



Rose & Westra
A Division of GZA



GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

The Widdicomb Building
601 Fifth Street NW
Suite 102
Grand Rapids, MI 49504
T: 616.956.6123
F: 616.288.3327
www.rosewestra.com
www.gza.com



MEMORANDUM

To: Abby Hendershott, MDEQ

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

Date: April 30, 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, March 22, 2019 through April 23, 2019, GZA has done the following:

1. April 15, 2019 through April 23, 2019: Began drilling at WV-MW-14 location.
2. Completed boring logs for WV-MW-10 and WV-MW-13.
3. Continued work to obtain access to additional drilling locations.

ANALYTICAL DATA RECEIVED

No additional data was received during this period.

ANTICIPATED ACTIONS AND SCHEDULE FOR NEXT REPORTING PERIOD

During the next reporting period, April 24, 2019 through May 24, 2019, R&W/GZA anticipates the following activities:

- 1) Complete drilling at WV-MW-14 and install monitoring wells.
- 2) Install an additional shallow monitoring well at the WV-MW-10 location.
- 3) Continue to work for access to other drilling locations for additional monitoring wells. Conduct additional drilling if access is obtained.
- 4) Complete boring logs for WV-MW-16.
- 5) Conduct a round of groundwater sampling starting April 29, 2019.



6) Survey the newly installed monitoring wells.

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GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No. MW-WV-10/MW-MW-10D

Page: 1 of 4

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry H.

Logged by: John Morehouse

Date Start/Finish: 3-5-19 / 3-13-19

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					
1						See MW-WV-10S for soil descriptions from 0.0 to 78.8 feet.	BLIND DRILL	1	PROTECTIVE CASING	
2										
3										
4										
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R E M A R K S

1. Blind drilled from 0.0 to 78.0 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 No.: MW-WV-10/MW-MW-10D

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
41							BLIND DRILL			
42										
43										
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45										
46										
47										
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76										
77										
78	1	24/22	78-80	11-24 36-50	2.3 ppmv	Gray, CLAY, moist. Changing at 78.2 feet to: Very dense, brown, fine to coarse SAND, moist.	78' 78.2' CLAY SAND			
79										
80	2	24/24	80-82	12-48-50	1.7 ppmv	Very dense, fine to coarse SAND, moist. Changing at 80.2 feet to: Hard, gray, CLAY, wet.	80.2' CLAY			
81										Bentonite/Grout
82	3	24/24	82-84	42-50	0.1 ppmv	Hard, gray, Clayey SILT, wet. Changing at 83.8 feet to: Very dense, gray, fine to coarse SAND, wet.	82' Clayey SILT			
83										
84	4	24/12	84-86	19-50	1.7 ppmv	Hard, gray, Clayey SILT, trace fine to	83.8' 84' SAND Clayey SILT			
85										
86		24/24		3-10	2.3 ppmv		86' CLAY			
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).										
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-WV-10/MW-MW-10D	

