

Waters Edge Interceptor Capacity Evaluation

Boone County Regional Sewer District

November 25, 2020



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Boone County Regional Sewer District
Waters Edge Interceptor Capacity Evaluation
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Background

The Waters Edge Interceptor (Interceptor) serves a portion of Boone County east of the City of Columbia City Limits in the Hominy Branch Watershed, as shown in Appendix A. According to water usage records provided by the Boone County Regional Sewer District (District), there are approximately 214 homes and 7 apartment units that connect to the 8-inch Interceptor upstream of Manhole 171178.

The City of Columbia owns and operates the Interceptor downstream of Manhole 171178. Two segments of the City's 24-inch Interceptor were evaluated to determine its hydraulic effect on the District's Interceptor upstream of Manhole 171178.

Prior to allowing more connections to the Interceptor, the District desires to know the capacity of the Interceptor, and if additional capacity is available to serve future development in the service area.

Evaluation Objectives

The objectives of this Evaluation are as follows:

1. Perform a hydraulic analysis of the Interceptor to determine its capacity for existing conditions.
2. Determine the amount of excess capacity in the Interceptor to accommodate future development.

Wastewater Flows

Average Day Flow

The District provided water usage records from January, February and March of 2018, 2019 and 2020 for each water meter within the existing service area of the Interceptor. It is noted that approximately 214 homes and 7 apartment units recorded water usage during these three-month periods. The water usage data is included in Appendix B.

The average monthly water usage per water meter (unit) was divided by 30 to derive the average day flow (ADF) for each unit. Units include homes and apartments. The calculated ADF's are as follows:

Table 1 – ADF Per Unit

Types of Unit	Total Water Usage (gpd)	Total Units (each)	ADF (gpd)
Single Family Residences	842,230	214 ¹	132
Apartments	12,270	7 ¹	58

¹Only those units that actually contributed wastewater flow during January, February and March of 2018, 2019 and 2020 were included in the calculation of ADF.

Peak Flows

Flow metering was not included in this Evaluation, so peak flow data from actual rainfall events could not be calculated for the Interceptor. In lieu of flow meter data, the Missouri Department of Natural Resources (MDNR) Code of State Regulations 10 CSR 20-8.020 requires sanitary sewers to be designed to convey ADF multiplied by a peak factor. MDNR stipulates that the peak factor within a sewer system is to be calculated in accordance with 10 CSR 20-8.110:

$$\text{Peak Design Factor} = (18 + \sqrt{\text{population}/1,000}) / (4 + \sqrt{\text{population}/1,000})$$

There is no specific population data for the existing Waters Edge Interceptor Service Area. However, "U.S. Census Bureau Quick Facts for Boone County, MO" states there were 2.41 persons per household between 2012 and 2016.

Assuming all 221 units in the service area have 2.41 people per unit, the population of the existing service area is 533 people (221 units x 2.41 people per unit). The peak design factor is as follows:

$$\text{Peak Design Factor} = (18 + \sqrt{\text{population}}) / (4 + \sqrt{\text{population}}), \text{ (population is in thousands)}$$

$$\text{Peak Design Factor} = (18 + \sqrt{0.533}) / (4 + \sqrt{0.533})$$

$$\text{Peak Design Factor} = 3.95$$

HDR's experience with MDNR's methodology for calculating ADF and peak factors is it results in values that are too high for ADF and values that are too low for peak factors. However, when MDNR's methodology for calculating ADF and peak factors are factored with actual ADF derived from water usage records, it results in peak flows that could be considered reasonable for a 30-year-old Interceptor.

For example: Per MDNR's 10 CSR 20-8.020, Section 11, residential units contribute 370 gpd (3.7 people/unit x 100 gallons/capita/day) to a sewer system. The 370 gpd of ADF is 2.80 times greater than the 132 gpd of average day flow shown in Table 1. When 2.80 is multiplied by a peak factor of 3.95, the resulting peak flow will be 11.1 times greater than an average flow of 132 gpd.

Based on HDR's experience in the analysis of sanitary sewer collection systems, an Interceptor nearing 30 years of age could be expected to experience peak factors ranging from 5 to 10.

This Evaluation will use a conservative peak factor of 10.

Flows in the City of Columbia's Interceptor

Average day and peak flows from the Edgewater Apartment Complex and the subdivision south of Waters Edge Lake were estimated even though these flows discharge into the City's 24-inch Interceptor downstream of Manhole 171178. The results of the hydraulic model indicate that these flows have little effect on the hydraulic grade line in the District's portion of the Waters Edge Interceptor.

Hydraulic Model

The capacity of the existing Interceptor was calculated using EPA's *Storm Water Management Model (SWMM)* software, XPSWMM 2019.1.3 Version 20.40. The model software calculates the water surface profile in a pipe of a specified diameter, slope and material.

The pipe diameters and slopes were taken from the following Drawings provided by the District:

- Breezewood Estates Plat No. 1 prepared by Crockett Engineering Consultants
- Manchester Heights Wastewater System Improvements prepared by Trabue, Hansen & Hinshaw, Inc.
- Waters Edge - Lakeland Acres Sanitary Sewer Extension prepared by James Brush and Associates

HDR retained A Civil Group to provide field survey data for manholes that were not included in the Drawings listed above.

This Evaluation divided the current service area into sub-service areas and assigned a point wastewater flow discharge into a particular manhole. Exhibits of the SWMM Model discharge input points are shown in Appendix C, Exhibits C-1 and C-2.

Model results are shown graphically as a water surface profile and in tabular form in Appendix C. A water surface profile that is below the top of pipe indicates that the pipe has the capacity to convey the peak flows without surcharging in the Interceptor. A water surface profile that exceeds the top of pipe indicates surcharging in the Interceptor. The last column in each table titled "Max d/D (depth/diameter) Ratio" indicates a surcharged condition in the system if the Max d/D Ratio is greater than 1.0. See Exhibits C-3 through C-7A in Appendix C.

Evaluation of the Waters Edge Interceptor

Flow Condition No. 1

Flow Condition No. 1 includes the existing flow condition in the Interceptor in January, February and March of 2018, 2019 and 2020. The water usage records provided by the District (see Appendix B) determined the ADF. The ADF was multiplied by a peaking factor of 10 and imported into the SWMM Model to determine if the existing Interceptor has the capacity to convey the estimated peak flows.

Conclusions: Exhibits C-3 and C-3A show the water surface profile below the top of the Interceptor and a Max d/D Ratio less than 1.0 in all pipe segments. Therefore, the Interceptor will convey the existing ADF for Flow Condition No. 1 without surcharging the system.

Exhibits C-4 and C-4A show the water surface profile below the top of the Interceptor and a Max d/D Ratio less than 1.0 in all pipe segments, except for the pipe segments immediately upstream and downstream of Manhole 10259. Exhibit C-4A indicates the surcharge is less than 1.0 feet at that Manhole. Taking into consideration that Manhole 10259 is approximately 7 feet deep and the nearest residence is approximately 27 feet higher in elevation than the flow line of the Manhole. It is concluded that the minor surcharging has no detrimental impact on the Interceptor or the residences connected to it.

Flow Condition No. 2

Flow Condition No. 2 includes Flow Condition No. 1 plus anticipated future flows from the currently undeveloped areas in the Waters Edge Interceptor Service Area. See Exhibit A-2 in Appendix A.

