

WILGUS TRACT

STORM DRAIN REPORT

Prepared On Behalf Of:

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INTRODUCTION

The Wilgus Tract site is located in North Bethesda, MD within the jurisdiction of Montgomery County, Maryland. The site is approximately 12.88 acres and is generally bounded by Montrose Road to the north, Towne Road to the east, Montrose Parkway to the south and East Jefferson Street to the west. The site is currently zoned CR-2.0, C-1.0, R-1.5, H-200, CR-2.0, C-0.25, R-1.75, H-75, and CRN-0.75, C-0.0, R-0.75, H-50' and drains, via existing public storm drain, to an unnamed tributary to Old Farm Creek of the Cabin John Creek watershed, Use Class I-P.

Currently, the site is unimproved, with the exception of Parcel Q (N208), which contains an approximately 3,120 square foot automobile service station. The applicant proposes redeveloping the property with up to 1,025,789 square feet of residential uses (745 units – in multifamily, 2 over 2s, and townhouses). Approximately 15,000 square feet of commercial uses are anticipated to be located in the proposed mixed-use buildings.

EXISTING CONDITIONS HYDROLOGY

In the existing conditions the site is primarily wooded. There is a Sunoco gas station with frontage to the Montrose Road on the North side of the Stonehenge Place. The site can be separated into an east parcel and west parcel divided by Stonehenge place in the middle. In the existing condition, the north side of the west parcel sheets flows from east to west. The runoff is intercepted by the existing storm drain system along East Jefferson Street. The South side of the west parcel sheet flows to the Montrose parkway where it gets picked up by the existing storm drain system along Eastbound Montrose Parkway and ultimately ends up in a dry pond located at the North West quadrant of the intersection of East Jefferson Street and Montrose Parkway.

The East parcel has high points along Towne road, the storm runoff from the west parcel flows from east to North West and exits the site through various existing storm drain inlets along Montrose Road. The storm drain runoff in the existing storm drain system goes across Montrose Road through the parking lot of Jewish Community Center. Ultimately the runoff outfalls to B'nai Israel SWM pond.

PROPOSED CONDITIONS HYDROLOGY

In the proposed condition the runoff from the site gets collected and treated by various stormwater management facilities (microbioretention, green roof, modular wetland system, bioretention and storm filters). The runoff exits the proposed development at three locations, towards the west via existing storm drain system at Montrose Parkway, through the existing storm drain system along Stonehenge Place and towards the North West via an existing storm drain system along Montrose Road. A storm drain study has been carried out for all three exit locations and the results are summarized in this report.

CONCLUSION

After the storm drain analysis of the existing storm drain system it was found that the existing storm drain system along Montrose Parkway and Montrose Road are inadequate to convey the additional runoff generated due to the added impervious area to the site. Hence, it is recommended that the undersized storm drain system be upgraded to handle the additional stormwater runoff. The pipe sections that need to be upsized are highlighted in the storm drain analysis results and the sections are called out in the drainage area Map. The storm drain system at Stonehenge Place was found to be sufficient to carry additional stormwater load from the proposed site.

Runoff Coefficient Calculation

Weighted Runoff Coefficient (C) = (Imp. Area *0.90 + Perv. Area*0.

Impervious "C" Factor = 0.90

Pervious "C" Factor = 0.25

Structure No.	Total Tributary Drainage Area (Ac.)	Impervious Area (Ac.)	Weighted "C"
EX101	0.245	0.140	0.62
EX102	0.296	0.146	0.57
EX103	0.471	0.218	0.55
EX104	0.735	0.353	0.56
EX105	0.179	0.109	0.65
EX106	0.469	0.254	0.60
EX107	0.635	0.324	0.58
EX109	0.095	0.070	0.72
EX110	0.106	0.081	0.74
EX111	0.247	0.179	0.72
EX112	0.189	0.138	0.72
EX113	0.231	0.171	0.73
EX114	0.252	0.198	0.76
EX115	0.267	0.240	0.83
EX116	0.311	0.219	0.71
EX117	0.246	0.173	0.71
EX118	0.280	0.199	0.71
EX501	0.445	0.290	0.67
EX502	0.130	0.098	0.74
EX503	0.104	0.067	0.67
EX504	0.096	0.090	0.86

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Runoff Coefficient Calculation

Weighted Runoff Coefficient (C) = (Imp. Area *0.90 + Perv. Area*0.

Impervious "C" Factor = 0.90

Pervious "C" Factor = 0.25

Structure No.	Total Tributary Drainage Area	Impervious Area	Weighted "C"
	(Ac.)	(Ac.)	
EX201	0.477	0.311	0.67
EX202	0.153	0.094	0.65
EX203	0.146	0.083	0.62
EX204	0.191	0.116	0.64
EX205	0.795	0.530	0.68
EX207	0.223	0.181	0.78
EX208	0.758	0.666	0.82
EX208A	0.119	0.085	0.71
EX210	0.102	0.052	0.58
EX214	0.494	0.366	0.73
P_OFFSITE	1.442	0.929	0.67