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
87	5		86-88	28-45		coarse Sand, wet.	CLAY		
88	6	24/24	88-90	19-29 38-50	1.5 ppmv	Hard, gray, CLAY, trace Silt, trace Rock fragments, moist. Changing at 86.2 feet to: Gray, SAND, moist. Changing at 87.2 feet to: Stiff, gray, Silty CLAY, wet.	88' Clayey SILT		
89	7	24/24	90-92	10-18 32-41	2.3 ppmv	Hard, gray, Clayey SILT, trace fine to coarse Sand, moist.	90' Silty CLAY		
91	8	24/24	92-94	3-8 21-27	2.5 ppmv	Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
92	9	24/24	94-96	3-8 21-27	1.9 ppmv	Hard, gray, Silty CLAY, trace Rock fragments, wet.			
93	10	24/24	96-98	20-21 26-38	0.9 ppmv	Hard, gray, Silty CLAY, trace Rock fragments, wet.			
94	11	24/24	98-100	27-32 40-80	7.1 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.			
95	12	24/24	100-102	1-2 11-22	1.6 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.			
96	13	24/12	102-104	5-40 48-50	0.9 ppmv	Hard, gray, Silty CLAY, wet.			
97	14	24/24	104-106	5-19 18-26	1.7 ppmv	Hard, gray, Silty CLAY, trace Gravel, wet.			
98	15	24/24	106-108	2-2 18-24	1.6 ppmv	Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.			
99	16	24/24	108-110	6-13 25-46	1.8 ppmv	Hard, gray, Silty CLAY, moist.			
100	17	24/20	110-112	7-28-50	0.6 ppmv	Hard, gray, Silty CLAY, wet.			
101	18	24/24	112-114	3-19 50-21	1.4 ppmv	Hard, gray, Silty CLAY, moist. Changing at 113.7 feet to: Very loose, fine to coarse SAND, trace Gravel, moist.	114'		
102	19	24/24	114-116	2-4 10-16	2.2 ppmv	Medium dense, gray, fine to coarse SAND, trace Silt, wet.	SAND		
103	20	24/10	116-118	6-27-50/4"	0.7 ppmv	Medium dense, gray, fine to coarse SAND, trace Silt, wet. Changing at 116.5 feet to: Gray, fine to coarse Clayey SAND, some Gravel, wet.	116.5' Clayey SAND		
104	21	24/23	118-120	5-26 29-32	0.5 ppmv	Dense, gray, SAND, wet. Changing at 119.8 feet to: Hard, gray, CLAY, little fine to coarse Sand, trace Gravel, moist.	118' SAND		
105	22	24/10	120-122	24-50	0.4 ppmv	Hard, gray, Silty CLAY, trace Rock fragments, wet.	119.8' CLAY Silty CLAY		
106	23	24/24	122-124	6-27-50	0.4 ppmv	Hard, gray, Silty CLAY, trace Gravel, wet.	120'		
107	24	24/24	124-126	23-50/6"	0.6 ppmv	Medium dense, gray and brown, SAND, wet. Changing at 123.8 feet to: Hard, gray, Silty CLAY, trace Gravel, wet.	124' SAND		
108	25	24/24	126-128	9-30-50/6"	0.4 ppmv	Dense, gray and brown, SAND, trace Gravel, wet. Changing at 127.5 feet to: Hard, gray, Silty CLAY, trace fine to coarse Sand, wet.			
109	26	24/4	128-130	4-40-50/6"	0.4 ppmv	Gray and brown, fine to coarse SAND, wet.	130'		
110	27	24/24	130-132	13-31-52/6"	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse SAND, wet.	Silty CLAY		
111	28	24/24	132-134	11-26 29-50/6"	0.4 ppmv	Hard, gray, Silty CLAY, trace fine to coarse			
112	R E M A R K S								
113	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 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134	29	24/24	134-136	16-34-50/6"	0.3 ppmv	SAND, wet.	Silty CLAY		
135						Hard, gray, Silty CLAY, trace fine to coarse SAND, wet.			
136	30	24/14	136-138	5-17 28-33	1.5 ppmv	Very stiff, Clayey SILT, little fine to coarse Sand, wet. Changing at 137.8 feet to: Hard, gray, Silty CLAY, wet.	136' Clayey SILT		
137									
138	31	24/22	138-140	14-50/6"	1.1 ppmv	Hard, gray, Silty CLAY, wet with Rock fragments at top of spoon.	138' Silty CLAY		
139									
140	32	24/24	140-142	8-20 25-34	1.2 ppmv	Hard, gray, Silty CLAY, wet.			
141									
142	33	24/24	142-144	22-27 40-45	2.0 ppmv	Hard, gray, Silty CLAY, wet with fine Sand at bottom of spoon.			
143									
144	34	24/24	144-146	9-22 44-50/3"	0.8 ppmv	Hard, gray, Silty CLAY, little Gravel, wet with 2-inch of Gravel at top of spoon.			
145									
146	35	24/24	146-148	9-38-50/3"	1.6 ppmv	Hard, gray, Silty CLAY, wet.			
147									
148	36	24/24	148-150	2-22 29-32	1.2 ppmv	Hard, gray, Silty CLAY, wet.			
149									
150	37	24/24	150-152	2-7 19-31	2.3 ppmv	Very stiff, gray, Silty CLAY, wet.			
151									
152	38	24/24	152-154	18-30 44-50/6"	1.9 ppmv	Hard, gray, Silty CLAY, trace Gravel, wet.			
153									
154	39	24/24	154-156	8-14 45-50/6"	1.5 ppmv	Very dense, gray, Clayey fine to coarse SAND, some Gravel, wet.	154' SAND		
155									
156	40	24/18	156-158	22-50/4"	1.5 ppmv	Very dense, gray, Clayey fine to coarse SAND, some Gravel, wet.			
157									
158	41	24/15	158-160	24-50/3"	1.0 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.	158' SAND and GRAVEL	2	
159									
160	42	24/24	160-162	50/4"	0.4 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.			
161									
162	43	24/24	162-164	14-50/4"	0.2 ppmv	Very dense, gray, Clayey fine to coarse SAND and GRAVEL, wet.			
163									
164	44	24/10	164-166	50/3"	0.4 ppmv	Hard, Silty CLAY, some Gravel, some fine to coarse Sand, wet.	164' CLAY		
165									
166	45	24/12	166-168	50/6"	0.9 ppmv	Very dense, red, Clayey fine to coarse SAND, some Gravel, wet.	166' SAND		
167									
168	46	24/12	168-170	50	0.7 ppmv	Very dense, red, Clayey fine to coarse SAND, some Gravel, trace Shells, wet.			
169									
170	47	24/0	170-172	50/3"	NA	NO RECOVERY.	170' NO RECOVERY	3	
171									
172	48	24/0	172-174	50/3"	NA	NO RECOVERY.			
173									
174	49	24/0	174-176	50/3"	NA	NO RECOVERY.			
175									
176						Bottom of Borehole at 176.0 Feet	176'	4	
177									
178									
179									

