



Monitoring Well Installation Report

For Michigan Part 115 CCR Solid Waste Regulations

Former J.B. Sims Generating Station

November 27, 2023

Revised - May 1, 2024



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1.0 Introduction

The purpose of this Monitoring Well Installation Report is to document details pertaining to the drilling, construction, and development of groundwater monitoring wells installed at the former J.B. Sims Generating Station (facility or Site) in Grand Haven, Michigan operated by Grand Haven Board of Light and Power (GHBLP) (**Figure 1**). The groundwater monitoring system is intended to support compliance with the U.S. Environmental Protection Agency's (EPA) final Coal Combustion Residuals (CCR) Rule (40 CFR §257.91.) and Part 115 Solid Water Management, of the Michigan Natural Resourced and Environmental Protection Act, 1994 PA 451 (Part 115) and the Part 115 regulations. The Site has two units subject to the CCR Rule: Units 1/2 Impoundment and Unit 3A/B Impoundments (**Figure 2**). The two CCR units are currently inactive. WSP was contracted by HDR to assist with locating certain wells used for the CCR program. WSP located, designed, and oversaw the installation of eight new groundwater monitoring wells at the Site.

2.0 Background Information

2.1 Monitoring Well Network

In January 2017, Environmental Resources Management (ERM) installed the initial four monitoring wells around Unit 3A/B (MW-01 through MW-04). Construction details of monitoring well construction is provided in *Groundwater Monitoring System Certification* (ERM, 2017). Monitoring well MW-01 was used as the upgradient location and MW-02, MW-03, MW-04 were placed on the downgradient waste boundary. In July 2018 Golder & Associates (Golder) expanded the monitoring well network to include MW-05 through MW-10. Based on available groundwater contours prior to well installation, monitoring well MW-07 was utilized as the upgradient monitoring location. Monitoring well MW-06 was placed on the waste boundary, MW-08 was placed up gradient along the northern access road, and MW-09 and MW-10 were placed further downgradient near the property boundary. In January 2021 the Michigan Department of Environment, Great Lakes, and Energy (EGLE), EPA, and GLBLP agreed that Units 1/2 would be addressed pursuant to state and federal CCR regulations, subsequently the monitoring well network was expanded. Golder began installing monitoring wells in August 2021 to include PZ-11 through PZ-32. The network expansion was documented in Field Summary Report of Results from Approved Work Plan - Piezometer Installation and Additional Data Collection (Field Summary Report) (Golder, 2022). In 2022 the monitoring well network was revised, as stated in the 2022 Harbor Island Work Plan for CCR Compliance (HDR, 2022). The revisions included changes to nomenclature of well identification to reflect piezometer locations. previously only used for water levels, that have been added to the list of wells used for water quality monitoring (e.g., changing the well ID from PZ-# to MW-#). In the event of monitoring well network is updated, the nomenclature will be updated to reflect which wells are sampled (MW-X) and which wells are to be used as water level only (PZ-X). Note the numbers following "MW" or "PZ" will not be changed and can be used to identify a location that has been updated based on the well network. The well construction details for wells installed by others in previous



phases of the project (ERM and Golder) will be included herein for quick reference; however ERM (2017) and Golder (2022) represent the actual well installation reports for all onsite wells except for the new eight wells, MW-33, MW-34, MW-35, MW-36, MW-37, MW-38, MW-39, and MW-40 which are described herein.

2.2 Hydrogeology

The regional general direction of groundwater flow across Harbor Island is west to southwest towards Lake Michigan (Western Michigan University, 1981). The Grand River is located on the northern and western sides of the Site, and the South Channel is located on the south side of Harbor Island. Internal to the Island there are several influences to groundwater flow and direction. These influences are specifically related to:

- Various fill materials
- Surface water features, such as the inactive Units 1/2 Impoundment and wetlands
- Former coal yard area which may have lower infiltration rates due to compaction from heavy equipment and stockpiling.

These features influence the groundwater velocity and direction and are very localized. Boring logs contained in the *Field Summary Report of Results from Approved Work Plan - Piezometer Installation and Additional Data Collection* show the observed fill materials encountered during well installation (Golder, 2022). During the water level monitoring events conducted between September 2022 and February 2024, groundwater mounding is shown around monitoring well MW-01R, consistent with observations made by Golder between October and December 2021 (Golder, 2022). Groundwater flow in the area east of the internal wetland is consistent with regional groundwater flow and the flow of the Grand River toward the west. Groundwater data from the 2023 show groundwater flow beneath Unit 3A/B Impoundments is consistently west toward the Grand River (HDR, 2024). Groundwater flow beneath Units 1/2 Impoundment is seasonably and spatially variable; flow is generally northward toward near the North Channel (**Figure 2**), east from the ponds of Units 1/2 Impoundment toward the wetland, and potentially south near MW-05 (HDR, 2024). The wetland east of the Units 1/2 Impoundment appears to provide a hydraulic sink between the CCR impoundments and the wells situated to the east of the wetland (PZ-23 through PZ-26, MW-27, MW-33, and MW-34).





Figure 1 | Site Vicinity Map



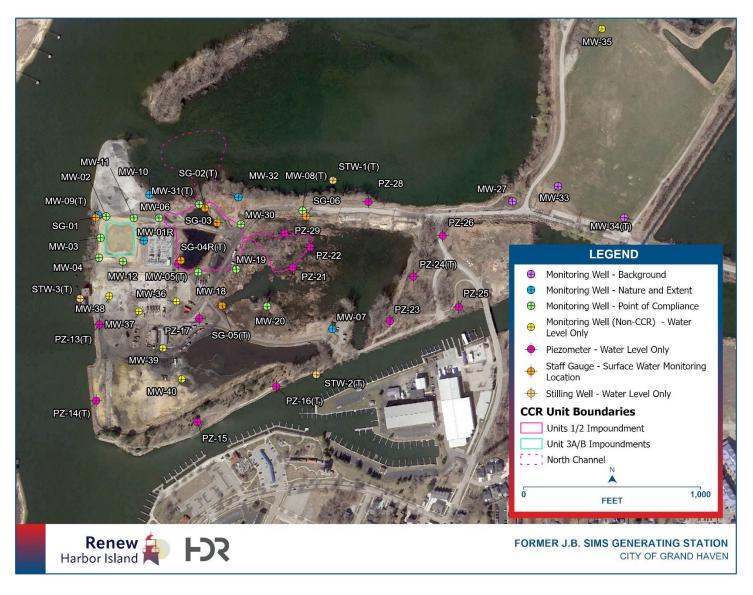


Figure 2 | Former J.B. Sims CCR Units and Monitoring Wells



3.0 Field and Laboratory Methods

3.1 Borehole Drilling

Table 1 contains the installation date, oversight company, driller, and drill method for each CCR monitoring location. Soils from boreholes were logged by the field geologist to document soil characteristics. The geologist visually classified soil type, consistency/relative density, color, and water content in accordance with the Unified Soil Classification System (USCS) as well as grain size, mineralogy, sorting, roundness, hardness, and matrix/clast support, among other textural properties.

In November 2022, WSP provided oversite of the installation of background monitoring wells MW-33 and MW-34. Based on the available groundwater flow data, the east arm of Harbor Island is upgradient of the CCR units. The two new monitoring wells were installed east of MW-27 to serve as background monitoring wells for the CCR program. In January 2023, WSP provided oversite of the installation of background monitoring wells MW-35 through MW-40 for a non-CCR groundwater monitoring investigation. The well locations were chosen based on sampling results of the non-CCR program and are shown on **Figure 2**. Monitoring wells MW-35, 39, and MW-40 are not sampled under the CCR program, however, water levels are collected as additional information for potentiometric contour maps.

Table 1.	Monitoring We	ll Installation Information	1	
Well	Date Completed	Well Design and Drilling Oversite Company	Drilling Company	Drilling Rig Type and Drilling Method
		Monitoring	g Wells	
MW-01	1/18/2017	ERM	EDAC	GUS Peck - Hollow Stem Auger
MW-01R	5/1/2020	Golder & Assoc.	EDAC	GUS Peck - Hollow Stem Auger
MW-02	1/18/2017	ERM	EDAC	GUS Peck - Hollow Stem Auger
MW-03	1/18/2017	ERM	EDAC	GUS Peck - Hollow Stem Auger
MW-04	1/18/2017	ERM	EDAC	GUS Peck - Hollow Stem Auger
MW-05	5/22/2018	Golder & Assoc.	EDAC	GUS Peck - Hollow Stem Auger
MW-06	5/22/2018	Golder & Assoc.	EDAC	GUS Peck - Hollow Stem Auger
MW-07	5/22/2018	Golder & Assoc.	EDAC	GUS Peck - Hollow Stem Auger
MW-08	5/22/2018	Golder & Assoc.	EDAC	GUS Peck - Hollow Stem Auger
MW-09	8/12/2019	Golder & Assoc.	GeoServe	Direct Push - Geoprobe
MW-10	8/12/2019	Golder & Assoc.	GeoServe	Direct Push - Geoprobe
MW-11	8/19/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-12	8/17/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-16	8/25/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-17	8/17/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-18	8/18/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-19	8/20/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-20	8/18/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-27	8/23/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe



Table 1. I	Monitoring We	ll Installation Information	ı	
Well	Date Completed	Well Design and Drilling Oversite Company	Drilling Company	Drilling Rig Type and Drilling Method
MW-28	8/23/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-30	8/19/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-31	9/1/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-32	8/30/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-33	11/28/2022	WSP	Job Site Services	Direct Push - Geoprobe
MW-34	11/28/2022	WSP	Job Site Services	Direct Push - Geoprobe
MW-36	1/30/2023	WSP	Job Site Services	Direct Push - Geoprobe
MW-37	1/30/2023	WSP	Job Site Services	Direct Push - Geoprobe
MW-38	1/30/2023	WSP	Job Site Services	Direct Push - Geoprobe
		Piezome	eters	
PZ-13	8/17/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-14	8/16/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-15	8/25/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-21	8/30/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-22	8/31/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-23	8/25/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-24	8/24/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-25	8/24/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-26	8/23/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-28	8/23/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
PZ-29	8/30/2021	Golder & Assoc.	MATECO	Direct Push - Geoprobe
MW-35	1/30/2023	WSP	Job Site Services	Direct Push - Geoprobe
MW-39	1/31/2023	WSP	Job Site Services	Direct Push - Geoprobe
MW-40	1/31/2023	WSP	Job Site Services	Direct Push - Geoprobe

3.2 Soil Samples – Geotechnical Analysis

The drilling method for each groundwater monitoring location is contained in **Table 1**. Locations MW-33, MW-34, MW-35, MW-36, MW-37, MW-38, MW-39, and MW-40 were continuously logged using direct push methods and soils were classified based on USCS guidelines. No soil samples were retained from the wells above for further geotechnical analysis.

3.3 Well Construction

Per the CCR Rule and Part 115 regulations, the uppermost aquifer is the target for groundwater monitoring. Monitoring wells are screened in the uppermost aquifer across the Island. The well construction details from ERM, Golder, and HDR/WSP are shown in **Table 2**. Similar to wells installed prior to 2022, monitoring wells MW-33, MW-34, MW-35, MW-36, MW-37, MW-38, MW-39, and MW-40 have 5-foot screen intervals targeting the uppermost aquifer. These eight wells are constructed of schedule 40, 2-inch Polyvinyl Chloride (PVC) pipe with 5-foot (10 slot) screens. Wells MW-33, MW-34, and MW-35 were completed with flush-mounted covers and 2-foot circular cement pads. Wells MW-36 through MW-40 were completed with 4-foot steel



protective casings and 1 by 1-foot cement pads. Wells MW-35 through MW-40 were installed as part of a non-CCR Site investigation and water levels are collected to further characterize the groundwater flow direction. Boring and well construction logs are contained in **Appendix A**. As described in **Section 2.2**, the uppermost aquifer is encountered at or near ground surface and extending to approximately 39.0 feet below surface. The shallow nature of the groundwater is the driving factor behind the shallow screen intervals shown in **Table 2**.

3.4 Well Development

Monitoring wells MW-33 and MW-34 were developed to improve hydraulic connectivity in the area immediately surrounding the well. Well development involves removing as much of the introduced drilling fluids, cuttings, and particulates from within and adjacent to the well as possible.

Well development of monitoring wells MW-33 and MW-34 was performed by HDR in tandem with Job Site Services (JSS). Post well installation, JSS began well development using a submersible pump. The pump was used to surge groundwater though the well screen and into the filter pack and vice versa. JSS recorded 22 gallons purged from MW-33 and 27 gallons removed from MW-34. HDR field staff completed well development using a peristaltic pump while monitoring water quality to verify stabilization of water quality parameters, as well as water clarity. In total 35.3 gallons or 44.1 well volumes were removed from MW-33. A total of 38.2 gallons or 27.3 well volumes were removed from MW-34. Well development logs for MW-33 and MW-34 are contained in **Appendix B**. Both wells achieved stabilization within the following parameters:

- Turbidity below 5.0 NTU and three consecutive readings within 10%
- pH three consecutive readings within 0.1 S.U.
- Conductivity three consecutive readings within 3.0%
- Dissolved Oxygen three consecutive readings within 0.3 mg/L
- Oxidation Reduction Potential three consecutive readings within 10 mV

Well development of MW-35 through MW-40 was conducted by WSP. The monitoring wells were developed a minimum of 24-hours after installation through alternating cycles of surging and purging the well using a clean decontaminated submersible pump and new HDPE tubing. The initial depth to water, total depth of well, development method, pumping rate, cumulative volume removed during well development, and depth to water after development were recorded on the well development form for each well (**Appendix B**). Water quality parameters were not monitored during well development, however, they were monitored as part of groundwater sample collection procedures. Well development was considered complete following removal of at least 12 well volumes and visual clarity of purge water. Job Site decontaminated the DPT drilling core barrels and submersible pump in between monitoring well installation and development locations using a pressure washer and Liquinox® soap.



Well I.D.	Northing	Easting	Date Installed	Ground Surface Elevation	Top of Casing (Staff Gauge) Elevation	Total Boring Depth (feet bgs)	Total Well Depth (feet bgs)	Stickup	Screen length (feet)	Screen Interval (feet bgs)	Comments
					Моі	nitoring Wells					
MW-01	578100.82	12624468.08	1/18/2017	584.34	587.29	12.3	12.3	2.95	5.0	4.0-9.0	Abandoned
MW-01R	578101.30	12624432.00	5/1/2020	585.73	588.45	10.0	9.0	2.72	5.0	4.0-9.0	
MW-02	578241.91	12624222.64	1/18/2017	592.67	595.64	21.0	20.0	2.97	5.0	15.0-20.0	
MW-03	578125.03	12624180.40	1/18/2017	590.42	593.08	17.0	17.0	2.66	5.0	12.0-17.0	
MW-04	578003.96	12624165.24	1/18/2017	588.66	591.49	17.0	15.0	2.83	5.0	10.0-15.0	
MW-05	577970.06	12624634.16	5/22/2018	585.31	587.67	12.0	9.0	2.36	5.0	4.0-9.0	
MW-06	578229.40	12624525.24	5/22/2018	588.22	590.40	17.0	14.0	2.18	5.0	9.0-14.0	
MW-07	577585.75	12625513.56	5/22/2018	583.65	586.49	16.0	16.0	2.84	5.0	11.0-16.0	
MW-08	578261.14	12625341.26	5/22/2018	582.74	585.40	15.0	9.0	2.66	5.0	4.0-9.0	
MW-09	578241.35	12624185.62	8/12/2019	586.8	589.65	12.0	12.0	2.85	5.0	7.0-12.0	
MW-10	578367.40	12624470.20	8/12/2019	583.71	586.73	10.0	10.0	3.02	5.0	5.0-10.0	
MW-11	578236.87	12624377.19	8/19/2021	592.46	595.27	40.0	15.0	2.81	5.0	10.0-15.0	
MW-12	577987.57	12624312.28	8/17/2021	584.94	588.03	40.0	8.0	3.09	5.0	3.0-8.0	
MW-16	577273.65	12625194.83	8/25/2021	582.18	584.87	35.0	8.0	2.69	5.0	3.0-8.0	
MW-17	577652.81	12624744.16	8/17/2021	584.03	587.02	40.0	8.0	2.99	5.0	3.0-8.0	
MW-18	577919.12	12624742.18	8/18/2021	584.12	587.22	34.0	8.0	3.1	5.0	3.0-8.0	
MW-19	577938.05	12624957.16	8/20/2021	583.06	585.86	25.0	8.0	2.8	5.0	3.0-8.0	
MW-20	577722.50	12625131.40	8/18/2021	582.43	585.74	34.0	8.0	3.31	5.0	3.0-8.0	
MW-27	578303.89	12626551.81	8/23/2021	581.87	585.09	40.0	8.0	3.22	5.0	3.0-8.0	
MW-28	578314.93	12625722.71	8/23/2021	585.11	588.07	29.5	9.0	2.96	5.0	4.0-9.0	
MW-30	578196.17	12624990.23	8/19/2021	583.02	585.80	34.0	8.0	2.78	5.0	3.0-8.0	
MW-31	578307.16	12624752.70	9/1/2021	582.56	585.85	27.0	8.0	3.29	5.0	3.0-8.0	
MW-32	578348.32	12624980.14	8/30/2021	583.08	586.26	40.0	8.0	3.18	5.0	3.0-8.0	
MW-33	578403.66	12626765.24	11/28/2022	583.23	582.81	7.0	7.0	-0.42	5.0	2.0-7.0	
MW-34	578225.86	12627140.54	11/28/2022	584.69	584.36	15.0	13.0	-0.33	5.0	8.0-13.0	



Table 2.	Well Cons	truction Deta	ails								
Well I.D.	Northing	Easting	Date Installed	Ground Surface Elevation	Top of Casing (Staff Gauge) Elevation	Total Boring Depth (feet bgs)	Total Well Depth (feet bgs)	Stickup	Screen length (feet)	Screen Interval (feet bgs)	Comments
MW-36	577753.42	12624605.70	1/30/2023	589.12	585.62	20.0	9.0	-3.51	5.0	4.0-9.0	
MW-37	577696.74	12624393.06	1/30/2023	585.59	589.62	20.0	9.0	4.03	5.0	4.0-9.0	
MW-38	577782.86	12624225.55	1/30/2023	586.26	590.51	20.0	9.0	4.25	5.0	4.0-9.0	
					P	Piezometers					
PZ-13	577623.94	12624190.94	8/17/2021	583.23	586.08	34.0	9.0	2.85	5.0	4.0-9.0	
PZ-14	577191.85	12624160.04	8/16/2021	583.46	586.39	35.0	9.0	2.93	5.0	3.0-8.0	
PZ-15	577062.51	12624730.23	8/25/2021	589.32	592.38	40.0	20.0	3.06	5.0	15.0-20.0	
PZ-21	577941.39	12625280.33	8/30/2021	N/A	583.32	30.0	9.0	N/A	5.0	4.0-9.0	Seal unable to be verified, no groundwater sampling
PZ-22	578056.88	12625387.96	8/31/2021	N/A	583.42	22.0	9.0	N/A	5.0	4.0-9.0	Seal unable to be verified, no groundwater sampling
PZ-23	577627.71	12625841.35	8/25/2021	584.39	587.21	25.0	9.0	2.82	5.0	4.0-9.0	
PZ-24	577884.7	12625979.33	8/24/2021	583.92	587.34	30.0	9.0	3.42	5.0	4.0-9.0	
PZ-25	577703.65	12626240.18	8/24/2021	583.46	586.37	30.0	8.0	2.91	5.0	3.0-8.0	
PZ-26	578114.39	12626145.22	8/23/2021	583.81	586.27	30.0	8.0	2.46	5.0	3.0-8.0	
PZ-29	578138.08	12625241.56	8/30/2021	N/A	583.49	35.0	9.0	N/A	5.0	4.0-9.0	Seal unable to be verified, no groundwater sampling
MW-35	579293.34	12627013.41	1/30/2023	590.42	589.72	18.0	12.30	-0.70	5.0	7.3-12.3	
MW-39	577488.79	12624528.83	1/31/2023	583.27	587.36	20.0	7.0	4.09	5.0	2.0-7.0	
MW-40	577313.68	12624636.21	1/31/2023	582.75	586.78	10.0	6.5	4.03	5.0	1.5-6.5	
				ı	S	taff Gauges				ı	
SG-01	578234.49	12624159.06	8/12/2019	NA	585.10 ¹	NA	NA	NA	NA	NA	
SG-02	578287.85	12624784.61	8/12/2019	NA	583.43 ¹	NA	NA	NA	NA	NA	
SG-03	578201.99	12624858.11	8/12/2019	NA	584.37 ¹	NA	NA	NA	NA	NA	
SG-04	577984.43	12624649.47	8/12/2019	NA	584.53 ¹	NA	NA	NA	NA	NA	
SG-04R	577966.13	12624647.67	6/9/2020	NA	585.04 ¹	NA	NA	NA	NA	NA	
SG-05	577717.81	12624888.51	8/12/2019	NA	584.83 ¹	NA	NA	NA	NA	NA	
SG-06	578227.56	12625365.56	8/12/2019	NA	584.88 ¹	NA	NA	NA	NA	NA	



Table 2.	Well Cons	truction Deta	ails								
Well I.D.	Northing	Easting	Date Installed	Ground Surface Elevation	Top of Casing (Staff Gauge) Elevation	Total Boring Depth (feet bgs)	Total Well Depth (feet bgs)	Stickup	Screen length (feet)	Screen Interval (feet bgs)	Comments
SG-07	577514.07	12625667.88	2/12/2024	NA	577.32 ¹	NA	NA	NA	NA	NA	
					s	tilling Wells					
STW-1	578433.87	12625522.16	4/17/2023	NA	583.03	NA	NA	NA	1	NA	
STW-2	577340.3	12625423.18	4/17/2023	NA	583.47	NA	NA	NA	5	NA	
STW-3	577771.11	12624083.74	4/17/2023	NA	591.17	NA	NA	NA	5	NA	

^{1.} Elevation referenced to 0 foot mark on gauge.



3.5 Well Survey

Survey information collected at each location includes elevations for top of PVC well casing (TOC), ground surface elevation, northing, and easting coordinates of the wells. Well survey information is contained in **Table 2**.

3.6 Groundwater Level and Aquifer (Slug) Testing

Slug tests were completed at 10 locations including MW-01R, MW-02, MW-04, MW-05, MW-07, MW-08, PZ-17, PZ-20, PZ-26, and PZ-31 by Golder in August 2021. The methodology and results from the tests are contained in the Field Summary Report (Golder, 2022). Additional monitoring well installation is anticipated for further Site investigation in 2024 and supplemental slug testing will be included in subsequent report updates.



4.0 References

ERM, 2017. Groundwater Monitoring System Certification for the Grand Haven Board of Light and Power, Environmental Resources Management Michigan, Inc. November 2017.

Golder Associates, Inc., 2022. Field Summary Report of Results from Approved Work Plan-Piezometer Installation and Additional Data Collection. February 15, 2022.HDR Inc, 2022. 2022 Harbor Island Work Plan for CCR Compliance. April 8, 2022. Amended June 23, 2022.

HDR, 2022., 2022 Harbor Island Work Plan for CCR Compliance. April 8, 2022. Revised June 23, 2022.

HDR, 2024., 4th Quarter 2023 Groundwater Monitoring Report. January 31, 2024.

Western Michigan University, Department of Geology. "Hydrogeologic Atlas of Michigan, Volume 1". The Department of Geology, Kalamazoo, Michigan. 1981.



Appendix A

Borehole Logs and Well Construction Diagrams



3352 128th Avenue Holland, MI 49424 P: 616-399-3500

PROJECT:
Grand Haven Board of Light and Power CCR Well Installation 1231 N 3rd Street Grand Haven, Michigan

BORING # MW-01

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR **EDAC ERM REPRESENTATIVE** Brian Beach Holland, MI OFFICE LOCATION Holland, MI DRILLING FOREMAN Sean Smith DATE: START 01/18/2017 **DRILLING METHOD** Hollow-Stem Augers DRILLING EQUIPMENT 01/18/2017 Gus Peck **FINISH** 10 ft

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet)

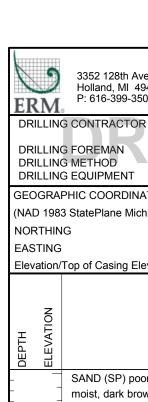
NORTHING 176201.037 **EASTING** 3847934.632

VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION 96.08 ft **BOREHOLE DEPTH**

BOREHOLE DIAMETER

DEPTH TO WATER (INITIAL)▼ 5 ft DEPTH TO WATER (FINAL) ∑

					ပြ	Ш		SAMPLING DATA
DEPTH	ELEVATION	STRATA DESCRIPTION	DEPTH	nscs	GRAPHIC LOG	SAMPLE TYPE	RECOVERY	Observations / Remark
		SAND (SP) poorly graded, fine grained SAND; loose, little gravel, moist, dark brown to	_					-
	=	black	-	SP				
	_							
	95—	SAND (GW-SW) well graded, fine grained SAND; loose, some gravel, moist, brown to	- '	0)4/				-
	_	grayish brown	-	GW- SW				
. 2	-		2 -					_
_		SAND (SP) fine grained SAND; loose, moist, black, [Bottom ash.]						-
	-		-	SP				
		SILTY SAND (SP) poorly graded, fine grained SAND; loose, little clay, moist to wet, dark	·					-
	_	brown to black, [Concrete, metal and wood fragments. Wet @ 5']	_					
. 4	-		_					<u></u>
7			-					-
	_		_					
	-		▼					
			F					
	_		-					
. 6	-		_	SP				<u> </u>
0	90-		_	SF.				
			-					
	-		-					-
			_					
. 8	-		-					-
. 0	-		F					
	4		-					
	_		9 -					
		SILT (OL) soft, little clay, trace fine sand, wet to moist, dark grayish brown	-					
	_		F	OL				
	-		-					-
	/ARK		LAB ANALY	'SIS:				
Elev	ation	data established from referenced benchmark set at 100.00'.						