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STRUCTURE	Inc A	Cumm A	A * R	Cumm	Injected	PIPE	Pipe	Pipe	Pipe	Pipe	Vmin=	Friction	Head	Full Flow					
FROM TO	(ac)	(ac)	R	AxR	Q	n	Size	Slope	Vel	Length	V10	Slope	Loss	Capacity					
Montrose Parkway - Storm Drain Analysis																			
MWS7 MH512	0.44	0.44	0.78	0.34	0.00	0.00	0.00	0.00	0.00	2.4	0.013	15.00	1.00%	4.9	54.57	1.97	0.14%	N/A	6.49
MH512 MH510	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	0.013	15.00	1.02%	2.0	142.34	1.97	0.14%	0.06	6.54
MWS6 MH510	0.43	0.43	0.80	0.34	0.00	0.00	0.00	0.00	0.00	2.4	0.013	15.00	1.00%	4.9	54.16	1.97	0.14%	N/A	6.48
MH510 MH508	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.8	0.013	18.00	0.99%	2.7	156.93	2.74	0.21%	0.12	10.50
MWS5 MH508	0.45	0.45	0.79	0.36	0.00	0.00	0.00	0.00	0.00	2.5	0.013	15.00	1.00%	4.9	54.93	2.04	0.15%	N/A	6.48
MH508 MH506	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.3	0.013	18.00	1.00%	4.2	185.69	4.15	0.49%	0.27	10.51
PB-4 MH506	0.07	0.07	0.90	0.06	0.00	0.00	0.00	0.00	0.00	0.4	0.013	15.00	1.00%	0.4	11.38	0.36	0.00%	N/A	6.48
MH506 MH504	0.00	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.7	0.013	18.00	0.99%	4.4	75.53	4.40	0.55%	0.05	10.50
IN505 MH504	0.04	0.04	0.90	0.04	0.00	0.00	0.00	0.00	0.00	0.2	0.013	15.00	1.01%	0.2	8.67	0.21	0.00%	N/A	6.51
MH504 MH500	0.00	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.0	0.013	18.00	1.01%	4.5	118.14	4.55	0.58%	0.05	10.57
PB-3 PB2	0.08	0.08	0.90	0.07	0.00	0.00	0.00	0.00	0.00	0.5	0.013	15.00	1.02%	0.4	71.26	0.41	0.01%	N/A	6.56
PB2 MH502	0.08	0.16	0.90	0.07	0.00	0.00	0.00	0.00	0.00	1.0	0.013	15.00	0.79%	0.8	39.04	0.83	0.02%	0.01	5.77
BIO1 MH502	0.69	0.69	0.77	0.53	0.00	0.00	0.00	0.00	0.00	3.7	0.013	15.00	1.01%	3.1	39.46	3.06	0.34%	N/A	6.50
MH502 MH500	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7	0.013	18.00	1.07%	2.7	101.48	2.70	0.21%	0.11	10.90
MH500 EX101	0.00	2.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.8	0.013	21.00	1.01%	5.3	26.60	5.32	0.65%	0.38	16.01
EX118 EX117	0.28	0.28	0.71	0.20	0.00	7.00	0.00	0.00	0.00	1.2	0.013	15.00	1.04%	4.2	198.19	1.06	0.04%	N/A	6.62
EX107 EX117	0.64	0.64	0.58	0.37	0.00	10.00	0.00	0.00	0.00	2.1	0.013	15.00	1.69%	5.7	94.61	1.76	0.11%	N/A	8.42
EX117 EX116	0.25	1.16	0.71	0.17	0.00	10.00	0.00	0.00	0.00	4.5	0.013	15.00	3.02%	8.7	237.55	3.74	0.50%	0.27	11.25
EX106 EX116	0.47	0.47	0.60	0.28	0.00	10.00	0.00	0.00	0.00	1.6	0.013	15.00	1.00%	1.3	79.17	1.34	0.06%	N/A	6.48
EX116 EX115	0.31	1.94	0.71	0.22	0.00	10.00	0.00	0.00	0.00	7.6	0.013	15.00	1.00%	6.3	187.33	6.25	1.41%	0.32	6.48
EX105 EX115	0.18	0.18	0.65	0.12	0.00	10.00	0.00	0.00	0.00	0.6	0.013	15.00	0.19%	1.9	78.62	0.55	0.01%	N/A	2.83
EX115 EX114	0.27	2.39	0.83	0.22	0.00	10.00	0.00	0.00	0.00	9.9	0.013	15.00	3.76%	11.3	189.74	8.09	2.36%	0.53	12.56
EX114 EX113	0.25	2.64	0.76	0.19	0.00	10.00	0.00	0.00	0.00	11.1	0.013	15.00	4.97%	12.9	194.13	9.10	2.99%	0.67	14.43
EX104 EX113	0.74	0.74	0.56	0.41	0.00	10.00	0.00	0.00	0.00	2.4	0.013	15.00	1.14%	2.0	78.91	1.96	0.14%	N/A	6.92
EX113 EX112	0.23	3.61	0.73	0.17	0.00	10.00	0.00	0.00	0.00	14.6	0.013	18.00	3.23%	8.3	145.99	8.31	1.95%	0.56	18.94
EX112 EX111	0.19	3.79	0.72	0.14	0.00	10.00	0.00	0.00	0.00	15.5	0.013	21.00	2.13%	6.5	193.86	6.47	0.97%	0.34	23.19
EX111 EX110	0.25	4.04	0.72	0.18	0.00	10.00	0.00	0.00	0.00	16.7	0.013	21.00	0.78%	7.0	86.39	6.95	1.11%	0.39	13.99
EX110 EX109	0.11	4.15	0.74	0.08	0.00	10.00	0.00	0.00	0.00	17.2	0.013	24.00	1.17%	5.5	82.00	5.49	0.58%	0.24	24.54
EX109 EX101	0.10	4.24	0.72	0.07	0.00	10.00	0.00	0.00	0.00	17.6	0.013	24.00	0.93%	5.6	51.46	5.63	0.61%	0.66	21.91
EX103 EX102	0.47	0.47	0.55	0.26	0.00	10.00	0.00	0.00	0.00	1.5	0.013	15.00	1.30%	1.2	142.48	1.23	0.06%	N/A	7.38
EX102 EX101	0.30	0.77	0.57	0.17	0.00	10.00	0.00	0.00	0.00	2.5	0.013	15.00	0.95%	2.0	126.19	2.04	0.15%	0.09	6.32
EX101 EX501	0.25	7.53	0.62	0.15	0.00	10.00	0.00	0.00	0.00	33.8	0.013	24.00	0.98%	10.8	191.74	10.78	2.24%	2.69	22.46
EX501 EX502	0.45	7.98	0.67	0.30	0.00	10.00	0.00	0.00	0.00	35.7	0.013	24.00	1.38%	11.4	80.89	11.39	2.50%	1.65	26.69
EX504 EX502	0.10	0.10	0.86	0.08	0.00	5.00	0.00	0.00	0.00	0.5	0.013	18.00	1.00%	0.3	46.45	0.32	0.00%	N/A	10.53
EX502 EX503	0.13	8.21	0.74	0.10	0.00	5.00	0.00	0.00	0.00	36.9	0.013	30.00	1.01%	7.5	136.90	7.53	0.81%	0.72	41.29

