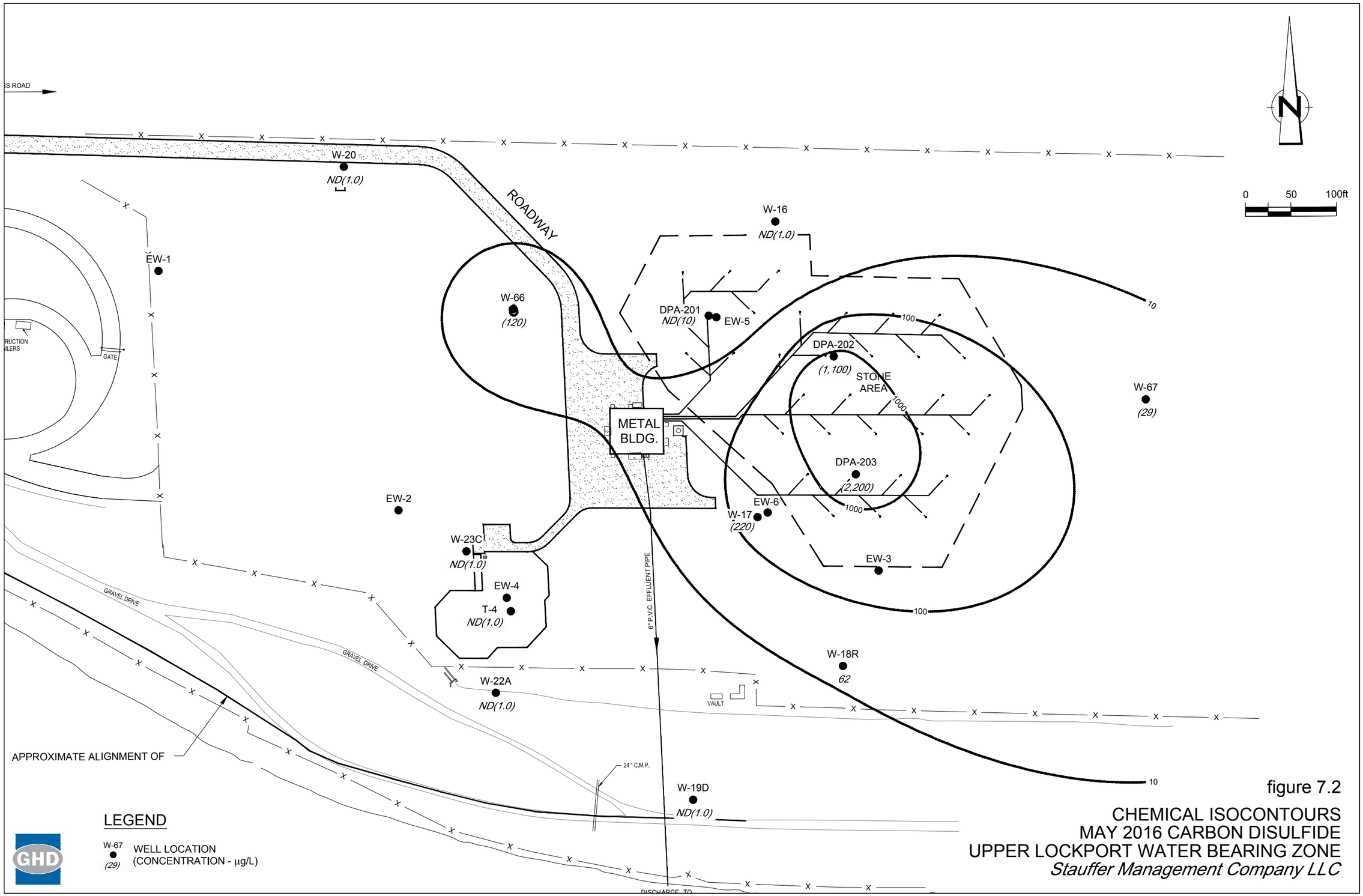


figure 7.2

CHEMICAL ISOCONTOURS
MAY 2016 CARBON DISULFIDE
UPPER LOCKPORT WATER BEARING ZONE
Stauffer Management Company LLC

06488-20(030)GN-BU007 MAR 28/2017

S ROAD

W-20
ND(1.0)

ROADWAY

W-16
(250)

EW-1

W-66
(1700)

DPA-201
(4600)

EW-5

DPA-202
(51600)

STONE
AREA

W-67
(480)

METAL
BLDG.

DPA-203
(232000)

EW-2

EW-6

W-17
(14200)

W-23C
(1.4)

EW-3

EW-4

T-4
ND(1.0)

6" P.V.C. EFFLUENT PIPE

GRAVEL DRIVE

GRAVEL DRIVE

W-18R
(33200)

W-22A
(69)

APPROXIMATE ALIGNMENT OF

24 " C.M.P.

W-19D
(3.6)

10

100

1000

10000

100000

0 50 100ft

N

LEGEND

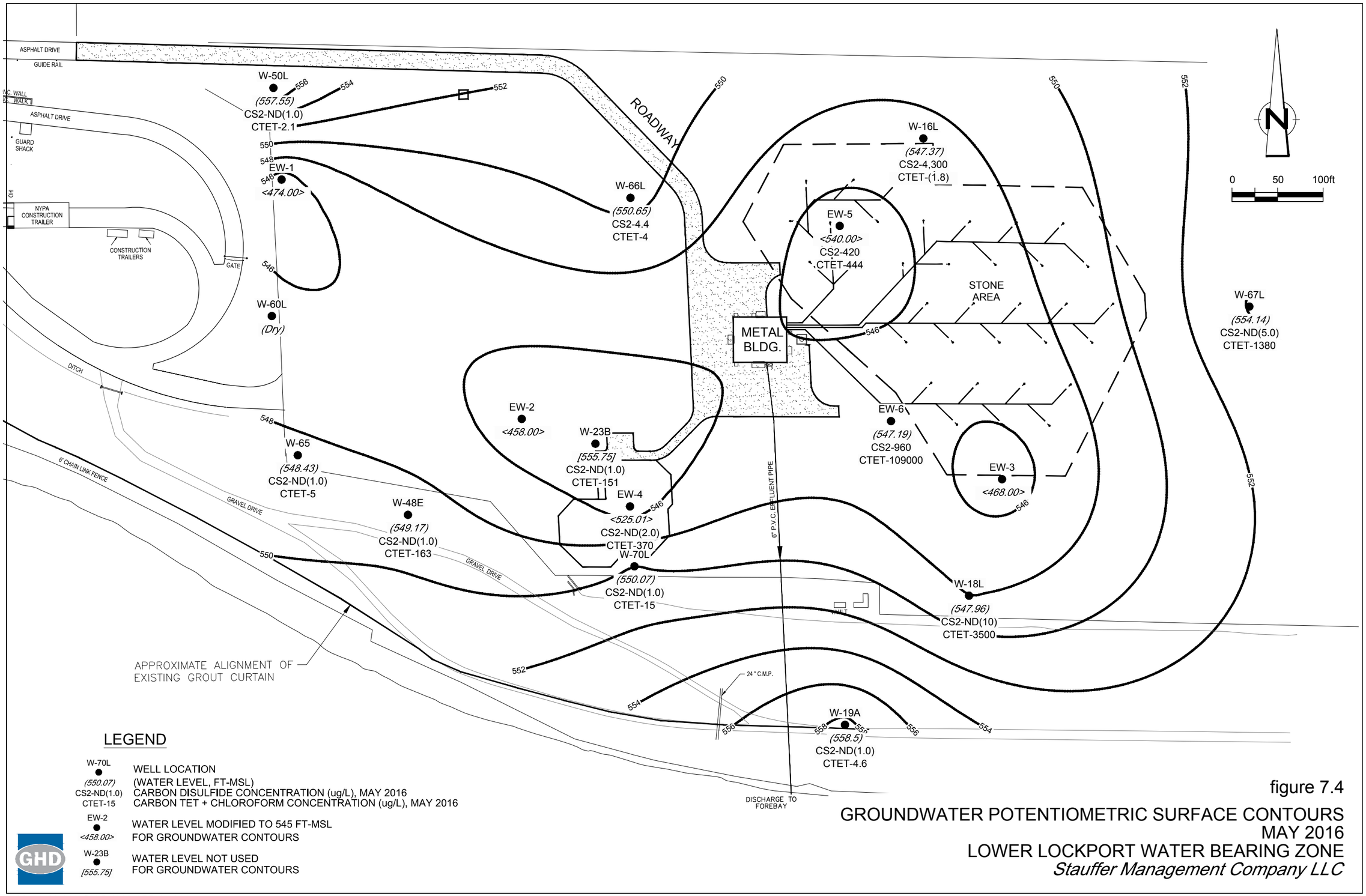
W-67 WELL LOCATION
(480) (CONCENTRATION - µg/L)

GHD

figure 7.3

CHEMICAL ISOCONTOURS
MAY 2016 CARBON TETRACHLORIDE AND CHLOROFORM
UPPER LOCKPORT WATER BEARING ZONE
Stauffer Management Company LLC

06488-20(030)GN-BU008 MAR 28/2017



LEGEND

W-70L	WELL LOCATION
(550.07)	(WATER LEVEL, FT-MSL)
CS2-ND(1.0)	CARBON DISULFIDE CONCENTRATION (ug/L), MAY 2016
CTET-15	CARBON TET + CHLOROFORM CONCENTRATION (ug/L), MAY 2016
EW-2	WATER LEVEL MODIFIED TO 545 FT-MSL
<458.00>	FOR GROUNDWATER CONTOURS
W-23B	WATER LEVEL NOT USED
[555.75]	FOR GROUNDWATER CONTOURS

