

**Letter of Transmittal**

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**To:** Ms. Jennifer Dorman  
Environmental Program Associate  
Remediation and Redevelopment Program  
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Milwaukee, WI 53212-3128

**Date:** November 12, 2019

**Project Name:** Milwaukee Die Casting Co Site

**Geosyntec Proj. No.:** CHW8271N

Letter                       Proposal  
 Report                       Electronic Files (storage device)  
 **Work Plan**                       Other

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1	11/12/2019	<b>Updated Site Investigation Work Plan</b> <i>(WDNR review fee previously submitted)</i>

**For Review**                       As Requested                       Other  
 For File                       For Distribution

<b>Comments:</b>	<b>WDNR FID #: 241228240</b>
	<b>WDNR BRRS #: 02-41-000023</b>

**cc:** WDNR RR Submittal Portal  
Ms. Mary Jo Anzia, BSI  
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*Prepared for*  
**Pharmacia LLC**

# **UPDATED SITE INVESTIGATION WORK PLAN**

## **Milwaukee Die Casting Company Site**

4132 North Holton Street  
Milwaukee, Wisconsin  
WDNR BRRTS # 02-41-000023  
WDNR FID # 241228240

*Prepared by*

**Geosyntec**   
consultants

10600 N. Port Washington Road, Suite 100  
Mequon, Wisconsin 53092  
Project Number CHW8271N

December 14, 2018  
**Updated November 12, 2019**

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## Milwaukee Die Casting Company Site

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Milwaukee, Wisconsin  
WDNR BRRTS # 02-41-000023  
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*Prepared for*

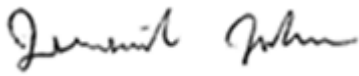
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December 14, 2018

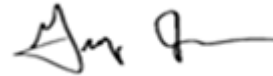
**Updated November 12, 2019**



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Jeremiah Johnson, P.G.  
Project Geologist  
(Licensed P.G. in WI)

"I, Jeremiah Johnson, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."



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Gregory L. Johnson, P.G., P.H., P.E.  
Senior Engineer, P.E. #: 29898-006  
(Licensed P.E. in WI, P.H. in WI, P.G. in IL, WI)

"I, Gregory L. Johnson, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

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## 1. INTRODUCTION

At the direction of the Wisconsin Department of Natural Resources (WDNR), this Updated Site Investigation Work Plan (“Updated Work Plan”) was prepared by Geosyntec Consultants (Geosyntec) on behalf of Pharmacia, LLC (Pharmacia) for the Milwaukee Die Casting Company (MDCC) site located at 4132 North Holton Street, Milwaukee, Wisconsin (“Site”).

This Updated Work Plan was prepared pursuant to the following, which are incorporated into the Updated Work Plan by reference:

- Item 2 on Page 3 of WDNR’s August 10, 2018 letter to Pharmacia and Fisher Controls International Inc. (Fisher) (WDNR, 2018a), referred to hereafter as the WDNR Notice Letter. Pharmacia is acting on behalf of Fisher in this matter.
- Wisconsin Administrative Code NR 716.09.
- December 14, 2018 Site Investigation Work Plan (prepared by Geosyntec on behalf of Pharmacia).
- February 13, 2019 WDNR email comments to the December 14, 2018 Site Investigation Work Plan.
- February 28, 2019 WDNR email response to Geosyntec (on behalf of Pharmacia) February 27, 2019 email note.
- April 2, 2019 Responses to WDNR Comments (letter prepared by Geosyntec on behalf of Pharmacia).
- June 28, 2019 WDNR email supplemental comments (to the December 14, 2018 Site Investigation Work Plan and the April 2, 2019 Responses to WDNR Comments).
- August 22, 2019 Responses to WDNR Supplemental Comments (letter prepared by Geosyntec on behalf of Pharmacia).

The December 14, 2018 Site Investigation Work Plan was based on WDNR’s August 10, 2018 letter. WDNR asserted in the August 10, 2018 letter that tetrachloroethene (PCE), trichloroethene (TCE), and related breakdown products are the primary groundwater contaminants of concern (COCs) at the Site. The December 14, 2018 Work Plan was prepared consistent with this assertion. WDNR subsequently requested in comments to the December 14, 2018 Site Investigation Work Plan that additional groundwater investigation include polychlorinated biphenyl (PCB) (filtered and unfiltered) and semi-volatile organic compound (SVOC), including 1,4-dioxane, analysis in addition to volatile organic compound (VOC) analysis for the planned initial two rounds of groundwater sampling. As documented in the August 22, 2019 Responses to WDNR Supplemental Comments, these parameters have been added to the planned initial two rounds of sampling, with the

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understanding that Pharmacia remains in disagreement with WDNR regarding the addition of SVOCs, including 1,4-dioxane.

In addition, WDNR requested in comments that the utility assessment, which was a planned task in the December 14, 2018 Work Plan, be conducted prior to and the findings incorporated into this Updated Work Plan. As documented in Section 3, the utility assessment has been completed and the findings have been incorporated into this Updated Work Plan.

Significant removal action activities were conducted at the Site pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) by Pharmacia and Fisher between 2013 and 2015 in accordance with an Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) with the United States Environmental Protection Agency (USEPA), effective date March 12, 2013 (USEPA, 2013). The Site removal action included, among other things, the excavation and off-site disposal of unsaturated chlorinated volatile organic compound (CVOC)-impacted soil and the excavation and disposal or relocation (within capped area) of PCB-impacted soil. The USEPA issued a “Notification of Completion-Compliance with Settlement Agreement” on August 20, 2018 (USEPA, 2018). The scope of work presented in this document is intended to perform an additional groundwater investigation and vapor pathway assessment at the Site, as directed by WDNR in the WDNR Notice Letter.

This Work Plan includes the following sections:

- Section 1: Introduction;
- Section 2: Background Information;
- Section 3: Utility Assessment;
- Section 4: Pre-Investigation;
- Section 5: Additional Groundwater Investigation;
- Section 6: Vapor Pathway Investigation;
- Section 7: Reporting and Schedule; and
- Section 8: References.



## 2. BACKGROUND INFORMATION

### 2.1 Site Ownership

The Site is currently owned by the Redevelopment Authority of the City of Milwaukee (RACM).

### 2.2 Site Location

The Site is identified by the property address of 4132 North Holton Street, Milwaukee, Wisconsin and Parcel (Taxkey) Number 2419982000.

The Site is located in the southwest ¼ of the southwest ¼ of Section 4, Township 7 North, Range 22 East, and at Wisconsin Transverse Mercator (WTM) coordinates 690593, 293172 on WDNR's RR Sites Map. The Site location is depicted on **Figure 1**.

### 2.3 Site Description

The Site is a 3.7-acre vacant, grass-covered, parcel. Site removal action activities included Site capping and vegetative cover. The Site cap includes three components as depicted on **Figure 2** (i.e., clay cap, soil cover, and topsoil cover).

The Site is subject to “continuing obligations” in accordance with a Post-Removal Site Control Plan (Geosyntec, 2018b), including a Cap Maintenance Plan in accordance with NR 724.13 and impacted property notifications in accordance with Wis. Stat. § 292.12(4) and NR 725.07.

The Site vicinity generally consists of light industrial, institutional, and commercial land use. The Site is bordered to the west by North Holton Street and a Wisconsin Army National Guard facility, to the north by a parking lot (Phoenix Cudahy, LLC), to the east by vacant land (Phoenix Cudahy, LLC/Pamida Seven, LLC and Scripps Media, LLC), and to the south by a parking lot and storage facility (DIV HDV Milwaukee I LLC).

Prior to Site removal action activities, the Site was developed with a centrally-located, approximately 70,000-square-foot industrial building formerly used for die-casting operations. The building was constructed in 1952 with an addition constructed in 1964. Die casting operations ceased in 1997. The building was demolished as part of the Site removal action. The former building footprint is depicted on **Figure 2**.

On-Site subsurface utilities were removed/abandoned as part of the Site removal action. The former Site subsurface utilities and the existing off-Site proximate utilities are depicted on **Figure 3A** (refer to Section 3).

Historical records document the former presence of a trichloroethene (TCE) underground storage tank (UST) in the southwest portion of the Site (exterior of southwest corner of the former building).<sup>1</sup> The approximate location of the former TCE UST is depicted on **Figure 3**.

## **2.4 Previous Investigation and Removal Action Summary**

Previous Site investigation activities conducted between approximately 1991 and 2012 revealed PCB and CVOC impacts to Site soil and proximate off-Site soil. The Site removal action included the excavation and off-site disposal of unsaturated CVOC soil impacts and the excavation and disposal or relocation (within capped area) of PCB soil impacts as documented in the June 7, 2018 Final Report and the subsequent USEPA issued August 20, 2018 “Notification of Completion-Compliance with Settlement Agreement”. The approximate extent of removal action impacted soil excavation is depicted on **Figure 2**.

Pre-removal action groundwater sampling conducted between 1998 and 2013 reported PCB and CVOC groundwater impacts at concentrations greater than NR 140 enforcement standards (ESs). The reported CVOC impacts consisted of TCE and tetrachloroethene (PCE) and their degradation products [cis-1,2- and trans-1,2-dichloroethene (DCE) and vinyl chloride]. The pre-removal action groundwater sampling data are summarized in **Table 1**. **Figure 4** depicts the former groundwater monitoring well locations and highlights the former well locations in which PCBs and/or CVOCs were reported as detected at concentrations greater than NR 140 ESs in the most recent sampling event (2013). The wells were abandoned in accordance with NR 141 during the Site removal action.

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<sup>1</sup> Historical information presented in this work plan is based on information provided by others and has been relied on as accurate. If it is determined that this information is inaccurate or incomplete, this work plan and any associated reports may be revised, amended and/or supplemented as appropriate.

