City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-1

Water Servicing Analysis

City of Hamilton Water and Wastewater Master Plan

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Appendix A-1 (01)

Growth Projections

Population

PRESSURE_DISTRICT	2001	2011	2021	2031
1	136,591.41	152,419.29	168,389.93	180,021.80
2	60,545.13	66,026.39	71,013.93	72,735.76
3	14,112.76	14,531.66	14,557.99	14,546.53
4	35,178.74	37,274.95	41,326.78	41,705.79
5	72,636.84	73,320.43	78,062.70	80,893.09
6	82,533.00	91,780.13	110,909.32	113,650.15
7	7,423.23	9,271.73	15,743.66	109,151.71
9	19.05	25.86	41.52	117.01
10	339.25	460.49	739.38	2,083.62
11	14,456.99	15,797.15	16,347.82	16,325.45
12	5,312.80	5,598.53	6,008.66	6,084.97
13	678.80	721.23	853.89	813.59
14	428.50	455.29	539.03	513.59
16	13,611.04	14,313.00	20,368.40	29,642.60
17	2,238.36	2,319.23	2,568.17	2,472.08
18	19,513.75	22,676.24	29,338.98	29,377.67
19	398.46	411.69	411.03	411.03
20	269.46	271.15	271.15	271.15
21	113.71	133.99	140.10	139.65
22	4,908.98	6,120.57	11,636.75	18,863.15
Grand Total	**471,310.25**	**513,929.00**	**589,269.20**	**719,820.40**

Jobs

PRESSURE_DISTRICT	2001	2011	2021	2031
1	99,301.95	106,527.43	115,082.20	126,022.96
2	35,017.02	42,223.11	50,068.27	58,645.11
3	1,108.65	1,089.27	1,066.40	1,126.66
4	4,688.05	4,919.90	5,168.49	5,922.60
5	17,641.82	18,836.50	20,813.39	22,979.46
6	19,395.33	22,314.84	29,476.08	45,732.11
7	5,104.22	6,298.11	7,887.92	8,953.72
10	61.57	64.15	62.47	66.66
11	5,301.53	5,956.73	6,337.61	7,015.21
12	597.84	622.77	634.21	687.67
13	59.90	61.93	72.07	81.29
16	5,009.73	5,906.08	7,209.78	8,048.44
17	498.76	506.85	574.07	645.56
18	4,824.60	6,012.81	7,777.35	11,653.11
19	87.89	86.38	84.12	89.74
20	33.54	33.15	32.54	34.69
22	300.50	823.00	1,531.00	2,382.00
Grand Total	**201,033.90**	**224,294.00**	**255,899.00**	**302,118.00**

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Appendix A-1 (02)

Demand Projections

Max Day Demands

PRESSURE_DISTRICT	2001 (m3/d)	2011 (m3/d)	2021 (m3/d)	2031 (m3/d)
1	133,591.86	146,845.84	160,876.70	173,545.02
2	54,535.93	61,571.85	68,643.86	74,136.91
3	9,044.16	9,285.41	9,289.32	9,313.78
4	23,545.03	24,923.32	27,483.68	28,103.23
5	52,755.85	53,787.24	57,660.58	60,485.18
6	59,605.37	66,671.80	81,873.16	91,970.79
7	7,108.14	8,838.06	13,547.92	70,146.96
9	11.43	15.52	24.91	70.20
10	235.56	309.65	476.11	1,284.83
11	11,430.99	12,575.79	13,104.25	13,443.18
12	3,498.56	3,682.96	3,934.98	4,008.57
13	438.43	464.94	549.81	530.43
14	257.10	273.17	323.42	308.15
16	10,771.68	11,658.96	15,970.13	21,970.75
17	1,602.37	0.55	1,839.42	1,818.94
18	14,217.04	0.00	21,647.61	23,686.22
19	284.78	291.93	290.36	293.28
20	179.11	179.93	179.61	180.73
21	68.22	80.40	84.06	83.79
22	3,101.65	4,100.30	7,778.17	12,556.53
Grand Total	**386,283.26**	**405,557.61**	**485,578.08**	**587,937.48**

Peak Hour Demands

PRESSURE_DISTRICT	2001 (m3/d)	2011 (m3/d)	2021 (m3/d)	2031 (m3/d)
1	200,387.79	220,268.76	241,315.06	260,317.53
2	81,803.89	92,357.77	102,965.79	111,205.37
3	13,566.23	13,928.12	13,933.99	13,970.68
4	35,317.55	37,384.98	41,225.53	42,154.84
5	79,133.77	80,680.86	86,490.88	90,727.77
6	89,408.06	100,007.69	122,809.73	137,956.18
7	10,662.20	13,257.08	20,321.87	105,220.44
9	17.15	23.27	37.37	105.31
10	353.35	464.47	714.17	1,927.25
11	17,146.49	18,863.68	19,656.38	20,164.77
12	5,247.84	5,524.44	5,902.48	6,012.86
13	657.64	697.41	824.72	795.64
14	385.65	409.76	485.13	462.23
16	16,157.52	17,488.44	23,955.19	32,956.13
17	2,403.56	0.83	2,759.12	2,728.41
18	21,325.56	0.00	32,471.42	35,529.32
19	427.17	437.90	435.54	439.93
20	268.67	269.89	269.42	271.09
21	102.34	120.59	126.09	125.68
22	4,652.47	6,150.46	11,667.25	18,834.79
Grand Total	**579,424.88**	**608,336.41**	**728,367.12**	**881,906.22**

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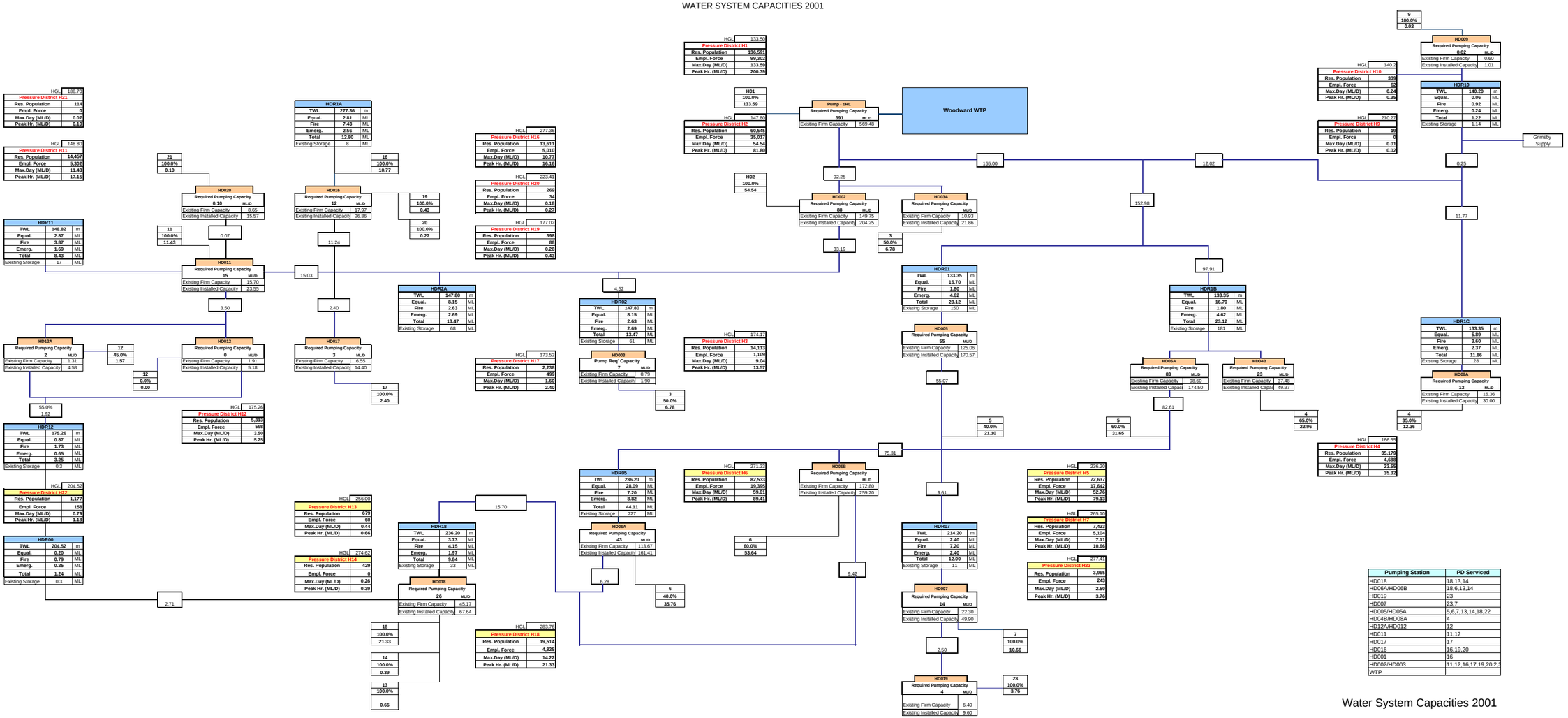
Appendix A-1 (03)

Water System Capacities

HAMILTON WATER AND WASTEWATER MASTER PLAN
WATER SYSTEM CAPACITIES 2001

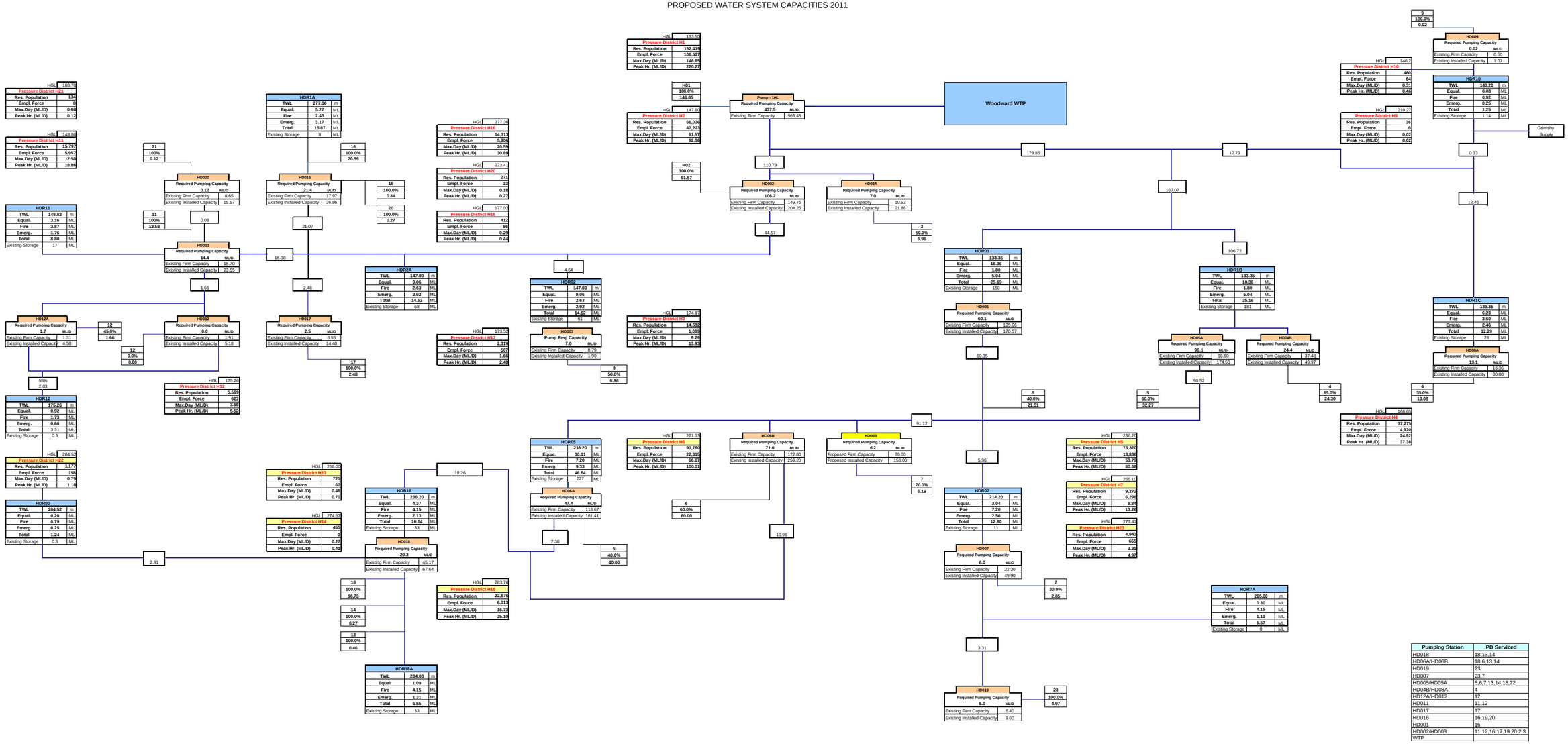


Pumping Station	PD Serviced
HD018	18,13,14
HD06A/HD06B	18,6,13,14
HD019	23
HD007	23,7
HD005/HD05A	5,6,7,13,14,18,22
HD04B/HD08A	4
HD12A/HD012	12
HD011	11,12
HD017	17
HD016	16,19,20
HD001	16
HD002/HD003	11,12,16,17,19,20,2
WTP	

Water System Capacities 2001

HAMILTON WATER AND WASTEWATER MASTER PLAN

PROPOSED WATER SYSTEM CAPACITIES 2011

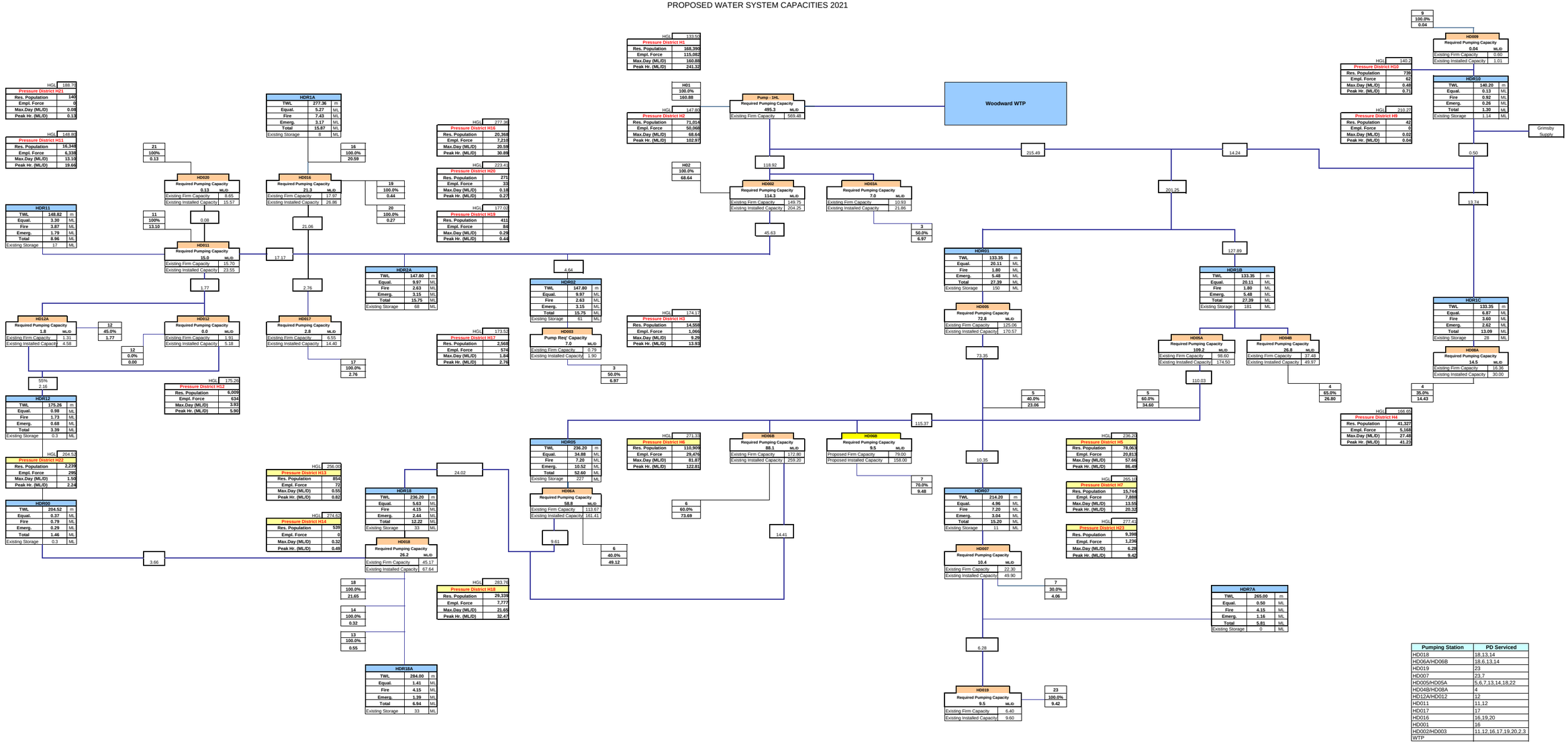


Pumping Station	PD Serviced
HD018	18,13,14
HD06A/HD06B	18,6,13,14
HD019	23
HD007	23,7
HD005/HD05A	5,6,7,13,14,18,22
HD04B/HD08A	4
HD12A/HD012	12
HD011	11,12
HD017	17
HD016	16,19,20
HD01	16
HD002/HD003	11,12,16,17,19,20,2,3
WTP	