figure 7.4

GROUNDWATER POTENTIOMETRIC SURFACE CONTOURS MAY 2016 LOWER LOCKPORT WATER BEARING ZONE

Stauffer Management Company LLC

06488-20(030)GN-BU009 APR 04/2017

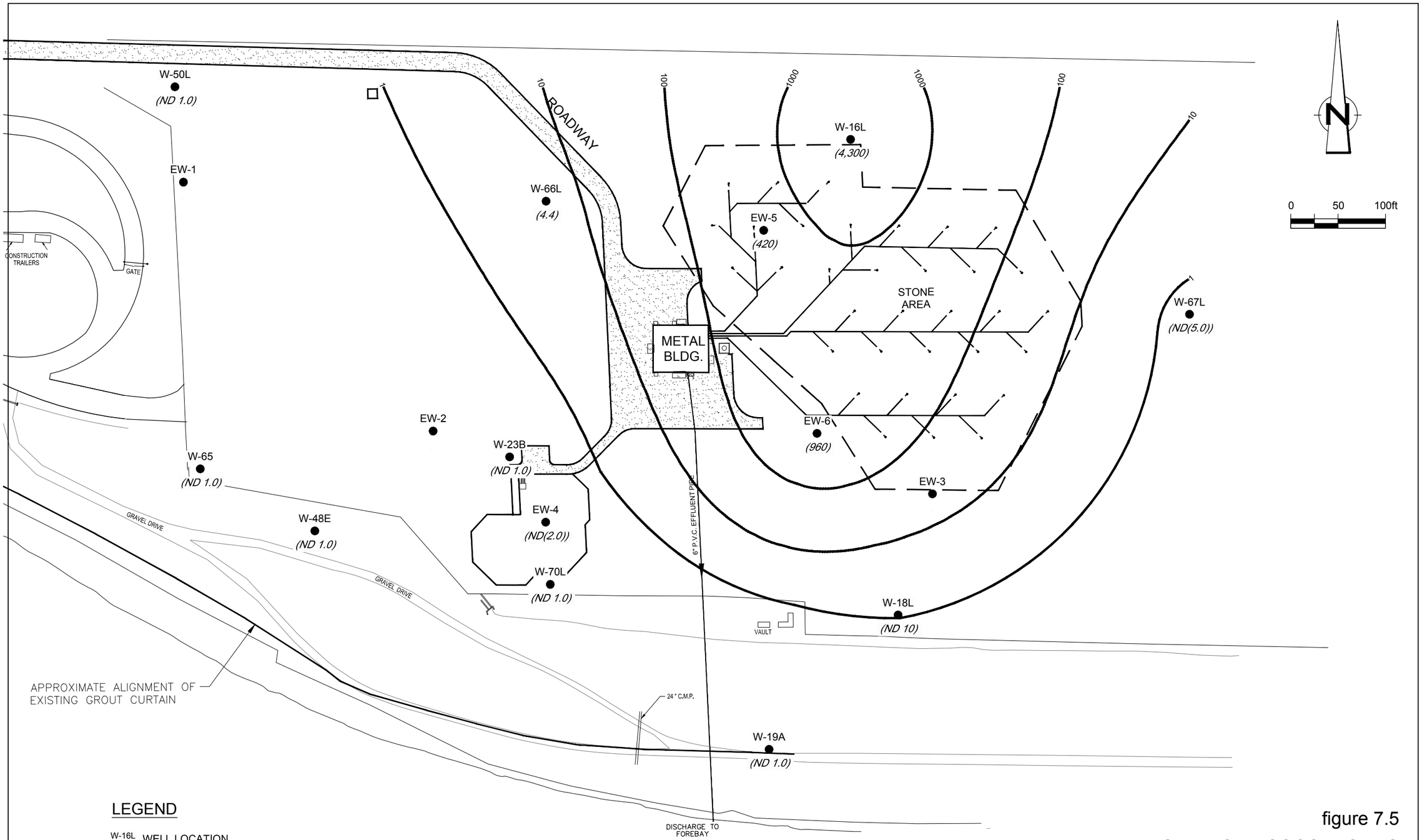
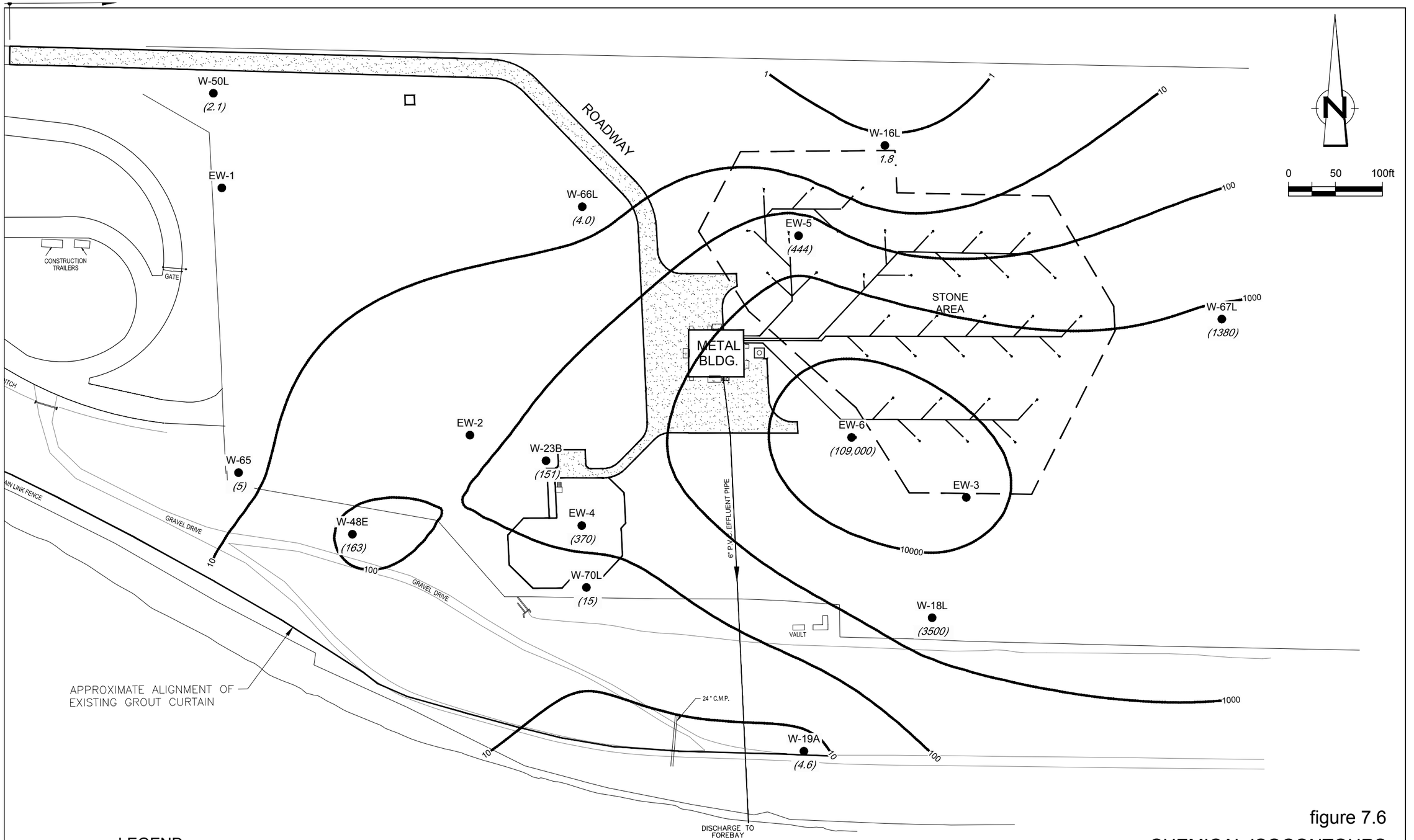


figure 7.5

CHEMICAL ISOCONTOURS
MAY 2016 CARBON DISULFIDE
LOWER LOCKPORT WATER BEARING ZONE
Stauffer Management Company LLC

GHD

06488-20(030)GN-BU010 MAR 08/2017



LEGEND

W-67L
(1380)
WELL LOCATION
(CONCENTRATION - µg/L)

figure 7.6

CHEMICAL ISOCONTOURS
MAY 2016 CARBON TETRACHLORIDE AND CHLOROFORM
LOWER LOCKPORT WATER BEARING ZONE
Stauffer Management Company LLC

ASPHALT DRIVE
GUIDE RAIL
ASPHALT DRIVE
GUARD HACK
NYPA CONSTRUCTION TRAILER
CONSTRUCTION TRAILERS
GATE
DITCH
6' CHAIN LINK FENCE
GRAVEL DRIVE
GRAVEL DRIVE
ROADWAY
STONE AREA
METAL BLDG.
6" P.V.C. EFFLUENT PIPE
VAULT
24 " C.M.P.
APPROXIMATE ALIGNMENT OF EXISTING GROUT CURTAIN
DISCHARGE TO FOREBAY

LR-50
(557.71)
CS2-4.9
CTET-ND(1.0)

LR-20
(554.44)
CS2-ND(1.0)
CTET-ND(1.0)

EW-1
<474.00>

LR-51
(549.69)
CS2-ND(1.0)
CTET-1.2

LR-49
(549.93)
CS2-ND(1.0)
CTET-ND(1.0)

LR-69
[511.55]
CS2-ND(1.0)
CTET-1.1

LR-48
(549.22)
CS2-ND(1.0)
CTET-300

LR-66
<545>
CS2-9.6
CTET-420

LR-16
(547.45)
CS2-7,600
CTET-3320

EW-2
<458.00>

LR-2
(548.66)
CS2-52
CTET-5700

EW-3
<468.00>

LR-61
(550.16)
CS2-110
CTET-4200

W-19B
(550.45)
CS2-ND(25)
CTET-5800

LR-67
(549.70)
CS2-45,000
CTET-ND(100)

OW-5
(554.89)
CS2-45,000
CTET-340

LR-62
(550.26)
CS2-9,500
CTET-53.1

548 546 552 554 550 556

N

0 50 100ft

LEGEND

LR-2	WELL LOCATION
(548.66)	(WATER LEVEL, FT-MSL)
CS2-52	CARBON DISULFIDE CONCENTRATION (ug/L), MAY 2016
CTET-5700	CARBON TET + CHLOROFORM CONCENTRATION (ug/L), MAY 2016
EW-1	WATER LEVEL MODIFIED TO 545 FT-MSL
<474>	FOR GROUNDWATER CONTOURS
LR-69	WATER LEVEL NOT USED
[511.55]	FOR GROUNDWATER CONTOURS
CS2-2.5	

figure 7.7

GROUNDWATER POTENTIOMETRIC SURFACE CONTOURS MAY 2016 LOCKPORT/ROCHESTER WATER BEARING ZONE

Stauffer Management Company LLC

06488-20(030)GN-BU012 MAR 28/2017

ASPHALT DRIVE
GUIDE RAIL
N.C. WALL
S. WALK
ASPHALT DRIVE
GUARD SHACK
OH
NYPA CONSTRUCTION TRAILER
CONSTRUCTION TRAILERS
GATE
DITCH
6' CHAIN LINK FENCE
GRAVEL DRIVE
GRAVEL DRIVE
APPROXIMATE ALIGNMENT OF EXISTING GROUT CURTAIN
ROADWAY
6" P.V.C. EFFLUENT PIPE
24" C.M.P.
DISCHARGE TO FOREBAY
VAULT
METAL BLDG.
STONE AREA

LR-50 (4.9)
LR-20 (ND(1.0))
EW-1
LR-51 (ND 1.0)
LR-49 (ND 1.0)
LR-69 (ND 1.0)
LR-48 (ND 1.0)
LR-66 (9.6)
LR-16 (7,600)
EW-2
LR-2 (52)
EW-3
LR-61 (110)
W-19B (ND 25)
LR-62 (9,500)
LR-67 (45,000)
OW-5 (45,000)