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STRUCTURE	Inc A	Cumm A	A * R	Cumm	Injected	PIPE	Pipe	Pipe	Pipe	Pipe	Vmin=	Friction	Head	Full Flow
FROM TO	(ac)	(ac)	R	AxR	Q	n	Size	Slope	Vel	Length	V10	Slope	Loss	Capacity
Montrose Road Storm Drain Analysis														
SF-3	MH416	0.32	0.90	0.29	0.00	0.00	15.00	1.97%	5.9	53.32	1.65	0.10%	N/A	9.09
MH416	MH414	0.00	0.00	0.00	0.00	0.00	24.00	0.50%	3.5	44.41	0.65	0.01%	N/A	15.96
MH414	MH412	0.00	0.00	0.00	0.00	0.00	24.00	0.49%	3.5	59.27	0.65	0.01%	N/A	15.95
PB36	PB34	0.11	0.73	0.08	0.00	0.00	15.00	1.00%	3.2	35.71	0.45	0.01%	N/A	6.48
PB34	MH412	0.13	0.76	0.10	0.00	0.00	15.00	1.00%	4.1	5.80	1.01	0.04%	N/A	6.48
SF-2	MH412	0.54	0.90	0.49	0.00	0.00	15.00	7.01%	10.9	7.91	2.78	0.28%	N/A	17.15
MH412	MH410	0.00	0.00	0.00	0.00	0.00	24.00	0.51%	4.9	74.00	2.13	0.09%	N/A	16.18
MWS-41	MWS-40	0.07	0.90	0.06	0.00	0.00	8.00	1.00%	3.6	78.46	1.28	0.10%	N/A	1.43
MWS-40	SF-5	0.07	0.90	0.06	0.00	0.00	8.00	1.00%	4.3	96.87	2.55	0.39%	N/A	1.43
MWS-39	SF-5	0.09	0.90	0.08	0.00	0.00	8.00	1.00%	3.9	72.54	1.64	0.16%	N/A	1.43
SF-5	MH410	0.49	0.85	0.42	0.00	0.00	15.00	0.99%	5.6	64.73	3.58	0.46%	N/A	6.45
PB23	MH410	0.06	0.90	0.05	0.00	0.00	15.00	1.00%	2.9	15.48	0.31	0.00%	N/A	6.48
MH410	MH408	0.00	0.00	0.00	0.00	0.00	24.00	0.50%	5.6	21.31	3.64	0.26%	N/A	16.11
PB37A	MH408	0.10	0.82	0.08	0.00	0.00	15.00	1.00%	3.2	40.45	0.47	0.01%	N/A	6.48
MH408	MH406	0.00	0.00	0.00	0.00	0.00	24.00	0.50%	5.6	109.14	3.83	0.28%	N/A	16.01
PB24	MH406	0.21	0.84	0.18	0.00	0.00	15.00	1.03%	4.1	17.48	0.99	0.04%	N/A	6.57
PB35	MH406	0.13	0.70	0.09	0.00	0.00	15.00	1.00%	3.3	3.18	0.51	0.01%	N/A	6.48
MH406	MH400	0.00	0.00	0.00	0.00	0.00	24.00	0.49%	5.7	25.41	4.41	0.38%	N/A	15.84
PB28	MH602	0.32	0.90	0.29	0.00	5.00	15.00	1.08%	3.7	92.58	0.69	0.02%	N/A	6.73
MH602	MH600	0.00	0.00	0.00	0.00	5.00	15.00	1.00%	3.6	173.51	0.69	0.02%	N/A	6.49
PB38	MH600	0.44	0.90	0.40	0.00	0.00	15.00	0.99%	5.0	13.16	2.26	0.18%	N/A	6.44
MH600	EX214	0.00	0.00	0.00	0.00	0.00	18.00	0.99%	5.4	26.25	2.05	0.12%	N/A	10.48
P-OFFSITE	EX214	1.44	0.67	0.97	0.00	7.00	24.00	1.62%	2.0	89.98	2.01	0.08%	N/A	28.89
EX214	EX212	0.49	0.73	0.36	0.00	7.00	24.00	1.05%	3.9	131.92	3.91	0.29%	N/A	23.28
EX212	EX211	0.00	0.00	0.00	0.00	7.00	24.00	1.02%	3.9	82.43	3.91	0.29%	N/A	22.90
EX211	EX206	0.00	0.00	0.00	0.00	7.00	24.00	9.02%	3.9	13.87	3.91	0.29%	N/A	68.11
EX206	EX205	0.00	0.00	0.00	0.00	7.00	24.00	1.00%	3.9	237.81	3.91	0.29%	N/A	22.68
EX210	EX209	0.10	0.58	0.06	0.00	10.00	15.00	1.00%	2.8	26.09	0.28	0.00%	N/A	6.48
EX209	EX205	0.00	0.00	0.00	0.00	10.00	15.00	1.00%	2.8	65.35	0.28	0.00%	N/A	6.48
EX205	MH400	0.80	0.68	0.54	0.00	10.00	18.00	2.75%	9.2	117.16	9.15	2.37%	N/A	17.47
SF-4	MH404	0.71	0.90	0.64	0.00	0.00	15.00	1.97%	7.4	46.11	3.66	0.48%	N/A	9.10
MH404	PB26	0.00	0.00	0.00	0.00	0.00	15.00	1.02%	5.7	109.78	3.66	0.48%	N/A	6.56
PB26	MH402	0.39	0.90	0.35	0.00	0.00	18.00	1.02%	6.4	17.46	3.93	0.44%	N/A	10.64
PB37	MH402	0.06	0.69	0.04	0.00	0.00	15.00	0.42%	2.0	20.01	0.24	0.00%	N/A	4.18
MH402	MH400	0.00	0.00	0.00	0.00	0.00	18.00	0.98%	6.4	53.46	4.10	0.48%	N/A	10.45
MH400	EX204	0.00	0.00	0.00	0.00	0.00	18.00	2.62%	21.1	23.31	21.10	12.60%	N/A	17.04
EX204	EX203	0.19	0.64	0.12	0.00	0.00	21.00	0.97%	15.8	115.83	15.80	5.75%	N/A	15.62
EX203	MH300	0.15	0.62	0.09	0.00	0.00	21.00	1.00%	16.0	60.26	16.02	5.91%	N/A	15.85
PB20	MH300	0.33	0.79	0.26	0.00	0.00	15.00	0.90%	4.3	32.71	1.45	0.08%	N/A	6.15
MH300	EX202	0.00	0.00	0.00	0.00	0.00	21.00	0.93%	16.8	49.52	16.76	6.47%	N/A	15.31
EX202	EX208	0.15	0.65	0.10	0.00	0.00	24.00	0.89%	13.0	63.87	13.01	3.27%	N/A	21.43