Water System Capacities 2011

HAMILTON WATER AND WASTEWATER MASTER PLAN

PROPOSED WATER SYSTEM CAPACITIES 2021

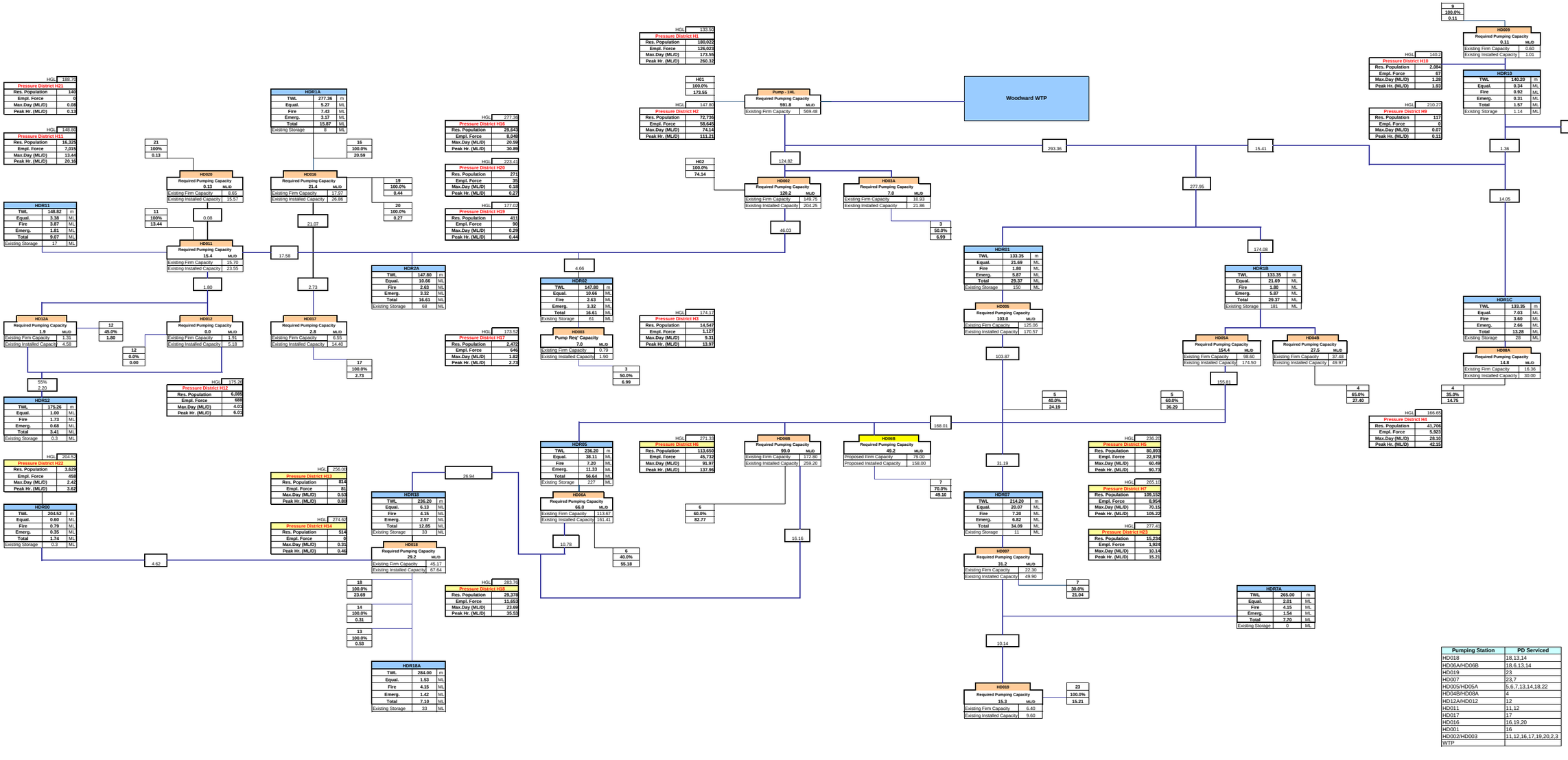


Pumping Station	PD Serviced
HD018	18,13,14
HD06A/HD06B	18,6,13,14
HD019	23
HD007	23,7
HD005/HD05A	5,6,7,13,14,18,22
HD04B/HD08A	4
HD12A/HD012	12
HD011	11,12
HD017	17
HD016	16,19,20
HD001	16
HD002/HD003	11,12,16,17,19,20,2,3
WTP	

Water System Capacities 2021

HAMILTON WATER AND WASTEWATER MASTER PLAN

PROPOSED WATER SYSTEM CAPACITIES 2031



Pumping Station	PD Serviced
HD018	18,13,14
HD06A/HD06B	18,6,13,14
HD019	23
HD007	23,7
HD005/HD05A	5,6,7,13,14,18,22
HD04B/HD08A	4
HD12A/HD012	12
HD011	11,12
HD017	17
HD016	16,19,20
HD001	16
HD002/HD003	11,12,16,17,19,20,2,3
WTP	

Water System Capacities 2031

City of Hamilton Water and Wastewater Master Plan

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Appendix A-1 (04)

Pumping Requirements

Pumping Requirements

Pressure District	Description	Design Flows (MLD)			
		2001	2011	2021	2031
22	Supply Requirement				
	HD-22 Max	0.78	0.79	1.50	2.42
	Pumping Capacity				
	% HD018	1.45	1.26	1.78	2.79
	Surplus/Deficit Capacity	0.67	0.47	0.29	0.37
13	Supply Requirement				
	HD-13 Peak	0.66	0.70	0.82	0.80
	Pumping Capacity				
	% HD018	1.23	1.12	0.98	0.92
	Surplus/Deficit Capacity	0.57	0.42	0.16	0.12
14	Supply Requirement				
	HD-14 Peak	0.39	0.41	0.49	0.46
	Pumping Capacity				
	% HD018	0.72	0.66	0.58	0.53
	Surplus/Deficit Capacity	0.33	0.25	0.09	0.07
18	Supply Requirement				
	HD-22 Max	0.78	0.79	1.50	2.42
	HD-14 Peak	0.39	0.41	0.49	0.46
	HD-13 Peak	0.66	0.70	0.82	0.80
	HD-18 Peak	22.40	26.30	35.09	35.53
	Total Requirement	**24.22**	**28.20**	**37.90**	**39.21**
	Pumping Capacity				
	HD018 Firm Capacity	**45.17**	**45.17**	**45.17**	**45.17**
	Surplus/Deficit Capacity	20.95	16.97	7.27	5.96
6	Supply Requirement				
	HD-14 Max	0.26	0.27	0.32	0.31
	HD-13 Max	0.44	0.46	0.55	0.53
	HD-18 Max	14.93	17.53	23.39	23.69
	HD-06 Max	58.89	65.87	80.13	91.97
	Total Requirement	**74.52**	**84.14**	**104.39**	**116.50**
	Pumping Capacity				
	HD06A Firm Capacity	113.67	113.67	113.67	113.67
	HD06B Firm Capacity	172.80	172.80	172.80	172.80
	Total Capacity	**286.47**	**286.47**	**286.47**	**286.47**
	Surplus/Deficit Capacity	211.95	202.33	182.08	169.97
23	Supply Requirement				
	HD-23 Peak	4.65	4.97	9.42	15.21
	Pumping Capacity				
	% HD007 Firm Capacity	6.77	6.08	7.06	2.82
	Surplus/Deficit Capacity	2.12	1.11	-2.36	-12.39
7	Supply Requirement				
	HD-07 Peak	10.66	13.26	20.32	105.22
	HD-23 Peak	4.65	4.97	9.42	15.21
	Total Requirement	**15.31**	**18.22**	**29.74**	**120.43**
	Pumping Capacity				
	HD007 Firm Capacity	**22.30**	**22.30**	**22.30**	**22.30**
	Surplus/Deficit Capacity	6.99	4.08	-7.44	-98.13

Pumping Requirements

Pressure District	Description	Design Flows (MLD)			
		2001	2011	2021	2031
5	Supply Requirement				
	HD-14 Max	0.26	0.27	0.32	0.31
	HD-13 Max	0.44	0.46	0.55	0.53
	HD-18 Max	14.93	17.53	23.39	23.69
	HD-06 Max	58.89	65.87	80.13	91.97
	HD-23 Max	3.10	3.31	6.28	10.14
	HD-07 Max	7.11	8.84	13.55	70.15
	HD-05 Max	52.76	53.79	57.66	60.49
	Total Requirement	**137.48**	**150.08**	**181.88**	**257.27**
	Pumping Capacity				
	HD005 Firm Capacity	125.06	125.06	125.06	125.06
	HD05A Firm Capacity	98.60	98.60	98.60	98.60
	Total Capacity	**223.66**	**223.66**	**223.66**	**223.66**
	Surplus/Deficit Capacity	86.17	73.58	41.77	-33.61
4	Supply Requirement				
	HD-04 Peak	**35.32**	**37.38**	**41.23**	**42.15**
	Pumping Capacity				
	HD04B Firm Capacity	37.48	37.48	37.48	37.48
	HD08A Firm Capacity	16.36	16.36	16.36	16.36
	Total Capacity	**53.84**	**53.84**	**53.84**	**53.84**
	Surplus/Deficit Capacity	18.52	16.46	12.61	11.69
9	Supply Requirement				
	HD-09 Peak	0.02	0.02	0.04	0.11
	Total Requirement	**0.02**	**0.02**	**0.04**	**0.11**
	Pumping Capacity				
	HD009 Firm Capacity	**0.60**	**0.60**	**0.60**	**0.60**
	Surplus/Deficit Capacity	0.58	0.58	0.56	0.49
19	Supply Requirement				
	HD-19 Peak	0.43	0.44	0.44	0.44
	Pumping Capacity				
	% HD016 Firm Capacity	0.67	0.64	0.47	0.37
	Surplus/Deficit Capacity	0.24	0.20	0.03	-0.07
20	Supply Requirement				
	HD-20 Peak	0.27	0.27	0.27	0.27
	Pumping Capacity				
	% HD016 Firm Capacity	0.42	0.39	0.29	0.23
	Surplus/Deficit Capacity	0.15	0.12	0.02	-0.04

Pumping Requirements

Pressure District	Description	Design Flows (MLD)			
		2001	2011	2021	2031
16	Supply Requirement				
	HD-19 Peak	0.43	0.44	0.44	0.44
	HD-20 Peak	0.27	0.27	0.27	0.27
	HD-16 Max	10.77	11.66	15.97	20.59
	Total Requirement	**11.47**	**12.37**	**16.68**	**21.31**
	Pumping Capacity				
	HD016 Firm Capacity	**17.97**	**17.97**	**17.97**	**17.97**
	Surplus/Deficit Capacity	6.50	5.60	1.29	-3.34
12	Supply Requirement				
	HD-12 Max	**3.50**	**3.68**	**3.93**	**4.01**
	Pumping Capacity				
	HD012 Firm Capacity	1.91	1.91	1.91	1.91
	HD12A Firm Capacity	1.31	1.31	1.31	1.31
	Total Requirement	**3.22**	**3.22**	**3.22**	**3.22**
	Surplus/Deficit Capacity	-0.28	-0.46	-0.71	-0.79
21	Supply Requirement				
	HD-21 Peak	0.10	0.12	0.13	0.13
	Pumping Capacity				
	HD020 Firm Capacity	8.65	8.65	8.65	8.65
	Surplus/Deficit Capacity	8.55	8.53	8.52	8.53
11	Supply Requirement				
	HD-11 Max	11.43	12.58	13.10	13.44
	HD-12 Max	1.57	1.66	1.77	1.80
	HD-21 Peak	0.10	0.12	0.13	0.13
	Total Requirement	**13.11**	**14.35**	**15.00**	**15.37**
	Pumping Capacity				
	HD011 Firm Capacity	**15.70**	**15.70**	**15.70**	**15.70**
	Surplus/Deficit Capacity	2.59	1.34	0.70	0.33
17	Supply Requirement				
	HD-17 Peak	**2.40**	**2.48**	**2.76**	**2.73**
	Pumping Capacity				
	HD017 Firm Capacity	**6.55**	**6.55**	**6.55**	**6.55**
	Surplus/Deficit Capacity	4.15	4.07	3.79	3.82
3	Supply Requirement				
	HD-03 Peak	13.57	13.93	13.93	13.97
	Pumping Capacity				
	HD003 Firm Capacity	0.79	0.79	0.79	0.79
	HD002-PD3 Firm Capacity	149.75	149.75	149.75	149.75
	Total Capacity	150.54	150.54	150.54	150.54
	Surplus/Deficit Capacity	136.97	136.61	136.61	136.57
2	Supply Requirement				
	HD-19 Max	0.28	0.29	0.29	0.29
	HD-20 Max	0.18	0.18	0.18	0.18
	HD-16 Max	10.77	11.66	15.97	20.59
	HD-12 Max	3.50	3.68	3.93	4.01
	HD-21 Peak	0.10	0.12	0.13	0.13
	HD-11 Max	11.43	12.58	13.10	13.44
	HD-17 Peak	2.40	2.48	2.76	2.73
	HD-03 Max	9.04	9.29	9.29	9.31
	HD-02 Max	54.54	61.57	68.64	74.14
	Total Requirement	**92.25**	**101.85**	**114.30**	**124.82**
	Pumping Capacity				
	HD002 Firm Capacity	**149.75**	**149.75**	**149.75**	**149.75**
	Surplus/Deficit Capacity	57.50	47.90	35.45	24.93

Pumping Requirements

Pressure District	Description	Design Flows (MLD)			
		2001	2011	2021	2031
1	Supply Requirement				
	HD-19 Max	0.28	0.29	0.29	0.29
	HD-20 Max	0.18	0.18	0.18	0.18
	HD-16 Max	10.77	11.66	15.97	20.59
	HD-12 Max	3.50	3.68	3.93	4.01
	HD-21 Peak	0.10	0.12	0.13	0.13
	HD-11 Max	11.43	12.58	13.10	13.44
	HD-17 Peak	2.40	2.48	2.76	2.73
	HD-03 Max	9.04	9.29	9.29	9.31
	HD-02 Max	54.54	61.57	68.64	74.14
	HD-14 Max	0.26	0.27	0.32	0.31
	HD-13 Max	0.44	0.46	0.55	0.53
	HD-18 Max	14.93	17.53	23.39	23.69
	HD-06 Max	58.89	65.87	80.13	91.97
	HD-23 Max	3.10	3.31	6.28	10.14
	HD-07 Max	7.11	8.84	13.55	70.15
	HD-05 Max	52.76	53.79	57.66	60.49
	HD-04 Max	23.55	24.92	27.48	28.10
	HD-10 Max	0.24	0.31	0.48	1.28
	HD-09 Max	0.01	0.02	0.02	0.07
	HD-01 Max	133.59	146.85	160.88	173.55
	Total Requirement	**387.12**	**424.02**	**485.04**	**585.10**
	Pumping Capacity				
	Woodward Firm Capacity	**569.48**	**569.48**	**569.48**	**569.48**
	Surplus/Deficit Capacity	182.36	145.46	84.44	-15.62

City of Hamilton Water and Wastewater Master Plan

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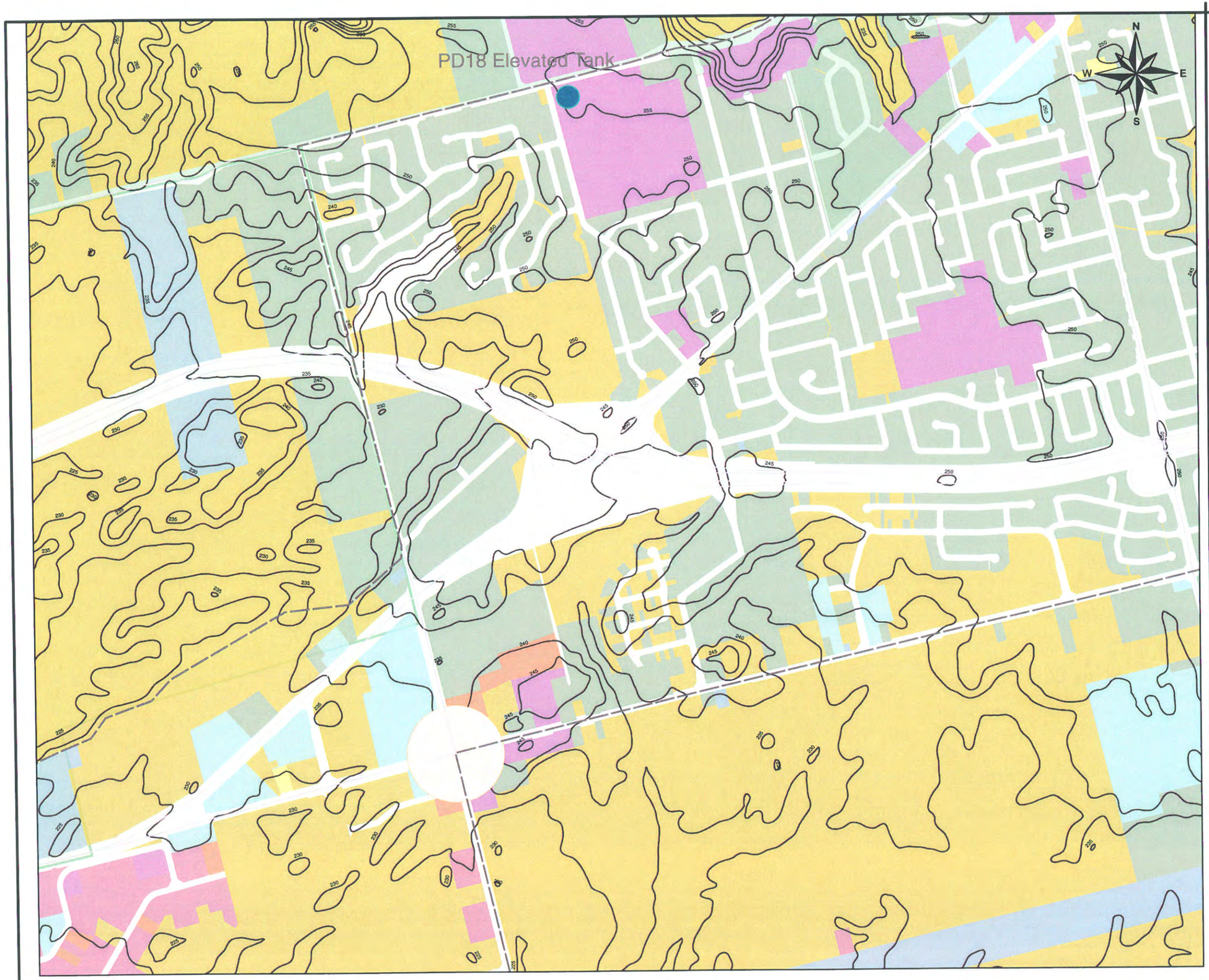
Appendix A-1 (05)