1
10
100
1000
10000

N

0 50 100ft

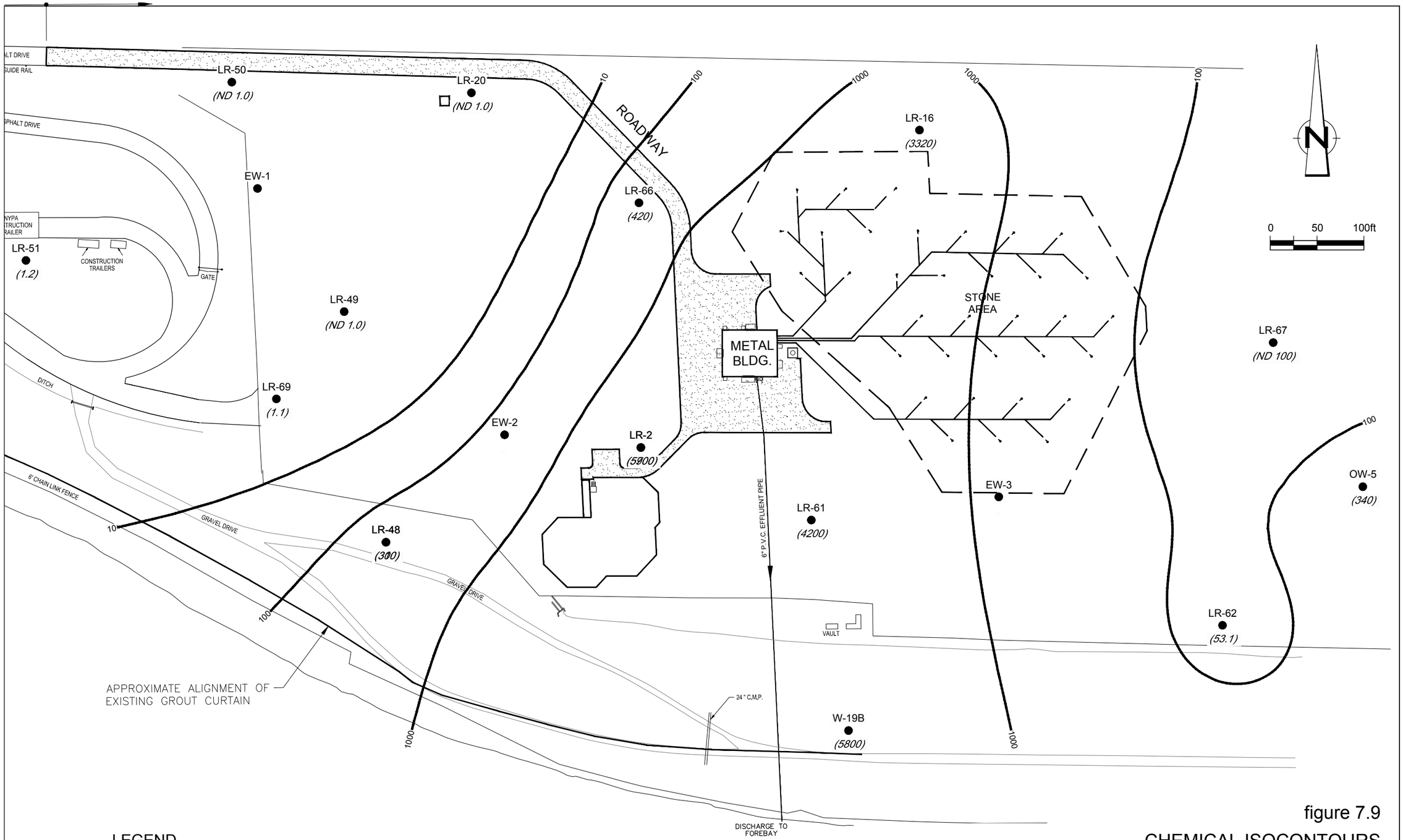
LEGEND

LR-67 (45,000) WELL LOCATION (CONCENTRATION - µg/L)

GHD

figure 7.8

CHEMICAL ISOCONTOURS
MAY 2016 CARBON DISULFIDE
LOCKPORT/ROCHESTER WATER BEARING ZONE
Stauffer Management Company LLC

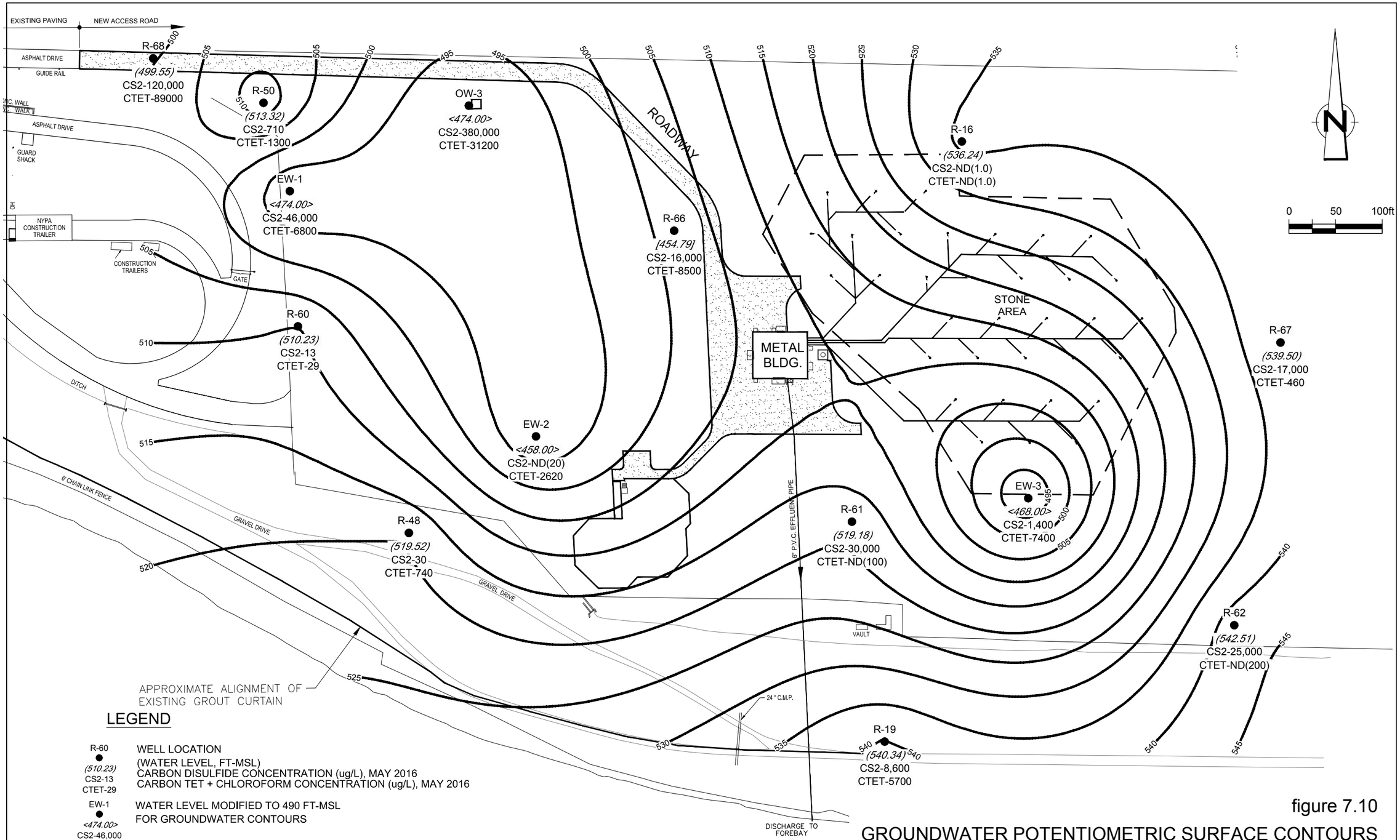


LEGEND

LR-61 (4200) WELL LOCATION (CONCENTRATION - µg/L)

figure 7.9

CHEMICAL ISOCONTOURS
MAY 2016 CARBON TETRACHLORIDE AND CHLOROFORM
LOCKPORT/ROCHESTER WATER BEARING ZONE
Stauffer Management Company LLC



LEGEND

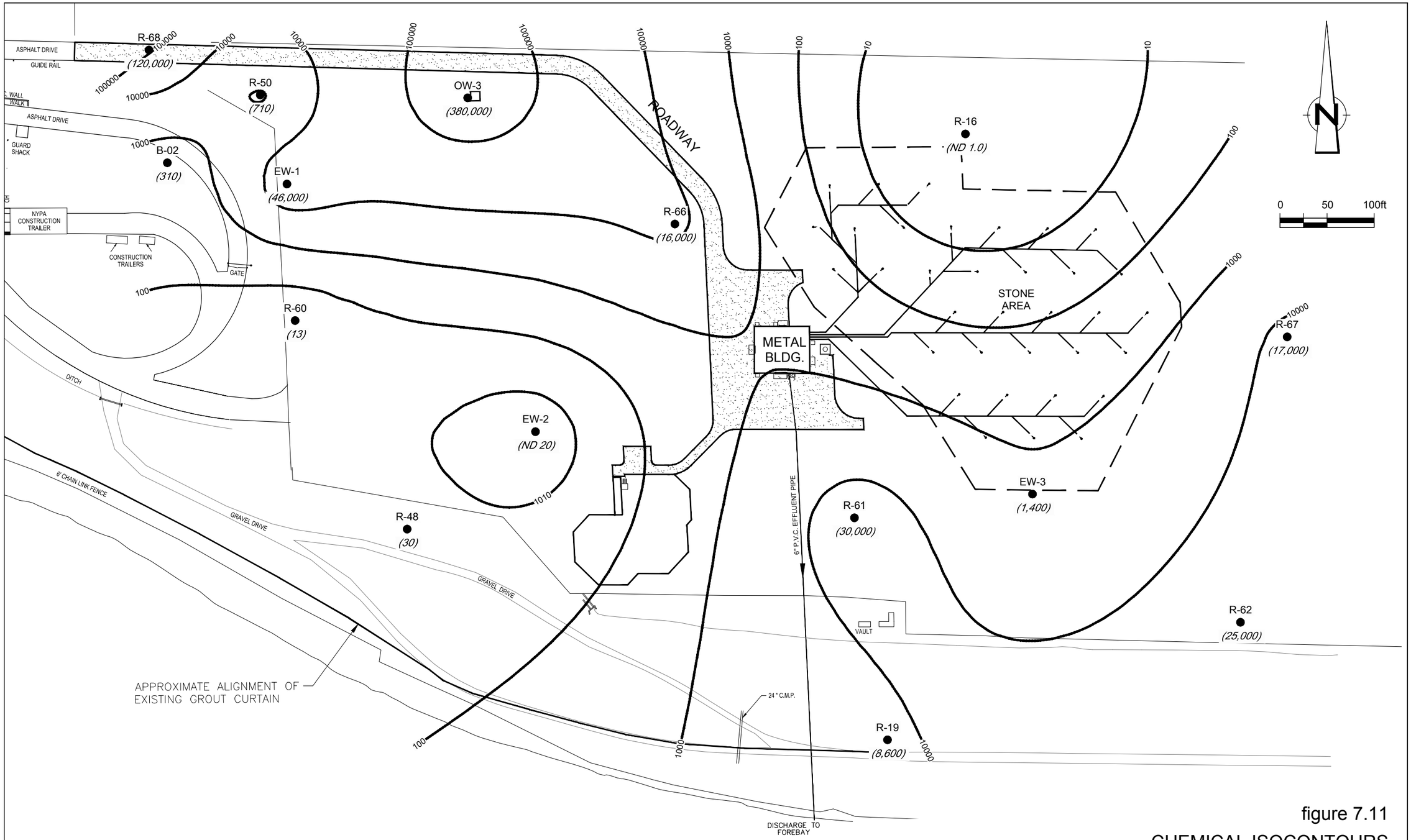
R-60 — WELL LOCATION
(510.23) — (WATER LEVEL, FT-MSL)
CS2-13 — CARBON DISULFIDE CONCENTRATION (ug/L), MAY 2016
CTET-29 — CARBON TET + CHLOROFORM CONCENTRATION (ug/L), MAY 2016