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STRUCTURE FROM	TO	Inc A (ac)	Cumm A (ac)	R	A * R (ac)	Cumm AxR	T/C	INTENS	Injected Q	Q (cfs)	PIPE n	Pipe Size	Pipe Slope	Pipe Vel	Pipe Length	Vmin= V10	Friction Slope	Head Loss	Full Flow Capacity
EX208A	EX208	0.12	0.12	0.71	0.08	0.00	7.00	0.00	0.00	0.55	0.013	15.00	1.00%	3.2	87.04	0.45	0.01%	N/A	6.48
EX208	EX207	0.76	8.77	0.82	0.62	0.00	7.00	0.00	0.00	45.83	0.013	27.00	1.22%	11.5	310.83	11.53	2.19%	N/A	34.24
IN220	MH218	0.29	0.29	0.90	0.26	0.00	0.00	0.00	0.00	1.85	0.013	18.00	0.99%	4.5	25.18	1.04	0.03%	N/A	10.50
IN222	MH218	0.17	0.17	0.90	0.15	0.00	0.00	0.00	0.00	1.08	0.013	15.00	1.03%	3.9	66.05	0.88	0.03%	N/A	6.57
PB19A-F	MH218	0.06	0.06	0.90	0.05	0.00	5.00	0.00	0.00	0.15	0.011	12.00	1.00%	2.5	45.00	0.19	0.00%	N/A	4.22
MH218	MH216	0.00	0.52	0.00	0.00	0.00	5.00	0.00	0.00	3.08	0.013	18.00	1.00%	5.2	29.92	1.74	0.09%	N/A	10.55
PB19	MH216	0.27	0.27	0.71	0.19	0.00	0.00	0.00	0.00	1.31	0.013	15.00	0.94%	4.0	51.47	1.07	0.04%	N/A	6.29
PB18	MH216	0.11	0.11	0.90	0.10	0.00	0.00	0.00	0.00	0.68	0.013	15.00	1.00%	3.4	9.57	0.56	0.01%	N/A	6.48
MH216	MH214	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	5.07	0.013	18.00	1.01%	5.9	71.48	2.87	0.23%	N/A	10.57
PB13A-F	MH214	0.06	0.06	0.90	0.05	0.00	0.00	0.00	0.00	0.29	0.011	15.00	3.20%	4.5	45.59	0.24	0.00%	N/A	13.69
MH214	MH212	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	5.37	0.013	18.00	1.01%	6.0	135.20	3.04	0.26%	N/A	10.56
BIO12	MH212	0.99	0.99	0.80	0.79	0.00	0.00	0.00	0.00	4.14	0.013	15.00	14.37%	14.9	9.46	3.38	0.41%	N/A	24.55
MH212	MH210	0.00	1.95	0.00	0.00	0.00	0.00	0.00	0.00	9.51	0.013	21.00	1.00%	6.9	29.85	3.95	0.36%	N/A	15.89
PB13	MH210	0.13	0.13	0.71	0.09	0.00	0.00	0.00	0.00	0.64	0.013	15.00	1.03%	3.4	11.22	0.52	0.01%	N/A	6.56
MH210	MH208	0.00	2.08	0.00	0.00	0.00	0.00	0.00	0.00	10.15	0.013	24.00	0.49%	5.4	19.00	3.23	0.20%	N/A	15.94
PB31	MH208	0.14	0.14	0.70	0.10	0.00	0.00	0.00	0.00	0.68	0.013	15.00	1.00%	3.4	4.24	0.55	0.01%	N/A	6.48
MH208	MH206	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	10.83	0.013	24.00	0.49%	5.4	42.12	3.45	0.23%	N/A	15.88
MH206	MH204	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	10.83	0.013	24.00	0.50%	5.5	151.12	3.45	0.23%	N/A	16.09
PB32B	MH204	0.13	0.13	0.67	0.09	0.00	0.00	0.00	0.00	0.60	0.013	15.00	1.00%	3.3	9.68	0.49	0.01%	N/A	6.48
MH204	MH200	0.00	2.35	0.00	0.00	0.00	0.00	0.00	0.00	11.43	0.013	24.00	0.52%	5.6	30.80	3.64	0.26%	N/A	16.35
PB15	PB14	0.17	0.17	0.90	0.15	0.00	0.00	0.00	0.00	1.08	0.013	15.00	1.04%	3.9	41.25	0.88	0.03%	N/A	6.62
PB14	MH202	0.46	0.63	0.77	0.35	0.00	0.00	0.00	0.00	3.56	0.013	18.00	0.92%	5.2	42.91	2.01	0.11%	N/A	10.10
PB 32A	MH202	0.14	0.14	0.64	0.09	0.00	0.00	0.00	0.00	0.63	0.013	15.00	1.00%	3.3	17.81	0.51	0.01%	N/A	6.48
MH202	MH200	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	4.19	0.013	24.00	0.50%	4.3	43.76	1.33	0.03%	N/A	16.08
MH200	EX201	0.00	3.12	0.00	0.00	0.00	0.00	0.00	0.00	15.62	0.013	24.00	0.50%	5.8	95.71	4.97	0.48%	N/A	16.06
EX201	EX207	0.48	2.04	0.67	0.32	0.00	0.00	0.00	0.00	8.85	0.013	23.00	1.46%	5.0	53.51	3.07	0.19%	N/A	24.45
EX201	EX207	0.48	2.04	0.67	0.32	0.00	0.00	0.00	0.00	8.85	0.013	23.00	1.08%	5.0	53.51	3.07	0.19%	N/A	21.08
EX207	FREE_EXT	0.22	13.07	0.78	0.17	0.00	0.00	0.00	0.00	64.66	0.013	30.00	1.00%	13.2	25.09	13.17	2.49%	N/A	41.13

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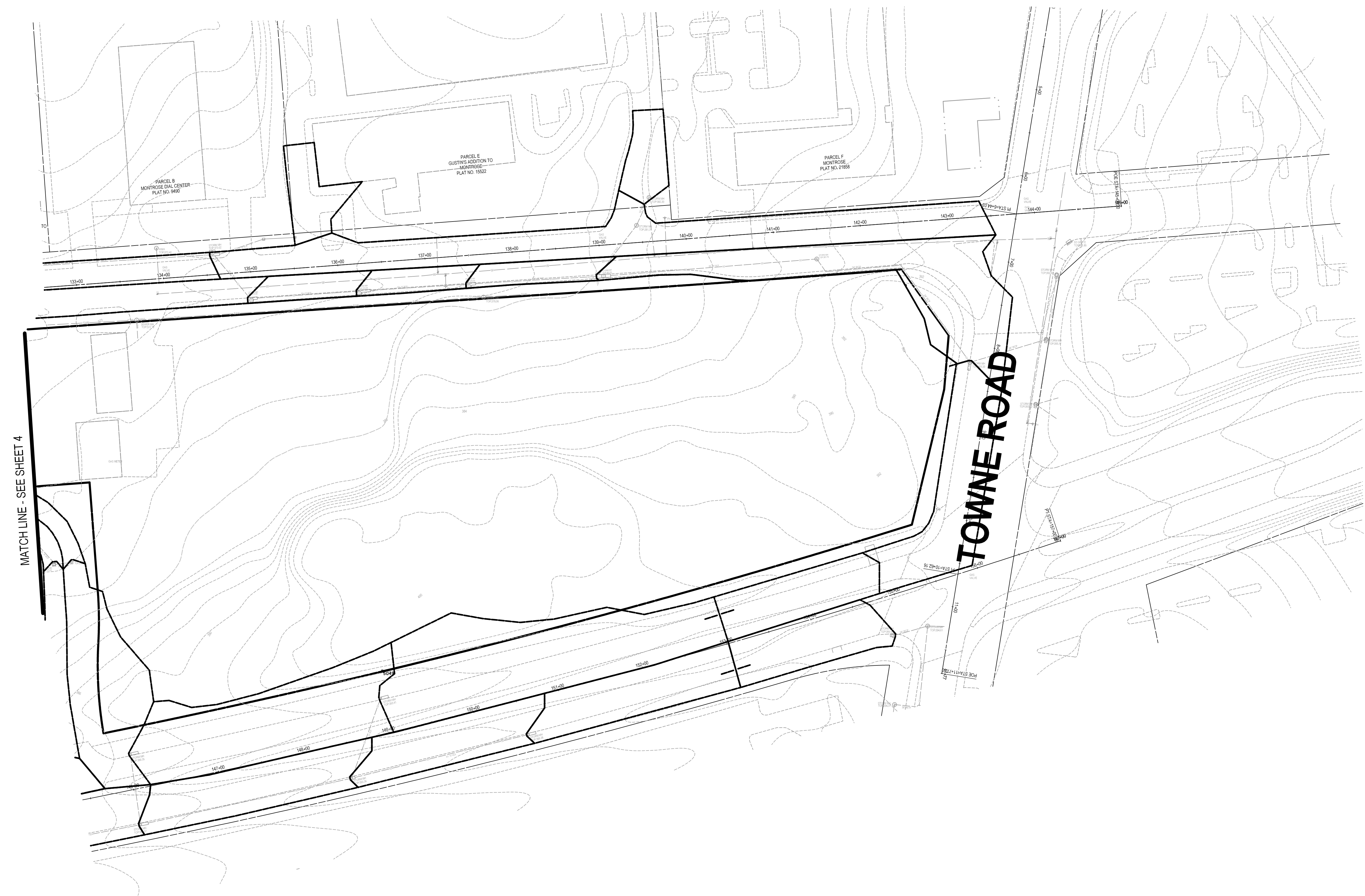
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 Report File: P:\13260201\Engineer\InRoads_Files\SD_Prelim Rev-Pipe.xls