Storage Requirements

				As per MOE Guidelines									
Pressure District	**Avg Day Demand (m3/d)**	**Max Day Demand (m3/d)**	**Equiv Pop**	**Fire (l/s)**	**Duration**	**Fire (m3)**	**Equalization (m3)**	**Emergency (m3)**	**Storage (m3)**	**Storage Max Day (m3)**	**Existing Storage (m3)**	**Surplus/ Deficit (ML)**	**Surplus/ Deficit Max Day (ML)**
1	86,772.51	173,545.02	241,034.75	250	4	3,600.00	43,386.26	11,746.56	58,732.82	173,545.02			
4	14,051.61	28,103.23	39,032.26	250	4	3,600.00	7,025.81	2,656.45	13,282.26	28,103.23			
									72,015.08	201,648.25	360,276.79	288.26	158.63
2	37,068.46	74,136.91	102,967.93	250	4	3,600.00	18,534.23	5,533.56	27,667.79	74,136.91			
3	4,656.89	9,313.78	12,935.81	200	2	1,440.00	2,328.45	942.11	4,710.56	9,313.78			
17	909.47	1,818.94	2,526.31	100	2	720.00	454.73	293.68	1,468.42	1,818.94			
									33,846.76	85,269.64	129,103.67	95.26	43.83
5	30,242.59	60,485.18	84,007.19	250	4	3,600.00	15,121.29	4,680.32	23,401.62	60,485.18			
6	45,990.57	91,981.14	127,751.58	250	4	3,600.00	22,995.28	6,648.82	33,244.11	91,981.14			
									56,645.72	152,466.32	227,299.79	170.65	74.83
7	35,073.48	70,146.96	97,426.34	250	4	3,600.00	17,536.74	5,284.19	26,420.93	70,146.96			
23	5,070.51	10,141.03	14,084.76	250	4	3,600.00	2,535.26	1,533.81	7,669.07	10,141.03			
									34,090.00	80,287.99	11,371.65	-22.72	-68.92
9	35.10	70.20	97.51	38	2	273.60	17.55	72.79	363.94	70.20			
10	642.42	1,284.83	1,784.49	88	2	633.60	321.21	238.70	1,193.51	1,284.83			
									1,557.45	1,355.04	1,140.00	-0.42	-0.22
11	6,721.59	13,443.18	18,671.08	250	4	3,600.00	3,360.80	1,740.20	8,700.99	13,443.18			
21	41.89	83.79	116.37	38	2	273.60	20.95	73.64	368.18	83.79			
									9,069.18	13,526.97	16,372.23	7.30	2.85
12	2,004.29	4,008.57	5,567.46	160	3	1,728.00	1,002.14	682.54	3,412.68	4,008.57	3,700.96	0.29	-0.31
16	10,297.37	20,594.73	34,324.55	440	4	6,336.00	5,148.68	2,871.17	14,355.85	20,594.73			
19	146.64	293.28	407.34	38	4	547.20	73.32	155.13	775.65	293.28			
20	90.36	180.73	251.01	38	4	547.20	45.18	148.10	740.48	180.73			
									15,871.98	21,068.74	10,055.55	-5.82	-11.01
18	11,837.93	23,675.87	32,883.15	250	4	3,600.00	5,918.97	2,379.74	11,898.71	23,675.87			
13	265.21	530.43	736.70	38	2	273.60	132.61	101.55	507.76	530.43			
14	154.08	308.15	427.99	38	2	273.60	77.04	87.66	438.30	308.15			
									12,844.76	24,514.45	36,069.57	23.22	11.56
Total	**292,072.98**	**584,145.96**							**239,353.61**	**584,145.96**	**795,390.22**	556.0366	211.24



Legend

- Pump
- Reservoir
- Plant
- Watermain
- Rural Settlement Area
- Niagara Escarpment
- Greenbelt
- Urban Boundary

LANDUSE

PLUC

- 100
- 200
- 300
- 400
- 500
- 600
- 700
- 800
- 900

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Integrated Water & Wastewater Master Plan

Water Servicing

Ancaster ET

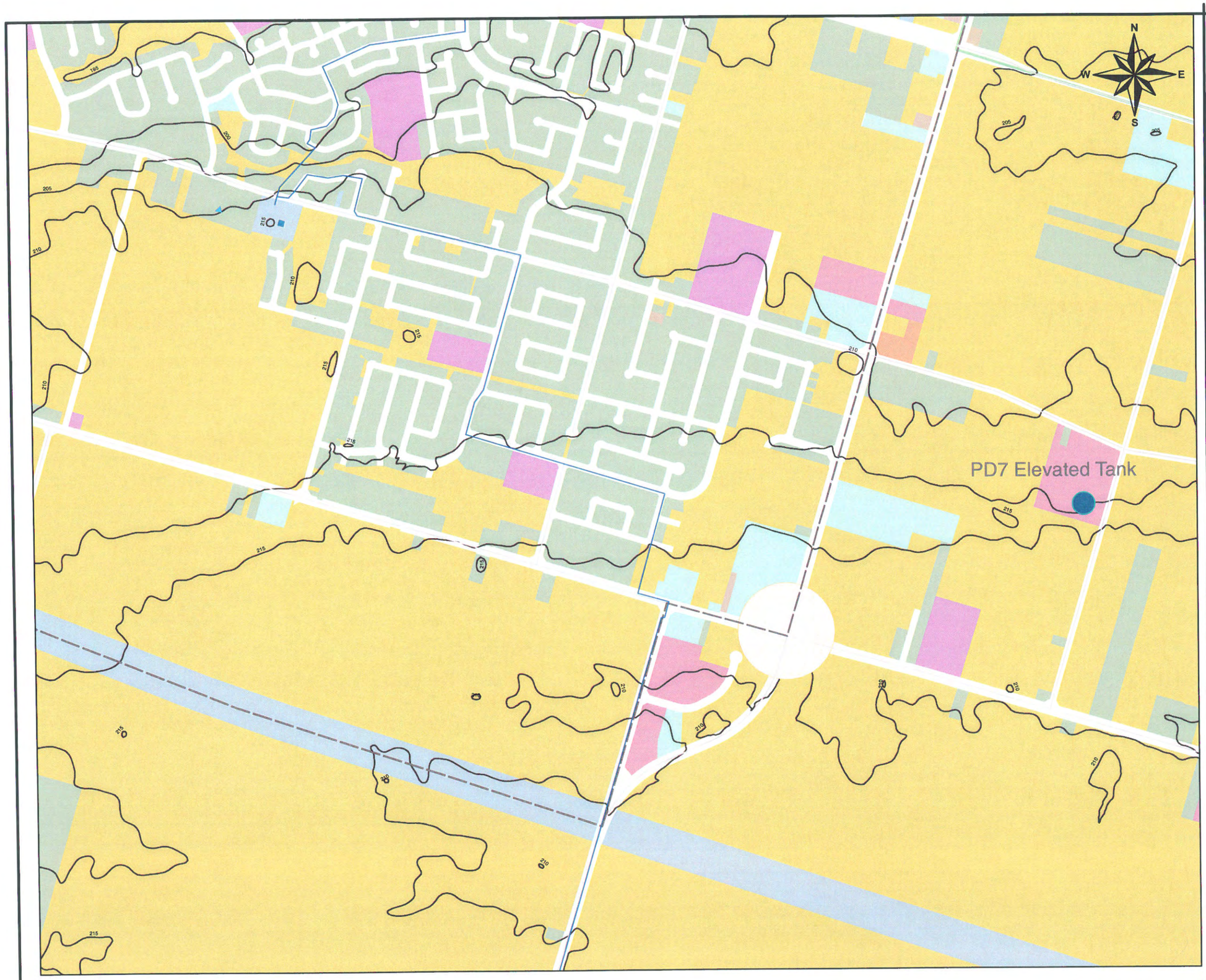
KMK Consultants Limited

Appendix A1 (05)

Nov 18, 2006

1:12,000

2590-D-86A



Legend

- Pump
- Reservoir
- Plant
- Watermain
- Rural Settlement Area
- Niagara Escarpment
- Greenbelt
- Urban Boundary

LANDUSE

PLUC

- 100
- 200
- 300
- 400
- 500
- 600
- 700
- 800
- 900

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Integrated Water & Wastewater Master Plan

Water Servicing

Southeast Mountain ET

KMK Consultants Limited

Appendix A1 (05)

Nov 18, 2006

1:12,000

2590-D-87A

Waterdown South

Waterdown North

N

W E

S

Legend

- Pump
- Reservoir
- Plant
- Watermain
- Rural Settlement Area
- Niagara Escarpment
- Greenbelt
- Urban Boundary

LANDUSE

PLUC

- 100
- 200
- 300
- 400
- 500
- 600
- 700
- 800
- 900

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Integrated Water & Wastewater Master Plan

Water Servicing

Waterdown ET

KMK Consultants Limited

Appendix A1 (05)

Nov 10, 2006

1:16,000

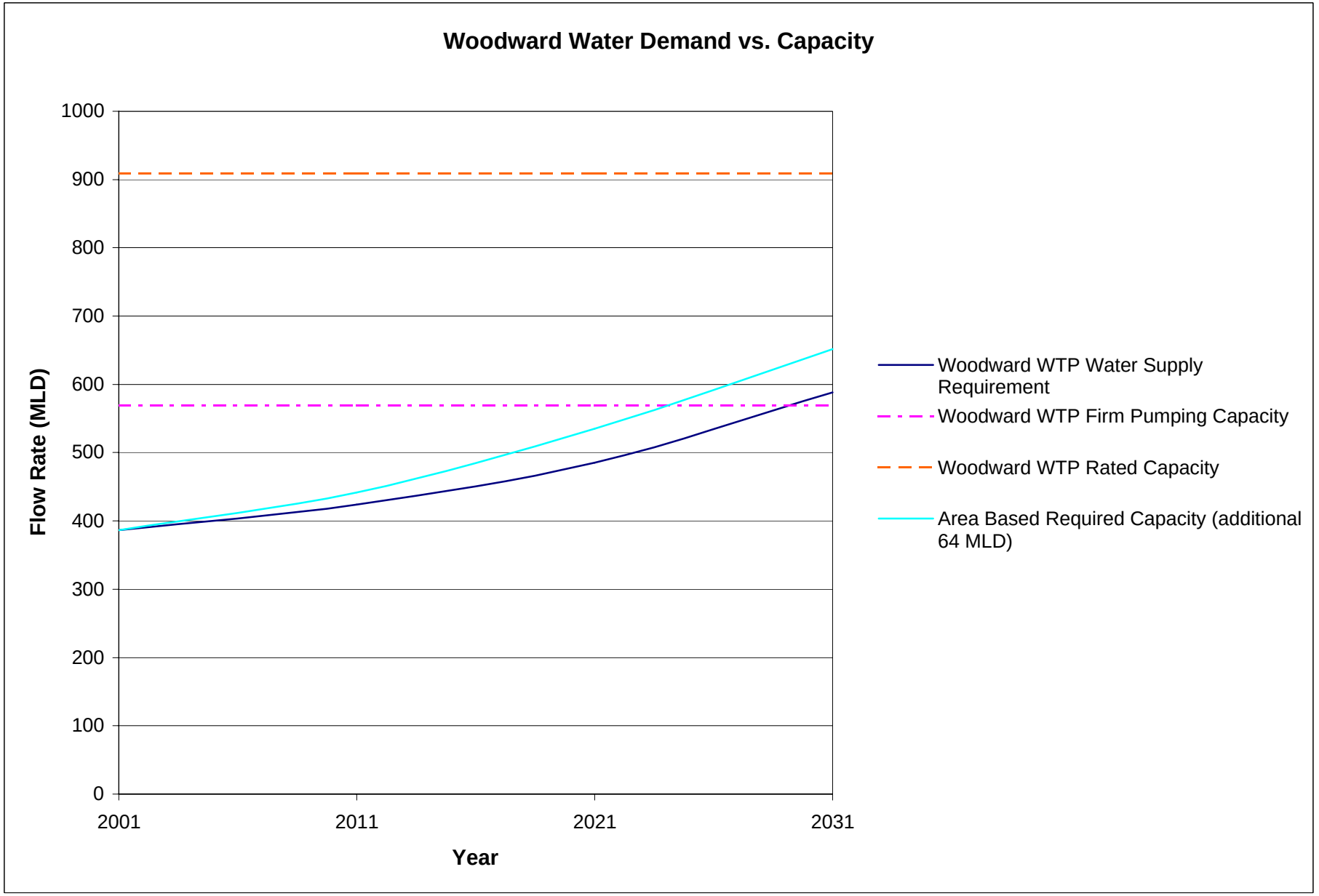
2590-D-85A

City of Hamilton Water and Wastewater Master Plan

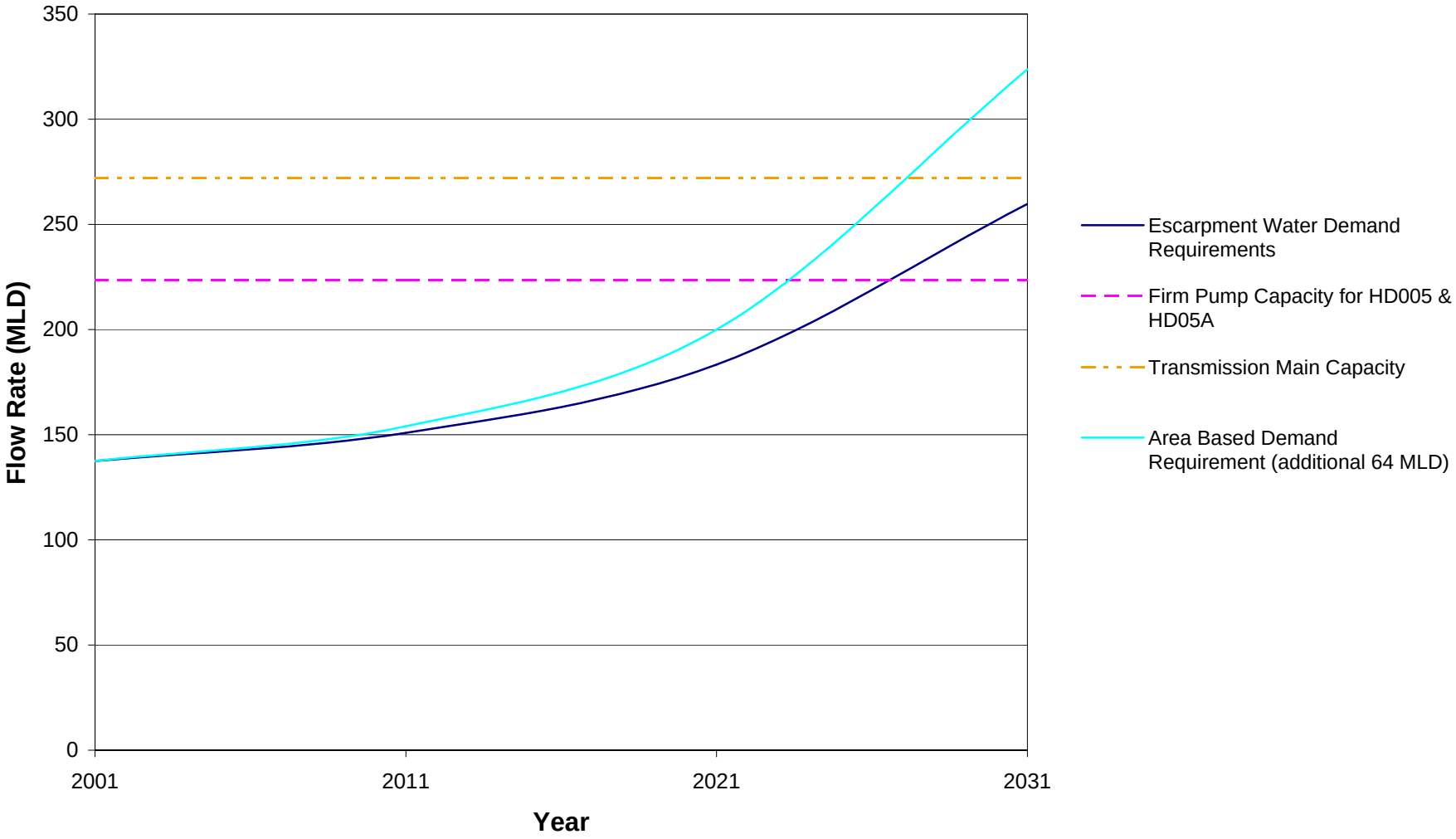
Report III - Master Plan Class EA Report

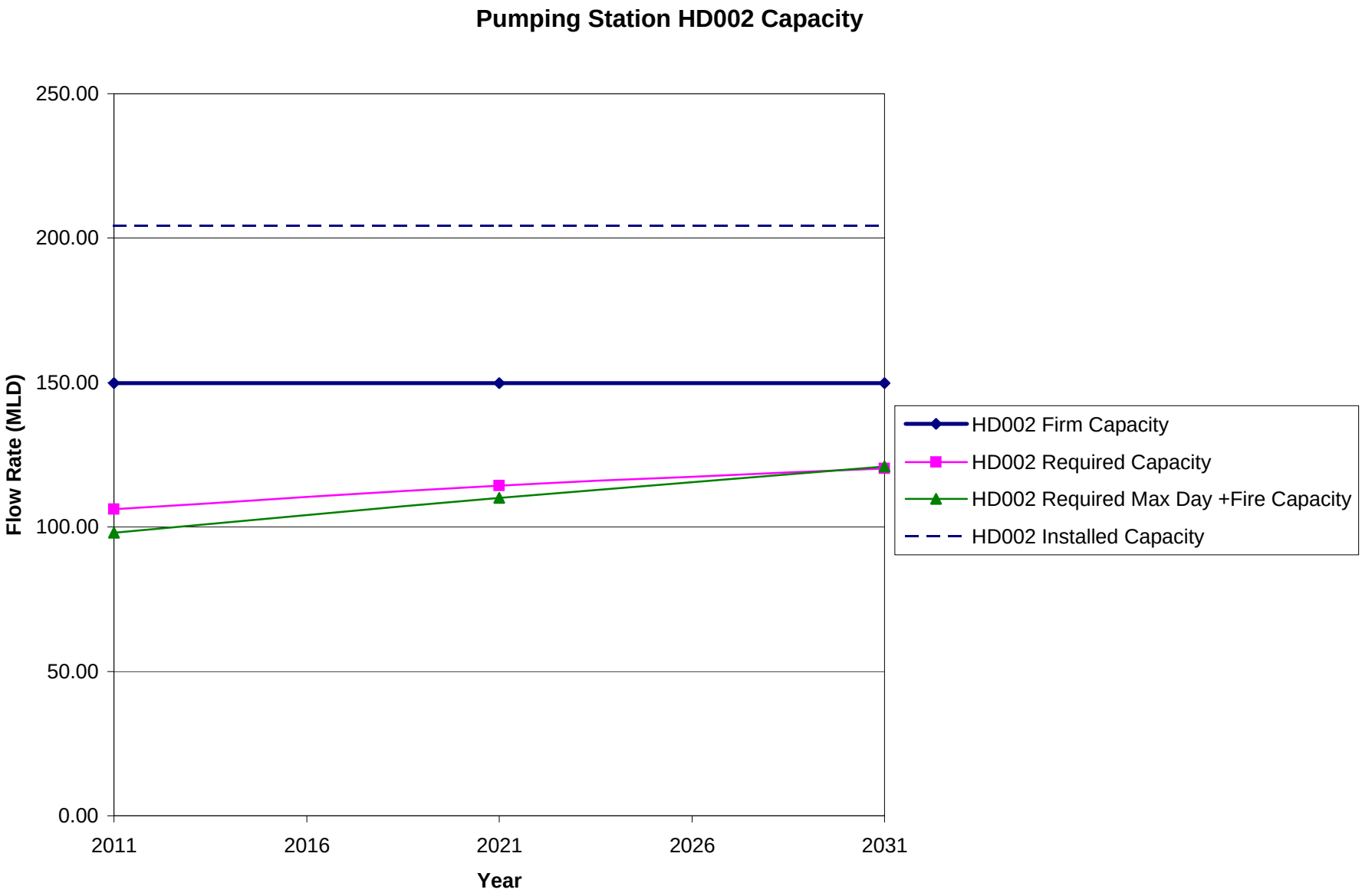
Appendix A-1 (06)

