Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	46.000	-42.806	MH	0.00	0.00	0.90	10.0	859.33	1.59	860.06	24	Cir	0.013	0.15	867.91	
2	1	146.121	4.318	MH	0.00	0.00	0.90	10.0	860.07	0.12	860.24	24	Cir	0.013	1.00	868.45	
3	2	57.748	89.285	MH	0.00	0.47	0.88	10.0	860.24	0.21	860.36	24	Cir	0.013	0.44	867.74	
4	3	200.206	22.773	MH	0.00	1.14	0.88	10.0	860.36	0.34	861.05	24	Cir	0.013	0.88	866.30	
5	4	123.082	-58.546	MH	0.00	0.29	0.75	10.0	861.05	0.22	861.32	24	Cir	0.013	0.15	864.98	
6	5	121.074	-0.586	MH	0.00	0.44	0.75	10.0	861.32	0.21	861.58	24	Cir	0.013	0.85	865.23	
7	6	218.369	-55.260	MH	0.00	1.06	0.75	10.0	861.58	0.22	862.06	18	Cir	0.013	1.00	865.00	

STATE OF OHIO
MICHAEL A. TIMKO
E-68148
REGISTERED
PROFESSIONAL ENGINEER
7/11/17

Project File: as-built STM.stm | Number of lines: 7 | Date: 7/11/2017

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		28.49	24	Cir	46.000	859.33	860.06	1.587	860.97	861.70	n/a	861.70	End	Manhole
2		7.71	24	Cir	146.121	860.07	860.24	0.116	861.71	861.88	0.12	862.00	1	Manhole
3		10.31	24	Cir	57.748	860.24	860.36	0.208	862.00	862.11	0.09	862.19	2	Manhole
4		13.28	24	Cir	200.206	860.36	861.05	0.345	862.19	862.78	0.29	863.07	3	Manhole
5		10.59	24	Cir	123.082	861.05	861.32	0.219	863.07	863.32	0.03	863.35	4	Manhole
6		10.48	24	Cir	121.074	861.32	861.58	0.215	863.35	863.58	0.15	863.73	5	Manhole
7		4.92	18	Cir	218.369	861.58	862.06	0.220	863.73*	864.21*	0.12	864.33	6	Manhole

grate @ 865

Project File: as-built STM.stm | Number of lines: 7 | Run Date: 7/11/2017

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown).

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	46.000	0.00	0.00	0.90	0.00	0.00	10.0	0.0	0.0	28.49	28.49	10.34	24	1.59	859.33	860.06	860.97	861.70	0.00	867.91	
2	1	146.121	0.00	0.00	0.90	0.00	0.00	10.0	0.0	0.0	7.71	7.71	2.80	24	0.12	860.07	860.24	861.71	861.88	867.91	868.45	
3	2	57.748	0.47	0.00	0.88	0.41	0.00	10.0	0.0	0.0	10.31	10.31	3.53	24	0.21	860.24	860.36	862.00	862.11	868.45	867.74	
4	3	200.206	1.14	0.00	0.88	1.00	0.00	10.0	0.0	0.0	13.28	13.28	4.50	24	0.34	860.36	861.05	862.19	862.78	867.74	866.30	
5	4	123.082	0.29	0.00	0.75	0.22	0.00	10.0	0.0	0.0	10.59	10.59	3.37	24	0.22	861.05	861.32	863.07	863.32	866.30	864.98	
6	5	121.074	0.44	0.00	0.75	0.33	0.00	10.0	0.0	0.0	10.48	10.48	3.34	24	0.21	861.32	861.58	863.35	863.58	864.98	865.23	
7	6	218.369	1.06	0.00	0.75	0.80	0.00	10.0	0.0	0.0	4.92	4.92	2.79	18	0.22	861.58	862.06	863.73	864.21	865.23	865.00	

not calculating the actual flow pipe

Project File: as-built STM.stm

Number of lines: 7

Run Date: 7/11/2017

NOTES:Intensity = 200.22 / (Inlet time + 20.60) ^ 0.97; Return period =Yrs. 100 ; Total flows limited to full flow capacities ; c = cir e = ellip b = box