BORING WELL: 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19

REMARKS

2. Temporary well installed from 158.0 to 168.0 feet below ground surface. Well screen interval from 163.0 to 168.0 feet below ground surface. Purged 80.0 gallons of water.
3. Likely encountered sandstone bedrock at 170.0 feet below ground surface with a well screen set from 165.0 to 170.0 feet below ground surface.
4. Monitoring well was installed in borehole upon completion. Well screen set from approximately 165.0 to 170.0 feet below ground surface.



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 Engineers and Scientists

Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-10S

Page: 1 of 5

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: C. Melby

Date Start/Finish: 3-5-19 / 3-9-18

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

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	24/12	0-2	3-1 1-4	ND	Very loose, dark brown, TOPSOIL. Changing at 0.5 feet to: Brown, fine SAND, some Silt, trace Gravel, dry.	0.5' TOPSOIL SAND	1		
2	2	24/0	2-4	3-2 2-4	NA	NO RECOVERY.	2' NO RECOVERY	2		
4	3	24/24	4-6	1-2 2-4	ND	Loose, light brown, fine to medium SAND, little Silt, moist.	4' SAND			
6	4	24/0	6-8	3-2 4-4	NA	NO RECOVERY.	6' NO RECOVERY			
8	5	24/18	8-10	2-3 3-3	ND	Loose, light brown, fine SAND, some Silt, wet.	8' SAND	3 4		
10	6	24/24	10-12	1-1 1-1	ND	Very loose, light brown, fine SAND, some Silt, wet. Changing at 11.5 feet to: Brown, fine to coarse SAND, some Silt, wet.				
12	7	24/24	12-14	3-7 4-6	ND	Medium dense, brown, fine to coarse SAND, some Silt, trace Rock fragments, wet.				
14	8	24/24	14-16	1-3 5-8	ND	Loose, brown, fine to coarse SAND, little Silt, trace Rock fragments, wet.				

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).
- During drilling to 4.0 feet below ground surface, sediment appeared to be Sand.
- Groundwater was encountered at approximately 8.0 feet below ground surface.
- Temporary well installed from 8.0 to 18.0 feet below ground surface. Well screen interval from 13.0 to 18.0 feet below ground surface. Purged 30.0 gallons of water.

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-WV-10S

BORING WELL: 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
16	9	24/24	16-18	7-11 13-36	ND	Medium dense, fine to coarse SAND, little Silt, wet.	SAND	5	
17									
18	10	24/24	18-20	4-10 9-11	ND	Medium dense, brown, fine to coarse SAND, little fine Gravel, little Silt, wet.			
19									
20	11	24/24	20-22	6-19 21-18	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.			
21								6	
22	12	24/24	22-24	6-16 15-15	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.			
23									
24	13	24/24	24-26	10-17 18-16	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet.			
25									
26	14	24/24	26-28	2-6 10-9	ND	Dense, brown, fine to coarse SAND, little Gravel, little Silt, wet. Changing at 26.5 feet to: Brown, fine SAND and Silt with 17 to 18-inch brown, Silty CLAY lenses.			
27									
28	15	24/24	28-30	4-6 6-15	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 28.8 feet to: Brown, Silty CLAY, little fine Sand, wet.	28.8' Silty CLAY		
29									
30	16	24/24	30-32	5-8 8-10	ND	Medium dense, brown, fine to coarse SAND, little Silt, wet. Changing at 30.5 feet to: Brown, CLAY & SILT, little fine Sand, wet.	30.5' CLAY & SILT		
31									
32	17	24/12	32-34	2-4 10-13	ND	Stiff, brown, Clayey SILT, little fine Sand,	32' Clayey SILT		