WELL CONSTRUCTION GHBLP 0387368 CCR WELLS.GPJ ERM DATA TEMPLATE.GDT 11/1/17

3352 128th Avenue Holland, MI 49424 P: 616-399-3500

PROJECT:
Grand Haven Board of Light and Power
CCR Well Installation
1231 N 3rd Street
Crond Haven Michigan Grand Haven, Michigan

BORING # MW-01

ERM PROJECT # 0387368 SHEET 1 OF 1

EDAC Holland, MI DRILLING FOREMAN Sean Smith DRILLING METHOD Hollow-Stem Augers **ERM REPRESENTATIVE** OFFICE LOCATION DATE: START

Brian Beach Holland, MI 01/18/2017

DF	RILLIN	NG EQUIPMENT Gus Peck	0.0			FINIS	Н		01/18/2017	
GE	OGR	APHIC COORDINATES		WELL CC	NSTR	UCTIC)N			WELL
(NA	D 19	83 StatePlane Michigan South (US Feet))	Riser		ı	Screen	l	DEV	ELOPMENT
NO	RTHI	ING 176201.037	Material: Diameter (ID):	Schedule 40 2-inch		Schedu	ule 40 PVC 2-inch	, 0.010-slot		erpumping hours
EAS	STIN	G 3847934.632	Coupling:	Threade			Threade		Gals. Purged:30	nours
Ele	vatior	n/Top of Casing Ele % 6.08 ft/ 99.35 ft	Well Permit #	t: No permit	require	ed.			L	
				•						
		STRATA DESCR	RIPTION					ဗ္ဗ	WELL CON	NSTRUCTION
	S) C		
ΙŢ	ELEVATION					I		GRAPHIC LOG		
DEPTH	Ä,					DEPTH	nscs	\ \}	Casing Type 6-inch Diame	e: ter
ق	<u> </u>					<u> </u>	<u> </u>	ō	Steel Sticku	p 1
Ł		SAND (SP) poorly graded, fine graine	d SAND; loose	, little gravel	, _					
F		moist, dark brown to black			F		SP			
						1 -		0 0 0 0 0 0		
-	95-	SAND (GW-SW) well graded, line gra	ined SAND; loo	ose, some	-					
F		gravel, moist, brown to grayish brown			F		GW-SW			Schedule 40 PVC
L	2	_				2 -		: \$		Riser
-		SAND (SP) fine grained SAND; loose	, moist, black, [Bottom ash.	.] –	-				
L					ļ.		SP			
-		-			-	2				
F	-	SILTY SAND (SP) poorly graded, fine	grained SAND	; loose, little	: -	3 -				
L		clay, moist to wet, dark brown to black	k, [Concrete, m	etal and woo	od 📙					
F		_ fragments. Wet @ 5']			F					
	4 _	-								
F					-					
F					F					
<u>.</u> -	-	_			Ŧ					
-		-			-					
					F					
	6 90-	4			\vdash		SP			•
5		-			F					■ 0.010-slot Schedule
_										40 PVC Screen
-	_				F					:
5		-			_					
<u> </u>		-			-					
5 —	8 _	_			<u> </u>					:
					Ŀ					
}		-			-					
3						9 -				:
-		SILT (OL) soft, little clay, trace fine sa	nd, wet to mois	st, dark	-					
Ē		grayish brown			F		OL			
_		<u>-</u>			-					
'	EMAR				WELL	INSTA	ALLATION	NOTES:		
Ele	evatio	on data established from referenced bench	nmark set at 10	00.00'.						

RECORD OF WELL DECOMMISSIONING: MW-01

CLIENT: Grand Haven BLP

May 01, 2020

DATE:

ELEVATION: 584.3 ft (Ground)

Sheet 1 of 1

PROJECT: GHBLP - JB Sims Generating Station
PROJECT NO: 20141048

COORDINATES: N: 176201.0 ft E: 3847934.6 ft

COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: EDAC HORZ DATUM: NAD83 VERT DATUM: NAVD88

OCA	101	N. Grand Haven, Mil		CON	TRACT	OIX	. LDA								110	VZ DATON	I. INADOS	VL	ERI DATUM	NAVDOO
	8	MATERIAL PROFILE					SAMP			۷	WATER COM PERCEM	NTENT NT		SH	EAR NGTH	ا ق ا	NS S	# S		RUCTION AND ATION DETAILS
DEPTH (ft)	DRILL METHOD		SS	ATA OT	ELEV.	A	Hamm STM D1586, B 140-lb hamme		6 in rop		Plastic & Liqu	d Limits	×		/ane Vane et Pen	ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	INOTALL	ATION DETAILO
	DRILL	DESCRIPTION	NSCS	STRATA	DEPTH (ft)	NUMBER	TYPE REC%	BLOWS	N-VALUE	NF	Water Conten P Nonplasti		0	Q U		ADD LAB	ADD	GROU		
		SAND, poorly graded, fine grained, loose, little gravel, moist, dark brown to black.			0.0						δ 4 φ	φ .		2 4	9 9	Ę				
			SP																	
					583.3															
1		SAND, well graded, fine grained, loose, some gravel, moist, brown to grayish brown.			1.0															
			l ≳																	
2		SAND, poorly graded, fine grained, loose,		<u>^</u> _	582.3															
		moist, black (bottom ash).			2.0															
			SP																	
3		Silty SAND, poorly graded, fine grained, loose, little clay, moist to wet, dark brown to			581.3 3.0															
		black (concrete, metal, and wood fragments). Wet at 5 feet.																		
4 .2	nder																			
GP-1100 ATV Ria	Hollow Stem Auger																			
5 GP-1	Hollov																	\Box		0 0 - 10 0 ft bas:
																			H	0.0 - 10.0 ft bgs: Hydrated Bentonite Chips
6			SC-SM																	
			0)																	
7																				
8																				
9		SILT, soft, little clay, trace fine sand, wet to			575.3															
		moist, dark grayish brown.			9.0															
			ML																	
10	+	End of hole at 10.0 ft.			574.3					\perp								_		
EPTI	l S	CALE: 1:53						-	•	_			-							REV:



LOGGED: Adam Near, CPG CHECKED: Dawn Prell, CPG DATE: May 01, 2020 DATE: Jun 11, 2020 RECORD OF BOREHOLE / WELL: MW-01R

CLIENT: Grand Haven BLP DATE: May 01, 2020 ELEVATION: 585.7 ft (Ground)

PROJECT: GHBLP - JB Sims Generating Station COORDINATES: N: 578101.3 ft E: 12624432.0 ft

PROJECT NO: 20141048 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: EDAC HORZ DATUM: NAD83 VERT DATUM: NAVD88

LOCA	110		Grand Haven, IVII		CON	TRACT	OIX.	. LD	AC							HOIX	Z DATOW.	INADOS	VI	ERI DATUM:	NAVDOO
	Ţ	3	MATERIAL PROFILE						//PLE			WATER CONTENT PERCENT	(HEAI ENG		P G F	JAL SNC	R S		RUCTION AND
DEPTH (ft)		<u> </u>		တ္သ	ĕ ⊢	ELEV.		Ha STM D158 140-lb han		per 6 in in drop		⊢ Plastic & Liquid Limits (%)	× •	Ren	Vane n Vane	•	TION	TIONA SVATIC	NDWAT		
		DRILL MEI HOD	DESCRIPTION	nscs	STRATA	DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	O Water Content (%) NP Nonplastic	0	Q U	Ket Pe		ADDITIONAL LAB TESTING	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	Pip	e Stickup: 2.7 ft
+	+	Fine S	AND, loose, dark brown to black, little			0.0	z		- '	ш :	Ż	8 8 8 8	9	50	9	8 6				0.7	e Stickup: 2.7 ft e Elev: 588.4 ft
		Gravel	, moist.																	0. C	0 - 0.5 ft bgs: oncrete
				SP																	
- 1		Fine to	coarse SAND, loose, brown to gray,		<u> </u>	584.7															
			Gravel, moist.		<u></u>	1.0															
				SW																0. H	5 - 2.5 ft bgs: ydrated Bentonite
					Δ Δ Δ	583.7		nife	0											C	nips
- 2		Fine S moist.	AND, loose, black (bottom ash),			2.0		Air Knife	100											R	chedule 40 PVC iser (2-inch ameter)
				S																	,
- 3		Silty fir	ne SAND, loose, dark brown to black, Clay, wood fragments, wet.	t		582.7 3.0													\square		
		Johno	olay, wood hagmonto, wet.																		
- 4																					
	2	ia di																			
- 5		Tem Au					-	SS	86	13-10-16	23										
- 5 Sig /F/ 0012		Hollow Stem Auger								5											
				SP-SM																	5 - 10.0 ft bgs: Iter Sand
				R																	ior cana
- 6																					
																					010-inch slot
																				P'	VC screen
- 7							2	SS	25	5-3-3	∞										
- 8										_											
			pose, dark brown to black, trace			577.5 8.2															
		Sand,	wet.																		
0							_	SS	٠	5-2											
- 9				M				S	9	5-2-2	7										
10	\dagger		End of hole at 10.0 ft.			575.7														DAVE W	lee:
EPT	H S	CALE: 1	:53																		REV:



LOGGED: Adam Near, CPG CHECKED: Dawn Prell, CPG DATE: May 01, 2020 DATE: Jun 11, 2020

Sheet 1 of 1



BORING LOG

PROJECT:
Grand Haven Board of Light and Power CCR Well Installation 1231 N 3rd Street Grand Haven, Michigan

BORING # MW-02

ERM PROJECT # 0387368

SHEET 1 OF 1

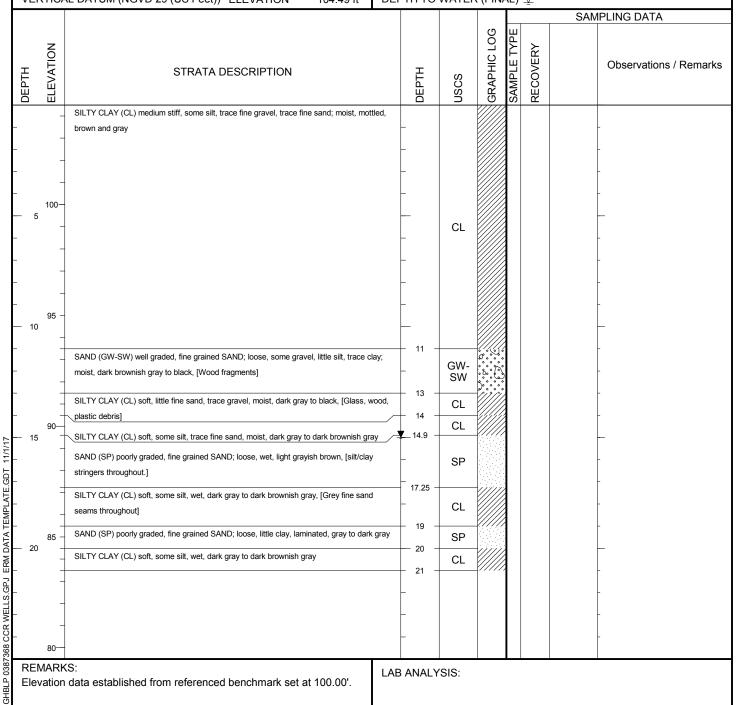
DRILLING CONTRACTOR EDAC **ERM REPRESENTATIVE** Brian Beach Holland, MI OFFICE LOCATION Holland, MI DRILLING FOREMAN Sean Smith DATE: START 01/18/2017 Hollow-Stem Augers **DRILLING METHOD** DRILLING EQUIPMENT Gus Peck **FINISH** 01/18/2017 HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet) **BOREHOLE DEPTH**

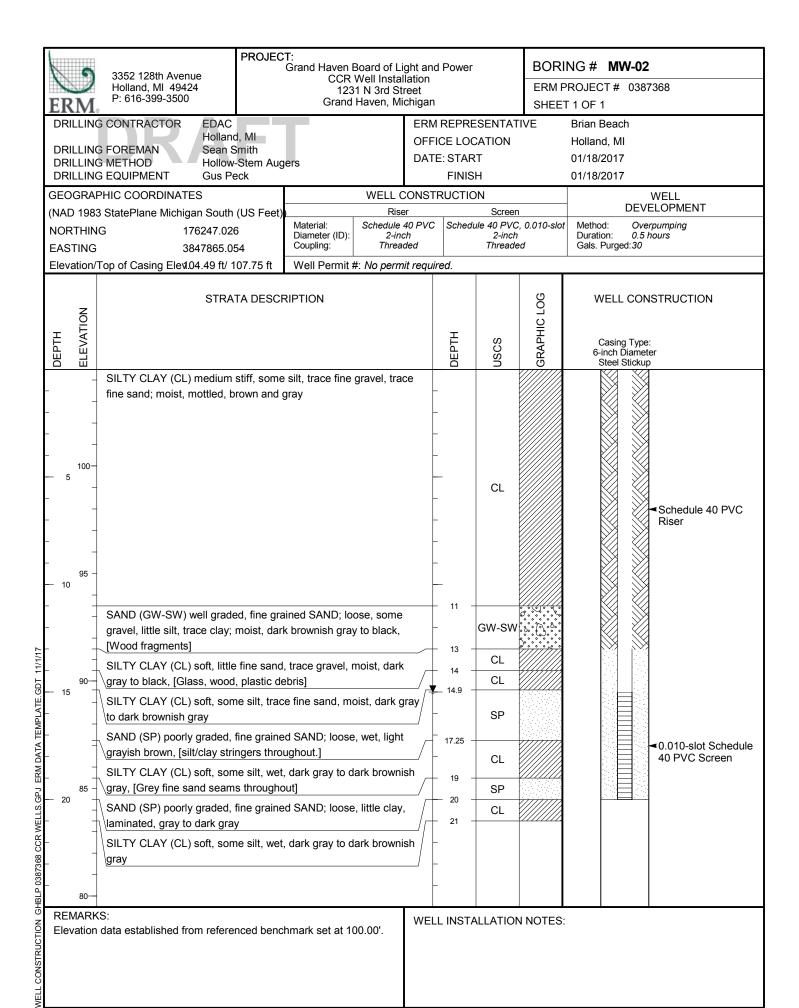
NORTHING 176247.026 **EASTING** 3847865.054

VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION 104.49 ft

BOREHOLE DIAMETER

DEPTH TO WATER (INITIAL)▼ 15 ft







3352 128th Avenue Holland, MI 49424 P: 616-399-3500

PROJECT:
Grand Haven Board of Light and Power CCR Well Installation 1231 N 3rd Street Grand Haven, Michigan

BORING # MW-03

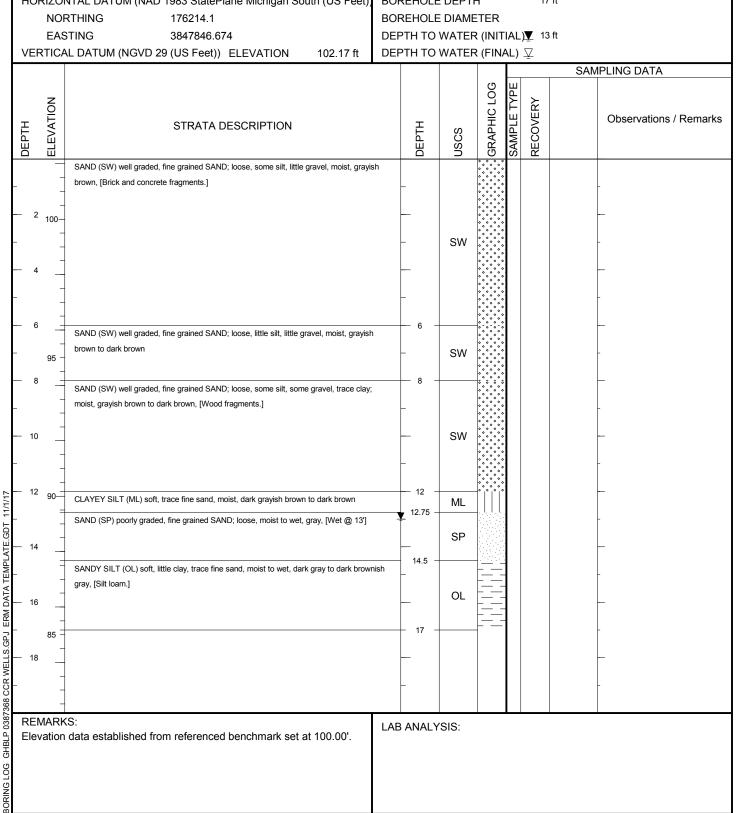
ERM PROJECT # 0387368

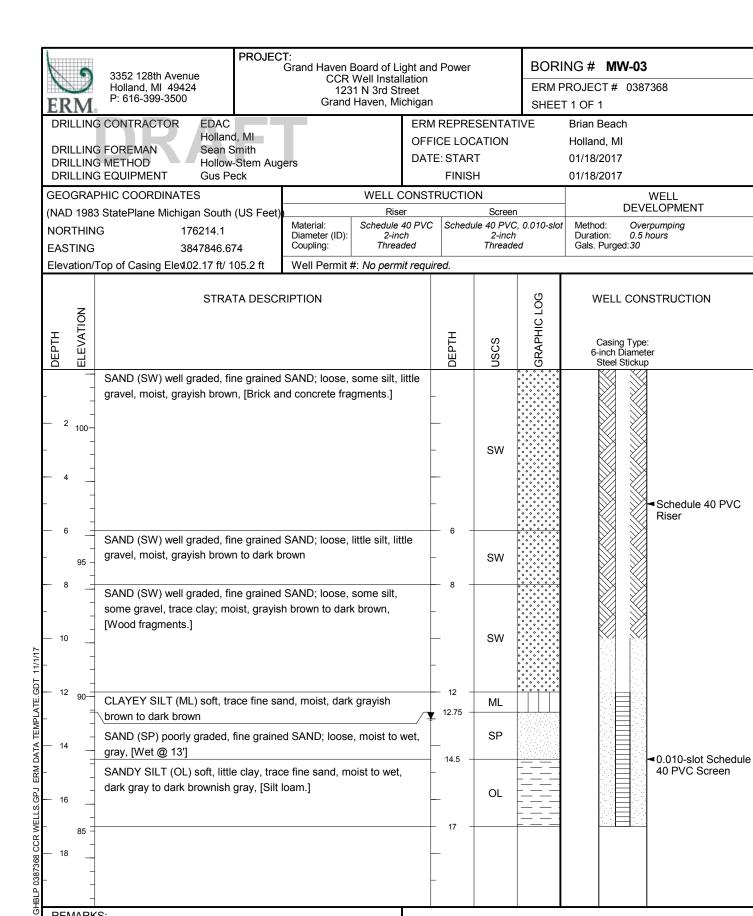
SHEET 1 OF 1

DRILLING CONTRACTOR EDAC **ERM REPRESENTATIVE** Brian Beach Holland, MI OFFICE LOCATION Holland, MI DRILLING FOREMAN Sean Smith DATE: START 01/18/2017 Hollow-Stem Augers DRILLING METHOD DRILLING EQUIPMENT Gus Peck **FINISH** 01/18/2017

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet)

BOREHOLE DEPTH





Elevation data established from referenced benchmark set at 100.00'.

WELL INSTALLATION NOTES:



BORING LOG

3352 128th Avenue Holland, MI 49424 P: 616-399-3500

PROJECT:
Grand Haven Board of Light and Power 1231 N 3rd Street Grand Haven, Michigan

BORING # MW-04

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR EDAC **ERM REPRESENTATIVE** Brian Beach Holland, MI OFFICE LOCATION Holland, MI DRILLING FOREMAN Sean Smith DATE: START 01/18/2017 Hollow-Stem Augers **DRILLING METHOD** DRILLING EQUIPMENT Gus Peck **FINISH** 01/18/2017

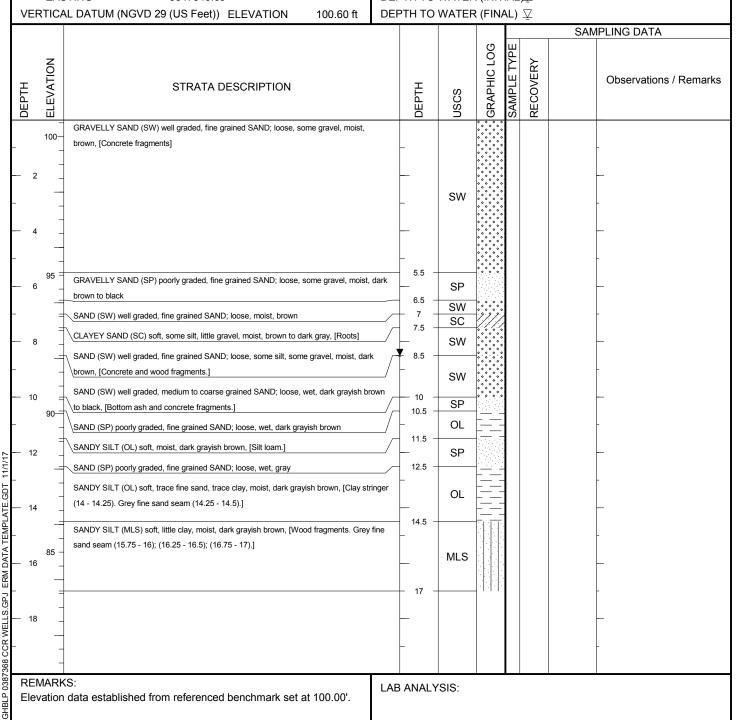
HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet)

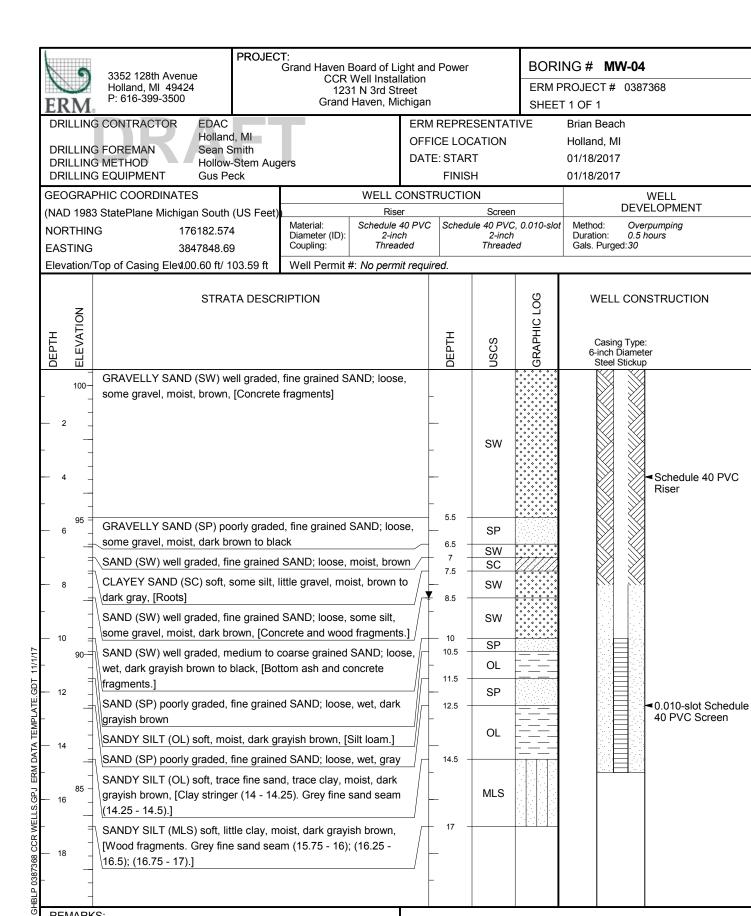
NORTHING 176182.574 **EASTING** 3847848.69

BOREHOLE DEPTH

BOREHOLE DIAMETER

DEPTH TO WATER (INITIAL)▼ 8.5 ft





REMARKS:

Elevation data established from referenced benchmark set at 100.00'.