NO

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	24	28.49	859.33	860.97	1.64	2.76	10.33	1.66	862.63	0.000	46.000	860.06	861.70	1.64	2.76	10.34	1.66	863.36	0.000	0.000	0.000	0.15	n/a
2	24	7.71	860.07	861.71	1.64*	2.76	2.80	0.12	861.83	0.116	146.121	860.24	861.88	1.64	2.75	2.80	0.12	862.00	0.116	0.116	0.170	1.00	0.12
3	24	10.31	860.24	862.00	1.76	2.93	3.52	0.19	862.19	0.187	57.748	860.36	862.11	1.75	2.91	3.54	0.19	862.30	0.189	0.188	0.108	0.44	0.09
4	24	13.28	860.36	862.19	1.83	3.02	4.40	0.30	862.49	0.300	200.206	861.05	862.78	1.73	2.89	4.59	0.33	863.11	0.316	0.308	0.617	0.88	0.29
5	24	10.59	861.05	863.07	2.00	3.14	3.37	0.18	863.25	0.219	123.082	861.32	863.32	2.00	3.14	3.37	0.18	863.50	0.214	0.217	0.267	0.15	0.03
6	24	10.48	861.32	863.35	2.00	3.14	3.34	0.17	863.52	0.215	121.074	861.58	863.58	2.00	3.14	3.34	0.17	863.75	0.210	0.212	0.257	0.85	0.15
7	18	4.92	861.58	863.73	1.50	1.77	2.79	0.12	863.85	0.220	218.369	862.06	864.21	1.50	1.77	2.79	0.12	864.33	0.220	0.220	0.480	1.00	0.12

Project File: as-built STM.stm | Number of lines: 7 | Run Date: 7/11/2017

Notes: * Normal depth assumed ; c = cir e = ellip b = box

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	24.924	0.000	MH	0.00	0.00	0.90	10.0	858.84	0.04	858.85	24	Cir	0.012	1.00	867.28	
2	1	41.073	90.302	MH	0.00	0.00	0.90	10.0	858.88	0.05	858.90	24	Cir	0.012	1.00	866.91	
3	2	271.174	-92.041	MH	0.00	0.00	0.90	10.0	858.91	0.04	859.02	24	Cir	0.012	0.15	865.70	
4	3	161.719	0.670	MH	0.00	0.00	0.90	10.0	859.08	0.03	859.13	18	Cir(2b)	0.012	0.15	869.02	
5	4	335.135	0.168	MH	0.00	0.00	0.90	10.0	859.27	0.07	859.51	24	Cir	0.012	0.81	868.81	
6	5	182.937	-50.703	MH	0.00	0.00	0.90	10.0	859.51	0.18	859.84	24	Cir	0.012	0.55	864.58	
7	6	36.286	-29.574	MH	9.65	0.00	0.90	10.0	859.84	0.36	859.97	24	Cir	0.012	1.00	866.08	

STATE OF OHIO
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7/11/17

asbit-STM (downstream) | Number of lines: 7 | Date: 7/11/2017

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		4.90	24	Cir	24.924	858.84	858.85	0.040	859.95	859.98	0.11	860.09	End	Manhole
2		5.41	24	Cir	41.073	858.88	858.90	0.049	860.88	860.90	0.05	860.95	1	Manhole
3		4.94	24	Cir	271.174	858.91	859.02	0.041	860.95	861.02	0.01	861.03	2	Manhole
4		4.00	18	Cir(2b)	161.719	859.08	859.13	0.031	861.03*	861.08*	0.00	861.08	3	Manhole
5		6.56	24	Cir	335.135	859.27	859.51	0.072	861.27	861.51	0.05	861.56	4	Manhole
6		10.41	24	Cir	182.937	859.51	859.84	0.180	861.56	861.84	0.09	861.93	5	Manhole
7		14.66	24	Cir	36.286	859.84	859.97	0.358	861.93*	862.06*	0.34	862.40	6	Manhole

asblt-STM (downstream) | Number of lines: 7 | Run Date: 7/11/2017

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown).