The estimated wastewater flows generated by full single-family residential development of the undeveloped areas within the watershed is a function of the following factors:

- Available developable land
- Density of development
- Volume of wastewater per person

Available Developable Land: According to aerial mapping, the undeveloped area of the watershed contains approximately 1,800 acres of total land area. Based upon engineering experience with land development, HDR assumes that approximately 25% of any large tract of ground is non-developable due to the land required for future streets, public spaces, stream corridors, etc. Based upon these assumptions, the amount of developable land in the watershed is as follows:

Developable Land = (Total Acreage – (25% Available Total Acreage))

1,350 acres = (1,800 acres – (450 acres))

Density of Development: A density of 3 houses per acre will be assumed. This assumption is based on a review of aerial mapping of the developed portions of the watershed. The potential number of future homes in the watershed is calculated as follows:

Total Homes = (Area of Developable Land x 3 Homes per Acre)

4,050 Homes = (1,350 acres x 3 houses per acre)

Volume of Wastewater per Home: Applying the 132 gpd for ADF per residence, derived above, the future wastewater flow from the undeveloped area of the watershed is shown in the Table below.

Table 2 – Future Estimated Flows

Future Dwellings (each)	ADF Per Residence (gpd)	Average Day Flow (gpd)	Peak Flow Factor	Peak Flow (gpd)
4,050	132	534,600	10	5,346,000

Conclusions: Exhibits C-5 and C-5A show the water surface profile above the top of the Interceptor and a Max d/D Ratio greater than 1.0 in 55% of all pipe segments. Therefore, the Interceptor will be in a surcharged condition over most of its length when conveying the ADF estimated for Flow Condition No. 2.

Exhibits C-6 and C-6A show the water surface profile above the top of the Interceptor and a Max d/D Ratio greater than 1.0 in 86% of all pipe segments. Therefore, the Interceptor will be in a surcharged condition over most of its length when conveying the Peak Flow estimated for Flow Condition No. 2.

Additional Capacity of the Waters Edge Interceptor

The Evaluation of the Waters Edge Interceptor described in the previous sections supports the following observations:

1. The Interceptor operating under existing conditions (Flow Condition No. 1) will convey ADF without surcharging. The Peak Flow causes the Interceptor to operate under a slight surcharged condition that does not detrimentally affect the Interceptor and adjacent residents.
2. The Interceptor operating under potential future conditions (Flow Condition No. 2) will not convey ADF or Peak Flow without extensive surcharging and potential detrimental effects to the Interceptor and adjacent residents.

Items 1 and 2 above strongly suggest there is no additional capacity in the Interceptor to convey wastewater from future development in the Hominy Branch Watershed, unless the District accepts greater amounts of surcharging in the Interceptor or constructs wastewater infrastructure improvements in the developed or undeveloped areas of the Watershed.

Potential Options for Increasing Flow in the Interceptor

As discussed in Item 1 above, the Interceptor operating under Peak Flow conditions is surcharged only slightly in two segments of pipe. A greater amount of surcharging may be permissible, but only if sewer backups into residences and overflow from manholes can be avoided. For instance, if 18-inches of surcharging was proven acceptable, it would allow 127 additional residences (167,892 gpd/10 peak factor/132 gpd/residence) to be connected to the Interceptor.

Another option to increase flows in the Interceptor is to provide wastewater flow storage somewhere in the undeveloped areas of the Hominy Branch Watershed. Exhibits C-7 and C-7A in Appendix C show the hydraulic conditions for a future ADF of 158,850 gpd from the undeveloped area of the Watershed. This translates to an additional 1,200 residences (158,850 gpd/132 gpd/residence) with no surcharging in the existing Interceptor. However, this option would require storing approximately 1,400,000 gallons of Peak Flow and releasing it from storage as the Interceptor empties from a rain event.

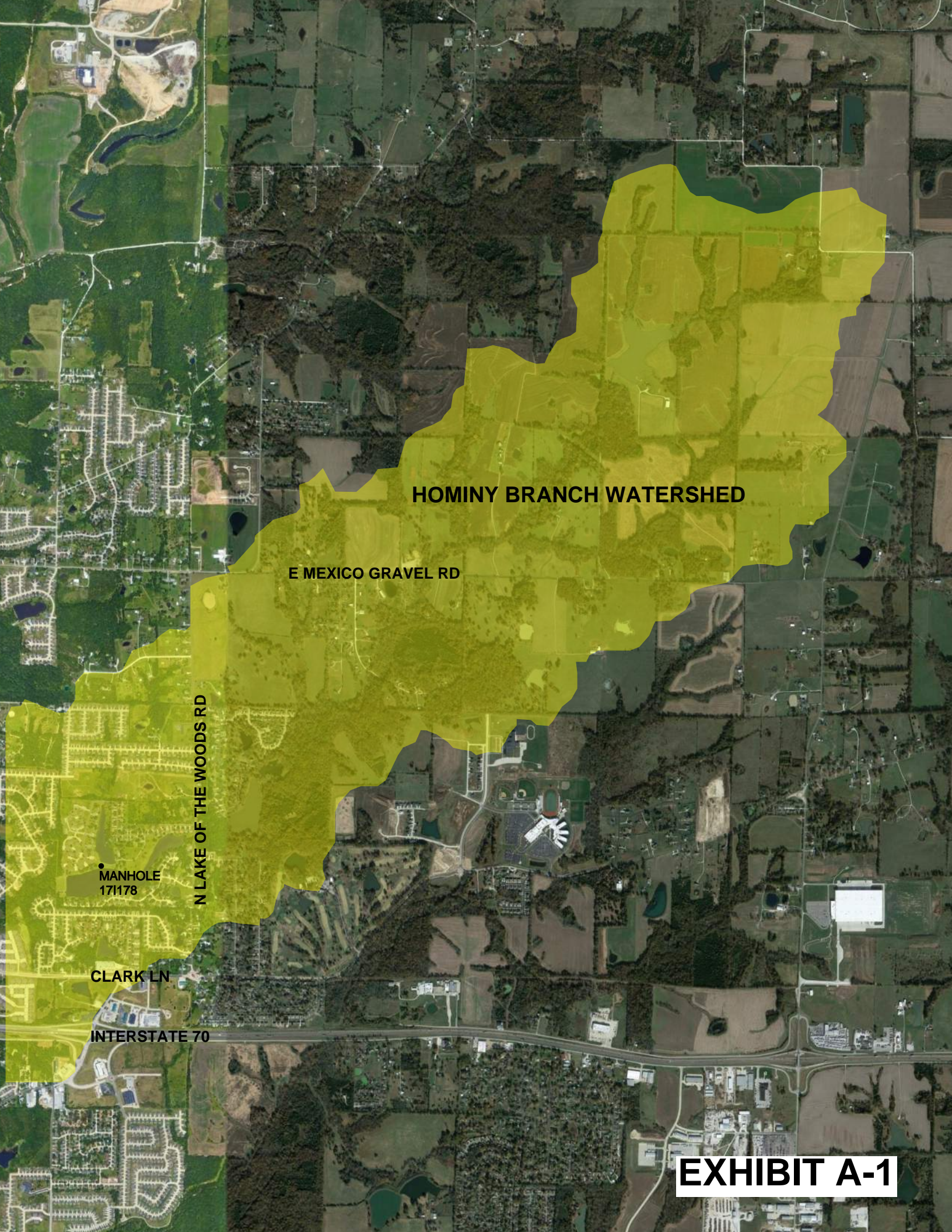
Another option to increase the capacity of the Interceptor is to either upsize the existing pipe infrastructure to the extent needed to convey future flows or construct a “parallel” piping system.

Recommendations

The recommendations of this Evaluation are as follows:

1. The District should require future developers to meter the actual flow conditions in the Waters Edge Interceptor and model the system using actual flow data before allowing additional units to be connected to the Interceptor.
2. Future developers should provide sufficient engineering and survey evaluations to verify that proposed developments will have no adverse effects on the Waters Edge Interceptor and residences connected to the Interceptor.