WELL INSTALLATION NOTES:

PRO LOC CLIE	JEC ATION	CT: GHBLP 2018 Wells CT NUMBER: 1775416B ON: Grand Haven, Michigan Grand Haven Board of Light and Power CT: GHBLP 2018 Wells CRILLING I DRILLING I DRILL RIG:	METHO DATE:	D: Holl 5/22/18	ow-Stem		er	/V-U5 DATUM: Grou AZIMUTH: n/: COORDS: n/:	а	SHEET 1 of 1 rface GS ELEVATION:
DEPTH (ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	nscs	GRAPHIC LOG	ELEV.	NUMBER	TYPE	SAMPLES BLOWS per 6 in	/ ATT	NOTES WATER LEVELS WELL INSTALLATION
0 -	BORIN	VEGETATION: 0.0 - 8.5	sn	A GRA	DEPTH (ft)	NON	TY	140 lb hammer 30 inch drop	REC / ,	GRAPHIC Cement pad →
	Hand auger	ASH, fine-grained, many small brick fragments, black; wet at 4 ft. More coarse at bottom, some glass and wood fragments		A A A A A A			AG		24.0	Bentonite chips →
5			ASH	00000		1	SS	16-13-9-9	18.0 24.0	2" PVC screen (0.010 slot)
10	Hollow-stem auger	8.5 - 10.0 (SC-CL) clayey SAND, fine-medium sand; dark grey, moist, semi-cohesive	sc		8.5	2	ss	1-1-1-2	<u>24.0</u> 24.0	
10	Ι.	10.0 - 12.0 Sandy PEAT, some fibrous material, shell fragments; organic odor, dark grey Boring completed at 12.0 ft.	OL	1,1,1,1	10.0	3	SS	H-1-1-1	<u>24.0</u> 24.0	Natural collapse -
15										
20										
25										
30										
35										
10		GOLDER DEPTH SCALE:1 in to 5 ft DRILLING CONTRACTOR: EI DRILLER: SS	DAC					LOGGED: A CHECKED: © DATE: 07/06	UR_	

PRO	OJE	CT: GHBLP 2018 Wells RECORD (OF V	/ELI	L LO	G	M۷	N-06		SHEET 1 of 1
PR(OJE CAT		METHO DATE:	D: Holl 5/22/18	ow-Stem		jer	DATUM: Grou AZIMUTH: n/a COORDS: n/a	а	irface GS ELEVATION: TOC ELEVATION: INCLINATION: -90
CLI		SOIL PROFILE	01-11	OUAIN				SAMPLES	a	INGELIVATION30
DEPTH (ft)	BORING METHOD	DESCRIPTION VEGETATION:	nscs	GRAPHIC LOG	ELEV. DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	REC / ATT	NOTES WATER LEVELS WELL INSTALLATION GRAPHIC
-0 -	<u></u>	0.0 - 7.5 Clayey SAND, medium sand, some 1" clay nodules (brown with reddish mottling), trace small brick fragments; dark brown					AG		24.0	Cement pad →
- - - - 5	Hand auger		sc							Bentonite chips →
-						1	SS	9-19-24-24	24.0 24.0	- 20 (20)
-	<u></u>	7.5 - 9.0 Refuse, plastic mesh, brick fragments; wet 9.0 - 10.0	Refuse		7.5 9.0	2	SS	5-2-5-5	<u>24.0</u> 24.0	Filter sand → -
- 10 -	Hollow-stem auger	SAND, some black organic fines, rounded; wet 10.0 - 15.0 Refuse, black, sandy (medium with some angular coarse sand), fiberglass in top and bottom of spoon; wet; steel fragment at 14.5 ft	- Or		10.0	3	SS	2-2-8-8	24.0	2" PVC screen (0.010 slot)
-	Hollov		Refuse						0.0	
- 15		15.0 - 17.0 PEAT, black, leaf intact, fibrous wood; wet			15.0	4	SS	6-8-3-3	6.0 24.0	Natural collapse →
		Boring completed at 17.0 ft.	OL	1		5	SS	2-2-2-3	24.0 24.0	
ANC_WELLLOG GHBLP 2018.GFU ANC.GDT 7/10/18										
40		DEPTH SCALE:1 in to 5 ft						LOGGED: A	JS	
ANC WI	>	GOLDER DRILLING CONTRACTOR: EL DRILLER: SS	DAC					DATE: 07/06		

		CT: GHBLP 2018 Wells RECORD C	OF V	VELI	L LO	G	M۷	N-07		SHEET 1 of 1
		CT NUMBER: 1775416B DRILLING NION: Grand Haven, Michigan DRILLING I	METHO	D: Holl	ow-Stem	Aug	ger	DATUM: Grou AZIMUTH: n/a	und Su a	rface GS ELEVATION: TOC ELEVATION:
	ENT	: Grand Haven Board of Light and Power DRILL RIG:	GP-11	100 AT\	/			COORDS: n/a		INCLINATION: -90
	BORING METHOD	SOIL PROFILE						SAMPLES		NOTES
DEPTH (ft)	MET	DESCRIPTION	S	9 €	ELEV.	<u>۳</u>	ш	BLOWS	F	NOTES WATER LEVELS
	SING	IJRAFI	nscs	GRAPHIC LOG	DEPTH	NUMBER	TYPE	per 6 in	REC / ATT	WELL INSTALLATION GRAPHIC
	BÖ	VEGETATION:		9	(ft)	Z		140 lb hammer 30 inch drop	2	
0 -		0.0 - 7.5 Sandy CLAY, some gravel; brown, stiff, w <pl< td=""><td></td><td>///</td><td></td><td></td><td></td><td></td><td></td><td>Cement pad →</td></pl<>		///						Cement pad →
 	 -						AG		24.0	-
-	Hand auger									-
-	and									-
-			CL							Bentonite chips →
- 5										5.1 ft ——
-						1	SS	4-5-7-9	<u>12.0</u> 24.0	5/22/18 1527 -
-									24.0	_
L		7.5 - 11.5	 	KMA	7.5					_
	_	Sandy PEAT, some shell fragments; black, moist, cohesiv, firm, cannot roll thread		I,III,		2	ss	0-1-3-5	24.0 24.0	
100	ange		OL	H Y			33	0-1-5-5	24.0	
- 10	stem			\\\/					24.0	Filter sand →
	Hollow-stem auger	11.5 - 15.0			11.5	3	SS	1-3-5-8	<u>24.0</u> 24.0	
	Ĭ	Silty SAND, some shell fragments, medium sand; black-brown; wet			1 1.5					
-			SM							2" PVC screen (0.010 slot)
-						4	SS	6-9-11-16	24.0 24.0	
- 15					15.0					
-	Н	Boring completed at 16.0 ft.								
-										-
-										<u>-</u>
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GHBLP 2018.GFJ										-
<u> </u>										-
										_
AINC_WELLUG		DEPTH SCALE:1 in to 5 ft	1				1	LOGGED: A	JS	
		GOLDER DRILLING CONTRACTOR: EL	DAC					CHECKED:		
ב'ן בא		DRILLER: SS						DATE: 07/06	5/2018	

PR	OJE	CT: GHBLP 2018 Wells RECORD	OF V	VEL	L LO	G	M۱	N-08		SHEET 1 of 1
PR	OJE	CT NUMBER: 1775416B DRILLING ION: Grand Haven, Michigan DRILLING	METHO	D: Holl	low-Stem	n Aug	ger	DATUM: Grod AZIMUTH: n/s	und Su	urface GS ELEVATION: TOC ELEVATION:
	ΙĘΝΤ	: Grand Haven Board of Light and Power DRILL RIG						COORDS: n/a		INCLINATION: -90
	BORING METHOD	SOIL PROFILE						SAMPLES		
DEPTH	MET	DESCRIPTION	(0	₽	ELEV.	 #		BLOWS	þ	NOTES WATER LEVELS
	SING	IJKALI	nscs	GRAPHIC LOG	DEPTH	NUMBER	TYPE	per 6 in	REC / ATT	WELL INSTALLATION GRAPHIC
	BÖ	VEGETATION:		9	(ft)	Z		140 lb hammer 30 inch drop	22	
0		0.0 - 3.5 Medium SAND, fill; wet, light brown								Cement pad →
-	₁₀	moduli o ito, iii, iio, igit o oiii	SP				AG		24.0	- Pontonito chino
-	ang		35		:					Bentonite chips →
-	Hand auger									Filter sand →
-		3.5 - 8.5 Refuse, plastic bags			3.5					4.16 ft ▼ -
- 5										5/23/18 0727
-			Refuse			1	SS	7-2-7-4	<u>0.0</u> 24.0	
_									24.0	2" PVC screen (0.010 slot)
	rger	8.5 - 15.0		****	8.5	2	ss	2-2-2-5	12.0 24.0	
40	em at	Clayey SAND, medium sand, some shell fragments; brown, some pockets of cohesion; wet			1	Ľ	33	2-2-2-3	24.0	
- 10	Hollow-stem auger				1				3.0	
	위		sc		1	3	SS	0-1-3-5	3.0 24.0	
					1					Natural collapse → -
-]					
-					1	4	ss	2-1-2-5	6.0 24.0	
- 15		Boring completed at 15.0 ft.		7//	4					
-		- '								-
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-										_
-										_
- 20										_
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	-	DEPTH SCALE:1 in to 5 ft						LOGGED: A		
NAC_WELLLOG	>	GOLDER DRILLING CONTRACTOR: E	DAC					CHECKED:		
		DRILLER: SS						DATE: 07/0	5/2018	5

DELLING DATE Haven Michigan COCKING Stand Haven Read of Light and Power Solit PROFILE SOLIT P	PRC	JEC	CT: GHBLP Monitoring Wells CT NUMBER: 18113500	RECORD								SHEET 1 of 1
COLINE Gend Heven Board of Light and Power DRILL RIG. Geographe 728801 COUNTS N. 578 213 S 12 224, 18562 NCLINATION - 90	LOC	ATI	ON: Grand Haven, Michigan	DRILLING DATE	E: 8/12/2	2019	sh D. A	atui Zimu	M: Lo ITH:	ocal n/a		GS ELEVATION: 586 TOC ELEVATION: 58
Dent to coarse sand some gravel, well at 5 Sown fine account some sand, well Dent town sand, sand, some sand, well Dent town sand, san	CLIE	NT:	Grand Haven Board of Light	and Power DRILL RIG: Ge	oprobe 7	288DT	С	OOR	DS:		E: 12	2,624,185.62 INCLINATION: -90
Dent to coarse sand some gravel, well at 5 Sown fine account some sand, well Dent town sand, sand, some sand, well Dent town sand, san	_	JHO!		SOIL PROFILE						SAMPLES		NOTES
Dent to coarse sand some gravel, well at 5 Sown fine account some sand, well Dent town sand, sand, some sand, well Dent town sand, san	#E #E	3 ME	DESCRIF	TION	တ္သ	⊋ ₀	ELEV.	H.	Щ		ATT	WATER LEVELS
Dent to coarse sand some gravel, well at 5 Sown fine account some sand, well Dent town sand, sand, some sand, well Dent town sand, san	ă	RINC	VECETATIONS		OSO	LO	DEPTH] W	¥		EC/	GRAPHIC
Book liceous for organics, dry	-0 -	ВО					(ft)	_		30 inch drop	~	
38.7.2 Brown fine to coarse sand some gravet, wet at 5' SW T7.2.8.6 Dark trown sand, set 107 110 107 117 Fine gray sand, wet Soring completed at 12.0 ft. Soring completed at 12.0 ft. Dark trown salt, some sand, set 107 107 107 107 107 107 107 107 107 10		ger	Brown topsoil w/ organics, dry		Topsoi	J	0.3					
38.7.2 Brown fine to coarse sand some gravet, wet at 5' SW T7.2.8.6 Dark trown sand, set 107 110 107 117 Fine gray sand, wet Soring completed at 12.0 ft. Soring completed at 12.0 ft. Dark trown salt, some sand, set 107 107 107 107 107 107 107 107 107 10		nd Au							AG		3.0	
3.3.7.2 The first sand some gravel, wet at 5 SW The first sand some gravel, wet at 5 SW The first sand some sand some gravel, wet at 5 SW The first sand some sand, wet SW The first sand some sand, wet SW The sand some sand some gravel, wet some sand, wet SW The sand some sand, wet SW The sand some sand some sand some gravel, wet some sand, wet SW The sand some sand some sand, wet SW The sand some sand some sand, wet SW The sand some sand some sand some gravel, wet some sand, wet SW The sand some		Har			SP							Bentonite →
Solve							583.0				16	
10				avel, wet at 5'			3.8		MC		2.0	
T2-86 Dark Strom sand, wet	- 5		•		SW							
Dark brown sit, some sand, wet		ore)										Filter sand →
Dark brown sit, some sand, wet		cro o	72 86					-	MC		4.5	
Dark brown sit, some sand, wet		ma_		wet	ML				IVIC		5.0	
10		DPT				1111						
10.7 - 11.7 - 12.0 Try - 12.0 Try - 12.0 Dirk bown all, some sand, wet Boring completed at 12.0 ft. DEPTH SCALE: 1 in to 5 ft DPHL SCALE: 1 i	- 10		Dark brown slit, some sand, wet		ML							2" PVC slotted screen
17.7-12.0 Dark brown sill, some sand, wet Boring completed at 12.0 ft. 20 25 30 GOLDER DEPTH SCALE: 1 in to 5 ft. DRILLING CONTRACTOR: GeoServe CHECKED: GEP					65			1	MC		2.0	
Boring completed at 12.0 ft. 20 25 30 30 GOLDER DEPTH SCALE: 1 in to 5 ft. DRILLING CONTRACTOR: GeoServe CHECKED: GEP			Fine gray sand, wet					_			2.0	
20 25 30 35 GOLDER DEPTH SCALE: 1 in to 5 ft GeoServe CHECKED: CEP			Dark brown silt, some sand, wet	ted at 12.0 ft		1						
20 25 30 36 37 38 39 BEPTH SCALE:1 in to 5 ft PRILLING CONTRACTOR: GeoServe CHECKED: CEP			Boning compic	icu at 12.0 it.								
20 25 30 36 37 38 39 BEPTH SCALE:1 in to 5 ft PRILLING CONTRACTOR: GeoServe CHECKED: CEP												
25 30 36 40 DEPTH SCALE:1 in to 5 ft. DRILLING CONTRACTOR: GeoServe LOGGED: ACN CHECKED: CEP	15											
25 30 36 40 DEPTH SCALE:1 in to 5 ft. DRILLING CONTRACTOR: GeoServe LOGGED: ACN CHECKED: CEP												
25 30 36 40 DEPTH SCALE:1 in to 5 ft. DRILLING CONTRACTOR: GeoServe LOGGED: ACN CHECKED: CEP												
25 30 36 40 DEPTH SCALE:1 in to 5 ft. DRILLING CONTRACTOR: GeoServe LOGGED: ACN CHECKED: CEP												
25 30 36 40 DEPTH SCALE:1 in to 5 ft. DRILLING CONTRACTOR: GeoServe LOGGED: ACN CHECKED: CEP												
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DEPTH SCALE:1 in to 5 ft LOGGED: ACN DRILLING CONTRACTOR: GeoServe CHECKED: CEP												
GOLDER DRILLING CONTRACTOR: GeoServe CHECKED: CEP	40											
DRILLER: GeoServe CHECKED: CEP			COLDED		00							
			GOLDER	DRILLING CONTRACTOR: (DRILLER: GeoServe	GeoServ	е						

PRO	OJEC	CT: GHBLP Monitoring Wells CT NUMBER: 18113500	RECORD (SHEET 1 of 1
LOC	CATIO	ON: Grand Haven, Michigan	DRILLING METHO DRILLING DATE: and Power DRILL RIG: Geop	8/12/2	019	AZ	ZIMU	/I: Lo	ocal n/a N: 578,367.40	E: 1'	GS ELEVATION: 583.71 TOC ELEVATION: 586.73 2,624,470.20 INCLINATION: -90
CLI		Grand Haven Board of Light	SOIL PROFILE	nobe 7.	200D1	C	JURI	<u> </u>	SAMPLES	E. 14	2,624,470.20 INCLINATION90
DEPTH (ft)	BORING METHOD	DESCRIF	PTION	nscs	GRAPHIC LOG	ELEV. DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in lb hammer 30 inch drop	REC / ATT	NOTES WATER LEVELS WELL INSTALLATION GRAPHIC
	ıger	0.0 - 0.3 Brown topsoil w/ organics, dry		Topsoil	11111	0.3					
-	Hand Auger	0.3 - 4.7 Brown fine sand, trace gravel, wet a	at 2.8'	SP				AG		3.0	Bentonite →
- 5	re)	4.7 - 5.1		ML	JJ	579.0 5.1		МС		<u>0.5</u> 2.0	Filter sand →
-	DPT (macro core)	Brown sandy silt, trace gravel, wet 5.1 - 10.0 Brown fine to coarse sand w/ grave	il, wet	sw	。 。) 。	5.1		МС		1.0 5.0	2" PVC slotted screen
- - - 10	jū				。 ((573.7				3.0	
-		Boring comple	eted at 10.0 ft.								
-											
— 15 –											
-											
- - 20											
-											
- 25											
-											
GHBLP 2019.GPJ GLDR, ANC.GDT 10/29/19											
35 — 35											
- Z019.GF											
		GOLDER	DEPTH SCALE:1 in to 5 ft DRILLING CONTRACTOR: Ge DRILLER: GeoServe	eoServ	e		<u> </u>		LOGGED: A CHECKED: (DATE: 10/24	CEP	

DATE: August 19, 2021 ELEVATION:

592.5 ft (Ground) COORDINATES: N: 578236.9 ft E: 12624377.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

GPS SURVEYOR:

	- 1	SURVE	IOI		PS ———	1			- 1	Т		00007711071511	AND INIOTALL STICE
	НОР	MATERIAL PROFILE	T	1		-	SAMP	PLES		IONS	ONS		AND INSTALLATION TAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	P	ipe Stickup: 2.81 ft ipe Elev: 595.3 ft
1 2 3 4		Brown silty CLAY, dry, firm, brittle.	CL		0.0		SS	100					0.0 - 8.0 ft bgs: Bentonite Chips
5 6 7 8	,	Brown fine SAND, dry, loose. Dark gray SAND, dry to moist, loose. Brown and gray mottled CLAY, moist, soft to firm.	CL		587.3 5.2 587.0 5.5 584.5 8.0		SS	92					2" Schedule 40 PVC
Geoprobe 7822DT	Direct Push - 4-in Hole Dia.	Brown fine SAND, dry, loose, trace gravel. Brown and gray sandy mottled CLAY, moist, soft to firm. Gray and black SAND, moist, loose, trace silt, trace gravel, glass fragments, wood present.	SP CL SP		582.4 10.1 581.3 11.2 580.3 12.2		SS	80					8.0 - 15.0 ft bgs: Filt Sand 2" Schedule 40 slotte PVC
	ļ	Black peaty SILT, soft, moist, wood present, plastic present, glass present. Black and gray fine SAND, wet, loose.	SP OL		575.7 16.8 573.5 19.0 572.5	-	SS	48					
		Black peaty SILT, moist, soft, wood and glass present, shell fragments. Gray sand seams present from 25' to 30' BGS.	O.		20.0		SS	64					
5		Continued on Next Page				Ш							REV:

HAMMER TYPE: Automatic

CLIENT:

GHBLP

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 19, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

DATE: August 19, 2021 ELEVATION: 592.5 ft (Ground)

CLIENT: COORDINATES: N: 578236.9 ft E: 12624377.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

GPS SURVEYOR:

GHBLP

	Т	SURVEY	UK	. 6	PS	T	044	V F C				CONSTRUCTION AND INSTALL ATION
[] []		MATERIAL PROFILE				+	SAMP	LES		TAL	ATER	CONSTRUCTION AND INSTALLATION DETAILS
DRILL RIG		DESCRIPTION	SOSA	STRATA PLOT	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL	GROUNDWATER OBSERVATIONS	Pipe Stickup: 2.81 ft Pipe Elev: 595.3 ft
27 28 29		Black peaty SILT, moist, soft, wood and glass present, shell fragments. Gray sand seams present from 25' to 30' BGS.	OL		9 9 9 9 9		SS	100				15.0 - 40.0 ft bgs: Material Collapse
Geoprobe 7822DT Direct Push - 4-in Hole Dia		Gray fine SAND, wet, loose, shell fragments. Black peaty SILT, moist, soft, wood present.	OL SP		561.5 31.0 558.7 33.8 558.1		SS	09				
35 36 37		Gray fine SAND, wet, loose, medium to coarse grained from 36' to E.O.B.			34.4	-						
39			SP		552.5		SS	100				
10		End of hole at 40.0 ft.			332.3							
1 2		Target Depth Reached Refer to diagram for well construction details.										
4												
5												
6												
7												
8												
9												
60												
								Ш				REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 19, 2021 DATE: Nov 03, 2021

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Sheet 2 of 2

CLIENT: GHBLP DATE: August 17, 2021

ELEVATION: 584.9 ft (Ground)

COORDINATES: N: 577987.6 ft E: 12624312.3 ft PROJECT: J.B. Sims Well Installations PROJECT NO: 21464427

COORD SYS: SP MI South FIPS 2113 Ft

Sheet 1 of 2

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

GPS SURVEYOR:

		SURVE	IOK	. G	PS		0411	1.50		1		CONST	DUCTIO	N AND INSTALL ATION
ilG	THOD	MATERIAL PROFILE					SAMP	LES		NAL TONS	ATER IONS	CONST		N AND INSTALLATION ETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA PLOT	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			Pipe Stickup: 3.09 ft Pipe Elev: 588.0 ft
		Brown sandy CLAY, dry, firm.	ر ا	////	0.0									
1		Brown SAND, wet, loose.	+	/ / /	583.9 1.0									0.0 - 1.0 ft bgs: Bentonite Chips
2														2" Schedule 40 PVC
							SS	100						
3														
1			SP											
5														1.0 - 8.0 ft bgs: Filte Sand
														2" Schedule 40 slotte
		Brown clayey PEAT, moist to wet, soft, trace sand.		7 77 7 70 70	577.9 7.0		SS	99						PVC
				70 70 7 70 7 70 70			o)						o 99	
				70 70 6 76 3										
				7 70 7 70 70 7 70 7										
				7 77 7 77 77									, a , o ,	
Geoprobe 7822DT	Jia.			70 70 6 70 7										
822DT	Direct Push - 4-in Hole Dia			70 70 6 76 3										
Geoprobe 7822DT	ısh - 4-i			7 76 7 76 76 7 76 7			SS	94						
Geo	Jirect Pu			7 77 7 77 77										
	٦	Gray fine SAND, wet, loose.		<u> </u>	570.7 14.2	-								
		Dark gray clayey PEAT, moist, soft, some gray sand seams	SP		569.7	-		+						
		present.		7 70 7 70 70 7 76 7	15.2									
				7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									, a . o .	
				70 70 6 70 7			SS	22						
				70 70 0 70 7										
		Gray fine SAND, wet, loose, trace medium grained sand.		70 70 70 70 70 70 7	565.9 19.0	-								
		•						Ш						
													, a . a	
			SP				"	(6)						
							SS	99					, a . o .	
														0.0 40.0 % !
													9,0	8.0 - 40.0 ft bgs: Material Collapse
		Continued on Next Page	+	:		1		+	+			1,44. [14.0]. 9		

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 17, 2021 DATE: Nov 03, 2021

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Ider - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

GHBLP DATE:

CLIENT: August 17, 2021 ELEVATION: 584.9 ft (Ground)

COORDINATES: N: 577987.6 ft E: 12624312.3 ft PROJECT: J.B. Sims Well Installations PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

	,	SURVE	YOR	t: G	PS					_		
	. 8	MATERIAL PROFILE					SAMF	LES		NS NS	유왕	CONSTRUCTION AND INSTALLATION DETAILS
DEPTH (ft)	DRILL METHOD	PILAII	S	ĕ ∟	ELEV.	L				ADDITIONAL	GROUNDWATER OBSERVATIONS	52.7.425
DEP		DESCRIPTION	NSCS	STRATA	DEPTH	NUMBER	TYPE	REC %	OWS	ADDIT SSER	ROUN	Din - 06 days - 0.00 ft
	٥				(ft)	Š		2	BLOW N-VAI	<u> </u>	90	Pipe Stickup: 3.09 ft Pipe Elev: 588.0 ft
		Gray fine SAND, wet, loose, trace medium grained sand.										47 1 1 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2
26												
27												[49] T. J. J. G. 1049 T. J. J.
							SS	72				
28			SP									
29												
30												.a
-												
- 31	Dia.	Gray silty fine SAND, moist, compact.			553.9 31.0							
32 6	n Hole											[+g] + 1 (2, 18) (40+g] + 1 (2, 1]
31 32 32 32 32 33 34 34 34 34 34 34 34 34 34 34 34 34	sh - 4-i						SS	74				
33 8	Direct Push - 4-in Hole Dia.											
- 34			SM									0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
35										 -		
36												
37		Gray SILT, moist, hard.			547.9 37.0							[40
38			M				SS	100				
			_		F4F 0							
39		Gray CLAY, moist, firm to soft.	H H	7777	545.9 39.0	11						
40	-	End of hole at 40.0 ft.	10		544.9			+	+			
41		Target Depth Reached Refer to diagram for well										
- "		construction details.										
42												
- 43												
— 43 — 44												
45												
46												
46												
- 47 -												
48												
49												
50												
		7.05										REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 17, 2021 DATE: Nov 03, 2021

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Sheet 2 of 2

CLIENT: GHBLP DATE: August 17, 2021 ELEVATION: 583.2 ft (Ground)

COORDINATES: N: 577623.9 ft E: 12624190.9 ft PROJECT: J.B. Sims Well Installations SP MI South FIPS 2113 Ft

PROJECT NO: 21464427 COORD SYS: LOCATION: Grand Haven, MI HORZ DATUM: NAD83

CONTRACTOR: MATECO Drilling

SURVEYOR: GPS

		SURVEY	/OR	: G	PS	1						T	
ري اح	<u></u>	MATERIAL PROFILE		I			SAMP	LES		AL ONS	TER NS		I AND INSTALLATION ETAILS
DRILL RIG	URILL ME I	DESCRIPTION	SOSO	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Stickup: 2.85 ft Pipe Elev: 586.1 ft
		Brown fine SAND, dry, loose.			0.0 582.7 0.5								1 100 Elev. 600.1 K
2 3 3 4		Gray fine SAND, dry to moist, loose, trace silt. Gray fine to medium SAND, wet, loose.	SP		579.2 4.0 578.2		SS	100					0.0 - 2.0 ft bgs: Bentonite Chips 2" Schedule 40 PVC
5	ľ	Dark gray silty SAND, wet, loose.	SM		5.0	1							2.0 - 9.0 ft bgs: Filter
6 7 8 9		Gray fine SAND, wet, loose.	ds.		577.5		SS	89					2" Schedule 40 slotted PVC
		Dark gray GRAVEL & SAND, wet, loose.		000	572.9	11							
1 5	Ja.		GP	0000	571.7								
Geoprobe 7822DT	Direct Pusn - 4-in Hole	Gray silty SAND, wet, cohesive, some organics present.	SM		11.5		SS	40					
6 7 8 9		Gray fine SAND, wet, loose, some medium grained sand present below 20' BGS.			566.2 17.0		SS	99					
2 3 4		Continued on Next Page	SP				SS	50					9.0 - 34.0 ft bgs: Matieral Collapse
31 I		Continued on Next Page	1	_		1 F			-				

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 17, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

DATE: August 17, 2021 ELEVATION:

CLIENT: GHBLP 583.2 ft (Ground) COORDINATES: N: 577623.9 ft E: 12624190.9 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

