



REPORT

Work Plan - Piezometer Installation and Additional Data Collection

Former JB Sims Generating Station

Submitted to:

Grand Haven Board of Light and Power

17000 Eaton Drive, Grand Haven, MI 48417

Submitted by:

Golder Associates Inc.

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April 23, 2021

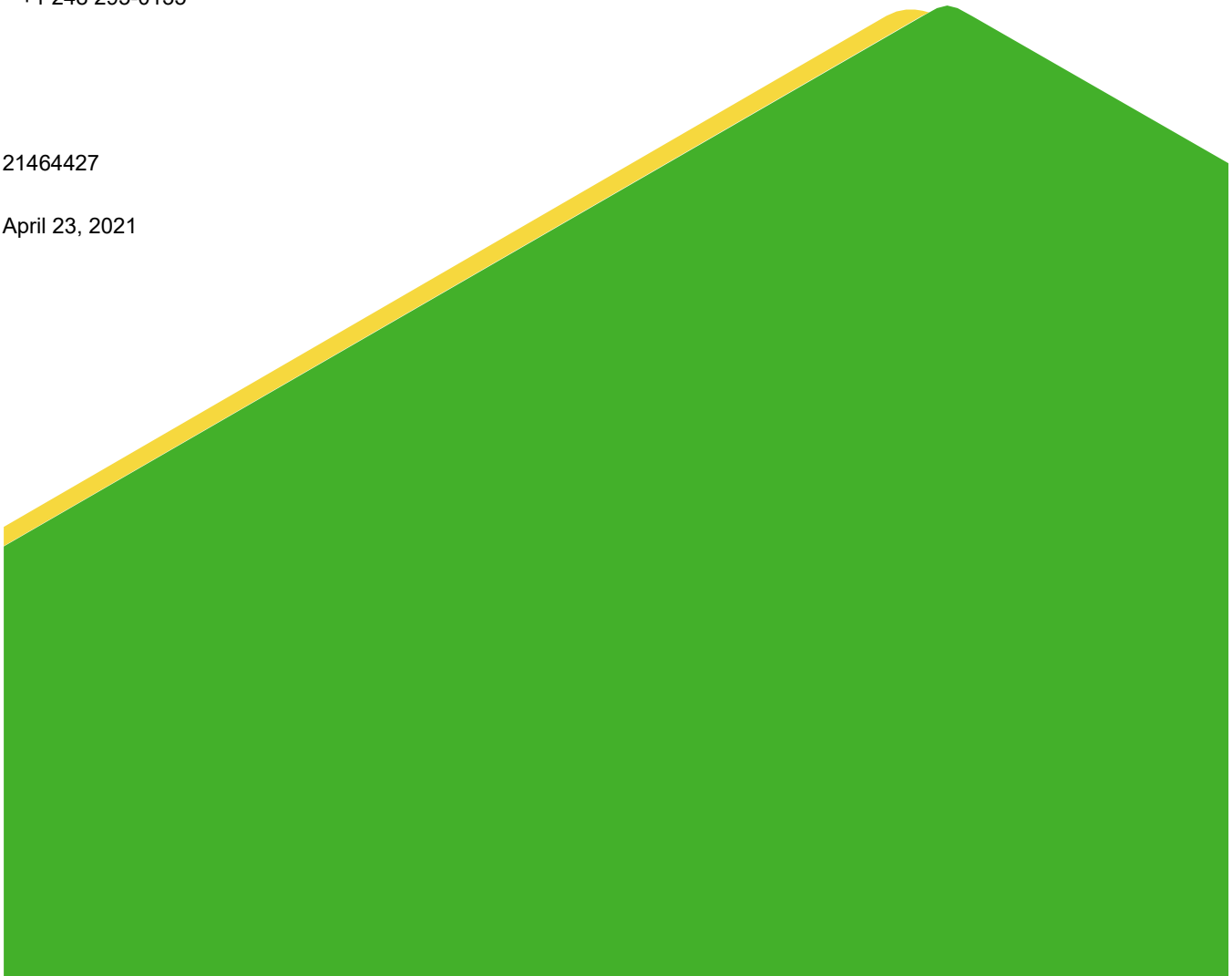


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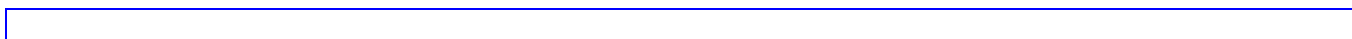
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FIGURE

Figure 1 Proposed Piezometer Location Map

ATTACHMENT

Historical Groundwater Figures



1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this Work Plan to identify additional field activities and data analyses required to evaluate the groundwater monitoring network based on the recently updated impoundment boundary for the inactive Units 1/2 Impoundment (Inactive 1/2 Impoundment) at the former JB Sims Generating Station (Site). Additional piezometers are proposed to augment the existing groundwater monitoring network. It is anticipated that many of the proposed piezometers will be converted to monitoring wells. Based on the complexity of the site, a phased approach to developing the groundwater monitoring network will be implemented; piezometers will be installed, site wide groundwater flow established and then detection monitoring wells will be identified. Following concurrence of the monitoring well network, additional delineation may be warranted, and assessment monitoring wells identified. This Work Plan was prepared by Golder for Grand Haven Board of Light and Power (GHBLP) to complete fieldwork in accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (40 Code of Federal Regulations [CFR] 257 Subpart D; published in 80 FR 21302-21501, April 17, 2015) and the State of Michigan enacted Public Act 640 with reference to, Part 115 (Solid Waste Management) of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (“Part 115”), dated December 28, 2018.

As discussed in a call with EPA and EGLE on April 14, 2021, additional information is necessary to properly identify an adequate groundwater monitoring network for the updated impoundment boundary for the inactive 1/2 Impoundment. Therefore, this work plan describes a scope of work to assist with augmenting and improving the existing groundwater monitoring network.

The Site is located on the western portion of Harbor Island in Grand Haven, Michigan, and is operated by the Grand Haven Board of Light and Power. The portion of Harbor Island where the Site is situated is surrounded by the Grand River and South Channel of the Grand River which flow in a westerly direction toward Lake Michigan, which is about one mile west of the site.

The Site was a coal-fired power generation facility which ceased operations in February 2020. Demolition of plant infrastructure and buildings was completed in February 2021. The Inactive 1/2 Impoundment ceased receiving CCR materials in 2012. In addition, the former Unit 3 A (East) / B (West) Impoundments (former 3A/B Impoundments) ceased accepting CCR materials in July 2020 and the former 3A/B Impoundments have been substantially closed by removal (December 2020). Figure 1, Proposed Piezometer Location Map depicts the general configuration of the CCR units and location of existing monitoring wells and proposed piezometers.

2.0 SITE GEOLOGY AND HYDROGEOLOGY

As described in the *Groundwater Monitoring System Certification* (ERM, 2017), the site is located in an area of glacial drift (consisting of fine to medium sand with occasional beds of gravel) which is underlain by Marshall Sandstone. The glacial drift is between 100 to 200 feet thick in the area.

The former 3A/B Impoundments were engineered clay lined above ground units built over a field of ash from Units 1 & 2. The Inactive 1/2 Impoundment was a depression in the ground where ash was disposed. The site was also previously used as the Grand Haven city dump. Materials documented from the former dump consist of a layer of mixed debris which includes glass, wood, plastic, ceramic, concrete, hides, brick and metal within a matrix of dark-grey to black, fine grained sand. The extent of the historical trash dump is detailed in the ERM Report titled “Coal Ash Delineation Sampling Results, Grand Haven Board of Light & Power, Grand Haven, Michigan” dated February 8, 2016 (ERM, 2016).

Portions of Harbor Island were developed by creating land with the use of unconsolidated fill, beneficial use of historical ash fill, and municipal solid waste. Specifically, borings consist of a mixture of unconsolidated fine sand fill with intervals of silt and sand, historical ash fill, and municipal solid waste within the first 20 feet below ground surface (bgs). The fine sand fill was underlain by silt and clay to the bottom of each boring. The silt and clay represent the confining unit beneath the CCR units.

Groundwater, identified as the Uppermost Aquifer, was encountered between 5 and 15 feet bgs within the unconsolidated fill material, which consists of fine sand, ash, and municipal solid waste, located above the silt and clay unit. As described in the Groundwater Monitoring System Certification, (ERM, 2017), sand in the uppermost aquifer assumes an effective porosity of 30 percent (%) and consists of poorly-graded fine sand with an estimated hydraulic conductivity of 27 feet per day and well-graded fine sand with an estimated hydraulic conductivity of 53 feet per day.

3.0 PURPOSE AND SCOPE OF WORK

On November 24, 2020 EPA presented, during a technical meeting, the east channel discharge delineation that they consider part of the Inactive 1/2 Impoundment. During a follow up technical meeting on January 14, 2021, GHBLP, Golder, EPA, and EGLE discussed and came to an agreement on this Inactive 1/2 Impoundment boundary. Based on the revised impoundment boundary for the Inactive 1/2 Impoundment, a revised groundwater monitoring network is necessary. During a technical meeting on April 14, 2021, GHBLP, Golder, EPA, and EGLE further discussed the monitoring well network for the Inactive 1/2 Impoundment. However, based on the record high water levels experienced in 2020 groundwater flow changed directions on the former Sims site. Therefore, based on the discussions during the April 14, 2021 technical meeting with EPA, EGLE, GHBLP, and Golder, it was collectively determined that additional information would be necessary further evaluate the hydrogeologic complexities on Harbor Island before an adequate groundwater monitoring plan could be approved. A phased approach to establishing an adequate groundwater monitoring network was determined to be the best path forward. This work plan describes the first phase of the plan which includes piezometer installation and aquifer permeability testing.

Golder will complete the installation of twenty-one (21) piezometers for the Site to assist in establishing an approved groundwater monitoring network. Since the groundwater flow direction has changed overtime, Golder has provided historical groundwater figures as an attachment for reference (Attachment). Note, the referenced attachments are from historical reports and well symbols used do not reflect current designations. The historical groundwater figures from previous reports (2019 Annual Report and 2020 Annual Report) were evaluated as the basis for determining the piezometer locations (Figure 1). Due to the groundwater mounding observed around the Inactive 1/2 Impoundment in 2020, piezometers were spaced around the perimeter of the Site to assist in evaluating the hydrogeologic complexities and influences from the Grand River. Piezometers are also proposed to be placed in a manner with the intent to utilize some of these locations for future detection or assessment monitoring.

In addition, Golder proposes to conduct the aquifer permeability testing. Currently groundwater flow rates are based on similar soil types from reference material evaluated by ERM in the original Groundwater Monitoring Network Certification. Site specific hydraulic conductivity will be beneficial for evaluating the groundwater monitoring network as well as the closure alternatives for the Inactive 1/2 Impoundment.

The details regarding the proposed field investigation activities are described in the following sections.

3.1 Piezometer Installation Procedures

Piezometers will be constructed in a manner that complies with CCR Rule §257.91(e) and Part 115 Rule 906. EGLE and EPA will be notified prior to piezometer installation activities and will also be notified when documentation of the procedures used during the installation activities are placed in the Site's Operating Record. The proposed piezometer locations are shown on Figure 1.

Golder will retain a drilling subcontractor and the soil borings and associated piezometers will be completed using a direct-push drill rig (e.g., Geoprobe®) fitted with hollow-stem augers to facilitate the placement of annulus materials (i.e. filter pack sand) during installation. Drilling and sampling tools will be cleaned with Alconox® or Liquinox® (or other approved detergent solutions) and rinsed with potable water prior to each boring location. A Golder field geologist or engineer will be present on-site during the drilling activities. The proposed boring locations will be surveyed and staked in the field prior to drilling. If surface conditions prevent the use of a conventional drill rig to complete the installation of these piezometers, an amphibious drill rig may be appropriate for proper installation.

During soil boring advancement, continuous soil samples will be recovered until the boring terminus is reached, using 5-foot long clear plastic liners. The soil borings will be advanced to approximately 20 feet bgs, or until the upper aquifer is penetrated (whichever occurs first). Soil samples will be classified by on-site Golder personnel in general conformance with the unified soil classification system (ASTM D-2487). Individual boring logs will be prepared by the field personnel to include the classification of soils encountered, samples collected, relative moisture, equipment and personnel used, and other pertinent information related to the completion of the borings. Soil cuttings produced during the drilling activities will be placed on the ground next to the respective boring.

At each location, once the target interval is reached (the upper aquifer) the boring will be converted to a piezometer (see Figure 1). Golder's field geologist/engineer will provide direction on piezometer construction, including depth and length of screened intervals, and will oversee and document the piezometer construction. Golder will document any difficulties experienced during drilling and installation that might impact the performance of the piezometer. Each piezometer will be constructed of 2-inch diameter polyvinyl chloride (PVC) riser pipe fitted with a 5-foot long PVC screen (0.010 slot). The assembly will be installed into the borehole through the drill stem (hollow-stem augers). The materials will be unwrapped, assembled, and centered in the drill stem. The annular space surrounding the screen will be filled with uniform sized, clean, medium grain size sand. As the filter pack sand is added, the drill stem will be removed from the borehole at a uniform rate that is compatible with the volume of packing material being placed around the screen. The filter pack will extend at least two feet above the top of the screen. Upon placement of the filter pack, hydrated bentonite chips will be placed to within 1-foot of the ground surface. A surface seal of neat cement will be placed to ground surface, and a lockable above-ground protective cover will be cemented in-place over each piezometer following completion. Identification information will be placed on each piezometer and will be visible.

3.2 Piezometer Development

Golder will complete development of the piezometers after they are constructed. Golder will develop these piezometers by alternating surging and pumping techniques to confirm connection to the aquifer material. Golder will record turbidity, pH, specific conductivity, and temperature measurements and total volume of water removed, and create electronic piezometer development forms; a SmarTroll will be utilized to record and submit development data electronically. Development equipment will be decontaminated using an Alconox® or

Liquinox® (or other approved detergent solutions) between each location. We also assume that development water will be discharged to the ground surface at each location.

3.3 Surveying

Following installation, Golder will coordinate a surveyor to survey the newly installed piezometers and provide the data to Golder. Similar to previous efforts, we assume that latitude and longitude will be surveyed to the nearest 0.01 foot in the site coordinate system, and the top of casing and ground surface elevations were surveyed to the nearest 0.01 foot relative to mean sea level (msl). The survey data should be provided as quickly as possible after installation for inclusion on the piezometer installation logs to be included in a forthcoming field summary report.

3.4 Aquifer Permeability Testing

Following installation of the newly installed piezometers, slug tests will be completed at the following locations: existing MW-01R, MW-02, MW-04, MW-05, MW-07, MW-08, as well as at, four (4) of the proposed piezometer locations (tentatively PZ-17, PZ-21, PZ-26 and PZ-31). Since the piezometer locations are not currently installed, the final selection of specific piezometers chosen to be tested will be based on the observed field conditions.