System Upgrade Requirements

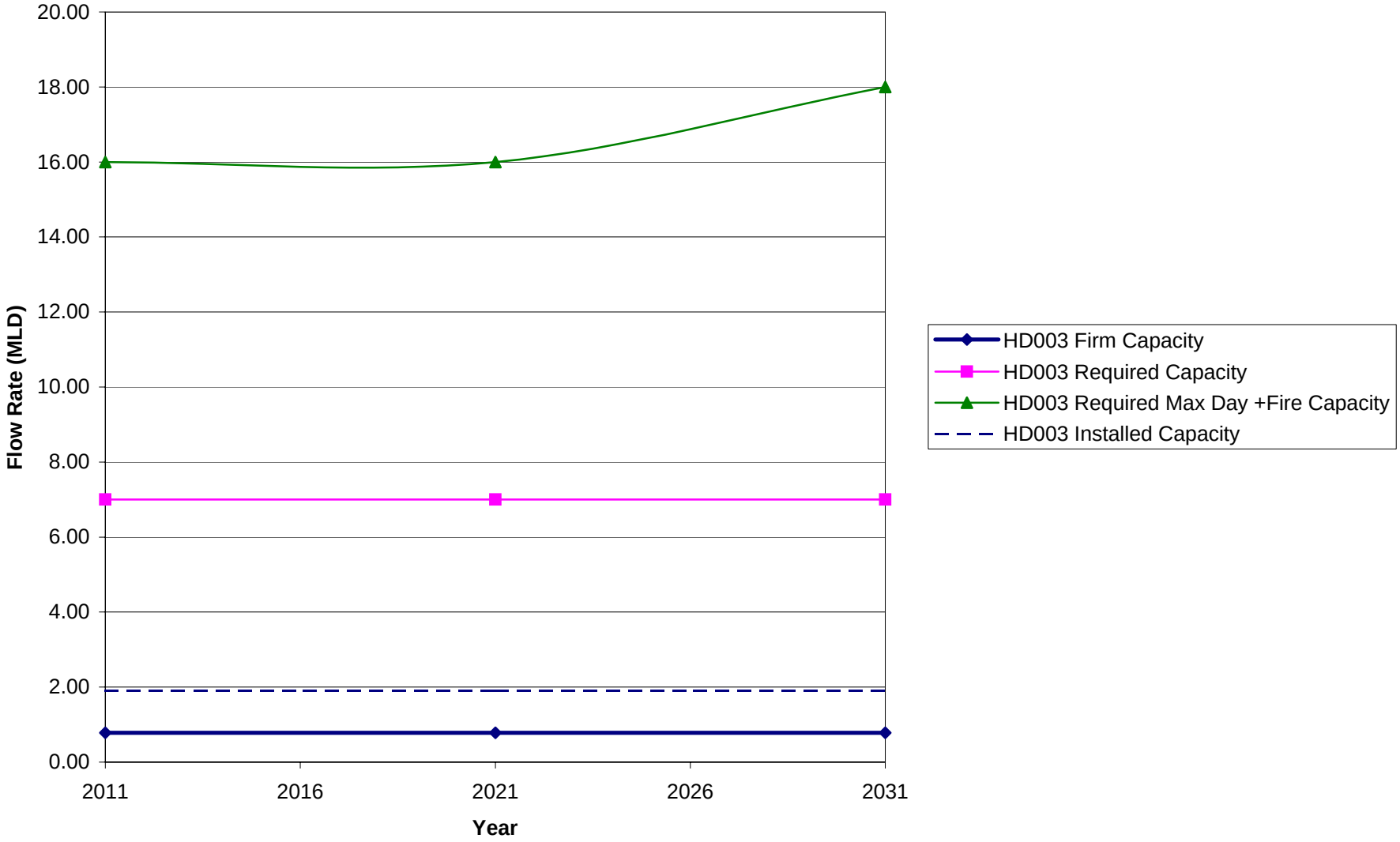

Woodward Water Demand vs. Capacity
Flow Rate (MLD)
1000
900
800
700
600
500
400
300
200
100
0
2001
2011
2021
2031
Year
Woodward WTP Water Supply Requirement
Woodward WTP Firm Pumping Capacity
Woodward WTP Rated Capacity
Area Based Required Capacity (additional 64 MLD)

Escarpment Water Demand vs. Capacity

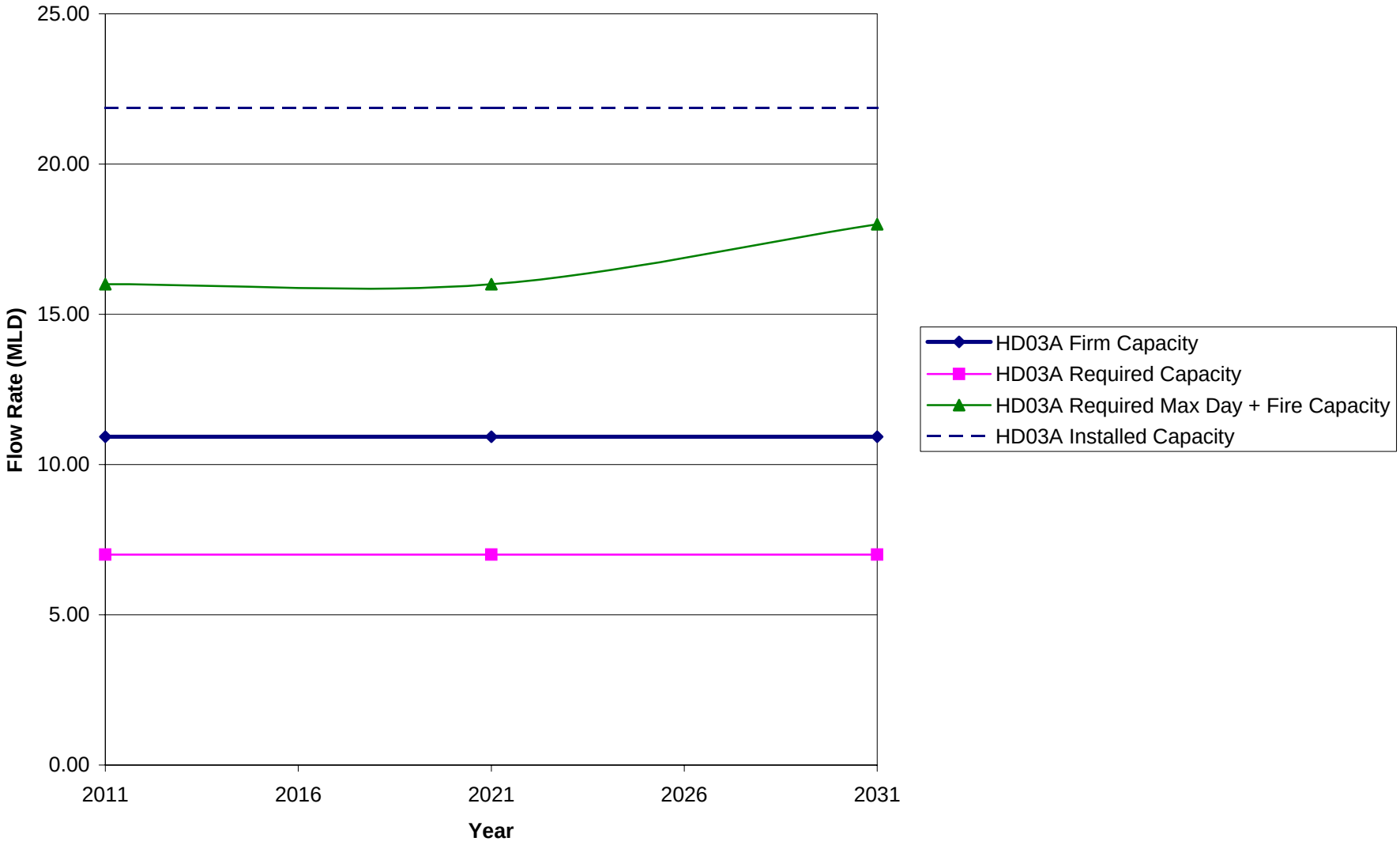



Pumping Station HD002 Capacity
250.00
200.00
150.00
100.00
50.00
0.00
Flow Rate (MLD)
2011
2016
2021
2026
2031
Year
HD002 Firm Capacity
HD002 Required Capacity
HD002 Required Max Day +Fire Capacity
HD002 Installed Capacity

