



August 10, 2018

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Subject: Reported Contamination at Milwaukee Die Casting Company, Inc.  
4132 N. Holton Street, Milwaukee, WI  
BRRTS Activity # 02-41-000023, FID # 241228240

Dear Ms. Malone, Mr. Clapp, Ms. McCafferty Harvey, Mr. Markus, and Mr. Schott:

The Department of Natural Resources (DNR) acknowledges and appreciates the significant clean-up efforts completed to date by Pharmacia LLC (Pharmacia) and Fisher Controls International, Inc. (Fisher) for the voluntary "Administrative Settlement Agreement and Order on Consent for Removal Action" (AOC; dated March 6, 2013) with the U.S. Environmental Protection Agency (EPA). However, further environmental work is still needed to bring the above-referenced environmental case to closure under Wisconsin laws.

The purpose of this letter is to notify Pharmacia and Fisher, the Responsible Parties (RPs), that additional environmental investigation and remediation of contamination at the Milwaukee Die Casting Company (MDCC) site are required for compliance with the hazardous substance spill law, Wis. Stat. § 292.11(3). An assessment of potential contamination above state regulatory standards in all environmental media is needed to determine the remedial actions necessary to restore the environment. Efforts to date, have focused primarily on investigation and removal of polychlorinated biphenyls (PCBs) and shallow chlorinated solvents contamination in soil. Limited groundwater investigation has been conducted, but remains incomplete.

### **Background**

Site groundwater was determined to be contaminated primarily by chlorinated volatile organic compounds (CVOCs), including the degreasing solvents tetrachloroethene (PCE) and trichloroethylene (TCE) and related breakdown products: cis- and trans-1,2-dichloroethene (c- and t-1,2-DCE) and vinyl chloride (VC). Refer to attached Figure B.3.b. Groundwater Iso-Concentration Map and Table A.1 Groundwater Analytical Table. Laboratory analysis of filtered and unfiltered groundwater samples appears to indicate that PCB contamination in

unfiltered groundwater is likely due to PCBs sorbed to suspended soil particles and/or colloids in the former site monitoring wells.

As summarized in the first work plan prepared under the AOC (Arcadis, April 8, 2013):

“PCE and TCE were the predominant VOCs detected that exceed the industrial soil RSLs [EPA ‘regional screening levels’] at the site. A total of 69 soil samples were collected from the upper soil zone (0 to 4 ft bls [feet below land surface]), and total PCE/TCE concentrations ranged from non-detect to 312 ppm [parts per million]. A total of 97 soil samples were collected from deep soil zone (> 4 ft bls), and total PCE/TCE concentrations ranged from non-detect to 1,529 ppm.”

Refer to attached Drawing Numbers 12 and 13, which show concentrations in parts per billion, ppb. The generally higher concentrations at greater depths likely reflect the heavier-than-water (sinking) property of PCE and TCE compounds.

Soils with high PCE and TCE concentrations were specifically targeted for excavation within the southwest quadrant of the building footprint, but only to the shallow water table (approximately 4 ft bls). Within eastern portions of the site, especially the former access road and “courtyard” area, PCE and TCE contamination was removed to greater depths during targeted excavation of PCB-contaminated soils. At least two additional areas of high CVOC concentrations – outside the northwest corner and near the former electrical substation at the southeast corner of the former building – were not excavated. Therefore, soils with high PCE and TCE concentrations remain in place as on-going sources of CVOC contamination to groundwater. Consequently, to move the site to case closure, additional groundwater investigation and monitoring is required to evaluate the post-removal action groundwater quality, potential migration pathways, and contaminant concentration trends.

Furthermore, information submitted to or obtained by the DNR indicates the MDCC facility was a source of PCB contamination in Milwaukee River sediments near and downstream of the City of Milwaukee storm sewer system #2265 outfall (located approximately 500 feet northeast of the facility), as well as contamination possibly under the storm sewer system itself, based on multiple investigations, which include the following:

- Screening Site Inspection Report for Milwaukee Die Casting Co., Inc., December 21, 2012, prepared by the WDNR for the U.S.EPA Site Assessment program.
- Removal Site Assessment Summary Report for the Milwaukee Die Casting Site, February 29, 2012, prepared by Weston Solutions, Inc. for the U.S.EPA as part of removal action planning for the site.
- Addendum to February 29, 2012, Removal Site Assessment Summary Report, Milwaukee Die Casting Site, September 11, 2012, prepared by Weston Solutions, Inc. for the U.S.EPA as part of removal action planning for the site.
- Site Inspection Report for Milwaukee River PCB Outfall 2265, September 2, 2016, prepared by the WDNR for the U.S.EPA Site Assessment program.
- Miscellaneous documents in the DNR case files and provided to U.S.EPA in response to their CERCLA Section 104(e) information request.

The remainder of this letter describes the legal responsibilities of a “person,” as defined in Wis. Stat. § 292.01(13), who is responsible under Wis. Stat. § 292.11, explains what you need to do to investigate and clean

up the contamination, and provides you with information about cleanups, environmental consultants, possible financial assistance, and working cooperatively with the DNR.

### **Legal Responsibilities:**

Your legal responsibilities are defined both in statute and in administrative codes. The hazardous substances spill law, Wis. Stat. § 292.11 (3), states:

- **RESPONSIBILITY.** A person who possesses or controls a hazardous substance which is discharged or who causes the discharge of a hazardous substance shall take the actions necessary to restore the environment to the extent practicable and minimize the harmful effects from the discharge to the air, lands, or waters of the state.

Wis. Admin. Code chs. NR 700-754 establish requirements for emergency and interim actions, public information, site investigations, design and operation of remedial action systems, and case closure. Wis. Admin. Code ch. NR 140 establishes groundwater standards for contaminants that reach groundwater.

### **Steps to Take:**

The longer contamination is left in the environment, the farther it can spread and the more it may cost to clean up. Quick action may lessen damage to your property and neighboring properties and reduce your costs in investigating and cleaning up the contamination. To ensure that your cleanup complies with Wisconsin's laws and administrative codes, you should hire a professional environmental consultant who understands what needs to be done. The following information provides the timeframes and required steps to take. Unless otherwise approved by DNR in writing you must complete the work by the timeframes specified.