## **2.5 Physiographical and Geological Setting**

### **2.5.1 Topography and Drainage**

The Site ground surface topography slopes from west to east as depicted on **Figure 2**. Site vicinity topography generally slopes to the east towards the Milwaukee River which is located approximately 500 feet east of the Site as depicted on **Figure 1**.

Site storm water runoff flows by overland flow with topography towards a shallow swale on the east side of the Site. The swale conveys stormwater to a storm sewer catch basin proximate to the northeast corner of the Site.

### **2.5.2 Geology and Hydrogeology**

The Site geology generally consists of up to approximately 12 feet of soil fill (clay, silty clay, and silt with sand and gravel and sands) overlying stiff to hard, low-permeability glacial till (predominantly silt with trace fine sand and gravel). The till unit contains discontinuous fine to coarse-grained sand lenses. In the eastern portion of the Site, a discontinuous clay unit was observed beneath the soil fill unit (and overlying the till unit).

Bedrock of the Milwaukee Formation (dolomite, dolomitic siltstone, and shale) underlies the glacial till in the Site vicinity (WGNHS, 2004b). The depth to bedrock in the Site vicinity is approximately 50 to 100 feet below ground surface (bgs) (WGNHS, 2004b).

Removal action activities modified the subsurface conditions at the Site. Removal action excavation depths ranged from approximately 2 to 20 feet bgs. The approximate extent of removal action soil excavation is depicted on **Figure 2**. The removal action areas were backfilled and compacted with documented clean off-Site borrow source soil and relocated on-Site and proximate off-Site soil. Further, a cap was constructed over the Site consisting of three components (2-foot clay cap, 2-foot soil cover, and 6-inch topsoil cover) as depicted on **Figure 2**.

Groundwater occurs at the Site at shallow depths (typically ranging from approximately 3 to 14 feet bgs). The water table is typically within the soil fill unit. The underlying till unit behaves as a low-permeability confining layer that limits downward seepage of groundwater from the soil fill unit.

Groundwater flow is generally to the east-northeast. Groundwater elevation data and contours for the most recent pre-removal action water level measurement event (September 23, 2013) are depicted on **Figure 4**.

### 3. UTILITY ASSESSMENT

On-Site utilities were removed as part of the Site removal action. An assessment of proximate off-Site subsurface utilities was conducted in September 2019 to assist in establishing groundwater and vapor pathway investigation locations, and in accordance with WDNR requests. The assessment included Diggers Hotline marking and records review, City of Milwaukee records review and field surveying. The assessment findings are depicted on **Figure 3A** (Utility Layout Map) and **Figure 3B** (Utility Layout Map Notes). Utility information is also depicted in cross-sections provided on **Figures 6 and 7** (Section A-A' and Section B-B').

It is important to note that subsurface utility trench dimensions and characteristics were not provided in available City or Diggers Hotline records, which is often the case. WDNR has specified in their February 13, 2019 email comments (Comment 1) that select wells “*should intercept the trenches*” indicating that “*We need to know if the trenches are intercepting the residual groundwater contamination and thereby allowing migration to the north and south.*” As indicated in Section 5.2 and on **Figures 5 through 7**, groundwater monitoring wells will be installed directly upgradient of the utilities to assess this potential. The objective is to screen these wells within the utility backfill; however, final locations will be based on minimum and recommended Diggers Hotline off-set distances, inferred accuracy of the utility locations (e.g., confirmed by survey versus marking and record only), property owner authorization, and the safety policies of Geosyntec and Pharmacia. This process will also be followed for locating soil gas probes.

## **4. PRE-INVESTIGATION**

This section provides a description of pre-investigation activities that will be conducted prior to implementing the additional groundwater and vapor pathway investigation field work.

### **4.1 Health and Safety Plan**

The Site investigation field work will be conducted pursuant to a Site-specific, work-specific Health and Safety Plan (HASP) prepared in accordance with applicable Occupational Safety and Health Standards (OSHA) regulations.

### **4.2 Permits and Access Agreements**

A City of Milwaukee Right-of-Way (ROW)/Drilling Permit will be obtained to conduct groundwater and vapor pathway investigation work within the North Holton Street ROW adjacent to the west of the Site.

Access agreements will be executed to conduct groundwater and vapor pathway investigation on properties adjacent to the east of the Site.

## 5. ADDITIONAL GROUNDWATER INVESTIGATION

This section provides the objectives, scope and rationale, and procedures of the additional groundwater investigation.

### 5.1 Objectives

The objectives of the additional groundwater investigation are to evaluate post-removal action groundwater quality, potential migration pathways, and specific areas identified by WDNR on Pages 4 and 5 of the WDNR Notice Letter including the following:

- Area adjacent to storm and sanitary sewers immediately to the east (downgradient) of the Site to assess the sewers (trench backfill) as preferential migration pathways.
- Area of former TCE UST (and area of former groundwater monitoring well GMMW-104) in the southwest portion of the Site.
- Area of abandoned underground gas line trending west of northwest corner of former building and upgradient of former groundwater monitoring well GMMW-102.
- Area of residual CVOC soil impacts in vicinity of former transformers in the southeast portion of the Site.
- Additional locations as indicated to evaluate overall Site groundwater quality, the extent of groundwater impacts greater than NR 140 ESs and subsequently to evaluate plume stability, if necessary.

### 5.2 Scope and Rationale

The proposed additional groundwater investigation will include approximately 13 groundwater monitoring wells and three piezometers. The proposed monitoring well and piezometer locations are depicted on **Figure 5** (Proposed Investigation Map) and on **Figures 6 and 7** (Section A-A' and Section B-B'). The following table summarizes the rationale for each of the proposed groundwater monitoring well and piezometer locations:

Proposed Well ID	Location/Rationale for Location
MW-1 PZ-1	on-Site (southwest); downgradient of former TCE UST, near former GMMW-104 (groundwater CVOCs reported > NR 140 ESs), area of residual unsaturated soil CVOCs reported > WDNR groundwater protection residual contaminant levels (RCLs)

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Proposed Well ID	Location/Rationale for Location
MW-2 PZ-2	on-Site (west-central); vicinity of former GMMW-102 and GMMW-103 (groundwater CVOCs reported > NR 140 ESs), area of residual unsaturated soil CVOCs reported > WDNR groundwater protection RCLs
MW-3	on-Site (northwest); downgradient margin of Site, downgradient of former GMMW-102 and GMMW-103 (groundwater CVOCs reported > NR 140 ESs), downgradient of area of residual unsaturated soil CVOCs reported > WDNR groundwater protection RCLs
MW-4	on-Site (northeast); downgradient margin of Site, area of residual unsaturated soil CVOCs reported > WDNR groundwater protection RCLs, near former GMMW-2
MW-5	off-Site (east-central); downgradient of Site, downgradient of former GMMW-105 and GMMW-106 (groundwater CVOCs and PCBs reported > NR 140 ESs), immediately upgradient of exiting 27-inch diameter storm sewer and 12-inch diameter sanitary sewer (refer to <b>Figure 6</b> , Section A-A'); <i>Note: the proposed MW-5 location was moved outside of clay cap and deeper excavation areas pursuant to the April 2, 2019 Responses to WDNR Comments (WDNR Comment 2 Response) (refer to Figures 5 and 6).</i>
MW-6	off-Site (east-central); downgradient Site, downgradient and/or vicinity of former GMMW-107, GMMW-3, GMMW-108, GMMW-110, and GMMW-202 (groundwater CVOCs and PCBs reported > NR 140 ESs), immediately upgradient of exiting 27-inch diameter storm sewer and 12-inch diameter sanitary sewer (refer to <b>Figure 7</b> , Section B-B'). <i>Note: the proposed MW-6 location was moved outside of clay cap and deeper excavation areas pursuant to the April 2, 2019 Responses to WDNR Comments (WDNR Comment 2 Response) (refer to Figures 5 and 7).</i>
MW-7	on-Site (southeast); downgradient and/or vicinity of former GMMW-111 and GMMW-108 (groundwater CVOCs and PCBs reported > NR 140 ESs), area of residual unsaturated soil CVOCs reported > WDNR groundwater protection RCLs, vicinity of former electrical substation (referenced in WDNR Notice Letter)
MW-8	off-Site (east); downgradient of former GMMW-108, GMMW-111, and GMMW-202 (groundwater CVOCs and PCBs reported > NR 140 ESs)
MW-9	off-Site (east); downgradient of Site; immediately upgradient of existing 72-inch Milwaukee Metropolitan Sewerage District (MMSD) Metropolitan Interceptor Sewer (MIS) and 24-inch storm sewer (refer to <b>Figure 7</b> , Section B-B')
MW-10 PZ-10	off-Site (east); downgradient of Site; immediately upgradient of existing 72-inch MMSD MIS and 24-inch storm sewer (refer to <b>Figure 6</b> , Section A-A')
MW-11	off-Site (northeast); downgradient of Site; immediately upgradient of existing 24-inch storm sewer and 72-inch MMSD MIS
MW-12	off-Site (west; within North Holton Street ROW); upgradient of Site; upgradient of former GMMW-102 (CVOCs reported > NR 140 ESs); vicinity of former east-west trending natural gas line (references in WDNR Notice Letter)
MW-13	off-Site (west, within North Holton Street ROW); upgradient of Site; upgradient of former GMMW-104 (CVOCs reported > NR 140 ESs)



The groundwater monitoring well locations may be modified based on observed field conditions, safety requirements, and permit and access agreement conditions (refer to Section 4.2).

Two rounds of groundwater sampling will be conducted. Additional groundwater sampling will be contingent upon the results of these two sampling events and, if warranted will be documented in an Update Work Plan addendum.

### **5.3 Procedures**

#### **5.3.1 Soil Boring Drilling**

Groundwater monitoring well soil borings will be advanced using a hollow-stem auger drill rig. Soil samples will be collected continuously using split-spoon samplers. Each soil sample will be classified in accordance with the Unified Soil Classification System (USCS) and field screened for VOCs with a photo-ionization detector (PID). The groundwater level observed during drilling will be recorded.

