



Rose & Westra
A Division of GZA



GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

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MEMORANDUM

To: Abby Hendershott, MDEQ

From: Leslie Nelson, Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

Date: January 31, 2019

File No.: 16.0062677.81 Task 001

Re: Wolverine World Wide, Inc. (Wolverine) – Wolven/Jewell RI – Monthly Progress Report

This Monthly Progress Report (MPR) is being provided at the request of the MDEQ to provide an update regarding the implementation of the December 13, 2017 Source Area Investigation Work Plan (WP) related to per- and polyfluorinated alkyl substances (PFAS) detected in residential wells in the Wolven/Jewell study area.

ACTIONS PERFORMED

During this period, December 29, 2018 through January 25, 2019, GZA has done the following:

1. January 2 through January 10, 2019: Drill at WV-MW-11 location. Install two monitoring wells. Boring logs in progress.
2. Planned for groundwater sampling event in February, which will include all existing wells.
3. Obtained access from resident to install monitoring wells at WV-MW-10.
4. Continued work to obtain access to additional drilling locations.
5. Completed boring logs for WV-MW-7S, WV-MW-7D, WV-MW-12S, WV-MW-12M, and WV-MW-12D (attached).

ANALYTICAL DATA RECEIVED

Vertical aquifer profile data for the WV-MW-7, WV-MW-11 and WV-MW-12 locations is attached as Table 1. Figure 1 is an updated monitoring well location plan.

ANTICIPATED ACTIONS AND SCHEDULE FOR NEXT REPORTING PERIOD

During the next reporting period, January 26 through February 22, 2019, R&W/GZA anticipates the following activities:

- 1) Conduct drilling activities at WV-MW-10 as weather permits and at other locations if access is obtained.



- 2) Complete boring logs for WV-MW-11 monitoring wells.
- 3) Continue to work for access to other drilling locations for additional monitoring wells.
- 4) Sample monitoring wells as weather permits.

J:\62000\626xx\62677.81 - Wolven-Jewell Investigation\DEQ Monthly Updates\January 31, 2019 DEQ Monthly Report\Wolven_Jewell Monthly Update_013119.docx

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Wolven/Jewell
Algonia Township, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-7	PMW-WV-11	PMW-WV-11	PMW-WV-11	PMW-WV-11	PMW-WV-11	PMW-WV-11
Sample Name			PMW-WV-7 20-25	PMW-WV-7 29.5-34.5	PMW-WV-7 40-45	PMW-WV-7 50-55	PMW-WV-7 60-65	PMW-WV-7 70-75	PMW-WV-7 80-85	PMW-WV-7 88.5-93.5	SB-11-107.5-112.5	SB-11-118-123	SB-11-128-133	SB-11-138-143	SB-11-148-153	SB-11-158.5-163.5
Laboratory Sample ID			TJ26001-001	TJ26001-002	TJ26001-003	TJ26001-004	TJ26001-007	TJ26001-008	TJ26001-009	TJ26001-010	UA11012-001	UA11012-002	UA11012-003	UA11012-004	UA11012-005	UA11012-006
Sample Date			10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/24/2018	10/24/2018	10/24/2018	10/24/2018	01/08/2019	01/08/2019	01/08/2019	01/09/2019	01/09/2019	01/09/2019
Parameter (µg/L)																
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0072	<0.0071	<0.0071	<0.0071	<0.0073	<0.0071	<0.0071	<0.0071	<0.0072	<0.0071	<0.0072	<0.0071	<0.0071
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	0.0051	0.0064	0.0073	0.011	0.0066	0.0073	0.0095	0.0076	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	0.0036	<0.0035	0.0044	0.0039	0.0039	0.0047	0.0042	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	0.011	0.0092	0.012	0.009	0.0081	0.013	0.0053	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	0.0075	0.006	0.009	0.0064	0.0065	0.0092	0.0087	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	0.0058	0.025	0.02	0.028	0.018	0.018	0.028	0.023	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	0.0073	0.0064	0.0088	0.0062	0.0075	0.0099	0.0074	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.07	0.012	0.018	0.23	0.23	0.32	0.27	0.26	0.31	0.06	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorooctanoic acid (PFOA)	0.07	12	0.015	0.063	0.052	0.075	0.051	0.055	0.077	0.063	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
PFOA + PFOS (Calculated)	0.07	NCL	0.033	0.29	0.28	0.4	0.32	0.32	0.39	0.12	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0036	<0.0035	0.0039	0.0043	0.0045	0.0056	0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0072	<0.0071	<0.0071	<0.0071	<0.0073	<0.0071	<0.0071	<0.0071	<0.0072	<0.0071	<0.0072	<0.0071	<0.0071
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	0.0042	0.0042	0.006	0.0037	0.0039	0.0054	0.0068	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035
Total PFAS (Calculated)	NCL	NCL	0.044	0.36	0.34	0.48	0.38	0.37	0.47	0.19	ND	ND	ND	ND	ND	ND

TABLE 1
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Wolven/Jewell
Algoma Township, Kent County, MI