EW-1 — WATER LEVEL MODIFIED TO 490 FT-MSL
<474.00> — FOR GROUNDWATER CONTOURS
CS2-46,000
CTET-6800

R-66 — WATER LEVEL NOT USED
[454.79] — FOR GROUNDWATER CONTOURS
CS2-16,000
CTET-8500

figure 7.10

GROUNDWATER POTENTIOMETRIC SURFACE CONTOURS
MAY 2016
ROCHESTER WATER BEARING ZONE
Stauffer Management Company LLC



LEGEND

R-48 (30) WELL LOCATION (CONCENTRATION - µg/L)

figure 7.11

CHEMICAL ISOCONTOURS
MAY 2016 CARBON DISULFIDE
ROCHESTER WATER BEARING ZONE
Stauffer Management Company LLC

06488-20(030)GN-BU016 MAR 28/2017

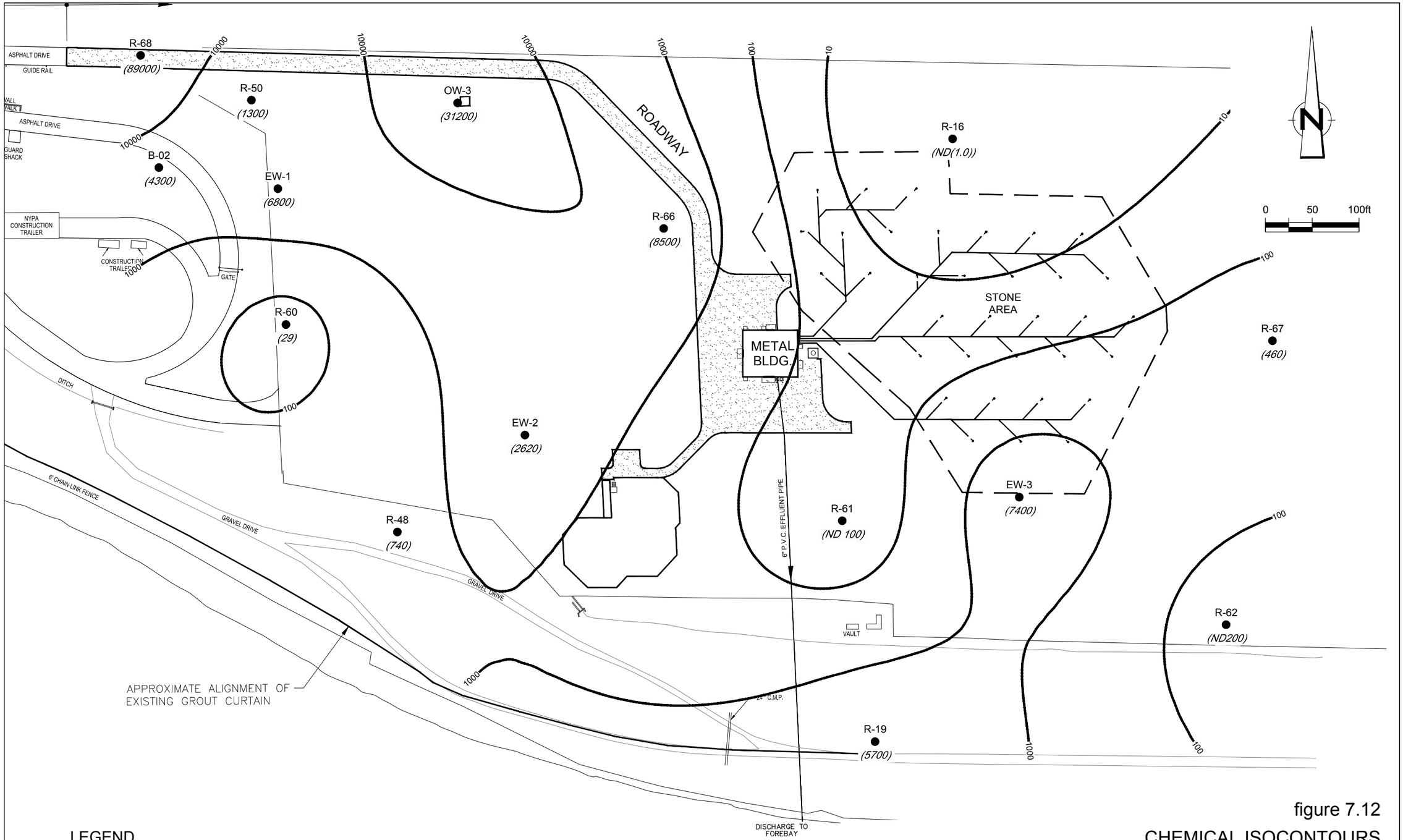


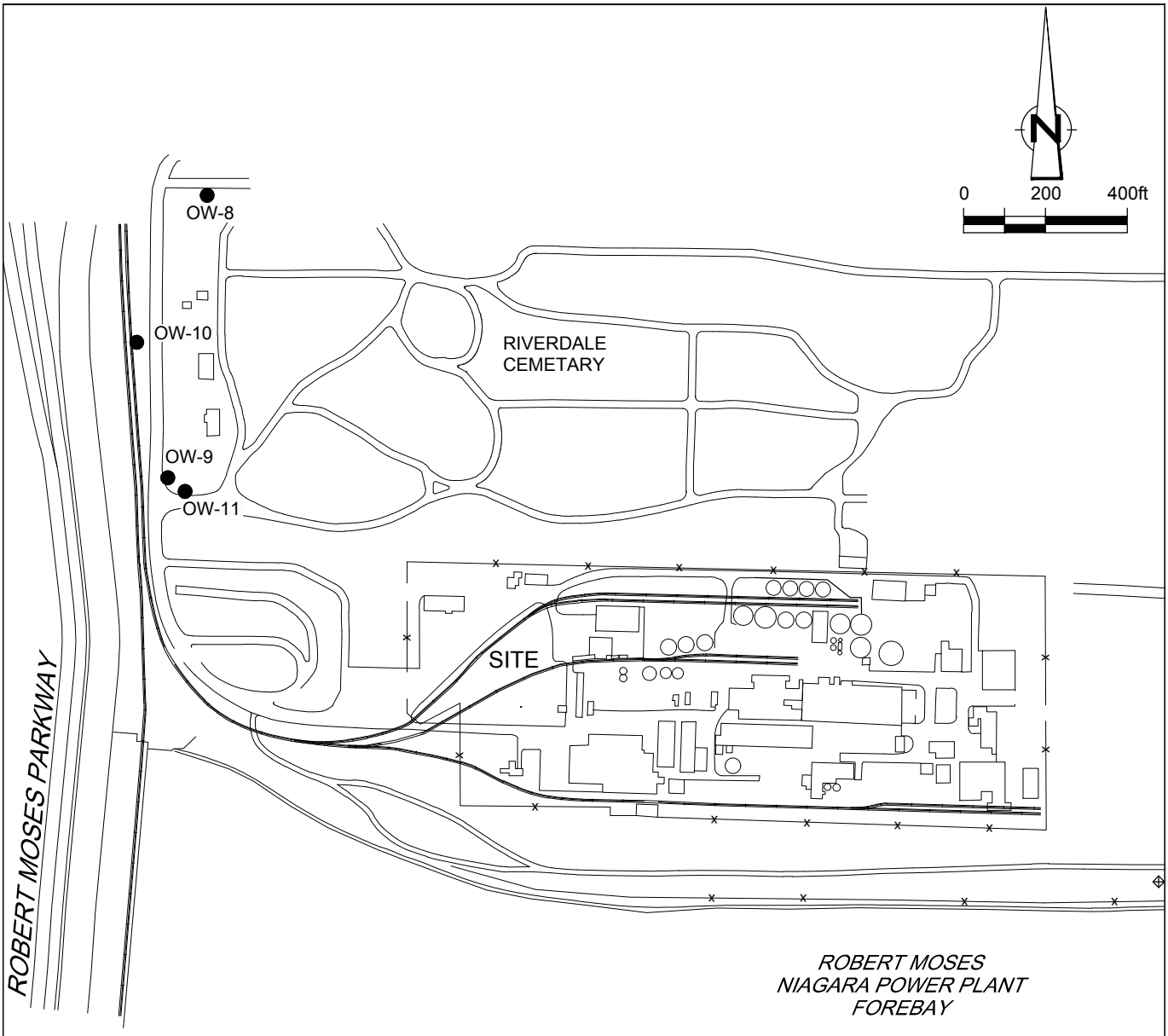
figure 7.12

CHEMICAL ISOCONTOURS
MAY 2016 CARBON TETRACHLORIDE AND CHLOROFORM
ROCHESTER WATER BEARING ZONE
Stauffer Management Company LLC

LEGEND

R-66 WELL LOCATION

(8500) (CONCENTRATION - µg/L)



LEGEND

OW-11 ● NORTH SIDE GROUNDWATER MONITORING WELL LOCATIONS

NOTE:
SAMPLING OF OVERBURDEN WELLS OW-8, OW-9 AND OW-10 WAS DISCONTINUED IN MAY 2004. BEDROCK WELL OW-11 CONTINUES TO BE SAMPLED SEMIANNUALLY.

figure 8.1

NORTH SIDE WELL LOCATIONS
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

GHD

Tables

TABLE 5.1

EXTRACTION WELL EW-1
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	304,743	gallons
2nd Quarter	256,263	gallons
3rd Quarter	370,222	gallons
4th Quarter	307,861	gallons
Total	**1,239,089**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	46,000	475.4
Carbon tetrachloride	6,800	70.3
Chlorobenzene	0	0.0
Chloroform	0	0.0
Methylene chloride	220	2.3
Tetrachloroethene	110	1.1
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**549**

Notes:
VOC Volatile Organic Compound.
SSPL Site Specific Parameter List

TABLE 5.2

EXTRACTION WELL EW-2
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	675,091	gallons
2nd Quarter	840,805	gallons
3rd Quarter	755,216	gallons
4th Quarter	765,099	gallons
Total	**3,036,211**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	0	0.0
Carbon tetrachloride	2,100	53.2
Chlorobenzene	0	0.0
Chloroform	520	13.2
Methylene chloride	34	0.9
Tetrachloroethene	34	0.9
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**68**

Notes:
VOC Volatile Organic Compound.