APPENDIX A
WATERSHED MAPS



HOMINY BRANCH WATERSHED

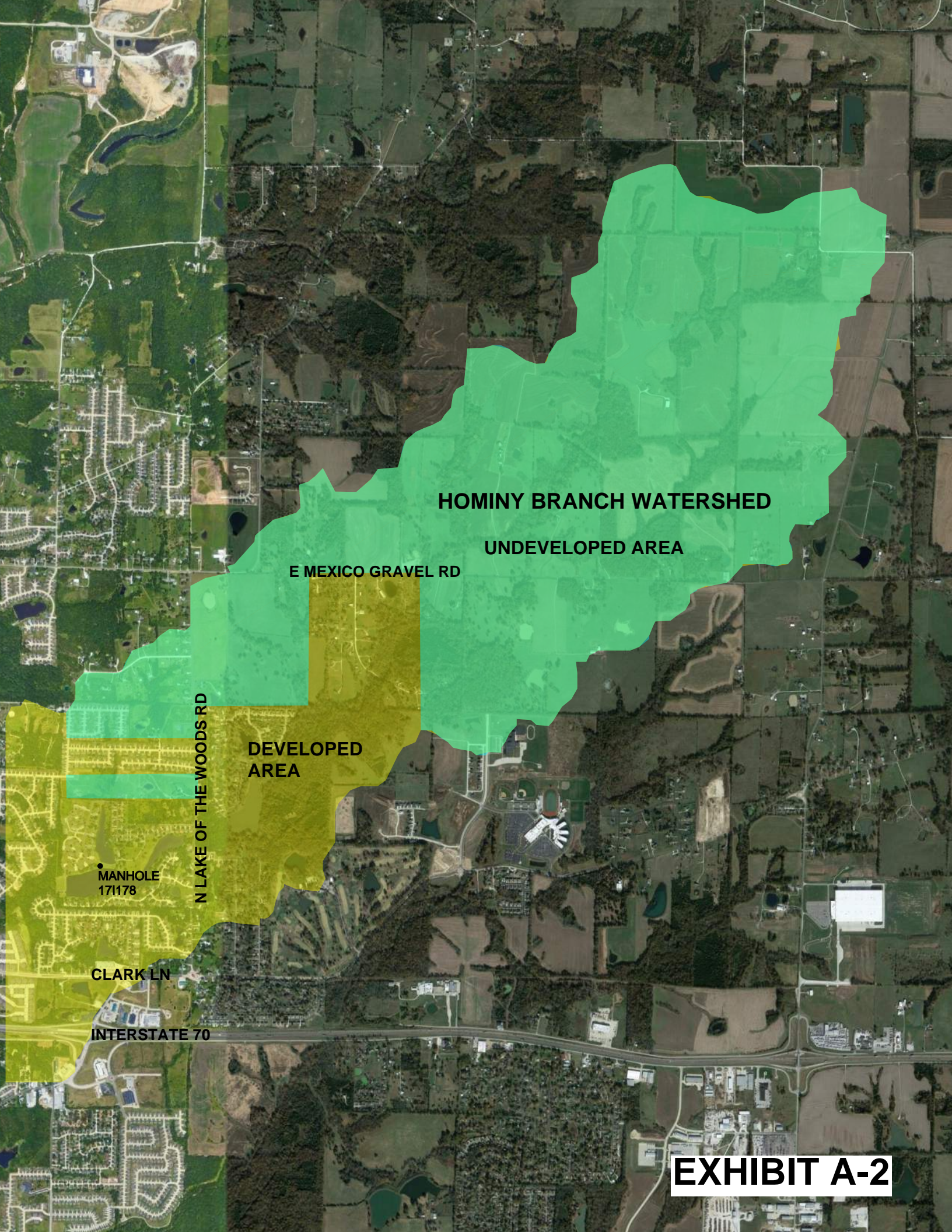
E MEXICO GRAVEL RD

N LAKE OF THE WOODS RD

**MANHOLE
171178**

CLARK LN

INTERSTATE 70



HOMINY BRANCH WATERSHED

UNDEVELOPED AREA

E MEXICO GRAVEL RD

DEVELOPED AREA

**MANHOLE
171178**

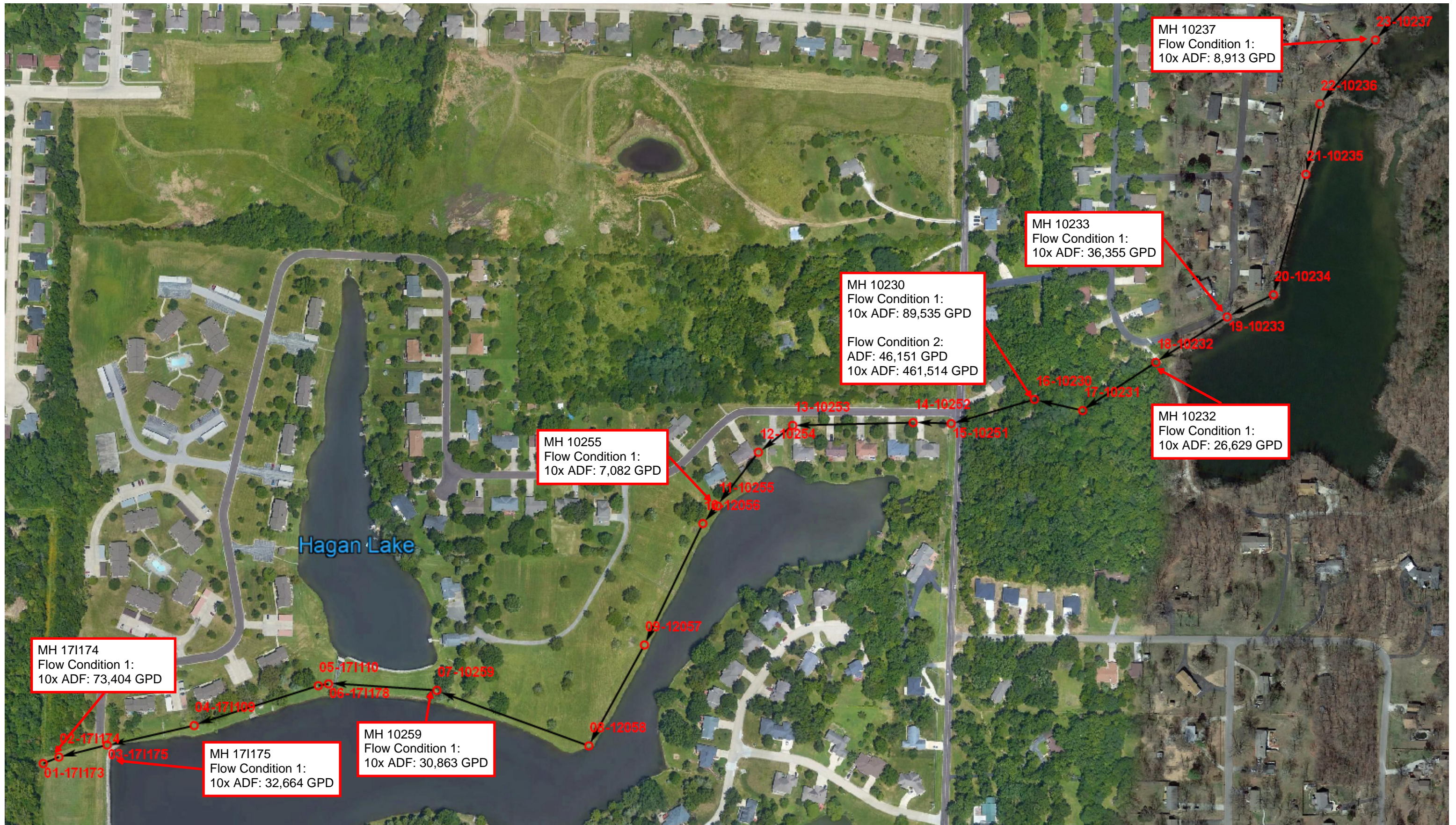
CLARK LN

INTERSTATE 70

N LAKE OF THE WOODS RD

APPENDIX B
WATER USAGE RECORDS
(FURNISHED BY THE DISTRICT)