HORZ DATUM: NAD83 LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI

The state of the				SURVE	YOR	:: G	PS							
Gray fine SAND & Stut, well, beard. Study and prince SAND & St			2	MATERIAL PROFILE					SAMP	LES		S	α. ω	
Gray fine SAND & Stut, well, beard. Study and prince SAND & St	H (ft)	RIG	ĒΗ			_	FLEV					ONAL	WATE	DETAILS
Gray fine SAND & Stut, well, beard. Study and prince SAND & St	EPT	NELL NE	LLM	DESCRIPTION	SCS	'RAT/		ER	ш	%	S =	ERV.	OUND SERV	
Gray fine SAND & Stut, well, beard. Study and prince SAND & St			DRI			ST	(ft)	NUME	Ł	REC	BLO\ N-VAI	A A B	88	Pipe Stickup: 2.85 ft
City sing fine SAND, well, catherine. 20				Gray fine SAND, wet, loose, some medium grained sand	SP			Ħ						
27 29 29 29 29 29 29 29 29 29 29 29 29 29	26			Gray silty fine SAND, wet, cohesive.			25.4							
27 29 29 29 29 29 29 29 29 29 29 29 29 29														
The state of the	27													a Paris Carlos
Gray fine SAND & SILT, wet, hard. 33	20								SS	80				
Gray fine SAND & SILT, wet, hard. 33	- 20		Dia.		5									ુવા કે કહે છે. કહે વા કે કહે ક ૧૯૬૦ કે તાલું કે તાલુ
Gray fine SAND & SILT, wet, hard. 33	29	7822D	in Hole		S									
Gray fine SAND & SILT, wet, hard. 33		orobe 7	sh - 4-											
Gray fine SAND & SILT, wet, hard. 33	30	Geog	ect Pu											
Gray fine SAND & SILT, wet, hard. 38 End of hole at 34.0 ft. Refusal prior to 40.1 tragged depth. Refer to diagram for weal construction details. 39 40 41 42 43 44 44 45 46 47 48 49 40 40 40 40 40 40 40 40 40	31		ä											
Signature SAND & Silt, wet, hard. Signature SAND &							551.2							
34 End of hole at \$4.0 h. Refusal prior to 40-ft target depth. Refer to diagram for well connettruction details. 35 -39 -40 -41 -44 -46 -46 -46 -46 -46 -46 -46 -46 -46	32			Gray fine SAND & SILT, wet, hard.	T		32.0		SS	10(
End of hole at 34 0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. 38 40 41 42 43 44 45 46 47 48 49 40 40 40 40 40 40 40 40 40	33				WS-c									
End of hole at 34.0 ft. Returning into 14.0 ft. traped elegin. Refer to diagram for well construction details. 38 39 40 41 42 43 44 45 46 47 48 49 40 40 40 40 40 40 40 40 40					S		F40.2							
construction details. construction details. construction details. construction details.	34			End of hole at 34.0 ft.		1 - 1:1:	549.2							49 4 5 7 3 18 1 2 4 4 5 5 7 3 1
construction details. construction details. construction details. construction details.	35			Refusal prior to 40-ft target depth.										
- 37				construction details.										
- 58 - 58 - 58 - 58 - 58 - 58 - 58 - 58	36													
- 58 - 58 - 58 - 58 - 58 - 58 - 58 - 58	37													
- 40	- "													
- 40	38													
- 40	E 20													
- 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 49 - 49 - 49 - 50 - 60 - 60 - 60 - 60 - 60 - 60 - 60														
- 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 50 - 50	40													
- 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 50 - 50														
- 43 - 44 - 45 - 47 - 48 - 49 - 50 - 50	41													
- 43 - 44 - 45 - 47 - 48 - 49 - 50 - 50	42													
- 45 - 46 - 47 - 48 - 49 - 50	F													
- 45 - 46 - 47 - 48 - 49 - 50	43													
- 45 - 46 - 47 - 48 - 49 - 50	44													
- 46 - 47 - 48 - 49 - 50	FI													
- 47 - 48 - 49 - 50	45													
- 47 - 48 - 49 - 50	46													
- 49 - 49 - 50														
- 49 - 49 - 50	47													
- 49 - 49 - 50	48													
	F													
	49													
	50													
					1	L		Ц		Ш				

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 17, 2021 DATE: Nov 03, 2021

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CLIENT: GHBLP DATE: August 16, 2021 ELEVATION:

COORDINATES: N: 577191.9 ft E: 12624160.0 ft

Sheet 1 of 2

583.5 ft (Ground) PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVEY	OR	: G	PS	1					ı	1		
. _U	밁	MATERIAL PROFILE	1	1			SAMF	PLES	i	IAL ONS	TER	CONS		ON AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL	GROUNDWATER OBSERVATIONS]	Pipe Stickup: 2.93 ft Pipe Elev: 586.4 ft
		Brown SAND, dry to wet, loose, some medium grained sand.			0.0								, a	5 4
1														2" Schedule 40 PVC
2							SS	100						1 5 2 7 3 1 3 5
3			SP				S	12						14 11 14 14
4														
5														1.0 - 8.0 ft bgs: Filte Sand
					577.5									2" Schedule 40 slotte
	ŀ	Brown silty SAND, wet, loose. Brown fine SAND, wet, loose.	ωΣ		6.0 577.2									
					6.3		SS	80						
3							0,						0.0	
			S									a a a	o 9	
					573.2							a	0.9	
		Black fine SAND, wet, loose, some organics present. Black CLAY, moist, soft, some sand, organics present,			10.3 572.7							9 9	o, 9	
TO		organic scent.			10.8							9 9	0.0	
Geoprobe 7822DT	Direct Push - 4-in Hole Dia.						SS	54					0.0	
Geopro	ect Push		占	/ ///								å	o, 9	
	Dire											9 9	0, 9 0, 9	
		Brown silty SAND, wet, loose.	ωΣ		568.5 15.0]				-		a a 0	,0*a .a	*
		Dark gray PEAT, wet, soft, some clay present, organic scent.		70 70	568.3 15.2							\$ 0 0	0.9	
				7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7								a a 0	0.0	
				70 70 6 76 7 70 70	:		SS	20					,0'4 ,0'4 ,0'4	
				F 7F 7 7F 7F F 7F 7										
				7 70 7 70 70								9 9	0.0	
	ŀ	Gray silty SAND, wet, loose, organics present.	5		563.8 19.7	1		-		-			٥. ٩٠٠	<u>: 1</u>
		Converged to CAND wet long	SM		562.5							2 ° 0	0,0 0,0 0,0	
		Gray medium SAND, wet, loose.			21.0									8.0 - 35.0 ft bgs: Matieral Collapse
							SS	70					0.0	
			SP									9 9 0	0.0	
												a . a .0	0.0	
5	-	Continued on Next Page	-					+	\parallel	_		8 9 0		
4N4E														REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 16, 2021 DATE: Nov 03, 2021

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der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 16, 2021 ELEVATION:

583.5 ft (Ground) PROJECT: J.B. Sims Well Installations COORDINATES: N: 577191.9 ft E: 12624160.0 ft

PROJECT NO: 21464427

Grand Haven, MI

LOCATION:

CONTRACTOR: MATECO Drilling

COORD SYS: SP MI South FIPS 2113 Ft Sheet 2 of 2

HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVEY	OR —	: G	PS							
	00	MATERIAL PROFILE					SAMP	LES		NS S	S S	CONSTRUCTION AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA PLOT	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALIF	ADDITIONAL	GROUNDWATER OBSERVATIONS	Pipe Stickup: 2.93 ft Pipe Elev: 586.4 ft
		Gray medium SAND, wet, loose.	SP			\Box		П	İ			
26 27 28 29 30 30 30 31 31 32 31 32 31 31 31 31 31 31 31 31 31 31 31 31 31	Direct Push - 4-in Hole Dia.	Gray sandy SILT, wet, non-cohesive.			25.4		SS	100				
oprob	- hsn-		ML									
31 8	Direct											
32												
33							SS	88				
		Gray SILT, wet, cohesive, trace sand.			550.0 33.5							
34		Gray Gill, wet, coriesive, trace saird.			33.5							
35					548.5	Ц		Ц				
		End of hole at 35.0 ft.										
6		Refusal prior to 40-ft target depth. Refer to diagram for well construction details.										
37												
38												
10												
11												
12												
4												
4												
.5												
46 47												
18												
19												
50												
					1	Ц		11				REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 16, 2021 DATE: Nov 03, 2021

CLIENT: GHBLP DATE: August 25, 2021 ELEVATION:

589.3 ft (Ground)

SP MI South FIPS 2113 Ft

Sheet 1 of 2

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577062.5 ft E: 12624730.2 ft

PROJECT NO: 21464427 COORD SYS: LOCATION: Grand Haven, MI

CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

COAL Stock gravely SAND, most, loses. Stock gravely SAND, most, loses. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND, gravely SAND, most, soft, trace sit, some trash present. Stock gravely SAND,			SURVEY	YOR	t: G	PS								
Signature and process of the second process		8	MATERIAL PROFILE					SAMP	LES		NS SNS	#S		
Signature and process of the second process	L RIG	ETH	PILALI		⋖.	ELEV.					IONA ATIC)WATI		
Birow sandy ToPSOL, dry loose, 25	DRILL RIG	DRILLN	DESCRIPTION	nsce	STRAT	DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDIT OBSER\	GROUNE		Pipe Stickup: 3.05 ft Pipe Elev: 592.4 ft
COAL Social Section and Section (and section present) Social Section			1		316 316									
COAL See 3 See 3 See 4 See 5	2 3		Eight Brown On C. Gry to motor, 10000.			0.5		SS	100					
COAL. Black gravely SAND, moist, loose. 572.8 Black mucky PEAT, moist, soft, trace silt, some trash present. Dark gray sandy PEAT, moist, soft, shell fragments present.	5 6 7			dS			-	Ø	0					Surface Cuttings
COAL	8							ŠŠ	20					Z" Schedule 40 PVC
Black gravelly SAND, moist, loose. 579.8 9.5			COAL.				$\left \cdot \right $							
Black mucky PEAT, moist, soft, trace silt, some trash present S77.0	9													
Black mucky PEAT, moist, soft, trace silt, some trash present ST7.0	10		Black gravelly SAND, moist, loose.			9.5	-						8 9 0 8 9 0	
Dark gray mucky SAND, moist to wet, soft. 574.2 15.1	14	Direct Push - 4-in Hole Dia.	at 14.8' BGS.	dS.	70 70 7 70 70 70 7 70 7 70 7 70 7 70 7	12.3	_	SS	76					10.0 - 13.0 ft bgs: Bentonite Chips
Dark gray sandy PEAT, moist, soft, shell fragments present. 2 \(\frac{\pi \chi}{\pi} \) \(\frac{\pi \chi}{\pi \chi} \) \(\frac{\pi \chi}{\pi} \) \(\fra	15 16 17 18		Black fine SAND, wet, loose, some glass present. Dark gray mucky SAND, moist to wet, soft.	ds		574.2		SS	46					2" Schedule 40 slotted
Continued on Next Page	22 22 23 24		Pale black PEAT, moist, soft. Gray sand seams present @ 24.9', 25.7', and 28.0' BGS.		70 70 7 70 30 7 70 30 70 70 70 70 70 70	22.1 565.1	- - -	SS	99					
	25		Continued on Next Page				Ц							REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 25, 2021 DATE: Nov 03, 2021

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der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 25, 2021 ELEVATION: 589.3 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577062.5 ft E: 12624730.2 ft

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

Pale black PEAT, moist, soft. Gray sand seams present @	xup: 3.05 ft : 592.4 ft
Pape black PEAT, motal, soft, Gray sand seams present @	: 592.4 ft
Page black PEAT, moist, soft. Gray sand seams present @	: 592.4 ft
Pape black PEAT, motal, soft, Gray sand seams present @	: 592.4 ft
Pale black PEAT, moist, soft. Gray sand seams present	
20	
27	
28 28 29 30 30 31 32 32 33 36 36 36 37 38 38 38 38 38 38 38 38 38 38 38 38 38	
28	
28	
20.0 - 40 20	
30 Dark gray medium SAND, wet, loose, shell fragments 30.0 Material 30.0	
20	
33	i.() ft bas:
33	Collapse
33	
33	
33	
34 35 36 37 38 39 Gray silty SAND, moist, compact. End of hole at 40.0 ft. Tarret Denth Reached Tarret Denth Reached	
34 35 36 37 38 39 Gray silty SAND, moist, compact. End of hole at 40.0 ft. Tarret Denth Reached Tarret Denth Reached	
Gray silty SAND, moist, compact.	
37 38 39 Gray silty SAND, moist, compact.	
38	
37	
39 Gray silty SAND, moist, compact. Find of hole at 40.0 ft. Tarret Denth Reached. S	
39 Gray silty SAND, moist, compact.	
Gray silty SAND, moist, compact. Solution S49.7	
Substitution Subs	
Gray silty SAND, moist, compact. End of hole at 40.0 ft. Target Depth Reached.	
End of hole at 40.0 ft. Target Denth Reached	
Tarriet Denth Reached	
E 41 Refer to diagram for well	
Refer to diagram for well construction details.	
47	

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 25, 2021 DATE: Nov 03, 2021

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CLIENT: GHBLP DATE: August 25, 2021

ELEVATION: 582.2 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577273.6 ft E: 12625194.8 ft

> COORD SYS: SP MI South FIPS 2113 Ft

Sheet 1 of 2

CONTRACTOR: MATECO Drilling LOCATION: Grand Haven, MI HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVE	YOR	:: G	PS									
	ОО	MATERIAL PROFILE					SAMP	LES		A Z	# S	CONS		N AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	PILALI		4	ELEV.					ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			
I I	LL M	DESCRIPTION	NSCS	STRATA	DEPTH	SER	ш	%	S E	DDITI SERV	SERV	Г	1	
	DRI			ST	(ft)	NUMBER	TYPE	REC %	BLO N-VAL	AE	88			Pipe Stickup: 2.69 ft Pipe Elev: 584.9 ft
		Brown TOPSOIL, moist, loose.		عادد عادد		\forall		Ħ					0.0	
		Dark gray fine SAND, wet, loose.	SP		581.7 0.5	11						0 0	0 °	0.0 - 1.0 ft bgs: Bentonite Chips
1		Black GRAVEL & SAND fill, wet, loose.		30.5	581.2									2" Schedule 40 PVC
2		Black peaty CLAY, moist, soft.			1.0 580.7									: 2 Scriedule 40 FVC
				////	1.5		SS	9						
3			동	////			0,							
														:
		Gray fine SAND, wet, loose.			578.2 4.0	- 1								
		oray into orate, well, losse.	SP		4.0									1.0 - 8.0 ft bgs: Filte
			"		576.9	-		+	+					Sand
		WOOD ORGANICS, mucky fines mixed in.		$\frac{\times \times \times}{\times \times}$	5.3									2" Schedule 40 slotte PVC
i				×××/								E		
				××××								 		
				$\times \times \times \langle$			w	~				=		
				××××			SS	45						
				××××								9 0	o. a . a .	1
				×××/									0.4	1
				××××									0.0	1
				${\times}\frac{\times}{\times}$					-			0	0.0	1
				××××								0 0		
	ë			$\times \times $										1
	Direct Push - 4-in Hole Dia			×××>									0.0	
Geoprobe 7822DT	-in Hc			$\times \times \times \times$									0.4	
oprobe	sh - 4			×××××			SS	9				4	0.4	1
Geog	ect Pu			$\frac{\times \times \times \times}{\times \times}$								9 9	0.0	
	Dire			××××								a ° 0	0.0	
				$\times \times $								9	o a a	
		Black mucky PEAT, moist, soft.	4	70 70	567.2 15.0	┨┞		+	-			0 0	0.4	1
		Black masky (E vi, most, soit.		70 70 70 70 3	15.0							0 0	0. 9	1
				6 20 3								.0		
				7 76 3 76 76										
				77 77 77 77	,		တ္တ						0.4	
				70 70 70 70			Š	28					0.4	
				71 71								9 9		1
				70 70 7 70 3									0.9	
				70 70 7 70 70									o. 9	1
		Black mucky fine SAND, some shell fragments present.	+	<u> 200</u>	562.2 20.0	┧┝		+	+				0.0	1
														1
													0.0	1
													0.0	8.0 - 35.0 ft bgs: Material Collapse
			٥		559.7		S							- Conapoo
		Dark gray medium SAND, wet, loose.	SP		22.5	11	SS	80					0.0	
													0.4	
													0.4	:
					FF7.							9 9 0	0.0	1
5		Gray very fine SAND, moist, compact, trace silt.			557.4 - 24.8	 		\perp	\perp				o	1
		Continued on Next Page		L	<u> </u>	Ш		11						REV:

HAMMER TYPE: Automatic

PROJECT NO: 21464427

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 25, 2021 DATE: Nov 03, 2021

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Ider - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 25, 2021 ELEVATION: 582.2 ft (Ground)

 PROJECT:
 J.B. Sims Well Installations
 COORDINATES:
 N: 577273.6 ft
 E: 12625194.8 ft

 PROJECT NO:
 21464427
 COORD SYS:
 SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVEY	OR	: G	PS							
	8	MATERIAL PROFILE					SAMP	LES		ADDITIONAL OBSERVATIONS	NS NS	CONSTRUCTION AND INSTALLATION DETAILS
DEPTH (ft) DRILL RIG	DRILL METHOD			۸,	ELEV.					IONA ATIC	GROUNDWATER OBSERVATIONS	
DEPI DRIL	ILL	DESCRIPTION	nscs	STRATA	DEPTH	BER	TYPE	%	SMS	DDIT SER\	SOUNE SSER\	
_ _	DR		_	· S _	(ft)	NUMBER	Ξ	REC %	N-VAL	OB A	R B	Pipe Stickup: 2.69 ft Pipe Elev: 584.9 ft
		Gray very fine SAND, moist, compact, trace silt.										
- 26												(4) (4) (5) (6) (6) (4) (4) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6
- 27							SS	0				
- 28							S	80				
	l esi		SP									
- 29 - 30 Geoprobe 7822DT	Direct Push - 4-in Hole Dia.											
Geoprobe 7822DT	4-in F							Ш				
gondoe	- hsu-											
- 31 G	Direct											
- 32		Gray sandy SILT, moist, firm.	⊌		550.5 31.7	$\exists \mid$						
		Gray CLAY, moist, soft, sticky, high plasticity.		////	550.2 32.0		SS	80				
- 33			_	Y///								
- 34			동	Y///								
				Y///								
- 35		End of hole at 35.0 ft.			547.2	H		$^{+}$				
- 36		Refusal prior to 40-ft target depth. Refer to diagram for well										
		construction details.										
- 37												
- 38												
- 39												
- 40												
- 41												
- 42												
- 43												
- 44												
- 43												
- 45												
- 46												
- 46 - 47												
- 47												
- 48												
- 49												
- 50												
	1	1	1									REV:
		TVD5										

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 25, 2021 DATE: Nov 03, 2021

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CLIENT: GHBLP DATE: August 17, 2021 ELEVATION: 584.0 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577652.8 ft E: 12624744.2 ft PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVE	YOR	l: G	SPS					 		1			
(n)	ᄝ	MATERIAL PROFILE					SAMP	LES		NS ONS	TER NS	CONS		ON AND INSTA	ALLATION
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			Pipe Stickup Pipe Elev: 5	o: 2.99 ft 687.0 ft
\prod		Brown SAND, dry, loose, some gravel.			0.0							3 0 0	0,0		
1					:							a (°a)	9.4	0.0 - 1.0 ft l Bentonite 0	
2														2" Schedul	le 40 PVC
			SP		:		SS	100							
3			"		:										
4															
5		Black SAND, moist, loose, trace organics.	_		579.3									1.0 - 8.0 ft l Sand	bgs: Filter
		Brown gravelly SAND, dry, compact. Black gravelly SILT, wet, compact, trace organics present.			579.0 5.0									2" Schedul	le 40 slotte
					578.5 5.5										
			M												
							SS	09							
	-	Black silty PEAT, moist, soft.		<u>ν ην</u>	575.5 - 8.5	$\ \ $							0.4		
				70 70 6 70 70 70	7							9 9 0			
	ŀ	Black sandy SILT, moist, soft, trace organics.		7 7 V	574.0	┨┠		+				9 9 0	o. 9		
												9,70	, o . d . d . d		
TO	ole Dia.											4 9 0	0.4		
e 7822	4-in Hc						SS	44					0.9		
Geoprobe 7822DT	Direct Push - 4-in Hole Dia						0,					9 9 0			
	Direc											9 9 9	0.4		
			M									9 9 0	o. 9		
			-									a ' a ' 0	0,9 °9		
												4 4 0	0.0		
													0.0		
							SS	20					o. e . e		
												9 ° 0 ° 0			
					564.5								0.4		
		Gray fine SAND, wet, loose.			19.5	1									
					:								0.4		
													0.4		
			SP												
					:		SS	54				a . a . o	0.4		
												9 9	0.0		
													0.4	8.0 - 40.0 ft Material Co	
												1 0 0 0			

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 17, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

Ider - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 17, 2021 ELEVATION:

584.0 ft (Ground) PROJECT: J.B. Sims Well Installations COORDINATES: N: 577652.8 ft E: 12624744.2 ft

PROJECT NO: 21464427

Sheet 2 of 2

COORD SYS: SP MI South FIPS 2113 Ft

CONTRACTOR: MATECO Drilling LOCATION: Grand Haven, MI HORZ DATUM: NAD83

SURVEYOR: GPS

			SURVEY	OR	: G	PS							
		2	MATERIAL PROFILE					SAMP	PLES	3	S Z	κ. δ	CONSTRUCTION AND INSTALLATION DETAILS
DEPTH (ft)	DRILL RIG	DRILL METHOD			_	ELEV.					ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	DETAILS
EPTI	RIL	I W	DESCRIPTION	nscs	STRATA	DEPTH	띪	ш	%	S	ERV.	OUND SERV	
٥		DRII		Ď	ST	(ft)	NUMBER	TYPE	REC %	BLOV	ADOBS	GRC	Pipe Stickup: 2.99 ft
			Gray fine SAND, wet, loose.				Ħ		+	-			Pipe Elev: 587.0 ft
26				SP									
26						557.5							[49] 1 [2] [4] [44] 1 [2] [1
27			Gray silty SAND, wet, loose to compact, trace silt seams.			26.5							*
								SS	100				
28													
				SM									
29				0)									
30													
ŧΙ													
31		نہ	Crow condu CII T wat hard			552.9							
	占	e Dia	Gray sandy SILT, wet, hard. Gray silty SAND, wet, hard.	M		31.1 552.5	$\ \ $						
32	7822	i- H				31.5							
32	Geoprobe 7822DT	ısh - 4		5				SS	70				(a) (b) (a) (b) (b) (a) (b) (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b
53	Geo	Direct Push - 4-in Hole Dia		SM									
34		ä											
			Gray sandy SILT, wet, hard.			549.4 34.6	$\ \ $						
35			Stay Sandy Oler, wet, hard.			34.0	╽┟						
36													
36													[49 : 13 8 10 9 : 13]
37				¥									
								SS	84				
38													
39						545.0							
-			Gray CLAY, moist, soft, high plasticity.	동	Y///	39.0							
40	-	_	End of hole at 40.0 ft.			544.0	Н			\perp			
41			Target Depth Reached Refer to diagram for well construction details.										
42													
43													
44													
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-													
46													
47													
E 4/													
48													
49													
50													
50					<u> </u>								REV:
1													· · · · ·

HAMMER TYPE: Automatic



CHECKED: Caroyln Powrozek

DATE: Aug 17, 2021 DATE: Nov 03, 2021

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LOGGED: Parker Sutton

RESORD OF BOILEFIGEE. 12-10

CLIENT: GHBLP DATE: August 18, 2021 ELEVATION: 584.1 ft (Ground)
PROJECT: J.B. Sims Well Installations COORDINATES: N: 577919.1 ft E:

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577919.1 ft E: 12624742.2 ft PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVE	YOR	R: G	PS									
. (1)	9	MATERIAL PROFILE					SAMF	PLES	;	NO NS	R S	CONSTI		N AND INSTALLATION ETAILS
DRILL RIG	JETH		S	≰∟	ELEV.		П			HONA	DWAT			
	DRILL METHOD	DESCRIPTION	nscs	STRATA	DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	ADDITIONAL	GROUNDWATER OBSERVATIONS			Pipe Stickup: 3.10 ft Pipe Elev: 587.2 ft
		Brown TOPSOIL, dry, loose. Brown GRAVEL & SAND, moist to wet, loose.		216 216	583.6								9 9	0.0 - 1.0 ft bgs:
1		BIOWIT GRAVEE & GAINE, ITIOSE to Wet, 10030.			0.5									Bentonite Chips
2														2" Schedule 40 PVC
							SS	100						
3			>											
1			GW		•									
														1.0 - 8.0 ft bgs: Filter Sand
										-				2" Schedule 40 slotte
;														PVC
		Brown peaty SILT, moist, soft, trace sand, cohesive.		* -	577.6 6.5	+								
7							SS	09						
3			ML				0,						,a 99	
												9 9 0	, a . a	
					574.3							9 9 9	9 0	
		Gray fine to medium SAND, wet, loose. Brown peaty sandy SILT, moist, soft, cohesive.	S G		9.8	1				_		a ' a 0 ' o		
					10.1									
	le Dia.												, a	
7822	4-in Ho						SS	50				9 9 0	3 0	
Geoprobe 7822DT	Direct Push - 4-in Hole Dia.						S	5					9	
ď	Direct											9 9 0	9 9	
			M									3 ° 3 ° 3	, a . a	
										-		9 9 0 0 9 9 0 0		
												, a , a , a		
							S	24				4 9 0	8 9	
							Ś	5						
		Gray fine SAND, wet, loose, some organics and shell			565.6 18.5									
		fragments at 23' BGS.										a ' a ' 0 ' 0	å .	
										_		e ° e ° 0	9 0	
													, e , e	8.0 - 34.0 ft bgs:
			SP			$ \ $								Material Collapse
							SS	42					E+0"	
1		Gray silty SAND, wet, loose, some organics and shell	-		559.9 24.2	$\left \cdot \right $						a a 0	8 9	
5		fragments present. Compact starting at 28' BGS. Continued on Next Page	SM					\perp		_			9.0	
		Continued on Next Page			1	$\perp \perp$					1	<u> </u>		REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 18, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

lder - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 18, 2021 ELEVATION: 584.1 ft (Ground)