TABLE 5.3

EXTRACTION WELL EW-3
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	742,427	gallons
2nd Quarter	961,989	gallons
3rd Quarter	851,654	gallons
4th Quarter	787,187	gallons
Total	**3,343,257**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	1,400	39.0
Carbon tetrachloride	4,600	128.3
Chlorobenzene	0	0.0
Chloroform	2,800	78.1
Methylene chloride	140	3.9
Tetrachloroethene	110	3.1
Toluene	0	0.0
Trichloroethene	130	3.6
Total VOC Removal		**256**

Notes:
VOC Volatile Organic Compound.

TABLE 5.4

EXTRACTION WELL EW-4
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	75,000	gallons
2nd Quarter	75,000	gallons
3rd Quarter	75,000	gallons
4th Quarter	75,000	gallons
Total	**300,000**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	0	0.0
Carbon tetrachloride	260	0.7
Chlorobenzene	0	0.0
Chloroform	110	0.3
Methylene chloride	0	0.0
Tetrachloroethene	12	0.0
Toluene	0	0.0
Trichloroethene	5	0.0
Total VOC Removal		**1.0**

Notes:
VOC Volatile Organic Compound.

TABLE 5.5

EXTRACTION WELL EW-5
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	1,149,798	gallons
2nd Quarter	1,264,484	gallons
3rd Quarter	1,420,838	gallons
4th Quarter	1,178,286	gallons
Total	**5,013,406**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	420	17.6
Carbon tetrachloride	370	15.5
Chlorobenzene	0	0.0
Chloroform	74	3.1
Methylene chloride	0	0.0
Tetrachloroethene	63	2.6
Toluene	0	0.0
Trichloroethene	18	0.8
Total VOC Removal		**39.5**

Notes:
VOC Volatile Organic Compound.

TABLE 5.6

EXTRACTION WELL EW-6
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	477,405	gallons
2nd Quarter	171,551	gallons
3rd Quarter	197,898	gallons
4th Quarter	597,238	gallons
Total	**1,444,092**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	960	11.6
Carbon tetrachloride	92,000	1108.0
Chlorobenzene	0	0.0
Chloroform	17,000	204.7
Methylene chloride	290	3.5
Tetrachloroethene	1,300	15.7
Toluene	0	0.0
Trichloroethene	110	1.3
Total VOC Removal		**1,344.8**

Notes:
VOC Volatile Organic Compound.

TABLE 5.7

DUAL-PHASE AREA A WELL DPA-201
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	17,500	gallons
2nd Quarter	17,500	gallons
3rd Quarter	17,500	gallons
4th Quarter	17,500	gallons
Total	**70,000**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	16	0.0
Carbon disulfide	0	0.0
Carbon tetrachloride	3,500	2.0
Chlorobenzene	0	0.0
Chloroform	1,100	0.6
Methylene chloride	41	0.0
Tetrachloroethene	3,100	1.8
Toluene	0	0.0
Trichloroethene	860	0.5
Total VOC Removal		**5.0**

Notes:

VOC Volatile Organic Compound.

TABLE 5.8

DUAL-PHASE AREA A WELL DPA-202
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	28,541	gallons
2nd Quarter	11,472	gallons
3rd Quarter	20,245	gallons
4th Quarter	7,422	gallons
Total	**67,680**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	1,100	0.6
Carbon tetrachloride	46,000	26.0
Chlorobenzene	0	0.0
Chloroform	5,600	3.2
Methylene chloride	0	0.0
Tetrachloroethene	1,100	0.6
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**30.4**

Notes:
VOC Volatile Organic Compound.

TABLE 5.9

DUAL-PHASE AREA A WELL DPA-203
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	4,500	gallons
2nd Quarter	8,000	gallons
3rd Quarter	7,000	gallons
4th Quarter	7,000	gallons
Total	**26,500**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	2,200	0.5
Carbon tetrachloride	190,000	42.0
Chlorobenzene	0	0.0
Chloroform	42,000	9.3
Methylene chloride	0	0.0
Tetrachloroethene	1,900	0.4
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**52.2**

Notes:
VOC Volatile Organic Compound.

TABLE 5.10

EXTRACTION WELL OW-3
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	7,951	gallons
2nd Quarter	17,029	gallons
3rd Quarter	25,267	gallons
4th Quarter	68,906	gallons
Total	**119,153**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	380,000	377.6
Carbon tetrachloride	24,000	23.8
Chlorobenzene	0	0.0
Chloroform	7,200	7.2
Methylene chloride	0	0.0
Tetrachloroethene	2,500	2.5
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**411.1**

Notes:
VOC Volatile Organic Compound.

TABLE 5.11

EXTRACTION WELL LR-66
LIQUID-PHASE MASS LOADINGS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

Flow Rates:

1st Quarter	45,000	gallons
2nd Quarter	45,000	gallons
3rd Quarter	45,000	gallons
4th Quarter	45,000	gallons
Total	**180,000**	**gallons**

Compound	***SSPL VOC Concentration (ug/L)***	***Total Mass Removed (lbs.)***
Benzene	0	0.0
Carbon disulfide	10	0.0
Carbon tetrachloride	320	0.5
Chlorobenzene	0	0.0
Chloroform	100	0.2
Methylene chloride	6	0.0
Tetrachloroethene	10	0.0
Toluene	0	0.0
Trichloroethene	0	0.0
Total VOC Removal		**0.7**

Notes:
VOC Volatile Organic Compound.

TABLE 7.1

2016 MEASURED GROUNDWATER ELEVATIONS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Well I.D.	***May 2016***	***August 2016***	***November 2016***
Extraction Wells			
DPA-201	581.24	578.47	581.44
DPA-202	586.83	580.56	579.28
DPA-203	577.1	578.59	578.44
T-4	572.87	569.69	569.53
EW-1	474	470	471
EW-2	458	464	458
EW-3	468	483	464
EW-4	525.01	525.03	524.97
EW-5	540	579.71	545.9
EW-6	547.19	546.77	535.4
OW-3	474	504	496.6
LR-66	-	-	-
Upper Lockport Wells			
W-16	578.03	576.53	576.26
W-17	584.9	583.25	583.87
W-18R	573.71	573.63	573.43
W-19D	573.57	571.3	Dry
W-20	574.63	569.97	569.34
W-22A	577.52	Dry	Dry
W-23C	578.49	577.41	575.77
W-66	569.8	569.12	569.34
W-67	591.31	586.71	585.54
OW-11	557.82	552.55	549.78

TABLE 7.1

2016 MEASURED GROUNDWATER ELEVATIONS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Well I.D.	*May 2016*	*August 2016*	*November 2016*
Lower Lockport Wells			
W-16L	547.37	546.66	543.21
W-18L	547.96	549.66	542.41
W-19A	558.5	557.83	558.17
W-23B	555.75	555.77	555.59
W-48E	549.17	551.18	Dry
W-50	557.55	555.87	556.17
W-60L	Dry	Dry	Dry
W-65	548.43	548.74	547.92
W-66L	550.65	549.99	544.32
W-67L	554.14	551.18	549.88
W-70L	550.07	543.86	547.49
Lockport/Rochester Wells			
W-19B	550.45	552.96	545.24
LR-2	548.66	549.82	543.24
LR-16	547.45	546.68	543.37
LR-20	554.44	552.35	548.98
LR-48	549.22	551.17	543.94
LR-49	549.93	550.82	544.69
LR-50	557.71	555.21	552.03
LR-51	549.69	551.11	543.63
LR-61	550.16	551.21	544.35
LR-62	550.26	549.3	544.13
LR-67	549.7	548.97	544.24
LR-69	511.55	503.73	506.22
OW-5	554.89	553.37	548.2
Rochester Wells			
R-16	536.24	525.79	531.06
R-19	540.34	543.11	539.13
R-48	519.52	524.12	516.03
R-50	513.32	504.63	508.05
R-60	510.23	517.53	507.04
R-61	519.18	528.32	515.62
R-62	542.51	543.33	542.9
R-66	454.79	452.4	454.2
R-67	539.5	538.44	537.59
R-68	499.55	511.36	496.58

TABLE 7.1

2016 MEASURED GROUNDWATER ELEVATIONS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Well I.D.	*May 2016*	*August 2016*	*November 2016*

Notes:
Ft. msl
NM

TABLE 7.2

MONITORING AND EXTRACTION WELLS BY WATER BEARING ZONE
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Upper Lockport	*Lower Lockport*	*Lockport/Rochester*	*Rochester*
Well ID	***Well ID***	***Well ID***	***Well ID***
OW-11	W-16L	LR-2	B-02
T-4	W-18L	LR-16	R-16
W-16	W-19A	LR-20	R-19
W-17	W-23B	LR-48	R-48
W-18R	W-48E	LR-49	R-50
W-19D	W-50	LR-50	R-51
W-20	W-60L	LR-51	R-60
W-22A	W-65	LR-61	R-61
W-23C	W-66L	LR-62	R-62
W-66	W-67L	LR-67	R-66
W-67	W-70L	LR-69	R-67
DPA-201	EW-1	OW-5	R-68
DPA-202	EW-2	W-19B	EW-1
DPA-203	EW-3	LR-66	EW-2
EW-4	EW-4	EW-1	EW-3
EW-5	EW-5	EW-2	OW-3
EW-6	EW-6	EW-3	

TABLE 9.1
COMPOUND-SPECIFIC SSPL REMOVAL
AREA A SVE SYSTEM
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2003-2014

SSPL Compound	*2003*		*2004*		*2005*		*2006*		*2007*		*2008*	
	Lbs. Removed	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Carbon disulfide	0	0	1	0	1	0	3	0	0	0	0	0
Carbon tetrachloride	801	85	198	87	1,782	91	1,536	90	2,132	91	442	87
Chlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0
Chloroform	68	7	18	8	95	5	98	6	93	4	32	6
Methylene chloride	0	0	0	0	0	0	2	0	0	0	0	0
Tetrachloroethene	68	7	8	4	75	4	62	4	110	5	28	6
Toluene	0	0	0	0	0	0	0	0	0	0	0	0
Trichloroethene	0	0	3	1	1	0	11	0	13	1	4	1
Total:	**937**		**228**		**1,954**		**1,712**		**2,349**		**507**	

