

STORM DRAINAGE CALCULATIONS

FOR

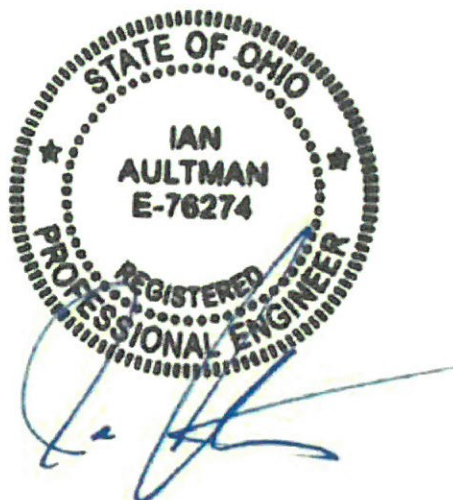
Aldi Massillon #76

Massillon, Ohio

BY

ms consultants, inc.
COLUMBUS, OHIO

September, 2018



STORMWATER DRAINAGE SUMMARY

**for
Aldi Massillon #76
Massillon, Ohio**

CONTEXT

The subject parcel is located in Massillon, Ohio, west of Erie Street S. and immediately north of the access road to the Menard's property. The subject parcel is 2.29 acres and is currently an empty grass lot. Proposed work includes construction of a new Aldi store, including the necessary utilities, stormwater collection system, and parking lot. The existing Menards development included a storm collection system and detention pond that was sized to accommodate the development of the future outlots both in water quantity and water quality. Per discussion with the city engineer, Jason Popiel, the Aldi development may tie into the existing Menards storm infrastructure, and it is not necessary to provide any additional controls for the stormwater runoff.

TIME OF CONCENTRATION (T_c)

A minimum time of concentration of 10 minutes was used in post-development conditions. Catchment area maps can be found in Appendix A.

RAINFALL INTENSITY

The rainfall intensities were obtained from the NOAA Precipitation Frequency Data Server.

DETENTION REQUIREMENTS

When the existing Menards development was constructed, Menards provided a storm system and detention pond that was sized to accommodate the future development of the outlots in front of the Menards property. These calculations assumed that each lot would be 70% impervious surface. The proposed Aldi development is 79% impervious surface. However, per a discussion with the city engineer, Jason Popiel, there is no need to provide any additional storage on the Aldi property for the additional runoff that would be generated by the extra impervious surface.

STORM SEWER DESIGN

The proposed storm system has been designed to convey the 10-year storm with a 100-year storm hydraulic grade line check. Calculations for the proposed storm system can be found in Appendix B.

SUMMARY

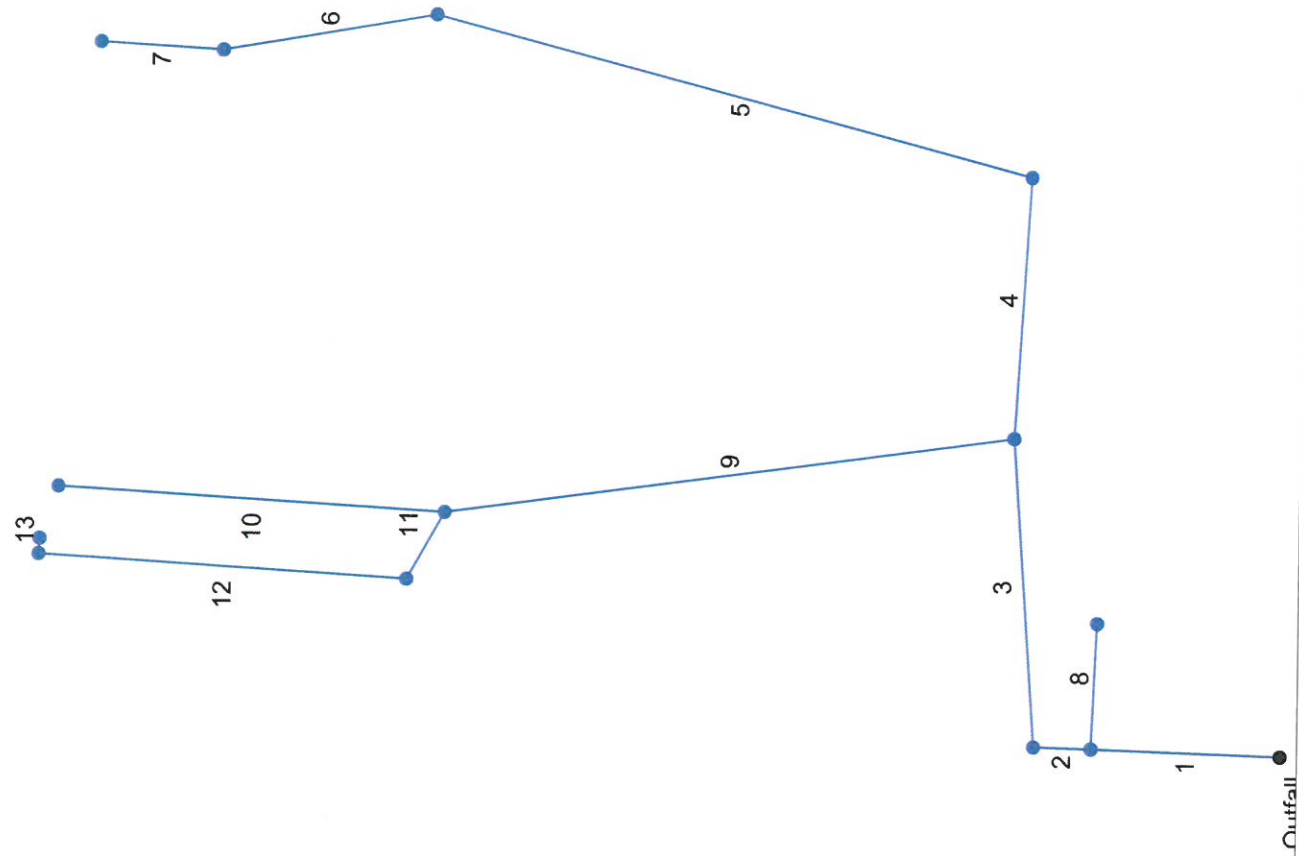
As indicated above and shown by the attached calculations, the project is in compliance with the City of Massillon stormwater requirements.