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	24.924	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	4.90	4.90	2.70	24	0.04	858.84	858.85	859.95	859.98	0.00	867.28	
2	1	41.073	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	5.41	5.41	1.72	24	0.05	858.88	858.90	860.88	860.90	867.28	866.91	
3	2	271.174	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	4.94	4.94	1.57	24	0.04	858.91	859.02	860.95	861.02	866.91	865.70	
4	3	161.719	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	4.00	4.00	1.13	18(2b)	0.03	859.08	859.13	861.03	861.08	865.70	869.02	
5	4	335.135	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	6.56	6.56	2.09	24	0.07	859.27	859.51	861.27	861.51	869.02	868.81	
6	5	182.937	0.00	0.00	0.90	0.00	0.00	10.0	1.$	0.0	10.41	10.41	3.31	24	0.18	859.51	859.84	861.56	861.84	868.81	864.58	
7	6	36.286	0.00	0.00	0.90	0.00	0.00	10.0	10.0	0.0	14.66	14.66	4.67	24	0.36	859.84	859.97	861.93	862.06	864.58	866.08	

what out of bounds?

asblt-STM (downstream) | Number of lines: 7 | Run Date: 7/11/2017

NOTES:Intensity = 200.22 / (Inlet time + 20.60) ^ 0.97; Return period =Yrs. 100 ; Total flows limited to full flow capacities ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	24	4.90	858.84	859.95	1.11	1.79	2.73	0.12	860.07	0.113	24.924	858.85	859.98	1.13	1.83	2.67	0.11	860.09	0.106	0.110	0.027	1.00	0.11
2	24	5.41	858.88	860.88	2.00*	3.14	1.72	0.05	860.93	0.049	41.073	858.90	860.90	2.00	3.14	1.72	0.05	860.95	0.049	0.049	0.020	1.00	0.05
3	24	4.94	858.91	860.95	2.00	3.14	1.57	0.04	860.98	0.041	271.174	859.02	861.02	2.00	3.14	1.57	0.04	861.06	0.040	0.040	0.109	0.15	0.01
4	18(2b)	4.00	859.08	861.03	1.50	3.53	1.13	0.02	861.05	0.031	161.719	859.13	861.08	1.50	3.53	1.13	0.02	861.10	0.031	0.031	0.050	0.15	0.00
5	24	6.56	859.27	861.27	2.00*	3.14	2.09	0.07	861.34	0.072	335.135	859.51	861.51	2.00	3.14	2.09	0.07	861.57	0.069	0.070	0.235	0.81	0.05
6	24	10.41	859.51	861.56	2.00	3.14	3.31	0.17	861.73	0.180	182.937	859.84	861.84	2.00	3.14	3.31	0.17	862.01	0.175	0.178	0.325	0.55	0.09
7	24	14.66	859.84	861.93	2.00	3.14	4.67	0.34	862.27	0.358	36.286	859.97	862.06	2.00	3.14	4.67	0.34	862.40	0.358	0.358	0.130	1.00	0.34

asblt-STM (downstream) | Number of lines: 7 | Run Date: 7/11/2017

Notes: * Crown depth assumed ; c = cir e = ellip b = box

Detention Basin Storage (AS-BUILT)

Surface Ponding
Volume = (1/3)*(EL2-EL1)*[A1+A2+sqrt(A1*A2)]

DETENTION AREA ELEVATION (ft)	AREA (SF)	INCREMENTAL (SF)	INCREMENTAL VOLUME (CF)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)
859.80	774.39	0.00	0.00	0.000	0.000
860.00	888.37	2492.19	166.15	166.146	0.004
861.00	1495.35	3536.29	1178.76	1344.911	0.031
862.00	1964.89	5174.35	1724.78	3069.694	0.070
863.00	2490.73	6667.86	2222.62	5292.315	0.121
864.00	3154.76	8448.64	2816.21	8108.528	0.186
865.00	4672.74	11666.94	3888.98	11997.508	0.275
866.00	6262.11	16344.22	5448.07	17445.580	0.400

AS-BUILT DETENTION BASIN VOLUME =	0.4005	AC-FT
	17445.58	CF

Detention Basin Storage (PROPOSED)

Surface Ponding
Volume = (1/3)*(EL2-EL1)*[A1+A2+sqrt(A1*A2)]

DETENTION AREA ELEVATION (ft)	AREA (SF)	INCREMENTAL (SF)	INCREMENTAL VOLUME (CF)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)
859.75	0.00	0.00	0.00	0.000	0.000
860.00	1087.50	1087.50	90.63	90.625	0.002
861.00	1614.77	4027.44	1342.48	1433.103	0.033
862.00	2260.39	5785.66	1928.55	3361.657	0.077
863.00	3028.06	7904.67	2634.89	5996.546	0.138
864.00	3908.85	10377.29	3459.10	9455.644	0.217
865.00	5296.09	13754.84	4584.95	14040.591	0.322
866.00	6770.64	18054.88	6018.29	20058.884	0.460