STRUCTURE		Inc A	Cumm A		A * R	Cumm			Injected		PIPE	Pipe	Pipe	Pipe	Pipe	Vmin=	Friction	Head	Full Flow
FROM	TO	(ac)	(ac)	R	(ac)	AxR	T/C	INTENS	Q	Q (cfs)	n	Size	Slope	Vel	Length	V10	Slope	Loss	Capacity
Stonehenge Place - Storm Drain Analysis																			
PB10	PB11	0.08	0.08	0.90	0.07	0.00	0.00	0.00	0.00	0.5	0.013	15.00	0.99%	3.1	73.61	0.41	0.01%	N/A	6.45
PB11	MH120	0.08	0.16	0.90	0.07	0.00	0.00	0.00	0.00	1.0	0.013	15.00	1.00%	3.8	26.94	0.83	0.02%	0.01	6.48
PB33	MH120	0.09	0.09	0.59	0.05	0.00	0.00	0.00	0.00	0.3	0.013	15.00	1.00%	2.8	14.73	0.30	0.00%	N/A	6.48
MH120	MH114	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	1.3	0.013	15.00	1.00%	4.2	45.68	1.13	0.05%	0.02	6.48
PB16	MH118	0.13	0.13	0.82	0.11	0.00	0.00	0.00	0.00	0.7	0.013	15.00	1.00%	3.5	26.85	0.61	0.01%	N/A	6.48
MH118	MH116	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.7	0.013	15.00	1.00%	3.5	138.03	0.61	0.01%	0.00	6.48
MH116	MH114	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.7	0.013	15.00	1.00%	3.5	41.81	0.61	0.01%	0.00	6.48
SF1	MH114	0.38	0.38	0.74	0.28	0.00	0.00	0.00	0.00	1.9	0.013	15.00	1.14%	4.8	97.48	1.61	0.09%	N/A	6.92
MH114	MH112	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	4.1	0.013	18.00	0.87%	5.3	74.87	2.32	0.15%	0.08	9.81
PB30A	MH112	0.20	0.20	0.65	0.13	0.00	0.00	0.00	0.00	0.9	0.013	15.00	0.98%	3.7	44.17	0.74	0.02%	N/A	6.43
PB30B	MH112	0.06	0.06	0.60	0.04	0.00	0.00	0.00	0.00	0.2	0.013	15.00	1.00%	2.5	13.74	0.21	0.00%	N/A	6.48
MH112	FREE_EXT	0.00	1.02	0.00	0.00	0.00	0.00	0.00	0.00	5.2	0.013	18.00	1.00%	5.9	41.94	2.98	0.25%	0.11	10.54

APPENDIX

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SCALE: 1" = 60'



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← EXISTING CONDITIONS DRAINAGE DIVIDE



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Frederick
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NO.	DATE	DESIGNED	TECHNICIAN	REVISIONS	BY	DATE

DATE: OCTOBER 2019
DESIGNED: A.G.
CAD STANDARDS VERSION: V8 - NCS
TECHNICIAN: D.C.G.
CHECKED: B.J.F.

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OWNER/DEVELOPER/APPLICANT

WILGUS-MONTROSE ASSOCIATES, LLC
7811 MONTROSE ROAD
SUITE 200
POTOMAC, MD 20854
PHONE: (240) 399-1500
ROCHEN@WILLCO.COM
RICHARD COHEN

MAP: ADC	GRID: 5285
TAX MAP: G062	ZONING CATEGORY: CR-20 (C-10, R-10, R-20, CR-10, CR-15, CR-20, CR-25, CR-30, CR-35, CR-40, CR-45, CR-50)
WISC 200 SHEET: 215 NW 06	SITE DATUM: HORIZONTAL: NAD83 VERTICAL: NAD83