COORDINATES: N: 577919.1 ft E: 12624742.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft HORZ DATUM: NAD83 LOCATION: Grand Haven, MI

CONTRACTOR: MATECO Drilling

SURVEYOR:	GPS				
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			SURVEY	OR	: G	iPS								
		8	MATERIAL PROFILE					SAMP	PLE	S		NS NS	S. S.	CONSTRUCTION AND INSTALLATION DETAILS
H (ft)	2	E E			∢	ELEV.						ONA	WATE	DETAILS
DEPTH (ft)		DRILL METHOD	DESCRIPTION	nscs	STRATA	DEPTH	BER	J.	%	WS	E.E.	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	
_ _	1	DR]	R F	(ft)	NUMBER	TYPE	REC	BLOWS	N-VAL	AI OB\$	SB BB	Pipe Stickup: 3.10 ft Pipe Elev: 587.2 ft
	Ì		Gray silty SAND, wet, loose, some organics and shell fragments present. Compact starting at 28' BGS.											
- 26			magnisms process. Compact starting at 20 200.											
- 27								"	_					
- 28								SS	100					
Ŀ	_	Direct Push - 4-in Hole Dia.												(a) (b) (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b
- 29 COX 9446	10221	는 유		SM										
- 30	annid	nsh - 4												
9	5	rect P												
- 31														
- 32								SS	100					
32								S	1					
- 33			Gray sandy SILT, moist, firm to hard, cohesive.			550.9	4							
34				M		33.2 550.1								
34			End of hole at 34.0 ft.											
- 35			Refusal prior to 40-ft target depth. Refer to diagram for well construction details.											
- 36			construction details.											
30														
- 37														
- 38														
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				1	L	1				ш				REV:
1 / 1 / 1	1 ⊏1	οт	YPE: Automatic											

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

CHECKED: Caroyln Powrozek

DATE: Aug 18, 2021 DATE: Nov 03, 2021

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Sheet 2 of 2

LOGGED: Parker Sutton

CLIENT: GHBLP DATE: August 20, 2021 ELEVATION:

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577938.0 ft E: 12624957.2 ft

PROJECT NO: 21464427 COORD SYS:

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

	1	SURVEY	YUR	i: G	PS			. = -				CONCEDUCTO	LI AND INICTALL ATION
9	H	MATERIAL PROFILE	1				SAMP	LES		IONS	ATER		NAND INSTALLATION ETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Stickup: 2.80 ft Pipe Elev: 585.9 ft
		Black clayey TOPSOIL, moist, soft, organics present.		316 316 6 316 .		Ħ							0.0 - 1.0 ft bgs:
1 2 3 4		Black peaty SAND, wet, loose, trace gravel.	SP	alla alla la alla alla alla la alla alla alla		-	SS	100					Bentonite Chips 2" Schedule 40 PVC 1.0 - 8.0 ft bgs: Filter
5		Black coarse SAND, wet, loose.			577.7 5.4	- 							Sand 2" Schedule 40 slotte
6 7 8 9		Brown peaty SILT, moist, soft, some sand present, shell fragments present.	ML		577.4 5.7		SS	44					PVC
Geoprobe 7822DT	ia.												
7822DT	in Hole D	Brown fine SAND, wet, loose, trace organics present until 15' BGS.			571.6 11.5								
Geoprobe 7822DT	Direct Push - 4-in Hole Dia						SS	52					
			SP				SS	92					8.0 - 25.0 ft bgs: Material Collapse
		Gray silty fine SAND, wet, compact.			562.5	 							
			5				SS	98					
			SM										
		End of hole at 25.0 ft.			558.1	${\color{blue}{+}}$		+	+				
		Refusal prior to 40-ft target depth. Refer to diagram for well construction details.											
1						1 1							

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 20, 2021 DATE: Nov 03, 2021

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Sheet 1 of 1

583.1 ft (Ground)

SP MI South FIPS 2113 Ft

Golder - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

DATE: August 18, 2021 ELEVATION:

CLIENT: 582.4 ft (Ground) PROJECT: J.B. Sims Well Installations COORDINATES: N: 577722.5 ft E: 12625131.4 ft

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

GPS SURVEYOR:

т т		SURVEY	OR		SPS	П	0			1		CONCT	DUCTIO	NI AND INICTALL ATION
9	DRILL METHOD	MATERIAL PROFILE	I				SAMP	LES		IONS	GROUNDWATER OBSERVATIONS	CONST		N AND INSTALLATION ETAILS
DRILL RIG	MET	DESCRIPTION	nscs	STRATA	ELEV.	~		1.1	, ш	RVAT	JNDW/		 a	
R	DRILL		SN		DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALU	ADDITIONAL OBSERVATIONS	GROU			Pipe Stickup: 3.32 ft Pipe Elev: 585.7 ft
		TOPSOIL Brown peaty SAND, wet, soft, trash present (Glass, metal,		2111 211	581.9									0.0 - 1.0 ft bgs: Bentonite Chips
		coal).			0.5									2" Schedule 40 PVC
														2 Scriedule 40 PVC
							SS	100						
														1.0 - 8.0 ft bgs: Filt Sand
		Gray fine SAND, wet, loose. Brown peaty SILT, moist, soft, metal sheet present at 13'	S P		577.2	1								2" Schedule 40 slot
		BGS.			576.9 5.5									PVC
							SS	45						
													0.0	
													0.9	
			₹									a 'a '0	o. e . ° °	
iĝi										a °a °0	o. e . ° °			
										å ° 0	o. e			
2DT	Direct Push - 4-in Hole Dia.											9 0		
be 782	- 4-in }						SS	58				å ° 0	0.4	
Geoprobe 7822DT	ot Push				568.9								0.4	
	Dire	Gray fine SAND, wet, loose, shell fragments present.			13.5								6.9	
					:								0.4°	
								\dagger	T			a ° a ° 0	o. 4 . 4 .	
					:								0.4	
			S S											
							SS	09				a . a . 0		
					:							å , o	o.a ,a	
					:							9 9 9		
												9 9 0		
		Brown silty SAND, wet, cohesive, shell fragments present, trace organics.		Ш	20.0	1		$\dagger\dagger$	\dagger			a ° a ° 0	0.9	
					:							9 9 0	o, e , e ,	8.0 - 34.0 ft bgs:
			SM											Material Collapse
							SS	89				9 0		
		Crow condy SILT maint hard			559.2							0 0	o. o . o .	
		Gray sandy SILT, moist, hard.			23.2							a . a . a	o. o . o .	
			ML									9 9 9	0.4	

HAMMER TYPE: Automatic

GHBLP

GOLDER

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 18, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

MEMBER OF WSP

der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 18, 2021 ELEVATION: 582.4 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577722.5 ft E: 12625131.4 ft

PROJECT NO: 21464427

COORD SYS: SP MI South FIPS 2113 Ft

Sheet 2 of 2

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

DESCRIPTION Gase Revarions Gas sandy Silt, moist, hard. Gas sandy Silt, moist, hard.	CONSTRUCTION AND INSTALLATION DETAILS
	Dina Stiakun: 2 22 ft
	Pipe Stickup: 3.32 ft Pipe Elev: 585.7 ft
	1 Po Elev. 300.7 h
	က်တွင် လိုင်းတွင် မြောင်းသည်။ ကို သည် သည် သည် သည် ကို သည်
28	*
	9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
29 LIGEN AND, wet, loose, shell fragments present.	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
29	
30 g f g Gray medium SAND, wet, loose, shell fragments present.	
31	
Gray silty SAND, wet, compact.	
. 33	
Gray sandy SILT, moist, firm.	
34 End of hole at 34.0 ft.	(1) (1) (10 (10 (10 (10 (10 (10 (10 (10 (10 (10
Refusal prior to 40-ft target depth. Refer to diagram for well	
construction details.	
36	
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- 38	
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. 44	
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- 43 - 44 - 45 - 46 - 47	
47	
48 49 49	
49	
.50	
	REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 18, 2021 DATE: Nov 03, 2021

August 30, 2021

ELEVATION: 580.3 ft (Top of Casing)

COORDINATES: N: 577941.4 ft E: 12625280.3 ft

SP MI South FIPS 2113 Ft COORD SYS:

Sheet 1 of 2

HORZ DATUM: NAD83

PROJECT NO: 21464427 LOCATION:

CLIENT:

PROJECT:

Grand Haven, MI

J.B. Sims Well Installations

GHBLP

CONTRACTOR: MATECO Drilling

DATE:

		SURVE	YOR	2: G	PS								
_O	OOF	MATERIAL PROFILE	_				SAMP	PLES		ONS	TER	CONSTRUCTION DE	AND INSTALLATION
DRILL RIG	DRILL METHOD		δί	¥ ĭ	ELEV.	~1			1,	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		
DRI	RILL	DESCRIPTION	nscs	STRATA	DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDI	GROUI		
H		Black sandy MUCK, wet, soft, trace organics.		<u> </u>	0.0	Z			ΒŻ	O			Pipe Elev: 583.3 ft 0.0 - 0.2 ft bgs:
					A AND AND AND AND AND AND AND AND AND AN								Bentonite Chips 2" Schedule 40 PVC
		Brown MUCK, wet, soft, some organics.			576.8 3.5	_	SS	28					
		Gray fine SAND, wet, loose, trace silt starting at 13.5' BGS.		<u>}</u>	575.3	-							0.2 - 9.0 ft bgs: Filte Sand
							SS	20					2" Schedule 40 slotti PVC
						-							
Marsh Master Geoprobe	Direct Push - 4-in Hole Dia.						SS	36					
		Dark gray medium SAND, wet, loose.	S		565.3								
	•	Brown fine SAND, wet, loose.			563.3 17.0		SS	99					
									$\frac{1}{1}$				9.0 - 30.0 ft bgs: Material Collapse
							SS	100					
		Continued on Next Page	1					$\perp \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$					REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 30, 2021 DATE: Nov 03, 2021

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der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

DATE: August 30, 2021 ELEVATION: 580.3 ft (Top of Casing)

CLIENT: COORDINATES: N: 577941.4 ft E: 12625280.3 ft PROJECT: J.B. Sims Well Installations COORD SYS: SP MI South FIPS 2113 Ft PROJECT NO: 21464427

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

SURVEYOR: GPS

GHBLP

			SURVEY	OR	: GI	PS							
		Ö	MATERIAL PROFILE					SAMP	LES		S	S S	CONSTRUCTION AND INSTALLATION
£	DRILL RIG	DRILL METHOD									ADDITIONAL	GROUNDWATER OBSERVATIONS	DETAILS
DEPTH (ft)	∃	ME	DECORIDATION	S	STRATA	ELEV.	œ		П	, а Ш	RVA WA	ND.	
DE	품	RIL	DESCRIPTION	nscs	STR PL(DEPTH	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADD 3SEI	SROU BSE	
					0)	(ft)	ĺΝ	-	2	M-VAL	` "	9	Pipe Elev: 583.3 ft
			Brown fine SAND, wet, loose.										
26													a :
20	g	Dia.											(a) (a) (a) (a) (a) (b) (a) (b) (a) (b) (a) (b) (a) (b) (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b
26 27 28	Marsh Master Geoprobe	Direct Push - 4-in Hole Dia.											(a) (b) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c
- 2	er Ge	4-in		SP				SS	100				
28	Mast	- ysr		ြိ				o)	=				
	arsh	ect P											a
29	Ž	Dire											a ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '
-													
30						550.3	Ш		Ш				
			End of hole at 30.0 ft.										
31			Refusal prior to 40-ft target depth. Refer to diagram for well construction details.										
32													
			Ground elevation survey unable to be collected due to piezometer										
33			placement in standing water.										
34													
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49													
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		_							_				REV:

HAMMER TYPE: Automatic



LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 30, 2021 DATE: Nov 03, 2021

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CLIENT: GHBLP DATE: August 31, 2021 ELEVATION:

580.4 ft (Top of Casing)

PROJECT: J.B. Sims Well Installations

Grand Haven, MI

COORDINATES: N: 578056.9 ft E: 12625388.0 ft

Sheet 1 of 1

SP MI South FIPS 2113 Ft COORD SYS:

PROJECT NO: 21464427

LOCATION:

HORZ DATUM: NAD83

GPS SURVEYOR:

CONTRACTOR: MATECO Drilling

DESCRIPTION ack sandy MUCK, wet, soft, some organics present. ray fine SAND, wet, loose, shell fragments present. Trace it starting at 14' BGS.	nscs	STRATA		· ~	SS	18 REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Elev: 583.4 ft
ray fine SAND, wet, loose, shell fragments present. Trace			500 500 500 500 500 500 500 500 500 500		SS	18					
ray fine SAND, wet, loose, shell fragments present. Trace it starting at 14' BGS.		88888888888888888888888888888888888888	575.3								2" Schedule 40 PVC
			5.1		SS	40					0.0 - 9.0 ft bgs: Filte Sand 2" Schedule 40 slott PVC
	gS.				SS	58					
ark gray medium SAND, wet, compact. ray silty fine SAND, wet, compact.			565.9 14.5 564.2								9.0 - 22.0 ft bgs: Material Collapse
Gray silty fine SAND, wet, compact.	SM				SS	100					
End of hole at 22.0 ft.			558.4		SS	100					
Refusal prior to 40-ft target depth. Refer to diagram for well											
	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to be collected due to piezometer	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to be collected due to piezometer	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to be collected due to piezometer	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to be collected due to piezometer	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to be collected due to piezometer	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to	End of hole at 22.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground elevation survey unable to

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 31, 2021 DATE: Nov 03, 2021

Ider - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

DATE: August 25, 2021 ELEVATION: 584.4 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577627.7 ft E: 12625841.4 ft

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVE	/OR	: 0	SPS									
	8	MATERIAL PROFILE					SAMP	PLES		NNS	R S	CONS		N AND INSTALLATION ETAILS
L RIG	1ETH	PILAII		_ ≥ _	ELEV.					JONA/ ATIC	DWAT /ATIO			
DEPTH (II)	DRILL METHOD	DESCRIPTION	NSCS	STRATA	DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			Pipe Stickup: 2.82 ft
		Brown fine & medium SAND, dry to moist, loose.			: 0.0					-				Pipe Elev: 587.2 ft 0.0 - 1.0 ft bgs:
1 2 3 4		Gray fine SAND, wet, loose, some glass fragments present.	S		580.4		SS	100						Cement 1.0 - 2.0 ft bgs: Bentonite Chips 2" Schedule 40 PVC
5					578.3	-								2.0 - 9.0 ft bgs: Filter
		Black PEAT, moist, loose, trace silt.		70 70	6.1									2" Schedule 40 slotted
7 8 9		Brown to gray fine SAND, wet, loose.	SP		6.7	-	SS	09					° Ca, a ° Ca	PVC
11 12 13 13 14	Direct Push - 4-in Hole Dia.	Dark brown silty SAND, wet, loose, organics present. Brown fine to medium SAND, wet, loose.	WS		572.3 12.1 571.9 12.5	-	SS	50						
15 16 17 18		Gray very fine SAND, moist, compact, trace silt. Gray fine SAND, wet, loose, trace silt starting at 22' BGS.	S		567.9 16.5 566.6 17.8	- -	SS	100						9.0 - 25.0 ft bgs: Material Collapse
19													o.e .e	
21 22 23 24 25 26 27 28 29					560.4		SS	100						
25		Gray silty SAND, wet, cohesive.	SM		24.0							a ° a ° 0	0.0	
26		End of hole at 25.0 ft. Refusal Completed as well - refer to diagram.												
28														
29 30														
					1	Ц		Ш]				REV:

HAMMER TYPE: Automatic

CLIENT:

GHBLP

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 25, 2021 DATE: Nov 03, 2021

REV:

Sheet 1 of 1

TEODINE OF BUILDING. 1 2-24

CLIENT: GHBLP DATE: August 24, 2021 ELEVATION: 583.9 ft (Ground)

 PROJECT:
 J.B. Sims Well Installations
 COORDINATES:
 N: 577884.7 ft
 E: 12625979.3 ft

 PROJECT NO:
 21464427
 COORD SYS:
 SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

		SURVEY	OR	: 0	SPS									
	0	MATERIAL PROFILE					SAMP	LES		NS ONS	R R	CONSTRU		AND INSTALLATION
LRIG	ÆTH			٨.	ELEV.					TON/ ATIC	DWAT /ATIOI			
DRILL RIG	DRILL METHOD	DESCRIPTION	NSCS	STRATA	DEPTH	NUMBER	TYPE	% 0.	JWS ALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS			
					(ft)	Š	F	REC	N-VAL	7 8	90			Pipe Stickup: 3.41 ft Pipe Elev: 587.3 ft
		Brown sandy TOPSOIL, dry, loose. Brown fine SAND, dry, loose, trace gravel.		<u>alk al</u>	583.5	$\ \ $								0.0 - 1.0 ft bgs:
1					0.4									Cement
2													60	1.0 - 2.0 ft bgs: Bentonite Chip
		Dark brown SAND, moist, loose, leather, glass, metal			581.4 2.5	4	SS	100						2" Schedule 40 PVC
3		shavings present			: 2.3									
4														
					:									
5					:	-			+					
6														2.0 - 9.0 ft bgs: Filter Sand
			SP		:									2" Schedule 40 slotte
7		0			576.6									PVC
В		Gray fine to medium SAND, wet, loose, shell fragments present.			7.3		SS	70						
					:									
9					:								0,0	
0					:								9	
					:								0	
1	ia.												9 9	
22DT	Direct Push - 4-in Hole Dia				571.9							9 0 0	9	
Geoprobe 7822DT	4-in	Black PEAT, moist, soft, wood organics. Gray fine SAND, wet, loose. Silty sand seam from 19-19.2'	\vdash		12.0 571.7	11	SS	99					9 9	
Seopro	t Push	BGS.			12.2								9 9	
4	Direc				:							9,000	å	
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			SP		:		S	0						
					:		SS	10					9	
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													0	9.0 - 30.0 ft bgs:
					:			\coprod	\coprod				å	Material Collapse
													8	
					:							9 9 0 9	8	
!	-	Gray sandy SILT, moist, firm.			561.9								9	
		Say sainty Ole i, moot, iiiii.			22.0		SS	80					9	
3			¥									a ' a ' a ' a ' a ' a ' a		
4				ЩЦ	559.8									
		Gray fine SAND, wet, compact, trace silt.	SP		24.1									
5	- 1		1		-1			1 1				5 . 6 . 7 . 6 . 6 . 5 . 5	9	

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 24, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

lder - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 24, 2021 ELEVATION: 583.9 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 577884.7 ft E: 12625979.3 ft

PROJECT NO: 21464427

Grand Haven, MI

LOCATION:

CONTRACTOR: MATECO Drilling

SURVEYOR: GPS

Sheet 2 of 2

COORD SYS: SP MI South FIPS 2113 Ft

HORZ DATUM: NAD83

DESCRIPTION MATERIAL PROFILE DESCRIPTION DESCRIPTION OR ILL RIG (#) DESCRIPTION DESCRIPTION OR ILL RIG (#) DESCRIPTION OR ILL RIG OR ILL R	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS Pipe Stickup: 3.41 ft Pipe Elev: 587.3 ft
	GROUNDWATE	Pipe Stickup: 3.41 ft Pipe Elev: 587.3 ft
	GROUND	
	GRC	
Gray fine SAND, wet, compact, trace silt. Gray CLAY, moist, firm, high plasticity. 25.3 Gray CLAY, moist, firm, high plasticity.		19.1
29 Direct Push - 4-in Hole Dir		
Direct Push - 4-in Hole Dia - 100		
Head		
29		
30 End of hole at 30.0 ft.		
Refusal prior to 40-ft target depth. Refer to diagram for well		
construction details.		
= 32		
33		
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- 40		
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49		
50		
		REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 24, 2021 DATE: Nov 03, 2021

CLIENT: GHBLP DATE: August 24, 2021 ELEVATION: 583.5 ft (Ground) COORDINATES: N: 577703.7 ft E: 12626240.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

		SURVE	OR	t: (GPS									
	ОО	MATERIAL PROFILE					SAMP	PLES		NS NS	S S	CONS		ON AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	PILAI I		_ ≥ _	ELEV.	L				ADDITIONAL	GROUNDWATER OBSERVATIONS]
DRIL	ILL N	DESCRIPTION	nscs	STRATA	DEPTH	NUMBER	TYPE	%	SMS	DDIT	ROUNE BSER\		7	
	BA			ω _	(ft)	NOM	≽	REC	BLOW	8 A 80	2 2			Pipe Stickup: 2.91 ft Pipe Elev: 586.4 ft
		Brown TOPSOIL, moist, loose. Gray SAND, wet, loose, trace gravel.		2) (2) (2)	0.0 583.1	П							800	0.0 - 1.0 ft bgs:
1		Black peaty SAND, wet, loose.	-		0.4 582.5								o o	Bentonite Chips
					1.0									2" Schedule 40 PVC
			SP		:		SS	100						
3							0,	_						
					579.5									
		Black peaty SILT, wet, loose, hydrocarbon scent, some trash present.			4.0	11								1.0 - 8.0 ft bgs: Filte
		produit.								<u> </u> -				Sand
														2" Schedule 40 slotte
			M											FVC
													1	
							SS	48						
		Dark gray SAND, wet, loose, shell fragments.			575.5	1							0.0	
					:							9 9 9	,0°4a	
			SP		:							a a a	0.0	
					:			+		-		å °°°,	0.0	
					: 572.5							å ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	0.0	
	Dia.	Dark brown peaty SILT, moist, soft.			11.0								0.4	
Geoprobe 7822DT	Direct Push - 4-in Hole Dia.		M		571.1							a . a . 0	o a a	
robe 7	sh - 4-i	Brown fine SAND, wet, loose, shell fragments.			12.4	11	SS	09					0.0	
Geop	ect Pus		,		:								0.0	
	ä		SP		:								0.0	
					568.7								0.0	
		Gray silty SAND, wet, loose to firm.			14.8					=		a . a . 0	0.0	
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			SM		1								0.0	
														8.0 - 30.0 ft bgs: Material Collapse
]			Ш						
					1									
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					561.5							9 9 0	0.4	
		Gray sandy SILT, moist, compact.	ML		22.0		SS	100				a , a , 0	0.0	
		Gray CLAY, moist, firm to hard, trace sand, High plasticity.	╀		560.5	$\left\{ \ \right $						9 9 0	,0°a ,0°a ,0°a	
		· · · · · ·	H	V//.		$ \ $							0.4	
			ō	V//.								, e , e , o	0.0	
		Continued on Next Page	-	<i> </i>				\mathbb{H}	+	-			0.4	
		Communication and ago	1							I	1	l .		REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 24, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

Ider - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 24, 2021 ELEVATION:

583.5 ft (Ground)

Sheet 2 of 2

COORDINATES: N: 577703.7 ft E: 12626240.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft LOCATION: Grand Haven, MI

CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

			SURVE	YOR	R: G	PS								
		20	MATERIAL PROFILE					SAMP	PLES	;		_ R	κ. s	CONSTRUCTION AND INSTALLATION DETAILS
£ 1	2	HH				ELEV.						ATIO A	WATE	DETAILS
DEPTH (ft)	DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA		띪		%	S	_ 5	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	
	ם	DRI		ľ	STI	DEPTH (ft)	NUMBER	TYPE	REC	BLOWS	- -	AD OBSI	GRC OBS	Pipe Stickup: 2.91 ft Pipe Elev: 586.4 ft
:	-		Gray CLAY, moist, firm to hard, trace sand, High plasticity.				z		F		-			Pipe Elev: 586.4 ft
26 27 27 28 - 29					V///	4								
26		ja.			V///									() () () () () () () () () ()
		ole □			V///									
- 2/	78/e	4-in F		H	V///			SS	100					
28	Geoprobe / 822U I	Direct Push - 4-in Hole Dia.			V///.			0)	-					
<u> </u>	3	rect F												
- 29														
						553.5								
30	1		End of hole at 30.0 ft.		/////	333.3				H				Service Services
31			Refusal prior to 40-ft target depth.											
"			Refusal prior to 40-ft target depth. Refer to diagram for well construction details.											
32														
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														REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 24, 2021 DATE: Nov 03, 2021

DATE: August 23, 2021 ELEVATION:

PROJECT: J.B. Sims Well Installations COORDINATES: N: 578114.4 ft E: 12626145.2 ft

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

		SURVE	OR	: G	PS								
	ОО	MATERIAL PROFILE					SAMP	LES		NS ONS	ER	CONSTRUCTION	ON AND INSTALLATION DETAILS
H (#	IETH.		(2)	∢.	ELEV.					IONA/ATIO	OWATI ATIO	· '	7
DEPTH (ft)	DRILL METHOD	DESCRIPTION	NSCS	STRATA	DEPTH	BER	TYPE	%	I.UE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		
_ _	DR			S T	(ft)	NUMBER	Σ	REC %	N-VAL	OB ₈	R R		Pipe Stickup: 2.46 ft Pipe Elev: 586.3 ft
		Black sandy TOPSOIL		11/2 11/2 1-14	0.0 583.3								1
- 1		Brown fine to very fine SAND, moist to wet, loose.			0.5								0.0 - 1.0 ft bgs: Bentonite Chips
													2" Schedule 40 PVC
2							"	0					
3							SS	100					}
													}
4													}
													1.0 - 8.0 ft bgs: Filter Sand
5													2" Schedule 40 slotted
6													PVC
7					576.3		"						
8		Dark gray medium SAND, wet, loose, some organics present.	1		7.5		SS	20					1
9													
40													
10			SP									a ' a ' a ' a ' a ' a	
11	æ.		"										
П	Direct Push - 4-in Hole Dia												
12 7825	4-in Hc						SS	38					
12 13 Ceoprobe 7822DT	- usn						S	3				a ' a ' a ' a ' a ' a	
ě	irect F												
14													
15					568.8			Ш	Ш				
		Brown fine sand, wet, loose, trace gravel.			15.0								
6													d de la companya de
_													
7							SS	99					
8							0,						
9													
9													8.0 - 30.0 ft bgs: Material Collapse
20								\coprod	Ц				
		Gray SILT, wet, compact.			563.3 20.5								
21		Gray CLAY, moist, soft to firm, sticky, high plasticity.	Ť		563.0 20.8							4 4 9 6 4	
,,				V///	20.0							3 9 0 0 8	
22					1		SS	80				3 9 0 0 8	
23			공	V///	1							3 0 0 0 0	
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			1	1 # # #	1	ı I		1 1	1 1			The Country of the Country of the	
25		Continued on Next Page	-					\sqcup	Н				4