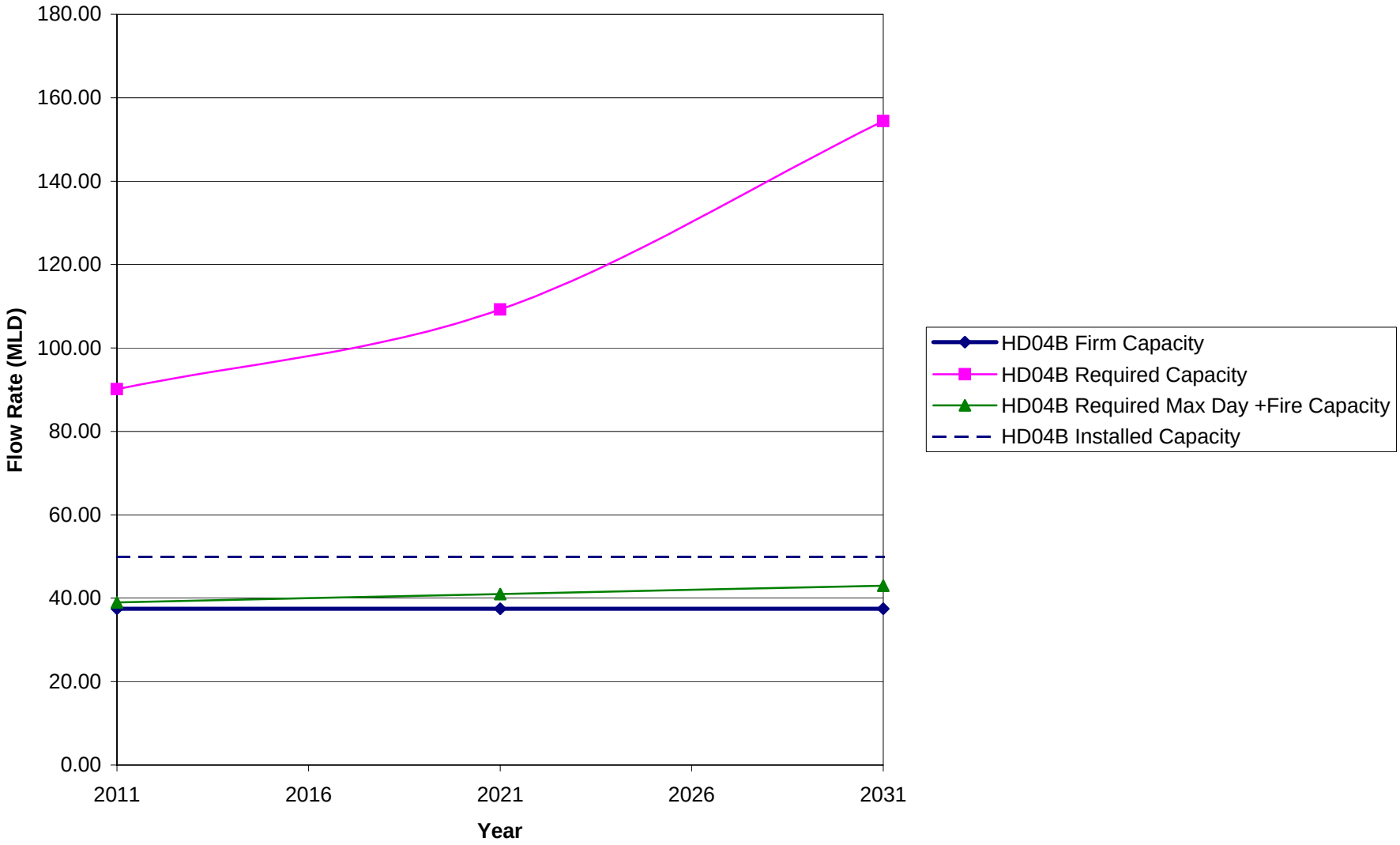
Pumping Station HD003 Capacity

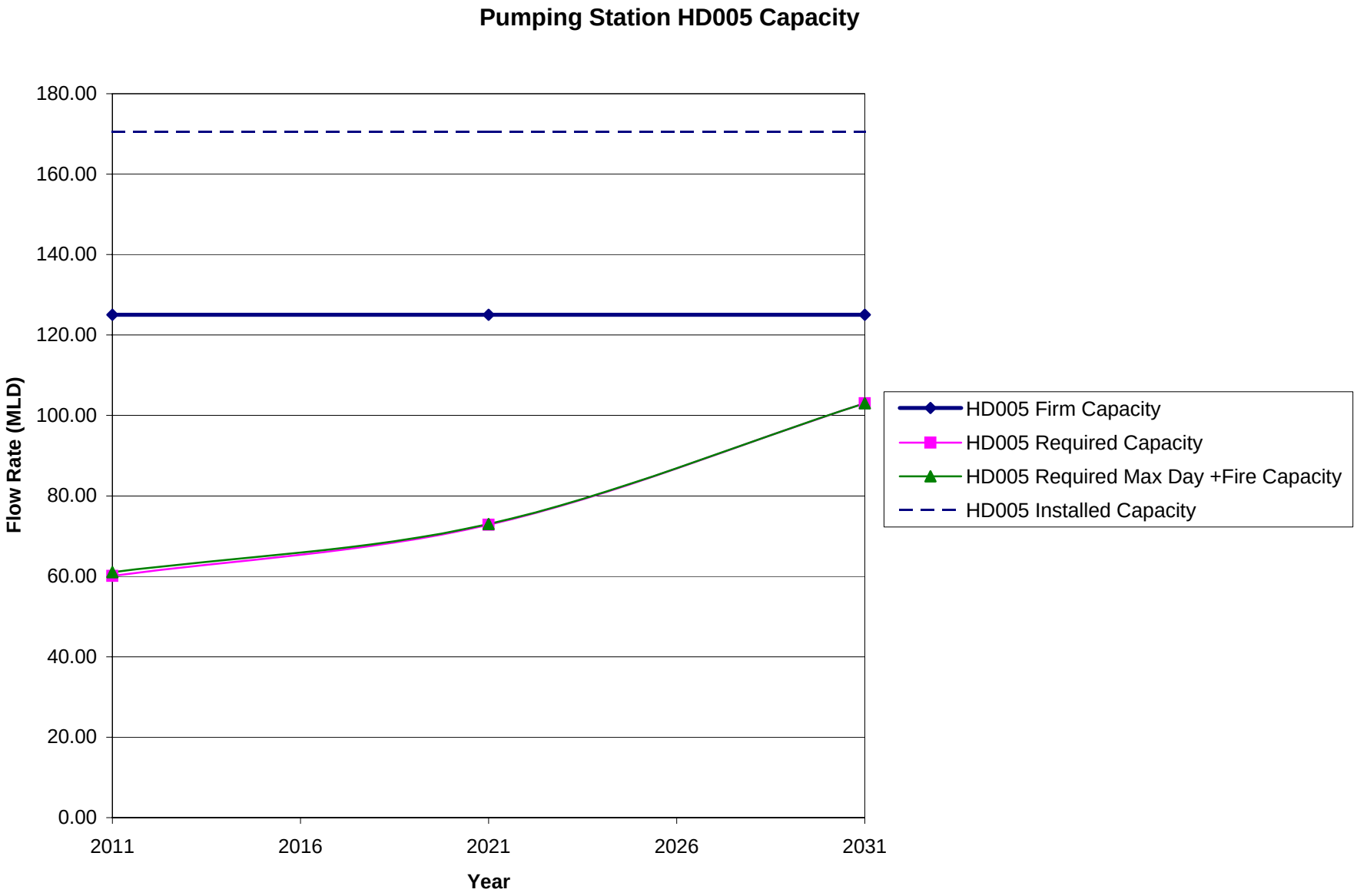


Pumping Station HD03A Capacity

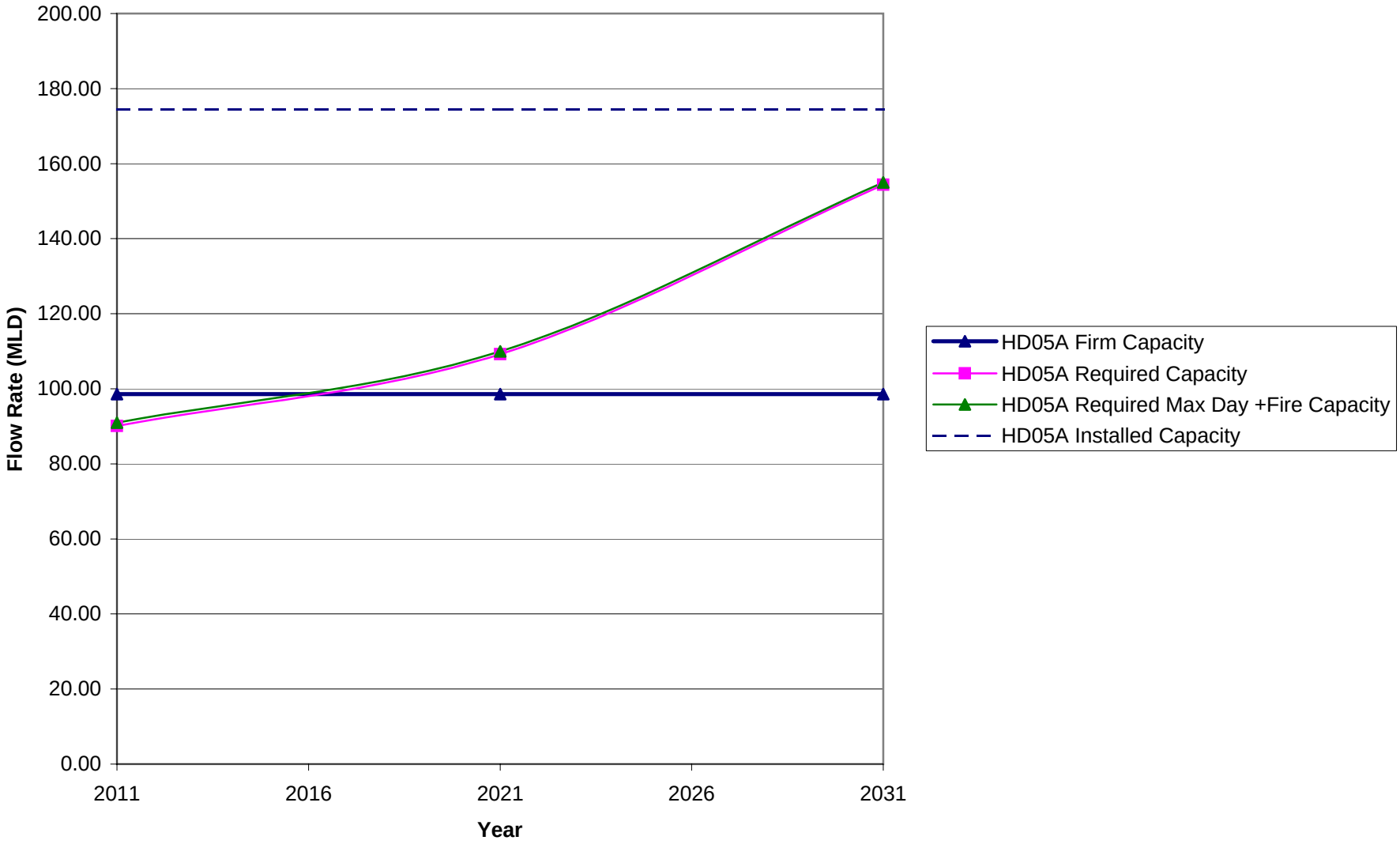


Pumping Station HD04B Capacity

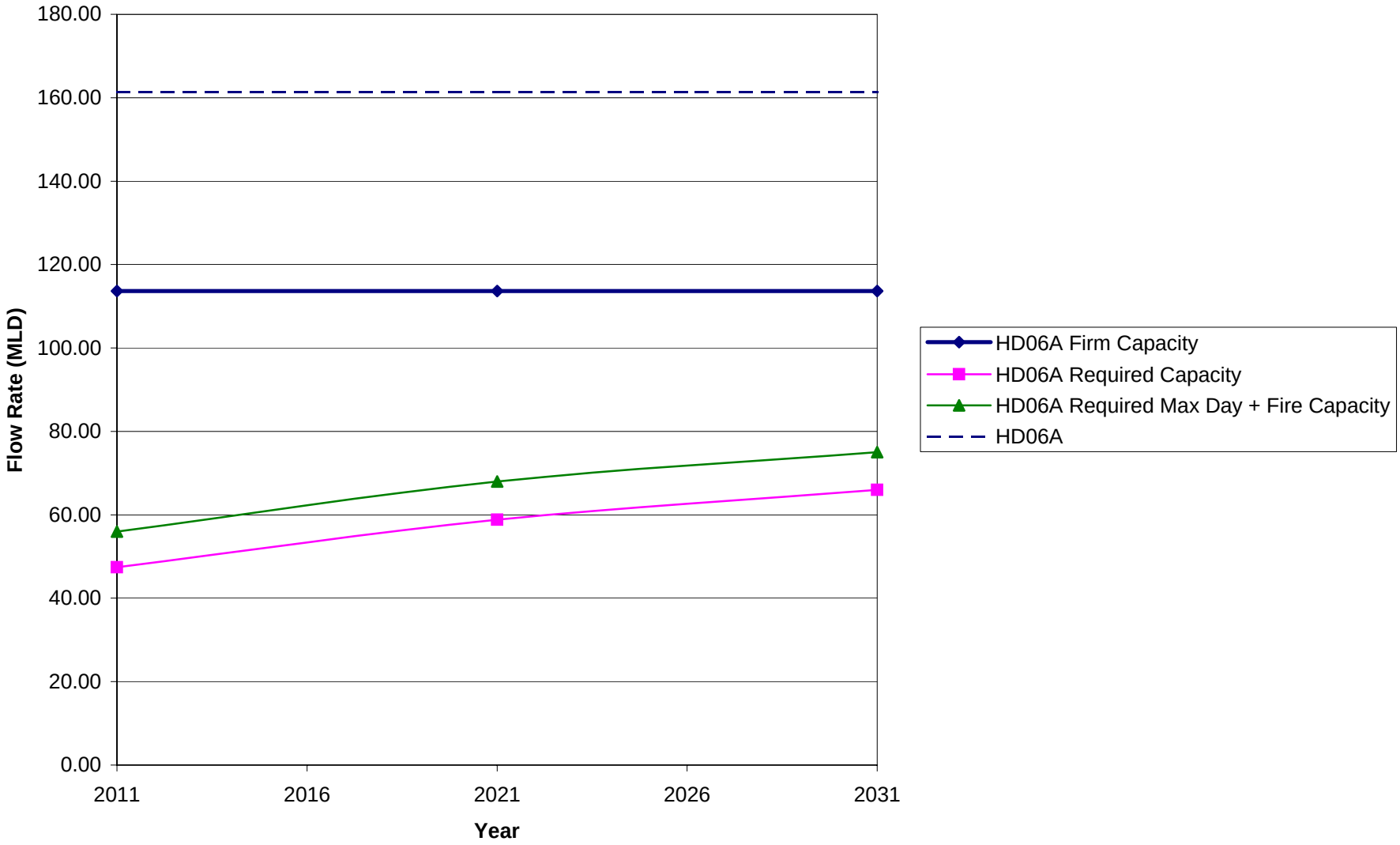



Pumping Station HD005 Capacity
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Flow Rate (MLD)
2011
2016
2021
2026
2031
Year
HD005 Firm Capacity
HD005 Required Capacity
HD005 Required Max Day +Fire Capacity
HD005 Installed Capacity