1. Within the next **30 days**, by **September 13, 2018**, you should submit written verification (such as a letter from the consultant) that you have hired an environmental consultant. If you do not take action within this time frame, the DNR may initiate enforcement action against you.
2. Within **60 days**, by **October 12, 2018**, you must submit a work plan for completing the investigation. The work plan must comply with the requirements in the NR 700 Wis. Adm. Code rule series and should adhere to current DNR technical guidance documents.
3. You must initiate the site investigation within 90 days of submitting the site investigation work plan. You may proceed with the field investigation upon DNR notification to proceed. If the DNR has not responded within 30 days from submittal of the work plan, you are required to proceed with the field investigation. If a fee for DNR review has been submitted, the field investigation must begin within 60 days after receiving DNR approval.
4. Within 60 days after completion of the field investigation and receipt of the laboratory data, you must submit a Site Investigation Report to the DNR or other agency with administrative authority. For sites with agrichemicals contamination, your case will be transferred to the Department of Agriculture, Trade and Consumer Protection for oversight.
5. Within 60 days after submitting the Site Investigation Report, you must submit a remedial actions options report (RAOR). The RAOR shall include an evaluation of Green and Sustainable Remediation opportunities as required by Wis. Adm. Code § NR 722.09 (2m).

Sites where discharges to the environment have been reported are entered into the Bureau for Remediation and Redevelopment Tracking System (“BRRTS”), a version of which appears on the DNR’s internet site. You may view the information related to your site at any time (<http://dnr.wi.gov/botw/SetUpBasicSearchForm.do>) and use the feedback system to alert us to any errors in the data.

If you want a formal written response from the department on a specific submittal, please be aware that a review fee is required in accordance with Wis. Adm. Code ch. NR 749. If a fee is not submitted with your reports, you must complete the site investigation and cleanup to maintain your compliance with the Wis. Stat. § 292.11 (3) and Wis. Adm. Code chs. NR 700-754. **The timeframes specified above are required by rule, so do not delay the investigation of your site.** We have provided detailed technical guidance to environmental consultants. Your consultant is expected to know our technical procedures and administrative rules and should be able to answer your questions on meeting cleanup requirements.

All correspondence regarding this site should be sent to:

Chue Yee Yang, Environmental Program Associate  
Remediation and Redevelopment Program  
Wisconsin Department of Natural Resources  
2300 N. Dr. Martin Luther King Jr. Drive  
Milwaukee, WI 53212  
ChueYee.Yang@wisconsin.gov

Unless otherwise directed, submit one paper copy and one electronic copy of plans and reports. To speed processing, correspondence should reference the BRRTS and FID numbers (if assigned) shown at the top of this letter.

### **Additional Site Investigation and Remediation**

To facilitate efforts, the DNR identifies (but does not limit attention to) the following areas for additional investigation and remediation:

- The storm and sanitary sewer line trenches immediately to the east (downgradient) of the former MDCC facility property. The trenches may intercept and direct groundwater plume migration to the north, south, and/or northeast towards the storm sewer outfall to the Milwaukee River. Figure 3-7 Potentiometric Surface Map appears to reflect this situation by the abrupt decrease in CVOC concentrations from former monitoring wells GMMW-110 and GMMW-202 (west side of sewers) to GMMW-200 (east side of sewers). See previously mentioned Figure B.3.b.
- The area surrounding the former PCE/TCE underground storage tank at the southwest corner of the MDCC building footprint and the former downgradient monitoring well GMMW-104, which was installed in the Trimming Department, possibly near former degreasing operations.
- The area surrounding the abandoned underground natural gas line trench running west from the northwest corner of the former MDCC building. Investigative activities should include evaluating groundwater quality to the immediate west (upgradient) of the former MDCC property to determine if the CVOC contamination near former monitoring well GMMW-102 was migrating along the gas line from the property or was migrating onto the property from an off-site source.

- The area surrounding the former electrical substation outside the southeast corner of the former MDCC building.
- Additional monitoring wells should be considered for installation at appropriate upgradient and downgradient locations to monitor general groundwater flow patterns and quality across the greater site area.
- At a minimum, additional remediation will include a groundwater monitoring program to evaluate plume stability and natural attenuation potential. Active remediation might be necessary to expedite case closure or if the remaining contamination sources are posing a significant threat to human health or the environment.

**Vapor Pathway Analysis:**

The site investigation work plan must address all environmental media, including an assessment of the vapor intrusion pathway. Wis. Adm. Code ch. NR 716 outlines the requirements for investigation of contamination in the environment. Specifically, Wis. Adm. Code § NR 716.11(3) (a) requires that the field investigation determine the “nature, degree and extent, both areal and vertical, of the hazardous substances or environmental pollution in all affected media”. In addition, Wis. Adm. Code §§ NR 716.11(5) (g) and (h) contains the specific requirements for evaluating the presence of vapors in the sub-surface as well as in indoor air.

You will need to include documentation with the Site Investigation Report that explains how the vapor assessment was completed. If the vapor pathway is being ruled out, then the report needs to provide the appropriate justification for reaching this conclusion. If the pathway cannot be ruled out, then investigation and, if appropriate, remedial action must be taken to address the risk presented prior to submitting the site for closure. The DNR has developed vapor-related guidance to help responsible parties and their consultants comply with the requirements described above. The guidance includes a detailed explanation of how to assess the vapor intrusion pathway and provides criteria which identify when an investigation is necessary. The guidance is available at: <http://dnr.wi.gov/files/PDF/pubs/rr/RR800.pdf>.

**Additional Information:**

We encourage you to visit our website at <http://dnr.wi.gov/topic/Brownfields/>, where you can find information on selecting a consultant and understanding the cleanup process. You will also find information about liability clarification letters, post-cleanup liability and more.

If you have questions or would like to schedule a meeting to discuss this letter, please contact Stephen D. Mueller, the DNR Project Manager at (414) 263-8631 or [StephenD.Mueller@Wisconsin.gov](mailto:StephenD.Mueller@Wisconsin.gov) for more information or visit the web site for the DNR’s Remediation and Redevelopment Program at the internet address above.

Thank you for your cooperation.