PROPOSED DETENTION BASIN VOLUME =	0.4605	AC-FT
	20058.88	CF
AS-BUILT VOLUME =	0.4005	AC-FT
	17445.58	CF
DEFICIT=	0.0600	AC-FT
	2613.30	CF

Summary

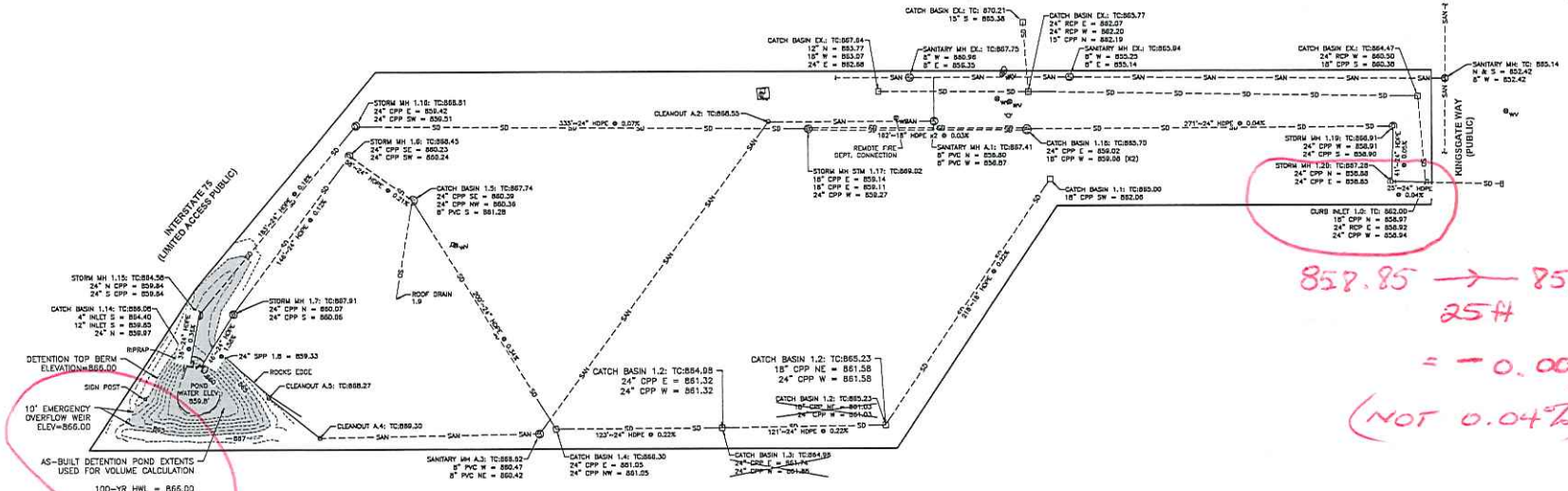
AS-BUILT:

Pipe Storage	2,577 CF	0.0592 AC-FT
Surface Storage	17,446 CF	0.4005 AC-FT
TOTAL PROVIDED STORAGE	20,023 CF	0.4597 AC-FT

PROPOSED:

Pipe Storage	2,743 CF	0.0630 AC-FT
Surface Storage	20,059 CF	0.4605 AC-FT
TOTAL PROVIDED STORAGE	22,802 CF	0.5235 AC-FT

DEFICIT:	2,779 CF	0.0638 AC-FT



858.85 → 858.94
25ft
= −0.004 ÷ −4%
(NOT 0.04%)

grading indicates a gap @ 865 ∴ a detail of the spillway is required

No.	DATE	REVISION

PROJECT No: 75566
DATE 01/01/2017
DES. ___ JC
DR. ___
CKD. CS

WOOLPERT
4454 Idea Center Blvd
Dayton, OH
45430-1500
937.461.5660
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TEXAS ROADHOUSE

7309 KINGSGATE WAY
TOWNSHIP OF WEST CHESTER, BUTLER COUNTY, OHIO

AS-BUILT SURVEY

SHEET NO.
1 OF 1