One soil sample will be collected during soil boring drilling from the screen interval of each groundwater monitoring well and piezometer for grain size distribution testing in accordance with ASTM D422.

A soil boring log (WDNR Form 4400-122) will be completed for each groundwater monitoring well soil boring.

#### **5.3.2 Monitoring Well Installation and Development**

The groundwater monitoring wells will be installed in accordance with NR 141. Completed screen intervals will be based on field observation during drilling and on previous groundwater monitoring well screen intervals. As depicted on **Figures 6 and 7** (Section A-A' and Section B-B'), it is anticipated that the water table monitoring well screen intervals may vary from approximately 3 to 13 feet bgs (east portion of Site) to approximately 5 to 15 feet bgs (off-site west) and the piezometer screen intervals may vary from approximately 25 to 30 feet bgs (off-site east) to approximately 35 to 40 feet bgs (west portion of Site).

The wells will be constructed of two-inch nominal diameter Schedule 40 polyvinyl chloride (PVC) riser and 10-foot long (water table monitoring wells) or 5-foot long (piezometers) Schedule 40 PVC, 0.010-inch machine slotted well screen. The on-Site wells and off-Site wells east of the Site will be completed at the surface with a lockable

protective steel stick-up casing and concrete surface seal. The wells within the North Holton Street ROW will be completed with a flush-mount steel, bolt-down cover. A Well Construction Form (WDNR Form 4400-113A) will be completed for each groundwater monitoring well.

The groundwater monitoring wells will be developed in accordance with NR 141. Development will include multiple cycles of purging and surging using a surge block. A portable water quality meter will be used to record the pH, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), turbidity and temperature of the purged water. A Monitoring Well Development Form (WDNR Form 4400-113B) will be completed for each groundwater monitoring well.

### **5.3.3 Surveying**

The location and elevation of the groundwater monitoring wells will be surveyed. Surveying will include northing and easting coordinates (State Plane Coordinates) and ground surface and top of casing elevations [National Geodetic Vertical Datum of 1929 (NGVD 29)].

### **5.3.4 Groundwater Sampling and Analysis**

Prior to sampling, the groundwater monitoring wells will be opened and the depth to water will be measured with an electronic water level indicator.

Groundwater samples will be collected using low-flow purging and sampling methods in accordance with NR 140 and the WDNR “Groundwater Sampling Field Manual” (WDNR, 1996).

During low flow purging, field parameters (pH, temperature, conductivity, DO, turbidity, and ORP) will be monitored using a portable water quality meter until the parameters stabilize.

Samples collected for dissolved PCB analysis will be field filtered using a 0.45-micron filter.

Collected groundwater samples will be immediately placed in laboratory supplied containers and placed in a cooler with ice for submittal to the laboratory.

The groundwater samples will be submitted to a NR 149 accredited laboratory under standard chain-of-custody protocols. The following table summarizes the laboratory analytical methods for the groundwater samples:

Parameter	Analytical Method
VOCs	USEPA 8260
methane, ethane and ethene	USEPA 8015B Modified
total organic carbon (TOC)	USEPA 9060
PCBs (dissolved and total)	USEPA 8082
SVOCs	USEPA 8270D
1,4-Dioxane	USEPA 8260-SIM Modified

### 5.3.5 Investigation-Derived Waste Management

Soil boring cuttings, development water, and sampling purge water will be contained in 55-gallon drums. The drums will be labeled and staged on-Site pending disposal.

### 5.3.6 Quality Assurance/Quality Control

Sampling and analysis quality assurance and quality control (QA/QC) procedures will be conducted in general accordance with NR 716.13(6) and include the following:

- One duplicate sample for every 10 or less samples.
- One equipment blank for every 10 or less samples, unless dedicated sampling equipment is used.
- One trip blank for each shipping container containing samples for VOC analysis.
- Decontamination of sampling equipment between each sampling location, unless dedicated or disposable sampling equipment are used.
- Checking and calibrating field instruments in accordance with manufacturer's instructions.

The quality of the laboratory analytical data will be evaluated by reviewing the chain-of-custody forms, holding times, analytical detection limits, results of field QA/QC sample analyses, and laboratory QA/QC results (method blanks, surrogates, and laboratory control samples).

### 5.3.7 Site Cap Considerations

Care will be taken to minimize the disturbance of the Site cap and vegetative cover during groundwater monitoring well installation. If necessary, repairs will be made in

accordance with the Site Cap Maintenance Plan. No groundwater monitoring wells will be installed within the Clay Cap portion of the Site cap.

### **5.3.8 Data Evaluation**

The validated additional groundwater investigation data (and the pre-removal action data), will be evaluated with respect to the additional groundwater investigation objectives. This evaluation will generally include groundwater flow and contaminant migration characteristics, including potential preferential migration pathways; the distribution of groundwater impacts greater than NR 140 ESs; and CVOC groundwater degradation characteristics [i.e., magnitude and distribution of CVOC source constituents (TCE and PCE) and their degradation products (cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, ethene, and ethane)].

## 6. VAPOR PATHWAY INVESTIGATION

This section provides the objectives, scope and rationale, and procedures for the vapor pathway investigation.

### 6.1 Objectives

A vapor pathway investigation will be conducted pursuant to Page 5 of the WDNR Notice Letter. The objectives of the vapor pathway investigation are as follows;

- Assess the potential for post-removal action off-Site soil vapor migration preferential pathways.
- Assess post-removal action residual on-Site vapor risk.

### 6.2 Scope and Rationale

Soil gas sampling will be conducted on the Site margins to assess potential off-site soil vapor migration preferential pathways. The locations were based on the utility assessment findings depicted on Figure The proposed soil gas probe locations are depicted on **Figure 4**. The following table summarizes the rationale for each of the proposed seven soil gas probe locations:

<b>Proposed Soil Gas Probe ID</b>	<b>Location/Rationale for Location</b>
SG-1	off-site (southwest); former natural gas lateral location; proximate residual unsaturated soil and pre-removal action groundwater CVOC impacts
SG-2	off-site (southwest); former water lateral location; proximate residual unsaturated soil and pre-removal action groundwater CVOC impacts
SG-3	off-site (southwest); former water lateral location; proximate residual unsaturated soil and pre-removal action groundwater CVOC impacts
SG-4	off-site (west-central); proximate to former natural gas lateral location; proximate residual unsaturated soil and pre-removal action groundwater CVOC impacts
SG-5	off-site (east); former storm sewer lateral location; proximate pre-removal action unsaturated soil and groundwater CVOC impacts
SG-6	off-site (east); former sanitary sewer lateral location; proximate pre-removal action unsaturated soil and groundwater CVOC impacts
SG-7	off-site (east); former storm and sanitary sewer lateral locations; proximate pre-removal action groundwater CVOC impacts

The soil gas probe locations may be modified based on observed field conditions safety requirements and permit and access agreement conditions (refer to Section 4.2).

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## **6.3 Procedures**

### **6.3.1 Soil Gas Sampling**

The soil gas probes will be advanced with a track or truck-mounted Geoprobe® unit. Soil samples will be collected continuously with a macro-core sampler. Each soil sample will be classified in accordance with the USCS and field screened with a PID. A soil boring log (WDNR Form 4400-122) will be completed for each soil gas probe.

One unsaturated soil sample will be collected from each soil gas probe location (from the probe screen interval) and analyzed for VOCs by USEPA Method 8260.

The soil gas probes will be installed within the unsaturated zone to a depth of approximately 1-foot above the observed depth to groundwater in proximate groundwater monitoring wells using 1/4-inch Nylaflow® tubing connected via a compression fitting to a six-inch-long, 1/4-inch-diameter stainless steel sampling screen. A sand filter pack will be placed in the annulus to a height of approximately three inches above the screen. Granular bentonite will be placed and wetted in two lifts of approximately three inches each above the filter pack and then a thick slurry of powdered bentonite and water will be added to seal the remainder of the borehole annulus to ground surface. The top of the soil gas probes will be fitted with valves to maintain an air-tight seal.

After installation, the soil gas probes will be allowed to rest at least two hours and then purged by removing a minimum of one liter of soil gas. Purging will be completed using a lung box and Tedlar™ bag, then purged gas will be screened with a gas meter for oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), and methane (CH<sub>4</sub>) to assess sub-surface soil gas conditions.

Soil gas samples will be collected with Summa® canisters and submitted to a NR 149 accredited laboratory under standard chain-of-custody protocols for laboratory analysis of VOCs by USEPA Method TO-15.

The location and ground surface elevation of the soil gas probes will be surveyed. The soil gas probes will be abandoned with bentonite chips following the collection of soil gas samples. Probe abandonment will be documented on borehole abandonment forms (WDNR Form 3300-005).

### 6.3.2 Investigation-Derived Waste Management

Soil gas probe cuttings will be contained in 55-gallon drums (combined with groundwater investigation soil boring cuttings). The drums will be labeled and staged on-Site pending disposal.

### 6.3.3 Quality Assurance/Quality Control

Sampling and analysis QA/QC procedures will include the following:

- One duplicate soil gas sample.
- Decontamination of sampling equipment between each sampling location, unless dedicated or disposable sampling equipment are used.
- Checking and calibrating field instruments in accordance with manufacturer's instructions.
- Each soil gas vapor probe will be leak tested by placing a small plastic shroud filled with helium over each soil gas probe and a minimum of 20% helium (He) will be injected into the shroud as a tracer. During sampling activities, purged vapors will be screened for the presence of helium using an MDG-2002 helium meter to determine if there are leaks in the sampling train. If elevated concentrations of helium (>5% of the shroud concentration) are observed in the purged vapors, the soil gas probe seal will be checked and/or enhanced to reduce the infiltration of ambient air into the probe and another purge sample will be collected.

The quality of the laboratory analytical data will be evaluated by reviewing the chain-of-custody forms, holding times, analytical detection limits, results of field QA/QC sample analyses, and laboratory QA/QC results (method blanks, surrogates, and laboratory control samples).