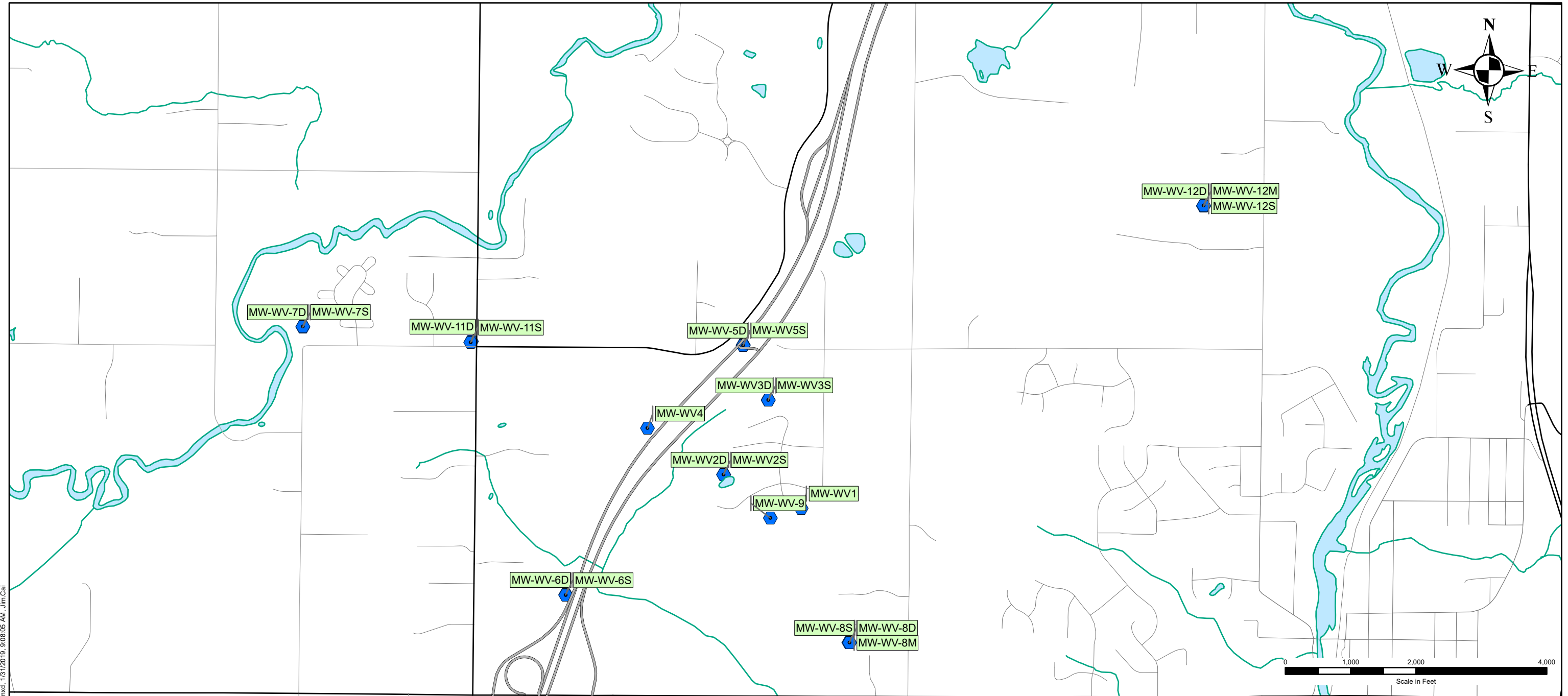
Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface	PMW-WV-12	PMW-WV-12	PMW-WV-12	PMW-WV-12	PMW-WV-12	PMW-WV-12
Sample Name			SB-12 75-80	SB-12 85-90	SB-12 145-150	SB-12 155-160	SB-12 165-170	SB-12 175-180
Laboratory Sample ID			TJ31080-001	TJ31080-002	TL01010-001	TL01010-002	TL01010-003	TL01010-004
Sample Date			10/29/2018	10/29/2018	11/26/2018	11/27/2018	11/27/2018	11/29/2018
Parameter (µg/L)								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	<0.0072	<0.0086	<0.026	<0.023	<0.011	<0.0078
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorohexanoic acid (PFHxA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorononanoic acid (PFNA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorooctane sulfonic acid (PFOS)	0.07	0.012	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorooctanoic acid (PFOA)	0.07	12	<0.0018	<0.0021	0.008	<0.0057	0.0034	<0.002
PFOA + PFOS (Calculated)	0.07	NCL	ND	ND	0.008	ND	0.0034	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	<0.0072	<0.0086	<0.026	<0.023	<0.011	<0.0078
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	<0.0036	<0.0043	<0.013	<0.011	<0.0056	<0.0039
Total PFAS (Calculated)	NCL	NCL	ND	ND	0.008	ND	0.0034	ND

TABLE 1 NOTES
Former Tannery
Rockford, Kent County, MI

NOTES:


1. Concentration and criteria units are micrograms per Liter ($\mu\text{g/L}$) or parts per billion (ppb). Calculated concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; updated June 25, 2018.
5. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria.
6. Abbreviations include:
"< RL" indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.

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Legend

MONITORING WELLS

 Existing

NO.	ISSUE/DESCRIPTION	BY	DATE
<p>UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.</p>			
<p>Rose & Westra, a Division of GZA 601 Fifth Street NW, Suite 102 Grand Rapids, Michigan 49504</p>			
<p>MONITORING WELL LOCATIONS WOLVEN/JEWELL AREAS</p>			
<p>GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com</p>		<p>PREPARED FOR: WN&J/WWW</p>	
PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: LIP	<p>FIGURE 1</p>
DESIGNED BY: JC	DRAWN BY: JC/JMG	SCALE: 1"=1500'	
DATE: 01-31-2019	PROJECT NO: 16.0062355.52	REVISION NO.	



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV12M

Page: 1 of 3

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 12-5-18 / 12-5-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push MacroCore
 O.D. / I.D.: NA 2.25"
 Hammer Wt.: NA NA
 Hammer Fall: NA NA
 TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					PROTECTIVE CASING
1						See boring log PMW-WV-12/MW-WV-12D for soil descriptions.				
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Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV12M

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19



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Engineers and Scientists

Wolverine World Wide
 Woven Avenue Area
 Algoma Twp, Kent County, Michigan

Boring No.: MW-WV12M
 Page: 2 of 3
 File No.: 16.0062677.81
 Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
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— Bentonite Grout

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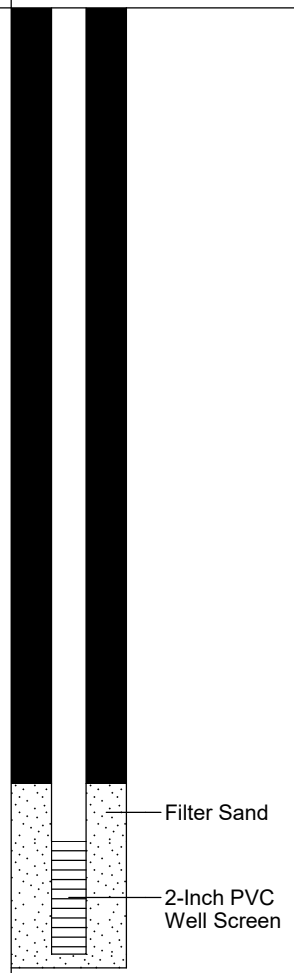
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV12M

BORING WELL 6267781 WWW.WOVLEN AVENUE.GPJ GZA CORP.GDT 1/30/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
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151						Bottom of Borehole at 150.0 Feet				
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REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 144.5 to 149.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ_GZA_CORP.GDT_1/30/19



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV12S

Page: 1 of 2

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 12-6-18 / 12-5-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Direct Push MacroCore
 O.D. / I.D.: NA 2.25"
 Hammer Wt.: NA NA
 Hammer Fall: NA NA
 TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
1						See boring log PMW-WV-12/MW-WV-12D for soil descriptions.			PROTECTIVE CASING	
2										
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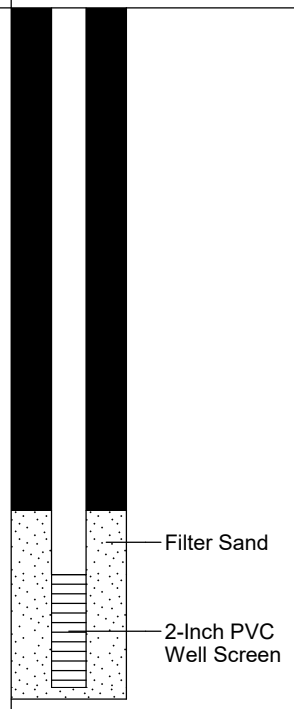
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV12S

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80						Bottom of Borehole at 80.0 Feet		1		
81										
82										
83										
84										
85										
86										
87										
88										
89										
90										
91										
92										
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102										
103										
104										
105										
106										
107										
108										



1. Monitoring well was installed in borehole upon completion. Well screen set from 74.6 to 79.5 feet below ground surface.