Sincerely,



Michele R. Norman  
Southeast Region Team Supervisor  
Remediation & Redevelopment Program

Attachments: Figure B.3.b. – Groundwater Iso-Concentration Map [Pre-Soil Removal Action]  
Table A.1 – Groundwater Analytical Table [Pre-Soil Removal Action]

Drawing No. 12 – Extent of VOCs in Surface Soils  
Drawing No. 13 – Extent of VOCs in Deep Soils  
Figure 3-7 – Potentiometric Surface Map September 23, 2013

cc: Christopher Clark  
Pharmacia LLC  
235 E. 42<sup>nd</sup> Street (MS 219/05/01)  
New York, NY 10017

Mathew Reimer  
Redevelopment Authority of the City of Milwaukee  
809 N. Broadway, Milwaukee, WI 53203

Well ID	GMMW-1	
Screen Interval (ft bgs)	6-16	
Sample Date	6/2/2011	8/6/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-107	
Screen Interval (ft bgs)	4-14	
Sample Date	6/2/2011	8/7/2013
PCBs (ug/L)	<b>55</b>	<b>110</b>
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	0.55 J
trans-1,2-DCE	ND	ND
VC	<b>6.8</b>	<b>3.1</b>

Well ID	GMMW-105	
Screen Interval (ft bgs)	5-15	
Sample Date	6/2/2011	8/6/2013
PCBs (ug/L)	<b>5.2</b>	<b>4.7</b>
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	1.6
cis-1,2-DCE	<b>11</b>	<b>220</b>
trans-1,2-DCE	ND	1.8
VC	<b>11</b>	<b>69</b>

Well ID	GMMW-2	
Screen Interval (ft bgs)	7-17	
Sample Date	6/1/2011	8/7/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	<b>13</b>	<b>4.6</b>
cis-1,2-DCE	<b>8.8</b>	<b>17</b>
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-106	
Screen Interval (ft bgs)	6-16	
Sample Date	6/2/2011	8/7/2013
PCBs (ug/L)	ND	<b>0.45</b>
CVOCs (ug/L)		
PCE	ND	<b>79</b>
TCE	<b>7.6</b>	<b>45</b>
cis-1,2-DCE	<b>44</b>	<b>110</b>
trans-1,2-DCE	ND	<b>6.5</b>
VC	<b>19</b>	<b>55</b>

Well ID	GMPZ-201	
Screen Interval (ft bgs)	25-30	
Sample Date	9/9/2013	9/24/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-201	
Screen Interval (ft bgs)	2-12	
Sample Date	9/9/2013	9/24/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	0.87 J
TCE	0.78	3.7
cis-1,2-DCE	5.6	14
trans-1,2-DCE	0.54 J	0.85 J
VC	ND	ND

Well ID	GMMW-103	
Screen Interval (ft bgs)	4-14	
Sample Date	5/31/2011	8/6/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	<b>490</b>	<b>470</b>
TCE	<b>130</b>	<b>84</b>
cis-1,2-DCE	<b>230</b>	<b>79</b>
trans-1,2-DCE	20	3.4
VC	ND	ND

Well ID	GMMW-102	
Screen Interval (ft bgs)	4-14	
Sample Date	5/31/2011	8/5/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	<b>11</b>
TCE	<b>18</b>	0.25 J
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-109	
Screen Interval (ft bgs)	4-14	
Sample Date	6/2/2011	8/6/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-101	
Screen Interval (ft bgs)	3.5-13.5	
Sample Date	6/1/2011	8/5/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-104	
Screen Interval (ft bgs)	3-13	
Sample Date	6/2/2011	8/7/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	<b>10</b>	<b>34</b>
TCE	<b>20</b>	<b>91</b>
cis-1,2-DCE	<b>2600</b>	<b>1900</b>
trans-1,2-DCE	30	17
VC	ND	<b>250</b>

Well ID	GMMW-4	
Screen Interval (ft bgs)	6-16	
Sample Date	6/1/2011	8/6/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-111	
Screen Interval (ft bgs)	+1-4	
Sample Date	6/1/2011	8/7/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	<b>460</b>	<b>60</b>
TCE	<b>840</b>	<b>110</b>
cis-1,2-DCE	<b>890</b>	<b>110</b>
trans-1,2-DCE	<b>85</b>	<b>5.6</b>
VC	<b>110</b>	<b>3.6</b>

Well ID	GMMW-100	
Screen Interval (ft bgs)	+1-4	
Sample Date	4/6/2005	5/16/2005
PCBs (ug/L)	<b>0.22</b>	ND
CVOCs (ug/L)		
PCE	ND	--
TCE	ND	--
cis-1,2-DCE	ND	--
trans-1,2-DCE	ND	--
VC	ND	--

Well ID	GMMW-108	
Screen Interval (ft bgs)	4-14	
Sample Date	6/2/2011	8/7/2013
PCBs (ug/L)	<b>12</b>	<b>6.1</b>
CVOCs (ug/L)		
PCE	<b>7.6</b>	<b>2.8 J</b>
TCE	<b>27</b>	<b>13</b>
cis-1,2-DCE	<b>460</b>	<b>1700</b>
trans-1,2-DCE	<b>11</b>	<b>12</b>
VC	<b>160</b>	<b>150</b>

Well ID	GMMW-203	
Screen Interval (ft bgs)	2-12	
Sample Date	8/16/2013	
PCBs (ug/L)	ND	
CVOCs (ug/L)		
PCE	ND	
TCE	0.5	
cis-1,2-DCE	1.1	
trans-1,2-DCE	ND	
VC	ND	

Well ID	GMMW-5	
Screen Interval (ft bgs)	5-15	
Sample Date	5/17/2005	6/1/2011
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	--	ND
TCE	--	ND
cis-1,2-DCE	--	ND
trans-1,2-DCE	--	ND
VC	--	ND

Well ID	GMMW-6	
Screen Interval (ft bgs)	9-19	
Sample Date	2/8/1999	6/2/2011
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-3	
Screen Interval (ft bgs)	5-15	
Sample Date	6/1/2011	8/6/2013
PCBs (ug/L)	<b>2.5</b>	<b>0.59</b>
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	0.61
cis-1,2-DCE	ND	2.7
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-110	
Screen Interval (ft bgs)	1-6	
Sample Date	6/1/2011	8/13/2013
PCBs (ug/L)	ND	<b>1.6</b>
CVOCs (ug/L)		
PCE	<b>210</b>	<b>44</b>
TCE	<b>59</b>	<b>130</b>
cis-1,2-DCE	26	<b>87</b>
trans-1,2-DCE	ND	1.1
VC	ND	ND