### 6.3.1 Data Evaluation

The potential for post-removal action off-Site soil vapor migration preferential pathways will be assessed through the evaluation of the utility assessment, soil gas sampling, and groundwater level data. The validated soil gas sampling results will be compared to WDNR soil gas vapor risk screening levels (VRSLs).

The groundwater sampling and groundwater level data will be used to assess the residual on-Site vapor risk. The use of groundwater data is considered appropriate based on the shallow nature of groundwater at the Site. Groundwater VRSLs will be calculated for the Site in accordance with WDNR guidance "Addressing Vapor

Intrusion at Remediation & Redevelopment Sites in Wisconsin” (WDNR, 2018b). The groundwater sampling data will subsequently be compared to the calculated groundwater VRSLS.



## 7. REPORTING AND SCHEDULE

The additional groundwater investigation and vapor pathway investigation findings and conclusions will be documented in a Supplemental Site Investigation Report prepared in accordance with NR 716.15.

It is anticipated that the investigation field activities will be conducted in Q1 2020 contingent upon weather conditions and WDNR approval of this Updated Work Plan. The second round of groundwater sampling would be conducted approximately three months following the initial sampling event. The Supplemental Site Investigation Report will be submitted to WDNR within 60 days after the receipt of the laboratory results of the second groundwater sampling event. Schedule updates will be provided to WDNR in the NR 700 semi-annual progress reports.

## 8. REFERENCES

ASTM (2007). Standard Test Method for Particle-Size Analysis of Soils, ASTM D422-63.

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WDNR (2018b). Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin, WDNR Publication RR-800, January 2018.

WDNR (1996). Groundwater Sampling Field Manual, WDNR Publication DG-038 96, September 1996.

USEPA (2018). Notification of Completion-Compliance with Settlement Agreement, Docket No. V-W-13-C-007, for the Milwaukee Die Casting Site, Milwaukee County, WI (Site ID #B5ZP), to Pharmacia LLC, August 20, 2018.

December 14, 2018

**Updated November 12, 2019**

USEPA (2013). Administrative Settlement Agreement and Order on Consent for Removal Action, Milwaukee Die Casting Site, March 6, 2013.

USGS (2013). Milwaukee, Wisconsin, 7.5 Minute Series (Topographic) Quadrangle Map, 2013.

WGNHS (2004a). Preliminary Bedrock Geologic Map of Milwaukee County, Wisconsin, Wisconsin Geological and Natural History Survey Open File Report 2004-14A.

WGNHS (2004b). Preliminary Depth to Bedrock Map of Milwaukee County, Wisconsin; Wisconsin Geological and Natural History Survey Open File Report 2004-14C.

# TABLES

**TABLE 1**  
**PRE-REMOVAL ACTION GROUNDWATER ANALYTICAL DATA SUMMARY**

Milwaukee Die Casting Company (MDCC) Site  
4132 North Holton Street, Milwaukee, Wisconsin

Well ID	Screen Interval (ft bgs)	Sample Date	CVOCs (µg/L)					PCBs (µg/L)
			PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	
GMMW-1	6-16	4/8/1998	ND	ND	ND	ND	ND	ND
		10/21/1998	ND	ND	ND	ND	ND	ND
		2/8/1999	ND	ND	ND	ND	ND	ND
		7/25/2002	ND	ND	ND	ND	ND	ND
		4/5/2005	ND	ND	ND	ND	ND	<b>48.46</b>
		5/16/2005	ND	ND	ND	ND	ND	ND
		6/2/2011	ND	ND	ND	ND	ND	ND
		8/6/2013	ND	ND	ND	ND	ND	ND
GMMW-2	7-17	4/8/1998	ND	2.3	0.98	ND	ND	ND
		7/26/2002	ND	1.2 Q	22	0.79 Q	ND	ND
		4/5/2005	1.1	<b>23</b>	2.6	ND	ND	ND
		6/1/2011	ND	<b>13</b>	8.8	ND	ND	ND
		8/7/2013	ND	4.6	17	ND	ND	ND
GMMW-3	5-15	4/9/1998	2.2	3.5	5.4	ND	<b>1.4</b>	<b>0.97</b>
		10/22/1998	ND	1.7	21	1.9	<b>25</b>	<b>0.79</b>
		2/9/1999	ND	2.1	6.9	0.5	<b>2.3</b>	<b>1.8</b>
		7/26/2002	ND	1.8 Q	4.9	ND	<b>1.1</b>	<b>0.8</b>
		4/5/2005	ND	1.9	ND	ND	ND	<b>1.76</b>
		5/17/2005	--	--	--	--	--	<b>1.14</b>
		6/1/2011	ND	ND	ND	ND	ND	<b>2.5</b>
		8/6/2013	ND	0.61	2.7	ND	ND	<b>0.59</b>
GMMW-4	6-16	4/9/1998	ND	ND	ND	ND	ND	ND
		10/21/1998	ND	ND	ND	ND	ND	ND
		2/8/1999	ND	ND	ND	ND	ND	ND
		7/25/2002	ND	ND	ND	ND	ND	ND
		4/5/2005	ND	ND	ND	ND	ND	<b>10.16</b>
		5/16/2005	--	--	--	--	--	ND
		6/1/2011	ND	ND	ND	ND	ND	ND
		8/6/2013	ND	ND	ND	ND	ND	ND
GMMW-5	5-15	4/9/1998	ND	ND	2.2	ND	ND	ND
		10/22/1998	ND	ND	2.7	ND	ND	ND
		2/8/1999	ND	ND	1.3	ND	ND	ND
		7/25/2002	ND	ND	1.2 Q	ND	ND	ND
		4/5/2005	ND	ND	1.4	ND	ND	<b>0.18</b>
		5/17/2005	--	--	--	--	--	ND
		6/1/2011	ND	ND	ND	ND	ND	ND
GMMW-6	9-19	6/4/1998	ND	ND	ND	ND	ND	ND
		10/21/1998	ND	ND	ND	ND	ND	ND
		2/8/1999	ND	ND	ND	ND	ND	ND
		6/2/2011	ND	ND	ND	ND	ND	ND
GMMW-100	0-4	4/6/2005	ND	ND	ND	ND	ND	<b>0.22</b>
		5/16/2005	--	--	--	--	--	ND
GMMW-101	3.5-13.5	4/6/2005	ND	ND	ND	ND	ND	<b>0.19</b>
		5/16/2005	--	--	--	--	--	ND
		6/1/2011	ND	ND	ND	ND	ND	ND
		8/5/2013	ND	ND	ND	ND	ND	ND
GMMW-102	4-14	4/6/2005	ND	ND	ND	ND	ND	ND
		5/31/2011	ND	<b>18</b>	ND	ND	ND	ND
		8/5/2013	<b>11</b>	0.25 J	ND	ND	ND	ND
GMMW-103	4-14	4/6/2005	1.4	0.51	6.9	ND	ND	<b>0.14</b>
		5/16/2005	--	--	--	--	--	ND
		5/31/2011	<b>490</b>	<b>130</b>	<b>230</b>	20	ND	ND
		8/6/2013	<b>470</b>	<b>84</b>	<b>79</b>	3.4	ND	ND

**TABLE 1**  
**PRE-REMOVAL ACTION GROUNDWATER ANALYTICAL DATA SUMMARY**

Milwaukee Die Casting Company (MDCC) Site  
4132 North Holton Street, Milwaukee, Wisconsin

Well ID	Screen Interval (ft bgs)	Sample Date	CVOCs (µg/L)					PCBs (µg/L)
			PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	
GMMW-104	3-13	4/6/2005	<b>18000</b>	<b>200000</b>	30	ND	ND	<b>3.41</b>
		5/17/2005	--	--	--	--	--	<b>5.49</b>
		6/2/2011	<b>10</b>	<b>20</b>	<b>2600</b>	30	ND	ND
		8/7/2013	<b>34</b>	<b>91</b>	<b>1900</b>	17	<b>250</b>	ND
GMMW-105	5-15	4/6/2005	ND	0.76	ND	ND	ND	<b>2.7</b>
		6/2/2011	ND	ND	11	ND	<b>11</b>	<b>5.2</b>
		8/6/2013	ND	1.6	<b>220</b>	1.8	<b>69</b>	<b>4.7</b>
GMMW-106	6-16	4/6/2005	ND	ND	ND	ND	ND	ND
		6/2/2011	ND	<b>7.6</b>	44	ND	<b>19</b>	ND
		8/7/2013	<b>79</b>	<b>45</b>	<b>110</b>	6.5	<b>55</b>	<b>0.45</b>
GMMW-107	4-14	4/6/2005	ND	ND	2.8	ND	<b>27</b>	<b>203.1</b>
		5/17/2005	--	--	--	--	--	<b>23.8</b>
		6/2/2011	ND	ND	ND	ND	<b>6.8</b>	<b>55</b>
		8/7/2013	ND	ND	0.55 J	ND	<b>3.1</b>	<b>110</b>
GMMW-108	4-14	4/6/2005	<b>27</b>	<b>31</b>	<b>740</b>	28	<b>6.4</b>	<b>1.0</b>
		6/2/2011	<b>7.6</b>	<b>27</b>	<b>460</b>	11	<b>160</b>	<b>12</b>
		8/7/2013	2.8 J	<b>13</b>	<b>1700</b>	12	<b>150</b>	<b>6.1</b>
GMMW-109	4-14	4/6/2005	ND	ND	ND	ND	ND	<b>0.19</b>
		5/17/2005	--	--	--	--	--	ND
		6/2/2011	ND	ND	ND	ND	ND	ND
		8/6/2013	ND	ND	ND	ND	ND	ND
GMMW-110	1-6	4/6/2005	<b>280</b>	<b>140</b>	<b>73</b>	3.2	<b>3.0</b>	<b>1.3</b>
		6/1/2011	<b>210</b>	<b>59</b>	26	ND	ND	ND
		8/13/2013	<b>44</b>	<b>130</b>	<b>87</b>	1.1	ND	<b>1.6</b>
GMMW-111	0-4	4/7/2005	<b>720</b>	<b>570</b>	<b>910</b>	58	<b>0.72</b>	ND
		6/1/2011	<b>460</b>	<b>840</b>	<b>890</b>	85	<b>110</b>	ND
		8/7/2013	<b>60</b>	<b>110</b>	<b>110</b>	5.6	<b>3.6</b>	ND
GMMW-200	2-12	9/10/2013	ND	ND	ND	ND	ND	ND
		9/23/2013	ND	ND	ND	ND	ND	ND
GMMW-201	2-12	9/9/2013	ND	0.78	5.6	0.54 J	ND	ND
		9/24/2013	0.87 J	3.7	14	0.85 J	ND	ND
GMMW-202	2-12	8/16/2013	<b>9.8</b>	<b>12</b>	<b>120</b>	10	<b>16</b>	ND
		9/24/2013	<b>24</b>	<b>21</b>	46	1.6	<b>2.3</b>	ND
GMMW-203	2-12	8/16/2013	ND	0.5	1.1	ND	ND	ND
GMPZ-200	25-30	9/9/2013	ND	ND	ND	ND	ND	ND
		9/25/2013	ND	ND	ND	ND	ND	ND
GMPZ-201	25-30	9/9/2013	ND	ND	ND	ND	ND	ND
		9/24/2013	ND	ND	ND	ND	ND	ND
NR 140 Enforcement Standard (ES)			5	5	70	100	0.2	0.03