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19

REMARKS

5. Temporary well installed from 18.0 to 28.0 feet below ground surface. Well screen interval from 23.0 to 28.0 feet below ground surface. Purged 20.0-25.0 gallons of water.
6. Temporary well installed from 26.0 to 36.0 feet below ground surface. Well screen interval from 31.0 to 36.0 feet below ground surface. Purged 20.0-25.0 gallons of water.

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					
33						wet.	Clayey SILT	7	Bentonite/Grout	
34	18	24/24	34-36	8-9 22-40	ND	Dense, brown, fine SAND and SILT, wet.	34' SAND			
35										
36	19	24/24	36-38	7-16 26-21	ND	Hard, gray, Silty CLAY, wet.	36' Silty CLAY			
37										
38	20	24/24	38-40	4-9 15-17	ND	Very stiff, brown and gray, Silty CLAY, wet.				
39										
40	21	24/24	40-42	5-10 14-15	ND	Very stiff, brown and gray, Silty CLAY, wet.				
41										
42	22	24/24	42-44	3-6 8-13	ND	Stiff, brown and gray, Silty CLAY, wet.				
43										
44	23	24/24	44-46	3-3 6-11	ND	Stiff, brown and gray, Silty CLAY, wet.				
45										
46	24	24/24	46-48	2-5 10-15	ND	Stiff, brown and gray, Silty CLAY, wet. Changing at 47.5 feet to: Stiff, brown and gray, Silty CLAY, trace fine Sand, wet.				
47										
48	25	24/24	48-50	6-7 11-16	ND	Very stiff, brown and gray, Silty CLAY, trace Fine Sand, wet.				
49										
R E M A R K S 7. Casing was set at 36.0 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 No.: MW-WV-10S	

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed	
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data					
51	26	24/24	50-52	12-17 <1-21	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet.	Silty CLAY			
52	27	24/24	52-54	4-15 21-19	ND	Hard, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 53.5 feet to: Brown and gray, fine SAND and Silt, little Clay, wet.	53.5' SAND			
54	28	24/24	54-56	5-11 17-20	ND	Very stiff, brown and gray, Silty CLAY with Sandy lenses 12-18 inches and black smear at 18 inches.	54' Silty CLAY			
56	29	24/24	56-58	8-16 20-27	ND	Hard, brown and gray, Silty CLAY, wet. Changing at 57.2 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	57.2' CLAY & SILT			
58	30	24/24	58-60	4-8 17-22	ND	Very stiff, brown and gray, Silty CLAY, trace fine Sand, wet. Changing at 59.5 feet to: Brown and gray, CLAY & SILT, trace fine to coarse Sand, wet.	58' Silty CLAY			
60	31	24/24	60-62	8-14 15-22	ND	Very stiff, Clayey SILT, little fine to coarse Sand, wet.	59.5' CLAY & SILT			
62	32	24/24	62-64	3-7 22-27	ND	Very stiff, Silty CLAY, trace fine Sand, wet. Changing at 63.6 feet to: Brown, fine to coarse SAND and Silt, little fine Gravel, wet.	60' Clayey SILT			
64	33	24/24	64-66	6-44-50/6"	ND	Very dense, brown, fine to medium SAND, some Silt, wet. Changing at 64.3 feet to: Brown and gray, Silty CLAY, trace fine to coarse Sand, wet. Changing at 65.0 feet to: Brown, fine to coarse SAND, little Gravel, some Silt, wet. Changing at 65.5 feet to: Brown, Clayey SILT, little fine to coarse Sand, wet.	62' Silty CLAY	8		
66	34	24/6	66-68	22-50/4"	ND	Hard, brown, Clayey SILT, little fine to coarse Sand, wet.	63.6' SAND			
67							64.3' Silty CLAY			
							65' SAND			
							65.5' Clayey SILT			
REMARKS 8. Switched to 3.0-inch split spoon at 64.0 feet below ground surface. 9. Temporary well installed from 66.0 to 76.0 feet below ground surface. Well screen interval from 71.0 to 66.0 feet below ground surface. Purged 34.0 gallons of water.										