The slug tests will be performed in accordance with ASTM D4044-15 using a “slug” to displace the water, and a pressure transducer and electronic data logger to measure the displacement of water within the casing as well as the recovery of the water level. Both “slug in” (rising head) and “slug out” (falling head) tests will be conducted at each existing monitoring well or proposed piezometer location. The data from the falling and rising head slug tests will be reduced to estimate the in-situ hydraulic conductivity of the monitored zone. The data collected from both the rising and falling head tests will be evaluated using the analysis method appropriate for the aquifer conditions encountered (e.g. confined, semi-confined, or unconfined equations). The data collected with the pressure transducer and electronic data logger during the slug tests will be managed using the Diver Office computer program and analyzed using the AQTESOLV software suite. The aquifer hydraulic conductivity measurements will be used in turn to estimate dissolved constituent migration velocities and the rate at which groundwater discharges to adjacent surface waters under non-bank storage hydraulic conditions.

During the slug tests, an appropriately-sized slug will be used to displace water within the monitoring well/piezometer locations. The pressure transducer and electronic data logger will be programmed to collect water level readings every half second during the test. Prior to initiating the slug tests, the static water level in each location will be recorded via electronic water level indicator. The “slug in” test will be conducted first by rapidly raising the water level in the monitoring well/piezometer location by introducing the PVC slug, and collecting data until the water level inside the monitoring well/piezometer location reaches equilibrium with the surrounding formation. The “slug out” test will then be conducted by rapidly removing the PVC slug from the monitoring well/piezometer location, while collecting recovery/water level data until the water level re-stabilizes. The water level meter, PVC slug, and other equipment will be thoroughly decontaminated prior to first use, and between each monitoring well/piezometer location.

3.5 Report Preparation

Following completion of piezometer installation, development, and aquifer performance testing, Golder will prepare a report documenting the piezometer construction activities. Golder will prepare boring logs with piezometer construction details. We will also include a summary of the aquifer permeability testing. Following aquifer permeability testing, Golder will prepare a field summary report and request a technical meeting to discuss proposed groundwater monitoring networks for the Site.

Signature Page

Golder Associates Inc.


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Senior Consultant

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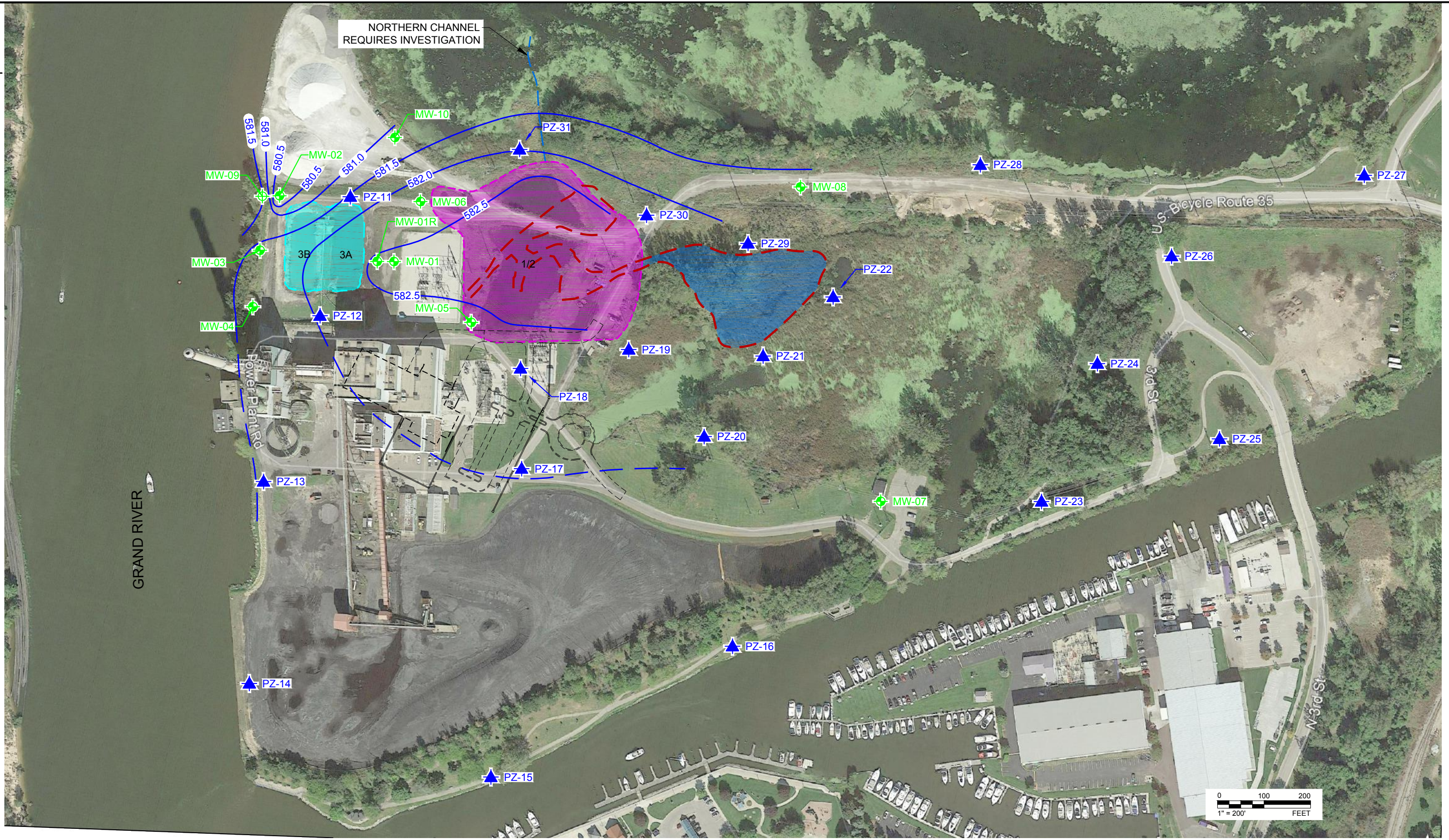
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FIGURE

Figure 1 - Proposed Piezometer Location Map



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NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. GROUNDWATER FLOW DIRECTION ON THIS FIGURE IS BASED ON WATER LEVELS COLLECTED IN JANUARY 2021.

- LEGEND**
- PROPOSED PIEZOMETER
 - EXISTING MONITORING WELL
 - LIMIT OF UNITS 1/2 ASH PLACEMENT ~1974-2012
 - UNIT 3 FORMER LIMITS OF ASH PLACEMENT
 - APPROXIMATE LIMIT OF UNITS OF 1/2 ASH DISPOSAL PRIOR TO 1974
 - 582 — GROUNDWATER CONTOURS

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT		YYYY-MM-DD	2021-04-20
DESIGNED	CEP		
PREPARED	DJC		
REVIEWED	CEP		
APPROVED	DLP		



PROJECT
JB SIMS GENERATING STATION
2021 WORK PLAN

TITLE
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LOCATION MAP**

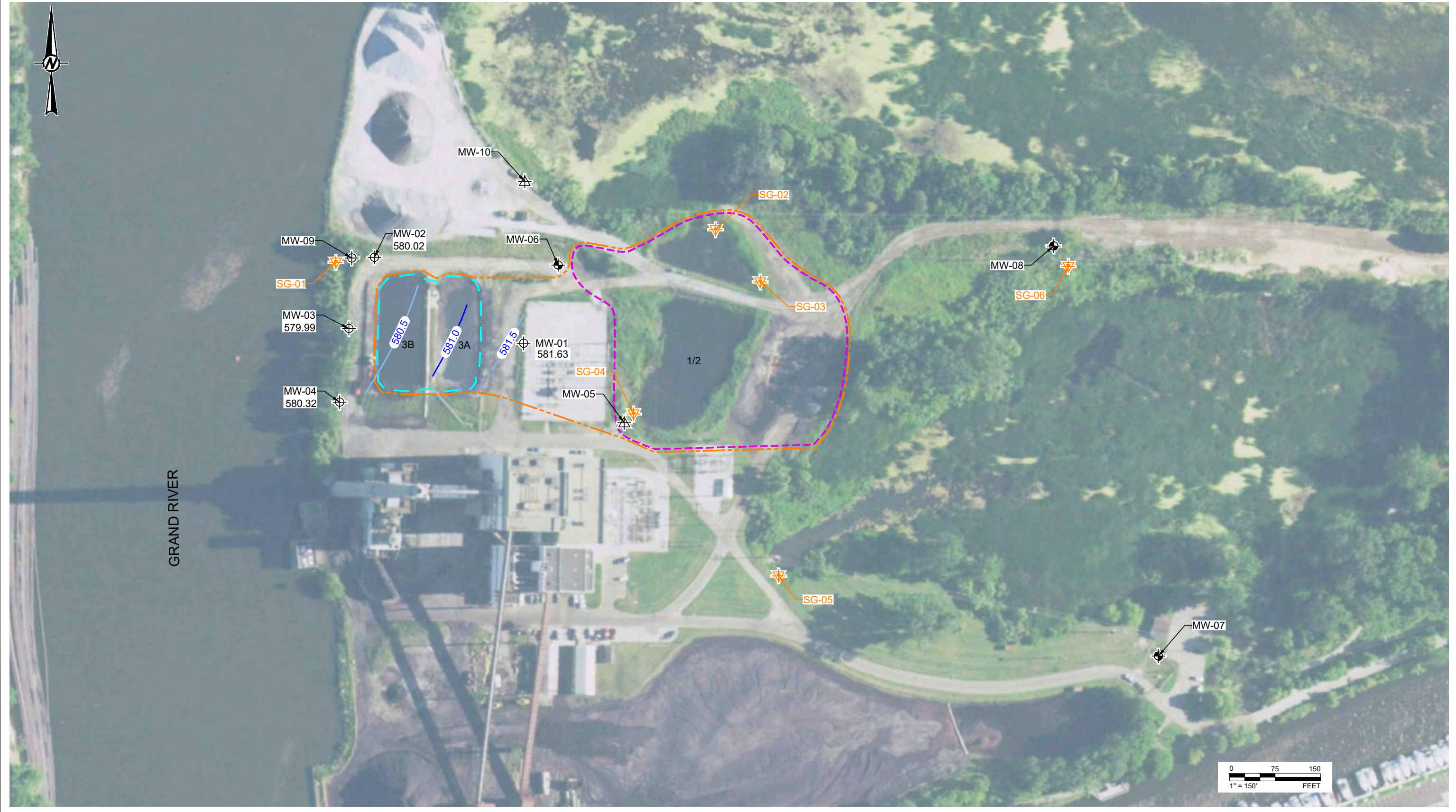
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ATTACHMENT

Historical Groundwater Figures

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NOTE(S)
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	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

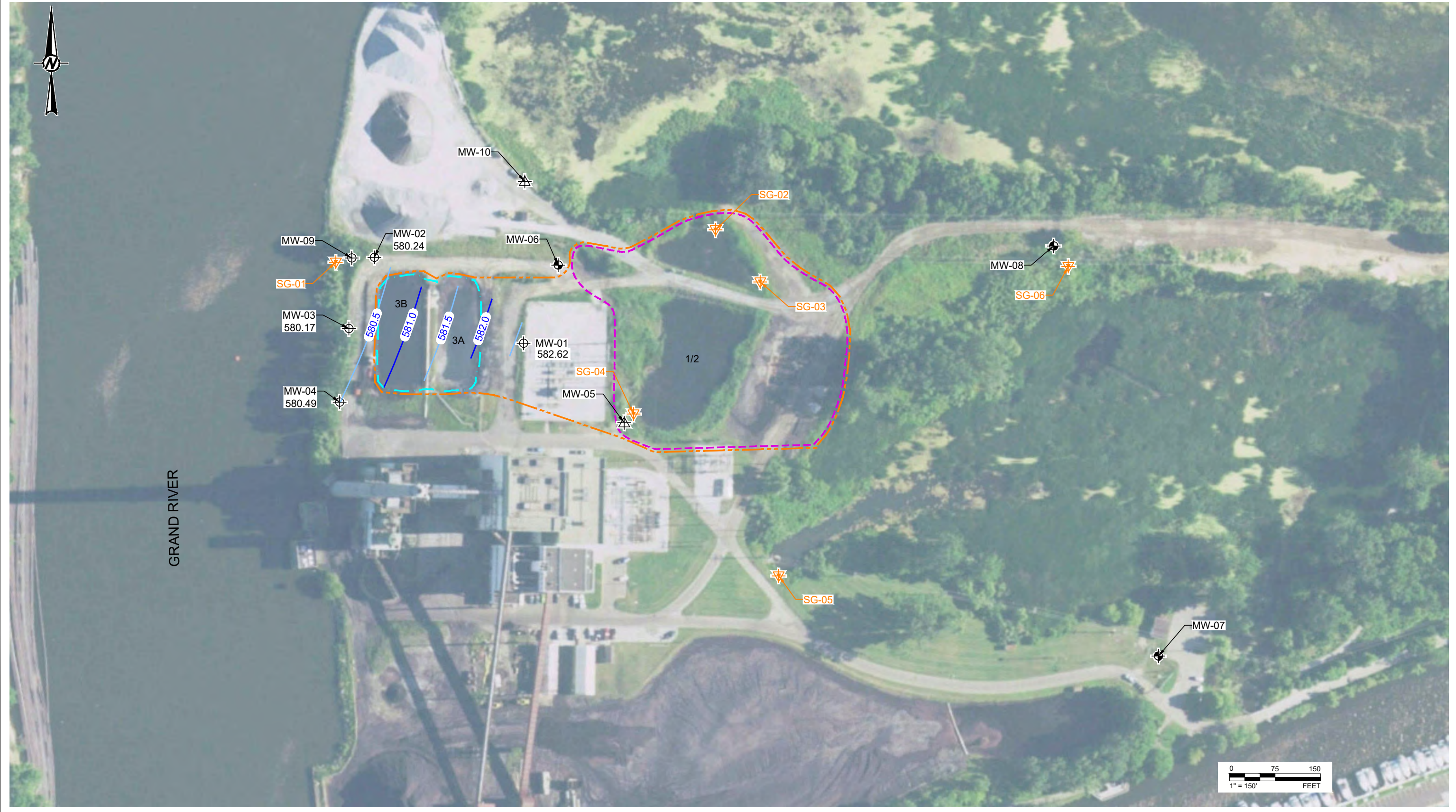
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PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP



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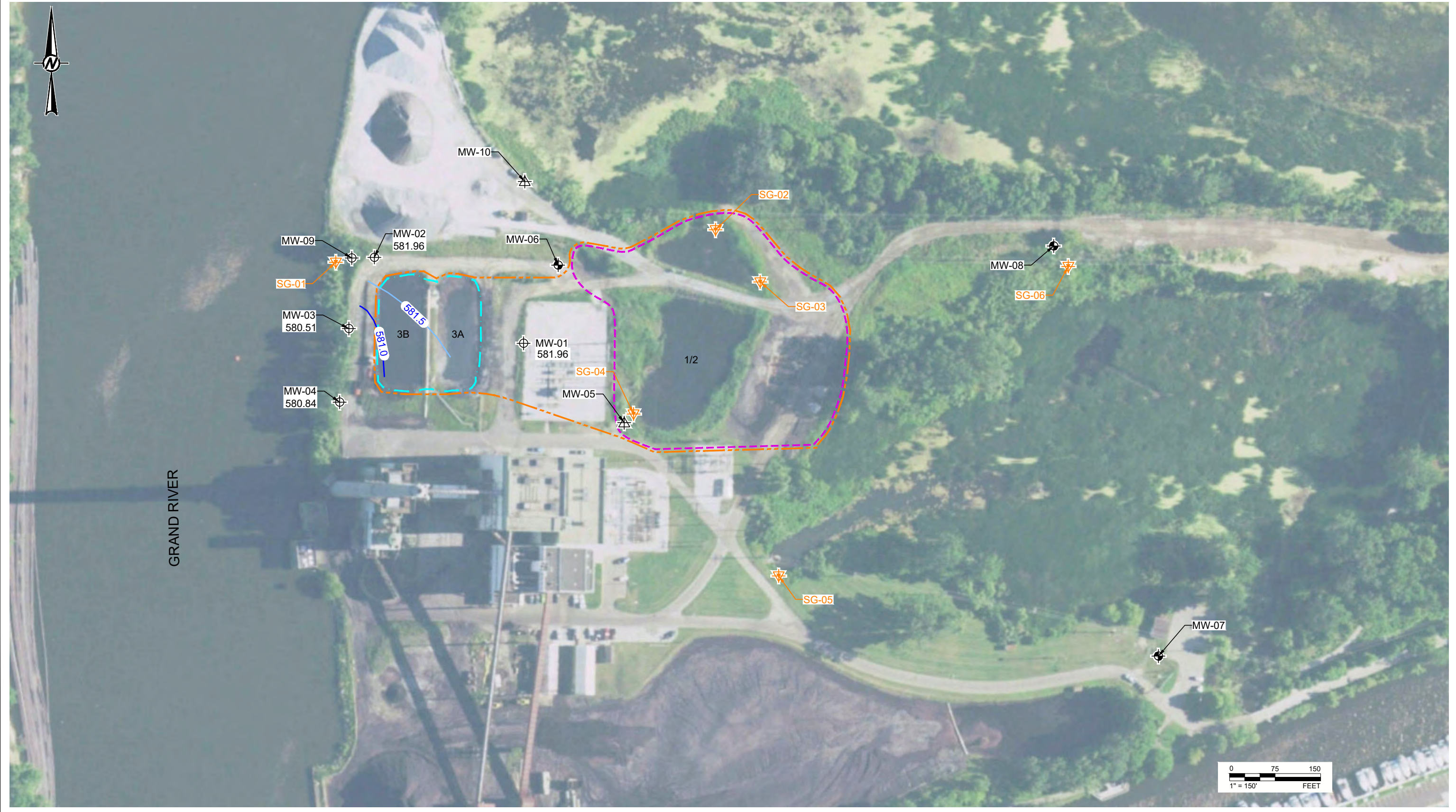
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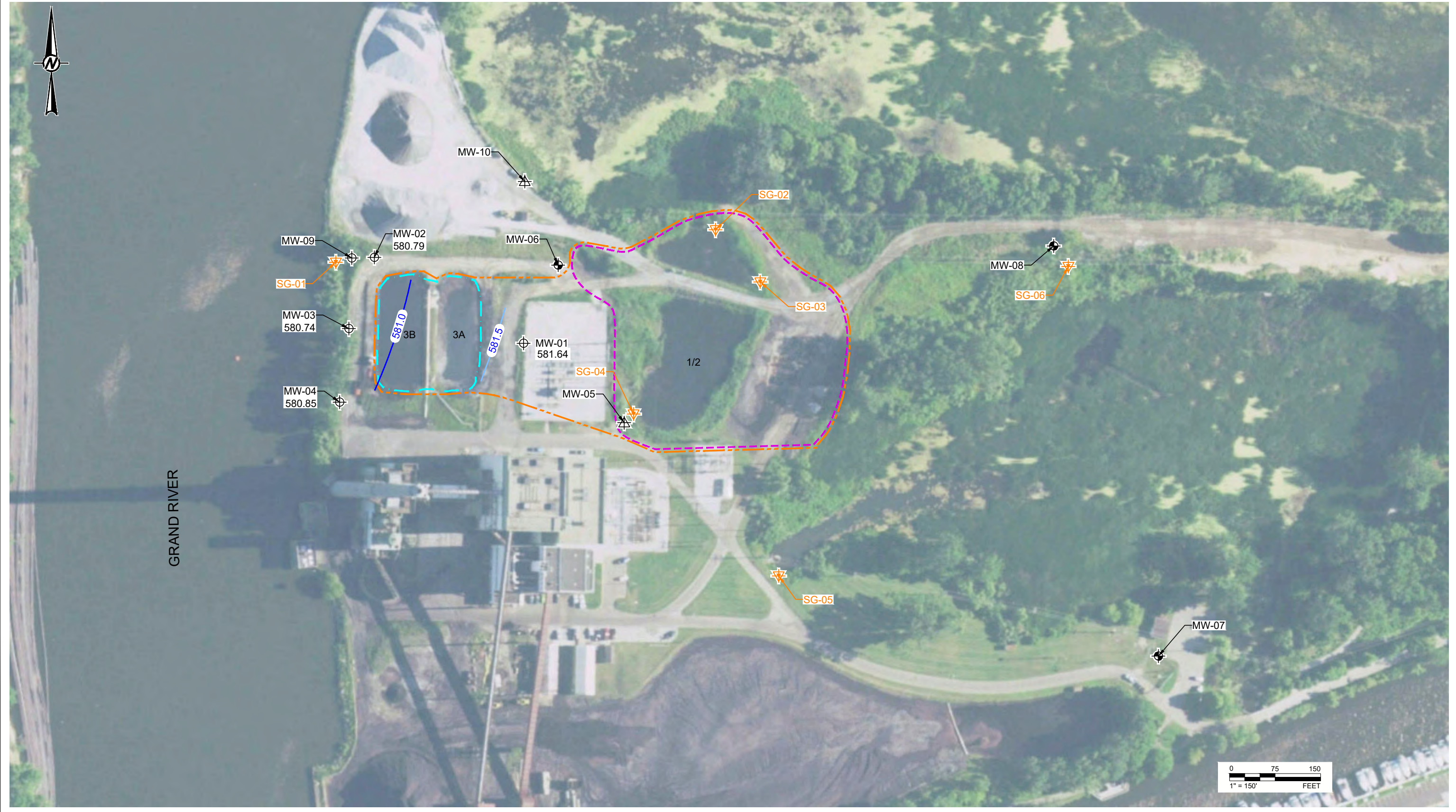
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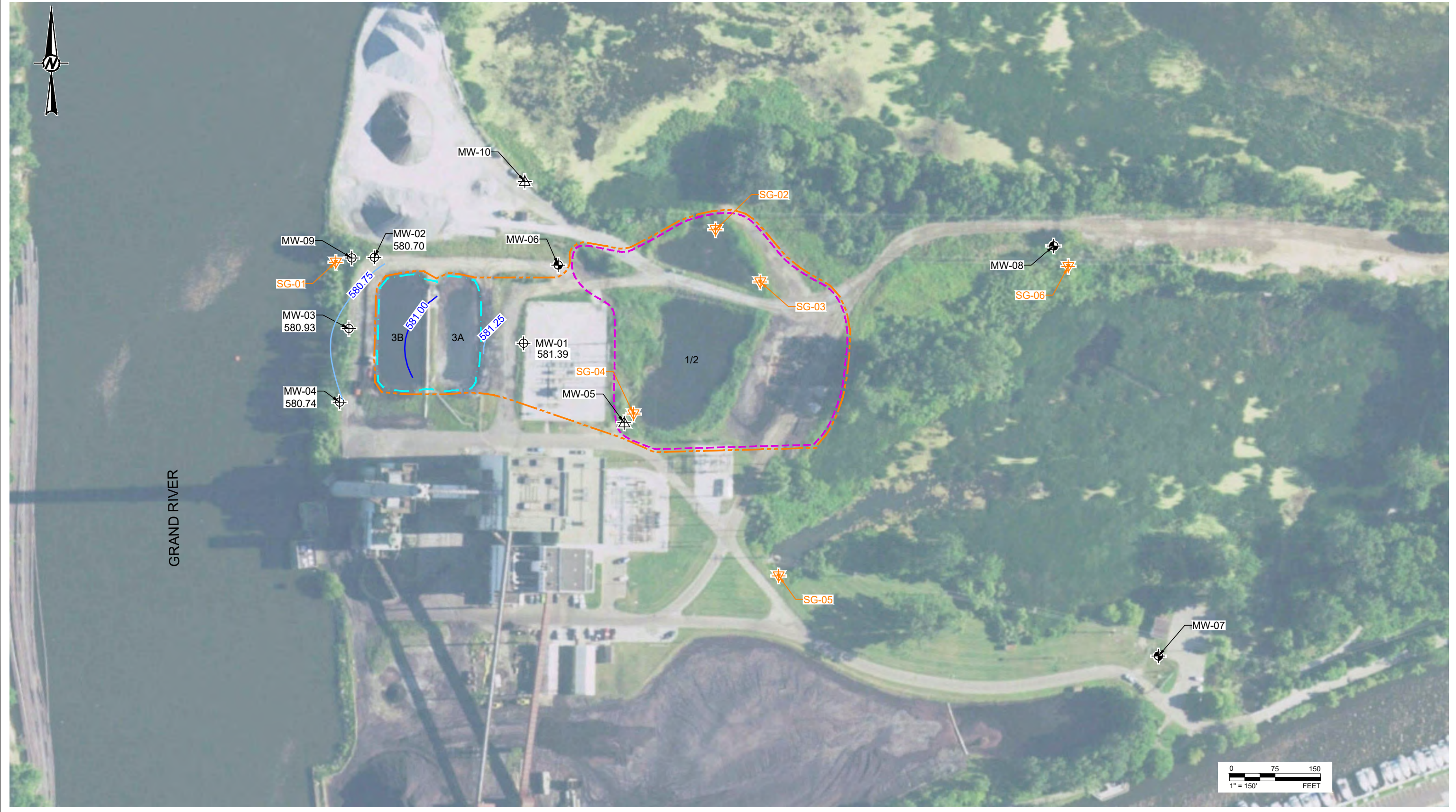
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GRAND RIVER



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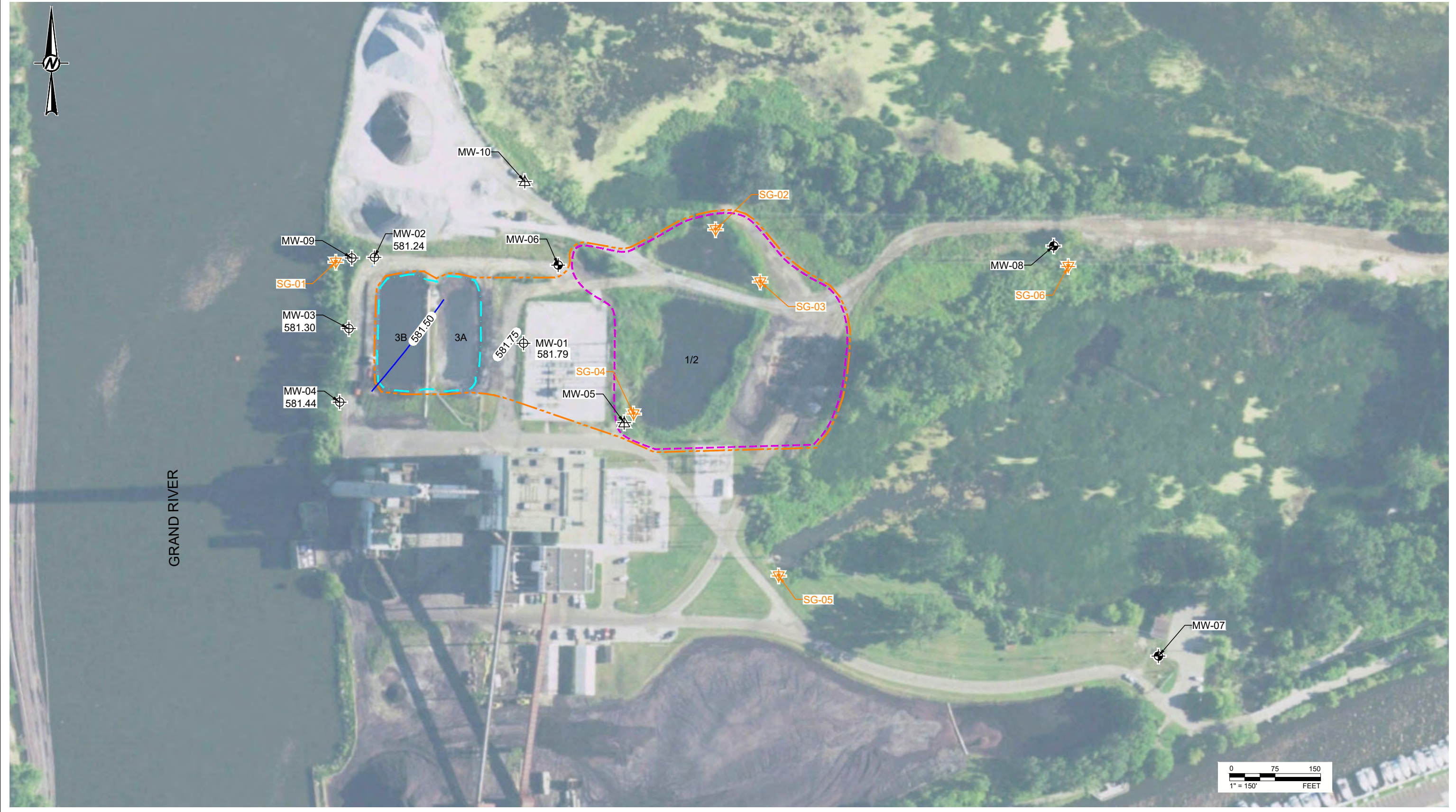
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		APPROVED	DLP