*Notes:*

bold + box - concentration > NR 140 ES

CVOC - chlorinated volatile organic compound

ft bgs - feet below ground surface

DCE - dichloroethene

J - estimated concentration between LOD and LOQ

LOD - limit of detection

LOQ - limit of quantitation

ND - not detected

PCBs - polychlorinated biphenyls

PCE - tetrachloroethene

Q - result confirmed by re-analysis

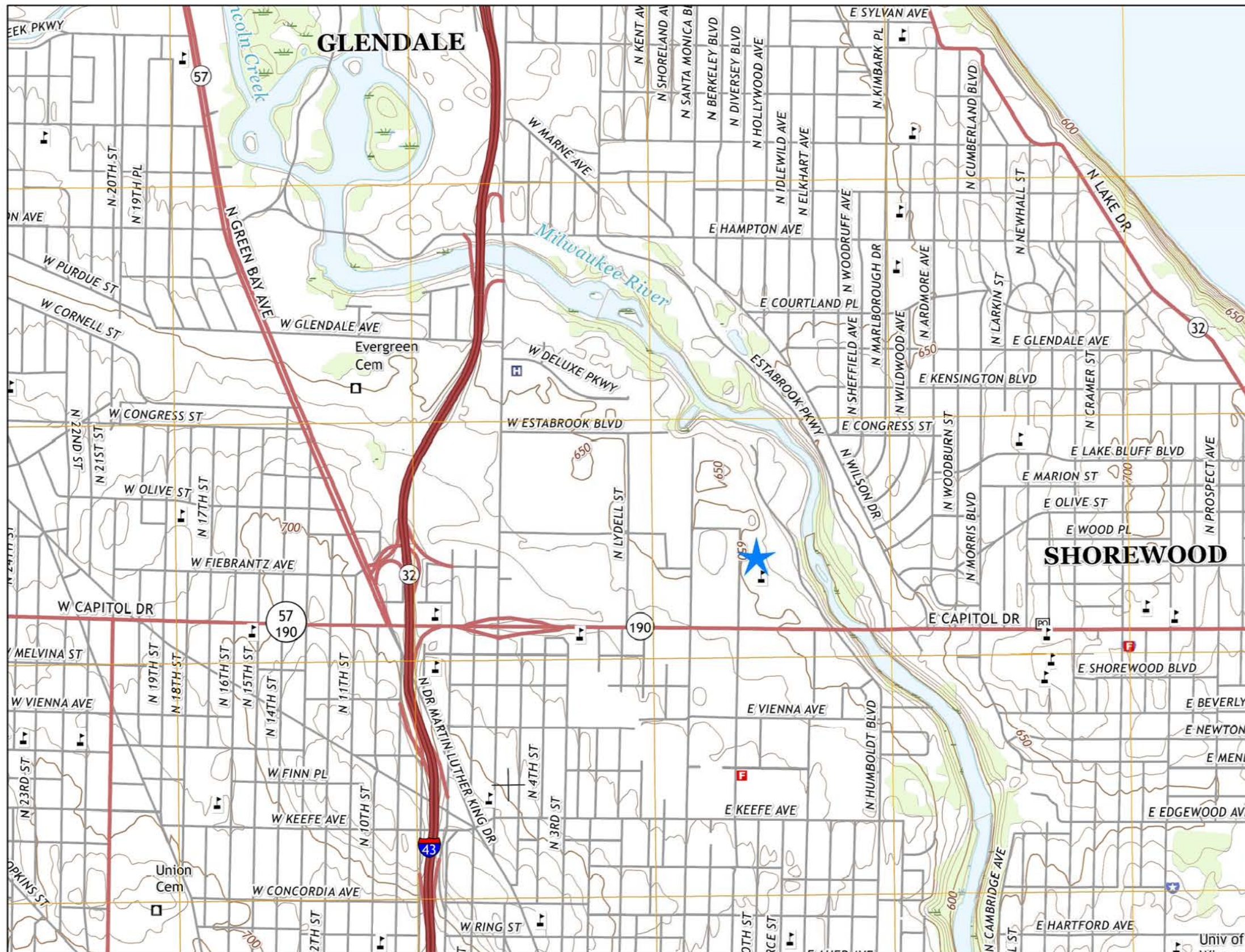
TCE - trichloroethene

µg/L - micrograms per liter

VC - vinyl chloride

# FIGURES





**LEGEND**



APPROXIMATE SITE LOCATION

REFERENCE: USGS MILWAUKEE, WI - 2016  
 SCALE: 1" = 1500' (APPROXIMATE)











**Geosyntec**<sup>®</sup>  
 consultants

CLIENT:	PHARMACIA, LLC.		
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN		
TITLE:	SITE LOCATION MAP		
PROJECT:	CHW8271M	FIGURE NO.:	1
DATE:	October 21, 2019	FILE NO.:	1910MDCC909
DRAWING NO.:			1 OF 7





**LEGEND**

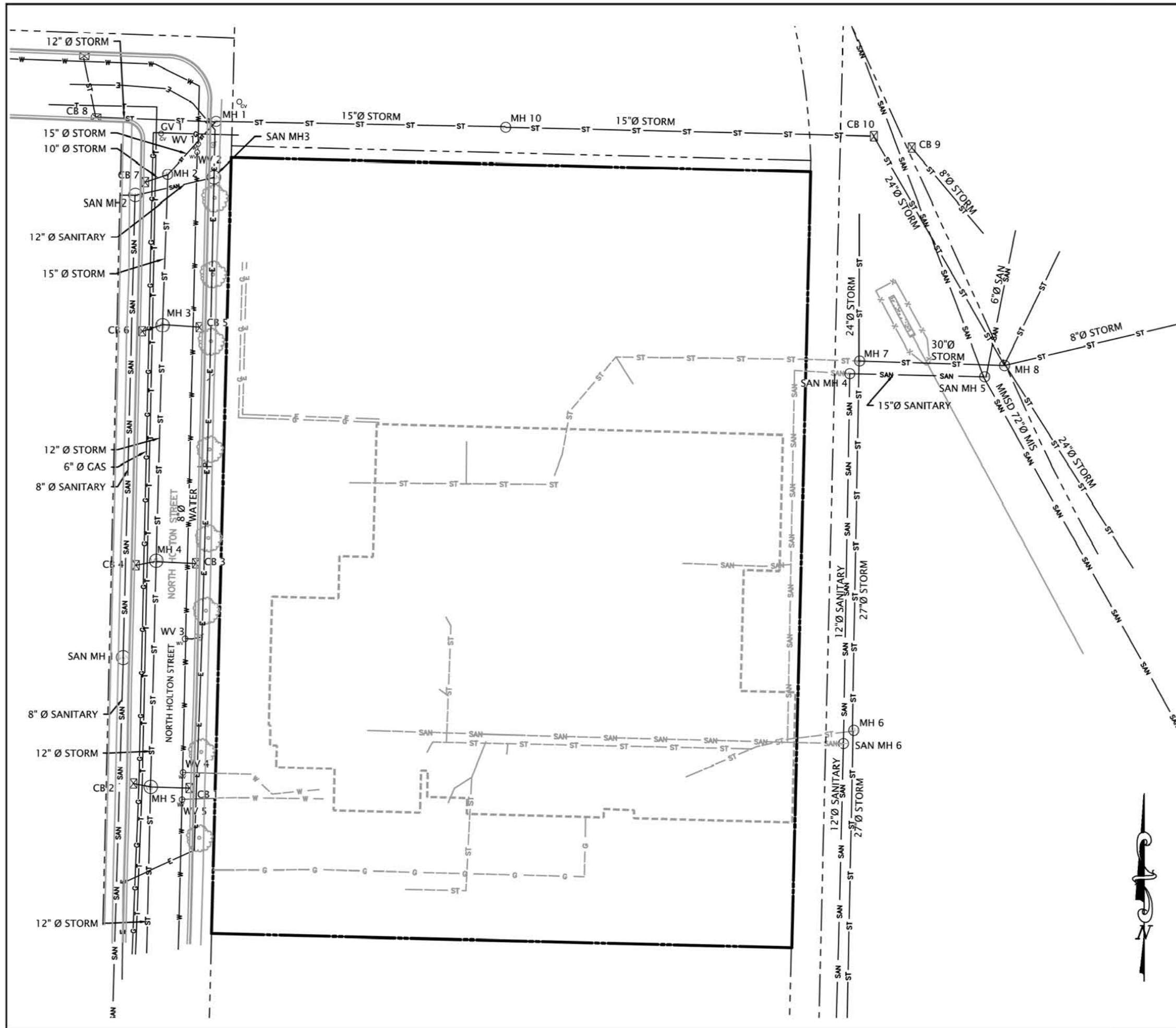
-  APPROXIMATE SITE PROPERTY LINE
-  APPROXIMATE ADJACENT PROPERTY LINES
-  APPROXIMATE FORMER BUILDING FOOTPRINT
-  APPROXIMATE EXTENT OF REMOVAL ACTION IMPACTED SOIL REMOVAL
-  1-FT GROUND SURFACE ELEVATION CONTOUR LINE (FEET ABOVE MEAN SEA LEVEL)
-  TRANSMISSION TOWER GUY WIRE FENCE
-  APPROXIMATE OVERHEAD TRANSMISSION TOWER GUY WIRE
-  CLAY CAP
-  SOIL COVER
-  TOPSOIL COVER