SSPL Compound	*2009*		*2010*		*2011*		*2012*		*2013*		*2014*	
	Lbs. Removed	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*
Benzene	0	0	0	0	0	0	0	0	0	0	0.0	0
Carbon disulfide	1	1	2	1	0	0	0	0	0	0	0.0	0
Carbon tetrachloride	94	87	227	90	240	83	215	86	130	85	17.8	81
Chlorobenzene	0	0	0	0	0	0	0	0	0	0	0.0	0
Chloroform	7	7	14	6	33	11	20	8	13	9	2.4	11
Methylene chloride	0	0	0	0	0	0	0	0	0	0	0.0	0
Tetrachloroethene	5	5	7	3	10	4	13	5	8	5	1.5	7
Toluene	0	0	0	0	0	0	0	0	0	0	0.0	0
Trichloroethene	1	1	1	0	6	2	2	1	1	1	0.2	1
Total:	**108**		**251**		**289**		**250**		**152**		**22.0**	

TABLE 9.2

EXTRACTION WELL SUMMARY
TOTAL VOLUME OF GROUNDWATER EXTRACTED
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

	Volume Pumped by Extraction Wells (Gallons/Year)											
Period	***EW-1***	***EW-2***	***EW-3***	***EW-4***	***EW-5***	***EW-6***	***DPA-201***	***DPA-202***	***DPA-203***	***OW-3***	***LR-66***	***Site Total***
First Quarter	304,743	675,091	742,427	75,000	1,149,798	477,405	17,500	28,541	4,500	7,951	45,000	3,527,956
Second Quarter	256,263	840,805	961,989	75,000	1,264,484	171,551	17,500	11,472	8,000	17,029	45,000	3,669,093
Third Quarter	370,222	755,216	851,654	75,000	1,420,838	197,898	17,500	20,245	7,000	25,267	45,000	3,785,840
Fourth Quarter	307,861	765,099	787,187	75,000	1,178,286	597,238	17,500	7,422	7,000	68,906	45,000	3,856,499
Total Gallons:	**1,239,089**	**3,036,211**	**3,343,257**	**300,000**	**5,013,406**	**1,444,092**	**70,000**	**67,680**	**26,500**	**119,153**	**180,000**	**14,839,388**

TABLE 9.3

EXTRACTION WELL SUMMARY
TOTAL MASS REMOVAL BY GROUNDWATER EXTRACTION
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

	Total Mass Removal (Lbs/Year)											
Compound	***EW-1***	***EW-2***	***EW-3***	***EW-4***	***EW-5***	***EW-6***	***DPA-201***	***DPA-202***	***DPA-203***	***OW-3***	***LR-66***	***Site Total***
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Carbon disulfide	475	0	39	0	18	12	0	1	0	378	0	922
Carbon tetrachloride	70	53	128	1	15	1108	2	26	42	24	0	1,470
Chlorobenzene	0	0	0	0	0	0	0	0	0	0	0	0
Chloroform	0	13	78	0	3	205	1	3	9	7	0	320
Methylene chloride	2	1	4	0	0	4	0	0	0	0	0	11
Tetrachloroethene	1	1	3	0	3	16	2	1	0	2	0	29
Toluene	0	0	0	0	0	1	0	0	0	0	0	1
Trichloroethene	0	0	4	0	1	0	1	0	0	0	0	5
Total VOC Removal	**549**	**68**	**256**	**1**	**40**	**1345**	**5**	**30**	**52**	**411**	**1**	**2,758**

Notes:
VOC Volatile Organic Compound.

TABLE 9.4

COMPOUND-SPECIFIC SSPL REMOVAL
GROUNDWATER EXTRACTION SYSTEM
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2005-2016

SSPL Compound	*2005*		*2006*		*2007*		*2008*		*2009*		*2010*	
	Lbs. Removed	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Carbon disulfide	2,611	53	1,664	47	1,954	53	2,109	44	1,182	80	1,554	60
Carbon tetrachloride	1,771	36	1,420	40	1,278	35	1,998	42	1,147	77	731	28
Chlorobenzene	2	0	1	0	1	0	2	0	7	0	2	0
Chloroform	461	9	401	11	400	11	605	13	387	26	257	10
Methylene chloride	14	0	11	0	14	0	15	0	10	1	9	0
Tetrachloroethene	33	1	17	1	20	1	42	1	18	1	20	1
Toluene	0	0	0	0	0	0	0	0	0	0	0	0
Trichloroethene	7	0	3	0	5	0	19	0	3	0	3	0
Total:	**3,517**		**3,672**		**3,672**		**4,790**		**2,754**		**2,575**	

SSPL Compound	*2011*		*2012*		*2013*		*2014*		*2015*		*2016*	
	Lbs. Removed	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*	*Lbs. Removed*	*% of Total*
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Carbon disulfide	1,510	60	1,665	66	938	52	956	64	881	56	922	33
Carbon tetrachloride	753	30	626	25	636	35	346	23	480	30	1,470	53
Chlorobenzene	2	0	2	0	1	0	1	0	0	0	0	0
Chloroform	216	9	195	8	197	11	161	11	193	12	320	12
Methylene chloride	7	0	9	0	11	1	8	1	10	1	11	0
Tetrachloroethene	12	0	11	0	11	1	9	1	10	1	29	1
Toluene	0	0	0	0	0	0	0	0	0	0	1	0
Trichloroethene	2	0	4	0	5	0	5	0	5	0	5	0
Total:	**2,501**		**2,511**		**1,801**		**1,486**		**1,580**		**2,758**	

TABLE 9.5

COMPOUND-SPECIFIC SSPL REMOVAL
SITE REMEDIAL SYSTEMS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2006-2016

Pounds Removed Per Year

SSPL Compound	*2006*		*2007*		*2008*		*2009*		*2010*		*2011*	
	SVE Systems	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Carbon disulfide	3	1,664	0	1,954	0	2,109	1	1182	2	1554	0	1510
Carbon tetrachloride	1,536	1,420	2,132	1,278	442	1,998	94	1147	227	731	240	753
Chlorobenzene	0	1	0	1	0	2	0	7	0	2	0	2
Chloroform	98	401	93	400	32	605	7	387	14	257	33	216
Methylene chloride	2	11	0	14	0	15	0	10	0	9	0	7
Tetrachloroethene	62	17	110	20	28	42	5	18	7	20	10	12
Toluene	0	0	0	0	0	0	0	0	0	0	0	0
Trichloroethene	11	3	13	5	4	19	1	3	1	3	6	2
Total:	**1,712**	**3,517**	**2,349**	**3,672**	**507**	**4,790**	**108**	**2,754**	**251**	**2,575**	**289**	**2,501**

SSPL Compound	*2012*		*2013*		*2014*		*2015*		*2016*			
	SVE Systems	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*SVE Systems*	*GW*	*Cumulative Compound Total*	*% of Total*
Benzene	0	0	0	0	0	0	0	0	0	0	**0**	0
Carbon disulfide	0	1665	0	938	0	956	0	881	0	922	**15,343**	43
Carbon tetrachloride	215	626	130	636	18	346	0	480	0	1470	**15,919**	45
Chlorobenzene	0	2	0	1	0	1	0	0	0	0	**19**	0
Chloroform	20	195	13	197	2	161	0	193	0	320	**3,645**	10
Methylene chloride	0	9	0	11	0	8	0	10	0	11	**116**	0
Tetrachloroethene	13	11	8	11	1	9	0	10	0	29	**444**	1
Toluene	0	0	0	0	0	0	0	0	0	1	**1**	0
Trichloroethene	2	4	1	5	0	5	0	5	0	5	**97**	0
Total:	**250**	**2,511**	**152**	**1,801**	**22**	**1,486**	**0**	**1,580**	**0**	**2,758**	**35,584**	100

Notes:
GW Groundwater extraction system.

Appendices

Appendix A
Groundwater Treatment System
2016 Process Monitoring Data

APPENDIX A-1
GROUNDWATER INFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	***INF-010416-SG***	***INF-020116-SG***	***INF-030716-SG***	***INF-040416-SG***
	Collection Date:	***01/04/16***	***02/01/16***	***03/07/16***	***04/04/16***
Parameters	***Units***				
Volatiles					
Benzene	mg/L	ND 20	ND 20	ND 50	ND 50
Carbon disulfide	mg/L	1700	4800	1400	3100
Carbon tetrachloride	mg/L	2700	3800	9100	9300
Chlorobenzene	mg/L	ND 20	ND 20	ND 50	ND 50
Chloroform	mg/L	1400	1700	3200	3000
Methylene chloride	mg/L	79	65	89	110
Tetrachloroethene	mg/L	49	90	170	190
Toluene	mg/L	ND 20	ND 20	ND 50	ND 50
Trichloroethene	mg/L	53	43	62	62

	Sample ID:	***INF-050316-SG***	***INF-053116-SG***	***INF-070516-SG***	***INF-080116-SG***
	Collection Date:	***05/03/16***	***05/31/16***	***07/05/16***	***08/01/16***
Parameters	***Units***				
Volatiles					
Benzene	mg/L	ND 50	ND 25	ND 25	ND 50
Carbon disulfide	mg/L	5700	740	2200	4200
Carbon tetrachloride	mg/L	6000	2300	2800	2600
Chlorobenzene	mg/L	ND 50	97	ND 25	ND 50
Chloroform	mg/L	2700	960	1400	1300
Methylene chloride	mg/L	120	33	82	82
Tetrachloroethene	mg/L	160	61	53	ND 50
Toluene	mg/L	ND 50	ND 25	ND 25	ND 50
Trichloroethene	mg/L	60	50	44	ND 50

Notes:
ND Non-detect at the associated value.