APPENDIX C
SWMM MODEL RESULTS



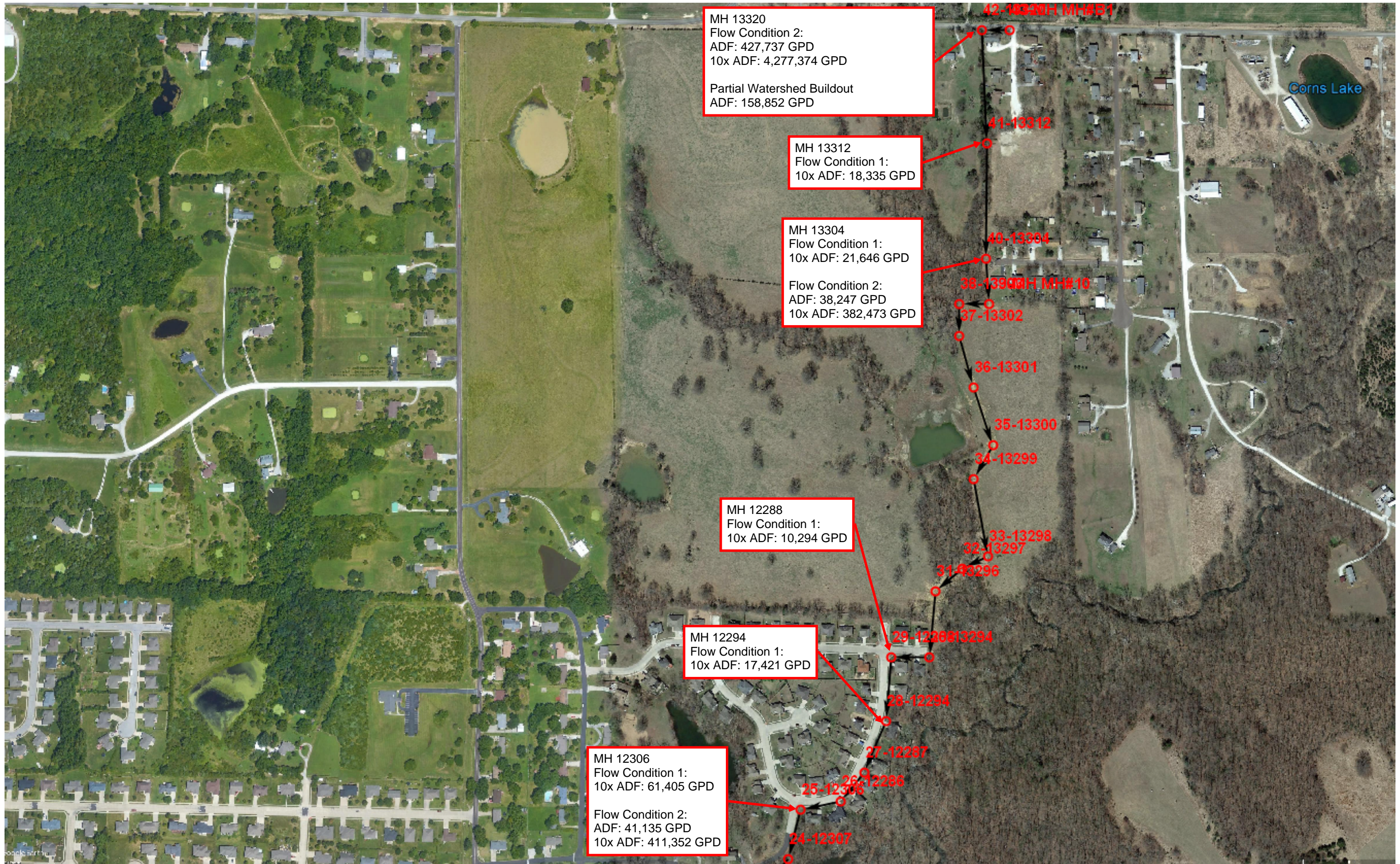
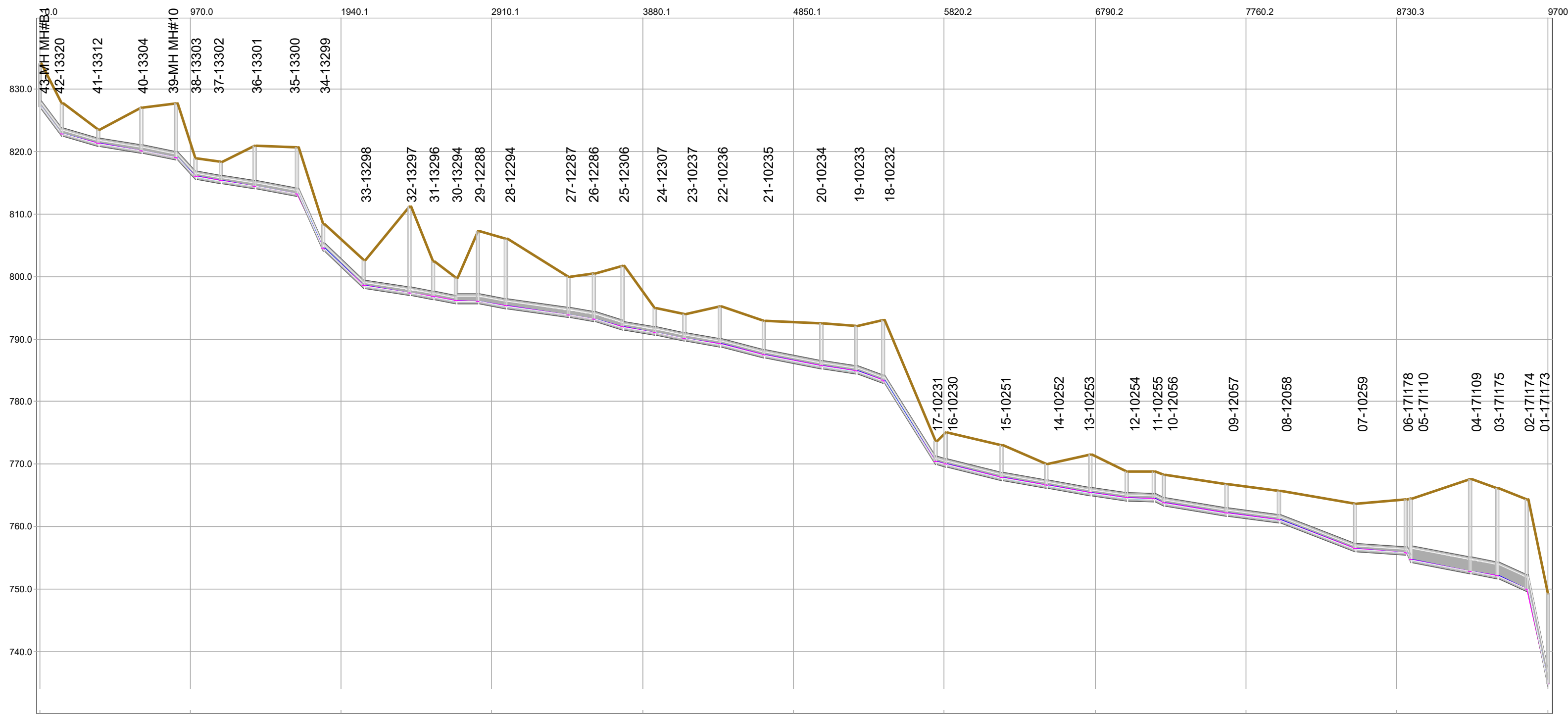