<b>Geosyntec</b> consultants		
CLIENT:	PHARMACIA, LLC.	
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN	
TITLE:	SITE LAYOUT MAP	
PROJECT: CHW8271M	FIGURE NO.: 2	DRAWING NO.: 2 OF 7
DATE: October 21, 2019	FILE NO.: 1910MDCC909	







**LEGEND**

- APPROXIMATE SITE PROPERTY LINE
- APPROXIMATE ADJACENT PROPERTY LINES
- APPROXIMATE FORMER BUILDING FOOTPRINT
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER
- EXISTING GAS
- EXISTING ELECTRIC
- TRANSMISSION TOWER GUY WIRE FENCE
- APPROXIMATE OVERHEAD TRANSMISSION TOWER GUY WIRE
- FORMER NATURAL GAS UTILITY
- FORMER WATER UTILITY
- FORMER STORM SEWER
- FORMER SANITARY SEWER
- CB 1 CATCH BASIN
- MH 1 MANHOLE (STORM)
- SAN MH 1 MANHOLE (SANITARY)
- HYDRANT
- VALVE (GAS)
- VALVE (WATER)

**GENERAL NOTES**

1. DATUM: NAD 83 (2011 ADJUSTMENT) UM 16 N (US SURVEY FEET).
2. FIELD SURVEY PERFORMED BY TERRATEC ENGINEERING, LLC ON 20 SEPTEMBER 2019.
3. BENCHMARKS:
  - 1 HYDRANT - WEST NUT, EL. = 652.92 FT AMSL
  - 2 HYDRANT - EAST NUT, EL. = 652.89 FT AMSL
4. REFER TO FIGURE 3B FOR MANHOLE, CATCH BASIN AND VAULT INFORMATION.
5. FT AMSL = FEET ABOVE MEAN SEA LEVEL



<b>Geosyntec</b> consultants		
CLIENT:	PHARMACIA, LLC.	
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN	
TITLE:	UTILITY LAYOUT MAP	
PROJECT: CHW8271M	FIGURE NO.: 3A	DRAWING NO.:
DATE: October 21, 2019	FILE NO.: 1910MDCC909	<b>3A</b> OF <b>7</b>

SANITARY SEWER MANHOLE SUMMARY

SAN MH1  
RIM = 650.50  
N IE = 640.45  
S IE = 640.35

SAN MH2  
RIM = 650.60  
E IE = 635.40  
W/S IE = 635.50

SAN MH 3  
RIM = 651.22  
W IE = 635.17

SAN MH 4  
RIM = 637.54  
E IE = 620.80  
S IE = 623.19  
W IE = 622.99

MH 5 (MMSD)  
RIM = 637.29  
SEDIMENT @ 615.20  
NE IE (6" CAST IRON DROP DOWN) ENTERS  
MH = 627.64  
NW/SE IE (72" RECORD) = 609.64

SAN MH 6  
RIM = 640.10  
N IE = 626.20  
S IE = 626.28

STORM SEWER CATCH  
BASIN SUMMARY

CB 1  
RIM = 650.19  
W IE = 646.19

CB 2  
RIM = 650.19  
E IE = 646.19

CB 3  
RIM = 650.04  
N IE = 646.50

CB 4  
RIM = 650.04  
N IE = 646.08

CB 5  
RIM = 650.04  
W IE = 645.64

CB 6  
RIM = 650.04  
E IE = 645.24

CB 7  
RIM = 650.30  
NE IE = 645.60

CB 8  
RIM = 650.00  
N IE = 645.35  
E IE = 645.15

CB 9 (BEEHIVE COVER)  
RIM = 635.40  
SE IE = 632.90

CB 10 (BEEHIVE COVER)  
RIM = 635.76  
W/SE IE = 630.05

STORM SEWER MANHOLE SUMMARY

MH 1  
RIM = 651.61  
E IE = 640.21  
SW IE = 640.16  
W IE = 639.61

MH 2  
RIM = 650.68  
NE IE = 639.88  
SW IE = 645.18  
S IE = 639.98

MH 3  
RIM 650.31  
N IE = 640.33  
E IE = 644.36  
S IE = 640.43  
W IE = 644.06

MH 4  
RIM = 650.33  
N IE = 640.93  
S IE = 640.88  
E IE = 644.38  
W IE = 644.08

MH 5 = 650.39  
N IE = 641.97  
S IE = 641.91  
E/W IE = 645.07

MH 6  
RIM = 639.46  
N IE = 632.33  
S IE = 632.46  
W IE = 639.48 (PLUGGED)

MH 7  
RIM = 637.45  
N IE = 629.10  
E IE = 625.63  
S IE = 629.83  
W IE = 632.45 (CAPPED)

MH 8  
RIM = 636.93  
NW IE = 625.53  
NE IE = 629.58  
E IE = 628.78  
SW IE = 625.58

MH 10  
RIM = 647.26  
W IE = 638.56  
E IE = 638.46

GAS & WATER VALVE SUMMARY

CV1  
RIM = 650.00  
UNABLE TO OPEN LID

WV 1  
RIM = 650.67  
TOP OF NUT = 645.99

WV2  
RIM = 650.70  
TOP OF NUT = 646.04

WV3  
RIM = 650.43  
TOP OF NUT = 645.44

WV4  
RIM = 650.04  
TOP OF NUT = 645.46

WV5  
RIM = 649.94  
TOP OF NUT = 645.23

UNITS = FEET ABOVE MEAN SEA LEVEL

Geosyntec  
consultants

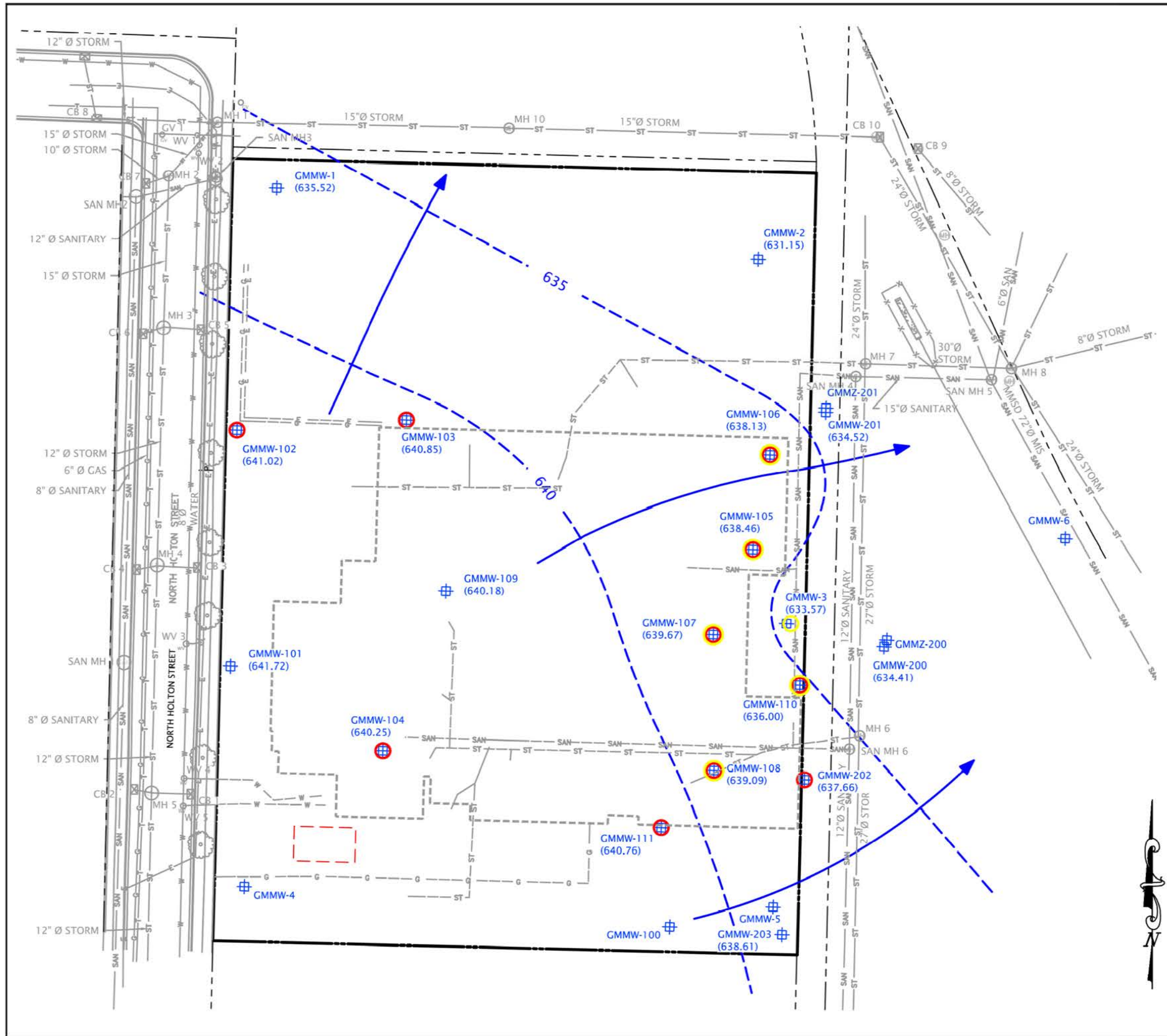
CLIENT: PHARMACIA, LLC.