APPENDIX A-1
GROUNDWATER INFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	INF-090516-DT	INF-100316-DT	INF-110616-DT	INF-12016-SG
	Collection Date:	09/05/16	10/03/16	11/06/16	12/05/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 50	ND 25	ND 25	ND 25
Carbon disulfide	mg/L	3600	4600	4900	1200
Carbon tetrachloride	mg/L	3000	2100	1700	2100
Chlorobenzene	mg/L	ND 50	ND 25	ND 25	ND 25
Chloroform	mg/L	1300	1000	1100	1100
Methylene chloride	mg/L	90	71	76	55
Tetrachloroethene	mg/L	ND 50	35	43	51
Toluene	mg/L	ND 50	ND 25	ND 25	ND 25
Trichloroethene	mg/L	ND 50	37	32	53

	Sample ID:
	Collection Date:
Parameters	**Units**
Volatiles	
Benzene	mg/L
Carbon disulfide	mg/L
Carbon tetrachloride	mg/L
Chlorobenzene	mg/L
Chloroform	mg/L
Methylene chloride	mg/L
Tetrachloroethene	mg/L
Toluene	mg/L
Trichloroethene	mg/L

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-010416-SG	CBT-011116-SG	CBT-011816-SG	CBT-012516-SG
	Collection Date:	01/04/16	01/11/16	01/18/16	01/25/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	14	58
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	67	240
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	52	170
Methylene chloride	mg/L	ND 1.0	ND 1.0	7.6	20
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	2.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	1.4

	Sample ID:	CBT-012716-DO	CBT-020116-SG	CBT-020316-DO	CBT-020816-SG
	Collection Date:	01/27/16	02/01/16	02/03/16	02/08/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 5.0
Carbon disulfide	mg/L	11	520	14	110
Carbon tetrachloride	mg/L	100	760	66	490
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 5.0
Chloroform	mg/L	95	420	98	290
Methylene chloride	mg/L	14	31	16	25
Tetrachloroethene	mg/L	ND 1.0	8.4	ND 1.0	5.9
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 5.0
Trichloroethene	mg/L	ND 1.0	4.0	ND 1.0	ND 5.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-022316-SG	CBT-022916-SG	CBT-030716-SG	CBT-031316-SG
	Collection Date:	02/23/16	02/29/16	03/07/16	03/13/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	CBT-032116-SG	CBT-032816-SG	CBT-040516-SG	CBT-041116-SG
	Collection Date:	03/21/16	03/28/16	04/05/16	04/11/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	2.4	14
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	13	110
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	130	170
Methylene chloride	mg/L	ND 1.0	2.1	19	26
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-041716-DJT	CBT-042416-DJT	CBT-050316-SG	CBT-050916-SG
	Collection Date:	04/17/16	04/24/16	05/03/16	05/09/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	CBT-051616-SG	CBT-052216-DJT	CBT-060516-DJT	CBT-061316-SG
	Collection Date:	05/16/16	05/22/16	06/05/16	06/13/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	2.6	63
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	45	390
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	30	220
Methylene chloride	mg/L	ND 1.0	ND 1.0	17	36
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	4.4
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	2.6

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-062016-SG	CBT-062716-SG	CBT-070516-SG	CBT-071116-SG
	Collection Date:	06/20/16	06/27/16	07/05/16	07/11/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 2.5	ND 2.5	ND 1.0	ND 1.0
Carbon disulfide	mg/L	140	67	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	300	180	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 2.5	ND 2.5	ND 1.0	ND 1.0
Chloroform	mg/L	280	300	ND 1.0	ND 1.0
Methylene chloride	mg/L	35	38	ND 1.0	ND 1.0
Tetrachloroethene	mg/L	ND 2.5	ND 2.5	ND 1.0	ND 1.0
Toluene	mg/L	ND 2.5	ND 2.5	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 2.5	ND 2.5	ND 1.0	ND 1.0

	Sample ID:	CBT-071816-SS	CBT-072516-SG	CBT-080116-SG	CBT-080816-SG
	Collection Date:	07/18/16	07/25/16	08/01/16	08/08/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	1.6
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	11
Methylene chloride	mg/L	ND 1.0	ND 1.0	5.8	24
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-081416-DT	CBT-082116-DT	CBT-082916-DT	CBT-090516-DT
	Collection Date:	08/14/16	08/21/16	08/29/16	09/05/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	45	190	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	13	15	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	100	220	ND 1.0	ND 1.0
Methylene chloride	mg/L	37	33	ND 1.0	ND 1.0
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	CBT-091116-DT	CBT-091916-DT	CBT-092616-SG	CBT-100316-DJT
	Collection Date:	09/11/16	09/19/16	09/26/16	10/03/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	1.1
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	4.9
Methylene chloride	mg/L	ND 1.0	ND 1.0	ND 1.0	6.8
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-100916-DJT	CBT-101716-SG	CBT-102416-SG	CBT-103016-DJT
	Collection Date:	10/09/16	10/17/16	10/24/16	10/30/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	2.4	34	31	210
Carbon tetrachloride	mg/L	3.7	46	22	180
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	18	70	110	270
Methylene chloride	mg/L	15	31	27	37
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	1.4
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	1.8

	Sample ID:	CBT-110616-DJT	CBT-111316-DJT	CBT-112016-DJT	CBT-112716-DJT
	Collection Date:	11/06/16	11/13/16	11/20/16	11/27/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-2
GROUNDWATER INTERSTAGE DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	CBT-120516-DJT	CBT-121216-SG	CBT-121916-SG	CBT-122716-DJT
	Collection Date:	12/05/16	12/12/16	12/19/16	12/27/16
Parameters	**Units**				
Volatiles					
Benzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	mg/L	ND 1.0	2.3	3.4	13
Tetrachloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	mg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:
	Collection Date:
Parameters	**Units**
Volatiles	
Benzene	mg/L
Carbon disulfide	mg/L
Carbon tetrachloride	mg/L
Chlorobenzene	mg/L
Chloroform	mg/L
Methylene chloride	mg/L
Tetrachloroethene	mg/L
Toluene	mg/L
Trichloroethene	mg/L

Notes:
ND Non-detect at the associated value.

APPENDIX A-3
GROUNDWATER EFFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	EFF-010416-SG	EFF-011116-SG	EFF-020116-SG	EFF-020816-SG
	Collection Date:	01/04/16	01/11/16	02/01/16	02/08/16
Parameters	**Units**				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	EFF-030716-SG	EFF-040416-SG	EFF-050316-SG	EFF-053116-SG
	Collection Date:	03/07/16	04/04/16	05/03/16	05/31/16
Parameters	**Units**				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-3
GROUNDWATER EFFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	***EFF-061316-SG***	***EFF-062016-SG***	***EFF-062716-SG***	***EFF-070516-SG***
	Collection Date:	***06/13/16***	***06/20/16***	***06/27/16***	***07/05/16***
Parameters	***Units***				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	***EFF-071116-SG***	***EFF-071816-SS***	***EFF-072516-SG***	***EFF-080116-SG***
	Collection Date:	***07/11/16***	***07/18/16***	***07/25/16***	***08/01/16***
Parameters	***Units***				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-3
GROUNDWATER EFFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	EFF-080816-SG	EFF-081416-DT	EFF-082216-DT	EFF-082916-SS
	Collection Date:	08/08/16	08/14/16	08/22/16	08/29/16
Parameters	**Units**				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	1.6	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

	Sample ID:	EFF-090516-DJT	EFF-100316-DJT	EFF-103016-DJT	EFF-110616-DJT
	Collection Date:	09/05/16	10/03/16	10/30/16	11/06/16
Parameters	**Units**				
Volatiles					
Benzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon disulfide	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chlorobenzene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Chloroform	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Methylene chloride	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Tetrachloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Toluene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trichloroethene	µg/L	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND Non-detect at the associated value.

APPENDIX A-3
GROUNDWATER EFFLUENT DATA
2016 ANALYTICAL RESULTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:	***EFF-120516-SG***
	Collection Date:	***12/05/16***
Parameters	***Units***	
Volatiles		
Benzene	µg/L	ND 1.0
Carbon disulfide	µg/L	ND 1.0
Carbon tetrachloride	µg/L	ND 1.0
Chlorobenzene	µg/L	ND 1.0
Chloroform	µg/L	ND 1.0
Methylene chloride	µg/L	ND 1.0
Tetrachloroethene	µg/L	ND 1.0
Toluene	µg/L	ND 1.0
Trichloroethene	µg/L	ND 1.0

Sample ID:	
Collection Date:	
Parameters	***Units***
Volatiles	
Benzene	µg/L
Carbon disulfide	µg/L
Carbon tetrachloride	µg/L
Chlorobenzene	µg/L
Chloroform	µg/L
Methylene chloride	µg/L
Tetrachloroethene	µg/L
Toluene	µg/L
Trichloroethene	µg/L

Notes:
ND Non-detect at the associated value.

Appendix B
Groundwater Treatment System
2016 SPDES Data

APPENDIX B
ANALYTICAL RESULTS SUMMARY
2016 SPDES SAMPLING
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

	Sample ID:		***SPDES-0601616***	***SPDES-080116***	***SPDES-110616***
	Sample Type:		***Effluent***	***Effluent***	***Effluent***
	Collection Date:		***06/01/16***	***08/01/16***	***11/06/16***
Semi-Volatiles	***Units***	***Discharge Limitation***			
2,4-Dichlorophenol	µg/L	10	ND 1.3	ND 1.3	ND 1.3
Hexachloroethane	µg/L	10	ND 1.2	ND 1.2	ND 1.2
Naphthalene	µg/L	10	ND 1.0	ND 1.0	ND 1.0
Metals					
Total Arsenic	lb/day	0.036	< 0.003	< 0.003	< 0.003
Total Chromium	lb/day	0.072	< 0.003	< 0.003	< 0.003
Total Copper	lb/day	0.1	< 0.007	< 0.007	< 0.007
Total Lead	lb/day	0.16	< 0.017	< 0.017	< 0.017
Total Nickel	lb/day	0.072	< 0.014	< 0.014	< 0.014
Total Selenium	lb/day	0.48	< 0.003	< 0.003	0.009
Total Zinc	lb/day	0.86	< 0.007	< 0.007	< 0.007
Wet Chemistry					
Total Recoverable Phenolics	mg/L	0.010	ND 0.0020	ND 0.0020	ND 0.0020

Notes:

ND Not detected at or above associated value

The 1st Quarter SPDES sample for semi-volatiles and metals was inadvertently not collected.

Mass discharge rates for metals were calculated utilizing laboratory results and average daily flow rates. All metals results with the exception of November selenium were non-detect, therefore the results are shown as less than the calculated result.