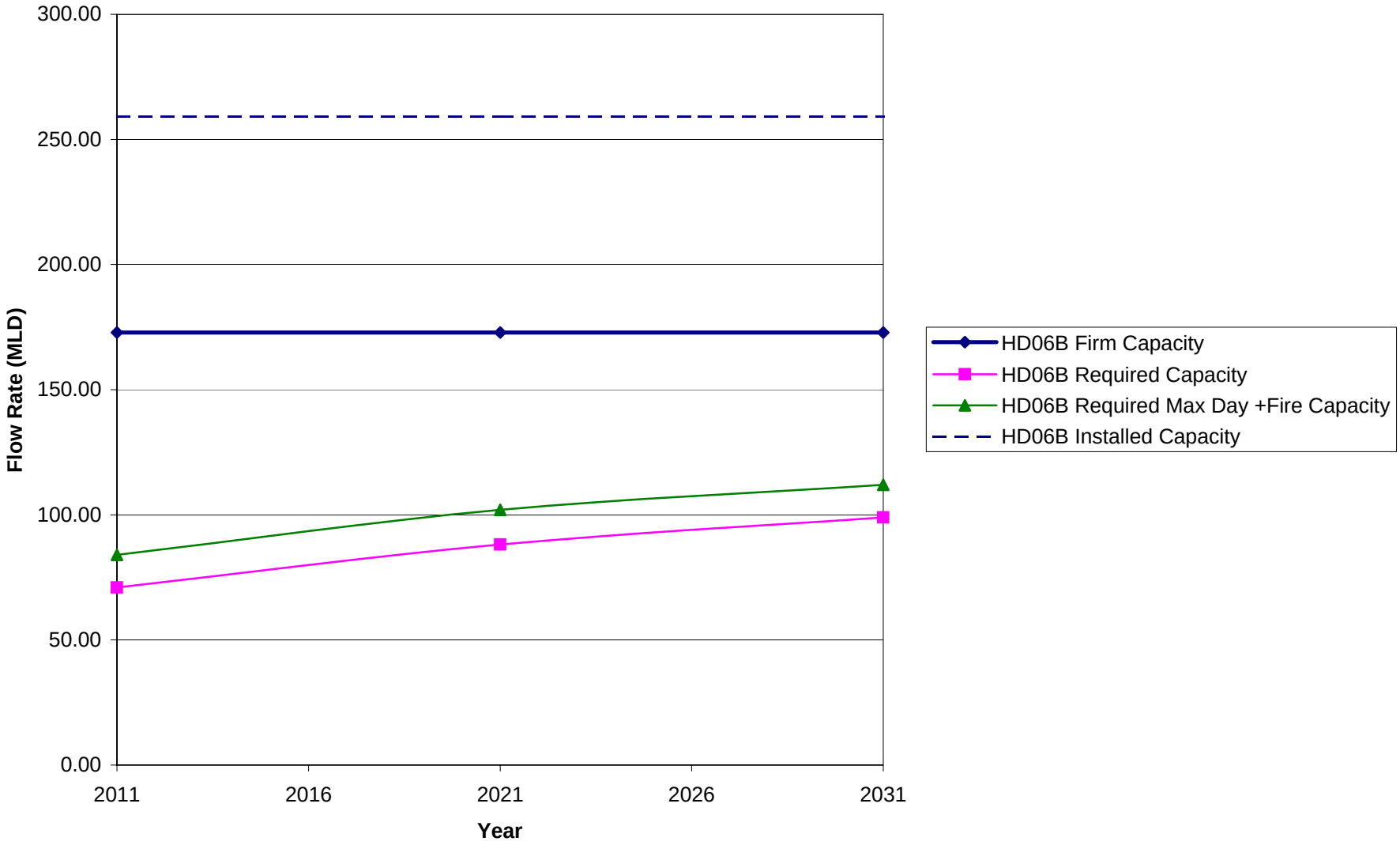
Pumping Station HD05A Capacity



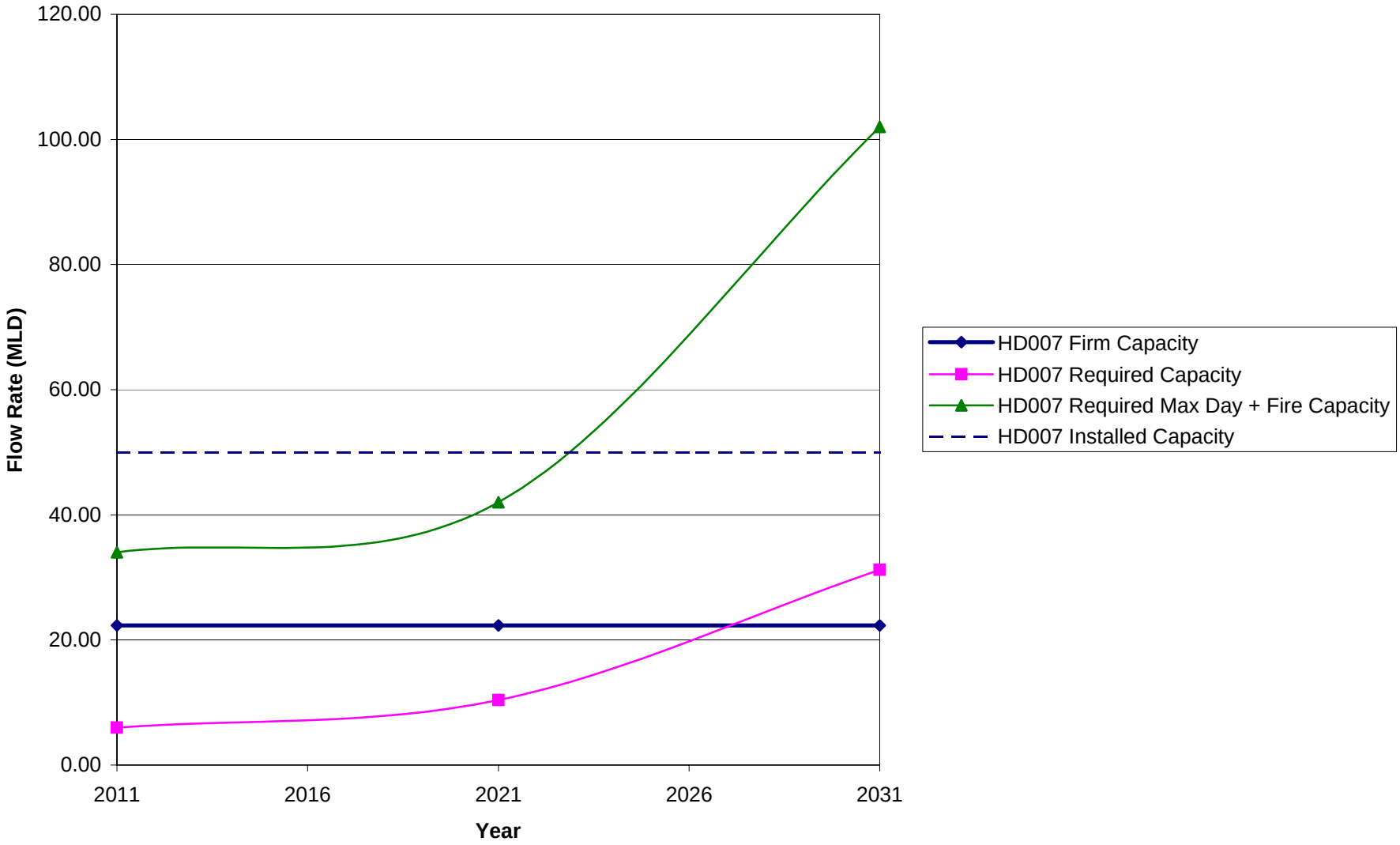
Pumping Station HD006A Capacity

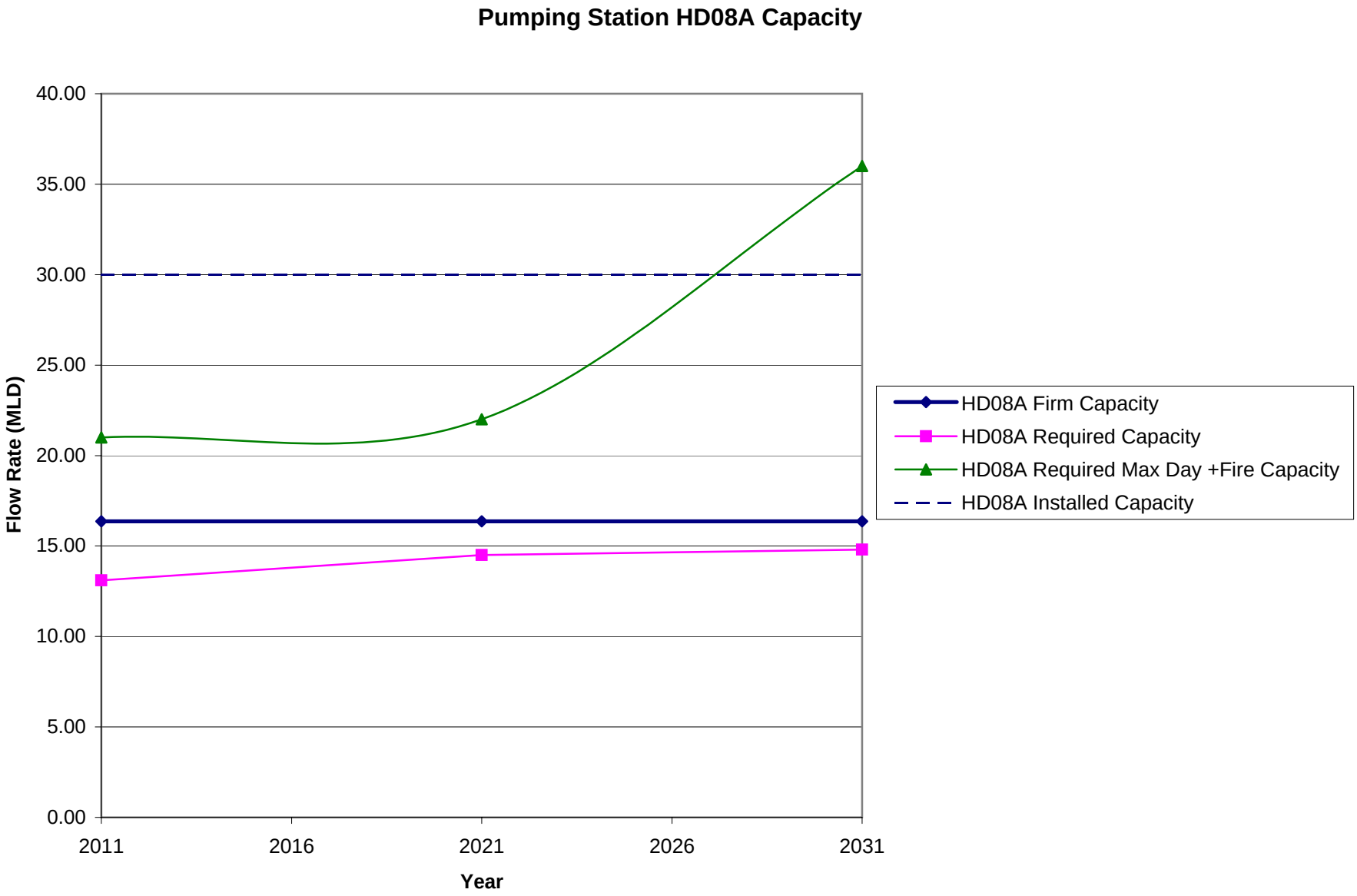


Pumping Station HD006B Capacity

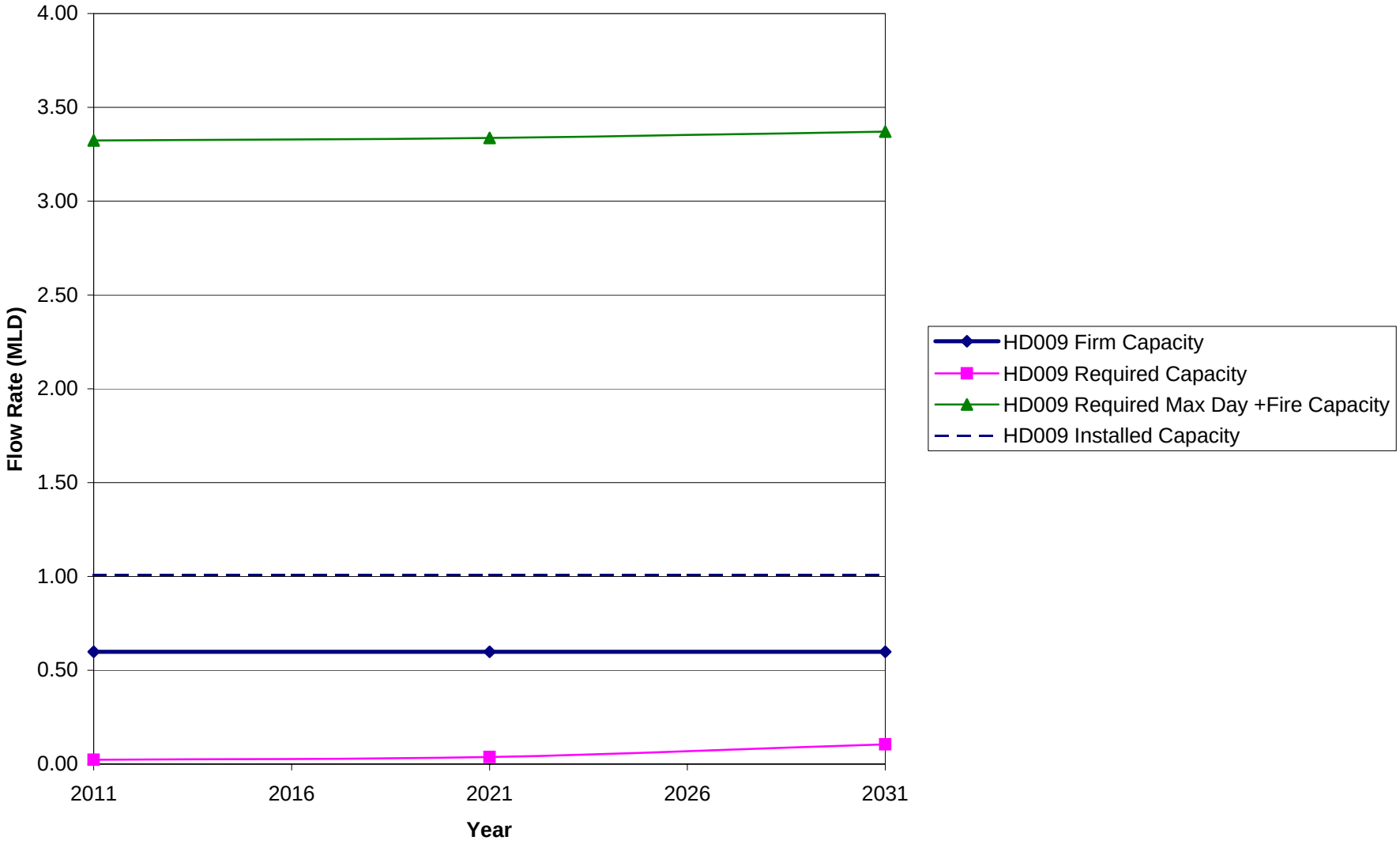


Pumping Station HD007 Capacity

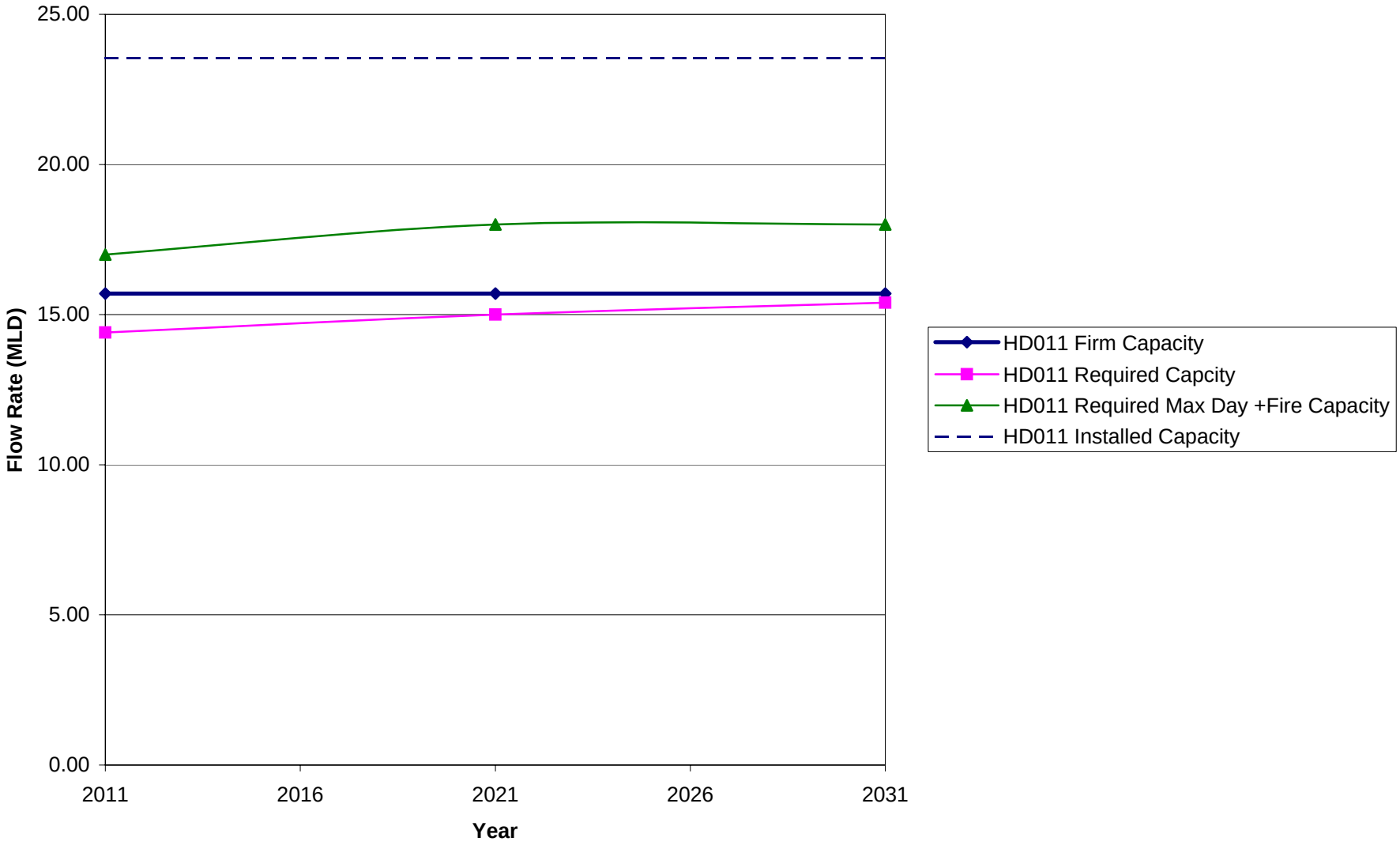



Pumping Station HD08A Capacity
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Flow Rate (MLD)
2011
2016
2021
2026
2031
Year
HD08A Firm Capacity
HD08A Required Capacity
HD08A Required Max Day +Fire Capacity
HD08A Installed Capacity