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Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV12S



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV7S

Page: 1 of 1

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: John Morehouse

Date Start/Finish: 10-25-18 / 10-25-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

Type: Hollow Stem Auger

Split Spoon

O.D. / I.D.: 12.25" / 4.25"

2.0" / 1 3/8"

Hammer Wt.: NA

140lbs

Hammer Fall: NA

30.0"

TOC Elev.: NA

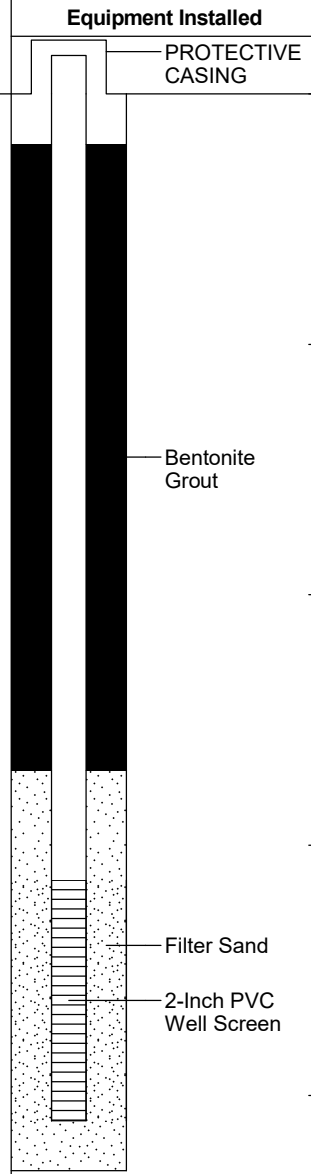
NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	
1						See boring log PMW-WV-7/MW-WV-7D for soil descriptions.				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22							Bottom of Borehole at 21.5 Feet		1	



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 15.7 to 20.5 feet below ground surface.

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19



GZA
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 Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-12/MW-WV-12D

Page: 1 of 14

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 10-26-18 / 11-29-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing

Sampler

GROUNDWATER READINGS

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

TOC Elev.: NA NA

Date	Time	Depth	Casing	Stab

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	
1	1	24	0-2	3-3 3-3	0.0 ppm	Dark brown, poorly sorted, fine to medium-grained SAND, some Silt, trace Clay, trace Gravel, non to slightly plastic, slightly cohesive, moist. Changing at 1.6 feet to: NO RECOVERY.	SAND	1		
2	2	24	2-4	2-2 1-1	0.0 ppm	Dark brown, poorly sorted, fine to medium-grained SAND, some Silt, trace Clay, trace Gravel, non to slightly plastic, slightly cohesive, moist. Changing at 2.3 feet to: Dark yellowish-brown, poorly sorted, SILT, little Clay, trace Gravel, moderately plastic, cohesive, moist. Changing at 2.6 feet to: Dark yellowish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 2.8 feet to: NO RECOVERY.	1.6' NO RECOVERY 2' SAND 2.3' SILT 2.6' CLAY & SILT NO RECOVERY			
3	3	24	4-6	0-0 1-2	0.0 ppm	Dark yellowish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 5.6 feet to: NO RECOVERY.	4' Silty CLAY			
4	4	24	6-8	0-1 5-6	0.0 ppm	Dark yellowish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 7.6 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing 7.8 feet to: NO RECOVERY.	5.6' NO RECOVERY 6' Silty CLAY			
5	5	24	8-10	4-7 9-8	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 8.6 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 9.5 feet to: NO RECOVERY.	7.6' SAND 7.8' NO RECOVERY 8' SAND			
6	6	24	10-12	5-8 8-10	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 11.5 feet to: NO RECOVERY.	9.5' NO RECOVERY 10' SAND 11.5' NO RECOVERY 12'			

REMARKS

1. Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: PMW-WV-12/MW-WV-12D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
13	7	24	12-14	2-7 13-24	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 13.0 feet to: Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, little Silt, slightly cohesive, moist. Changing at 13.9 feet to: NO RECOVERY.	SAND		
14	8	24	14-16	14-11 10-14	0.0 ppm	Yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Gravel, little Silt, slightly cohesive, moist. Changing at 14.5 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist. Changing at 15.7 feet to: NO RECOVERY.	13.9' NO RECOVERY SAND		
16	9	24	16-18	6-8 9-13	0.0 ppm	Dark gray, poorly sorted, Silty CLAY, plastic, cohesive, moist. Changing at 17.8 feet to: NO RECOVERY.	15.7' NO RECOVERY Silty CLAY		
18	10	24	18-20	6-10 11-16	0.0 ppm	Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 18.3 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 18.8 feet to: Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 18.9 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 19.8 feet to: NO RECOVERY.	17.8' NO RECOVERY SAND	2	
20	11	24	20-22	2-6 10-16	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 19.8 feet to: NO RECOVERY.	19.8' NO RECOVERY SAND		
22	12	24	22-24	6-8 12-10	0.0 ppm	Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 20.4 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand, partings. Changing at 20.8 feet to: Brown, moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 20.9 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.4 feet to: Brown,	21.8' NO RECOVERY Silty CLAY		
24	13	24	24-26	4-8 12-15	0.0 ppm	Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.4 feet to: Brown,	23.7' NO RECOVERY Silty CLAY		

2. Groundwater was encountered at approximately 18.0 feet below ground surface.

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
14	24	26-28	6-13 15-16	0.0 ppm	moderately well sorted, fine to medium-grained SAND, little Silt, moist to wet. Changing at 21.5 feet to: Yellowish-brown, poorly sorted, fine to medium-grained SAND, little Silt, little Clay, trace Gravel, slightly plastic, slightly cohesive, moist with occasional fine Sand partings. Changing at 21.8 feet to: NO RECOVERY.	Silty CLAY			
27						27' 27.2' SAND Silty CLAY			
28	15	28-30	5-7 10-14	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 23.7 feet to: NO RECOVERY.	27.8' 28' NO RECOVERY Silty CLAY			
29					Dark grayish-brown, well sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 24.7 feet. Changing at 25.4 feet to: Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 25.4 feet and 25.7 feet.				
30	16	30-32	5-7 11-16	0.0 ppm	Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 26.7 feet. Changing at 27.0 feet to: Brown, very well sorted, fine-grained SAND, trace Silt, moist. Changing at 27.2 feet to: Dark grayish-brown, poorly sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with fine Sand partings at 27.4 feet. Changing at 27.8 feet to: NO RECOVERY.	31.9' 32' NO RECOVERY Silty CLAY			
31					Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
32	17	32-34	4-9 11-17	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 31.9 feet to: NO RECOVERY.				
33					Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
34	18	34-36	5-11 13-13	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
35					Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
36	19	36-38	3-7 12-12	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.				
37									
38	20	38-40	3-8 11-13	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist.	38' CLAY & SILT			
39									