PROJECT: MILWAUKEE DIE CASTING COMPANY (MDCC) SITE  
4132 NORTH HOLTON STREET  
MILWAUKEE, WISCONSIN

TITLE: UTILITY LAYOUT NOTES

PROJECT: CHW8271M FIGURE NO.: 3B DRAWING NO.: 3B OF 7  
DATE: October 21, 2019 FILE NO.: 1910MDCC909





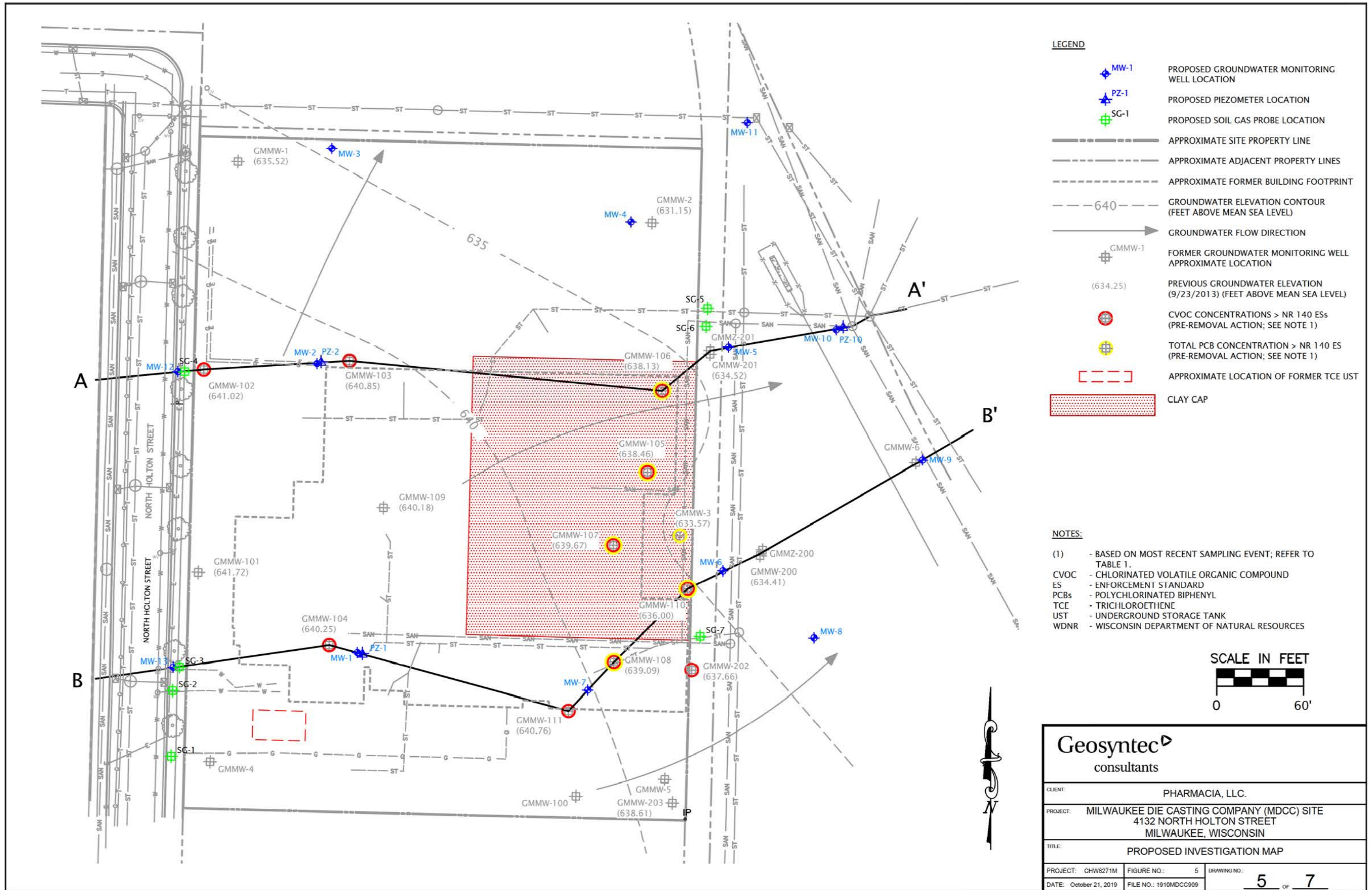
- LEGEND**
- APPROXIMATE SITE PROPERTY LINE
  - APPROXIMATE ADJACENT PROPERTY LINES
  - APPROXIMATE FORMER BUILDING FOOTPRINT
  - 640 - GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
  - GROUNDWATER FLOW DIRECTION
  - GMMW-1 FORMER GROUNDWATER MONITORING WELL APPROXIMATE LOCATION
  - (634.25) PREVIOUS GROUNDWATER ELEVATION (9/23/2013) (FEET ABOVE MEAN SEA LEVEL)
  - CVOC CONCENTRATIONS > NR 140 ES (PRE-REMOVAL ACTION; SEE NOTE 1)
  - TOTAL PCB CONCENTRATION > NR 140 ES (PRE-REMOVAL ACTION; SEE NOTE 1)
  - APPROXIMATE LOCATION OF FORMER TCE UST

- NOTES:**
- (1) - BASED ON MOST RECENT SAMPLING EVENT; REFER TO TABLE 1.
  - CVOC - CHLORINATED VOLATILE ORGANIC COMPOUND
  - ES - ENFORCEMENT STANDARD
  - PCBs - POLYCHLORINATED BIPHENYL
  - TCE - TRICHLOROETHENE
  - UST - UNDERGROUND STORAGE TANK
  - WDNR - WISCONSIN DEPARTMENT OF NATURAL RESOURCES



<b>Geosyntec</b> consultants		
CLIENT:	PHARMACIA, LLC.	
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN	
TITLE:	PRE-REMOVAL ACTION GROUNDWATER SUMMARY	
PROJECT: CHW8271M	FIGURE NO.: 4	DRAWING NO.: 4 7
DATE: October 21, 2019	FILE NO.: 1910MDCC909	





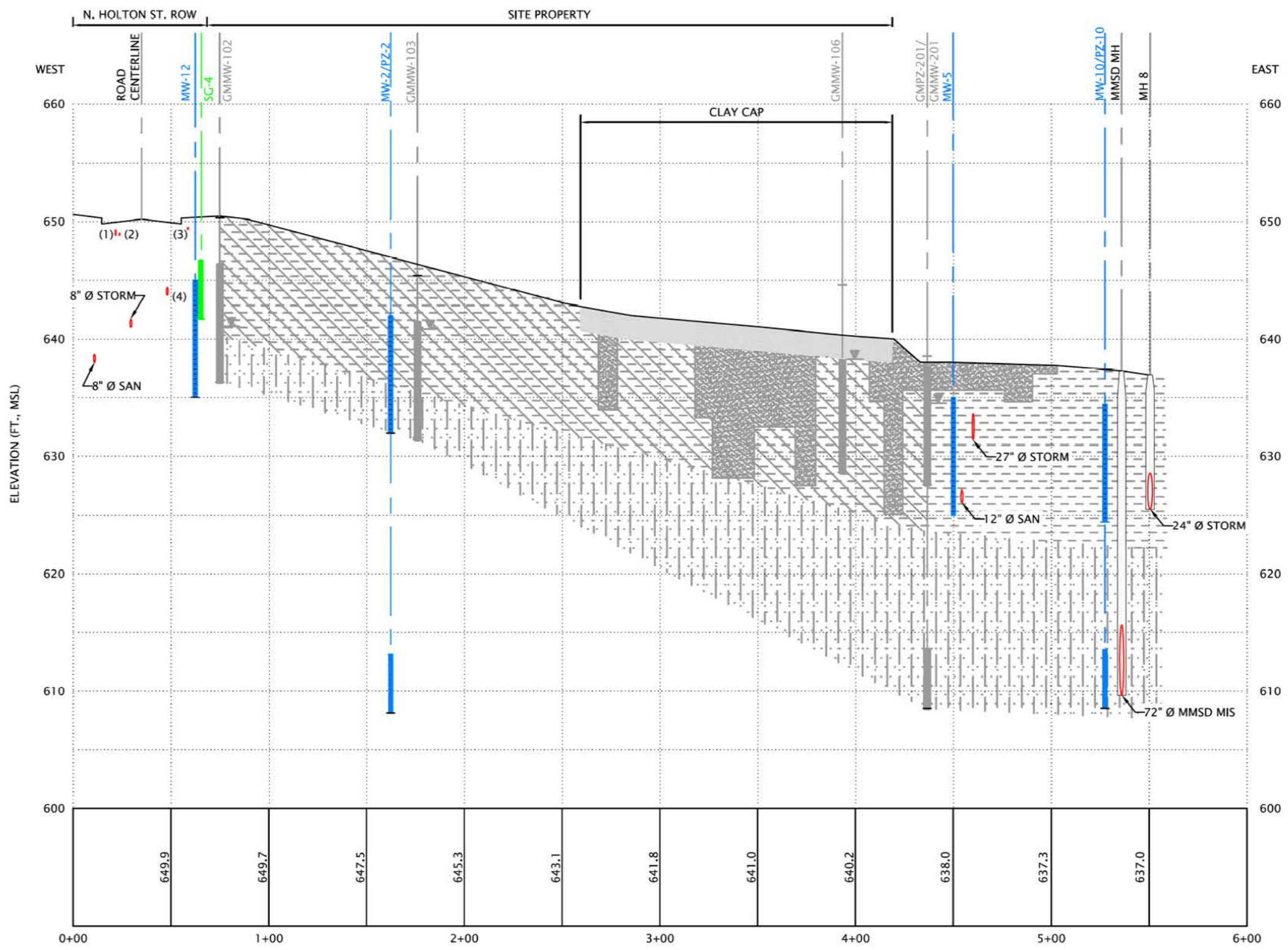
- LEGEND**
- ◆ MW-1 PROPOSED GROUNDWATER MONITORING WELL LOCATION
  - ▲ PZ-1 PROPOSED PIEZOMETER LOCATION
  - SG-1 PROPOSED SOIL GAS PROBE LOCATION
  - APPROXIMATE SITE PROPERTY LINE
  - - - APPROXIMATE ADJACENT PROPERTY LINES
  - - - APPROXIMATE FORMER BUILDING FOOTPRINT
  - - - 640 - - - GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
  - GROUNDWATER FLOW DIRECTION
  - ⊕ GMMW-1 FORMER GROUNDWATER MONITORING WELL APPROXIMATE LOCATION
  - (634.25) PREVIOUS GROUNDWATER ELEVATION (9/23/2013) (FEET ABOVE MEAN SEA LEVEL)
  - ⊙ CVOC CONCENTRATIONS > NR 140 ESs (PRE-REMOVAL ACTION; SEE NOTE 1)
  - ⊙ TOTAL PCB CONCENTRATION > NR 140 ES (PRE-REMOVAL ACTION; SEE NOTE 1)
  - ⊠ APPROXIMATE LOCATION OF FORMER TCE UST
  - ▨ CLAY CAP