PROJECT		JB SIMS GENERATING STATION	
TITLE		GROUNDWATER CONTOUR MAP JUNE 26, 2017	
PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B006.dwg	0	B-6

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\na\info\cad\Projects\19116042\GIBB_PUB_Sms_GeneratingPRODUCTION\GIBB-GM_CONTOUR.dwg | File Name: 19116042B007.dwg | Last Edited By: dcaas | Date: 2020-01-30 | Time: 11:13:25 AM | Printed By: Dcaas | Date: 2020-01-30 | Time: 11:40:01 AM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. MONITORING WELLS MW-05 TO MW-10 AND STAFF GAUGES SG-01 TO SG-06 WERE NOT INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT		PROJECT	
GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN		JB SIMS GENERATING STATION	
CONSULTANT		TITLE	
GOLDER		GROUNDWATER CONTOUR MAP	
		JULY 17, 2017	
YYYY-MM-DD	2019-11-04	PROJECT NO.	19116042
DESIGNED	CEP	CONTROL	19116042B007.dwg
PREPARED	ADR	REV.	0
REVIEWED	CEP	FIGURE	
APPROVED	DLP	B-7	

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\valuedata\proj\19116042\GIBL_PUB_Sms_Generating\PRODUCTION\GIBL-GM_CONTOUR | File Name: 19116042B008.dwg | Last Edited By: dcaas | Date: 2020-01-30 | Time: 11:11:11 AM | Printed By: Dcaas | Date: 2020-01-30 | Time: 11:12:22 AM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. MONITORING WELLS MW-05 TO MW-10 AND STAFF GAUGES SG-01 TO SG-06 WERE NOT INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT
 GRAND HAVEN BOARD OF LIGHT AND POWER
 GRAND HAVEN, MICHIGAN

CONSULTANT	YYYY-MM-DD	2019-11-7
	DESIGNED	CEP
	PREPARED	ADR
	REVIEWED	CEP
	APPROVED	DLP

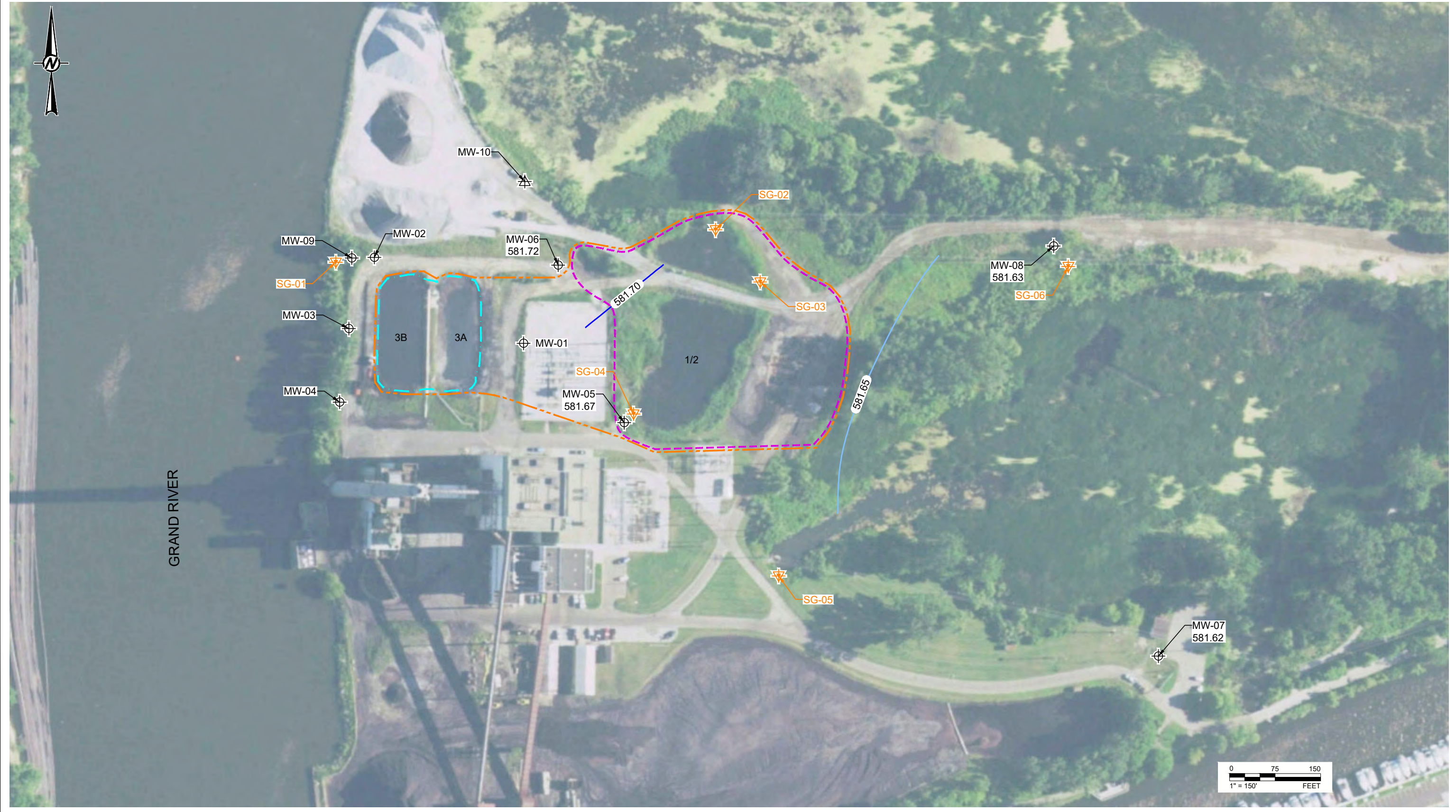
PROJECT
 JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
 AUGUST 7, 2017

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B008.dwg	0	B-8

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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GRAND RIVER



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT
 GRAND HAVEN BOARD OF LIGHT AND POWER
 GRAND HAVEN, MICHIGAN

CONSULTANT	YYYY-MM-DD	2019-11-07
	DESIGNED	CEP
	PREPARED	ADR
	REVIEWED	CEP
	APPROVED	DLP

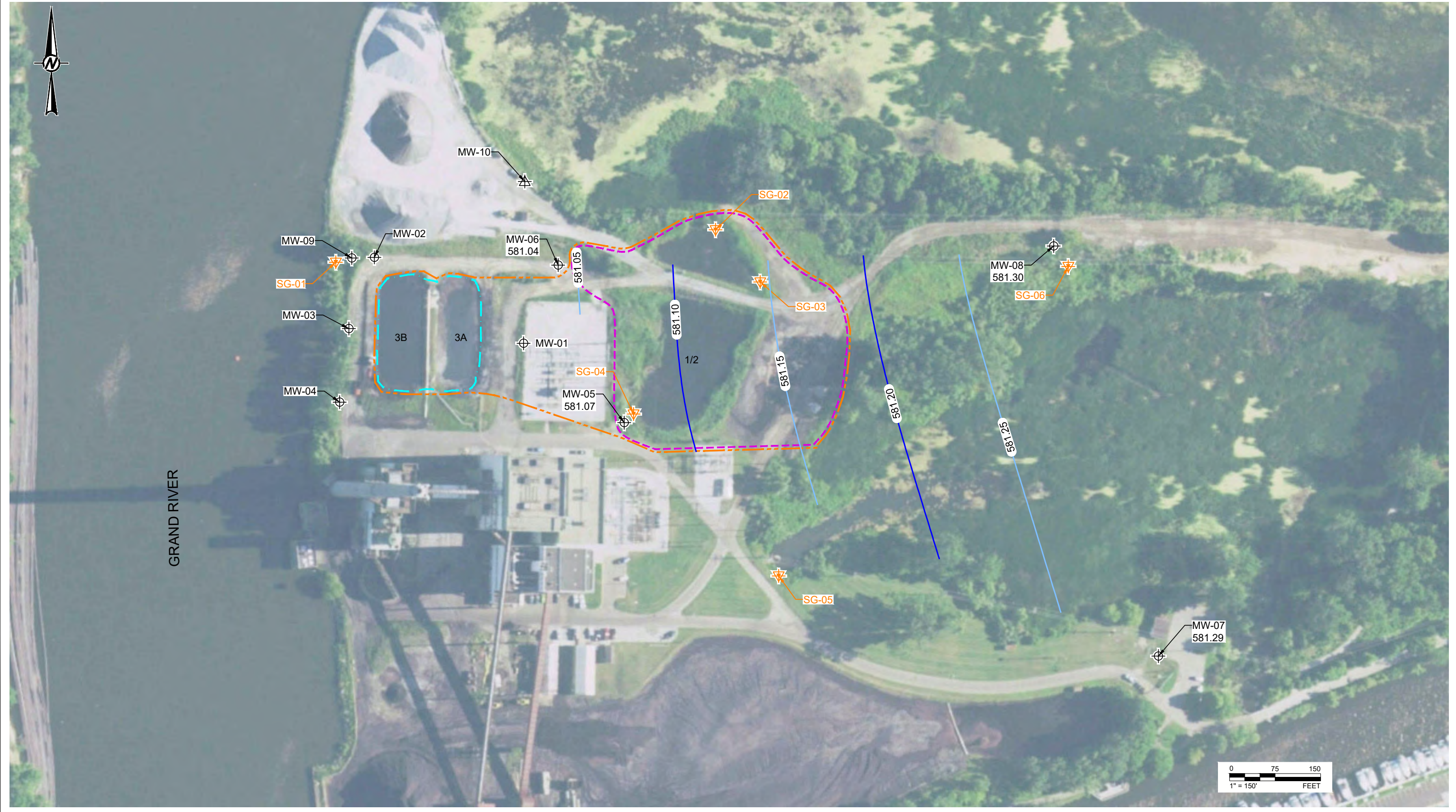
PROJECT
 JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
 JUNE 27, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B009.dwg	0	B-9

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

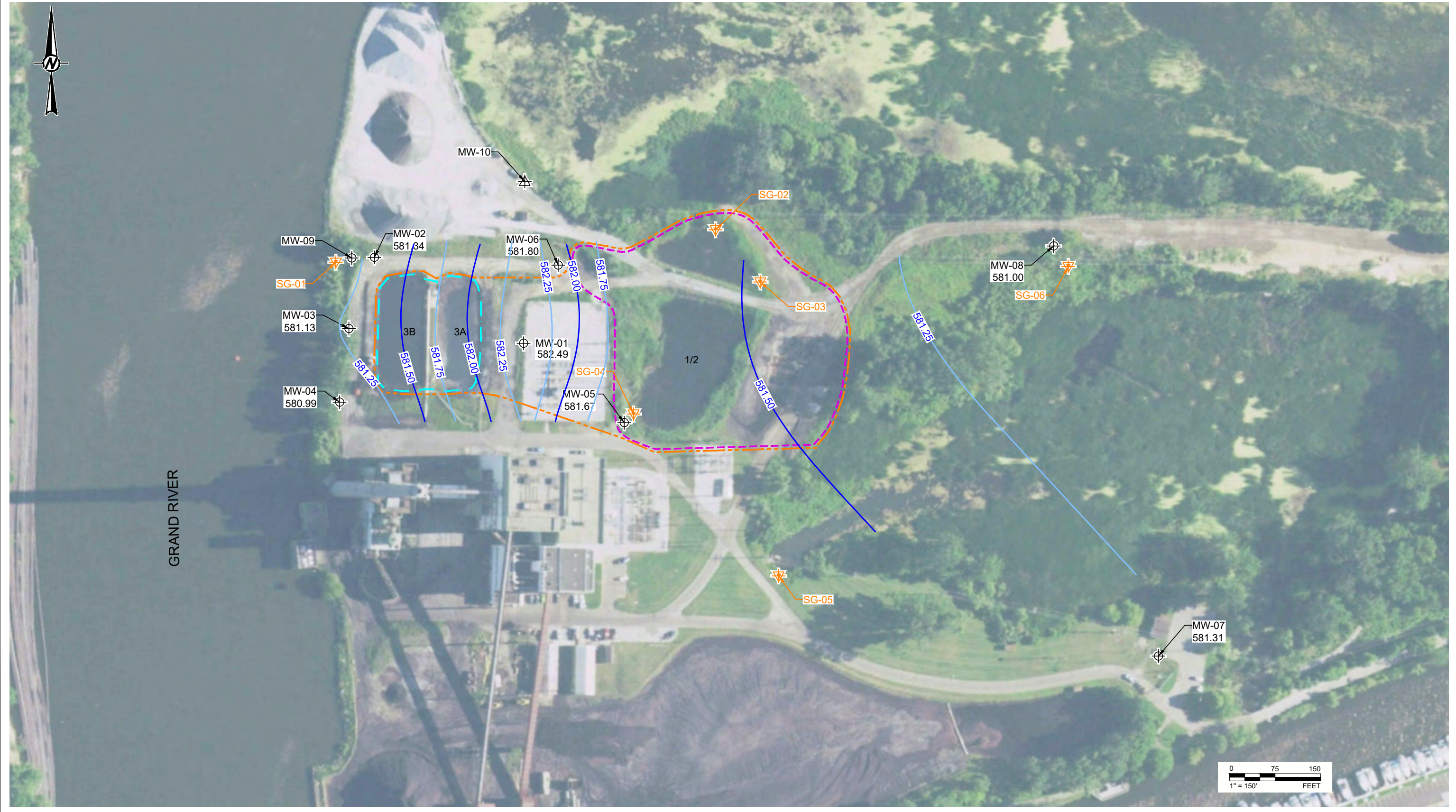
LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT		GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT		GOLDER	
DESIGNED	CEP	YYYY-MM-DD	2019-11-07
PREPARED	ADR		
REVIEWED	CEP		
APPROVED	DLP		

PROJECT		JB SIMS GENERATING STATION	
TITLE		GROUNDWATER CONTOUR MAP JULY 30, 2018	
PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B010.dwg	0	B-10