Appendix C
Groundwater Treatment System
2016 Performance Monitoring Data

APPENDIX C
ANALYTICAL RESULTS SUMMARY
2016 ANNUAL GROUNDWATER MONITORING
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Sample Location	Collection Date	Benzene ug/L	Carbon disulfide ug/L	Carbon tetrachloride ug/L	Chlorobenzene ug/L	Chloroform ug/L	Methylene chloride ug/L	Tetrachloroethene ug/L	Toluene ug/L	Trichloroethene ug/L
Extraction Wells										
DPA-201	5/25/2016	16	ND 10	3500	ND 10	1100	41	3100	ND 10	860
DPA-202	5/25/2016	ND 500	1100	46000	ND 500	5600	ND 500	1100	ND 500	ND 500
DPA-203	5/25/2016	ND 500	2200	190000	ND 500	42000	ND 500	1900	ND 500	ND 500
EW-1	5/24/2016	ND 50	46000	6800	ND 50	ND 50	220	110	ND 50	ND 50
EW-2	5/24/2016	ND 20	ND 20	2100	ND 20	520	34	34	ND 20	ND 20
EW-3	5/24/2016	ND 25	1400	4600	ND 25	2800	140	110	ND 25	130
EW-4	5/31/2016	ND 2.0	ND 2.0	260	ND 2.0	110	ND 2.0	12	ND 2.0	4.5
EW-5	5/24/2016	ND 2.5	420	370	ND 2.5	74	ND 2.5	63	ND 2.5	18
EW-6	5/24/2016	ND 50	960	92000	ND 50	17000	290	1300	ND 50	110
LR-66	5/24/2016	ND 2.5	9.6	320	ND 2.5	100	5.8	10	ND 2.5	ND 2.5
OW-3	5/24/2016	ND 1000	380000	24000	ND 1000	7200	ND 1000	2500	ND 1000	ND 1000
T-4	5/24/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	6.8	ND 1.0	2.3
Upper Lockport Wells										
OW-11	5/25/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
W-11	5/25/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	6.6	ND 1.0	5.2
W-16	5/25/2016	ND 1.0	ND 1.0	90	ND 1.0	160	ND 1.0	85	ND 1.0	110
W-17	6/10/2016	ND 10	220	11000	ND 10	3200	60	110	ND 10	200
W-18R	5/25/2016	ND 50	62	24000	ND 50	9200	350	240	ND 50	ND 50
W-18R (Dup.)	5/25/2016	ND 50	ND 50	19000	ND 50	9700	380	260	ND 50	ND 50
W-19D	5/25/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	3.6	ND 1.0	16	ND 1.0	ND 1.0
W-20	5/25/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
W-22A	5/25/2016	ND 1.0	ND 1.0	49	ND 1.0	20	ND 1.0	9.3	ND 1.0	3.0
W-23C	5/25/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	1.4	ND 1.0	1.8	ND 1.0	ND 1.0
W-66	6/2/2016	1.2	120	1000	ND 1.0	700	5.1	69	ND 1.0	27
W-67	6/2/2016	1.4	29	240	3.5	240	8.6	38	ND 1.0	26

Notes:
ND - Not present at or above the associated value.

APPENDIX C
ANALYTICAL RESULTS SUMMARY
2016 ANNUAL GROUNDWATER MONITORING
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Sample Location		Collection Date	Benzene ug/L	Carbon disulfide ug/L	Carbon tetrachloride ug/L	Chlorobenzene ug/L	Chloroform ug/L	Methylene chloride ug/L	Tetrachloroethene ug/L	Toluene ug/L	Trichloroethene ug/L
Lower Lockport Well											
W-16L		6/1/2016	ND 1.0	4300	ND 1.0	ND 1.0	1.8	ND 1.0	3.3	ND 1.0	7.2
W-18L		6/3/2016	ND 10	ND 10	1100	ND 10	2400	21	140	ND 10	63
W-19A		5/25/2016	ND 1.0	ND 1.0	2.0	ND 1.0	2.6	ND 1.0	4.3	ND 1.0	ND 1.0
W-23B		5/25/2016	ND 1.0	ND 1.0	88	11	63	ND 1.0	180	ND 1.0	39
W-48E		5/31/2016	ND 1.0	ND 1.0	100	ND 1.0	63	ND 1.0	20	ND 1.0	4.9
W-50L		6/1/2016	ND 1.0	ND 1.0	2.1	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
W-65		6/1/2016	ND 1.0	ND 1.0	2.3	ND 1.0	2.7	ND 1.0	1.9	ND 1.0	1.3
W-66L		6/1/2016	ND 1.0	4.4	2.3	ND 1.0	1.7	ND 1.0	ND 1.0	ND 1.0	ND 1.0
W-67L		6/2/2016	7.4	ND 5.0	380	ND 5.0	1000	40	38	ND 5.0	95
W-70L		6/2/2016	1.6	ND 1.0	1.0	59	14	ND 1.0	ND 1.0	ND 1.0	6.0
Lockport/Rochester Wells											
LR-2		6/6/2016	ND 25	52	3300	ND 25	2400	160	91	ND 25	27
LR-2	(Dup.)	6/6/2016	ND 25	70	3400	ND 25	2500	160	100	ND 25	27
LR-16		6/2/2016	ND 2.0	7600	120	ND 2.0	3200	1800	120	ND 2.0	180
LR-20		6/1/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
LR-48		6/2/2016	ND 1.0	ND 1.0	170	15	130	5.6	11	ND 1.0	6.9
LR-48	(Dup.)	6/2/2016	ND 1.0	ND 1.0	180	14	130	5.8	11	ND 1.0	6.5
LR-49		5/31/2016	ND 1.0	ND 1.0	ND 1.0	1.9	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
LR-50		6/1/2016	ND 1.0	4.9	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
LR-51		5/31/2016	ND 1.0	ND 1.0	1.2	3.8	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
LR-61		6/6/2016	ND 25	110	2700	42	1500	81	91	ND 25	77
LR-62		6/2/2016	57	9500	1.1	ND 1.0	52	2.3	2.6	9.5	13
LR-67		6/7/2016	160	45000	ND 100	ND 100	ND 100	ND 100	ND 100	ND 100	ND 100
LR-69		6/3/2016	300	ND 1.0	1.1	ND 1.0	ND 1.0	ND 1.0	ND 1.0	79	ND 1.0
OW-5		6/3/2016	ND 100	45000	120	ND 100	220	ND 100	ND 100	ND 100	ND 100

Notes:
ND - Not present at or above the associated value.

APPENDIX C
ANALYTICAL RESULTS SUMMARY
2016 ANNUAL GROUNDWATER MONITORING
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Sample Location		Collection Date	Benzene ug/L	Carbon disulfide ug/L	Carbon tetrachloride ug/L	Chlorobenzene ug/L	Chloroform ug/L	Methylene chloride ug/L	Tetrachloroethene ug/L	Toluene ug/L	Trichloroethene ug/L
W-19B		6/2/2016	ND 25	ND 25	2200	170	3600	230	75	ND 25	430
Rochester Wells											
B-02		6/7/2016	41	310	1100	ND 25	3200	400	ND 25	ND 25	ND 25
R-16		6/2/2016	97	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	36	ND 1.0
R-19		6/7/2016	86	8600	2600	ND 25	3100	350	37	62	ND 25
R-48		6/1/2016	2.6	30	540	1.2	200	17	3.9	ND 1.0	ND 1.0
R-50		6/7/2016	100	710	320	ND 10	980	180	16	59	ND 10
R-51		6/7/2016	40	9.5	ND 1.0	ND 1.0	12	22	ND 1.0	11	ND 1.0
R-60		6/7/2016	14	13	4.0	ND 1.0	25	1.4	1.6	ND 1.0	ND 1.0
R-61		6/3/2016	ND 100	30000	ND 100	ND 100	ND 100	ND 100	ND 100	ND 100	ND 100
R-62		6/7/2016	270	25000	ND 200	ND 200	ND 200	ND 200	ND 200	ND 200	ND 200
R-66		6/10/2016	ND 100	16000	8500	ND 100	ND 100	3300	ND 100	ND 100	ND 100
R-67		6/7/2016	ND 100	17000	150	ND 100	310	ND 100	900	ND 100	ND 100
R-68		6/7/2016	260	120000	41000	ND 50	48000	2100	620	190	ND 50
QA/QC											
RINSEBLANK	(other)	5/31/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
RINSEBLANK	(other)	6/1/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
RINSEBLANK	(other)	6/2/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
RINSEBLANK	(other)	6/6/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	5/24/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	5/31/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	6/1/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	6/2/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	6/3/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	6/6/2016	ND 1.0	1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0
Trip Blank	(other)	6/10/2016	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0

Notes:
ND - Not present at or above the associated value.

Appendix D
Monitoring Well Inventory

APPENDIX D
MONITORING WELL INVENTORY
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

November 19, 2016

Well No.	*Sounded Depth (Ft. BTOC)*	*Pro-Casing*	*Lock*	*Concrete Collar*
B02	NA (barcad)	G	G	G
OW-3	NA	NA	NA	NA
OW-5	103.04	G	G	G
OW-8	9.73	NA	NA	NA
OW-9	13.91	NA	NA	G
OW-10	13.14	NA	NA	G
OW-11	28.82	NA	NA	G
W-11	32.60	G	G	G
W-16	31.65	G	G	G
W-16L	67.17	G	G	G
W-17	39.32	G	G	G
W-18R	31.80	G	G	G
W-18L	74.04	G	G	G
W-19A	40.93	G	G	G
W-19B	82.66	G	G	G
W-19D	24.50	G	G	G
W-20	28.85	G	G	G
W-22A	22.70	G	G	G
W-23B	43.75	G	G	G
W-23C	23.11	G	G	G
W-48E	40.32	G	G	G
W-50	37.83	G	G	G
W-60L	33.96	G	G	G
W-65	57.43	G	G	G
W-66	48.07	G	G	G
W-66L	66.49	G	G	G
W-67	42.50	G	G	G
W-67L	71.72	G	G	G
W-70L	73.47	G	G	G
LR-2	90.22	G	G	G
LR-16	93.02	G	G	G
LR-20	87.04	G	G	G

Notes:
Ft. BTOC = Feet Below Top of Casing
PW = Pumping Well
EW = Extraction Well
NA = Not Available
G = Good Condition
P = Poor Condition
*Pro-Casing almost completely rotted out

APPENDIX D
MONITORING WELL INVENTORY
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK
2016

November 19, 2016

Well No.	*Sounded Depth (Ft. BTOC)*	*Pro-Casing*	*Lock*	*Concrete Collar*
LR-48	68.57	G	G	G
LR-49	75.79	G	G	G
LR-50	76.32	G	G	G
LR-51	65.87	G	G	G
LR-61	97.72	G	G	G
LR-62	103.64	G	G	G
LR-66	NA	NA	NA	NA
LR-67	102.62	G	G	G
LR-69	87.42	G	P	G
R-16	132.82	G	G	G
R-19	146.51	G	G	G
R-48	139.12	G	G	G
R-50	140.37	G	G	G
*R-51	NA (barcad)	P	G	G
R-60	138.13	G	G	G
R-61	153.47	G	G	G
R-62	157.72	G	G	G
R-66	151.47	G	G	G
R-67	142.15	G	G	G
R-68	122.10	G	G	G
EW-4	NA	G	NA	G
EW-5	NA	G	NA	G
EW-6	NA	G	NA	G
DPA-201	22.75	NA	NA	G
DPA-202	25.70	NA	NA	G
DPA-203	30.40	NA	NA	G
EW-1	NA	G	NA	G
EW-2	NA	G	NA	G
EW-3	NA	G	NA	G
T4	27.93	G	NA	G

Notes:
Ft. BTOC = Feet Below Top of Casing
PW = Pumping Well
EW = Extraction Well
NA = Not Available
G = Good Condition
P = Poor Condition
*Pro-Casing almost completely rotted out