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41	21	24	40-42	3-7 89-10	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 41.2 feet to: Dark gray, poorly sorted, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 41.4 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist with occasional fine Sand partings.	CLAY & SILT 41.2' 41.4' SILT & CLAY Silty CLAY 42'		
42	22	24	42-44	3-8 10-13	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Changing at 43.6 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 43.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist.	CLAY & SILT 43.6' 43.9' Silty CLAY		
44	23	24	44-46	2-8 12-12	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Changing at 44.9 feet to: Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 45.8 feet to: NO RECOVERY.	CLAY & SILT 44.9' SILT & CLAY 45.8'		
46	24	24	46-48	4-6 11-16	0.0 ppm	Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 46.2 feet to: Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 47.8 feet to: NO RECOVERY.	46' NO RECOVERY SILT & CLAY Silty CLAY 47.8'		
48	25	24	48-50	3-7 14-23	0.0 ppm	Dark gray, well sorted, Silty CLAY, plastic, cohesive, moist with fine Sand parting at 48.6 feet. Changing at 49.8 feet to: Brown, well sorted, fine to medium -grained SAND, trace Silt, moist to wet. Changing at 49.9 feet to: NO RECOVERY.	48' NO RECOVERY Silty CLAY 49.8'		
50	26	24	50-52	2-9 14-22	0.0 ppm	Grayish-brown to brown, poorly sorted, fine to coarse-grained SAND, trace Gravel, trace Silt, wet. Changing at 50.7 feet to: Dark gray, very well sorted, fine-grained SAND, some Silt, wet. Changing at 51.0 feet to: Dark yellowish-brown, moderately sorted, fine-grained SAND, some Silt, trace Clay, slightly plastic, cohesive, wet. Changing at 51.3 feet to: Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 51.5 feet to: NO RECOVERY.	49.9' SAND NO RECOVERY SAND 51.5' NO RECOVERY SAND 52.8'		
52	27	24	52-54	10-15 17-27	0.0 ppm	Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 52.8 feet to: Dark grayish-brown, very well sorted, SILT, trace	52.8' SILT 53.7' NO 54'		

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
55	28	24	54-56	13-17 17-32	0.0 ppm	Clay, slightly plastic, cohesive, moist. Changing at 53.7 feet to: NO RECOVERY. Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 55.2 feet to: Dark grayish-brown to grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet.	RECOVERY SILT & CLAY		
56	29	24	56-58	3-13 16-20	0.0 ppm		55.2' 55.4' SAND CLAY & SILT 56' SILT		
58	30	24	58-60	3-13 21-47	0.0 ppm	Dark grayish-brown to brown, well sorted, SILT with very thin Clay varves, plastic (Clay), cohesive, moist to wet. Changing at 57.7 feet to: NO RECOVERY. Dark grayish-brown, moderately sorted, CLAY & SILT, trace fine-grained Sand, plastic, cohesive, moist. Changing at 59.0 feet to: Dark gray to dark grayish-brown, moderately well sorted, fine to medium SAND, little Silt, moist to wet. Changing at 59.3 feet to: Dark grayish-brown, moderately sorted, CLAY & SILT, trace fine-grained Sand, plastic, cohesive, moist. Changing at 59.6 feet to: NO RECOVERY. Varved dark grayish-brown, well sorted, Silty CLAY and fine SAND, plastic, cohesive, moist to wet. Changing at 61.1 feet to: Dark grayish-brown, moderately well sorted, Silty CLAY, trace Gravel, plastic, cohesive, moist with occasional fine Sand partings.	57.7' NO RECOVERY CLAY & SILT		
60	31	24	60-62	3-10 15-37	0.0 ppm		59' 59.3' SAND 59.6' CLAY & SILT NO 60' RECOVERY Silty CLAY and SAND		
62	32	24	62-64	5-10 12-44	0.0 ppm	Varved dark grayish-brown, well sorted, Silty CLAY and fine SAND, plastic, cohesive, moist to wet with fine Sand partings from 62.0 to 63.0 feet. Changing at 63.0 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 63.6 feet to: NO RECOVERY. Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 64.6 feet to: Dark grayish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 64.7 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist.	61.1' Silty CLAY 61.7' NO RECOVERY Silty CLAY and SAND		
64	33	24	64-66	6-12 16-34	0.0 ppm		63' CLAY & SILT 63.6' NO 64' RECOVERY CLAY & SILT 64.6' 64.7' SAND 65.1' Silty CLAY 65.3' SAND 65.6' CLAY & SILT		
66	34	24	66-68	7-17 22-45	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 64.6 feet to: Dark grayish-brown, well sorted, fine to medium SAND, trace Silt, wet. Changing at 64.7 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 65.1 feet to: Dark grayish-brown, moderately well sorted, fine to medium-grained SAND, little Clay, little Silt, slightly plastic, moist to wet. Changing at 65.3 feet to: Dark grayish-brown, moderately sorted, CLAY & SILT, trace Gravel, trace Sand, plastic, cohesive, moist. Changing at 65.6 feet to: NO RECOVERY.	NO 66' RECOVERY Silty CLAY and SAND		
67							67.9'		

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
69	35	24	68-70	3-4 12-25	0.0 ppm	Varved dark grayish-brown, well sorted, Silty CLAY and fine-grained SAND, plastic, cohesive, moist. Changing at 67.9 feet to: Brown, moderately well sorted, fine to coarse-grained SAND, little Silt, grace Gravel, moist to wet.	68' SAND		
							68.5' Silty CLAY		
70	36	24	70-72	6-13-50/6"	0.0 ppm	Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 68.5 feet to: Brown, well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 69.0 feet to: Varved dark grayish-brown, well sorted, Silty CLAY and fine-grained SAND, plastic, cohesive, moist. Changing at 69.1 feet to: Varved dark grayish-brown, well sorted, Silty CLAY and SILT, plastic, cohesive, moist. Changing at 69.2 feet to: NO RECOVERY.	69' SAND		
71							69.2' Silty CLAY		
72	37	24	72-74	2-7 17-40	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Gravel, plastic, cohesive, moist. Grading to 71.0 feet: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 71.4 feet to: Brown, very well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 71.6 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 71.8 feet to: Brown, very well sorted, fine to medium SAND, trace Silt, moist to wet.	NO RECOVERY		
73							70' CLAY & SILT		
74	38	24	74-76	1-10 33-50	0.0 ppm	Brown, very well sorted, fine to medium SAND, trace Silt, moist to wet. Changing at 73.5 feet to: NO RECOVERY.	71' Silty CLAY		
75							71.4' SAND		
76	39	24	76-78	1-4 16-26	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, moist to wet. Changing at 74.5 feet to: NO RECOVERY.	71.6' SAND		
77							71.8' Silty CLAY		
78	40	24	78-80	5-22 31-38	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 79.6 feet to: NO RECOVERY.	SAND		
79							73.5' NO RECOVERY		
80	41	24	80-82	1-11 14-43	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 81.6 feet to: NO RECOVERY.	74' SAND		
81							74.5' NO RECOVERY		
							76' SAND		
							76.3' NO RECOVERY		
							78' SAND		
							79.6' NO RECOVERY		
							80' SAND		
							81.6' NO RECOVERY		
							82' SAND		