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

LICENSE NO. _____ EXPIRATION DATE: _____



DRAINAGE AREA MAP - EXISTING CONDITIONS

PRELIMINARY STORM DRAIN PLANS

WILGUS TRACT

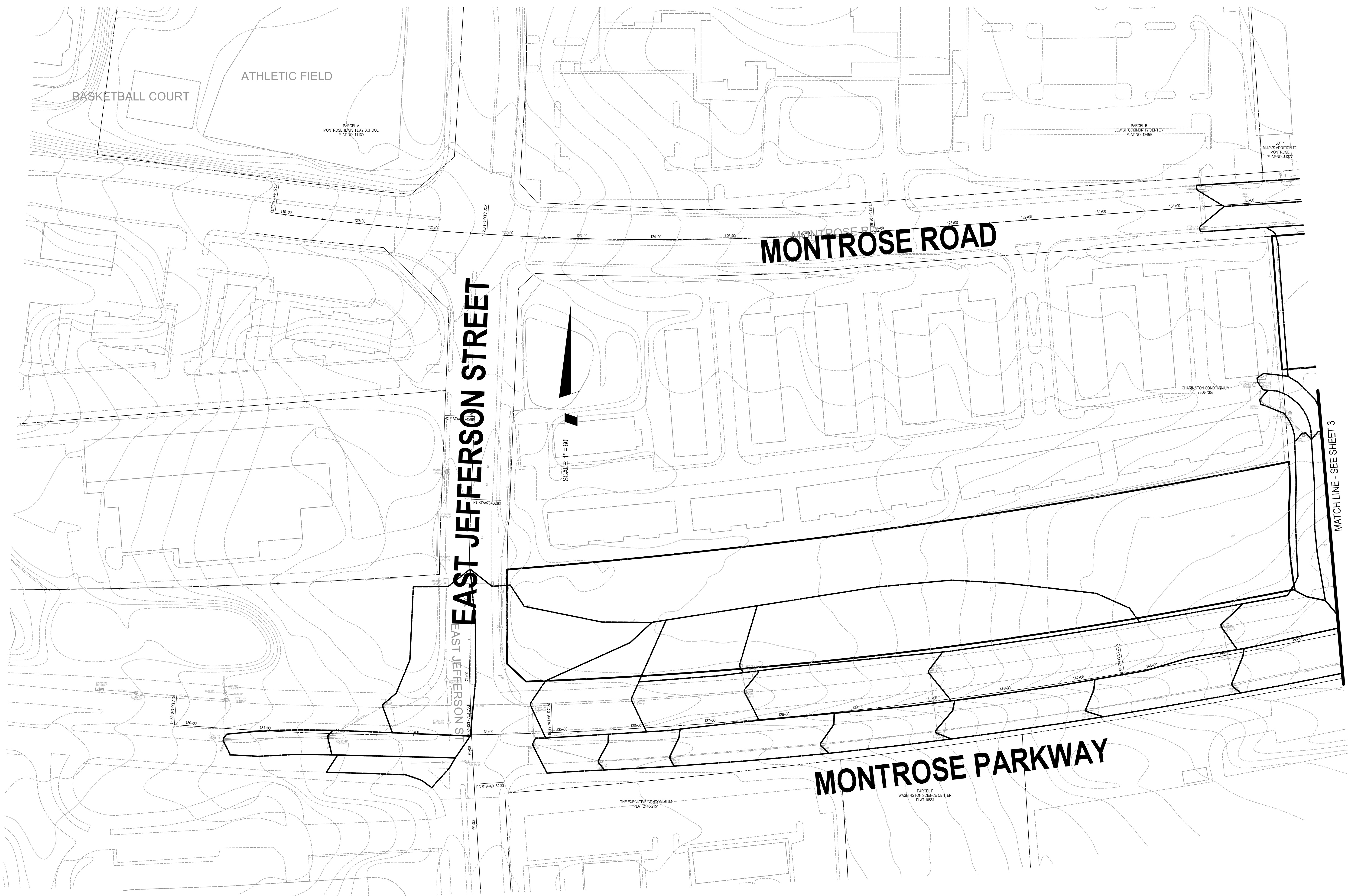
7811 MONTROSE ROAD

POTOMAC (1ST) ELECTION DISTRICT, MONTGOMERY COUNTY, MARYLAND

SHEET 3 OF 4

PROJECT NO. 1325-02-01

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NO.	DATE	REVISIONS	BY	DATE

DATE: OCTOBER 2019
DESIGNED: A.G.
CAD STANDARDS VERSION: 19 - NCS
TECHNICIAN: D.C.G.
CHECKED: B.J.F.

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OWNER/DEVELOPER/APPLICANT

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TAX MAP: G062	ZONING CATEGORY: CR-20 (C-10, R-10, R-20, R-30, R-40, R-50, R-60, R-70, R-80, R-90, R-100)
WISC 200 SHEET: 215 NW 06	SITE DATUM: HORIZONTAL: NAD83 VERTICAL: NAD83

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LICENSE NO. 26226
EXPIRATION DATE: 12/31/2024

DRAINAGE AREA MAP - EXISTING CONDITIONS

PRELIMINARY STORM DRAIN PLANS

WILGUS TRACT

7811 MONTROSE ROAD

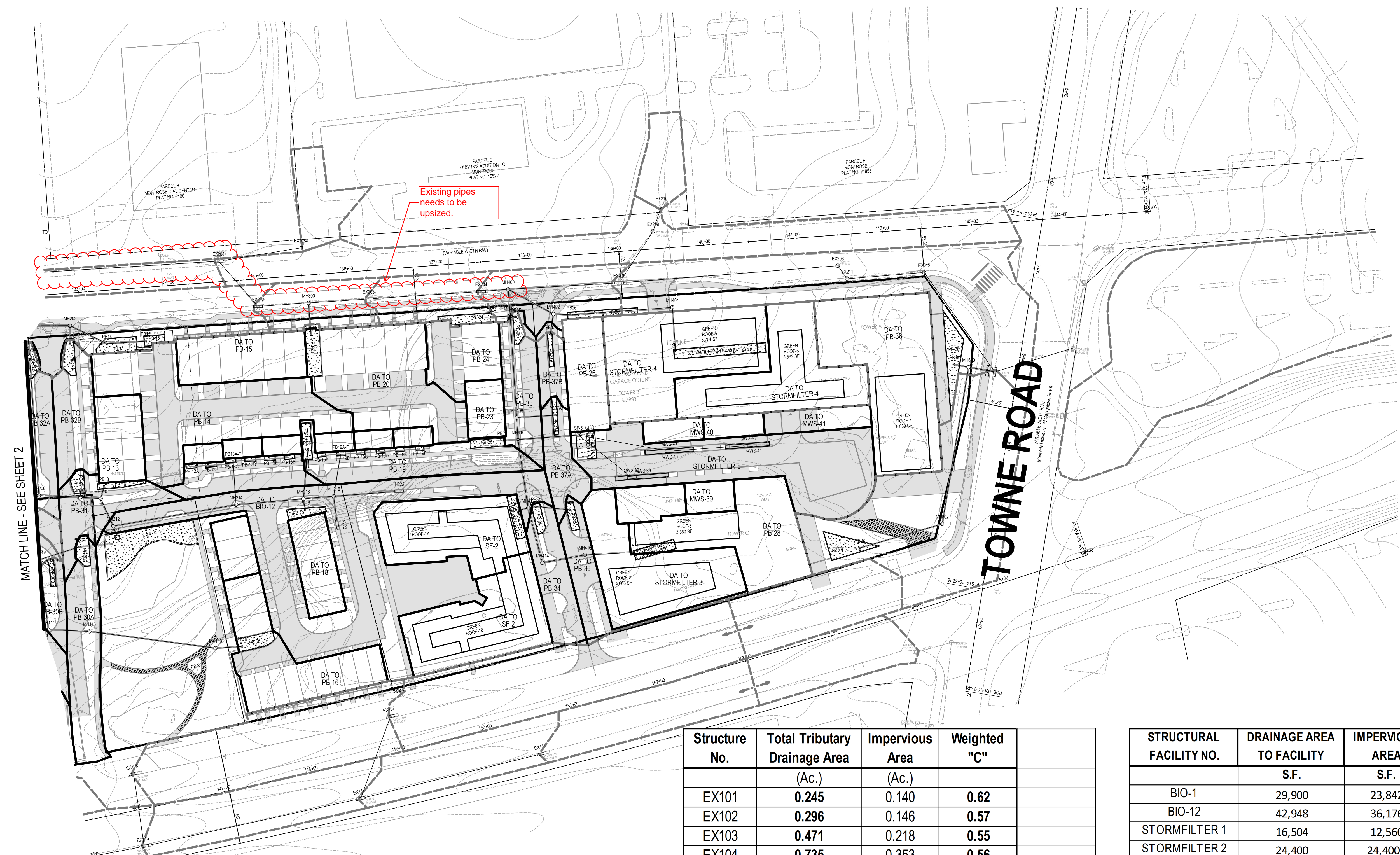
POTOMAC (1ST) ELECTION DISTRICT, MONTGOMERY COUNTY, MARYLAND