HAMMER TYPE: Automatic

CLIENT:

GHBLP

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton
CHECKED: Caroyln Powrozek

DATE: Aug 23, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

583.8 ft (Ground)

older - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 23, 2021 ELEVATION:

583.8 ft (Ground) COORDINATES: N: 578114.4 ft E: 12626145.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

GPS SURVEYOR:

		SURVEY	UR	: GPS						Γ	1	
		MATERIAL PROFILE				S	AMPI	LES		NS NS	문 S	CONSTRUCTION AND INSTALLATION DETAILS
TH (ft			, ·	₹. ELE	٧.					1ON¢ /ATIC	OWAT /ATIO	
DEPTH (ft)	ODII I METHOD	DESCRIPTION	nscs	A 2 DEb.		,	Д.	%S	LUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	
_ _	2		٦	S (ft)	TH B		TYPE	REC %	N-VAL	OB.	8 8	Pipe Stickup: 2.46 ft Pipe Elev: 586.3 ft
.	ı	Gray CLAY, moist, soft to firm, sticky, high plasticity.			1			Ħ	l			
- 26												
-	: 2											
- 27 282	1 1 1		_			Ι,	rn					
- 27 CS2 equicoe5	and a		CH			3	SS	82				
- 26 - 27 - 27 - 28 - 28 - 29	oiroct Dish - Asia Holo Dis											
- 29	-											
- 30				553	.8							
- 30		End of hole at 30.0 ft.										
- 31 -		Refusal prior to 40-ft target depth. Refer to diagram for well construction details.										
- 32												
- 33												
- 34												
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- 49 -												
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											1	REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 23, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

CLIENT: GHBLP

Grand Haven, MI

DATE: August 23, 2021 ELEVATION: 581.9 ft (Ground) COORDINATES: N: 578303.9 ft E: 12626551.8 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427

LOCATION:

COORD SYS: SP MI South FIPS 2113 Ft

CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVE	YOR	K: G	SPS					T	-	
(n	ф	MATERIAL PROFILE					SAMP	LES		AL ONS	S S	N AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER	Pipe Stickup: 3.21 ft Pipe Elev: 585.1 ft
		Brown TOPSOIL, moist, soft.		316 316 - 14	0.0 581.4							0.0 - 1.0 ft bas:
		Gray medium SAND, wet, loose.			0.5		SS	100				Bentonite Chips 2" Schedule 40 slotted PVC
1		Black SAND, wet, loose, organics present, hydrocarbon scent.	SP		578.4							1.0 - 8.0 ft bgs: Filter
5		Black peaty SAND, moist, loose, trace silt.			576.4							Sand 2" Schedule 40 slotte PVC
,							SS	40				
		Dark gray peaty SILT, moist, soft, trace sand.	¥		573.9 8.0 573.2							
		Light black peaty SAND & SILT, moist, soft, trace shell fragments.			8.7							
	Dia.		SP-SM									
Geoprobe 7822DT	- 4-in Hole	Black peaty SILT, moist, soft, shell fragments present, trace			569.4		SS	54				
Geopro	Direct Push - 4-in Hole Dia	gray sand, organics present.			12.3							
			M				SS	99				
							S	9				
					561.9							
		Gray fine SAND, wet, loose, trace shell fragments. Black peaty SILT, moist, soft, trace gray sand.	SP									
							(0					
			ML				SS	09				
												8.0 - 40.0 ft bgs: Material Collapse
		Continued on Next Page	1					П				T REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 23, 2021 DATE: Nov 03, 2021

CLIENT: GHBLP DATE: August 23, 2021 ELEVATION: 581.9 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 578303.9 ft E: 12626551.8 ft COORD SYS: SP MI South FIPS 2113 Ft

PROJECT NO: 21464427 LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

			SURVEY	OR	:(GPS							
		2	MATERIAL PROFILE					SAMP	LES		S J	κ. δ	CONSTRUCTION AND INSTALLATION
(£)	RIG	Η̈́			_	ELEV					ATIO	WATE	DETAILS
DEPTH (ft)	DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA PLOT	DEPTH		ш	%	S III	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	
		DRII		Ď	ST	(ft)	NUMBER	TYPE	REC	BLOWS N-VALUE	AD	GRO	Pipe Stickup: 3.21 ft Pipe Elev: 585.1 ft
			Black peaty SILT, moist, soft, trace gray sand.				-		$\dagger \dagger$	1	-		
26													
E 20													
27													
								SS	72				
28													4 9 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
29													
30									$\perp \downarrow$		1		
31		.ej											
	ZDT	ole D											
E 32	e 782	4-in-F		ML				SS	9,				
32	Geoprobe 7822DT	- usn _c		_				0,	ľ				9
Εl	Ğ	Direct Push - 4-in Hole Dia											**************************************
34		_											
35													
													1.3 4.4 4.4 4.4 4.4 1.1
36													(a
37								SS	06				
38								S	6				
-													
39													
40						541.9							
ŧΪ			End of hole at 40.0 ft.										
41			Target Depth Reached Refer to diagram for well										
			construction details.										
42													
43													
Εl													
44													
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F													
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1													KEV:

HAMMER TYPE: Automatic



LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 23, 2021 DATE: Nov 03, 2021

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GHBLP DATE: August 23, 2021

ELEVATION: 585.1 ft (Ground) Sheet 1 of 2

CLIENT: COORDINATES: N: 578314.9 ft E: 12625722.7 ft PROJECT: J.B. Sims Well Installations

COORD SYS: SP MI South FIPS 2113 Ft

PROJECT NO: 21464427 LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

		SURVEY	OR	: G	PS	т —				т —		1	
- U	40D	MATERIAL PROFILE	1			_	SAMP	PLES		AL ONS	TER		N AND INSTALLATION ETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Stickup: 2.96 ft Pipe Elev: 588.1 ft
		Brown sandy TOPSOIL, dry, loose, some gravel.		2) (c. 2) (c. 2) (c. 2)	0.0								0.0 - 1.0 ft bgs:
1				<u>alk alk</u> k alk : alk alk									Cement
2				د عاد : عاد عاد									1.0 - 2.0 ft bgs: Bentonite Chips 2" Schedule 40 PVC
3				ts silts : <u>silts silts</u> ts silts :			SS	100					
				ماند ماند د ماند : ماند ماند	581.1								
4		Brown fine SAND, dry, loose, trace gravel.		SMS SMS	4.0								
5						-				_			2.0 - 9.0 ft bgs: Filter
6		Black peaty SAND, dry, loose.			579.1 6.0								Sand
7		Gray fine SAND, dry to moist, loose, organics present starting at 9.4' BGS.	SP		578.8 6.3								2" Schedule 40 slotter PVC
8							SS	55					
9					575.4							4, 9, 0, 0, 4, 9,	
0		Gray GRAVEL, wet, loose. Black gravelly SAND, wet, loose, glass and rubber trash	SP ⊗		9.7 575.1	1				-			
1	ei	present. Dark gray peaty silty SAND, moist, soft.			10.0 574.6 10.5								
22DT	Direct Push - 4-in Hole Dia.												
Geoprobe 7822DT	sh - 4-in		SM				SS	48					
Geop	irect Pu												
4													
5		Black mucky SAND, wet, loose. Dark gray medium SAND, wet, loose, trace shell fragments.	H		570.1 15.0					-			
6		Dark gray medium SAND, wet, loose, trace shell fragments.			569.8 15.3								
,													
							SS	25					
3		Gray fine SAND, wet, slightly cohesive.	SP		566.5							A	
9		Gray line SAND, wet, slightly corresive.			18.6								9.0 - 29.5 ft bgs: Material Collapse
								+	\parallel	_			iviateriai Cullapse
					E62 7								
2		Gray silty SAND, moist, firm.	SM		563.7 21.4								
		Gray fine to very fine SAND, moist, compact. Wet from 25-28'	S		562.5 22.6		SS	72					
3		BGS.											
4			SP										
25		Continued on Next Page	-					\parallel		_			
			1	1	1							1	REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 23, 2021 DATE: Nov 03, 2021

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der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 23, 2021 ELEVATION:

585.1 ft (Ground) COORDINATES: N: 578314.9 ft E: 12625722.7 ft Sheet 2 of 2

J.B. Sims Well Installations PROJECT:

PROJECT NO: 21464427

COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI

HORZ DATUM: NAD83

00/11		Six. Grand Haven, ivii	SURVEY			PS		Ü			HORZ BATOW.		
	5	MATE	RIAL PROFILE					SAMF	PLES		J Z	# S	CONSTRUCTION AND INSTALLATION DETAILS
DEPTH (ft)	T L	Ť L		(0	۷.	ELEV.					- ATIONA	DWATE	BETTALES
DEP DRIL		OH LIMINATE DESCRIPTION DESCRIPTION	N	nscs	STRATA	DEPTH (ft)	NUMBER	TYPE	REC %	ALUE	N-VALUE N-VALUE ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	Pine Stickup: 2 06 ft
	٥	Gray fine to very fine SAND, moist, c	ompact. Wet from 25-28		: 1 :- : -	(11)	2		2	됩	<u></u>		Pipe Stickup: 2.96 ft Pipe Elev: 588.1 ft
00		BGS.	opasa 7761 20 20										
26	- I	ole Dia											
27 82	9.5	4- H Ci		SP				SS	100				
26 27 28 20 DI 28 28 27 28 27 28 27 28 27 28 27 28 28 28 28 28 28 28 28 28 28 28 28 28	40.0	Direct Push - 4-in Hole Dia.											
	Ë	Direc											
29		End of hole at 29	5.6			555.6							
30													
31		Refusal prior to 40-ft ta Refer to diagram f construction det	or well ails.										
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47 48 49													
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					L	<u> </u>	Ш						REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

CHECKED: Caroyln Powrozek

DATE: Aug 23, 2021 DATE: Nov 03, 2021

0

LOGGED: Parker Sutton

CLIENT: GHBLP DATE: August 30, 2021 ELEVATION: 580.5 ft (Top of Casing)

COORDINATES: N: 578138.1 ft E: 12625241.6 ft PROJECT: J.B. Sims Well Installations SP MI South FIPS 2113 Ft COORD SYS: PROJECT NO: 21464427

LOCATION: CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83 Grand Haven, MI

SURVEYOR: GPS

т т		SURVE	IOI		PS					<u> </u>				
<u>9</u>	НОВ	MATERIAL PROFILE	1				SAMP	PLES		JAL IONS	TER	CON	STRUCT	TION AND INSTALLATION DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	SOSN	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL	GROUNDWATER OBSERVATIONS			Pipe Elev: 583.5 ft
		Black sandy MUCK, wet, loose / soft.		<u> </u>	0.0 580.0	Ħ		П	\top					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3		Gray fine SAND, wet, loose.			0.5		SS	26						2" Schedule 40 PVC
		Black peaty SAND, wet, loose, metal present, glass present, paper present. Hydrocarbon scent and sheen.			576.5 4.0 575.2 5.3									0.0 - 9.0 ft bgs: Filte Sand
		Gray fine SAND, wet, loose, shell fragments present. Silty sand seam present from 11.5-12' BGS.			5.3		SS	16						2" Schedule 40 slott PVC
						_						00 00 00 00 00 00 00 00 00 00 00 00 00	0.4	
Marsh Master Geoprobe	Direct Push - 4-in Hole Dia.		SP				SS	52						
							SS	76						
							SS	48					0,0	9.0 - 35.0 ft bgs: Material Collapse
		Continued on Next Page			-			\parallel				. ** *	. 0., (4.)	DEV.
		TYPE: Automatic												REV:

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 30, 2021 DATE: Nov 03, 2021

Sheet 1 of 2

CLIENT: GHBLP DATE: August 30, 2021 ELEVATION: 580.5 ft (Top of Casing)

COORDINATES: N: 578138.1 ft E: 12625241.6 ft PROJECT: J.B. Sims Well Installations SP MI South FIPS 2113 Ft COORD SYS:

PROJECT NO: 21464427

CONTRACTOR: MATECO Drilling LOCATION: HORZ DATUM: NAD83 Grand Haven, MI

SURVEYOR: GPS

Brown fine SANO, well, loose, shell flagments present.				SURVE	YOR	:: G	PS							
Clay free SAND, well, boxes, shell flagments present. Stilly 2-3-3			٥	MATERIAL PROFILE					SAMP	LES	;	. 9	CC (0	
Clay free SAND, well, boxes, shell flagments present. Stilly 2-3-3	(£)	ડાઉ	ТНО									TION	MATE	DETAILS
Clay free SAND, well, boxes, shell flagments present. Stilly 2-3-3	PTH	ILF	ME	PERCENTION	SS	¥ L		~		П		- NA - NA - NA	NDW RVA	
Clay free SAND, well, boxes, shell flagments present. Stilly 2-3-3	DE	DR	3IL	DESCRIPTION	nsc	STR.	DEPTH	MBEF	ΥPE	% O	SMO	3SEI	ROU	
Secretary Secr								ΩN		22	BL N	`Ö	0	Pipe Elev: 583.5 ft
Brown State, soft, lices aand.				Gray fine SAND, wet, loose, shell fragments present. Silty sand seam present from 11.5-12' BGS.	_\p_			$\ \ $						\$ ° 0 ° 0 ° 0 ° 0 ° 0 ° 0 ° 0 ° 0 ° 0 °
Section Sect	26			Brown SILT, wet, soft, trace sand.			23.3			Ш				and the first section of the section
Bitoun fires SAND, wet. loose, shell fingments present. 22.0 39 40 40 40 40 40 40 40 4					Σ					Ш				and the state of t
20	27			Rrown fine SAND wet loose shell fragments present		ЩЩЦ		$\ \ $		Ш				
20				Brown and Grand, wet, 1999s, shell magnished present.			27.0		SS	100				\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
Dark gray to gray silty SAND, wet, compact. SATO SATO	28									Ш				1 3 4 3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
Dark gray to gray silty SAND, wet, compact. SATO SATO			a.				:			Ш				
Dark gray to gray silty SAND, wet, compact. SATO SATO	- 29	probe	ole Di							Ш				
Dark gray to gray silty SAND, wet, compact. SATO SATO		r Geo	i-i H											
Dark gray to gray silty SAND, wet, compact. SATO SATO	30	/aste	sh - 4		SP									
Dark gray to gray silty SAND, wet, compact. SATO SATO	21	arsh N	oct Pu							Ш				a care
33 S470 S470	31	M	Dire											
33 S470 S470	32						:			Ш				
Dark gray to gray sity SAND, wet, compact. 33 33 33 35 35 35 35 3									SS	100				1
Dark gray to gray silty SAND, wet, compact. Same	- 33													
Section Sect				Dark gray to gray silty SAND, wet, compact.				$\ \ $						
End of hole at 35 0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground relevation survey unable to be collected due to piezometer placement in standing water. 40 41 42 43 44 45 46 47 48 49	34				Σ									
End of hole at 35.0 ft. Refusal prior to 40-ft target depth. Refer to diagram for well construction details. Ground relevation survey unable to be collected due to piezometer plaucement in standing water. 40 41 42 44 45 46 47 48 49 50					"		545.5							
Construction details. Ground elevation survey unable to be collected due to piezometer placement in standing water. 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 49	35			End of hole at 35.0 ft.				Ħ		П				
Construction details. Ground elevation survey unable to be collected due to piezometer placement in standing water. 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 49	36			Refusal prior to 40-ft target depth.										
be collected due to piezometer placement in standing water.														
be collected due to piezometer placement in standing water. - 40	37			Ground elevation survey unable to										
- 38 - 39 - 39 - 30 -				be collected due to piezometer						Ш				
- 40	38			placement in standing trailer.										
- 40														
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				<u> </u>	1	L	1	Щ		Ш	Ш			I REV:

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 30, 2021 DATE: Nov 03, 2021

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CLIENT: GHBLP DATE: August 19, 2021 ELEVATION: 583.0 ft (Ground)

COORDINATES: N: 578196.2 ft E: 12624990.2 ft PROJECT: J.B. Sims Well Installations PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

GPS SURVEYOR:

		SURVE	TUR	ι. σ	SPS	I	SAMP	N EC				CONSTRUCT	ION AND INSTALLATION
(ii)	гнор	MAI ERIAL PROFILE	T				SAMP	LES		NAL	ATER	CONSTRUCT	DETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Stickup: 2.78 ft Pipe Elev: 585.8 ft
		Black sandy TOPSOIL, moist, soft, organics present.		31% 310 - 40	0.0	Ħ						3 0 0	6.6
1		Black peaty SAND, moist to wet, soft, wet @ 1.5' BGS.			0.5								0.0 - 1.0 ft bgs: Bentonite Chips
2			S										2" Schedule 40 PVC
2		Brown silty SAND, wet, loose, some trash present.			580.5	4	SS	100					
3		2.5.m. 5.m. 5.m. 5. m. 5											
4			_										
_			SM										1.0 - 8.0 ft bgs: Filter Sand
5													2" Schedule 40 slotte
6		Gray sandy SILT, moist, firm.	M		577.0 6.0	$\ \ $							PVC
7		Black peaty SAND, moist, soft, some trash present.			576.5 6.5								選 -
			g.				SS	28					
8					574.3							3 9 0 0 0	
9		Gray silty SAND, moist to wet, loose.			8.7							a ' a ' a ' a ' a ' a ' a ' a ' a ' a '	
0													क
		Gray silty SAND, wet, loose, some organics present.	+		572.6 10.4	$\ \ $							(1) (2) (3)
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Geoprobe 7822DT	Direct Push - 4-in Hole Dia											a * * 0 * 0 a	
probe 7	-4 - dsr						SS	54					
Geo	irect Pu												
4		Brown fine SAND, wet, loose.			569.0	$\ \ $							क ।
5												3 0 0 0	
												9,000	8 8 6
5			SP										
7							(0	_					
3		Gray silty SAND, wet, loose to firm.			565.0		SS	89					
9		Gray Sitty GAND, wet, loose to limit.			18.0								
3												å	
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												\$ \$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8.0 - 34.0 ft bgs:
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2							SS	82					
3							3,					3 9 0 0 4	
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4													
5		Continued on Next Page	+	<u> 1444 - </u>	558.0 25.0	┨┞		++	+				

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 19, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

CLIENT: GHBLP DATE: August 19, 2021 ELEVATION:

583.0 ft (Ground) COORDINATES: N: 578196.2 ft E: 12624990.2 ft PROJECT: J.B. Sims Well Installations

PROJECT NO: 21464427

LOCATION:

Sheet 2 of 2

COORD SYS: SP MI South FIPS 2113 Ft

Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

27			SURVEY	OR	: G	PS							
Gray safey CLAV, most, firm. Pop plastedly State		00	MATERIAL PROFILE					SAMP	PLES	 	<u> </u>	₩ Ş	
Gray safey CLAV, most, firm. Pop plastedly State	H (#)	H			A .	ELEV.					ONA ATIO	WATE ATION	DETAILS
Gray safey CLAV, most, firm. Pop plastedly State	DEPT DRILI	W	DESCRIPTION	SSS	TRAT	DEPTH	BER	H	%	WS	DDIT	SOUNE	
Gray sarky CLAY, moist, fam, high pleasistry Gray sity CLAY, moist, fam, high pleasistry Find of hor at 340 B. Reduced of the control of t	_ _	DR		_	, o	(ft)	NOM	Ξ	REC	BLO	OB A	R B	Pine Fley: 585 8 ft
Ciney and ySUT, wet, firm. 22.8 22.8 23.9 24.9 24.9 25.9			Gray fine SAND, wet, loose.	SP		5573							
10	26		Gray sandy SILT, wet, firm.										
10	07												
1 1 2 2 2 2 2 2 2 2	27							SS	94				
	28	6											
	207	Hole Di											
	79 Z9 Z9	4-in F		₹									*.************************************
	30 00	Push								\vdash	_		
	,,	Direct											
	31												
End of note at 34 and 1. Refusal prior 40-8 target depth. Refer to diagram for well construction details. 37 40 44 45 46 47 48 49 50 60 60 60 60 60 60 60 60 60	32							SS	100				
End of note at 34 and 1. Refusal prior 40-8 target depth. Refer to diagram for well construction details. 37 40 44 45 46 47 48 49 50 60 60 60 60 60 60 60 60 60	33		Gray silty CLAY moist firm high plasticity				4						
End of note at 34 and 1. Refusal prior 40-8 target depth. Refer to diagram for well construction details. 37 40 44 45 46 47 48 49 50 60 60 60 60 60 60 60 60 60	33		Gray sity GEAT, moist, min, mgri plasticity.	:L-ML	IIIIK								
Refer to diagram for well construction details. Refer to diagram for well construction details.	34		End of hole at 34.0 ft.	0		549.0	H			H			<u>့်ရဲ့ ဂိုက္ခံုခြင့္ပိုင္တိုင္တိုင္တိုင္တိုင္တိုင္တိုင္တိုင္တ</u>
Construction details. Construction details. Construction details.	35		Refusal prior to 40-ft target depth.										
37 38 38 40 41 42 43 45 46 47 48 49 50	33		Refer to diagram for well construction details.										
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	50												DE\/·

HAMMER TYPE: Automatic



LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 19, 2021 DATE: Nov 03, 2021

CLIENT: GHBLP DATE: September 01, 2021 ELEVATION: 582.6 ft (Ground)

PROJECT: J.B. Sims Well Installations COORDINATES: N: 578307.2 ft E: 12624752.7 ft PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: Grand Haven, MI CONTRACTOR: MATECO Drilling HORZ DATUM: NAD83

SURVEYOR: GPS

П	T	SURVEY MATERIAL PROFILE	UR	. (GPS	Τ	SAMF	PLES	 3	σ		CONSTRUCTIO	N AND INSTALLATION
DRILL RIG		DESCRIPTION	nscs	STRATA	ELEV. DEPTH	NUMBER	TYPE	REC %	BLOWS	NVAUE	GROUNDWATER		Pipe Stickup: 3.29 ft
	+	Black marshy TOPSOIL, moist, soft. Gray fine SAND, moist to wet, loose.		316 31		_				z			Pipe Elev: 585.9 ft 0.0 - 1.0 ft bgs: Bentonite Chips 2" Schedule 40 PVC
		Black mucky SAND, wet, loose, trash present.	SP		579.9 2.7 578.4		SS	62					
		Black sandy PEAT, moist, loose, shell fragments present, wood and plastic trash present down to 5' BGS.		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4		SS	46					1.0 - 8.0 ft bgs: Filt Sand 2" Schedule 40 slot PVC
				7 77 7 77 77 7 7 77 7 77 7 77 7 77	7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2								
Marsh Master Geoprobe	lect i usii - 4-iii i iole Dia.			7 70 7 7 70 7 7 70 7 7 70 7 7 70 7 7 70 7 7 70 7	7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4		SS	20					
	2 -	Gray fine SAND, wet, loose.					8	90					8.0 - 27.0 ft bgs: Material Collapse
	- 1	Gray coarse SAND, wet, loose. Gray very fine SAND, wet, firm.	SP		559.4 23.2 558.8 23.8	_	SS	92					
		End of hole at 27.0 ft.			555.6		SS	100					
		Refusal prior to 40-ft target depth. Refer to diagram for well construction details.											
MMER	 	YPE: Automatic											REV:

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Sep 01, 2021 DATE: Nov 03, 2021

Sheet 1 of 1

CLIENT: GHBLP DATE: August 20, 2021 ELEVATION: 583.1 ft (Ground) PROJECT:

COORDINATES: N: 578348.3 ft E: 12624980.1 ft J.B. Sims Well Installations PROJECT NO: 21464427 COORD SYS: SP MI South FIPS 2113 Ft

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

GPS SURVEYOR:

		SURVE	101		SPS		SAMP	טו בפ				CONSTRUCTION	N AND INSTALLATION
કાટ	ТНОБ	MAIERIAL PROFILE	1			1	SAIVIP	LES		NAL TIONS	ATER TONS		ETAILS
DRILL RIG	DRILL METHOD	DESCRIPTION	nscs	STRATA	ELEV. DEPTH (ft)	NUMBER	ТУРЕ	REC %	BLOWS N-VALUE	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS		Pipe Stickup: 3.18 ft Pipe Elev: 586.3 ft
		Brown sandy TOPSOIL, moist, loose.		31% 310 - 34	0.0 582.6	Ħ							
2		Brown fine SAND, moist to wet, loose. Dark brown peaty SILT, moist to wet, soft, trash (glass) present down to 9' BGS. Hydrocarbon scent from 7-9' BGS.	SP		0.5	-	SS	100					0.0 - 1.0 ft bgs: Bentonite Chips 2" Schedule 40 PVC
		Gray sand seams present starting at 9' BGS.											1.0 - 8.0 ft bgs: Filte Sand
			ML				SS	40					2" Schedule 40 slotte PVC
Geoprobe 7822DT	Direct Push - 4-in Hole Dia.	Gray fine SAND, wet, loose, shell fragments present. trace silt, some medium sand.	SP		569.6 13.5	_	SS	36					
		Gray silty fine SAND, wet, loose, small shell fragments.	SM		567.7 15.4	-	SS	09					
		Gray fine SAND, wet, loose.	۵		18.0	- -							
		Gray very fine sandy SILT, wet, soft.	ML SP		560.8	-	SS	76					8.0 - 40.0 ft bgs: Material Collapse
		Continued on Next Page	-	ШШ	Ц	1		$\perp \! \! \! \! \! \! \! \! \! \! \perp$	\perp				

HAMMER TYPE: Automatic

GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 20, 2021 DATE: Nov 03, 2021