BORING WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA CORP.GDT 4/3/19

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				
68	35	24/18	68-70	17-35-50/6"	ND	Very dense, gray and brown, fine to coarse SAND, little Silt, trace Gravel, wet.	68' Clayey SILT SAND	10	
69									
70	36	24/21	70-72	3-8 22-50/3"	ND	Dense, gray and brown, fine to medium SAND, little Silt, wet.			
71									
72	37	24/18	72-74	2-14-50/6"	ND	Dense, gray and brown, fine to medium SAND, little Silt, wet with Silty Clay 15 to 16 inches.			
73									
74	38	24/18	74-76	8-29-50/6"	ND	Very dense, gray and brown, fine to medium SAND, little Silt, wet.			
75									
76	39	24/15	76-78	17-30-50/3"	ND	Hard, gray, Silty CLAY, wet.	76'		
77									
78						Bottom of Borehole at 78.8 Feet		11	
79									
80									
81									
82									
83									
84									

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- 10. Switched to 2.0-inch split spoon at 68.0 feet below ground surface.
- 11. Monitoring well was installed in borehole upon completion. Well screen set from approximately 71.0 to 75.0 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.



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No. MW-WV13/MW-WV-13D

Page: 1 of 6

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Zach/Travis

Logged by: C. Melby

Date Start/Finish: 2-14-19 / 2-18-19

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	24/8	0-2	WOH 12"-1-1		Very soft, light brown, Clayey SILT, little Organic Matter, Moist.	Clayey SILT	1 2		
2	2	24/24	2-4	2-3 4-4		Very soft, light brown, Clayey SILT, little Organic Matter, Moist. Changing at 2.5 feet to: Brown, fine to medium SAND and Silt, wet.	2.5' SAND	3		
3	3	24/12	4-6	1-3 3-1		Loose, light brown, fine to medium SAND and Silt wet.				
4	4	24/12	6-8	1-1 3-3		Loose, brown, fine to medium SAND and Silt, wet.				
5	5	24/10	8-10	1-3 4-4		Loose, brown, fine to medium SAND and Silt, with tip of spoon at 9.9 feet gray, Silty CLAY, some fine to medium Sand, wet.				
6	6	24/10	10-12	1-4 5-5		Loose, brown, fine to medium SAND, trace Silt, wet.	9.9' Silty CLAY SAND	4		
7	7	24/16	12-14	4-5 4-4		Loose, brown, fine to coarse SAND, little Gravel, trace Silt, wet.				
8	8	24/18	14-16	1-4 5-5		Loose, brown, fine to medium SAND, trace Silt, wet.				

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).
- Installed temporary well from 0.0 to 10.0 feet below ground surface with a 5-foot well screen, and purged 20.0 gallons of water.
- Groundwater was encountered at approximately 2.0 feet below ground surface.
- Installed temporary well from 10.0 to 20.0 feet below ground surface with a 5-foot well screen, and purged 35.0 gallons of water.

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-WV13/MW-WV-13D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/3/19



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	16-18	3-5 5-10		Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 16.5 feet to: Brown, Clayey SILT, some fine to medium Sand, wet.	SAND 16.5' Clayey SILT	5	Bentonite/Grout	
17										
18	10	24/16	18-20	5-8 9-7		Brown, Clayey SILT, some fine to medium Sand, wet.				
19										
20	11	24/12	20-22	5-8 6-9		Medium dense, brown, fine to medium SAND, little Silt, wet.	20' SAND			
21										
22	12	24/16	22-24	1-6 3-4		Loose, brown, fine to medium SAND, little Silt, wet. Changing at 23.0 feet to: Brown, Silty CLAY, some fine Sand, wet.	23' Silty CLAY			
23										
24	13	24/21	24-26	2-6 8-10		Stiff, gray, Silty CLAY, trace fine Sand, wet.				
25										
26	14	24/12	26-28	0-0 2-3		Soft, brown, Silty CLAY, little fine Sand, wet.				
27										
28	15	24/24	28-30	3-5 6-7		Stiff, brown, Silty CLAY, some fine Sand, wet. Changing at 28.8 feet to: Medium dense, brown, fine to medium SAND, some Silt, wet. Changing at 29.5 feet to: Soft, Silty CLAY, trace fine Sand, wet.	28.8' SAND 29.5' Silty CLAY			
29										
30	16	24/24	30-32	3-5 8-9		Stiff, gray, brown and red, Silty CLAY, trace fine to coarse Sand, wet.				
31										
32	17	24/24	32-34	2-4 6-10		Stiff, brown, Clayey SILT, little fine to	32' Clayey SILT			
REMARKS 5. Installed 10-inch casing to 25.0 feet below ground surface. 12.25 inch auger advanced to 25.0 feet for 10-inch casing install.										
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-WV13/MW-WV-13D	