Well ID	GMMW-202	
Screen Interval (ft bgs)	2-12	
Sample Date	8/16/2013	9/24/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	<b>9.8</b>	<b>24</b>
TCE	<b>12</b>	<b>21</b>
cis-1,2-DCE	<b>120</b>	<b>46</b>
trans-1,2-DCE	10	1.6
VC	<b>16</b>	<b>2.3</b>

Well ID	GMPZ-200	
Screen Interval (ft bgs)	25-30	
Sample Date	9/9/2013	9/25/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

Well ID	GMMW-200	
Screen Interval (ft bgs)	2-12	
Sample Date	9/10/2013	9/23/2013
PCBs (ug/L)	ND	ND
CVOCs (ug/L)		
PCE	ND	ND
TCE	ND	ND
cis-1,2-DCE	ND	ND
trans-1,2-DCE	ND	ND
VC	ND	ND

- LEGEND**
- APPROXIMATE SITE PROPERTY LINE
  - APPROXIMATE ADJACENT PROPERTY LINES
  - FORMER BUILDING FOOTPRINT
  - FORMER GROUNDWATER MONITORING WELL APPROXIMATE LOCATION
  - ESTIMATED EXTENT OF CVOC CONCENTRATIONS > NR 140 ES [PRE-SOIL REMOVAL ACTION]
  - ESTIMATED EXTENT OF PCB CONCENTRATIONS > NR 140 ES [PRE-SOIL REMOVAL ACTION]

- NOTES:**
- bgs - BELOW GROUND SURFACE
  - BOLD & BOXED - GREATER THAN NR 140 ES
  - CVOCs - CHLORINATED VOLATILE ORGANIC COMPOUNDS
  - DCE - DICHLOROETHENE
  - ES - ENFORCEMENT STANDARD
  - ft - FEET
  - J - ESTIMATED CONCENTRATION ABOVE THE METHOD DETECTION LIMIT AND BELOW THE REPORTING LIMIT
  - ND - NOT DETECTED
  - PCBs - POLYCHLORINATED BIPHENYLS
  - PCE - TETRACHLOROETHENE
  - TCE - TRICHLOROETHENE
  - VC - VINYL CHLORIDE
  - ug/L - MICROGRAM PER LITER



**Geosyntec** consultants

CLIENT: PHARMACIA, LLC

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

TITLE: GROUNDWATER ISO-CONCENTRATION MAP  
[PRE-SOIL REMOVAL ACTION]

PROJECT: CHW8271      FIGURE NO.: B.3.b.      DRAWING NO.: **B.3.b.**

DATE: December 7, 2016      FILE NO.: 1611MDCC901

TABLE A.1  
GROUNDWATER ANALYTICAL TABLE [PRE-SOIL REMOVAL ACTION]  
Milwaukee Die Casting Company (MDCC) Site  
4132 North Holton Street, Milwaukee, Wisconsin

Well ID	GMMW-1								GMMW-2					GMMW-3							
Screen Interval (ft bgs)	6-16								7-17					5-15							
Sample Date	4/8/1998	10/21/1998	2/8/1999	7/25/2002	4/5/2005	5/16/2005	6/2/2011	8/6/2013	4/8/1998	7/26/2002	4/5/2005	6/1/2011	8/7/2013	4/9/1998	10/22/1998	2/9/1999	7/26/2002	4/5/2005	5/17/2005	6/1/2011	8/6/2013
PCBs (µg/L)	ND	ND	ND	ND	48.46	ND	ND	ND	ND	ND	ND	ND	ND	0.97	0.79	1.8	0.8	1.76	1.14	2.5	0.59
CVOCs (µg/L)																					
PCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	2.2	ND	ND	ND	ND	--	ND	ND
TCE	ND	ND	ND	ND	ND	ND	ND	ND	2.3	1.2 Q	23	13	4.6	3.5	1.7	2.1	1.8 Q	1.9	--	ND	0.61
cis-1,2-DCE	ND	ND	ND	ND	ND	ND	ND	ND	0.98	22	2.6	8.8	17	5.4	21	6.9	4.9	ND	--	ND	2.7
trans-1,2-DCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79 Q	ND	ND	ND	ND	1.9	0.5	ND	ND	--	ND	ND
VC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	25	2.3	1.1	ND	--	ND	ND

Well ID	GMMW-4								GMMW-5						GMMW-6				
Screen Interval (ft bgs)	6-16								5-15						9-19				
Sample Date	4/9/1998	10/21/1998	2/8/1999	7/25/2002	4/5/2005	5/16/2005	6/1/2011	8/6/2013	4/9/1998	10/22/1998	2/8/1999	7/25/2002	4/5/2005	5/17/2005	6/1/2011	6/4/1998	10/21/1998	2/8/1999	6/2/2011
PCBs (µg/L)	ND	ND	ND	ND	10.16	ND	ND	ND	ND	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND
CVOCs (µg/L)																			
PCE	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND
TCE	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND
cis-1,2-DCE	ND	ND	ND	ND	ND	--	ND	ND	2.2	2.7	1.3	1.2 Q	1.4	--	ND	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND
VC	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND

Well ID	GMMW-100		GMMW-101				GMMW-102			GMMW-103				GMMW-104				GMMW-105		
Screen Interval (ft bgs)	+1-4		3.5-13.5				4-14			4-14				3-13				5-15		
Sample Date	4/6/2005	5/16/2005	4/6/2005	5/16/2005	6/1/2011	8/5/2013	4/6/2005	5/31/2011	8/5/2013	4/6/2005	5/16/2005	5/31/2011	8/6/2013	4/6/2005	5/17/2005	6/2/2011	8/7/2013	4/6/2005	6/2/2011	8/6/2013
PCBs (µg/L)	0.22	ND	0.19	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND	3.41	5.49	ND	ND	2.7	5.2	4.7
CVOCs (µg/L)																				
PCE	ND	--	ND	--	ND	ND	ND	ND	11	1.4	--	490	470	18000	--	10	34	ND	ND	ND
TCE	ND	--	ND	--	ND	ND	ND	18	0.25 J	0.51	--	130	84	200000	--	20	91	0.76	ND	1.6
cis-1,2-DCE	ND	--	ND	--	ND	ND	ND	ND	ND	6.9	--	230	79	30	--	2600	1900	ND	11	220
trans-1,2-DCE	ND	--	ND	--	ND	ND	ND	ND	ND	ND	--	20	3.4	ND	--	30	17	ND	ND	1.8
VC	ND	--	ND	--	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	--	ND	250	ND	11	69