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Sheet 1 of 2

der - 3 Imperial US / Golder US Auto (common in US) / 2021-10-08

CLIENT: GHBLP DATE: August 20, 2021

ELEVATION: 583.1 ft (Ground) J.B. Sims Well Installations COORDINATES: N: 578348.3 ft E: 12624980.1 ft

PROJECT NO: 21464427

PROJECT:

COORD SYS: SP MI South FIPS 2113 Ft

Sheet 2 of 2

LOCATION: CONTRACTOR: MATECO Drilling Grand Haven, MI HORZ DATUM: NAD83

SURVEYOR: GPS

			SURVEY	OR	: G	PS							
		2	MATERIAL PROFILE					SAMP	LES		S LZ	K S	CONSTRUCTION AND INSTALLATION
DEPTH (ft)	DRILL RIG	DRILL METHOD				ELEV/					ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	DETAILS
ᇤ	╡	LME	DESCRIPTION	nscs	STRATA	ELEV.	<u>~</u>			တ မ	H NEW N	UND	
	5	JRI	BESONII HON	SN	STF	DEPTH (ft)	NUMBER	TYPE	REC %	BLOW	ADI	GROI	Pipe Stickup: 3.18 ft
	4	_	Gray very fine sandy SILT, wet, soft.				ź		Ľ.	<u>∞</u> ≥	<u> </u>		Pipe Elev: 586.3 ft
			Gray very fine SAND, wet, loose.	M		557.7 25.4							
26				SP									
E						556.3							
27			Gray silty SAND, wet, compact, cohesive.			26.8							
								SS	64				
28													
29													
2													4 3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
30							╽┟			4	_		6 1
31		ن ـ											
	_	le Dia											
32	7822	유											
	Geoprobe 7822DT	Direct Push - 4-in Hole Dia						SS	8				
33	9	ct Pu		SM									
34		Ö		0									
[]													
35										4			
Ē l													
36													
E													
37													
								SS	100				a
38													
39													
40	4		End of hole at 40.0 ft.			543.1	Н		Н	+			
41			Target Depth Reached Refer to diagram for well construction details.										
			construction details.										
42													
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													REV:

HAMMER TYPE: Automatic

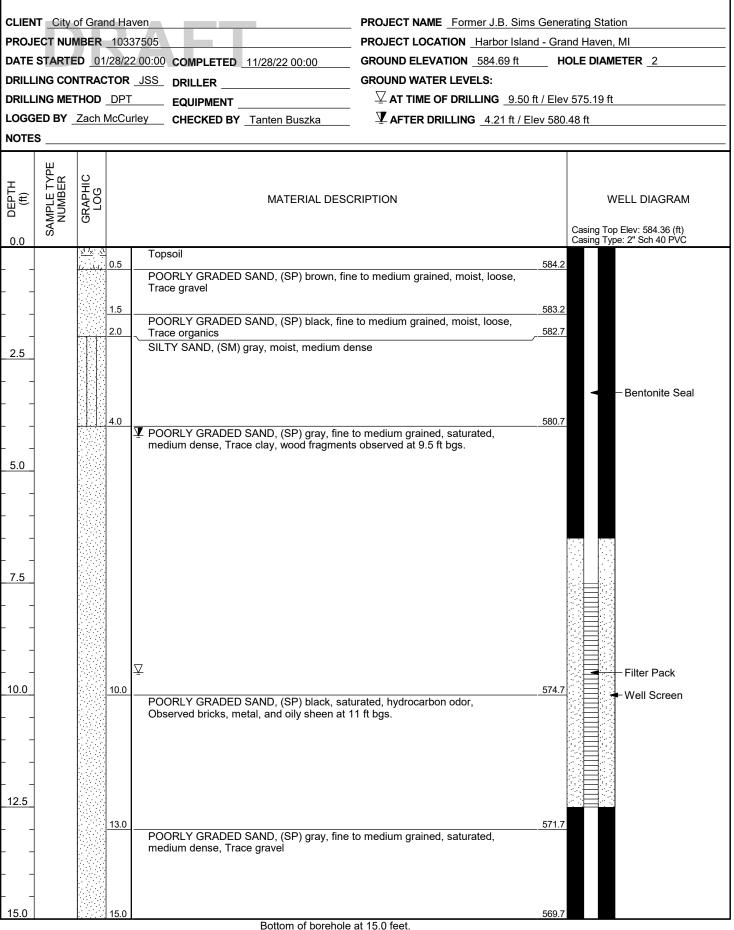
GOLDER MEMBER OF WSP

LOGGED: Parker Sutton CHECKED: Caroyln Powrozek DATE: Aug 20, 2021 DATE: Nov 03, 2021



CLIENT -City	∕ of Grai	nd Haven			PROJECT NAME Former J.B. Sims	Generating Station	
						PROJECT LOCATION Harbor Island - Grand Haven, MI	
PROJECT NUMBER 10337505 DATE STARTED 11/28/22 00:00 COMPLETED 11/28/22 00:00							
DRILLING CONTRACTOR JSS DRILLER							
DRILLING METHOD DPT EQUIPMENT					AT TIME OF DRILLING 2.00 ft / Elev 581.23 ft		
LOGGED BY Zach McCurley CHECKED BY Tanten Buszka					=		
NOTES			•				
O DEPTH O (ft) SAMPLE TYPE NUMBER	GRAPHIC LOG			MATERIAL DE	SCRIPTION	WELL DIAGRAM Casing Top Elev: 582.81 (ft) Casing Type: 2" Sch 40 PVC	
	21.1%	Тор	Soil				
	11.71	0.5				582.7	
			ORLY GRADED	SAND, (SP) brown,	fine to medium grained, moist, loose	- Bentonite Seal	
		1.0				582.2	
		CLA	YEY SAND, (SO) very dark brown a	nd gray, moist, medium dense,		
		Sall	urated at 1.8 ft bo	js			
		Ā					
0.5							
2.5							
		3.0 PO0	ORLY GRADED	SAND. (SP) brown.	fine to medium grained, saturated,	580.2	
		loos		, (, , , ,	3 , , ,		
		:					
						Filter Pack	
		:					
						Well Screen	
5.0							
		5.5	2017 004000	0.4MD (0D) 5		577.7	
		loos	ORLY GRADED e, Wood fragme	SAND, (SP) gray, fir nts observed at 6.5 f	ne to medium grained, saturated, ft bgs		
		:					
		7.0				576.2	
				Bottom of boreh	ole at 7.0 feet.		





DODIN'			en, Michiga rher Joland	411	SURFAC	E ELEVATION AN	ing GP-01/MW-3
3ORIN(LUCATI	ON: Hai	rbor Island		TBD	ADTED	DATE ENVIOLED
DRILLIN	NG CONTI	RACTOR:	Job Site	Services	DATE ST 11/29/2		DATE FINISHED: 11/29/22
ORILLIN	NG METH	OD: DP	7/1		TOTAL D 18.0	EPTH (ft.):	SCREEN INTERVAL (ft.): 13-18
DRILLIN	NG EQUIP	MENT:	Geoprobe	7822DT	DEPTH T 13.0	O WATER ATD (ft): CASING: 1", Sch-40 PVC
SAMPI	ING METH	10D· D	ual Tube		DEPTH T	O WATER ATS (ft	
					13.0) BY:	REG. NO.
HAMME	ER WEIGH			DROP: NA	Kierste		NA
DEPTH (feet)	Sample No.	(%) (%) Blow	PID Reading (ppm)	DESCRIPTION NAME (USCS): color, moist, % by w dilatancy, toughness, dry strength,	t., plasticity, consistency	151	CONSTRUCTION DETAILS OR DRILLING REMARKS
	Sa			Fill (GW):		Top of Casing	Elevation: TBD
5	GP-01		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	SILTY SAND (SM): olive, dry, fine silty sand, loose SILTY SAND (SM): olive, dry, fine silty sand, trace gravel, loose SILTY SAND (SM): gray, dry, fine silty sand, loose CLAYEY SAND (SC): gray, moist plasticity CLAYEY SAND (SC): gray, satural plasticity SILTY SAND (SM): light gray, satural loose SILTY SAND (SM): light gray, satural sand with clay, slight plasticity End of boring at 18 ft bgs.	e to medium e to medium t, slight rated, slight turated,	informa Permai	rary well ation shown on log. nent well ation shown on instruction log.
20-] /	
				ronymns		/	

SCREENED WELL CONSTRUCTION FORM ormer JB Sims Generating Station, Harbor Island, Grand Haven, MI **Project Number:** 3650220203.02.02 MW-35 GP-01 Well ID: Location ID: Job Site Services 01/30/2023 Drilling Subcontractor: **Installation Date:** David Mokma & Jeremiah Chapman **Drilling Personnel: Decon Performed:** Yes Direct Push Jared Walbert **Technician Name: Drilling Method:** Other Amec Foster Wheeler Representatives: Measurement Point (riser) **Protective Casing:** Elevation (ft msl): 589.724 Type: Flush Mount Dimensions (in): 590.421 Stickup (ft): 0 Land Surface Elevation (ft): Length (ft): Approximate Diameter **Guard Post:** of Borehole (in): 3.75 inches **Surface Pad:** Depth to Water (ft): 9.20 **Dimensions:** 12"x12" **During Drilling:** 8.30 Type: Date: 01/30/2023 8.30 **Post Development:** Annular Seal (grout above well seal): **BENTONITE** Date: 01/31/2023 Material: **Installation Method:** NA **Hydrologic Unit: Bentonite Seal:** Manufacturer: BENTONITE 3/8' Material: Chips Water added during Type: drilling (gal): **Installation Method:** Gravity Hydration time (hrs): Water removed during development (gal): 20 **Filter Pack Material:** Manufacturer: #2 Well Gravel Material: 0.03 Top of Bentonite Seal (ft): 1.0 Size: **Installation Method:** Gravity 0.33 Surging time: Top of Filter Pack (ft): 5.0 Well Casing (Riser): **ECT Manufacturing Inc** Manufacturer: 7.30 POLYVINYL CHLORIDE (PVC) Top of Screen Interval (ft): Type/Material: Length: Diameter (in): Well Screen: Bottom of Screened Interval (ft): 12.30 Manufacturer: Johnson Screens Type/Material: POLYVINYL CHLORIDE (PVC) Diameter (in): 0.010 Bottom of Filter Pack (ft): 12.30 Slot Size (in): **Slot Type: Factory Slot** Bottom of Borehole (ft): 12.30 feet bgs Sump/End Cap: Notes: **Technician Signature:** Josef Willet None. Depths and heights are referenced to ground surface unless specified TOC. **Technician Name** (print): Jared Walbert All elevations are referenced to MSL (NAVD 88). QA/QC Date: QA/QC'd by:

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BORING	G LOCA	TION:	Harb	or Island		SUF TBI		LEVATION AN	D DATUM:	
ORILLIN	NG CON	ITRAC	TOR:	Job Site	Services	DAT	TE STAR	TED:	DATE FINIS	SHED:
	NG MET	,				ТОТ	/7/22 TAL DEP	ΓΗ (ft.):		ITERVAL (ft.):
JKILLIN	NG IVIE I	HOD:	ואט			20.		VATER ATD (f	5-9; 16-20	0
ORILLIN	NG EQU	IPMEN	NT: G	eoprobe	7822DT	5.0)	•	1", stainle	ess steel
SAMPL	ING ME	THOD	Dua	al Tube		DEF 5.8		VATER ATS (fi	:):	
HAMME	R WEI	GHT:	NA		DROP: NA	LOG	GGED BY red Wal			REG. NO.
- [SAMP				DESCRIPTION	'			CONSTRUCT	
DEPTH (feet)	Sample No.	Recovery (%)	Blow Counts	PID Reading (ppm)	NAME (USCS): color, moist, % by dilatancy, toughness, dry strength	wt., plasticity, n, consistency	Depth (ft)		OR DRILLING	
	San	Reco	шö	- A 3			De	Top of Casing	Elevation:	TBD
					POORLY-GRADED SAND (SF): yellowish				
4				0.0	brown (10 YR 5/8), moist		-			
					왕 유					,
				0.0				$ \ \ \ $		/
\dashv				0.0			-	\		/
							_			/
				0.0	왕 송					/
5-				0.0	POORLY-GRADED SAND (SF	 P): yellowish				
				NM •••	brown (10 YR 5/8), saturated		<u>*</u>			
	9-2-0			I IVIVI	WELL-GRADED SAND with G	, ,			\	
7	VAS20-5-9			NM	yellowish brown (10 YR 5/8), sat				1", stainles	s steel screen
_	>			NM	WELL-GRADED GRAVEL (GV 1 6/N), saturated	V): gray (GLEY	´ _		useu	
									rary well	
				NM					ation shov nent well	vn on log.
10-				NM			-		ation shov	vn on
									nstruction	
				NM						
\dashv				NM o	SILTY GRAVEL (GM): very da	rk brown (10			/ \	
					YR 2/2), saturated	2.2 (10			/ \	\
				NM 0						\
\dashv				NM 2	To		-		/	\
15-				NM				/	1	\
					CLAYEY SILT (ML): very dark 2/2), saturated, low plasticity	brown (10 YR		/		\
7				NM						\
4	0			NM	SANDY SILT (ML): dark gray (5 Y 4/1),	-	$ \parallel / $		\
	VAS20-16-20				saturated SILT (ML): very dark brown (10) VP 2/2)			40	
7	AS20			NM	saturated	, (T Z/Z),	_		1", stainles used	s steel screen
-	>			NM	POORLY-GRADED SAND (SF): gray (5 Y	-			\
20-				NM	6/1), saturated					
				I AIVI	End of boring at 20 ft bgs.			/		

SCREENED WELL CONSTRUCTION FORM ormer JB Sims Generating Station, Harbor Island, Grand Haven, MI **Project Number:** 3650220203.02.02 VAS20 Well ID: Location ID: Job Site Services 01/30/2023 Drilling Subcontractor: **Installation Date:** David Mokma & Jeremiah Chapman Yes **Drilling Personnel: Decon Performed:** Direct Push Jared Walbert **Technician Name: Drilling Method:** Other Amec Foster Wheeler Representatives: **Measurement Point (riser) Protective Casing:** Elevation (ft msl): 589.121 Type: **Round Well Monument** Dimensions (in): 585.615 Stickup (ft): Land Surface Elevation (ft): Length (ft): Approximate Diameter **Guard Post:** of Borehole (in): 3.75 Inches **Surface Pad:** Depth to Water (ft): 5.60 **Dimensions:** 12"x12"x6" **During Drilling:** 5.60 Type: 01/30/2023 Date: 5.08 **Post Development:** Annular Seal (grout above well seal): **BENTONITE** Date: 02/01/2023 Material: **Installation Method: Hydrologic Unit: Bentonite Seal:** Manufacturer: BENTONITE 3/8' Material: Chips Water added during Type: drilling (gal): **Installation Method:** Gravity Hydration time (hrs): Water removed during development (gal): 15 **Filter Pack Material:** Manufacturer: #2 Well Gravel Material: 0.03 Top of Bentonite Seal (ft): 1.0 Size: **Installation Method:** Gravity Surging time: Top of Filter Pack (ft): 3.0 Well Casing (Riser): **ECT Manufacturing Inc** Manufacturer: 4.0 POLYVINYL CHLORIDE (PVC) Top of Screen Interval (ft): Type/Material: Length: Diameter (in): Well Screen: Bottom of Screened Interval (ft): 9.0 Manufacturer: Johnson Screens Type/Material: POLYVINYL CHLORIDE (PVC) Diameter (in): 0.010 Bottom of Filter Pack (ft): 9.0 Slot Size (in): **Slot Type: Factory Slot** Bottom of Borehole (ft): 9.0 feet bgs Sump/End Cap: Notes: Jared Willer & **Technician Signature:** None. Depths and heights are referenced to ground surface unless specified TOC. **Technician Name** (print): Jared Walbert All elevations are referenced to MSL (NAVD 88). QA/QC Date: QA/QC'd by:

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BORING LOCATIO	ON: Harbor Island			LEVATION AND	DATUM:
	RACTOR: Job Site S	Services	TBD DATE STAR 12/7/22		DATE FINISHED: 12/7/22
DRILLING METHO	DD: DPT		TOTAL DEP 20.0		SCREEN INTERVAL (ft.): 5-9; 16-20
ORILLING EQUIPM	MENT: Geoprobe 7	7822DT	5.0	WATER ATD (ft)	1", stainless steel
SAMPLING METH	OD: Dual Tube		5.58	WATER ATS (ft):	
HAMMER WEIGH		DROP: NA	LOGGED BY		REG. NO.
Sample No.	(%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	DESCRIPTION NAME (USCS): color, moist, % by wt., pla dilatancy, toughness, dry strength, consis		WELL (AND/C	CONSTRUCTION DETAILS OR DRILLING REMARKS Elevation: TBD
10 L L L L L L L L L L L L L L L L L L L	0.0 0.0 0.0 0.0 NM	SILTY GRAVEL (GM): gray (10 YR 6/damp POORLY-GRADED SAND (SP): yello brown (10 YR 5/8), damp SILTY GRAVEL (GM): very dark brow YR 2/2), damp POORLY-GRADED SAND (SP): brow YR 5/3), moist POORLY-GRADED SAND (SP): brow YR 5/3), wet POORLY-GRADED SAND (SP): brow YR 5/3), saturated, glass fragments at 7 POORLY-GRADED SAND (SP): dark (10 YR 4/1), saturated POORLY-GRADED SAND (SP): black 1 2.5/N), saturated	wish n (10 n (10 n (10 n (10 n (10 gray	Tempor informal Perman informal	1", stainless steel screen used ary well tion shown on log.
VAS21-16-20	NM NM NM NM	SILTY GRAVEL (GM): black (GLEY 1 saturated, poorly graded POORLY-GRADED SAND (SP): black 1 2.5/N), saturated SILTY CLAY (CL): very dark brown (1/2/2), wet, plastic POORLY-GRADED SAND (SP): dark	G (GLEY -		1", stainless steel screen used
20-	NM NM	(GLEY 1 4/N), saturated SILTY CLAY (CL): very dark brown (1/2/2), wet, plastic End of boring at 20 ft bgs.			

SCREENED WELL CONSTRUCTION FORM ormer JB Sims Generating Station, Harbor Island, Grand Haven, MI **Project Number:** 3650220203.02.02 MW-37 VAS21 Well ID: Location ID: Job Site Services 01/30/2023 Drilling Subcontractor: **Installation Date:** David Mokma & Jeremiah Chapman Yes **Drilling Personnel: Decon Performed:** Jared Walbert Direct Push **Technician Name: Drilling Method:** Other Amec Foster Wheeler Representatives: **Measurement Point (riser) Protective Casing:** Elevation (ft msl): 589.619 Type: **Round Well Monument** Dimensions (in): 585.59 Stickup (ft): Land Surface Elevation (ft): Length (ft): 5 Approximate Diameter **Guard Post:** of Borehole (in): 3.75 inches **Surface Pad:** Depth to Water (ft): 5.30 Dimensions: 12"x12"x6" **During Drilling:** Type: Date: 01/30/2023 5.60 **Post Development:** Annular Seal (grout above well seal): **BENTONITE** Date: 02/01/2023 Material: **Installation Method: Hydrologic Unit: Bentonite Seal:** Manufacturer: BENTONITE 3/8' Material: Chips Water added during Type: drilling (gal): **Installation Method:** Gravity Hydration time (hrs): Water removed during development (gal): 15 **Filter Pack Material:** Manufacturer: #2 Well Gravel Material: 0.03 Top of Bentonite Seal (ft): 1.0 Size: **Installation Method:** Gravity 0.25 Surging time: Top of Filter Pack (ft): 3.0 Well Casing (Riser): **ECT Manufacturing Inc** Manufacturer: 4.0 POLYVINYL CHLORIDE (PVC) Top of Screen Interval (ft): Type/Material: Length: Diameter (in): Well Screen: Bottom of Screened Interval (ft): 9.0 Manufacturer: Johnson Screens Type/Material: POLYVINYL CHLORIDE (PVC) Diameter (in): 0.010 Bottom of Filter Pack (ft): 9.0 Slot Size (in): **Slot Type: Factory Slot** Bottom of Borehole (ft): 9.0 feet bgs Sump/End Cap: Notes: **Technician Signature:** None Depths and heights are referenced to ground surface unless specified TOC. **Technician Name** (print): Jared Walbert All elevations are referenced to MSL (NAVD 88). QA/QC Date: QA/QC'd by:

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BORING			Haven Harbo	or Islan	d				E	LEVATION AND	DATUM:	
	_							TBD DATE STA	١R	TED:	DATE FIN	IISHED:
UKILLIN	NG CON	TRAC	IOR: ,	Job Site	Se	ervices		12/7/22		T11 (6)	12/7/22	
DRILLIN	NG MET	HOD:	DPT					TOTAL DE 20.0	-P΄	1Η (π.):	SCREEN 5-9; 16-2	INTERVAL (ft.): 20
ORII I IN	IG FOLI	IPMEN	JT: G	eoprobe	ے 7۶ م	ROOM		DEPTH TO	D۱	WATER ATD (ft)	: CASING:	
				•		52251		5.0 DEPTH TO) (WATER ATS (ft)		less steel
SAMPL	ING ME	THOD	Dua	al Tube				5.50		,		
HAMME	R WEI	SHT:	NA			DROP: NA		LOGGED Jared W				REG. NO.
I _	SAMP		. " «	D _		DESCRIPTION	- 41 - 1	4	£	WELL	CONSTRUC	CTION DETAILS
DEPTH (feet)	Sample No.	Recovery (%)	Blow Counts	PID Reading (ppm)		NAME (USCS): color, moist, % by wt., pla dilatancy, toughness, dry strength, consis		ty, Sy	Depth (ft)	AND/C	OR DRILLIN	IG REMARKS
ਠੁ	Sar	Rec (13	ă O					ă	Top of Casing	Elevation:	TBD
				b	M	SILTY GRAVEL (GM): black (GLEY 1	2.5	/N),				
-				0.0	90	damp			-			
					14				_]		1
				0.0								/
-				0.0					-	$+$ $ $ \setminus $ $		/
				6	ďζ]		/
				0.0	141] \		
5-				0.0		POORLY-GRADED SAND (SP): blac 1 2.5/N), wet	k (G	iley 	_ ▼			
-	2-9			NM :	DYKK.	POORLY-GRADED SAND (SP): brow yellow (10 YR 6/8), saturated	vnisl	n _	_	$+ \parallel \setminus$		
-	VAS22-5-9			NM		CLAYEY SILT (ML): black (GLEY 1 2 wet, coal fragments, low plasticity	.5/N),	-	-	1", stainle	ess steel screen
-				NM :		POORLY-GRADED SAND (SP): brow			-	Tompor	ary well	
-				NM		yellow to black (10 YR 6/8 to GLEY 1 2 saturated, wood and coal at 9.5-10.0 ft			-	informa	tion sho	wn on log.
10-				NM		CLAYEY SILT (ML): very dark grayish	n bro	own	-	Perman informa	ent well tion sho	
-				NM		(10 YR 3/2), saturated, low plasticity			-	well cor		
									_			
				NM		POORLY-GRADED SAND (SP): very	dar	k			/ \	\
\dashv				NM ::		gray (GLEY 1 3/N), saturated	'N I \		_		/	\
				,		SILT (ML): very dark gray (GLEY 1 3/ saturated	IN <i>)</i> ,		_]	/	\
				NM		CLAYEY SILT (ML): very dark grayish	n bro	own		/		\
15-				NM		(10 YR 3/2), saturated, leaves and root			-			\
				NM		16.0-17.0 ft bgs, low plasticity			_	/		\
				14141								\
\dashv	-20			NM	WK.	POORLY-GRADED SAND (SP): gray	(GL	EY.	-	↑ 🗐 / │		\
	VAS22-16-20			NM :		1 5/N), saturated	•		_	↓ 	1", staink	ess steel screen
	VAS2			INIVI							used	
\dashv				NM					-			\
20-				NM					_			
-				. 4141		End of boring at 20 ft bgs.				/		

SCREENED WELL CONSTRUCTION FORM ormer JB sims generating station, Harbor Island, Grand Haven, MI **Project Number:** 3650220203.02.02 MW-38 VAS22 Well ID: Location ID: Job Site Services 01/30/2023 Drilling Subcontractor: **Installation Date:** David Mokma & Jeremiah Chapman Yes **Drilling Personnel: Decon Performed:** Direct Push Jared Walbert **Technician Name: Drilling Method:** Other Amec Foster Wheeler Representatives: Measurement Point (riser) **Protective Casing:** Elevation (ft msl): Type: **Round Well Monument** Dimensions (in): Stickup (ft): 586.258 Land Surface Elevation (ft): Length (ft): Approximate Diameter **Guard Post:** of Borehole (in): 3.75 **Surface Pad:** Depth to Water (ft): 5.90 **Dimensions:** 12"x12"x6" **During Drilling:** Type: Date: 01/30/2023 6.37 **Post Development:** Annular Seal (grout above well seal): **BENTONITE** Date: 02/01/2023 Material: **Installation Method:** Hydrologic Unit: **Bentonite Seal:** Manufacturer: BENTONITE 3/8' Material: Chips Water added during Type: drilling (gal): **Installation Method:** Gravity Hydration time (hrs): Water removed during development (gal): 10.5 **Filter Pack Material:** Manufacturer: #2 Well Gravel Material: 0.03 Top of Bentonite Seal (ft): 1.0 Size: **Installation Method:** Gravity Surging time: Top of Filter Pack (ft): 3.0 Well Casing (Riser): ECT manufacturing inc Manufacturer: 4.0 POLYVINYL CHLORIDE (PVC) Top of Screen Interval (ft): Type/Material: Length: Diameter (in): Well Screen: Bottom of Screened Interval (ft): 9.0 Manufacturer: Johnson Screens Type/Material: POLYVINYL CHLORIDE (PVC) Diameter (in): 9.0 0.010 Bottom of Filter Pack (ft): Slot Size (in): **Slot Type: Factory Slot** Bottom of Borehole (ft): 9.37 Sump/End Cap: Notes: **Technician Signature:** None. Depths and heights are referenced to ground surface unless specified TOC. **Technician Name** (print): Jared Walbert All elevations are referenced to MSL (NAVD 88).