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: PMW-WV-12/MW-WV-12D



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
82-84	42	24	82-84	10-26 40-50	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 83.3 feet to: NO RECOVERY.	SAND		
83							83.3' NO RECOVERY		
84-86	43	24	84-86	4-10 17-20	0.0 ppm	Brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 85.2 feet to: Dark grayish-brown poorly sorted, SAND, little Clay, little Silt, slightly plastic, moderately cohesive, moist. Changing at 85.2 feet to: NO RECOVERY.	SAND		
85							85.3' NO RECOVERY		
86-88	44	24	86-88	15-28 33-50/4.5"	0.0 ppm	Dark grayish-brown, poorly sorted SAND, some Silt, trace Clay, slightly plastic, moderately cohesive, moist. Changing at 87.4 feet to: NO RECOVERY.	SAND		
87							87.4' NO RECOVERY		Bentonite Grout
88-90	45	24	88-90	11-21 20-25	0.0 ppm	Dark grayish-brown, poorly sorted SAND, some Silt, trace Clay, trace Gravel, slightly plastic, moderately cohesive, moist. Changing at 88.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, slightly plastic, cohesive, moist. Changing at 89.2 feet to: NO RECOVERY.	SAND		
89							88.9' CLAY & SILT		
90-92	46	24	90-92	14-23 19-22	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, slightly plastic, cohesive, moist. Changing at 90.6 feet to: Dark grayish-brown, well sorted, SILT, non plastic, moderately cohesive, moist to wet. Changing at 91.5 feet to: Dark grayish-brown to dark gray, poorly sorted, SILT & CLAY, trace Gravel, plastic, cohesive, moist. Changing at 91.9 feet to: NO RECOVERY.	CLAY & SILT		
91							89.2' NO RECOVERY		
92-94	47	24	92-94	9-31-50/6"	0.0 ppm	Dark grayish-brown to dark gray, poorly sorted, SILT & CLAY, trace Gravel, plastic, cohesive, moist. Changing at 93.1 feet to: Varved dark grayish-brown, well sorted, Silty CLAY and Silt, plastic, cohesive, moist. Changing at 93.2 feet to: NO RECOVERY.	SILT		
93							90.6' SILT		
94-96	48	24	94-96	31-50/4.5"	0.0 ppm	Varved dark grayish-brown, well sorted, Silty CLAY and Silt, plastic, cohesive, moist. Changing at 95.3 feet to: NO RECOVERY.	CLAY & SILT		
95							91.5' SILT & CLAY		
							91.9' NO RECOVERY		
							92' NO RECOVERY		
							93.1' CLAY & SILT		
							93.2' NO RECOVERY		
							94' CLAY & SILT		
							95.3' NO RECOVERY		
							96'		

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
97	49	24	96-98	25-48-50/4"	0.0 ppm 0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 97.2 feet to: NO RECOVERY.	CLAY & SILT 97.2' NO RECOVERY		
98	50	24	98-100	27-50/5.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 98.3 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 98.9 feet to: NO RECOVERY.	98' 98.3' CLAY & SILT Silty CLAY 98.9' NO RECOVERY		
100	51	24	100-102	8-23 37-32	0.0 ppm	Brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 100.5 feet to: Brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 101.2 feet to: NO RECOVERY.	100' SAND 100.5' SILT 101.2' NO RECOVERY		
102	52	24	102-104	27-28 44-45	0.0 ppm	Light grayish-brown to pale brown, very well sorted, SILT, cohesive, moist. Changing at 102.2 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 103.2 feet to: NO RECOVERY.	102' 102.2' SILT CLAY & SILT 103.2' NO RECOVERY		
104	53	24	104-106	11-27-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 105.4 feet to: NO RECOVERY.	104' CLAY & SILT 105.4' NO RECOVERY		
106	54	24	106-108	31-50/5.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 107.4 feet to: NO RECOVERY.	106' CLAY & SILT 107.4' NO RECOVERY		
108	55	24	108-110	26-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 108.8 feet to: NO RECOVERY.	108' CLAY & SILT 108.8' NO RECOVERY 110'		

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
111	56	24	110-112	11-22 37-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 111.9 feet to: NO RECOVERY.	CLAY & SILT		
112	57	24	112-114	31-50/3.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 112.7 feet to: NO RECOVERY.	111.9' 112' NO RECOVERY CLAY & SILT 112.6' 112.7' SAND NO RECOVERY		
114	58	24	114-116	18-38-50	0.0 ppm	Dark grayish-brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 114.7 feet to: Dark grayish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 114.8 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 115.5 feet to: NO RECOVERY.	114' SILT 114.7' 114.8' SAND CLAY & SILT 115.5' NO RECOVERY		
116	59	24	116-118	4-13 25-50	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 116.4 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 117.8 feet to: NO RECOVERY.	116' CLAY & SILT 117.8' 118' NO RECOVERY CLAY & SILT		
120	61	24	120-122	12-20 28-45	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 121.9 feet to: NO RECOVERY.	121.9' 122' NO RECOVERY CLAY & SILT		
122	62	24	122-124	17-23 46-50/3.5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 123.5 feet to: Dark grayish-brown, very well sorted, SILT, trace Clay, slightly plastic, cohesive, varved with very thin layers of Silty CLAY, moist. Changing at 123.8 feet to: NO RECOVERY.	123.5' 123.8' SILT 124' NO		
REMARKS									