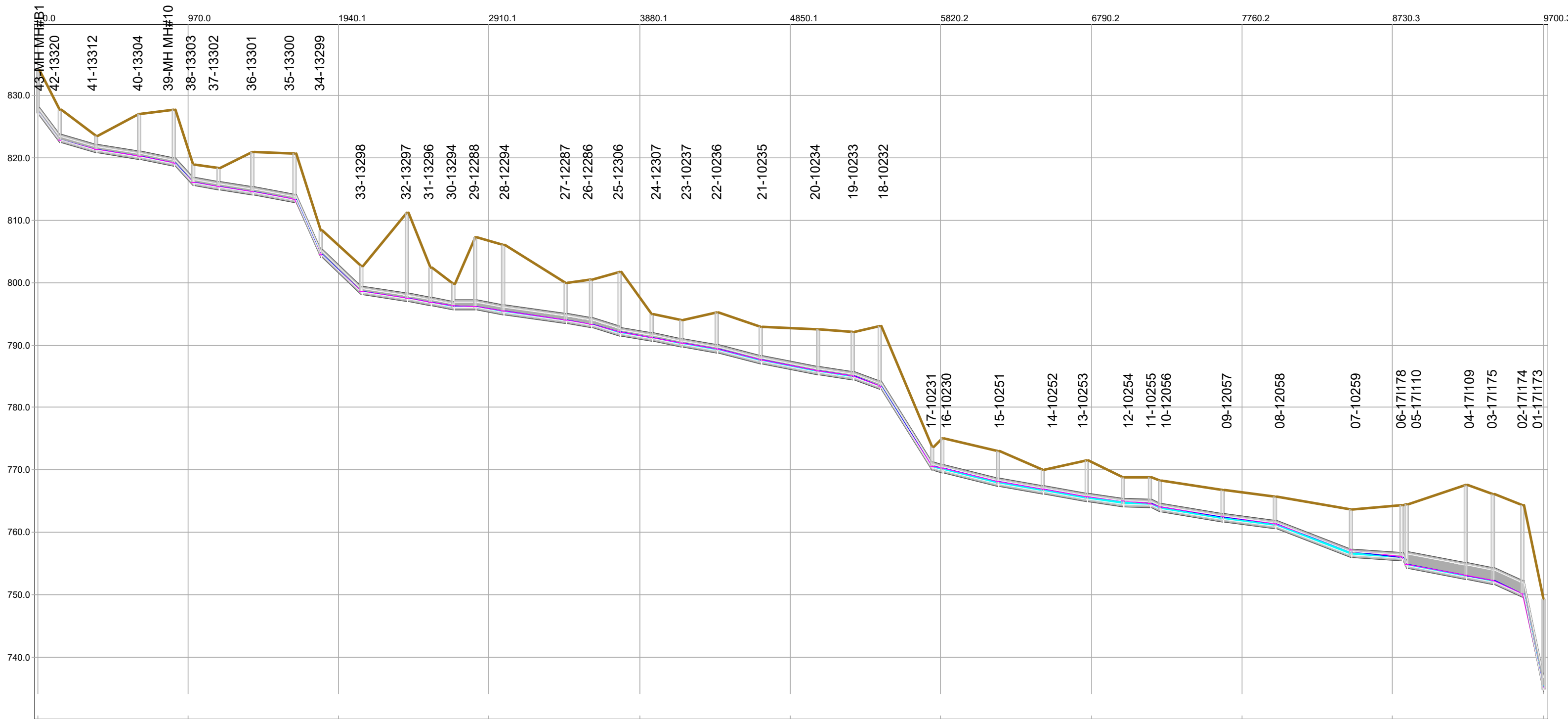
EXHIBIT C-2



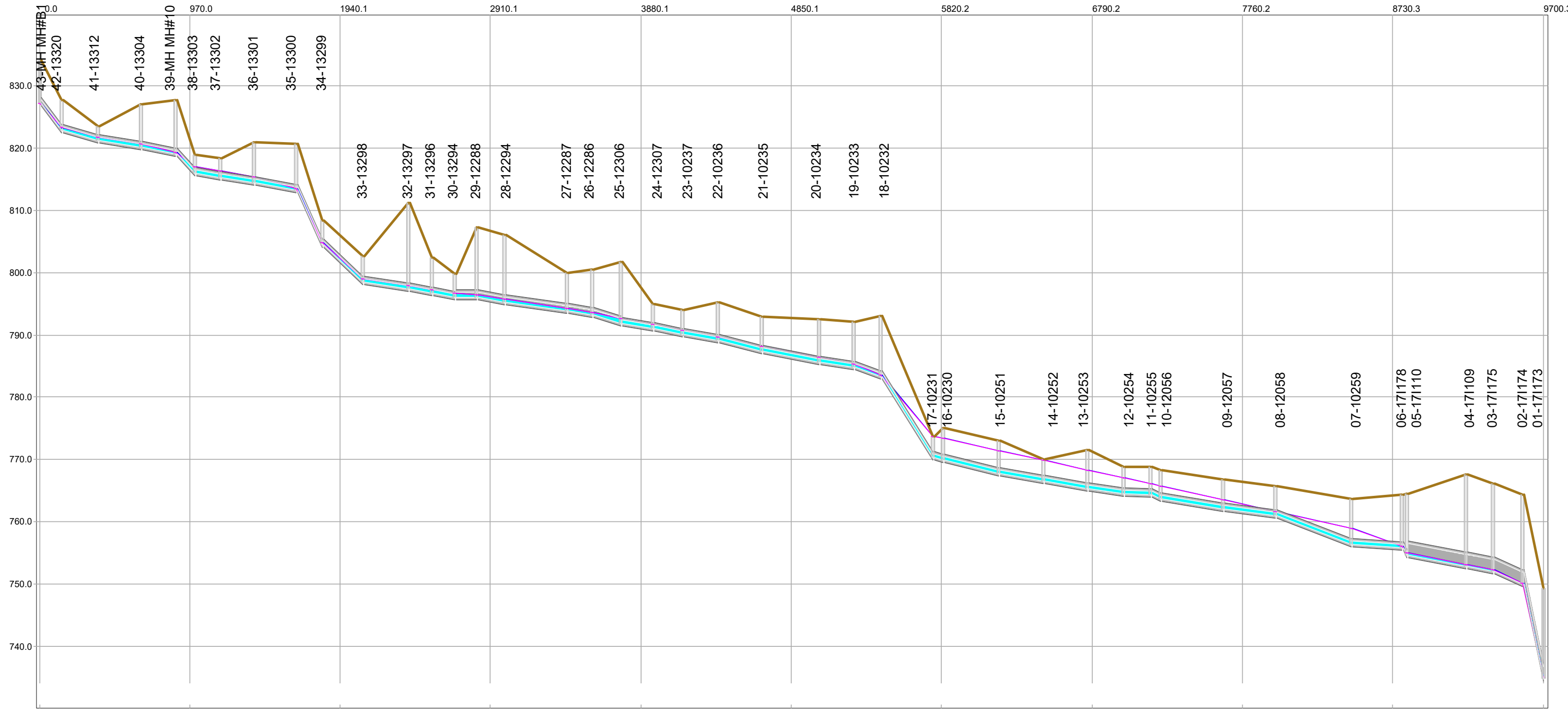
AVERAGE DAILY FLOW

AVERAGE DAILY FLOW - FLOW CONDITION 1 - EXHIBIT C-3A

Downstream Node Name	Upstream Node Name	Length ft	Diameter (Height) ft	Conduit Slope	Downstream Invert Elevation ft	Upstream Invert Elevation ft	Max d/D Ratio (depth/diameter)
01-17173	02-17174	134.96	2	11.18	734.848	749.936	0.023
02-17174	03-17175	188.25	2	1.116	749.936	752.036	0.041
03-17175	04-17109	173.8	2	0.426	752.036	752.776	0.045
04-17109	05-17110	381.91	2	0.492	752.776	754.655	0.045
05-17110	06-17178	33	0.667	4.816	754.655	755.793	0.128
06-17178	07-10259	328.02	0.667	0.158	755.793	756.311	0.259
07-10259	08-12058	485.62	0.667	0.968	756.311	761.01	0.259
08-12058	09-12057	338.19	0.667	0.309	761.01	762.054	0.202
09-12057	10-12056	405.45	0.667	0.399	762.054	763.673	0.202
10-12056	11-10255	64.23	0.667	1.026	763.673	764.332	0.172
11-10255	12-10254	175	0.667	0.056	764.332	764.43	0.277
12-10254	13-10253	230.22	0.667	0.4	764.43	765.25	0.277
13-10253	14-10252	285.89	0.667	0.4	765.25	766.49	0.175
14-10252	15-10251	285.89	0.667	0.4	766.49	767.73	0.167
15-10251	16-10230	358.74	0.667	0.577	767.73	769.9	0.167
16-10230	17-10231	64.4	0.667	0.4	769.9	770.29	0.154
17-10231	18-10232	339	0.667	3.845	770.29	783.323	0.129
18-10232	19-10233	173.95	0.667	0.869	783.323	784.834	0.122
19-10233	20-10234	224.02	0.667	0.365	784.834	785.651	0.122
20-10234	21-10235	368.06	0.667	0.482	785.651	787.424	0.122
21-10235	22-10236	283.78	0.667	0.621	787.424	789.186	0.114
22-10236	23-10237	229	0.667	0.373	789.186	790.04	0.127
23-10237	24-12307	192	0.667	0.4	790.04	790.97	0.127
24-12307	25-12306	205	0.667	0.44	790.97	791.88	0.113
25-12306	26-12286	183.9	0.833	0.3	791.88	793.18	0.091
26-12286	27-12287	167.7	0.833	0.3	793.18	793.88	0.066
27-12287	28-12294	400	0.833	0.3	793.88	795.28	0.066
28-12294	29-12288	180.3	0.833	0.3	795.28	796.02	0.065
29-12288	30-13294	140	0.833	0.3	796.02	796.04	0.098
30-13294	31-13296	150	0.667	0.4	796.04	796.74	0.123
31-13296	32-13297	148	0.667	0.4	796.74	797.33	0.071
32-13297	33-13298	296	0.667	0.4	797.33	798.51	0.071
33-13298	34-13299	260	0.667	2.27	798.51	804.5	0.068
34-13299	35-13300	169	0.667	5.14	804.5	813.28	0.046
35-13300	36-13301	270	0.667	0.4	813.28	814.46	0.075
36-13301	37-13302	220	0.667	0.4	814.46	815.34	0.075
37-13302	38-13303	164	0.667	0.4	815.34	816	0.072
38-13303	39-MH MH#10	125	0.667	2.07	816	819.09	0.068
39-MH MH#10	40-13304	220	0.667	0.4	819.09	820.17	0.07
40-13304	41-13312	278	0.667	0.4	820.17	821.28	0.07
41-13312	42-13320	235	0.667	0.69	821.28	822.9	0
42-13320	43-MH MH#B1	145	0.667	2.93	822.9	827.25	0