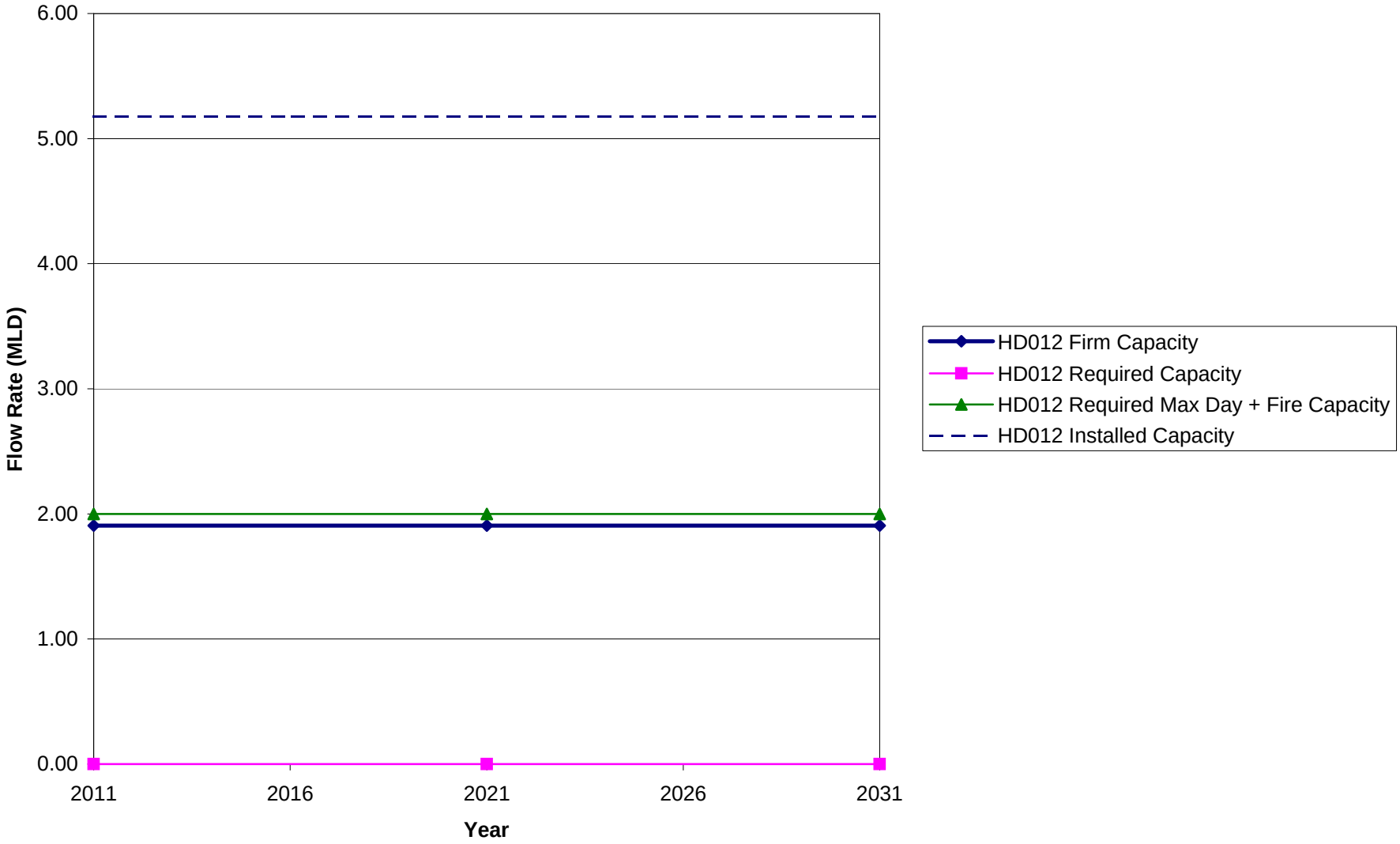
Pumping Station HD009 Capacity



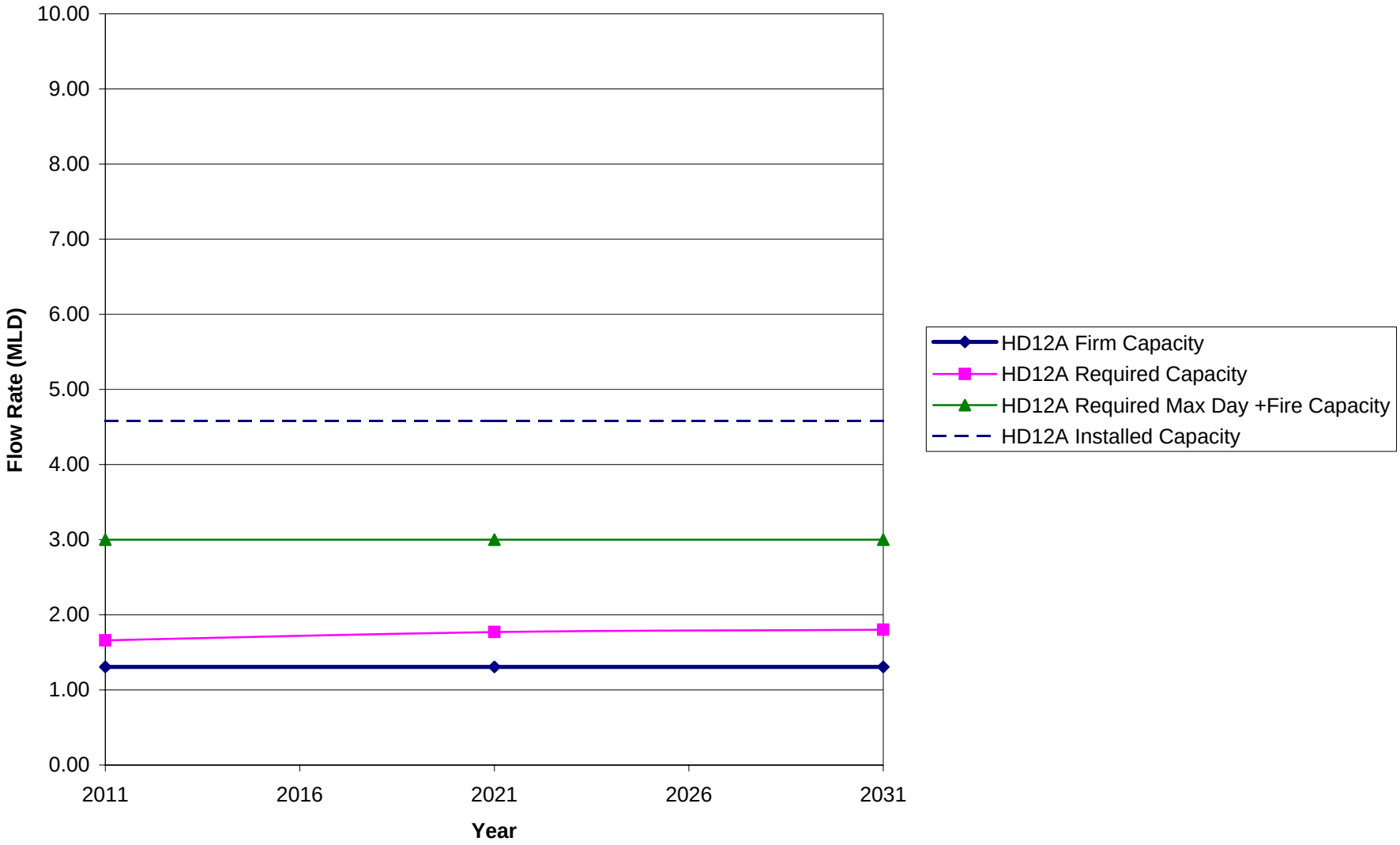
Pumping Station HD011 Capacity



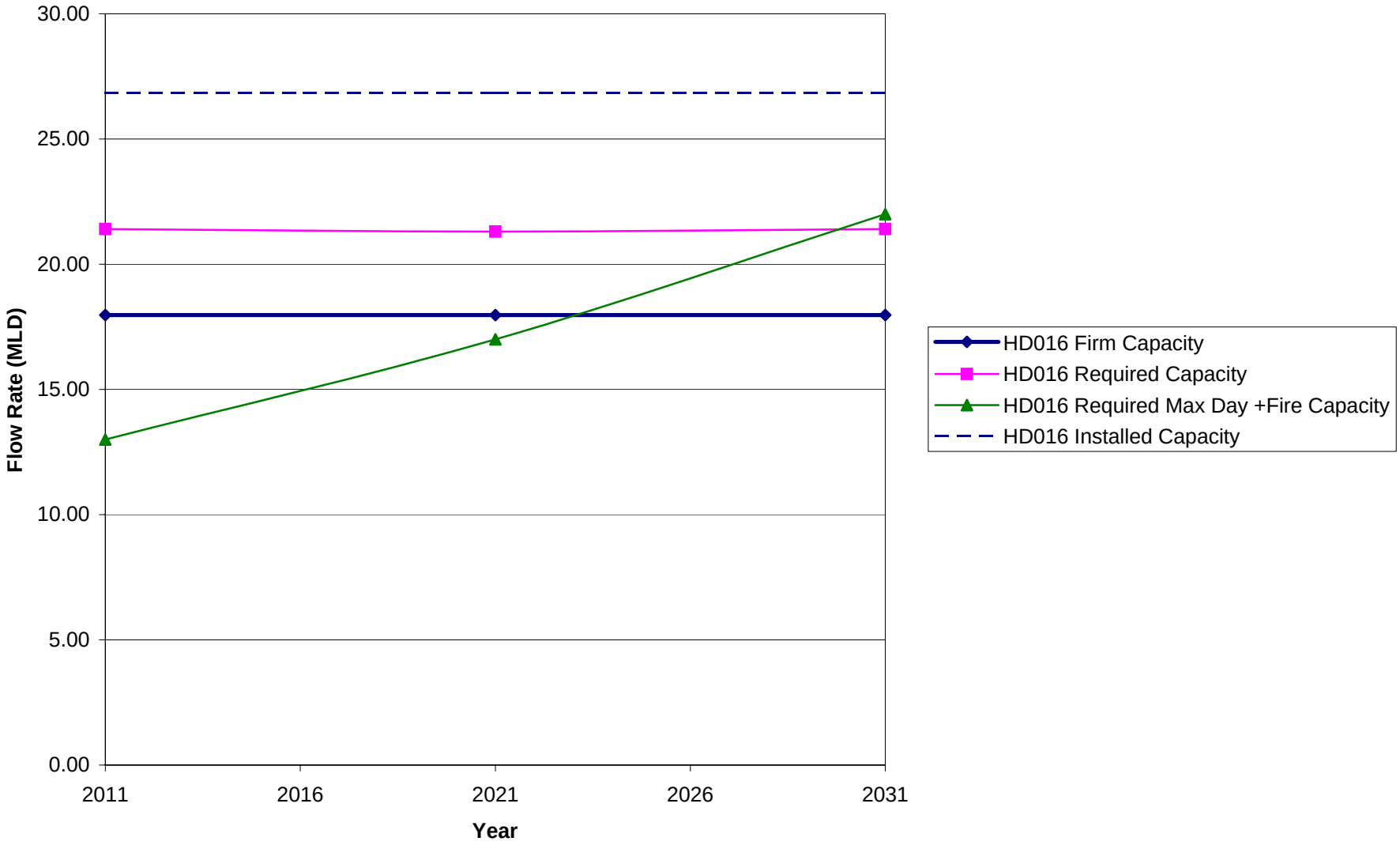
Pumping Station HD012 Capacity



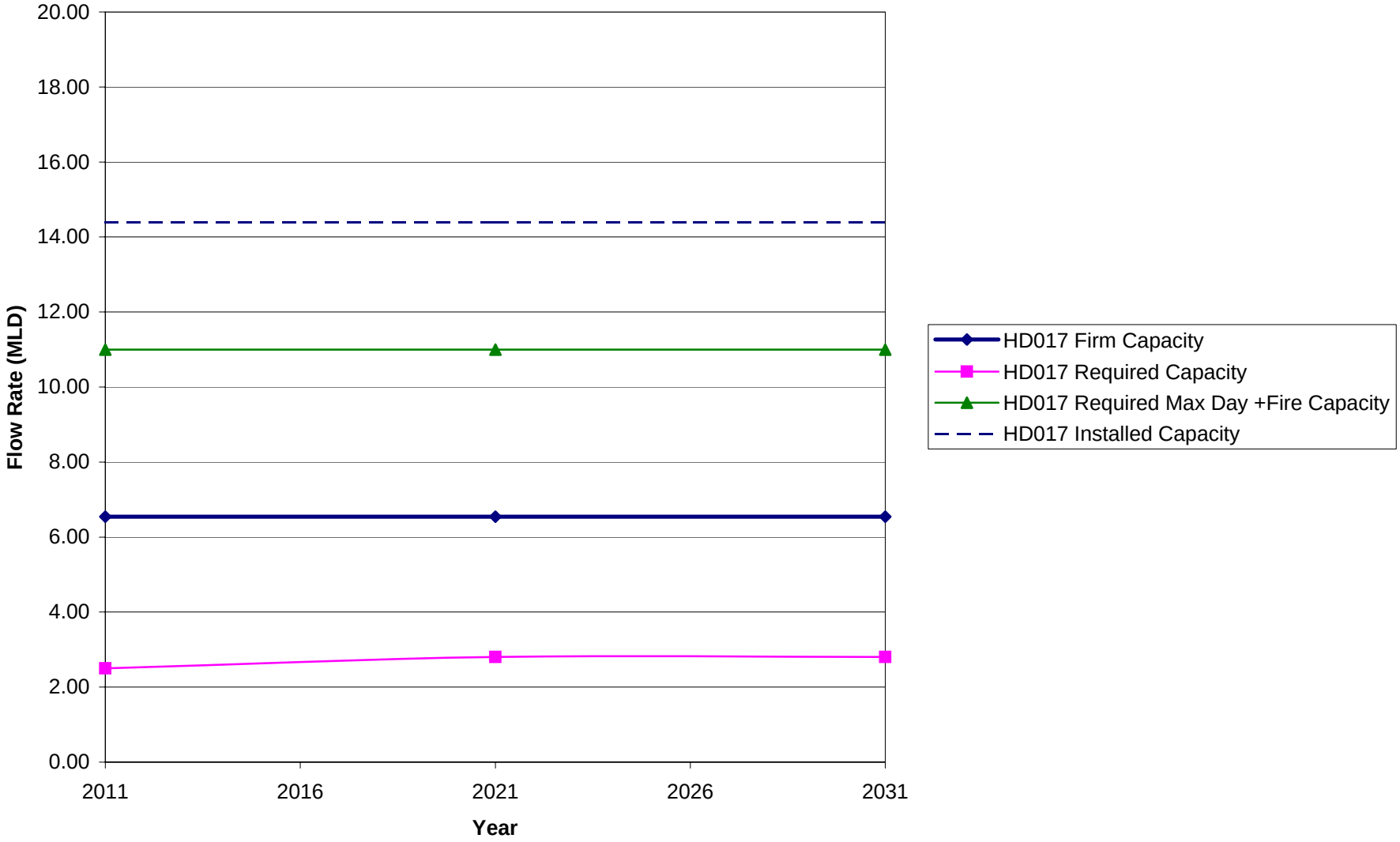
Pumping Station HD12A Capacity



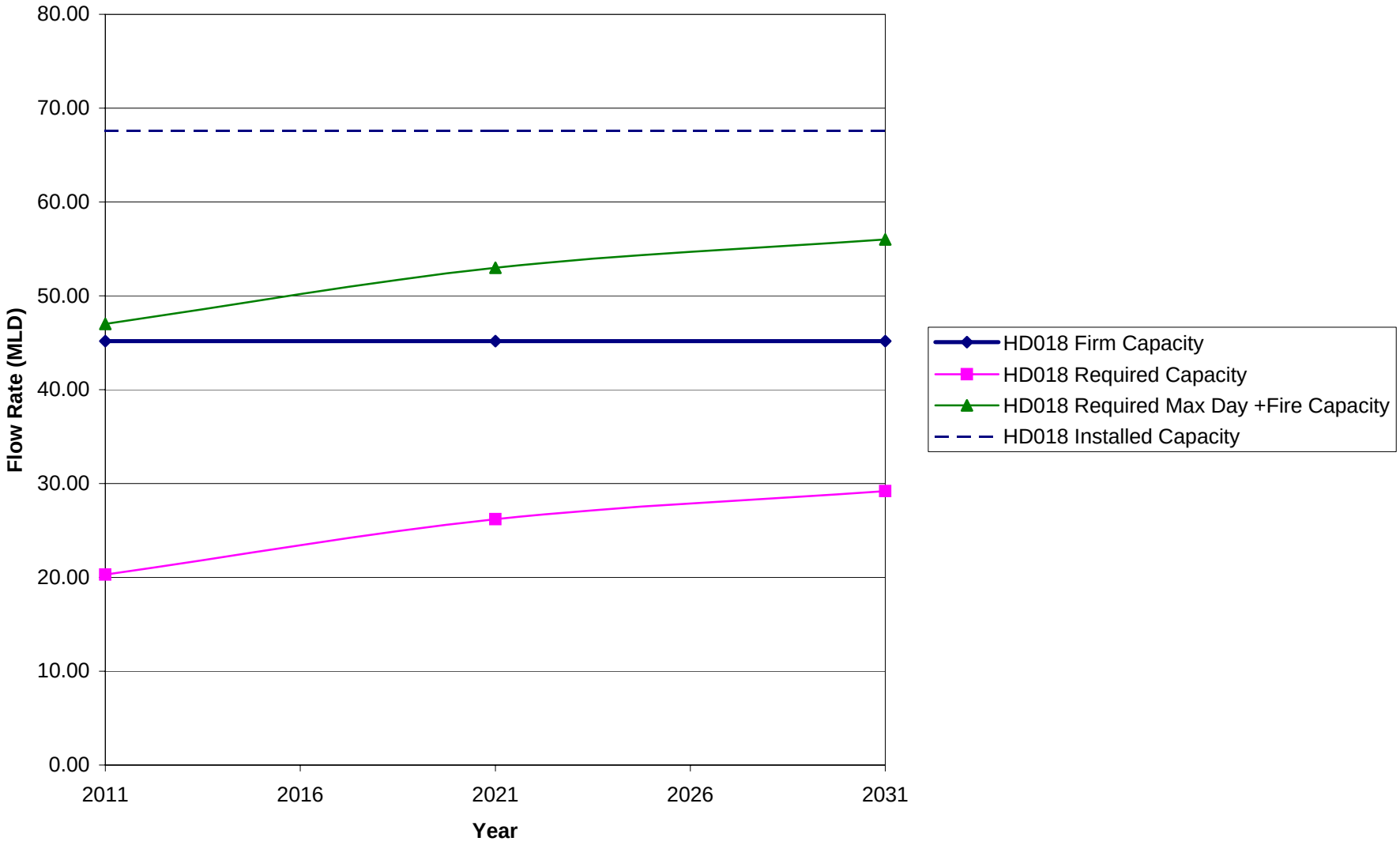
Pumping Station HD016 Capacity

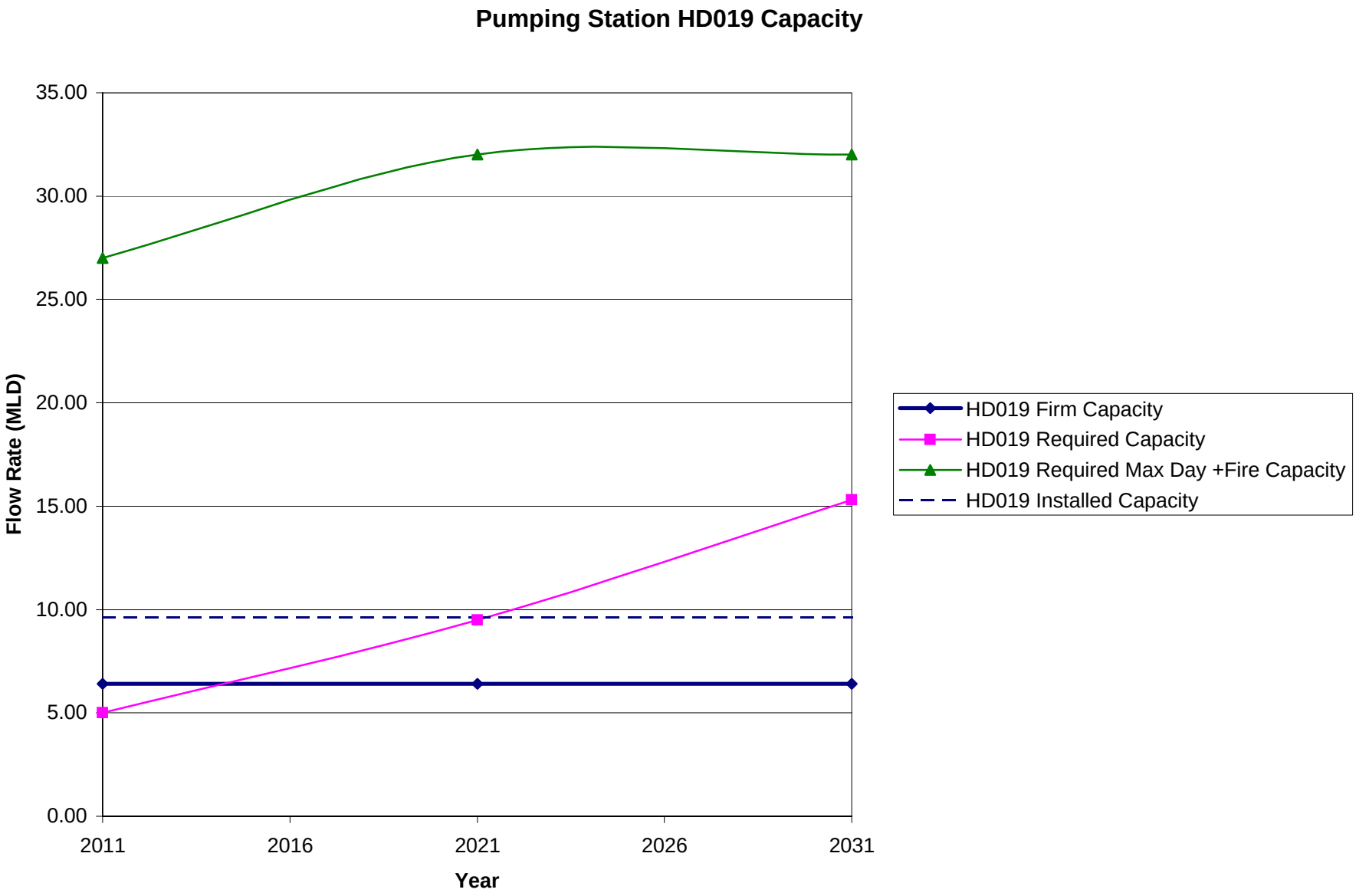


Pumping Station HD017 Capacity

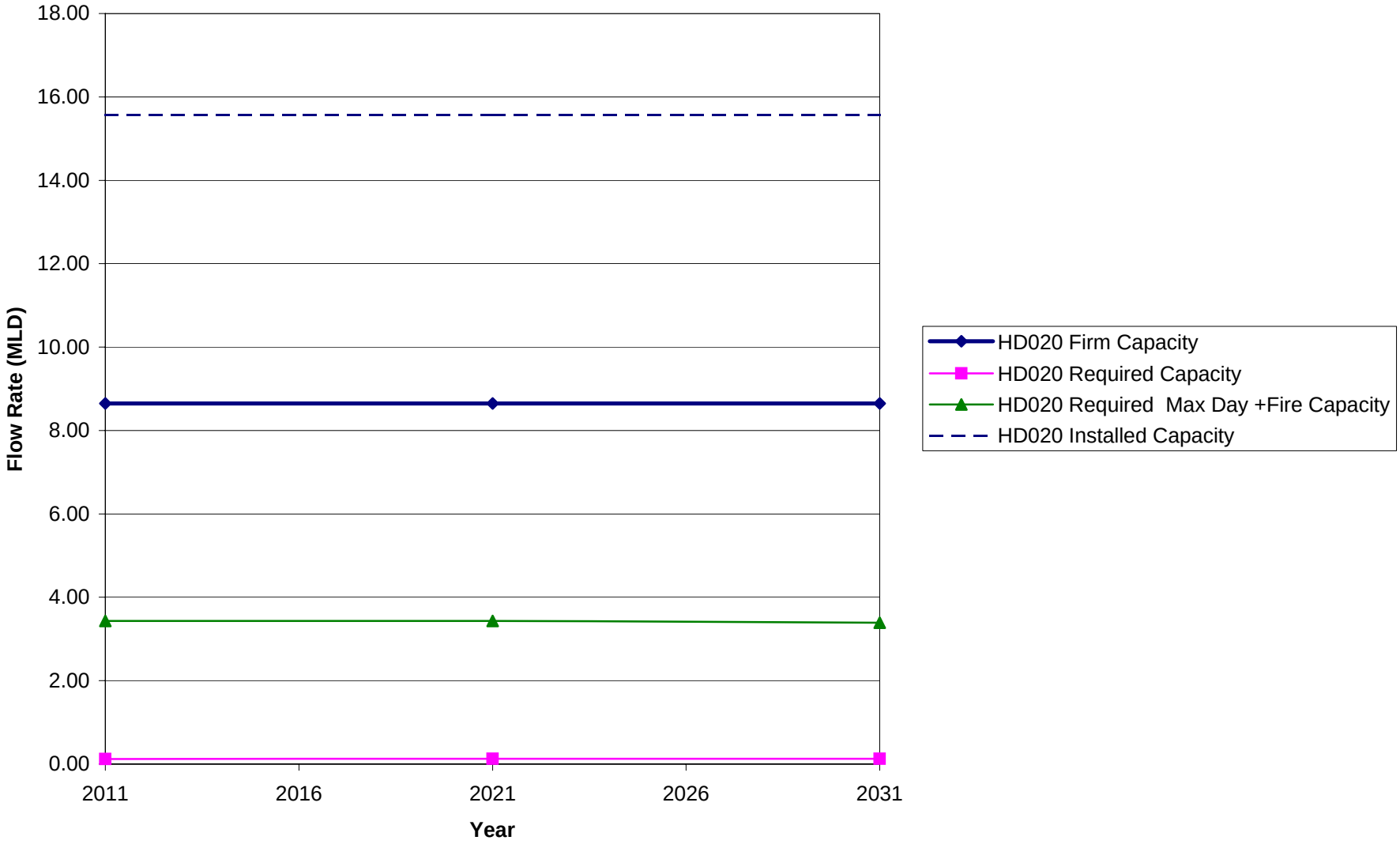


Pumping Station HD018 Capacity




Pumping Station HD019 Capacity
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Flow Rate (MLD)
2011
2016
2021
2026
2031
Year
HD019 Firm Capacity
HD019 Required Capacity
HD019 Required Max Day +Fire Capacity
HD019 Installed Capacity

Pumping Station HD020 Capacity



City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-1 (07)

Watermain Projects Alignment

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 3
Watermain

KMK Consultants Limited

22 NOV 06
1:10,000
2590-D-91

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

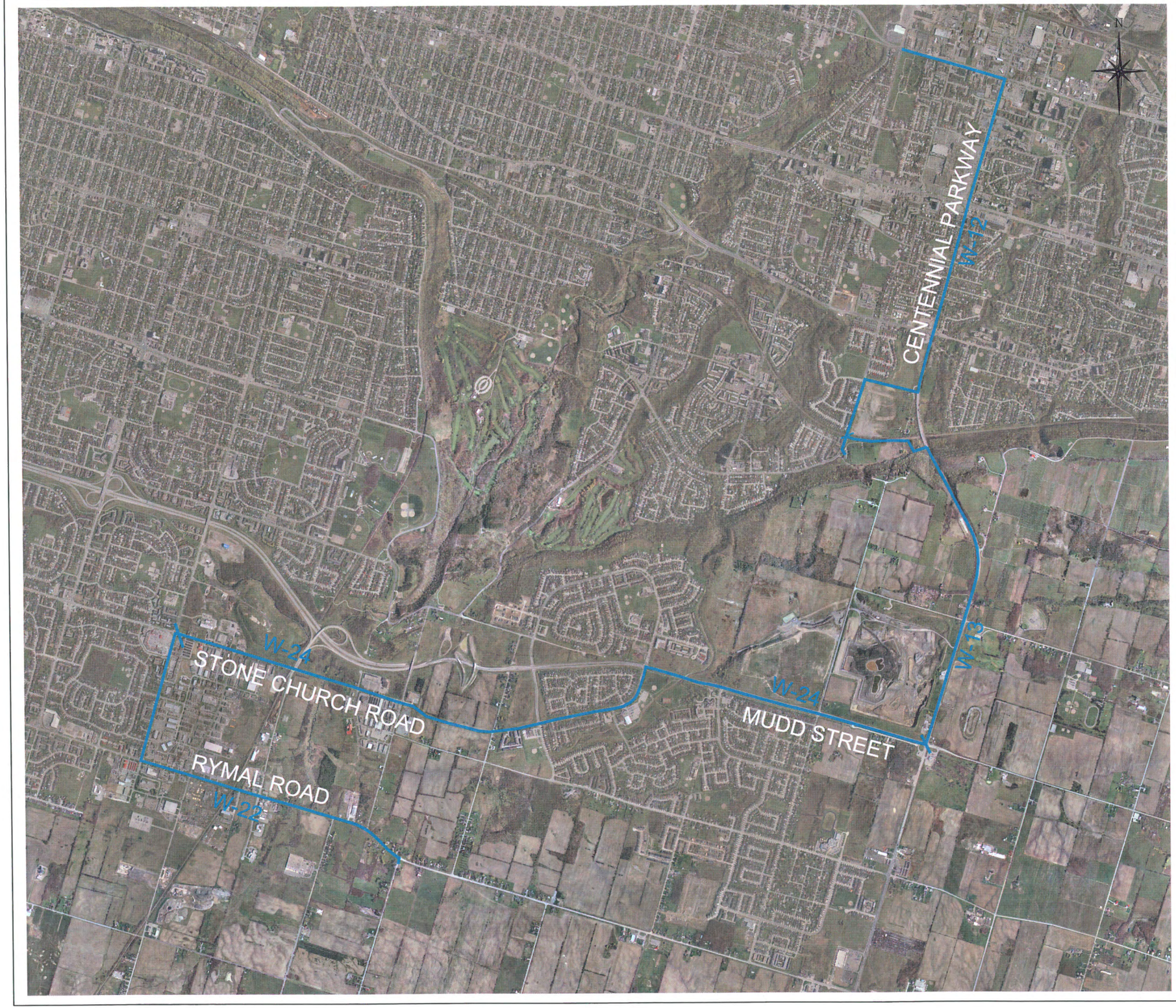
BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 9 & 27 Watermain

KMK Consultants Limited

22 NOV 06
1:30,000
2590-D-94



Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 12, 13, 22 & 24 Watermain

KMK Consultants Limited

22 NOV 06
1:30,000
2590-D-95

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 19 Watermain

KMK Consultants Limited

22 NOV 06
1:10,000
2590-D-93

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 25 Watermain

KMK Consultants Limited

22 NOV 06
1:10,000
2590-D-92

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Water Servicing

W - 30
Watermain

KMK Consultants Limited

22 NOV 06
1:20,000
2590-D-96

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2

Wastewater Servicing Analysis

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (01)

Projects WW-01 and WW-02

Twenty Road SPS (HC018)
and Forcemain Upgrades

KMK
220 Advance Boulevard, Brampton ON L6T 4J5
tel 905 459 4780 fax 905 459 7869 web www.kmk.ca

MEMORANDUM

To:	**City of Hamilton** Lisa De Angelis, Udo Ehrenberg
From:	**KMK Consultants Limited** Kevin Brown
CC:	Chris Hamel, KMK Consultants Limited
RE:	**Twenty Road Sewage Pumping Station**
Project:	Hamilton Water and Wastewater Master Plan
Date:	17 February 2006

The City has requested that KMK complete a capacity evaluation of the key wastewater servicing infrastructure associated with the Twenty Road Sewage Pumping Station (SPS).