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
125	63	24	124-126	8-24 44-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 125.8 feet to: NO RECOVERY.	RECOVERY CLAY & SILT		
126	64	24	126-128	10-25 47-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 127.8 feet to: NO RECOVERY.	125.8' 126' NO RECOVERY CLAY & SILT		
128	65	24	128-130	27-34-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 129.4 feet to: NO RECOVERY.	127.8' 128' NO RECOVERY CLAY & SILT		
130	66	24	130-132	9-21 35-50/5"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand trace Gravel, plastic, cohesive, moist. Changing at 131.9 feet to: NO RECOVERY.	129.4' NO RECOVERY 130' CLAY & SILT		
132	67	24	132-134	7-9 10-17	0.0 ppm	Dark grayish-brown poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 132.8 feet to: Dark grayish-brown, very well sorted, SILT, non plastic, cohesive, moist. Changing at 133.1 feet to: Dark grayish-brown, well sorted, Silty CLAY, plastic, cohesive, moist. Changing at 133.4 feet to: Dark grayish-brown, well sorted, SILT, some fine-grained SAND, non plastic, cohesive, moist to wet. Changing at 133.8 feet to: NO RECOVERY.	131.9' 132' NO RECOVERY CLAY & SILT		
134	68	24	134-136	19-33-50/4"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 134.3 feet to: Dark grayish-brown, very well sorted, SILT, non plastic, cohesive, moist. Changing at 134.6 feet to: Dark grayish-brown, moderately sorted, SILt, little Clay, slightly plastic, cohesive, moist. Changing at 134.8 feet to: Dark grayish-brown, very well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 135.4 feet to: NO RECOVERY.	133.8' 133.1' SILT 133.4' Silty CLAY SILT 133.8' 134' NO RECOVERY 134.3' CLAY & SILT SILT 134.8' SILT & CLAY (CL)		
136	69	24	136-138	50/4.5"	0.0 ppm	Dark grayish-brown, well sorted,			

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
139	70	24	138-140	30-50/2"	0.0 ppm	fine-grained SAND with layers of well sorted, Silty CLAY, moist. Chaging at 136.4 feet to: NO RECOVERY. Dark grayish-brown, well sorted, fine-grained SAND with layers of well sorted Silty CLAY, moist. Changing at 138.4 feet to: Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 138.6 feet to: NO RECOVERY.	SILT & CLAY (CL)		
140	71	24	140-142	2-1 4-8	0.0 ppm		Dark grayish-brown, poorly sorted, SILT & CLAY, little Sand, trace Gravel, slightly plastic, cohesive, moist. Changing at 138.6 feet to: NO RECOVERY. Varved dark grayish-brown, well sorted, SILT and Silty CLAY, plastic, cohesive, moist. Changing at 140.8 feet to: NO RECOVERY.		
141							140'		
142	72	24	142-144	7-19 35-50/3.5"	0.0 ppm	Dark grayish-brown to dark brown, poorly sorted, coarse-grained SAND, some Gravel, trace Silt, moist to wet. Changing at 142.3 feet to: Dark grayish-brown to dark brown, poorly sorted, fine to coarse-grained SAND, little Gravel, trace Silt, moist to wet. Changing at 143.0 feet to: NO RECOVERY.	SILT & CLAY		
143							140.8' NO RECOVERY		
144	73	24	144-146	41-50	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 144.7 feet to: NO RECOVERY.	142' SAND		
145							143' NO RECOVERY		
146	74	24	146-148	18-50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 146.9 feet to: NO RECOVERY.	144' GRAVEL		
147							144.7' NO RECOVERY		
148	75	24	148-150	38-50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 148.9 feet to: NO RECOVERY.	146' GRAVEL		
149							146.9' NO RECOVERY		
150	76	24	150-152	50/5"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, wet. Changing at 150.4 feet to: NO RECOVERY.	148' GRAVEL		
151							148.9' NO RECOVERY		
							150' GRAVEL		
							150.4' NO RECOVERY		
							152'		
R E M A R K S									
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BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19



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Wolverine World Wide
 Wolven Avenue Area
 Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-12/MW-WV-12D
Page: 12 of 14
File No.: 16.0062677.81
Check: Leslie Nelson

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
153	77	24	152-154	30-50/3"	0.0 ppm	Brown to dark gray, poorly sorted, GRAVEL with coarse-grained SAND, little Silt, moderately cohesive, moist to wet. Changing at 152.4 feet to: Very dark gray, poorly sorted, GRAVEL, some Silt, little Sand, trace Clay, non to slightly plastic, cohesive, moist. Changing at 152.5 feet to: Dark yellowish-brown, moderately sorted, coarse to medium-grained SAND, some Gravel, little Silt, moist. Changing at 152.7 feet to: NO RECOVERY.	GRAVEL		
							152.5' 152.7' NO RECOVERY		
154	78	24	154-156	50/4"	0.0 ppm	Dark yellowish-brown, moderately sorted, coarse to medium-grained SAND, some Gravel, little Silt, moist. Changing at 154.2 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained, SAND, trace Silt, trace Gravel, wet. Changing at 154.5 feet to: NO RECOVERY.	154' SAND		
							154.5' NO RECOVERY		
156	79	24	156-158	50-50/3"	0.0 ppm	Dark brown to dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, trace Silt, wet. Changing at 156.5 feet to: Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained Sand, little Silt, slightly cohesive, moist to wet. Changing at 156.8 feet to: NO RECOVERY.	156' SAND		
							156.5' 156.8' GRAVEL NO RECOVERY		
158	80	24	158-160	20-50/6"	0.0 ppm	Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained SAND, little Silt, slightly cohesive, moist to wet. Changing at 159.0 feet to: NO RECOVERY.	158' GRAVEL		
							159' NO RECOVERY		
160	81	24	160-162	32-50/3"	0.0 ppm	Dark brown, poorly sorted, GRAVEL, some medium to coarse-grained SAND, little Silt, slightly cohesive, moist to wet. Changing at 160.8 feet to: NO RECOVERY.	160' GRAVEL		
							160.8' NO RECOVERY		
162	82	24	162-164	50-64	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 162.8 feet to: NO RECOVERY.	162' SAND		
							162.8' NO RECOVERY		
164	83	24	164-166	40-50	0.0 ppm	Dark yellowish-brown to dark brown, moderately sorted, GRAVEL, some coarse-grained Sand, trace Silt, wet. Changing at 164.4 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 165.0 to NO RECOVERY.	164' GRAVEL		
							164.4' SAND 165' NO RECOVERY		
165							166'		