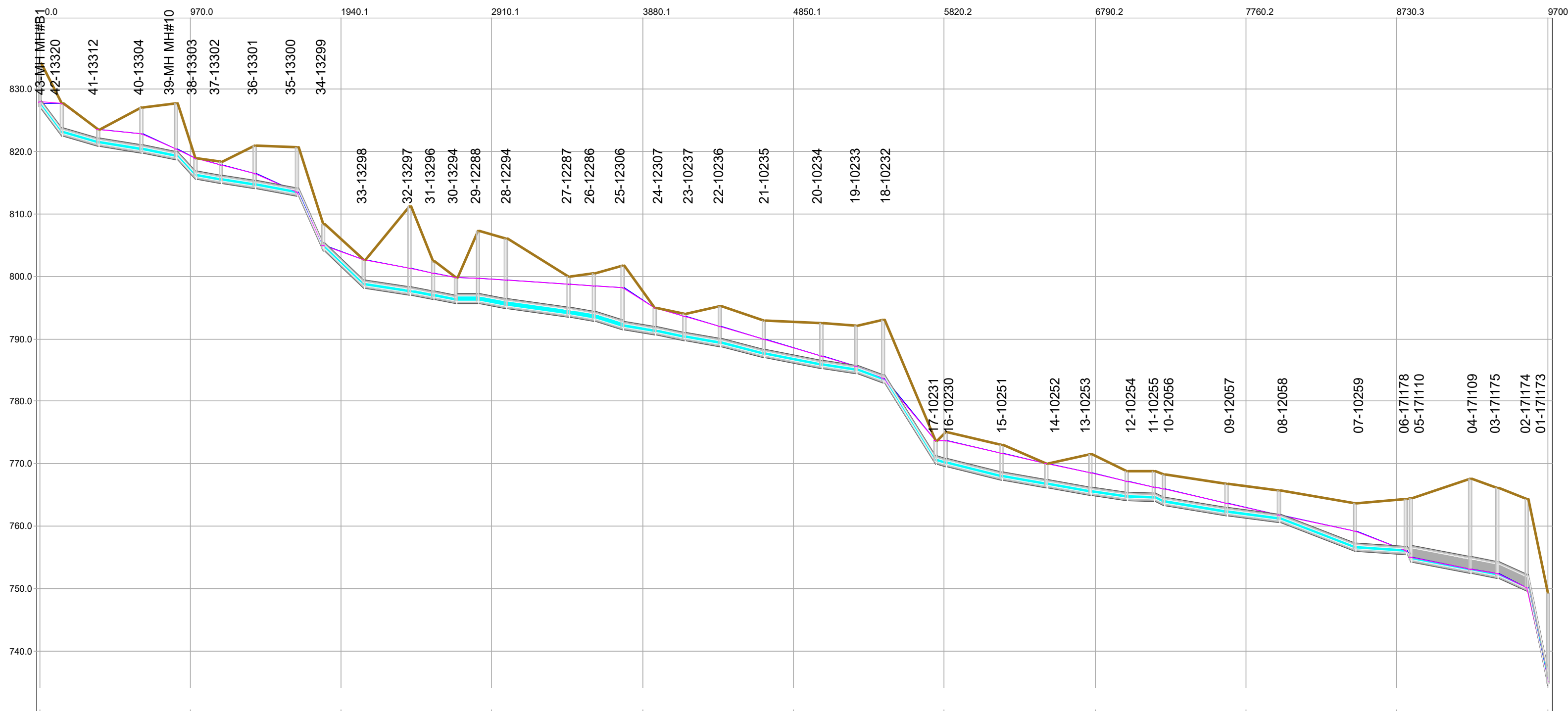
PEAK FLOW - 10X AVERAGE DAILY FLOW



AVERAGE DAILY FLOW - FLOW CONDITION 2

AVERAGE DAILY FLOW - FLOW CONDITION 2 - EXHIBIT C-5A

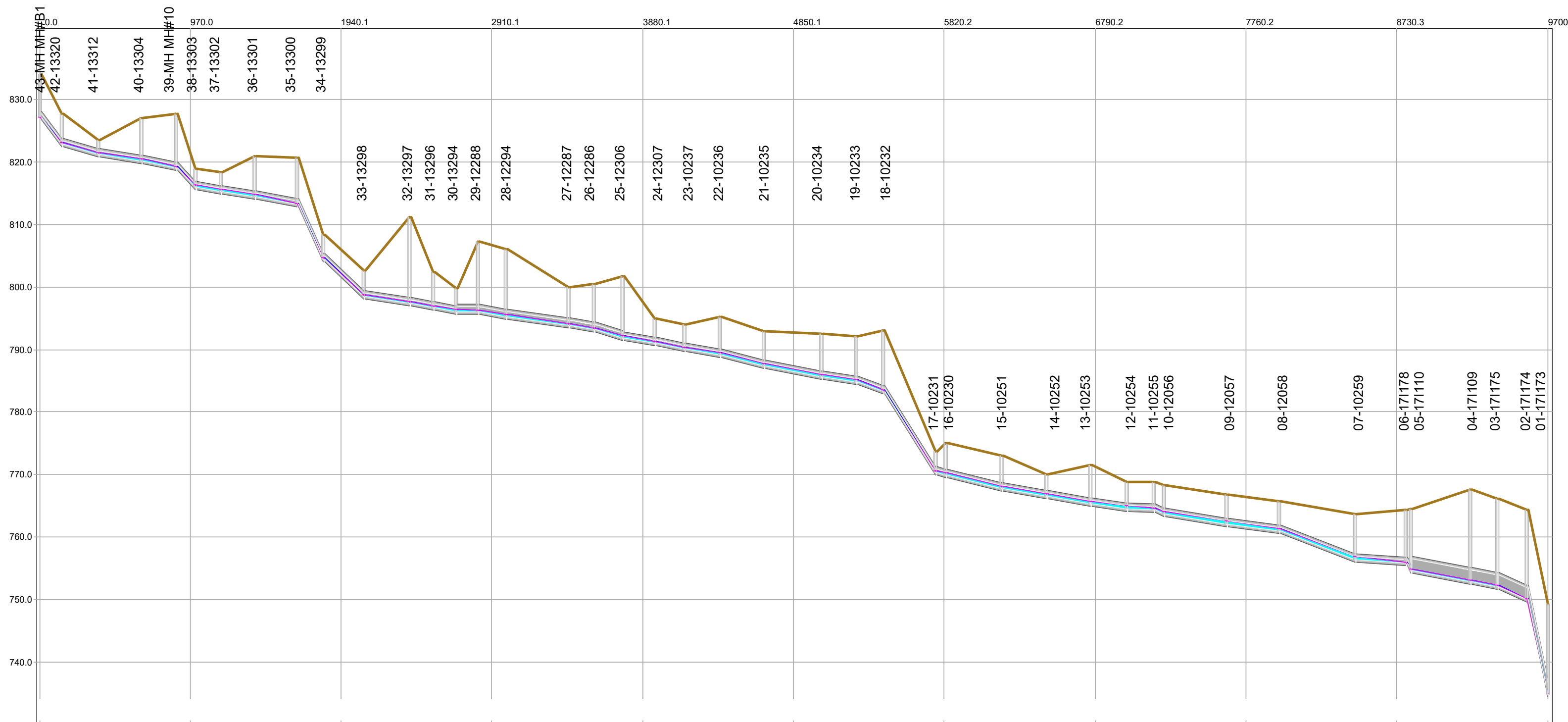
Downstream Node Name	Upstream Node Name	Length ft	Diameter (Height) ft	Conduit Slope	Downstream Invert Elevation ft	Upstream Invert Elevation ft	Max d/D Ratio (depth/diameter)
01-17173	02-17174	134.96	2	11.18	734.848	749.936	0.078
02-17174	03-17175	188.25	2	1.116	749.936	752.036	0.153
03-17175	04-17109	173.8	2	0.426	752.036	752.776	0.175
04-17109	05-17110	381.91	2	0.492	752.776	754.655	0.175
05-17110	06-17178	33	0.667	4.816	754.655	755.793	0.49
06-17178	07-10259	328.02	0.667	0.158	755.793	756.311	3.882
07-10259	08-12058	485.62	0.667	0.968	756.311	761.01	3.882
08-12058	09-12057	338.19	0.667	0.309	761.01	762.054	2.131
09-12057	10-12056	405.45	0.667	0.399	762.054	763.673	3.1
10-12056	11-10255	64.23	0.667	1.026	763.673	764.332	3.1
11-10255	12-10254	175	0.667	0.056	764.332	764.43	3.953
12-10254	13-10253	230.22	0.667	0.4	764.43	765.25	4.609
13-10253	14-10252	285.89	0.667	0.4	765.25	766.49	5.076
14-10252	15-10251	285.89	0.667	0.4	766.49	767.73	5.53
15-10251	16-10230	358.74	0.667	0.577	767.73	769.9	5.53
16-10230	17-10231	64.4	0.667	0.4	769.9	770.29	5.184
17-10231	18-10232	339	0.667	3.845	770.29	783.323	5.037