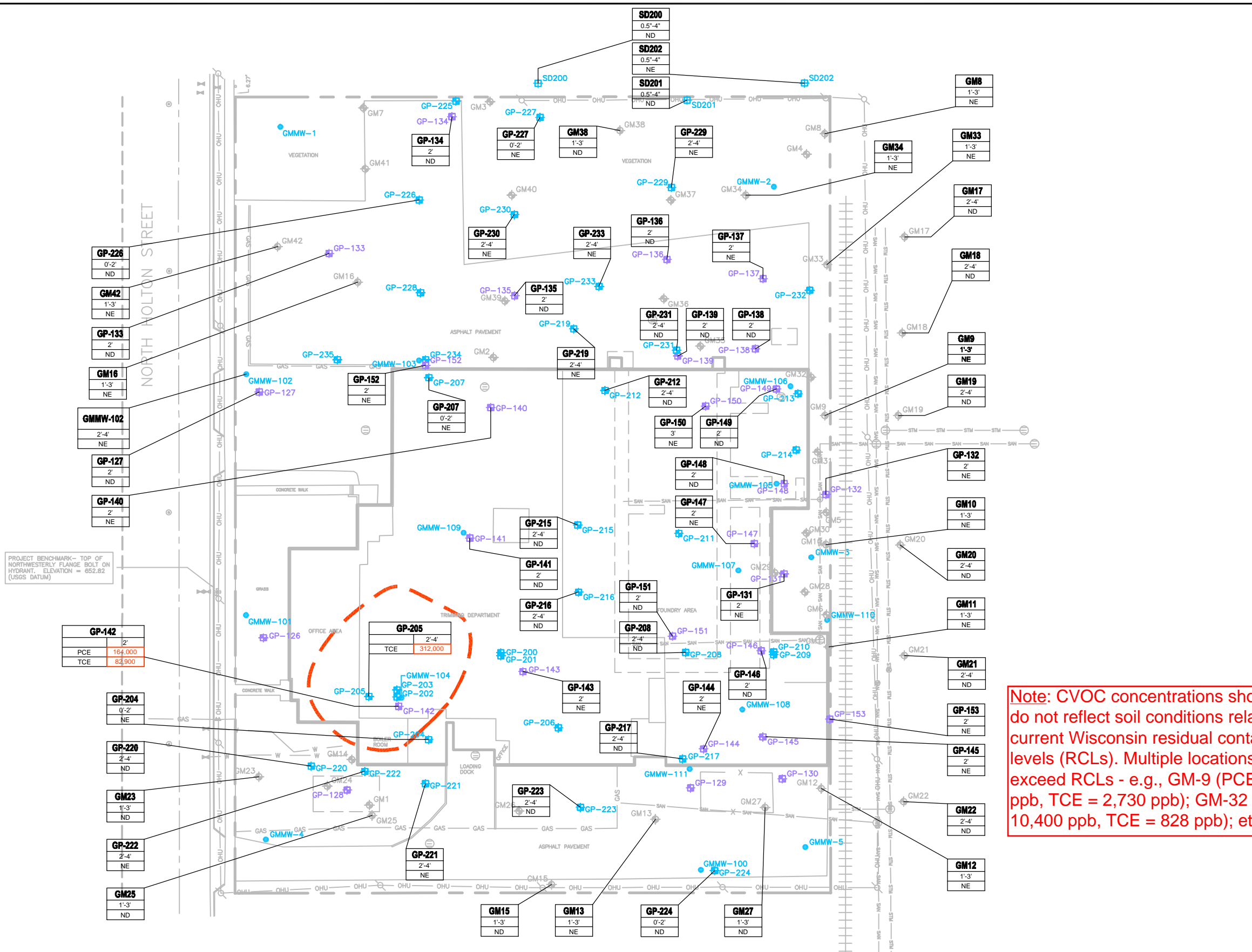
Well ID	GMMW-106			GMMW-107				GMMW-108			GMMW-109				GMMW-110			GMMW-111		
Screen Interval (ft bgs)	6-16			4-14				4-14			4-14				1-6			+1-4		
Sample Date	4/6/2005	6/2/2011	8/7/2013	4/6/2005	5/17/2005	6/2/2011	8/7/2013	4/6/2005	6/2/2011	8/7/2013	4/6/2005	5/17/2005	6/2/2011	8/6/2013	4/6/2005	6/1/2011	8/13/2013	4/7/2005	6/1/2011	8/7/2013
PCBs (µg/L)	ND	ND	0.45	203.1	23.8	55	110	1.0	12	6.1	0.19	ND	ND	ND	1.3	ND	1.6	ND	ND	ND
CVOCs (µg/L)																				
PCE	ND	ND	79	ND	--	ND	ND	27	7.6	2.8 J	ND	--	ND	ND	280	210	44	720	460	60
TCE	ND	7.6	45	ND	--	ND	ND	31	27	13	ND	--	ND	ND	140	59	130	570	840	110
cis-1,2-DCE	ND	44	110	2.8	--	ND	0.55 J	740	460	1700	ND	--	ND	ND	73	26	87	910	890	110
trans-1,2-DCE	ND	ND	6.5	ND	--	ND	ND	28	11	12	ND	--	ND	ND	3.2	ND	1.1	58	85	5.6
VC	ND	19	55	27	--	6.8	3.1	6.4	160	150	ND	--	ND	ND	3.0	ND	ND	0.72	110	3.6