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT
 GRAND HAVEN BOARD OF LIGHT AND POWER
 GRAND HAVEN, MICHIGAN

CONSULTANT	DATE	DESCRIPTION
	2019-11-07	DESIGNED
		CEP
		PREPARED
		ADR
		REVIEWED
	CEP	
	DLP	APPROVED

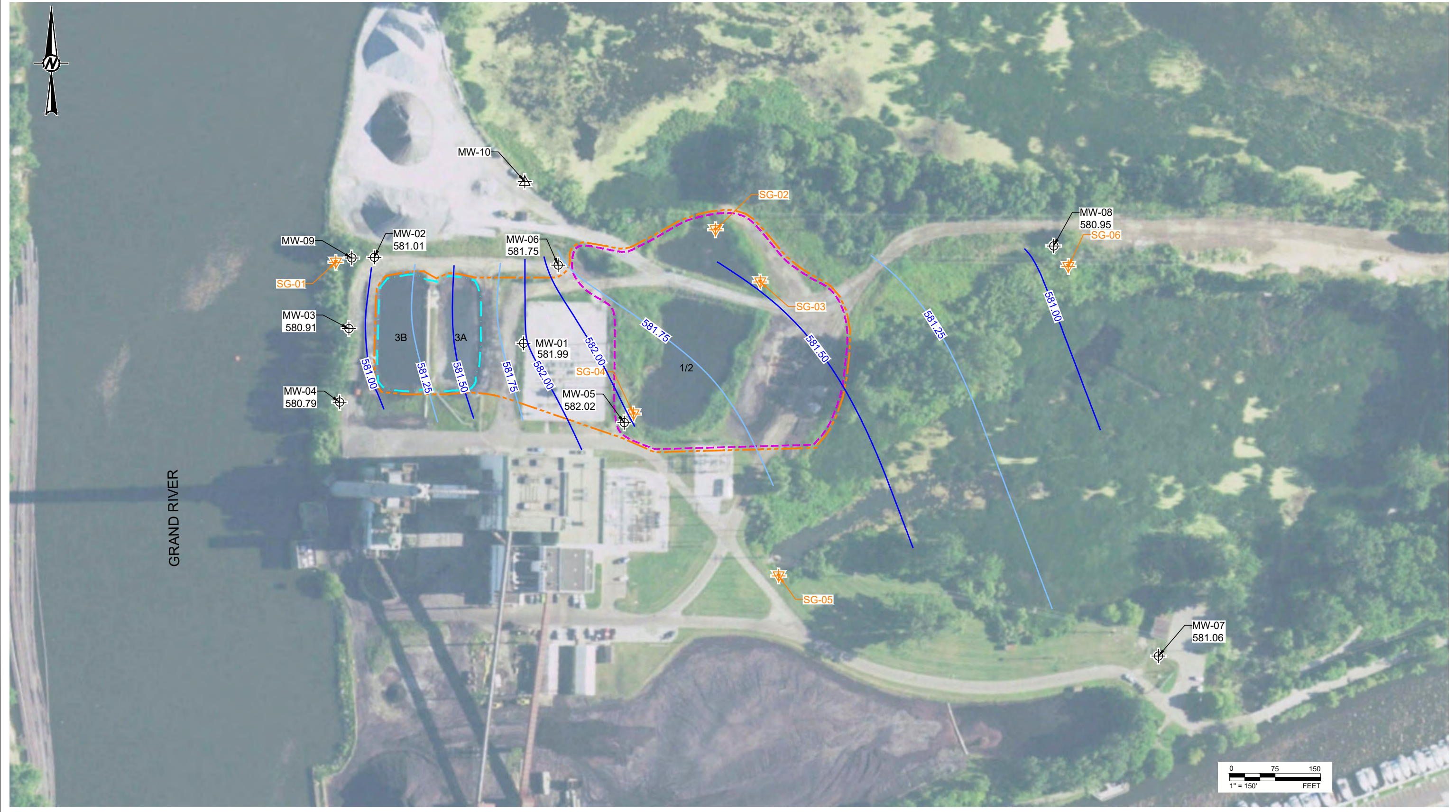
PROJECT
 JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
 AUGUST 27, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B011.dwg	0	B-11

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

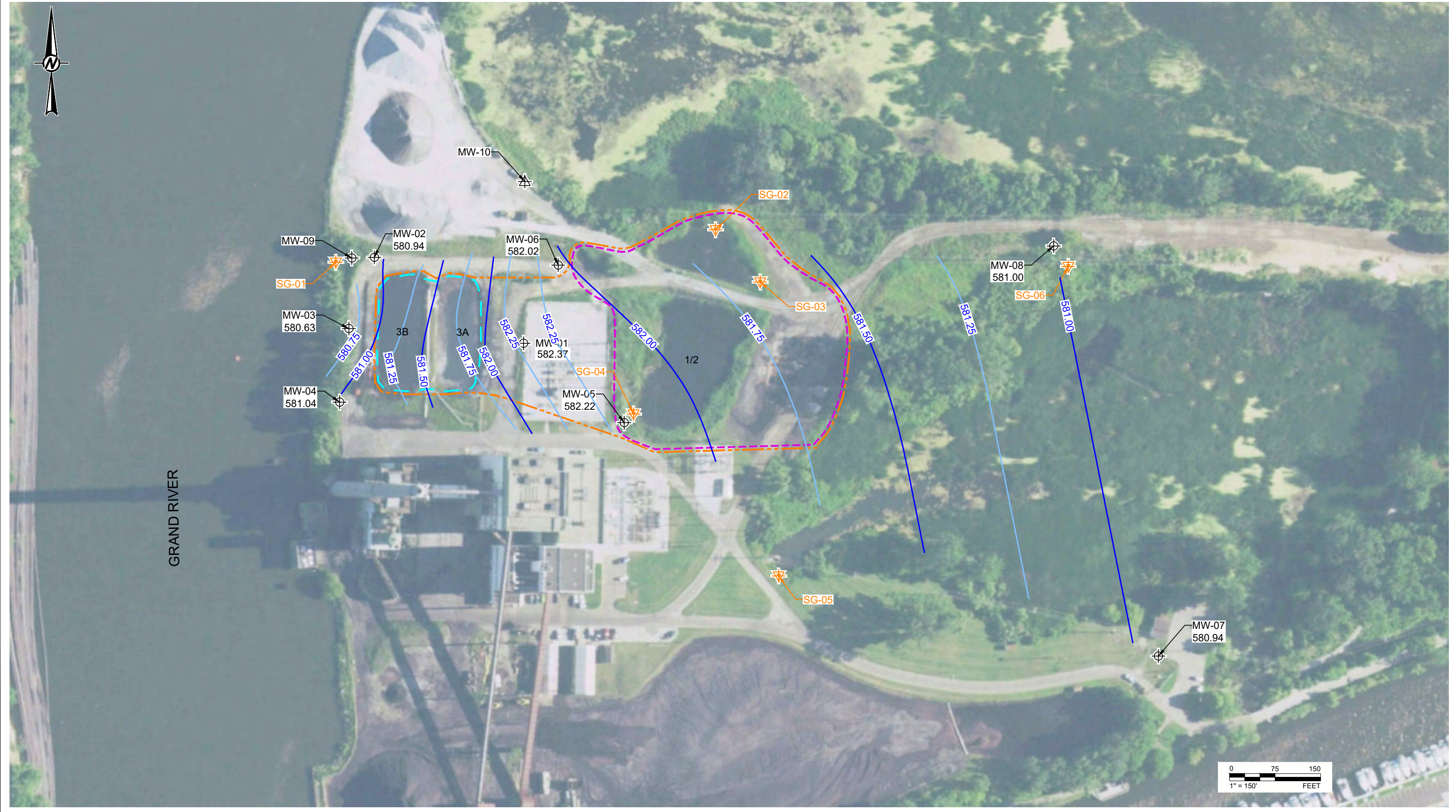
CLIENT		PROJECT	
GRAND HAVEN BOARD OF LIGHT AND POWER		JB SIMS GENERATING STATION	
GRAND HAVEN, MICHIGAN		TITLE	
		GROUNDWATER CONTOUR MAP	
		SEPTEMBER 26, 2018	
CONSULTANT		YYYY-MM-DD	2019-11-07
		DESIGNED	CEP
		PREPARED	ADR
		REVIEWED	CEP
		APPROVED	DLP



PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B012.dwg	0	B-12

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Path: \\nd\info\proj\19116042\GIBB_PUB_Sms_Generating\PRODUCTION\GIBB-GM_CONTOUR_1 | File Name: 19116042B013.dwg | Last Edited By: asae | Date: 2019-11-19 | Time: 10:44:57 AM | Printed By: DCase | Date: 2020-01-30 | Time: 11:25:39 AM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

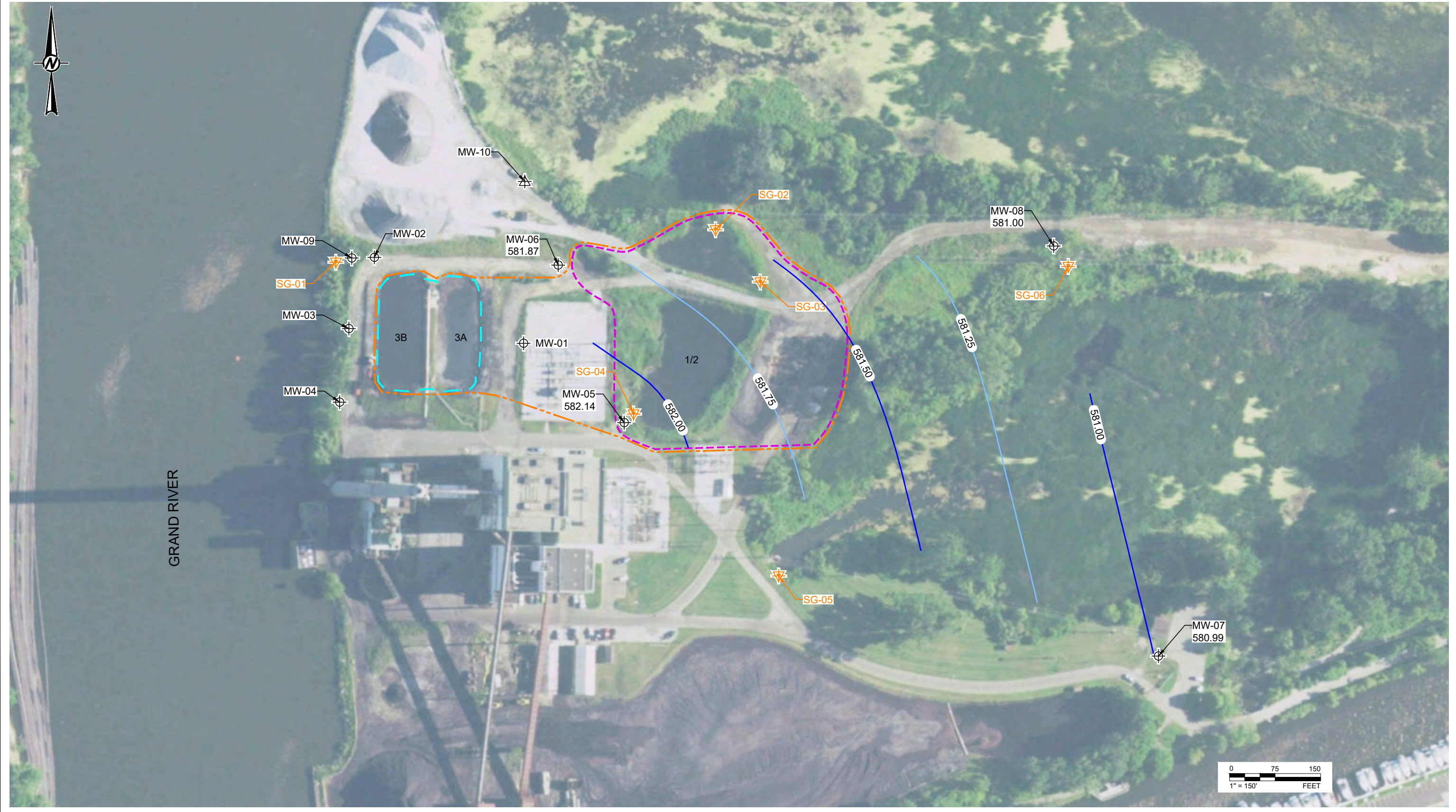
	DETECTION MONITORING WELL		LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	ASSESSMENT MONITORING WELL		UNIT 3 LIMITS OF ASH PLACEMENT
	PIEZOMETER		MULTIUNIT NETWORK BOUNDARY
	STAFF GAUGE		

CLIENT		GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT		GOLDER	
YYYY-MM-DD	2019-11-07	DESIGNED	CEP
		PREPARED	ADR
		REVIEWED	CEP
		APPROVED	DLP

PROJECT		JB SIMS GENERATING STATION	
TITLE		GROUNDWATER CONTOUR MAP OCTOBER 22, 2018	
PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B013.dwg	0	B-13

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

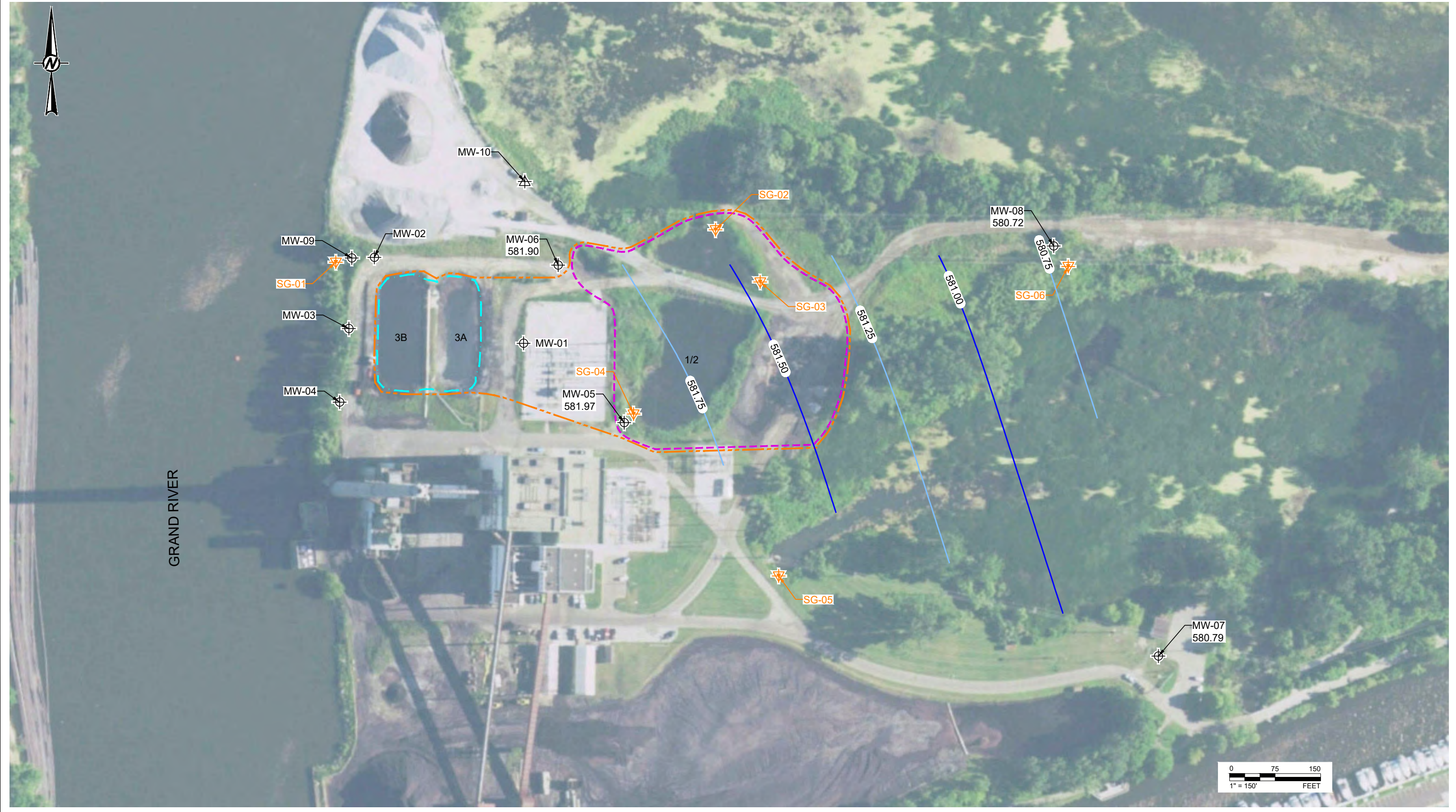
CLIENT	
GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT	
YYYY-MM-DD	2019-11-07
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DLP