18-10232	19-10233	173.95	0.667	0.869	783.323	784.834	0.741
19-10233	20-10234	224.02	0.667	0.365	784.834	785.651	1.129
20-10234	21-10235	368.06	0.667	0.482	785.651	787.424	1.129
21-10235	22-10236	283.78	0.667	0.621	787.424	789.186	1.061
22-10236	23-10237	229	0.667	0.373	789.186	790.04	1.112
23-10237	24-12307	192	0.667	0.4	790.04	790.97	1.112
24-12307	25-12306	205	0.667	0.44	790.97	791.88	1.113
25-12306	26-12286	183.9	0.833	0.3	791.88	793.18	0.891
26-12286	27-12287	167.7	0.833	0.3	793.18	793.88	0.553
27-12287	28-12294	400	0.833	0.3	793.88	795.28	0.565
28-12294	29-12288	180.3	0.833	0.3	795.28	796.02	0.565
29-12288	30-13294	140	0.833	0.3	796.02	796.04	0.828
30-13294	31-13296	150	0.667	0.4	796.04	796.74	1.034
31-13296	32-13297	148	0.667	0.4	796.74	797.33	0.873
32-13297	33-13298	296	0.667	0.4	797.33	798.51	0.851
33-13298	34-13299	260	0.667	2.27	798.51	804.5	0.842
34-13299	35-13300	169	0.667	5.14	804.5	813.28	0.455
35-13300	36-13301	270	0.667	0.4	813.28	814.46	1.489
36-13301	37-13302	220	0.667	0.4	814.46	815.34	1.532
37-13302	38-13303	164	0.667	0.4	815.34	816	1.558
38-13303	39-MH MH#10	125	0.667	2.07	816	819.09	1.558
39-MH MH#10	40-13304	220	0.667	0.4	819.09	820.17	0.874
40-13304	41-13312	278	0.667	0.4	820.17	821.28	0.874
41-13312	42-13320	235	0.667	0.69	821.28	822.9	0.778
42-13320	43-MH MH#B1	145	0.667	2.93	822.9	827.25	0