Well ID	GMMW-200		GMMW-201		GMMW-202		GMMW-203		GMPZ-200		GMPZ-201		NR 140 Public Health Groundwater Quality Standard	
Screen Interval (ft bgs)	2-12		2-12		2-12		2-12		25-30		25-30			
Sample Date	9/10/2013	9/23/2013	9/9/2013	9/24/2013	8/16/2013	9/24/2013	8/16/2013	9/9/2013	9/25/2013	9/9/2013	9/24/2013			
PCBs (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003	0.03	
CVOCs (µg/L)														
PCE	ND	ND	ND	0.87 J	9.8	24	ND	ND	ND	ND	ND	0.5	5	
TCE	ND	ND	0.78	3.7	12	21	0.5	ND	ND	ND	ND	0.5	5	
cis-1,2-DCE	ND	ND	5.6	14	120	46	1.1	ND	ND	ND	ND	7	70	
trans-1,2-DCE	ND	ND	0.54 J	0.85 J	10	1.6	ND	ND	ND	ND	ND	20	100	
VC	ND	ND	ND	ND	16	2.3	ND	ND	ND	ND	ND	0.02	0.2	

Notes:

- bold + box - concentration > NR 140 ES
- - not analyzed
- CVOCs - chlorinated volatile organic compounds
- ft bgs - feet below ground surface
- DCE - dichloroethene
- ES - enforcement standard
- J - estimated concentration between LOD and LOQ
- LOD - limit of detection
- LOQ - limit of quantitation
- ND - not detected
- PAL - preventive action limit
- PCBs - polychlorinated biphenyls (total)
- PCE - tetrachloroethene
- Q - result confirmed by re-analysis
- TCE - trichloroethene
- µg/L - micrograms per liter
- VC - vinyl chloride



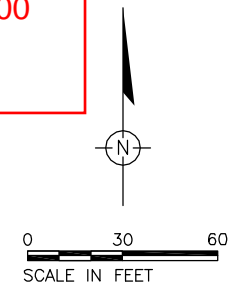


**LEGEND**

- RAILROAD TRACK
- SANITARY SEWER LINE
- STORM SEWER LINE
- OVERHEAD UTILITY
- GAS LINE
- WATER LINE
- APPROXIMATE PROPERTY BOUNDARY
- UTILITY TUNNEL
- MANHOLE
- GMMW-100 MONITORING WELL LOCATION
- GP-130 BRAUN INTERTEC GEOPROBE SAMPLING LOCATION
- GP-226 ARCADIS GEOPROBE LOCATION
- SB-201 ARCADIS SOIL BORING LOCATION
- GM36 GERAGHTY & MILLER GEOPROBE SAMPLING LOCATION
- B-103 OP&A SOIL BORING LOCATION
- SB105 ERM SOIL BORING LOCATION
- SD200 ARCADIS DRAINAGE SWALE SAMPLE LOCATION
- PCE** TETRACHLOROETHENE
- TCE** TRICHLOROETHENE
- ND** CONCENTRATIONS WERE REPORTED BELOW THE LABORATORY DETECTION LIMITS
- NE** CONCENTRATION DETECTED, BUT NOT ABOVE ESTABLISHED OR CALCULATED STANDARD
- 312,000** CONCENTRATION REPORTED ABOVE SITE-SPECIFIC DIRECT CONTACT INDUSTRIAL RESIDUAL CONTAMINANT LEVEL BASED ON THE INGESTION PATHWAY
- ESTIMATED EXTENT OF IMPACTS (DASHED WHERE INFERRED)

**NOTES:**  
 1. CONCENTRATIONS REPORTED IN MICROGRAMS PER KILOGRAM (ug/kg).  
 2. ARCADIS GEOPROBE AND SOIL BORING DATA WAS COLLECTED BETWEEN MARCH AND APRIL 2005.

**Note:** CVOC concentrations shown as "NE" do not reflect soil conditions relative to current Wisconsin residual contaminant levels (RCLs). Multiple locations significantly exceed RCLs - e.g., GM-9 (PCE = 16,600 ppb, TCE = 2,730 ppb); GM-32 (PCE = 10,400 ppb, TCE = 828 ppb); etc.



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 Acad Version : R16.1s (LMS Tech)  
 © 2006 ARCADIS G&M, INC.  
 Current Plotstyle : BldColor  
 Date : 19 Apr 2006 - 3:22pm  
 Page Setup: PDF  
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**Red text-box notes inserted by WDNR 2018**