PROJECT	
JB SIMS GENERATING STATION	
TITLE	
GROUNDWATER CONTOUR MAP NOVEMBER 12, 2018	
PROJECT NO.	CONTROL
19116042	19116042B014.dwg
REV.	0
FIGURE	B-14

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

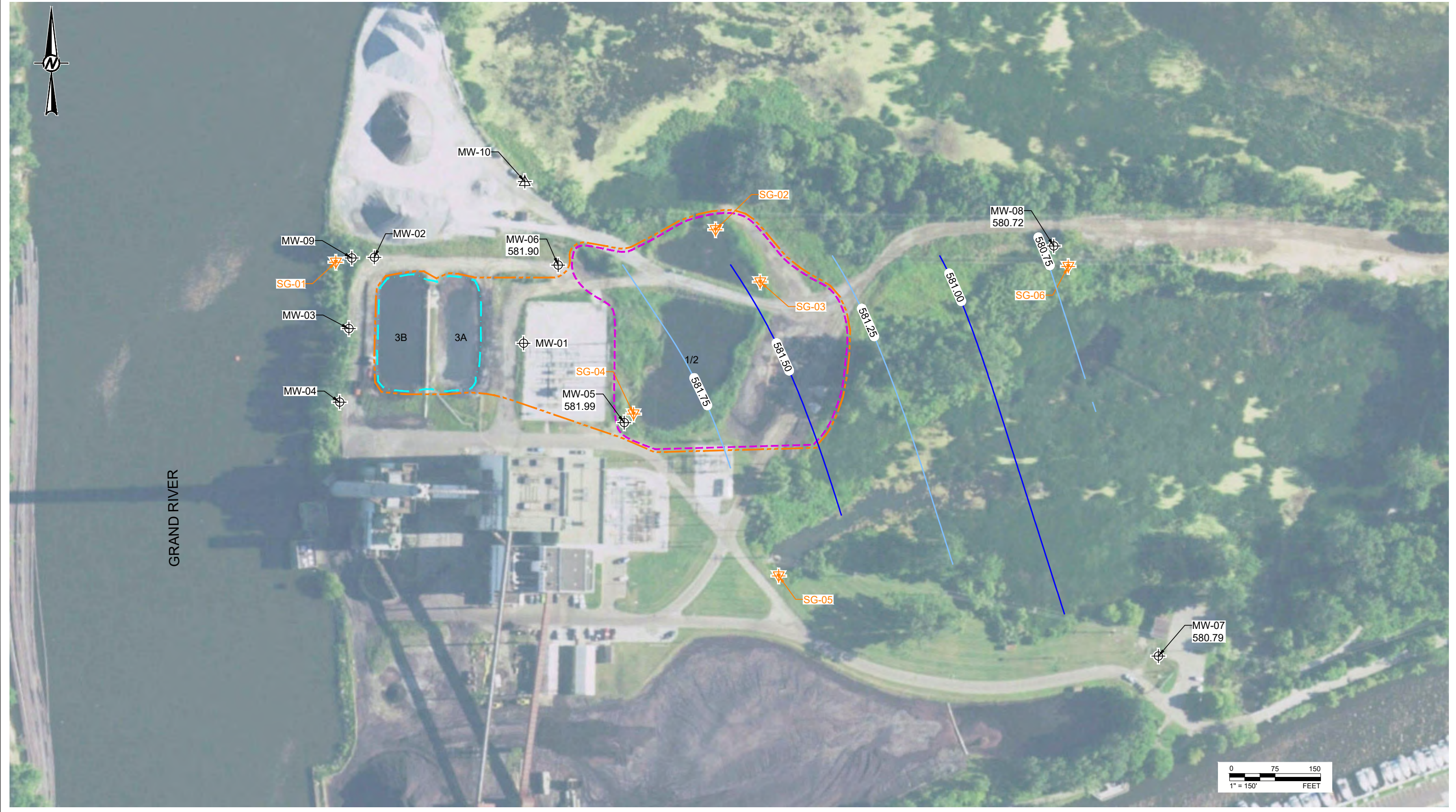
LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT		GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT		GOLDER	
YYYY-MM-DD	2019-11-08	DESIGNED	CEP
		PREPARED	ADR
		REVIEWED	CEP
		APPROVED	DLP

PROJECT		JB SIMS GENERATING STATION	
TITLE		GROUNDWATER CONTOUR MAP NOVEMBER 28, 2019	
PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B015.dwg	0	B-15

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT
 GRAND HAVEN BOARD OF LIGHT AND POWER
 GRAND HAVEN, MICHIGAN

CONSULTANT	YYYY-MM-DD	2019-11-08
	DESIGNED	CEP
	PREPARED	ADR
	REVIEWED	CEP
	APPROVED	DLP

PROJECT
 JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
 DECEMBER 7, 2018

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B016.dwg	0	B-16

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB



Path: \\v:\data\proj\19116042\GIBB_PUB_Sms_GeneratingPRODUCTION\GIBB-GM_CONTOUR\... | File Name: 19116042B017.dwg | Last Edited By: asae | Date: 2019-11-19 | Time: 11:00:51 AM | Printed By: D.Cass | Date: 2020-01-30 | Time: 11:37:40 AM



REFERENCE(S)
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
3. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

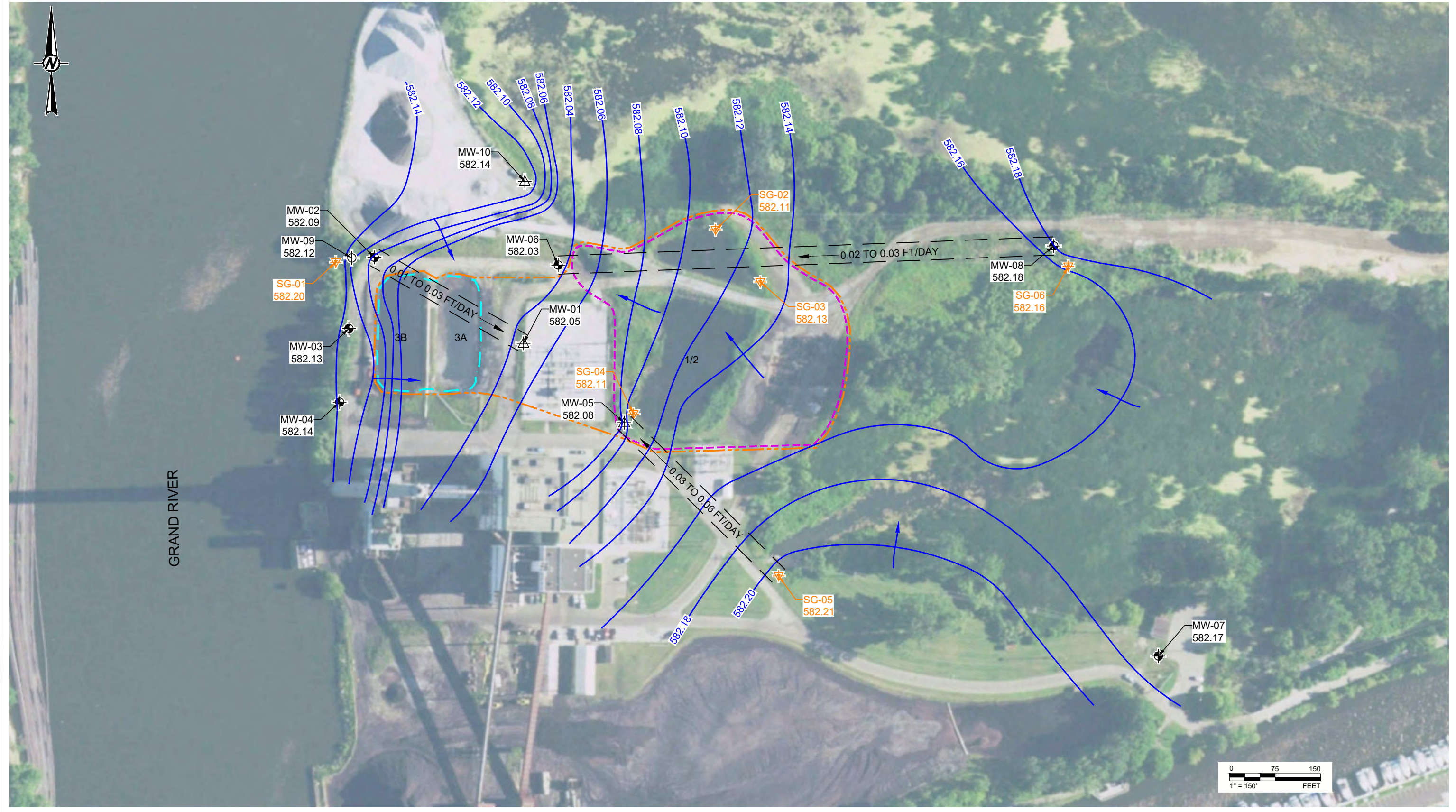
LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT		GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT		GOLDER	
YYYY-MM-DD	2019-11-08	DESIGNED	CEP
		PREPARED	ADR
		REVIEWED	CEP
		APPROVED	DLP

PROJECT		JB SIMS GENERATING STATION	
TITLE		GROUNDWATER CONTOUR MAP MARCH 27, 2019	
PROJECT NO.	19116042	CONTROL	19116042B017.dwg
REV.	0	FIGURE	B-17

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

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GRAND RIVER



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.

LEGEND	
	DETECTION MONITORING WELL WITH GROUNDWATER ELEVATION
	ASSESSMENT MONITORING WELL WITH GROUNDWATER ELEVATION
	PIEZOMETER WITH GROUNDWATER ELEVATION
	STAFF GAUGE WITH WATER ELEVATION
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY
	GROUNDWATER CONTOURS
	FLOW DIRECTION

CLIENT
 GRAND HAVEN BOARD OF LIGHT AND POWER
 GRAND HAVEN, MICHIGAN

CONSULTANT	DATE	DESCRIPTION
	2019-11-08	DESIGNED CEP
		PREPARED ADR
		REVIEWED CEP
		APPROVED DLP

PROJECT
 JB SIMS GENERATING STATION

TITLE
GROUNDWATER CONTOUR MAP
 SEPTEMBER 9, 2019

PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B018.dwg	0	B-18

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Path: \\v:\info\cad\proj\19116042\GIBL_PUB_Sms_Generating\PRODUCTION\GIBL-GM_CONTOUR | File Name: 19116042B019.dwg | Last Edited By: dcess | Date: 2020-01-30 | Time: 12:44:17 PM | Printed By: dcess | Date: 2020-01-30 | Time: 12:44:29 PM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. * GROUNDWATER ELEVATION FOR SG-4 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
 3. BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
 4. MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT	
GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT	
YYYY-MM-DD	2019-11-08
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP



PROJECT	
JB SIMS GENERATING STATION	
TITLE	
GROUNDWATER CONTOUR MAP NOVEMBER 1, 2019	
PROJECT NO.	CONTROL
19116042	19116042B019.dwg
REV.	0
FIGURE	B-19

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Path: \\v:\info\cad\Projects\19116042\GIBL_P_B_Sims_Generating\PRODUCTION\GIBL-GM_CONTOUR.dwg | File Name: 19116042B020.dwg | Last Edited By: dcess | Date: 2020-01-30 | Time: 11:51:40 AM | Printed By: dcess | Date: 2020-01-30 | Time: 11:51:51 AM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

- HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
- * GROUNDWATER ELEVATION FOR MW-02 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
- BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
- MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

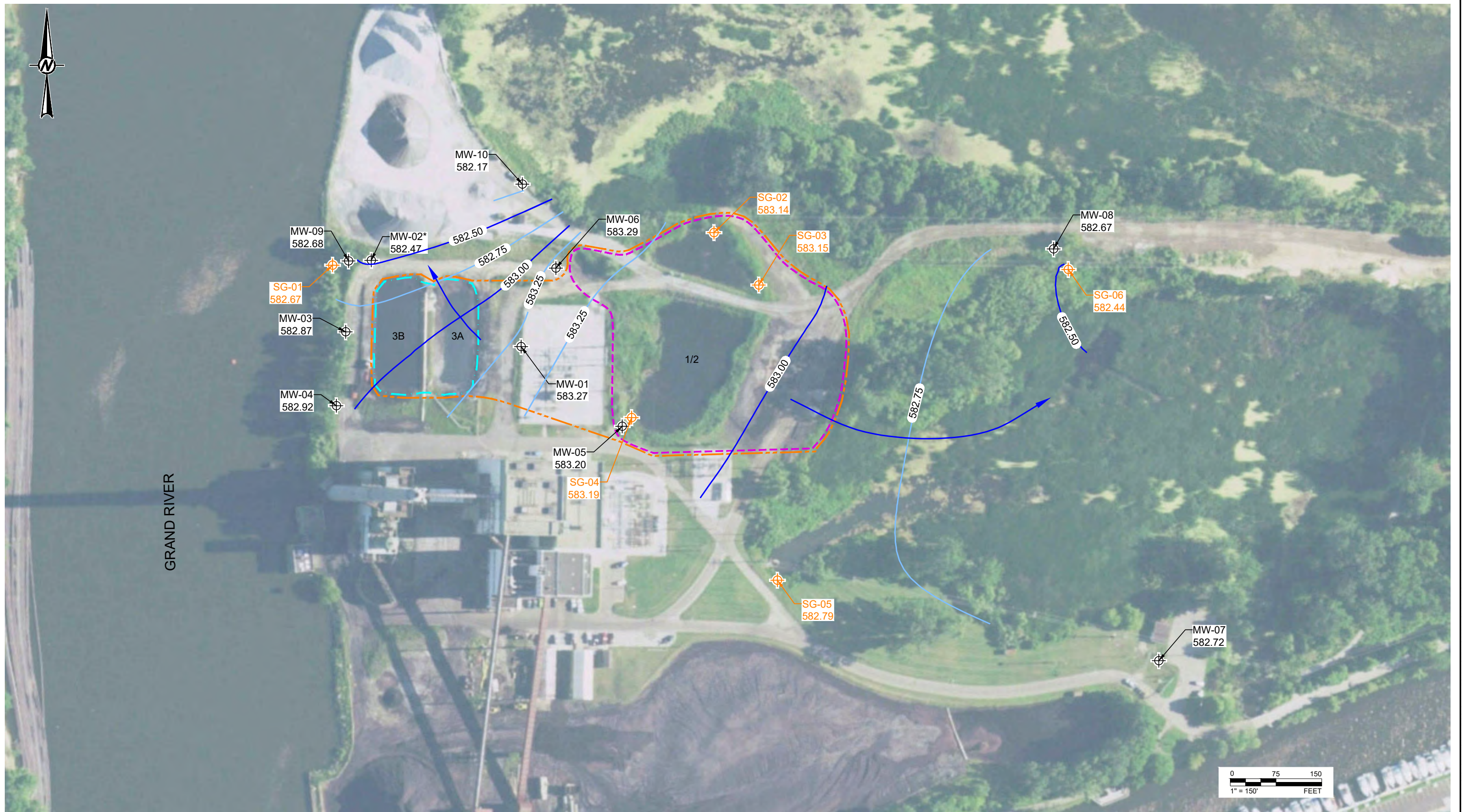
CLIENT		GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT		GOLDER	
DESIGNED	CEP	YYYY-MM-DD	2019-11-19
PREPARED	ADR		
REVIEWED	CEP		
APPROVED	DLP		