SHEET 4 OF 4

PROJECT NO. 1325-02-01

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SCALE: 1" = 60'



ESD FACILITY NO.	DRAINAGE AREA TO FACILITY S.F.	IMPERVIOUS AREA TO FACILITY S.F.
PB-2	3,696	3,696
PB-3	3,696	3,696
PB-4	3,036	3,036
MWS-5	19,386	16,083
MWS-6	18,567	15,573
MWS-7	19,307	15,884
PB-10	3,696	3,696
PB-11	3,696	3,696
PB-13	5,790	4,099
PB-13A	462	462
PB-13B	462	462
PB-13C	462	462
PB-13D	462	462
PB-13E	462	462
PB-13F	462	462
PB-14	19,877	15,859
PB-15	7,488	7,488
PB-16	5,794	5,044
PB-18	4,704	4,704
PB-19	11,767	8,345
PB-20	14,305	11,882
PB-23	2,688	2,688
PB-24	9,043	8,236
PB-26	5,670	5,670
PB-28	13,876	13,876*
PB-30A	8,587	5,237
PB-30B	2,614	1,400
PB-31	6,209	4,289
PB-32A	6,279	3,811
PB-32B	5,512	3,598
PB-33	3,970	2,084
PB-34	5,743	4,493
PB-35	5,860	4,092
PB-36	4,603	3,379
PB-37A	4,238	3,745
PB-37B	2,607	1,751
PB-38	19,049	19,049
MWS-39	3,960	3,960
MWS-40	3,220	3,220
MWS-41	2,990	2,990
PP-2	2,410	2,410
PP-3	2,812	2,812
GRF-1A	3,947	3,947
GRF-1B	4,288	4,288
GRF-2	4,608	4,608
GRF-3	3,360	3,360
GRF-5	5,701	5,701
GRF-6	4,592	4,592
GRF-7	5,830	5,830

Structure No.	Total Tributary Drainage Area (Ac.)	Impervious Area (Ac.)	Weighted "C"
EX101	0.245	0.140	0.62
EX102	0.296	0.146	0.57
EX103	0.471	0.218	0.55
EX104	0.735	0.353	0.56
EX105	0.179	0.109	0.65
EX106	0.469	0.254	0.60
EX107	0.635	0.324	0.58
EX109	0.095	0.070	0.72
EX110	0.106	0.081	0.74
EX111	0.247	0.179	0.72
EX112	0.189	0.138	0.72
EX113	0.231	0.171	0.73
EX114	0.252	0.198	0.76
EX115	0.267	0.240	0.83
EX116	0.311	0.219	0.71
EX117	0.246	0.173	0.71
EX118	0.280	0.199	0.71
EX501	0.445	0.290	0.67
EX502	0.130	0.098	0.74
EX503	0.104	0.067	0.67
EX504	0.096	0.090	0.86

STRUCTURAL FACILITY NO.	DRAINAGE AREA TO FACILITY S.F.	IMPERVIOUS AREA S.F.
BIO-1	29,900	23,842
BIO-12	42,948	36,176
STORMFILTER 1	16,504	12,560
STORMFILTER 2	24,400	24,400*
STORMFILTER 3	13,708	13,708*
STORMFILTER 4	30,856	30,856*
STORMFILTER 5	21,470	19,826

* IMPERVIOUS AREA ALSO TREATED BY GREEN ROOF

Structure No.	Total Tributary Drainage Area (Ac.)	Impervious Area (Ac.)	Weighted "C"
EX201	0.477	0.311	0.67
EX202	0.153	0.094	0.65
EX203	0.146	0.083	0.62
EX204	0.191	0.116	0.64
EX205	0.795	0.530	0.68
EX207	0.223	0.181	0.78
EX208	0.758	0.666	0.82
EX208A	0.119	0.085	0.71
EX210	0.102	0.052	0.58
EX214	0.494	0.366	0.73
P_OFFSITE	1.442	0.929	0.67

LEGEND

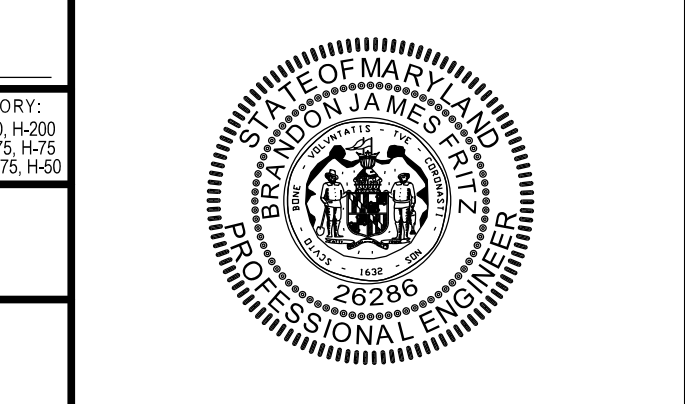
- PROPERTY LINE
- PLANTER BOX
- EXISTING DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE

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DRAINAGE AREA MAP - PROPOSED CONDITIONS EXHIBITS

PRELIMINARY STORM DRAIN PLANS
WILGUS TRACT
 7811 MONTROSE ROAD
 POTOMAC (1ST) ELECTION DISTRICT, MONTGOMERY COUNTY, MARYLAND

PROJECT NO. 1326-02-01

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NO.	DATE	BY	DATE
DESIGNED: A.G.	OCTOBER 2019	BY	DATE
TECHNICIAN: B.C.G.	CAO STANDARDS VERSION: 19 - NCS	CHECKED: B.J.F.	