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
33						medium Sand, wet. Changing at 33.8 feet to: Gray and brown, fine SAND, some Silt, wet.	Clayey SILT		
34	18	24/16	34-36	2-3 7-15		Stiff, brown, Clayey SILT, little fine Sand, wet. Changing at 35.4 feet to: Brown, fine SAND, some Silt, wet.	33.8' 34' SAND Clayey SILT	6	
35							35.4' SAND		
36	19	24/14	36-38	5-9 18-16		Medium dense, brown, fine SAND and Silt, wet.			
37									
38	20	24/24	38-40	1-3 5-10		Medium dense, brown, fine SAND and Silt, wet. Changing at 38.8 feet to: Brown and gray, Clayey SILT, trace fine Sand, wet.	38.8' Clayey SILT		
39									
40	21	24/16	40-42	2-10 22-22		Dense, gray and brown, SAND and Silt, wet.	40' SAND		
41									
42	22	24/24	42-44	6-16 20-28		Dense, gray and brown, SAND and Silt, wet.			
43									
44	23	24/18	44-46	3-6 15-15		Medium dense, gray and brown, SAND and Silt, wet.		7	
45									
46	24	24/18	46-48	8-3 6-10		Loose, tan and brown, fine to coarse SAND, little Silt, trace Gravel, wet.			
47									
48	25	24/18	48-50	3-6 9-25		Medium dense, fine to coarse SAND, little Silt, wet.			
49									

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6. Installed temporary well from 35.0 to 45.0 feet below ground surface with a 5-foot well screen, and purged 30.0 gallons of water.
7. Installed temporary well from 45.0 to 55.0 feet below ground surface with a 5-foot well screen, and purged 30.0 gallons of water.

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				
51	26	24/14	50-52	5-3 16-19		Medium dense, tan and brown, fine to medium SAND, little Silt, wet.	SAND	8	
52	27	24/24	52-54	3-5 8-11		Medium dense, tan and brown, fine to medium SAND, little Silt, wet.			
53									
54	28	24/18	54-56	2-2 3-4		Loose, tan and brown, fine to medium SAND, little Silt, trace Gravel, wet.			
55									
56	29	24/24	56-58	0-2 3-4		Loose, tan and brown, fine to medium SAND, trace Silt, trace Gravel, wet.			
57									
58	30	24/12	58-60	2-2 5-5		Loose, tan and brown, fine to medium SAND, trace Silt, wet.			
59									
60	31	24/0	60-62	1-1 2-3		NO RECOVERY.	60' NO RECOVERY		
61									
62	32	24/18	62-64	3-8 18-19		Medium dense, brown, fine to medium SAND, wet. Changing at 63.0 feet to: Brown, Clayey SILT, trace fine to coarse Sand, wet.	62' SAND		
63							63' Clayey SILT		
64	33	24/12	64-66	10-16 24-33		Hard, gray, Silty CLAY, trace fine Sand, wet.	64' Silty CLAY		
65									
66	34	24/15	66-68	7-16 30-50/3"		Hard, gray, Silty CLAY, trace fine Sand, wet. Changing at 67.7 feet to: Gray, Silty CLAY, some fine to coarse Sand, trace Rock fragments, wet.			
67									

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8. Installed temporary well from 53.0 to 63.0 feet below ground surface with a 5-foot well screen, and purged 65.0 gallons of water.