REMARKS

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Boring No.: PMW-WV-12/MW-WV-12D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
167	84	24	166-168	47-50/4"	0.0 ppm	Dark yellowish-brown to dark brown, moderately sorted, GRAVEL, some coarse-grained Sand, trace Silt, wet. Changing at 166.1 feet to: Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some silt, little Gravel, moist to wet. Changing at 166.7 feet to: Yellowish-brown, well sorted, fine to medium-grained SAND, trace Silt, wet. Changing at 166.8 feet to: NO RECOVERY. Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 168.8 feet to: NO RECOVERY.	166.1' GRAVEL SAND		
							166.8' NO RECOVERY		
168	85	24	168-170	30-50/4"	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 170.8 feet to: NO RECOVERY.	168' SAND		
							168.8' NO RECOVERY		
170	86	24	170-172	21-50/4"	0.0 ppm	Dark yellowish-brown, poorly sorted, fine to coarse-grained SAND, some Silt, little Gravel, moist to wet. Changing at 172.9 feet to: NO RECOVERY.	170' SAND		
							170.8' NO RECOVERY		
172	87	24	172-174	20-50/4"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 174.9 feet to: NO RECOVERY.	172' GRAVEL		
							172.9' NO RECOVERY		
174	88	24	174-176	45-50/4.5"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 176.6 feet to: NO RECOVERY.	174' GRAVEL		
							174.9' NO RECOVERY		
176	89	24	176-178	40-50/2"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 178.9 feet to: NO RECOVERY.	176' GRAVEL		
							176.6' NO RECOVERY		
178	90	24	178-180	11-12 9-12	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 178.9 feet to: NO RECOVERY.	178' GRAVEL		
							178.9' NO RECOVERY		
179							180'		

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
181	91	24	180-182	33-50/5"	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 180.8 feet to: NO RECOVERY.	GRAVEL 180.8' No RECOVERY		
182	92	24	182-184	33-18 10-27	0.0 ppm	Dark yellowish-brown to dark brown, poorly sorted, GRAVEL, some Silt, little fine to coarse-grained Sand, wet. Changing at 182.9 feet to: Dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 183.3 feet to: NO RECOVERY.	GRAVEL 182.9' CLAY & SILT 183.3'		
183							NO RECOVERY 184' CLAY & SILT		
184	93	24	184-186	21-33-50/3"	0.0 ppm	Dark grayish-brown, poorly sorted, CLAY & SILT, trace Sand, trace Gravel, plastic, cohesive, moist. Changing at 185.0 feet to: NO RECOVERY.	CLAY & SILT 185.0' NO RECOVERY		
186						Bottom of Borehole at 186.0 Feet	186'	3	
187									
188									
189									
190									
191									
192									
193									
REMARKS 3. Monitoring well was installed in borehole upon completion. Well screen set from 176.6 to 181.5 feet below ground surface.									
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BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: PMW-WV-7/MW-WV-7D

Page: 1 of 6

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: John Morehouse

Date Start/Finish: 10-23-18 / 10-25-18

Boring Location:

GS Elev.: Datum: NAD 83

Auger/
Casing Sampler

Type: Hollow Stem Auger Split Spoon

O.D. / I.D.: 12.25" / 4.25" 2.0" / 1 3/8"

Hammer Wt.: NA 140lbs

Hammer Fall: NA 30.0"

TOC Elev.: NA NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: NA Survey Date:

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				PROTECTIVE CASING	Sand
1	1	24/20.4	0-2	2-2 2-2	ND	Very dark brown, fine grained SAND, some Silt, trace Gravel, moist. Changing at 0.4 feet to: Dark yellowish-brown to yellowish-brown, very fine grained SAND and SILT, moist. Changing at 1.7 feet to: NO RECOVERY.	0.4' SAND SAND and SILT	1		
2	2	24/15.6	2-4	1-2 1-1	ND	Yellowish-brown, very fine grained SAND and SILT, moist. Changing at 3.3 feet to: NO RECOVERY.	1.7' NO RECOVERY 2' SAND and SILT			
3							3.3' NO RECOVERY			
4	3	24/19.2	4-6	1-4 3-2	ND	Yellowish-brown to brown, CLAY & SILT, moist. Changing at 4.6 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, moist. Changing at 5.6 feet to: NO RECOVERY.	4' CLAY & SILT 4.6' SAND			
5							5.6' NO RECOVERY			
6	4	24/12	6-8	1-1 1-1	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 7.0 feet to: NO RECOVERY.	6' SAND NO RECOVERY			
7							7' NO RECOVERY			
8	5	24/6	8-10	1-1 1-1	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 8.5 feet to: NO RECOVERY.	8' SAND 8.5' NO RECOVERY			
9							10' NO RECOVERY			
10	6	24/12	10-12	1-1 2-2	ND	Yellowish-brown, fine to coarse grained SAND, little Gravel, trace Silt, moist. Changing at 10.6 feet to: Pale brown to light yellowish-brown, fine SAND, trace Silt, moist. Changing at 11.0 feet to: NO RECOVERY.	10' SAND 11' NO RECOVERY			
11							12' NO RECOVERY			
12	7	24/16.8	12-14	2-3 3-3	ND	Pale brown to light yellowish-brown, fine SAND, trace Silt, moist. Changing at 12.7 feet to: Brown, fine to medium SAND, trace Silt, wet. Changing at 13.4 feet to: NO RECOVERY.	12' SAND 13.4' NO RECOVERY	2		
13							14' NO RECOVERY			
14	8	24/15.6	14-16	3-2 3-4	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 15.3 feet to: NO RECOVERY.	14' SAND			

REMARKS

- Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
- Groundwater was encountered at approximately 12.7 feet below ground surface.

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Boring No.: PMW-WV-7/MW-WV-7D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
16	9	24/16.8	16-18	2-2 3-4	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 17.4 feet to: NO RECOVERY.	15.3' SAND NO RECOVERY		
17							16' SAND		
18	10	24/19.2	18-20	0-2 3-6	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 19.6 feet to: NO RECOVERY.	17.4' NO RECOVERY		
19							18' SAND		
20	11	24/16.8	20-22	5-6 5-11	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 21.4 feet to: NO RECOVERY.	19.6' NO RECOVERY		
21							20' SAND		
22	12	24/19.2	22-24	8-12 13-11	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 23.6 feet to: NO RECOVERY.	21.4' NO RECOVERY		
23							22' SAND		
24	13	24/15.6	24-26	1-1 1-1	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 25.3 feet to: NO RECOVERY.	23.6' NO RECOVERY		
25							24' SAND		
26	14	24/14.4	26-28	1-1 2-0	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 27.2 feet to: NO RECOVERY.	25.3' NO RECOVERY		
27							26' SAND		
28	15	24/21.6	28-30	1-1 1-2	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 29.8 feet to: NO RECOVERY.	27.2' NO RECOVERY		
29							28' SAND		
30	16	24/16.8	30-32	0-0 1-1	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 31.4 feet to: NO RECOVERY.	29.8' NO RECOVERY		
31							30' SAND		
32	17	24/20.4	32-34	0-1 3-4	ND	Brown, fine to medium SAND, trace Silt,	31.4' NO RECOVERY		
							32' SAND		
REMARKS									