- NOTES:**
- (1) - BASED ON MOST RECENT SAMPLING EVENT; REFER TO TABLE 1.
  - CVOC - CHLORINATED VOLATILE ORGANIC COMPOUND
  - ES - ENFORCEMENT STANDARD
  - PCBs - POLYCHLORINATED BIPHENYL
  - TCE - TRICHLOROETHENE
  - UST - UNDERGROUND STORAGE TANK
  - WDNR - WISCONSIN DEPARTMENT OF NATURAL RESOURCES



<b>Geosyntec</b> consultants		
CLIENT:	PHARMACIA, LLC.	
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN	
TITLE:	PROPOSED INVESTIGATION MAP	
PROJECT: CHW8271M	FIGURE NO.: 5	DRAWING NO.: 5 OF 7
DATE: October 21, 2019	FILE NO.: 1910MDCC909	





- LEGEND:**
- EXISTING GROUND SURFACE
  - CLAY CAP
  - BACKFILL (REMOVAL ACTION EXCAVATION AREA)
  - FILL MATERIAL (HETEROGENOUS RE-WORKED CLAY WITH VARYING SAND & GRAVEL)
  - CLAY
  - SILT, SILTY SAND
  - FORMER GROUNDWATER MONITORING WELL SCREEN
  - PREVIOUS GROUNDWATER ELEVATION (9/23/2013)
  - PROPOSED APPROXIMATE GROUNDWATER MONITORING WELL SCREEN
  - PROPOSED APPROXIMATE SOIL GAS PROBE SCREEN

- NOTES:**
- (1) 6" Ø GAS
  - (2) TELEPHONE LINE
  - (3) ELECTRIC LINE
  - (4) 8" Ø WATER

**Geosyntec**  
consultants

CLIENT: PHARMACIA, LLC.

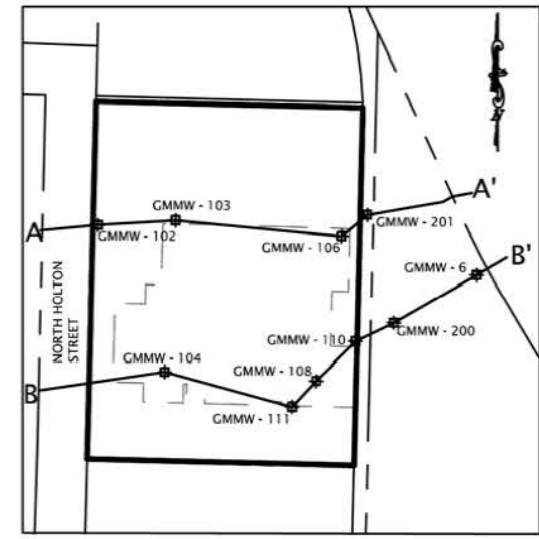
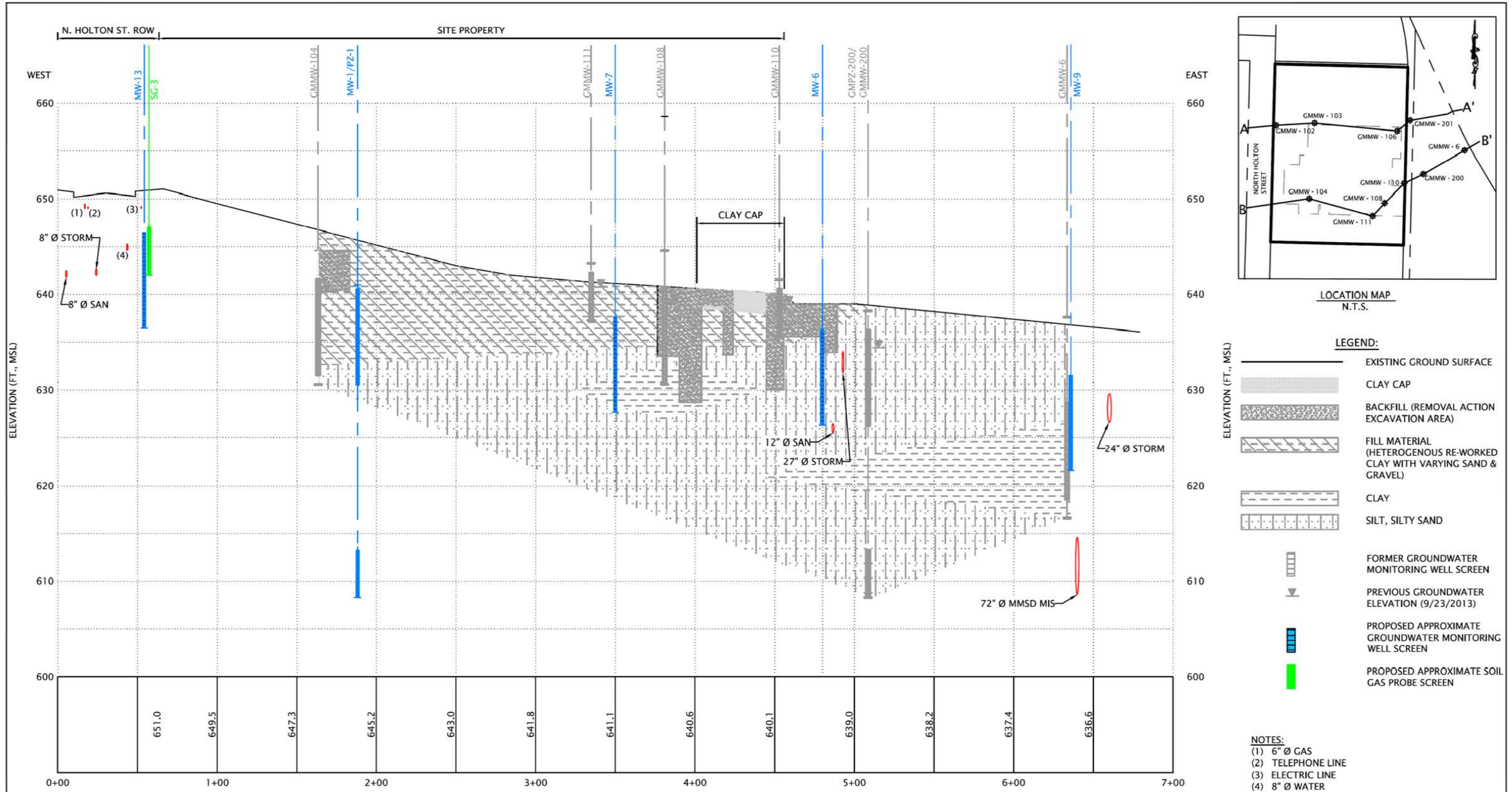
PROJECT: MILWAUKEE DIE CASTING COMPANY (MDCC) SITE  
4132 NORTH HOLTON STREET  
MILWAUKEE, WISCONSIN

TITLE: SECTION A - A'

PROJECT: CHW8271M    FIGURE NO.: 6    DRAWING NO.: 6 OF 7

DATE: October 21, 2019    FILE NO.1909sectionsA-B





- LEGEND:**
- EXISTING GROUND SURFACE
  - CLAY CAP
  - BACKFILL (REMOVAL ACTION EXCAVATION AREA)
  - FILL MATERIAL (HETEROGENOUS RE-WORKED CLAY WITH VARYING SAND & GRAVEL)
  - CLAY
  - SILT, SILTY SAND
  - FORMER GROUNDWATER MONITORING WELL SCREEN
  - PREVIOUS GROUNDWATER ELEVATION (9/23/2013)
  - PROPOSED APPROXIMATE GROUNDWATER MONITORING WELL SCREEN
  - PROPOSED APPROXIMATE SOIL GAS PROBE SCREEN

- NOTES:**
- (1) 6" Ø GAS
  - (2) TELEPHONE LINE
  - (3) ELECTRIC LINE
  - (4) 8" Ø WATER

<b>Geosyntec</b> consultants		
CLIENT:	PHARMACIA, LLC.	
PROJECT:	MILWAUKEE DIE CASTING COMPANY (MDCC) SITE 4132 NORTH HOLTON STREET MILWAUKEE, WISCONSIN	
TITLE:	SECTION B-B'	
PROJECT: CHW8271M	FIGURE NO.: 7	DRAWING NO.:
DATE: October 10, 2019	FILE NO.: 1909section ab	7 of 7