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 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
68	35	24/12	68-70	9-52-50/3"		Very dense, gray, fine to coarse SAND and Silt, trace Gravel, wet. Changing at 69.8 feet to: Gray, Silty CLAY, some fine to coarse Sand, wet.	68'		
							Silty CLAY		
69							SAND		
70	36	24/18	70-72	13-26 39-45		Hard, Clayey SILT, some fine to coarse Sand, little Rock fragments, trace Gravel, wet.	69.8'		
							Silty CLAY		
71							Clayey SILT		
72	37	24/24	72-74	11-18 21-21		Hard, Clayey SILT, some fine to coarse Sand, little Rock fragments, trace Gravel, wet.			
73									
74	38	24/24	74-76	15-22 24-37		Hard, CLAY & SILT, some fine to coarse Sand, little Rock fragments, wet.	74'		
							CLAY & SILT		
75									
76	39	24/0	76-78	15-50/6"		NO RECOVERY.	76'		9
							NO RECOVERY		
77									
78	40	24/24	78-80	6-26 24-20		Hard, gray, CLAY & SILT, little fine to coarse Sand, wet.	78'		
							CLAY & SILT		
79									
80	42	24/18	80-82	33-27 27-36		Hard, gray, Clayey SILT, little fine to coarse Sand, trace Rock fragments, wet.	80'		
							Clayey SILT		
81									
82	43	24/8	82-84	13-50/2"		Hard, gray, SILT & CLAY, some Rock fragments, little fine to coarse Sand with large Boulder at 82.8 feet.	82'		
							SILT & CLAY		
83									
84	44	24/24	84-86	19-29 35-45		Crushed BOULDER. Changing at 84.5 feet to: Gray, Clayey SILT, little fine to coarse Sand, wet.	84'		
							Crushed 84.5' BOULDER Clayey SILT		
REMARKS 9. Large rock shards.									
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BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/3/19



Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
86	45	24/0	86-88	10-50/1"		NO RECOVERY.	Clayey SILT 86' NO RECOVERY	10	
87									
88	46	24/6	88-90	21-50/3"		Hard, gray, Clayey SILT, little fine to coarse Sand with 2-inch Rock fragment at bottom.	88' Clayey SILT		
89									
90	47	24/6	90-92	50/6"		Hard, gray, Clayey SILT, little fine to coarse Sand, some Rock fragments, wet.			
91									
92	48	24/18	92-94	26-48-50/6"		Hard, gray, Clayey SILT, little fine to coarse Sand, some Rock fragments, wet.			
93									
94	49	24/20	94-96	5-22 45-50/5"		Hard, gray, Clayey SILT and fine to coarse Sand, little Gravel, trace Rock fragments, wet.			
95									
96	50	24/11	96-98	20-50/5"		Hard, gray, Clayey SILT, some fine to coarse Sand, wet.			
97									
98	51	24/9	98-100	34-50/3"		Hard, gray, Clayey SILT, some fine to coarse Sand, wet with 2-inch Rock fragments from 98.5 to 98.8 feet.			
99									
100	52	24/6	100-102	15-50/0"		Hard, gray, Clayey SILT, little fine to coarse Sand, trace Rock fragments, wet.			
101						Bottom of Borehole at 101.0 Feet	101'	11	
102									
R E M A R K S 10. 1-inch rock fragments. 11. Monitoring well was installed in borehole upon completion. Well screen set from approximately 58.0 to 63.0 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 No.: MW-WV13/MW-WV-13D

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/3/19



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Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13M

Page: 1 of 1

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: J. Muntoon

Logged by: S. Stephenson

Date Start/Finish: 2-22-19 / 2-22-19

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					
1						See boring log WV-MW-13/WV-MW-13D for soil descriptions.		1	PROTECTIVE CASING	
2									Grout	
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15									Bentonite Plug	
16									Silica Sand Filter Pack	
17									2-Inch PVC Well Screen	
18										
19										
20										
21										
22										
23										
24									Bottom of Borehole at 23.8 Feet	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 18.0 to 23.0 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 No.: MW-WV-13M

BORING WELL 6267781 WWW.WOLVENAVENUE.GPJ GZA CORP.GDT 4/3/19



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Wolverine World Wide

Wolven Avenue Area

Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-13S

Page: 1 of 1

File No.: 16.0062677.81

Check: Leslie Nelson

Contractor: Stearns Drilling Company

Foreman: Jerry Huntoon

Logged by: C. Melby/ J. Markosky

Date Start/Finish: 3-26-19 / 3-26-19

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	2-Inch PVC Well Screen
1						See boring log WV-MW-13/WV-MW-13D for soil descriptions.		1	PROTECTIVE CASING	Concrete
2										
3										
4										
5										
6										
7										
8									Bottom of Borehole at 8.0 Feet	
9										

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 1.5 to 6.5 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 No.: MW-WV-13S

BORING WELL: 6267781 WWW.WOLVENAVENUE.GPJ_GZA_CORP.GDT 4/3/19