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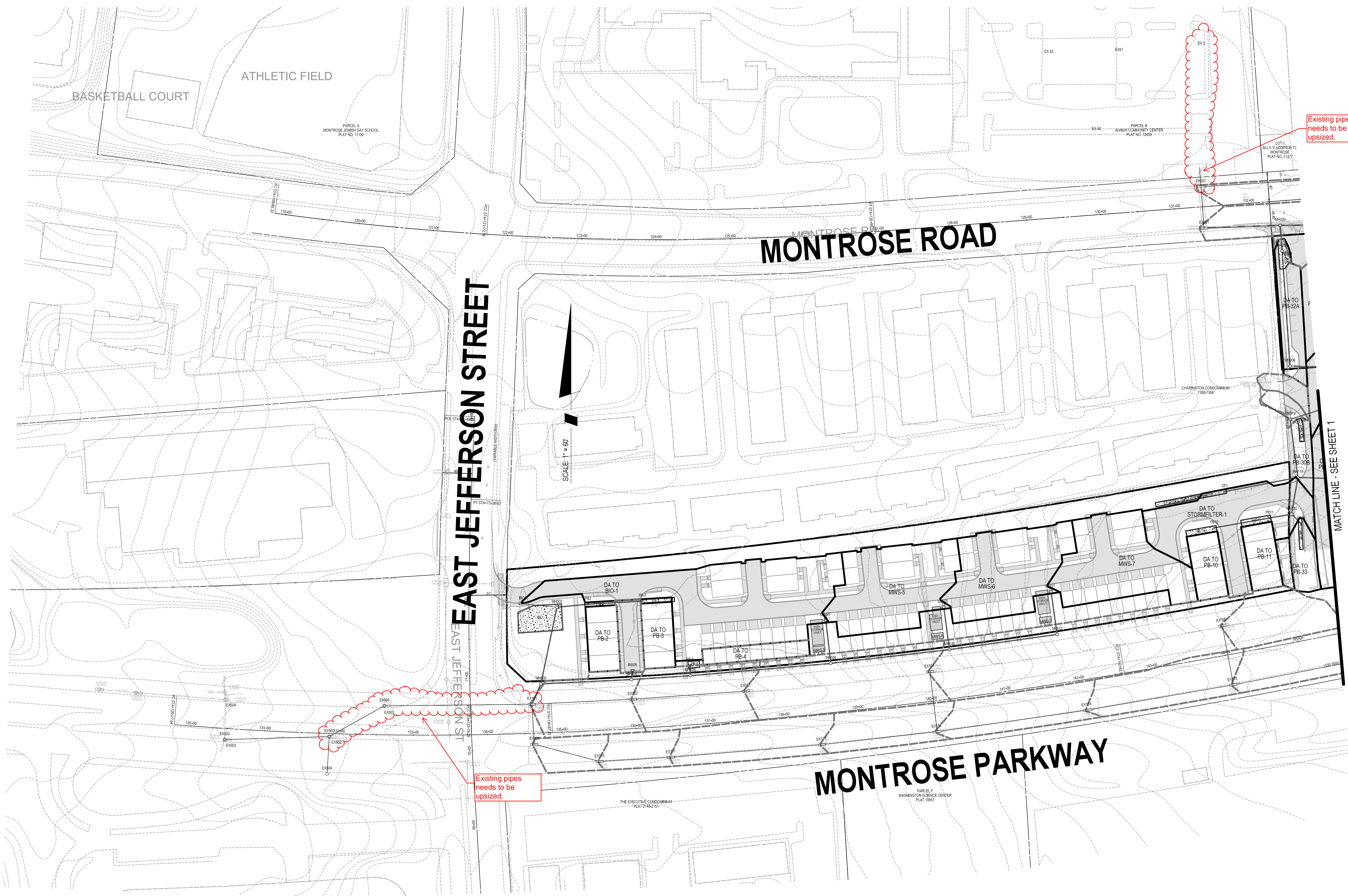
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 ROCKENWILLCO.COM
 RICHARD COHEN

MAP: ADC	GRID: 5285
TAX MAP: G062	
WBCS 200: SHEET: 215 NW 06	
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VERTICAL: NAD83	

1" = 60'

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Existing pipes
needs to be
upsized.

Existing pipes
needs to be
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- PROPERTY LINE
- PLANTER BOX
- EXISTING DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE



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NO.	DATE	DESIGNED	BY	DATE	REVISIONS
1	OCTOBER 2019	A.G.			18 - NCS
					TECHNICIAN: D.C.G.
					CHECKED: B.J.F.

MISS UTILITY NOTE
 INFORMATION CONCERNING EXISTING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS. THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AND UTILITY ORIGINATORS BY ENGINEERING TESTS BY HAND, WELL IN ADVANCE OF THE START OF EXCAVATION. CONTACT "MISS UTILITY" AT 1-800-261-7777 48 HOURS PRIOR TO THE START OF EXCAVATION. IF CLEARANCES ARE LESS THAN SHOWN ON THIS PLAN OR TWELVE (12) INCHES, WHICHEVER IS LESS, CONTACT THE ENGINEER AND THE UTILITY COMPANY BEFORE PROCEEDING WITH CONSTRUCTION. CLEARANCES LESS THAN NOTED MAY REQUIRE REVISIONS TO THIS PLAN.

OWNER/DEVELOPER/APPLICANT
 WILGUS/MONTROSE ASSOCIATES, LLC
 7811 MONTROSE ROAD
 SUITE 200
 POTOMAC, MD 20854
 PHONE: (240) 399-1500
 ROCKINGWILLCO.COM
 RICHARD COHEN

MAP	ADC	GRID	5285
TAX MAP	QC02	ZONING CATEGORY	CR-30, CD-1A, RD-10, PD-30, CR-30.7, CD-30, RD-10, PD-30
WISC 200	SHEET		215 NW 06
SITE DATUM	HORIZONTAL	NAD83	
	VERTICAL	NAD83	

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
 LICENSE NO. 26226
 EXPIRATION DATE: 12/31/2023

DRAINAGE AREA MAP - PROPOSED CONDITIONS EXHIBITS

PRELIMINARY STORM DRAIN PLANS
WILGUS TRACT
 7811 MONTROSE ROAD
 POTOMAC (1ST) ELECTION DISTRICT, MONTGOMERY COUNTY, MARYLAND

SHEET **2** OF **4**

PROJECT NO. 1325-02-01