APPENDIX A
CATCHMENT AREAS

APPENDIX B
STORM SEWER DESIGN

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	61.376	0.03	1.99	0.94	0.03	1.84	10.0	15.4	5.6	10.25	16.10	7.65	18	2.00	979.50	980.73	980.45	981.96	982.14	983.30	AREA B2
2	1	18.632	0.10	1.79	0.94	0.09	1.68	10.0	15.4	5.6	9.40	11.49	6.17	18	1.02	980.73	980.92	981.96	982.10	983.30	984.25	AREA G1
3	2	100.286	0.51	1.69	0.94	0.48	1.59	10.0	15.1	5.6	8.96	11.36	6.06	18	1.00	980.92	981.92	982.10	983.08	984.25	985.00	AREA E2
4	3	84.885	0.43	0.65	0.94	0.40	0.61	10.0	13.9	5.9	3.58	7.00	3.79	15	1.00	981.92	982.77	983.08	983.53	985.00	986.00	AREA D1
5	4	201.499	0.07	0.22	0.94	0.07	0.21	10.0	12.0	6.3	1.30	3.86	2.74	12	1.00	982.77	984.79	983.53	985.27	986.00	989.35	AREA C1
6	5	70.621	0.07	0.15	0.94	0.07	0.14	10.0	11.0	6.5	0.92	3.87	2.79	12	1.01	984.79	985.50	985.27	985.90	989.35	989.20	AREA B1
7	6	39.595	0.08	0.08	0.94	0.08	0.08	10.0	10.0	6.8	0.51	3.88	2.18	12	1.01	985.50	985.90	985.90	986.20	989.20	989.00	AREA A1
8	1	40.779	0.17	0.17	0.75	0.13	0.13	10.0	10.0	6.8	0.86	3.87	1.34	12	1.01	980.90	981.31	981.96	981.97	983.30	983.77	AREA A2
9	3	187.337	0.00	0.53	0.00	0.00	0.50	0.0	14.3	5.8	2.88	2.73	3.67	12	0.50	981.92	982.86	983.08	984.12	985.00	989.50	NONE
10	9	126.021	0.06	0.06	0.94	0.06	0.06	10.0	10.0	6.8	0.38	2.73	0.52	12	0.50	982.86	983.49	984.29	984.31	989.50	985.75	AREA F1
11	9	24.962	0.00	0.47	0.00	0.00	0.44	0.0	10.5	6.6	2.93	3.86	3.73	12	1.00	982.86	983.11	984.29	984.44	989.50	990.28	NONE
12	11	119.986	0.00	0.47	0.00	0.00	0.44	0.0	10.0	6.8	3.00	3.86	3.82	12	1.00	983.11	984.31	984.64	985.29	990.28	988.50	NONE
13	12	5.008	0.47	0.47	0.94	0.44	0.44	10.0	10.0	6.8	3.00	1.31	8.59	8	1.00	984.31	984.36	985.52	985.79	988.50	989.91	AREA BR1
Project File: 180928- Massillon- Aldi- Storm Conveyance.stm														Number of lines: 13				Run Date: 9/28/2018				
NOTES: Intensity = 42.40 / (Inlet time + 5.80) ^ 0.66; Return period = Yrs. 100 ; c = cir e = ellip b = box																						



Project File: 180928- Massillon- Aldi- Storm Conveyance.stm	Number of lines: 13	Date: 9/28/2018
---	---------------------	-----------------