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QA/QC'd by:

QA/QC Date:

BORING	G LOCA	TION:	Harb	or Islar	nd			SURFACE TBD	E ELEVATION AND DATUM:
DRILI IN	NG CON	TRAC	TOR.	Joh Sit	e Servi	ces		DATE STA	
	-	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			00.11			12/5/22 TOTAL DE	12/6/22 EPTH (ft.): SCREEN INTERVAL (ft.)
DRILLIN	NG MET	HOD:	DPT					20.0	3-7; 16-20
DRILLIN	NG EQU	IPMEN	NT: G	eoprob	e 7822	DT		3.0	O WATER ATD (ft): CASING: 1", stainless steel
SAMPL	ING ME	THOD	: Dua	al Tube	!			DEPTH TO 3.10	O WATER ATS (ft):
HAMME	R WEI	GHT:	NA		D	ROP: NA		LOGGED I	
<u></u>	SAMP			D		DESCRIPTION			
DEPTH (feet)	Sample No.	Recovery (%)	Blow Counts	PID Reading (ppm)	N c	AME (USCS): color, moist, % by w lilatancy, toughness, dry strength, o	t., plasticit consistenc	ty, ;y	AND/OR DRILLING REMARKS
-	<i>O</i>	<u> </u>			P	OORLY-GRADED SAND (SP):	yellowish	n	Top of Casing Elevation: TBD
-				0.0		wn (10 YR 5/8), dry	,		
-				0.0					
-	3-5			0.0		DORLY-GRADED SAND (SP):	-		 ¥
-	.S15-SB-;			0.6	. ' '	wn (10 YR 2/2), saturated, was eramics, glass and metal	te consis	ting	Odor detected at 3.0-5.0 ft bgs, low PID reaging of
5-	-7, ∨			NM c	SI SI	LTY GRAVEL (GM): very dark	brown (1	0	saturated soil (0.6 ppm)
-	VAS15-3-7, VAS15-SB-3-5			NM	YR	2/2), saturated, waste consistinglass	•		1", stainless steel scree used Odor detected at 5.0-7.0
-				NM	Cι	_AYEY SILT (ML): black to very	y dark gra	av	ft bgs
-				NM	(10	YR 2/1 to 10 YR 3/1), saturaters, low plasticity			Temporary well
-				NM	1 1 1 1 1	ANDY SILT (ML): brown (10 YF urated, shells at 9.0 ft bgs	R 5/3),		information shown on log
10-				NM	'VXXA	AYEY SILT (ML): very dark gr YR 3/2), saturated	ayish bro	wn	information shown on well construction log.
_				NM	((0,2), catalates			Well defined design log.
				NM					
+				NM	7///	LTY CLAY (ML): very dark gray YR 3/2), wet	yish brow	/n	
_				NM	CI	_AYEY SILT (ML): very dark gr	-		
15-				NM	*****	YR 3/2), saturated, leaf and wo 0-15.0 ft bgs	ood debri	is at	
				NM]
	-16-20			NM :	. 14. 14	OORLY-GRADED SAND (SP):), saturated	gray (10	YR	
	VAS15-16-20			NM :		·/ ·			1", stainless steel scree used
				NM					
20-				NM	Er	nd of boring at 20 ft bgs.			

SCREENED WELL CONSTRUCTION FORM ormer JB Sims Generating Station, Harbor Island, Grand Haven, MI **Project Number:** 3650220203.02.02 VAS15 Well ID: Location ID: Job Site Services 01/31/2023 Drilling Subcontractor: **Installation Date:** David Mokma & Jeremiah Chapman Yes **Drilling Personnel: Decon Performed:** Direct Push Jared Walbert Technician Name: **Drilling Method:** Other Amec Foster Wheeler Representatives: Measurement Point (riser) **Protective Casing:** Elevation (ft msl): 587.359 Type: **Round Well Monument** Dimensions (in): Stickup (ft): 4.5 583.272 Land Surface Elevation (ft): 5 Length (ft): Approximate Diameter **Guard Post:** of Borehole (in): 3.75 inches **Surface Pad:** Depth to Water (ft): 3.10 **Dimensions:** 12"x12"x6" **During Drilling:** 2.76 Type: 01/31/2023 Date: 3.17 **Post Development:** Annular Seal (grout above well seal): **BENTONITE** Date: 02/01/2023 Material: **Installation Method:** Hydrologic Unit: **Bentonite Seal:** Manufacturer: BENTONITE Material: Chips Water added during Type: drilling (gal): **Installation Method:** Gravity Hydration time (hrs): Water removed during development (gal): 15 **Filter Pack Material:** Manufacturer: #2 Well Gravel Material: 0.03 Top of Bentonite Seal (ft): 0.5 Size: **Installation Method:** Gravity Surging time: Top of Filter Pack (ft): 1.5 Well Casing (Riser): ECT Manufacturing inc Manufacturer: 2.0 POLYVINYL CHLORIDE (PVC) Top of Screen Interval (ft): Type/Material: Length: Diameter (in): Well Screen: Bottom of Screened Interval (ft): 7.0 Manufacturer: Johnson Screens Type/Material: POLYVINYL CHLORIDE (PVC) Diameter (in): 7.0 0.010 Bottom of Filter Pack (ft): Slot Size (in): **Slot Type: Factory Slot** Bottom of Borehole (ft): 7.0 Sump/End Cap: Notes: **Technician Signature:** None. Depths and heights are referenced to ground surface unless specified TOC. **Technician Name** (print): Jared Walbert All elevations are referenced to MSL (NAVD 88).

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QA/QC'd by:

QA/QC Date:

	Generating Station Harbor Island	Log of Soil Bori	ng VAS16/MW-40
Grand Haven, N		SURFACE ELEVATION AND	•
		TBD DATE STARTED:	DATE FINISHED:
DRILLING CONTRACTOR: Joh	Site Services	12/6/22	12/6/22
DRILLING METHOD: DPT	7.1 1	TOTAL DEPTH (ft.): 10.0	SCREEN INTERVAL (ft.): 3-7
DRILLING EQUIPMENT: Geo	probe 7822DT	DEPTH TO WATER ATD (ft) 3.0	: CASING: 1", stainless steel
SAMPLING METHOD: Dual 1		DEPTH TO WATER ATS (ft)	
		3.2 LOGGED BY:	REG. NO.
HAMMER WEIGHT: NA	DROP: NA	Jared Walbert	NA NA
DEPTH (feet) (feet) No. Recovery Sample (%) Blow Counts	DESCRIPTION NAME (USCS): color, moist, % by wt., plastic dilatancy, toughness, dry strength, consister	city, 🕒	CONSTRUCTION DETAILS DR DRILLING REMARKS Elevation: TBD
	POORLY-GRADED SAND (SP): dark gr brown (10 YR 4/2), damp	ayish	
	SILTY GRAVEL (GM): black (GLEY 1 2. damp, coal fragments POORLY-GRADED SAND (SP): dark gr		
	brown (10 YR 4/2), saturated	Tempor	-
2 - VAS16-3-7	SILTY GRAVEL (GM): grayish brown (10	Perman information	tion shown on log. ent well tion shown on astruction log.
	M O O O O O O O O O O O O O O O O O O O		
	M Co		
	M		
10-	End of boring at 10 ft bgs.		Multiple location refusal at 10 ft bgs, no deep interval acheived
115)	Acronymns ATD - At Time of Drilling ATS - At Time of Sampling	Project No. 3650220203	Page 1 of 1

WELL10

SCREENED WELL CONSTRUCTION FORM

11	5	

Depths and heights are referenced	None If to ground surface unless specif	Technician Name (pri	nt): Jared Walbert
	None		Jean Mills
Notes:	Neces	Technician Signature	·· 12.4Mo
	0.0	Sump/End Cap:	Point
Bottom of Borehole (ft):	6.5	Slot Type:	Factory Slot
Bottom of Filter Pack (ft):	6.5	Slot Size (in):	0.010
		Diameter (in):	2
		Type/Material:	POLYVINYL CHLORIDE (PVC)
Bottom of Screened Interval (ft):	6.5	Manufacturer:	Johnson Screens
		Well Screen:	
		Diameter (in):	2
		Length:	1.5
Top of Screen Interval (ft):	1.5	Type/Material:	POLYVINYL CHLORIDE (PVC)
		Manufacturer:	ECT Manufacturing
•		Well Casing (Riser):	
Top of Filter Pack (ft):	1.25	Surging time:	0.5
		Installation Method:	Gravity
Top of Bentonite Seal (ft):	0.5	Size:	0.03
		Material:	#2 Well Gravel
		Manufacturer:	K&E
	10	Filter Pack Material:	
Water removed during development (gal):	10	Hydration time (hrs):	24
drilling (gal):	.0	Installation Method:	Gravity
Water added during		Type:	Chips
		Material:	BENTONITE 3/8"
		Manufacturer:	Baroid
		Bentonite Seal:	
Hydrologic Unit:	NA	Installation Method:	Gravity
Date:	02/01/2023	Material:	BENTONITE Gravity
Post Development:	1.46	Annular Seal (grout above v	
Date:	01/31/2023		
During Drilling:	1.50	Type:	Concrete
Depth to Water (ft):	3.10	Dimensions:	12"x12"x6"
		Surface Pad:	
Approximate Diameter of Borehole (in):	3.75	Guard Post:	None
		Length (ft):	5
Land Surface Elevation (ft):	582.748	Stickup (ft):	4
		Dimensions (in):	4
Elevation (ft msl):	586.783	Type:	Round Well Monument
Measurement Point (riser)		Protective Casing:	
Other Amec Foster Wheeler Rep	presentatives:	None.	
Technician Name:	Jared Walbert	Drilling Method:	Direct Push
Drilling Personnel:	David Mokma & Jeremiah C	Decon Performed:	Yes
Drilling Subcontractor:	Job Site Services	Installation Date:	01/31/2023
Well ID:	MW-40	 Location ID:	VAS16
		•	
Site Name:	Former JB Sims Generating S	Project Number:	3650220203.02.02

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Appendix B
Well Development Forms

Well Development Field Sheet

DR

Site Name: City of Grand Haven - Harbor Island

Well Number: MW-33 Job Number: 10337505

Owner: City of Grand Haven

Date(s): 11/30/2022 - 12/1/2022

Date	Time	Conductivity (mS/cm)	pH (S.U.)	Temp (C)	Turbidity (NTU)	Water Volume Removed (gal)		
11/30/2022	9:00		Job Site Se	rvices begin	s developme	nt		
	12:00		Not Mea	sured		22		
12/1/2022	16:15		HDR begins development					
	17:15	1.10	7.13	7.9	1.22	1.6		
	17:30	1.10	7.12	8.2	0.65	1.7		
	17:45	1.10	7.13	8.2	0.02	1.6		
	18:00	1.10	7.12	8.3	0.02	1.7		
	18:15	1.10	7.12	8.3	0.02	1.7		
			Tota	l Vol. Purge	d (gal)	30.3		

Notes:				

Well Development Field Sheet

DR

Site Name: City of Grand Haven - Harbor Island

 Well Number:
 MW-34

 Job Number:
 10337505

Owner: City of Grand Haven

Date(s): 11/30/2022 - 12/1/2022

Date	Time	Conductivity (mS/cm)	pH (S.U.)	Temp (C)	Turbidity (NTU)	Water Volume Removed (gal)
11/30/2022	13:00		Job Site S	ervices begi	ns developmer	nt
	16:00		Not Me			27
12/1/2022	13:41		HDI	R begins dev	elopment	
	14:00	2.02	6.58	13.0	7.38	2.0
	14:15	2.09	6.63	12.9	6.61	1.5
	14:30	2.09	6.65	12.8	4.57	1.7
	14:45	2.11	6.66	12.9	6.55	1.6
	15:00	2.12	6.64	13.0	5.18	1.2
	15:15	2.12	6.66	12.8	5.11	1.6
	15:30	2.14	6.65	12.9	4.96	1.6
			Tot	al Vol. Purg	ed (gal)	38.2

Notes:				



Site Name:) [Former	JB Sims Ge	nerating Stat Haven		Island, Gand	Project N	umber:			3650220203	
Well ID:	<i>7</i> `		7	MW-33	}		Start Date	e:			11/30/22	
Sample Techi	nician:			Kiersten W	hite		End Date:	:			11/30/22	
Initial Depth t	o Water:			2.25				th of Well:		-	7.0	
Development	Method:			PUMPE	D		Depth to \	Water Afte	r Purging:		2.25	
Pump Start Ti	ime:			11:37				Volume (g			0.8	
Total Volume	Purged (g	jal):			22		3 Casing	Volumes (gal):		2.3	
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)	
							-					
Instruments	(Manufa	cturer, M	odel, and	Serial No	0.):							
						Water Quali						
0-1						na na i	ıu			-		
Calculations					Technician Signature:							
Saturated wel	ll casing v	olume: V=	= Π(R^2)H*	7.48 gal/ft^:	3							
V = Volume (gal Π = 3.14 R = well radius (H = height of wa	ft) = (well di	$V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$ $= \Pi * (2.0 \text{ (in)/12 (in/ft))/2})^2 * 4.75 * 7.48 \text{ gal/ft}^3$ ell diameter (in)/12 (in/ft))/2) $= 0.8$ mn (ft)									ML	
Notes:											Technician Name (print):	
					ne						roommotan Hame (print).	
na Measuring Point: Top of Riser no parameters taken									Kiersten White			
QA/QC'd by	:							Q	A/QC Date:			



Site Name: Former JB Sims Generating Station. Harbor Island, Gand Haven								umber:		3650220203	
Well ID:									11/30/22		
Sample Tech				Kiersten W	hite		End Date				11/30/22
Initial Depth t				4.21				th of Well:			12.5
Development				PUMPE	D				r Purging:		4.21
Pump Start T				11:37	07			Volume (g			1.4
Total Volume	Purged (g	jal):	1	1	27	0	3 Casing	Volumes (gal):	1	4.1
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
							-				
							1				
Instruments	: (Manufa	cturor M	odol and	Sorial N	o).						
instruments	Instruments (Manufacturer, Model, and Serial No.):										
Water Quality Meter											
, na na na											
Calculation	s:										Technician Signature:
Saturated we	II casina v	olume: \/=	: П/R^2\H*	7 48 gal/ft^	3					ı	
Jacaratea We	Judiniy V			io gai/it	~) 1 -
V = Volume (ga	l/ft)					-U * (2.0		H*7.48 gal/ft			AM
Π = 3.14 P = well radius	(ft) = (\u00e4\u00	ametar (in)/4	2 (in/ft)\/2\			=11" (2.0		1/2)^2 ^ 8.29 = 1.4	* 7.48 gal/ft^3		UVVV
R = well radius (H = height of wa			∠ (III/IL))/∠)								,
Notes:											Technician Name (print):
			N			during developme	ent.				IZ:
Measuring Point: Top of Riser no parameters taken									Kiersten White		
04/00/41				'	2. 0.11010				NOC Data		
QA/QC'd by	·:							Q	A/QC Date:		

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	$\mathbf{X} L$	\leftarrow	-											
Site Name:		Former	JB Sims Ge	nerating Stati Haven, M		sland, Grand	Project Nu	umber:			3650220203.02.02			
Well ID:				MW-35			Start Date	»:			01/31/2023			
Sample Tech				Jared Walk	pert		End Date:				01/31/2023			
Initial Depth t				8.32			Total Dep				11.7			
Development	Method:			PUMPE			Depth to V				8.30			
Pump Start T				14:40			1 Casing Volume (gal):				0.6			
Total Volume	Purged (g	jal):			20.0		3 Casing \	Volumes (gal):		1.7			
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance	e DO (mg/L) ORP Turbidity (NTU) Cum. Volume (gal.)				Comments/Observations During Purging (color, sediment, etc.)			
4.4.4.5		4.0				(mS/cm)								
14:45 14:50	10 10	1.0	8.32							10.0	Brown opaque color Brown opaque color			
14:50	10.0	1.0							<u> </u>	15.0	clear			
15:00	10.0	1.0							<u> </u>	20.0	clear			
10.00	10.0	1.0	 							25.0	5.561			
		<u> </u>	1											
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			<u> </u>						<u> </u>					
									<u> </u>					
		-												
Instruments	(Manufa	cturer Ma	del and	Serial No	.):				l					
	(and, and	22.10.110	- <i>/</i> -	Geosubmersil	ble Pump							
Calculations	 s:										Technician Signature:			
		olumo: \/-	· П/D/2\П*	7 10 001/51	2						. January organiculor			
V = Volume (gal Π = 3.14 R = well radius (Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3 V = Volume (gal/ft) Π = 3.14 R = well radius (ft) = (well diameter (in)/12 (in/ft))/2) H = height of water column (ft) V = Π(R^2)H*7.48 gal/ft^3 =Π * (2.0 (in)/12 (in/ft))/2)^2 * 3.38 * 7.48 gal/ft^3 = 0.6									Soul Mills				
Notes:											Technician Name (print):			
110163.					Non-						i schilician Name (μππ.).			
None. Measuring Point: Top of Casing									Jared Walbert					
QA/QC'd by: QA/QC Date:														

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	2 V		т.								•		
Site Name:		Former	JB Sims Ge	nerating Stati Haven, M		sland, Grand	Project N	umber:			3650220203.02.02		
Well ID:		MW-36 Start Date:									01/31/2023		
Sample Techi							End Date:				01/31/2023		
Initial Depth to				5.6			Total Dep	th of Well:	:		9.0		
Development Method: PUMPED											5.08		
Pump Start Ti		nod: PUMPED Depth to Water After Purging: 13:45 Depth to Water After Purging: 1 Casing Volume (gal):							0.6				
Total Volume		al).			15.0		3 Casing		•		1.7		
Total Volume	rurgeu (g	jaij.	Ī	1	15.0	Cracific	Jeasing	voiuilles (gai). T		1.7		
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)		
13:50	8.8	0.5								2.5	Brown opaque color		
13:55	8.8	0.5								5.0	clear		
14:00	8.8	0.5								7.5	clear		
14:05	8.8	0.5								10.0	clear		
14:10	8.8	0.5								12.5	clear		
14:15	8.8	0.5								15.0	clear		
	0.0	0.0											
							 		 				
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	/D.F		<u> </u>	0 1 - 1 - 1 - 1					l				
Instruments	(Manuta	cturer, MC	odei, and	Seriai No	.):	Geosubmersi ,	ble Pump						
Calculations	s:										Technician Signature:		
Saturated well casing volume: $V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$ V = Volume (gal/ft) $\Pi = 3.14$ $R = \text{well radius (ft)} = (\text{well diameter (in)/12 (in/ft))/2}$ $V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$ $V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$										0 19 Mast			
Π = 3.14 R = well radius (i H = height of wa	ft) = (well dia		2 (in/ft))/2)			=Π * (2.0	(in)/12 (in/ft))				Jorem Million V		
Notes:											Technician Name (print):		
				Meas	None. uring Point: T						Jared Walbert		
QA/QC'd by:	Measuring Point: Top of Casing QA/QC'd bv: QA/QC Date:												

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	21		T.		***	DEVELO	PIVILIN	LOG			•
Site Name:		Former	JB Sims Ge	nerating Stati Haven, M	on, Harbor Is II	sland, Grand	Project Nu	umber:			3650230203.02.02
Well ID:				MW-37			Start Date):			01/31/2023
Sample Tech	nician:			Jared Walk	pert		End Date:				01/31/2023
Initial Depth to Water: 5.3 Total De						Total Dep	th of Well:	1		9.0	
Development	velopment Method: PUMPED Depth to Water After Purging:							5.60			
Pump Start T	ime:			13:15			1 Casing \				0.6
Total Volume	Purged (g	jal):			15.0		3 Casing \	Volumes (gal):		1.8
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
13:20	8.8	1.0	, , ,			(mS/cm)				5.0	Brown opaque color
13:25	8.8	1.0								10.0	clear
13:30	8.8	1.0								15.0	clear
10.00	0.0									70.0	
		 									
		 									
		 									
							<u> </u>				
		-					1				
		 									
		 									
Instruments	(Manufa	cturer Mc	del and	Serial No	١٠						
mon amond	, (marrara	otaror, me	ouci, unu	ochai ito	.,.	Geosubmersi ,	ble Pump				
Calculations	s:										Technician Signature:
Saturated we	II casing v	olume: V=	: П(R^2)H*	7.48 gal/ft^3	3						
V = Volume (gal Π = 3.14 R = well radius (H = height of wa	l/ft) (ft) = (well dia	ameter (in)/12		3 3		=Π * (2.0	(in)/12 (in/ft))	H*7.48 gal/ft /2)^2 * 3.70 : 0.6	^3 * 7.48 gal/ft^3		Jorg hillos
Notes:											Technician Name (print):
				Meas	None. uring Point: T	op of Casing					Jared Walbert
QA/QC'd by	·:							C	A/QC Date:		
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Site Name:	Haven, MI							umber:			3650220203.02.02	
Well ID:				MW-38			Start Date	:			01/31/2023	
Sample Techr	nician:			Jared Wall	pert		End Date:				01/31/2023	
Initial Depth to	o Water:			5.9			Total Dept	th of Well:			9.0	
Development				PUMPE)		Depth to Water After Purging:				6.37	
Pump Start Ti				12:00			1 Casing Volume (gal):				0.5	
Total Volume	Purged (g								1.5			
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)	
12:05	8.8	0.25								1.25	Brown opaque color	
12:10	8.8	0.25								2.50	Brown opaque color	
12:15	8.8	0.25								3.75	Brown opaque color	
12:20	8.8	0.25								5.00	clear	
12:25	8.8	0.25								6.75	clear	
12:30	8.8	0.25								8.00	clear	
12:35	8.8	0.25								9.25	clear	
12:40	8.8	0.25								10.50	clear	
l 4	/NA	-4		0 1 N -	\-							
Instruments	(мапита	cturer, wic	odei, and	Seriai No	.):	Geosubmersi ,	ble Pump					
Calculations):										Technician Signature:	
Saturated well casing volume: $V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$ $V = \text{Volume (gal/ft)}$ $\Pi = 3.14$ $R = \text{well radius (ft)} = (\text{well diameter (in)/12 (in/ft)})/2)$ $V = \Pi(R^2)H^*7.48 \text{ gal/ft}^3$ $V = \Pi$										Jurel Wills &		
Notes:											Technician Name (print):	
NOTES:					Mono						i echnician Name (print):	
				Meas	None uring Point: 1	op of Casing					Jared Walbert	
QA/QC'd by:	ı !							Q	A/QC Date:		-	

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Site Name:	Former JB Sims Generating Station, Harbor Island, Grand Haven, MI MW-39 Start Date:							3650220203.02.02				
Well ID:				MW-39			Start Date	:			01/31/2023	
Sample Techr	nician:			Jared Walk	pert		End Date:				01/31/2023	
Initial Depth to	o Water:			2.76			Total Dept	th of Well:			7.18	
Development				PUMPE)				r Purging:		3.17	
Pump Start Ti				11:10			1 Casing Volume (gal):				0.7	
Total Volume	Purged (g							2.2				
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)	
11:10	7.0	0.5								0.0	Brown opaque color.	
11:15	7.0	0.5								2.5	Clear	
11:20	7.0	0.5								5.0	Clear	
11:25	7.0	0.5								7.5	Clear	
11:30	7.0	0.5								10.0	Clear	
11:35	7.0	0.5								12.5	Clear	
11:40	7.0	0.5								15.0	Clear	
							 					
Instruments	(Manufa	cturer, Mc	odei, and	Serial No	.):	Mega Monso ,	on Pump					
Calculations):										Technician Signature:	
Saturated wel	l casing v	olume: V=	: П(R^2)H*	7.48 gal/ft^3	3						•	
V = Volume (gal/ft) Π = 3.14 R = well radius (ft) = (well diameter (in)/12 (in/ft))/2) H = height of water column (ft) V = Π(R^2)H*7.48 gal/ft^3 =Π * (2.0 (in)/12 (in/ft))/2)^2 * 4.42 * 7.48 gal/ft^3 = 0.7										Sorul Wellet		
Notes:											Technician Name (print):	
. 10103.					None						(pility).	
				Meas		Top of Riser					Jared Walbert	
QA/QC'd by:	ı !							Q	A/QC Date:			

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	<u> </u>		_									
Site Name: Former JB Sims Generating Station					n	Project Number:				3650220203.02.02		
Well ID: MW-40					Start Date:				01/31/2023			
Sample Technician:				Jared Walk	pert		End Date:				01/31/2023	
Initial Depth to	o Water:			1.5			Total Dept	th of Well:			6.5	
Development Method:			PUMPED				Depth to Water After Purging:				1.42	
Pump Start Ti				10:15			1 Casing Volume (gal):				0.8	
Total Volume	Purged (g	gal):			10		3 Casing \	Volumes (gal):		2.5	
Time	Intake Depth (feet)	Rate (gpm)	Water Level (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)	
10:20	10	0.33								1.66		
10:25	10	0.33								3.33		
10:30	10	0.33								4.99		
10:35	10	0.33								6.65		
10:40	10	0.33								8.31		
10:45	10	0.33								10		
		-										
		 										
Instruments	(Manufa	cturor Mc	dol and	Sorial No	١٠				l.			
mon umento	(Wallala	cturer, wic	dei, and	Jenai 140	.,.	Mega Monso	on Pump					
Calculations	s:										Technician Signature:	
Saturated wel V = Volume (gal/ Π = 3.14 R = well radius (i H = height of wa	/ft) ft) = (well dia	ameter (in)/12		7.48 gal/ft^:	3	=Π * (2.0			^3 * 7.48 gal/ft^3		Jaral Callot	
Notes:											Tooknisian Nama (saint):	
Notes:				Meas	None uring Point: 1	Top of Casing					Technician Name (print): Jared Walbert	
QA/QC'd by:			. <u>. </u>	<u> </u>				C	A/QC Date:			