PEAK DAILY FLOW - 10X AVERAGE DAILY FLOW - FLOW CONDITION 2

PEAK FLOW - 10X AVERAGE DAILY FLOW - FLOW CONDITION 2 - EXHIBIT C-6A

Downstream Node Name	Upstream Node Name	Length ft	Diameter (Height) ft	Conduit Slope	Downstream Invert Elevation ft	Upstream Invert Elevation ft	Max d/D Ratio (depth/diameter)
01-17173	02-17174	134.96	2	11.18	734.848	749.936	0.093
02-17174	03-17175	188.25	2	1.116	749.936	752.036	0.16
03-17175	04-17109	173.8	2	0.426	752.036	752.776	0.179
04-17109	05-17110	381.91	2	0.492	752.776	754.655	0.179
05-17110	06-17178	33	0.667	4.816	754.655	755.793	0.502
06-17178	07-10259	328.02	0.667	0.158	755.793	756.311	4.257
07-10259	08-12058	485.62	0.667	0.968	756.311	761.01	4.257
08-12058	09-12057	338.19	0.667	0.309	761.01	762.054	2.406
09-12057	10-12056	405.45	0.667	0.399	762.054	763.673	3.395
10-12056	11-10255	64.23	0.667	1.026	763.673	764.332	3.395
11-10255	12-10254	175	0.667	0.056	764.332	764.43	4.225
12-10254	13-10253	230.22	0.667	0.4	764.43	765.25	4.849
13-10253	14-10252	285.89	0.667	0.4	765.25	766.49	5.277
14-10252	15-10251	285.89	0.667	0.4	766.49	767.73	5.831
15-10251	16-10230	358.74	0.667	0.577	767.73	769.9	5.831
16-10230	17-10231	64.4	0.667	0.4	769.9	770.29	5.605
17-10231	18-10232	339	0.667	3.845	770.29	783.323	5.037
18-10232	19-10233	173.95	0.667	0.869	783.323	784.834	1.125
19-10233	20-10234	224.02	0.667	0.365	784.834	785.651	2.356
20-10234	21-10235	368.06	0.667	0.482	785.651	787.424	3.715
21-10235	22-10236	283.78	0.667	0.621	787.424	789.186	4.142
22-10236	23-10237	229	0.667	0.373	789.186	790.04	5.31
23-10237	24-12307	192	0.667	0.4	790.04	790.97	5.892
24-12307	25-12306	205	0.667	0.44	790.97	791.88	9.398
25-12306	26-12286	183.9	0.833	0.3	791.88	793.18	7.525
26-12286	27-12287	167.7	0.833	0.3	793.18	793.88	6.318
27-12287	28-12294	400	0.833	0.3	793.88	795.28	5.802
28-12294	29-12288	180.3	0.833	0.3	795.28	796.02	4.904
29-12288	30-13294	140	0.833	0.3	796.02	796.04	4.573
30-13294	31-13296	150	0.667	0.4	796.04	796.74	5.733
31-13296	32-13297	148	0.667	0.4	796.74	797.33	5.903
32-13297	33-13298	296	0.667	0.4	797.33	798.51	6.237
33-13298	34-13299	260	0.667	2.27	798.51	804.5	6.237
34-13299	35-13300	169	0.667	5.14	804.5	813.28	0.702
35-13300	36-13301	270	0.667	0.4	813.28	814.46	2.969
36-13301	37-13302	220	0.667	0.4	814.46	815.34	3.83
37-13302	38-13303	164	0.667	0.4	815.34	816	4.453
38-13303	39-MH MH#10	125	0.667	2.07	816	819.09	4.453
39-MH MH#10	40-13304	220	0.667	0.4	819.09	820.17	3.95
40-13304	41-13312	278	0.667	0.4	820.17	821.28	3.95
41-13312	42-13320	235	0.667	0.69	821.28	822.9	7.346
42-13320	43-MH MH#B1	145	0.667	2.93	822.9	827.25	7.346



AVERAGE DAILY FLOW - PARTIAL WATERSHED BUILDOUT

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Downstream Node Name	Upstream Node Name	Length ft	Diameter (Height) ft	Conduit Slope	Downstream Invert Elevation ft	Upstream Invert Elevation ft	Max d/D Ratio (depth/diameter)
01-17173	02-17174	134.96	2	11.18	734.848	749.936	0.06
02-17174	03-17175	188.25	2	1.116	749.936	752.036	0.114
03-17175	04-17109	173.8	2	0.426	752.036	752.776	0.13
04-17109	05-17110	381.91	2	0.492	752.776	754.655	0.13
05-17110	06-17178	33	0.667	4.816	754.655	755.793	0.365
06-17178	07-10259	328.02	0.667	0.158	755.793	756.311	0.956
07-10259	08-12058	485.62	0.667	0.968	756.311	761.01	0.956
08-12058	09-12057	338.19	0.667	0.309	761.01	762.054	0.701
09-12057	10-12056	405.45	0.667	0.399	762.054	763.673	0.701
10-12056	11-10255	64.23	0.667	1.026	763.673	764.332	0.586
11-10255	12-10254	175	0.667	0.056	764.332	764.43	0.94
12-10254	13-10253	230.22	0.667	0.4	764.43	765.25	0.94
13-10253	14-10252	285.89	0.667	0.4	765.25	766.49	0.635
14-10252	15-10251	285.89	0.667	0.4	766.49	767.73	0.57
15-10251	16-10230	358.74	0.667	0.577	767.73	769.9	0.57
16-10230	17-10231	64.4	0.667	0.4	769.9	770.29	0.515
17-10231	18-10232	339	0.667	3.845	770.29	783.323	0.469
18-10232	19-10233	173.95	0.667	0.869	783.323	784.834	0.468
19-10233	20-10234	224.02	0.667	0.365	784.834	785.651	0.555
20-10234	21-10235	368.06	0.667	0.482	785.651	787.424	0.555
21-10235	22-10236	283.78	0.667	0.621	787.424	789.186	0.491
22-10236	23-10237	229	0.667	0.373	789.186	790.04	0.555
23-10237	24-12307	192	0.667	0.4	790.04	790.97	0.555
24-12307	25-12306	205	0.667	0.44	790.97	791.88	0.509
25-12306	26-12286	183.9	0.833	0.3	791.88	793.18	0.407
26-12286	27-12287	167.7	0.833	0.3	793.18	793.88	0.348
27-12287	28-12294	400	0.833	0.3	793.88	795.28	0.348
28-12294	29-12288	180.3	0.833	0.3	795.28	796.02	0.348
29-12288	30-13294	140	0.833	0.3	796.02	796.04	0.527
30-13294	31-13296	150	0.667	0.4	796.04	796.74	0.658
31-13296	32-13297	148	0.667	0.4	796.74	797.33	0.468
32-13297	33-13298	296	0.667	0.4	797.33	798.51	0.468
33-13298	34-13299	260	0.667	2.27	798.51	804.5	0.461
34-13299	35-13300	169	0.667	5.14	804.5	813.28	0.288
35-13300	36-13301	270	0.667	0.4	813.28	814.46	0.519
36-13301	37-13302	220	0.667	0.4	814.46	815.34	0.519
37-13302	38-13303	164	0.667	0.4	815.34	816	0.467
38-13303	39-MH MH#10	125	0.667	2.07	816	819.09	0.46
39-MH MH#10	40-13304	220	0.667	0.4	819.09	820.17	0.488
40-13304	41-13312	278	0.667	0.4	820.17	821.28	0.488
41-13312	42-13320	235	0.667	0.69	821.28	822.9	0.409
42-13320	43-MH MH#B1	145	0.667	2.93	822.9	827.25	0