PROJECT		JB SIMS GENERATING STATION HYDROGEOLOGIC MONITORING PLAN	
TITLE		GROUNDWATER CONTOUR MAP NOVEMBER 15, 2019	
PROJECT NO.	CONTROL	REV.	FIGURE
19116042	19116042B020.dwg	0	B-20

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB



Path: \\v:\info\proj\19116042\GIBL_P_B_Sims_Generating\PRODUCTION\GIBL-GM_CONTOUR.dwg | File Name: 19116042B021.dwg | Last Edited By: dcess | Date: 2020-01-30 | Time: 1:37:49 PM | Printed By: Dcess | Date: 2020-01-30 | Time: 1:38:01 PM



REFERENCE(S)

Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

NOTE(S)

- HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
- * GROUNDWATER ELEVATION FOR MW-02 WAS NOT USED TO CREATE CONTOURS DUE TO ANOMALOUS ELEVATION DATA.
- BACKGROUND EVENT FOR MW-05 TO MW-08, THEREFORE MONITORING WELLS MW-01 TO MW-04 WERE NOT GAUGED.
- MONITORING WELLS MW-09 & MW-10 & STAFF GAUGE SG-01 THROUGH SG-06 WERE INSTALLED PRIOR TO THIS EVENT.

LEGEND

-  DETECTION MONITORING WELL
-  ASSESSMENT MONITORING WELL
-  PIEZOMETER
-  STAFF GAUGE
-  LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
-  UNIT 3 LIMITS OF ASH PLACEMENT
-  MULTIUNIT NETWORK BOUNDARY

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT



YYYY-MM-DD	2019-12-31
DESIGNED	CEP
PREPARED	ADR
REVIEWED	CEP
APPROVED	DLP

PROJECT
JB SIMS GENERATING STATION
HYDROGEOLOGIC MONITORING PLAN

TITLE

GROUNDWATER CONTOUR MAP
DECEMBER 2, 2019

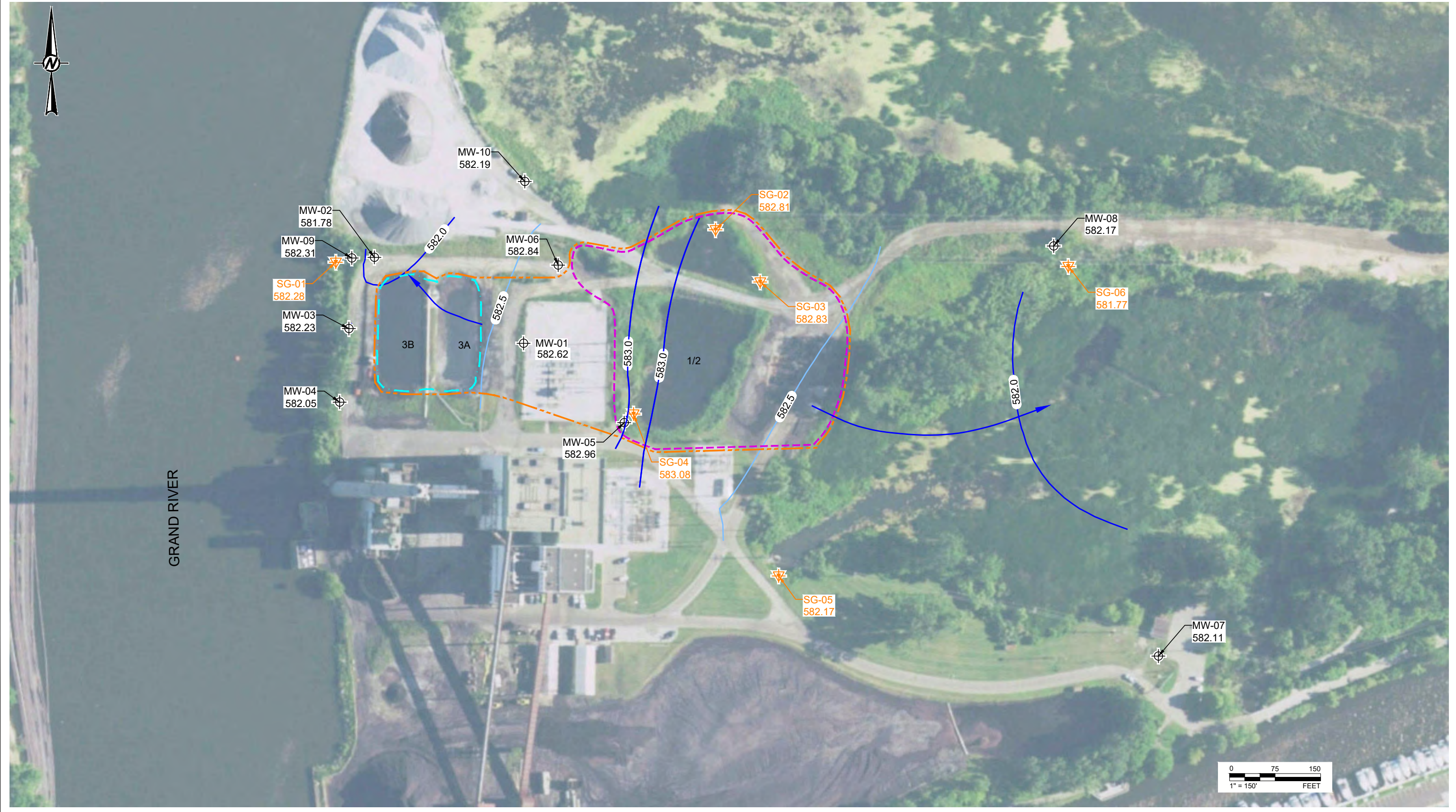
PROJECT NO. 19116042 CONTROL 19116042B021.dwg

REV. 0

FIGURE B-21

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Path: \\na\info\proj\19116042\GIBL_PUB_Sms_Generating\PRODUCTION\GIBL-GM_CONTOUR | File Name: 19116042B022.dwg | Last Edited By: dcess | Date: 2020-01-30 | Time: 2:29:19 PM | Printed By: Dcess | Date: 2020-01-30 | Time: 2:29:20 PM



REFERENCE(S)
 Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Date of imagery, 7/14/2016.

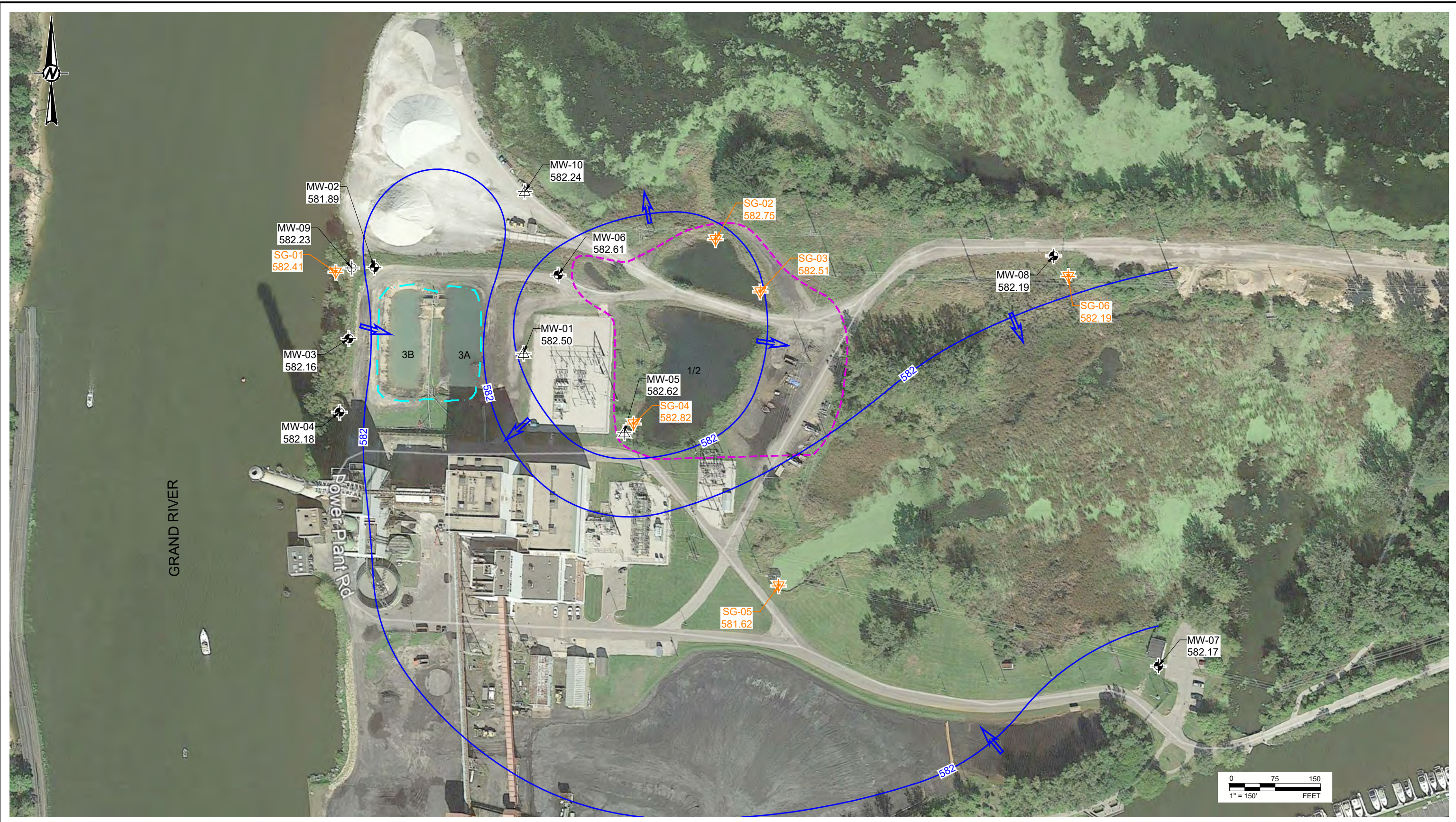
NOTE(S)
 1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
 2. MONITORING WELLS MW-05 TO MW-10 AND STAFF GAUGES SG-01 TO SG-06 WERE NOT INSTALLED PRIOR TO THIS EVENT.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	MULTIUNIT NETWORK BOUNDARY

CLIENT		PROJECT	
GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN		JB SIMS GENERATING STATION	
CONSULTANT		TITLE	
GOLDER		GROUNDWATER CONTOUR MAP	
YYYY-MM-DD	2020-01-30	DECEMBER 16, 2019	
DESIGNED	CEP	PROJECT NO.	19116042
PREPARED	DJC	CONTROL	19116042B022.dwg
REVIEWED	CEP	REV.	0
APPROVED	DLP	FIGURE	B-22

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\golder-gba.com\projects\2014\1048\G002\20-Projects\2014\1048\G002.dwg | File Name: 20141048G002.dwg | Last Edited By: dceas | Date: 2021-01-27 | Time: 11:30:05 AM | Printed By: Dceas | Date: 2021-01-27 | Time: 11:30:20 AM



REFERENCE
AERIAL PHOTOGRAPH COURTESY OF GOOGLE EARTH PRO; IMAGE DATE: 2018-09-22.

NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. THE UNIT 1/2 IMPOUNDMENT BOUNDARY IS CURRENTLY BEING EVALUATED BASED ON RECENT TECHNICAL MEETING WITH EPA AND EGLE. A REVISED BOUNDARY FOR THE UNITS 1/2 IMPOUNDMENT WILL BE PROVIDED IN 2021.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	GROUNDWATER CONTOURS
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	GROUNDWATER FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT	YYYY-MM-DD	2021-01-27
	DESIGNED	CEP
	PREPARED	DJC
	REVIEWED	
	APPROVED	

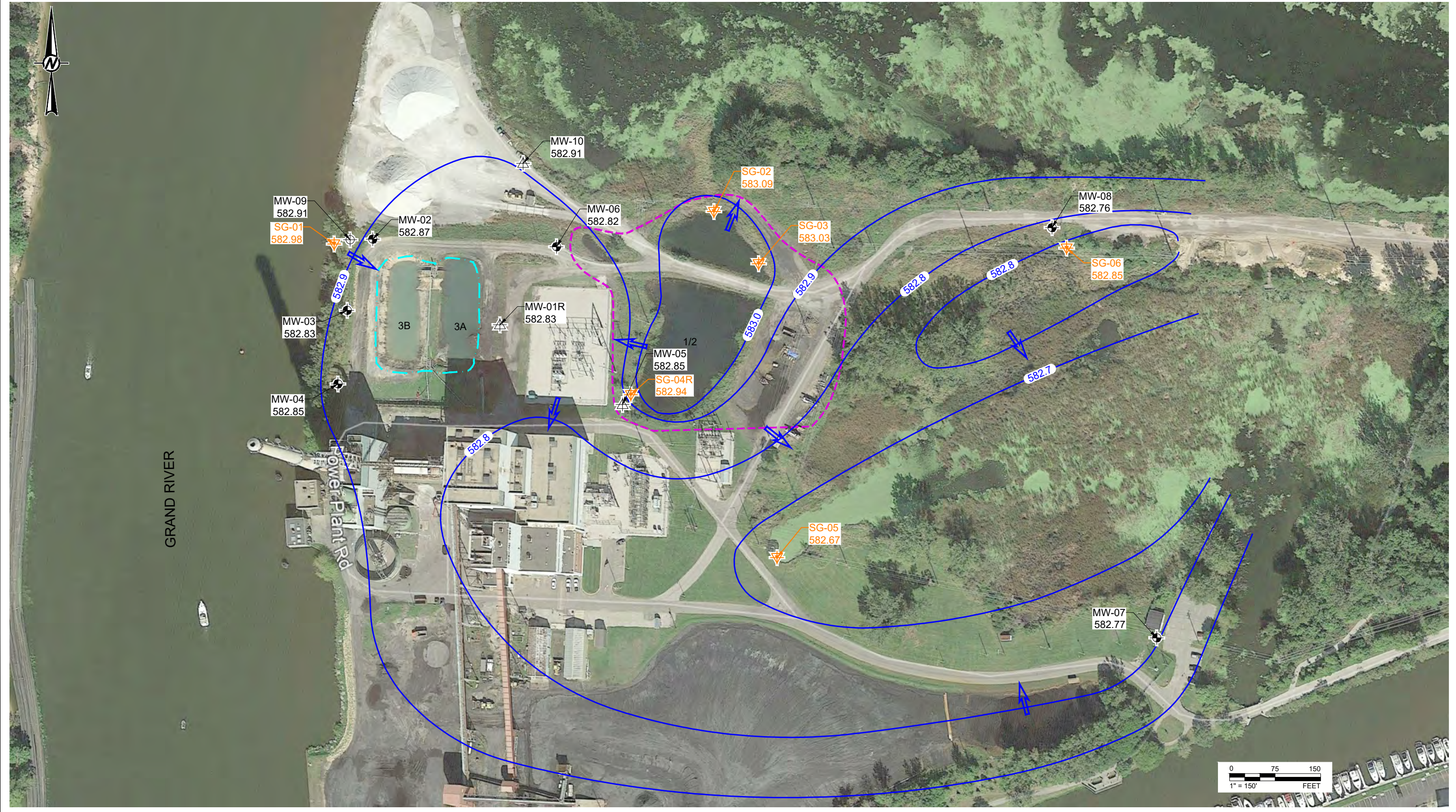
PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
GROUNDWATER CONTOUR MAP
MARCH 27, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
20141048	20141048G002.dwg	0	3

1" = 150' FEET IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\golder-gbl.com\workspace\data\2014\1048\G003\Project\2014\1048\G003.dwg | File Name: 20141048G003.dwg | Last Edited By: dceas | Date: 2021-01-27 | Time: 11:38:19 AM | Printed By: Dceas | Date: 2021-01-27 | Time: 11:38:34 AM



REFERENCE
AERIAL PHOTOGRAPH COURTESY OF GOOGLE EARTH PRO; IMAGE DATE: 2018-09-22.


NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. THE UNIT 1/2 IMPOUNDMENT BOUNDARY IS CURRENTLY BEING EVALUATED BASED ON RECENT TECHNICAL MEETING WITH EPA AND EGLE. A REVISED BOUNDARY FOR THE UNITS 1/2 IMPOUNDMENT WILL BE PROVIDED IN 2021.

LEGEND

-  DETECTION MONITORING WELL
-  ASSESSMENT MONITORING WELL
-  PIEZOMETER
-  STAFF GAUGE
-  582 — GROUNDWATER CONTOURS
-  LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
-  UNIT 3 LIMITS OF ASH PLACEMENT
-  GROUNDWATER FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT



YYYY-MM-DD	2021-01-27
DESIGNED	CEP
PREPARED	DJC
REVIEWED	
APPROVED	

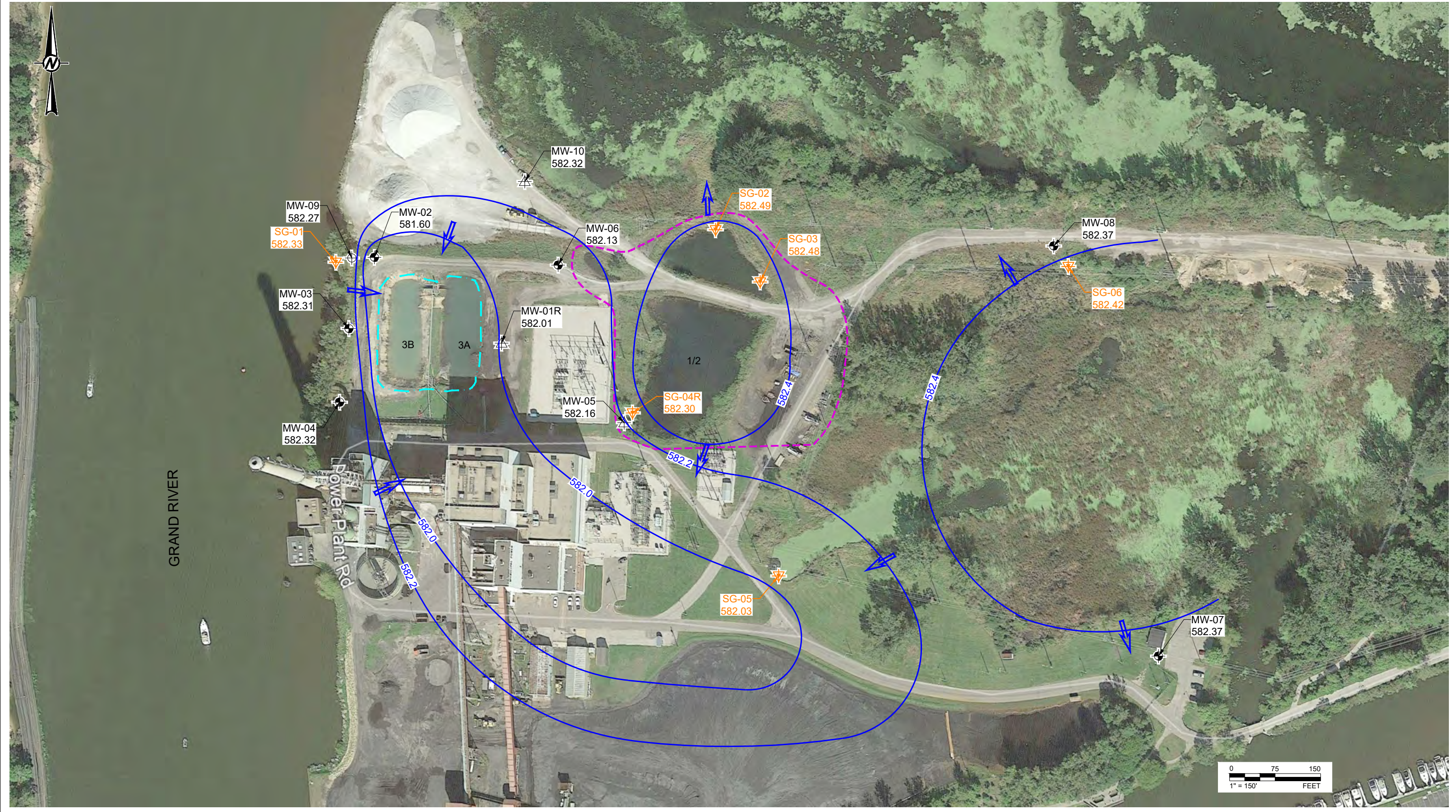
PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
GROUNDWATER CONTOUR MAP
JUNE 17, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
20141048	20141048G003.dwg	0	4

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\golder-gbl.com\projects\2014\1048\G004.dwg; Job: Sims Generating Station Annual Report; File Name: 20141048G004.dwg; Last Edited By: dceas; Date: 2021-01-27; Time: 11:38:33 AM; Printed By: Dceas; Date: 2021-01-27; Time: 11:38:47 AM



GRAND RIVER

Power-Plant Rd

REFERENCE
AERIAL PHOTOGRAPH COURTESY OF GOOGLE EARTH PRO; IMAGE DATE: 2018-09-22.

NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. THE UNIT 1/2 IMPOUNDMENT BOUNDARY IS CURRENTLY BEING EVALUATED BASED ON RECENT TECHNICAL MEETING WITH EPA AND EGLE. A REVISED BOUNDARY FOR THE UNITS 1/2 IMPOUNDMENT WILL BE PROVIDED IN 2021.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	GROUNDWATER CONTOURS
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	GROUNDWATER FLOW DIRECTION

CLIENT	
GRAND HAVEN BOARD OF LIGHT AND POWER GRAND HAVEN, MICHIGAN	
CONSULTANT	
YYYY-MM-DD	2021-01-27
DESIGNED	CEP
PREPARED	DJC
REVIEWED	
APPROVED	

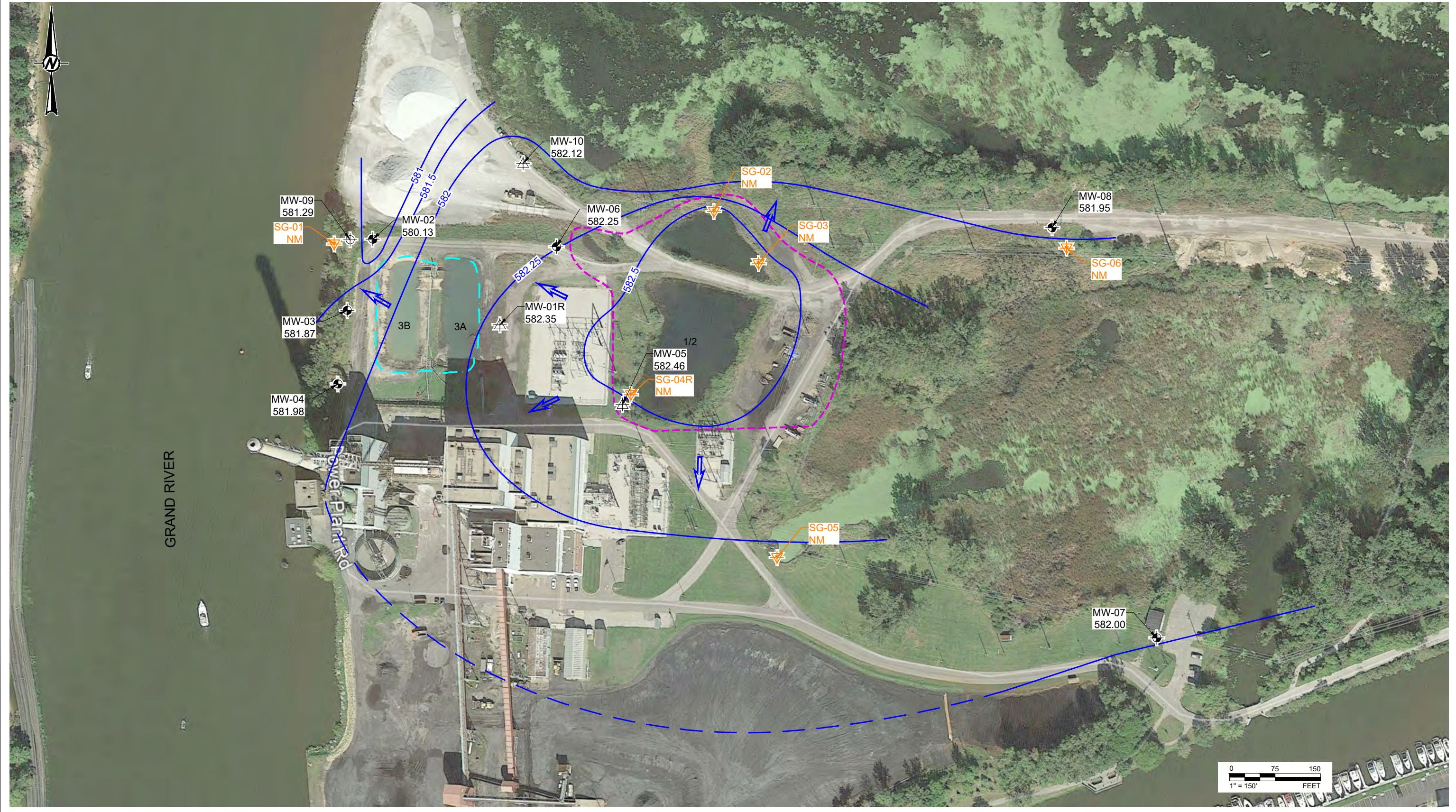


PROJECT	
JB SIMS GENERATING STATION ANNUAL REPORT	
TITLE	
GROUNDWATER CONTOUR MAP SEPTEMBER 25, 2020	
PROJECT NO.	CONTROL
20141048	20141048G004.dwg
REV.	0
FIGURE	5



1" = 150' FEET IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB

Path: \\golder-gbl.com\projects\2014\1048\G005.dwg; Job: Sims Generating Station Annual Report; File Name: 20141048G005.dwg; Last Edited By: dceas; Date: 2021-01-27; Time: 11:42:52 AM; Printed By: Dceas; Date: 2021-01-27; Time: 11:43:12 AM



REFERENCE
AERIAL PHOTOGRAPH COURTESY OF GOOGLE EARTH PRO; IMAGE DATE: 2018-09-22.

NOTE(S)
1. HORIZONTAL COORDINATE SYSTEM BASED ON MICHIGAN STATE PLANE SOUTH, INTERNATIONAL FEET. VERTICAL DATUM IS NAVD 1988.
2. THE UNIT 1/2 IMPOUNDMENT BOUNDARY IS CURRENTLY BEING EVALUATED BASED ON RECENT TECHNICAL MEETING WITH EPA AND EGLE. A REVISED BOUNDARY FOR THE UNITS 1/2 IMPOUNDMENT WILL BE PROVIDED IN 2021.

LEGEND	
	DETECTION MONITORING WELL
	ASSESSMENT MONITORING WELL
	PIEZOMETER
	STAFF GAUGE
	GROUNDWATER CONTOURS
	LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
	UNIT 3 LIMITS OF ASH PLACEMENT
	GROUNDWATER FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT	YYYY-MM-DD	2021-01-27
	DESIGNED	CEP
	PREPARED	DJC
	REVIEWED	
	APPROVED	

PROJECT
JB SIMS GENERATING STATION
ANNUAL REPORT

TITLE
GROUNDWATER CONTOUR MAP
NOVEMBER 20, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
20141048	20141048G005.dwg	0	6

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIB



GOLDER

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