REV.	ISSUED DATE	DESCRIPTION

KEYPLAN

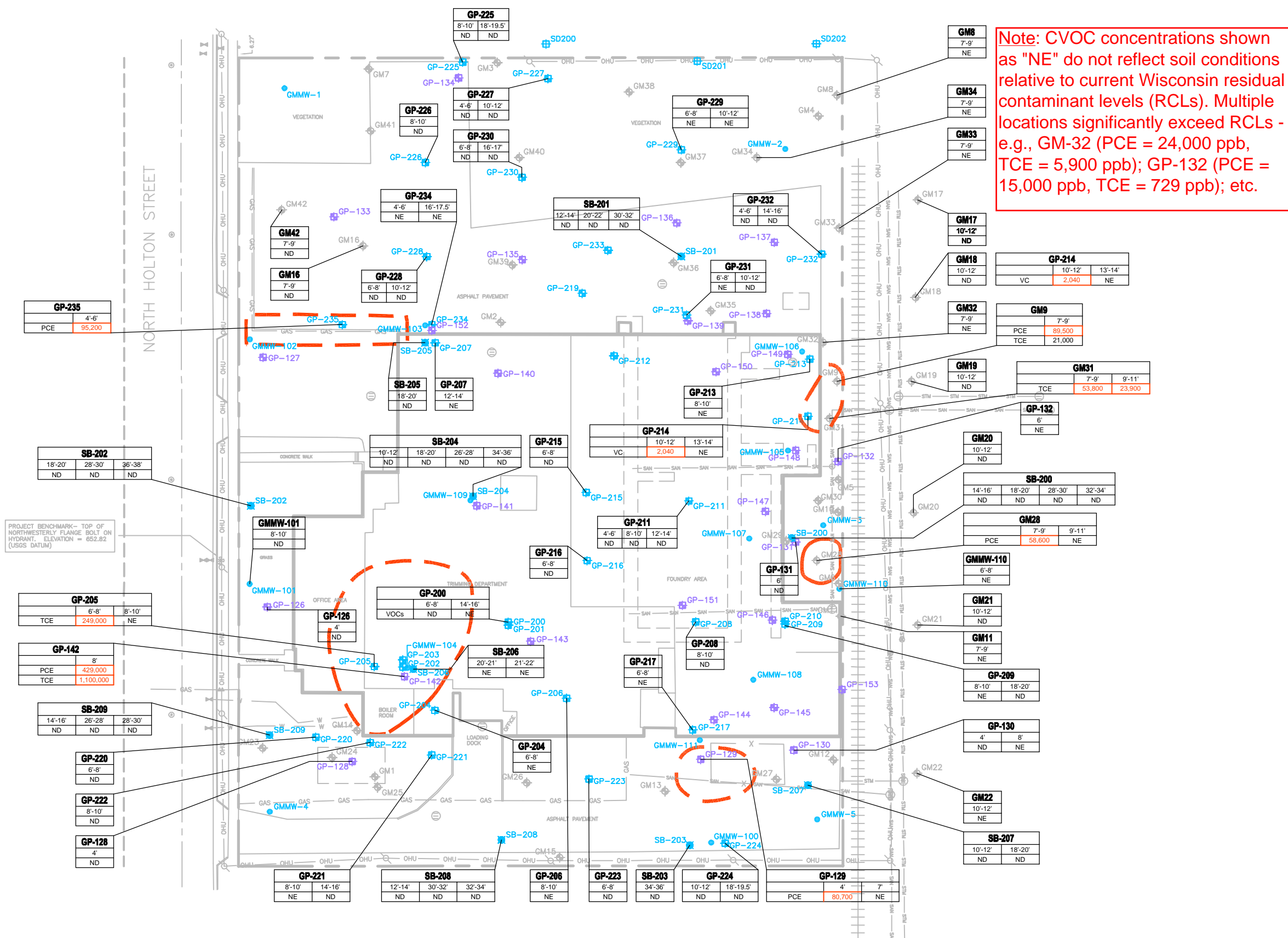
SEAL

126 North Jefferson Street, Suite 400  
 Milwaukee, Wisconsin 53202  
 Tel: 414-276-7742 Fax: 414-276-7803  
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**MILWAUKEE DIE CASTING COMPANY SITE  
 MILWAUKEE, WISCONSIN**

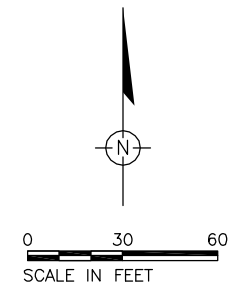
PROJECT MANAGER <b>B. VERBURG</b>	DEPARTMENT MANAGER <b>M. MAERLE</b>	LEAD DESIGN PROF. <b>B. VERBURG</b>	CHECKED BY <b>T. SCHOEN</b>
SHEET TITLE <b>EXTENT OF VOCs IN SURFACE SOILS</b>		TASK/PHASE NUMBER <b>0002.00001</b>	DRAWN BY <b>C. MCKEOUGH</b>
PROJECT NUMBER <b>W1001094</b>		DRAWING NUMBER <b>12</b>	

Note: CVOC concentrations shown as "NE" do not reflect soil conditions relative to current Wisconsin residual contaminant levels (RCLs). Multiple locations significantly exceed RCLs - e.g., GM-32 (PCE = 24,000 ppb, TCE = 5,900 ppb); GP-132 (PCE = 15,000 ppb, TCE = 729 ppb); etc.



- LEGEND**
- RAILROAD TRACK
  - SANITARY SEWER LINE
  - STORM SEWER LINE
  - OVERHEAD UTILITY
  - GAS LINE
  - WATER LINE
  - APPROXIMATE PROPERTY BOUNDARY
  - UTILITY TUNNEL
  - MANHOLE
  - GMMW-100 MONITORING WELL LOCATION
  - GP-130 BRAUN INTERTEC GEOPROBE SAMPLING LOCATION
  - GP-226 ARCADIS GEOPROBE LOCATION
  - SB-201 ARCADIS SOIL BORING LOCATION
  - GM36 GERAGHTY & MILLER GEOPROBE SAMPLING LOCATION
  - B-103 OP&A SOIL BORING LOCATION
  - SB105 ERM SOIL BORING LOCATION
  - SD200 ARCADIS DRAINAGE SWALE SAMPLE LOCATION
  - PCE TETRACHLOROETHENE
  - TCE TRICHLOROETHENE
  - TCLP TOXICITY CHARACTERISTIC LEACHING PROCEDURE
  - ND CONCENTRATIONS WERE REPORTED BELOW THE LABORATORY DETECTION LIMITS
  - NE CONCENTRATIONS DETECTED, BUT NOT ABOVE THE 20 TIMES TCLP CONCENTRATION
  - 249,000 PCE AND/OR TCE CONCENTRATION REPORTED EXCEEDS THE 20 TIMES TCLP CONCENTRATION
  - ESTIMATED EXTENT OF IMPACTS (DASHED WHERE INFERRED)

NOTES:  
 1. CONCENTRATIONS REPORTED IN MICROGRAMS PER KILOGRAM (ug/kg).  
 2. ARCADIS GEOPROBE AND SOIL BORING DATA COLLECTED BETWEEN MARCH AND APRIL 2005.



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 Acad Version : R16.1s (LMS Tech)  
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Red text-box notes inserted by WDNR 2018