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 1/30/19

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
33						trace Gravel, wet. Changing at 33.7 feet to: NO RECOVERY.	SAND		
34	18	24/22.8	34-36	1-2 4-5	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 35.9 feet to: NO RECOVERY.	33.7' 34' NO RECOVERY SAND		
35									
36	19	24/10.8	36-38	1-2 1-4	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 36.9 feet to: NO RECOVERY.	35.9' 36' NO RECOVERY SAND		
37							36.9' NO RECOVERY		
38	20	24/12	38-40	1-0 4-4	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 38.9 feet to: Brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 38.9 feet to: NO RECOVERY.	38' SAND		
39							38.9' 39' GRAVEL NO RECOVERY		
40	21	24/15.6	40-42	1-1 1-2	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 41.3 feet to: NO RECOVERY.	40' SAND		
41							41.3' NO RECOVERY		
42	22	24/15.6	42-44	1-1 1-1	ND	Brown, fine to medium SAND, trace Silt, trace Gravel, wet. Changing at 43.3 feet to: NO RECOVERY.	42' SAND		
43							43.3' NO RECOVERY		
44	23	24/6	44-46	1-1 1-1	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 44.3 feet to: Brown, fine to medium SAND, little coarse grained Sand, little Gravel, trace Silt, wet. Changing at 44.5 feet to: NO RECOVERY.	44' SAND		
45							44.5' NO RECOVERY		
46	24	24/9.6	46-48	1-1 3-5	ND	Brown, fine to medium SAND, little coarse grained Sand, little Gravel, trace Silt, wet. Changing at 46.6 feet to: Brown, GRAVEL and fine to coarse grained Sand, trace Silt, wet. Changing at 46.8 feet to: NO RECOVERY.	46' SAND		
47							46.6' 46.8' GRAVEL NO RECOVERY		
48	25	24/10.8	48-50	2-3 4-7	ND	Brown, fine to medium SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 48.9 feet to: NO RECOVERY.	48' SAND		
49							48.9' NO RECOVERY		
							50'		
REMARKS									
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BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19

Bentonite Grout



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
51	26	24/15.6	50-52	1-1 2-2	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet; with thin lenses of yellowish-brown, Silty Clay, moist. Changing at 51.3 feet to: NO RECOVERY.	SAND 51.3' NO RECOVERY		
52	27	24/15.6	52-54	0-0 2-9	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 53.2 feet to: Brown, GRAVEL and fine to coarse grained Sand, trace Silt, wet. Changing at 53.3 feet to: NO RECOVERY.	SAND 52' 53.2' 53.3' GRAVEL NO RECOVERY		
54	28	24/10.8	54-56	1-1 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Silt, wet. Changing at 54.9 feet to: NO RECOVERY.	SAND 54' 54.9' NO RECOVERY		
56	29	24/4.8	56-58	1-0 2-4	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 56.3 feet to: Brown, GRAVEL, trace Silt, wet. Changing at 56.4 feet to: NO RECOVERY.	SAND 56' 56.3' SAND 56.4' GRAVEL NO RECOVERY		
58	30	24/13.2	58-60	1-2 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 59.1 feet to: NO RECOVERY.	SAND 58' 59.1' NO RECOVERY		
60	31	24/9.6	60-62	1-2 6-11	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 60.8 feet to: NO RECOVERY.	SAND 60' 60.8' NO RECOVERY		
62	32	24/18	62-64	1-4 7-11	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 63.5 feet to: NO RECOVERY.	SAND 62' 63.5' NO RECOVERY		
64	33	24/13.2	64-66	1-2 3-6	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 65.1 feet to: NO RECOVERY.	SAND 64' 65.1' NO RECOVERY		
66	34	24/16.8	66-68	2-3 5-8	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 67.4 feet to: NO RECOVERY.	SAND 66' 67.4'		

REMARKS

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
68	35	24/21.6	68-70	1-1 2-3	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 69.8 feet to: NO RECOVERY.	68' NO RECOVERY SAND			
69										
70	36	24/21.6	70-72	1-2 2-4	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 71.8 feet to: NO RECOVERY.	69.8' 70' NO RECOVERY SAND			
71										
72	37	24/12	72-74	1-0 0-1	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 73.0 feet to: NO RECOVERY.	71.8' 72' NO RECOVERY SAND			
73							73' NO RECOVERY			
74	38	24/15.6	74-76	2-3 4-9	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 75.3 feet to: NO RECOVERY.	74' SAND			
75							75.3' NO RECOVERY			
76	39	24/19.2	76-78	1-2 5-6	ND	Brown, fine to medium grained SAND, trace coarse grained Sand, trace Gravel, trace Silt, wet. Changing at 77.2 feet to: Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 77.6 feet to: NO RECOVERY.	76' SAND			
77							77.6' NO RECOVERY			
78	40	24/12	78-80	2-1 4-5	ND	Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 79.0 feet to: NO RECOVERY.	78' NO RECOVERY SAND			
79							79' NO RECOVERY			
80	41	24/24	80-82	2-3 5-18	ND	Brown, fine to medium grained SAND, some Gravel, trace Silt, wet.	80' SAND			
81										
82	42	24/10.8	82-84	7-11 15-27	ND	Brown, GRAVEL, some fine to coarse grained SAND, wet. Changing at 82.9 feet to: NO RECOVERY.	82' GRAVEL			
83							82.9' NO RECOVERY			
84	43	24/19.2	84-86	23-27 35-25	ND	Yellowish-brown, GRAVEL, some Silty Sand, wet. Changing at 85.5 feet to: Yellowish-brown, GRAVEL, trace Silt, wet.	84' GRAVEL			
REMARKS										

BORING WELL: 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 1/30/19

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
86	44	24/8.4	86-88	6-8 19-29	ND	Changing at 85.6 feet to: NO RECOVERY. Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 86.7 feet to: NO RECOVERY.	85.6' GRAVEL 86' NO RECOVERY SAND		
87						86.7' NO RECOVERY			
88	45	24/24	88-90	3-4 10-17	ND	Brown, fine to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 88.8 feet to: Yellowish-brown, GRAVEL, trace Silt, wet.	88' SAND 88.8' GRAVEL		
89									
90	46	24/7.2	90-92	14-35 40-50/5"	ND	Yellowish-brown, GRAVEL and fine to coarse grained SAND, little Silt, moist to wet. Changing at 90.6 feet to: NO RECOVERY.	90.6' NO RECOVERY		
91									
92	47	24/14.4	92-94	4-8 12-10	ND	Yellowish-brown, GRAVEL and fine to coarse grained SAND, little Silt, moist to wet. Changing at 93.0 feet to: Very dark grayish-brown, Silty CLAY, moist. Changing at 93.2 feet to: NO RECOVERY.	92' GRAVEL 93' NO RECOVERY CLAY		
93									
94	48	24/24	94-96	17-24 26-50	ND	Very dark grayish-brown, Silty CLAY, moist.	94' Silty CLAY		
95									
96						Bottom of Borehole at 96.0 Feet	96'		

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3. Monitoring well was installed in borehole upon completion. Well screen set from 90.2 to 95.0 feet below ground surface.

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