REV.	ISSUED DATE	DESCRIPTION

KEYPLAN

SEAL

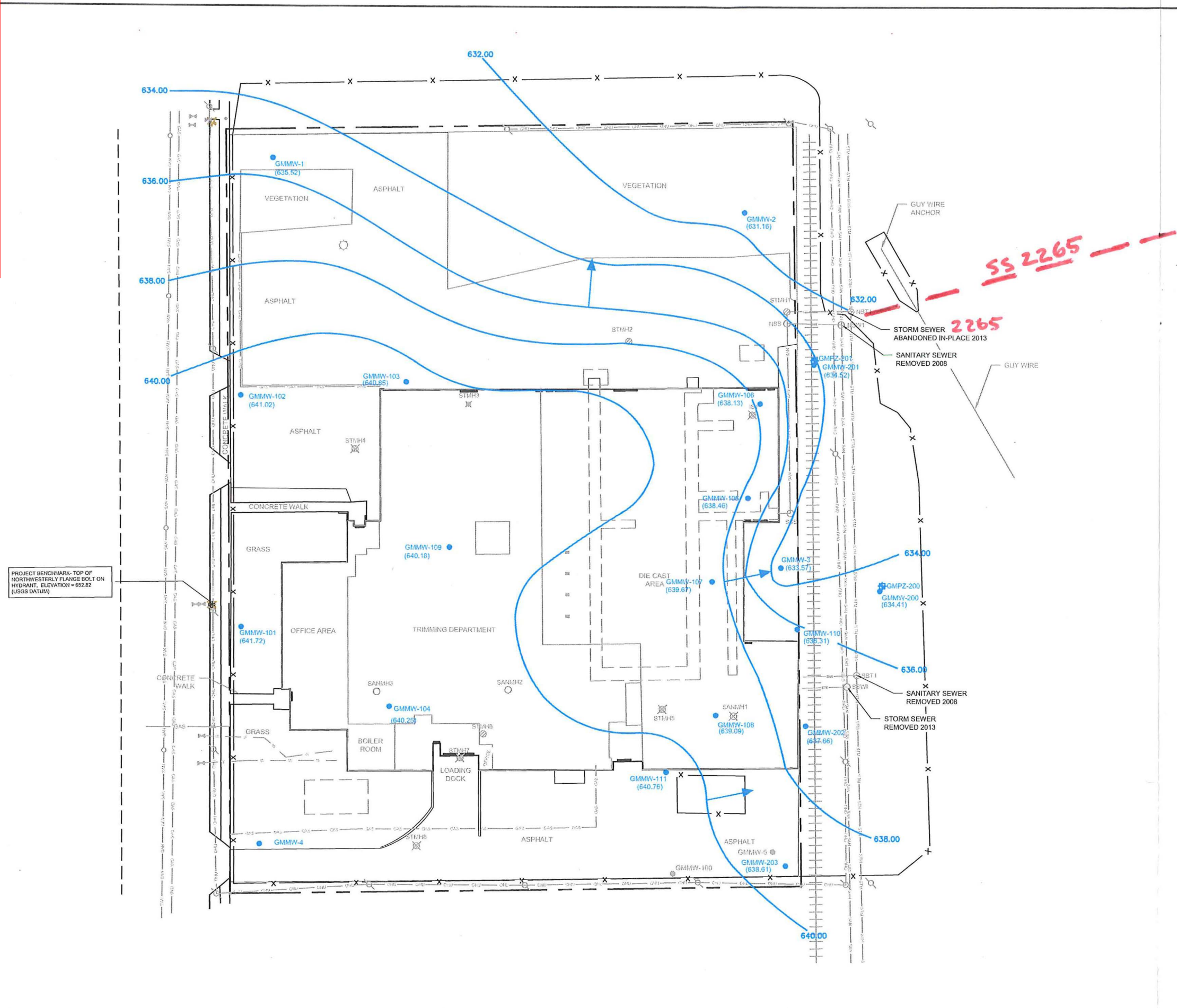
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MILWAUKEE DIE CASTING COMPANY SITE  
 MILWAUKEE, WISCONSIN

PROJECT MANAGER <b>B. VERBURG</b>	DEPARTMENT MANAGER <b>M. MAERLE</b>	LEAD DESIGN PROF. <b>B. VERBURG</b>	CHECKED BY <b>T. SCHOEN</b>
SHEET TITLE <b>EXTENT OF VOCs IN DEEP SOILS</b>		TASK/PHASE NUMBER <b>0002.00001</b>	DRAWN BY <b>C. MCKEOUGH</b>
PROJECT NUMBER <b>W1001094</b>		DRAWING NUMBER <b>13</b>	

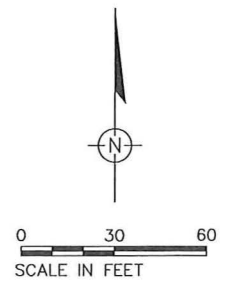
Location of the Storm Sewer System  
in Milwaukee River outfall.

CITY: MILWAUKEE DIV: GROUP: ENV DB: J: BAXTER LD: (OP) PIC: (OP) PM: B: VERBURG TM: T: SCHOEN LY: R: (OP) VN: F: OFF: REF: G:\projects\mld\diecasting\w17001\mld\cad\fig\figures\761.61c Application\37.dwg LAYOUT: 37 SAVED: 12/22/13 6:25 PM ACADUSER: 181.S (LMS TECH) PAGES: 18 PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOT: 12/22/13 6:25 PM XREFS: IMAGES: PROJECTNAME: Site\_Base\_091913 Site\_Utilities\_2013 Site\_Wells\_Borings\_2013



PROJECT BENCHMARK- TOP OF NORTHWESTERLY FLANGE BOLT ON HYDRANT. ELEVATION = 632.82 (USGS DATUM)

- LEGEND**
- GMMW-100 MONITORING WELL LOCATION
  - ⊙ GMMW-100 ABANDONED MONITORING WELL LOCATION
  - ⊕ GMPZ-200 PIEZOMETER LOCATION
  - 645 — TOPOGRAPHIC CONTOURS
  - RAILROAD TRACK
  - SAN — SANITARY SEWER LINE
  - STH — STORM SEWER LINE
  - CHU — OVERHEAD UTILITY
  - GAS — GAS LINE
  - W — WATER LINE
  - X — FENCE
  - BUILDING
  - APPROXIMATE PROPERTY BOUNDARY
  - UTILITY TUNNEL
  - OVERHEAD DOORS
  - ⊠ MAN DOORS
  - ⊙ STORM SEWER MANHOLE
  - ⊙ STORM SEWER MANHOLE FILLED WITH DEBRIS
  - ⊙ SANITARY SEWER MANHOLE
  - ⊙ SANITARY SEWER MANHOLE FILLED WITH DEBRIS
  - ▣ CATCH BASIN
  - ⊙ STREET LIGHT
  - ⊙ POWER POLE
  - (636.96) MEASURED GROUNDWATER ELEVATION (MEAN SEA LEVEL) APRIL 14, 2005
  - 637 GROUNDWATER ISOCONCENTRATION CONTOUR
  - GROUNDWATER FLOW DIRECTION



MILWAUKEE DIE CASTING SITE  
MILWAUKEE, WISCONSIN  
**RISK-BASED REMOVAL APPLICATION**

**POTENTIOMETRIC SURFACE MAP**  
SEPTEMBER 23, 2013

**ARCADIS**

FIGURE  
**3-7**