The City provided KMK with the details on the existing infrastructure as well as SCADA data.

The Twenty Road SPS currently services an area generally bound by:

- Twenty Road to the north;
- Whitechurch Road to the South;
- Glancaster Road to the west; and,
- Upper James Street/Highway 6 to the east.

The Twenty Road SPS is experiencing excessive inflows during wet weather events, and is approaching or exceeding the existing design capacity. The station currently has two constant-speed pumps installed, with space to add a third.

The existing pumps are rated at 88 L/s each, according to a station summary report prepared by the City in the summer of 2001. KMK reviewed the pump manufacturer data for the Wemco-Hydrostal model F6K-H, 13.5-inch impellor, 1750 RPM pump. KMK also attempted to confirm the current operating point of the existing pumps by examining SCADA data from the period of December 18th 2005 through January 15th 2006, but no correlation between pump run times and station discharge could be determined. It is recommended that the City review how data is collected at this station.

As such, part of our analysis is based on our derived theoretical system curve and manufacturer pump curves. Under existing conditions with the existing 300 mm diameter forcemain, the existing and potential capacity of the SPS would be as follows:

- 130 L/s with one existing pump in operation;
- 170 L/s with both existing pumps in operation; and,
- 190 L/s with both existing and one future pump in operation.

Adding a third pump would therefore increase the firm capacity of the station from 130 L/s to 170 L/s. Due to the very high forcemain losses, however, the total capacity of the station would only increase from 170 L/s to 190 L/s. SCADA data have indicated that there have been periods when the two existing pumps were operating simultaneously, so adding a third pump would therefore not provide sufficient additional benefit under periods of excessive inflow.

Design drawings of the station indicate that provision was made for the eventual twinning of the existing 300 mm forcemain. Doing so would increase the station capacity, as the hydraulic losses would be reduced. Adding a third pump and twinning the forcemain would result in the following station capacities:

- 170 L/s with one pump in operation;
- 250 L/s with both pumps in operation (firm capacity); and,
- 290 L/s with all three pumps in operation (total capacity).

As noted from the potential capacities above, twinning the forcemain provides the greatest benefit under existing conditions as well as future conditions.

The recommendations to address the station limitations are as follows:

1. Install a twinned forcemain from the existing SPS to the existing MH HG22A050 on Upper James Street, north of Alderson Drive.

2. Install a third pump. It is recommended to have firm capacity between two pumps with a third pump as standby.

3. Inspect the existing appurtenances in the meter chamber. Based on the discrepancies with the SCADA data, it is recommended that installation of a flow meter and potentially a pressure gauge be considered.

The City could consider phasing the above noted recommendations with installation of the twinned forcemain as the first priority.

Based on review of the existing conditions of the SPS, it should be noted that space for the future third pump has been provided. However, the MCC does not appear to have made allowance for the third starter. Further review of the electrical impacts should be undertaken.

Approximate cost estimates for the upgrades are provided below:

• 900 m of 300 mm diameter forcemain ($400/m):	$360,000
• New pump and starter:	$90,000
• New flow meters:	$50,000
• Engineering and Contingency (10%):	$50,000
• **Total:**	**$550,000**

We trust the above summary is satisfactory. Should you have any comments or questions, please contact the undersigned or Chris Hamel.

Yours truly,

KMK CONSULTANTS LIMITED

-Kevin

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (02)

Projects WW-03, WW-04, and WW-05

Harmony Hall SPS (HC008)
and Forcemain Upgrades

KMK
220 Advance Boulevard, Brampton ON L6T 4J5
tel 905 459 4780 fax 905 459 7869 web www.kmk.ca

MEMORANDUM

To:	**City of Hamilton**
	Udo Ehrenberg
From:	**KMK Consultants Limited**
	Kevin Brown
cc:	Lisa De Angelis – City of Hamilton
	Chris Hamel – KMK Consultants Limited
Re:	**ORC Lands at Highway 6 and Highway 403**
Project:	**Hamilton Water and Wastewater System - Analysis Support**
Date:	September 25, 2006

Udo:

We have completed an analysis of the Southcote Road sewer in order to determine what upgrades would be required to service the ORC Lands southeast of the Highway 6 interchange on Highway 403.

Earlier this year, we performed a similar analysis for the Southcote Woodlands Development Application. This analysis assumed a population density of 3.0 persons/unit, and an average flow of 360 Lpcd. The analysis concluded that the existing Harmony Hall SPS, the existing forcemain, and the Southcote Road gravity sewer all had sufficient capacity for the proposed development of 150 units, but that the SPS would need to be upgraded to 18.9 L/s in order to accommodate the ultimate development of that site. These results were presented to the City in a memorandum dated February 17, 2006.

That earlier analysis did not consider the ultimate development of the ORC Lands immediately to the west of Southcote Woodlands, nor the undeveloped land to the South of Garner Road. At the time, it was assumed that these lands would ultimately drain to the west to the Calvin Street SPS. Since the City is planning on replacing the existing Harmony Hall SPS with a completely new facility, we have now expanded upon that earlier analysis to also include the ORC Lands.

According to the Draft Plan of Subdivision for the ORC Lands, 681 additional housing units are planned, including some mixed-use development adjacent to Garner Road and a school. The basis for the flow estimates are as follows:

- The residential flows were evaluated assuming an average flow of 360 Lpcd and a unit density of 3 persons/unit.
- An average flow allowance of 28 m^3/ha·d was included for the school and the commercial portion of the mixed-use area.
- An external infiltration allowance of 0.2L/s·ha was included.

The details of the design flow calculation are presented in Table 1.

KMK
220 Advance Boulevard, Brampton ON L6T 4J5
tel 905 459 4780 fax 905 459 7869 web www.kmk.ca

MEMORANDUM

Inclusion of the ORC Lands in the new SPS would result in a required firm capacity of 60.8 L/s. The existing sewage forcemain only has a capacity of 40 L/s, so it would also need to be replaced.

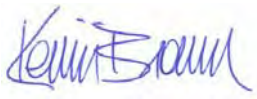
Our February 2006 memo indicated that the section of gravity sewer along Southcote Road immediately downstream of where the forcemain currently discharges has a capacity of only 60 L/s, and that the Southcote sewer will eventually be extended to service some additional properties to the south. An analysis of the entire stretch of gravity sewers was performed in order to assess the impact of any increased flows from the proposed SPS to the point where the gravity sewer discharges into the Wilson Street Trunk Sewer. These calculations are included in Table 2.

The sewer capacity analysis indicates that the first four sections of the Southcote Road sewer downstream of where the existing forcemain discharges would not have sufficient capacity to accept the increased SPS flows. These sections – totalling approximately 400 m in length – could be bypassed by extending an upgraded forcemain farther north on Southcote Road, to manhole AM10A003. The only other section of sewer where surcharging could be an issue is the 27 m section between manholes AM08A007 and AL08A001. The analysis indicates that design flows would exceed that pipe's capacity by approximately 22%.

A preliminary analysis of potential development south of Garner Road was also undertaken to determine whether there is any merit in servicing those lands through the Harmony Hall SPS. Based on the GRIDS planning projections, that additional catchment area – measuring 75.22 ha – could see an additional 1,000 jobs added between now and 2031. This would require an additional 27 L/s of firm pumping capacity (including the infiltration allowance) if these lands were also serviced through the Harmony Hall SPS. This additional flow would result in another two sections of downstream sewers requiring upgrades; 57 m between manholes AM09A008 and AM09A012, and 131 m between manholes AL08A049 and AL08A051

Replacing the three sections of undersized sewer that we have identified would cost approximately $300,000, and the new forcemain would cost approximately $500,000. These costs are in addition to the $3M that was identified in the Master Plan to replace the existing Harmony Hall SPS.

While we have not performed a full analysis of the required upgrades in order to service the ORC Lands and the lands south of Garner Road through the Calvin Street SPS, we anticipate that constructing a new sewer under Highway 6 and upgrading the Calvin Street SPS and its receiving sewers would prove to be even more costly.



-Kevin

KMK
220 Advance Boulevard, Brampton ON L6T 4J5
tel 905 459 4780 fax 905 459 7869 web www.kmk.ca

MEMORANDUM

Table 1 – Wastewater Flow to the Harmony Hall Pumping Station

		Existing Serviced Development	Existing and Southcote Woodlands	Existing, Southcote Woodlands and ORC Lands
Number of Residential Units				
	Existing Development	30	30	30
	Southcote Woodlands – Ultimate	0	186	186
	ORC Lands - Ultimate	0	0	681
	TOTAL	**30**	**216**	**897**
Commercial/Institutional Development				
	School	0	0	2.50 ha
	Mixed-Use Commercial	0	0	1.30 ha
	TOTAL	**0**	**0**	**3.80 ha**
Design Population				
	Population (Assuming 3 persons/unit)	90	648	2,691
Design Flow				
	Average Residential Flow (360 Lpcd)	0.38 L/s	2.70 L/s	11.21 L/s
	Average ICI Flow (28 m^3/ha-d)	0	0	1.23 L/s
	Peaking Factor, M=5/[(C/1000)^0.2]	5.0	5.0	4.1
	Domestic Peak Flow	1.9 L/s	13.5 L/s	51.0 L/s
	Area	6.36 ha	26.97 ha	49.01 ha
	External Infiltration (Area x 0.2 L/ha/s)	1.3 L/s	5.4 L/s	9.8 L/s
TOTAL PEAK FLOW, (G) + (I)		**3.2 L/s**	**18.9 L/s**	**60.8 L/s**

City of Hamilton
Sanitary Sewer Design

Location: Southcote Sewer - Harmony Hall SPS Upgraded to 60.8 L/s
Project #: KMK 2874.01
Checked by: KCB
Computed by: MZ
Date: 25-Sep-06

Design Flow Factor, F= 0.00417 L/s (equivalent to 360 Lpcd)
Infiltration Factor, F_I= 0.2 L/s/ha
Maximum Allowable Flow= 100 % of sewer's design capacity
Maximum Velocity= 3.0 m/s
Minimum Velocity= 0.6 m/s

	Location	Area Number	From MH	To MH	Pop Density (pers/ha)	Area (ha)		Population		Peaking Factor	Sanitary Flow (L/s)		Infiltration Flow (L/s)	Additional Flow (L/s)	Total Flow (L/s)	Proposed Sewer Design						Check Design	
						Incremental	Cumulative	Incremental	Cumulative		Average	Peak				Dia. (mm)	Grade (%)	Mann. N	Velocity (m/s)	Qd Full (L/s)	% Capacity	Velocity	Capacity
1	Harmony Hall FM	AM11	PS02	L002	0	0.001	0.00	0	0	5.00	0.00	0.00	0.00	60.80	60.80	200	1.00	0.015	0.90	28.43	214	OK	UNDER
2	Southcote Road	AN10	A002	A001	62	10.53	10.53	653	653	5.00	2.72	13.61	2.11	0.00	76.52	250	1.20	0.015	1.15	56.46	136	OK	UNDER
3	"	AN10	A001	A001	62	0.96	11.49	60	712	5.00	2.97	14.85	2.30	0.00	77.95	250	0.96	0.015	1.03	50.50	154	OK	UNDER
4	"	AM10	A001	A002	60	3.32	14.81	199	912	5.00	3.80	19.01	2.96	0.00	82.77	300	0.45	0.015	0.80	56.23	147	OK	UNDER
5	"	AM10	A002	A003	60	0.78	15.59	47	958	5.00	4.00	19.98	3.12	0.00	83.90	300	0.61	0.015	0.93	65.46	128	OK	UNDER
6	"	AM10	A003	A004	60	0.77	16.36	46	1005	5.00	4.19	20.93	3.27	0.00	85.00	350	1.00	0.015	1.31	126.43	67	OK	OK
7	"	AM10	A004	A005	60	0.62	16.98	37	1042	4.96	4.34	21.54	3.40	0.00	85.74	350	1.11	0.015	1.38	133.21	64	OK	OK
8	"	AM10	A005	A001	60	12.66	29.64	760	1801	4.44	7.51	33.39	5.93	0.00	100.12	525	0.50	0.015	1.22	263.59	38	OK	OK
9	"	AM09	A001	A002	62	4.21	33.85	261	2062	4.33	8.60	37.21	6.77	0.00	104.78	525	0.39	0.015	1.08	232.79	45	OK	OK
10	"	AM09	A002	A079	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	525	1.42	0.015	2.05	444.21	24	OK	OK
11	"	AM09	A079	A003	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	450	1.42	0.015	1.85	294.48	36	OK	OK
12	"	AM09	A003	A004	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	450	0.37	0.015	0.95	150.32	70	OK	OK
13	"	AM09	A004	A005	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	450	0.34	0.015	0.91	144.10	73	OK	OK
14	"	AM09	A005	A006	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	525	0.38	0.015	1.06	229.79	46	OK	OK
15	"	AM09	A006	A007	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	104.78	450	0.33	0.015	0.89	141.96	74	OK	OK
16	Dorval Drive	AM09	A007	A008	60	4.08	37.93	245	2307	4.23	9.62	40.70	7.59	0.00	109.08	450	0.53	0.015	1.13	179.91	61	OK	OK
17	"	AM09	A008	A012	60	5.05	42.98	303	2610	4.13	10.88	44.92	8.60	0.00	114.32	450	0.24	0.015	0.76	121.07	94	OK	OK
18	Elm Hill Boulevard	AM09	A012	A011	60	0.89	43.87	53	2664	4.11	11.11	45.65	8.77	0.00	115.23	375	1.15	0.015	1.48	162.97	71	OK	OK
19	"	AM09	A011	A009	60	0.24	44.11	14	2678	4.11	11.17	45.85	8.82	0.00	115.47	375	0.97	0.015	1.36	149.68	77	OK	OK
20	"	AM09	A009	A005	60	1.02	45.13	61	2739	4.09	11.42	46.69	9.03	0.00	116.51	375	0.96	0.015	1.35	148.90	78	OK	OK
21	"	AM08	A005	A006	60	0.81	45.94	49	2788	4.07	11.63	47.35	9.19	0.00	117.34	375	1.05	0.015	1.41	155.73	75	OK	OK
22	Golf Links Road	AM08	A006	A007	60	3.26	49.20	196	2983	4.02	12.44	49.99	9.84	0.00	120.63	450	0.58	0.015	1.18	188.20	64	OK	OK
23	"	AM08	A007	A001	0	0.00	49.20	0	2983	4.02	12.44	49.99	9.84	0.00	120.63	450	0.16	0.015	0.62	98.85	122	OK	UNDER
24	"	AL08	A001	A020	60	13.24	62.44	794	3778	3.83	15.75	60.38	12.49	0.00	133.67	450	1.00	0.015	1.55	247.12	54	OK	OK
25	"	AL09	A020	A019	60	0.50	62.94	30	3808	3.83	15.88	60.76	12.59	0.00	134.15	525	0.21	0.015	0.79	170.82	79	OK	OK
26	"	AL09	A019	A015	60	9.82	72.76	589	4397	3.72	18.34	68.18	14.55	0.00	143.53	525	0.34	0.015	1.00	217.36	66	OK	OK
27	Easement	AL09	A015	A014	60	9.93	82.69	596	4993	3.62	20.82	75.47	16.54	0.00	152.81	600	0.92	0.013	2.08	589.02	26	OK	OK
28	"	AL09	A014	A048	0	1.34	84.03	0	4993	3.62	20.82	75.47	16.81	0.00	153.08	600	0.19	0.013	0.95	267.68	57	OK	OK
29	"	AL08	A048	A049	23	5.34	89.37	123	5116	3.61	21.33	76.95	17.87	0.00	155.63	600	0.17	0.013	0.90	253.20	61	OK	OK
30	"	AL08	A049	A051	0	3.88	93.25	0	5116	3.61	21.33	76.95	18.65	0.00	156.40	600	0.07	0.013	0.57	162.47	96	LOW	OK
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City of Hamilton
Sanitary Sewer Design

Location: Southcote Sewer - Harmony Hall SPS Upgraded to 87.8 L/s
Project #: KMK 2874.01
Checked by: KCB
Computed by: MZ
Date: 25-Sep-06

Design Flow Factor, F= 0.00417 L/s (equivalent to 360 Lpcd)
Infiltration Factor, F_I= 0.2 L/s/ha
Maximum Allowable Flow= 100 % of sewer's design capacity
Maximum Velocity= 3.0 m/s
Minimum Velocity= 0.6 m/s

	Location	Area Number	From MH	To MH	Pop Density (pers/ha)	Area (ha)		Population		Peaking Factor	Sanitary Flow (L/s)		Infiltration Flow (L/s)	Additional Flow (L/s)	Total Flow (L/s)	Proposed Sewer Design						Check Design	
						Incremental	Cumulative	Incremental	Cumulative		Average	Peak				Dia. (mm)	Grade (%)	Mann. N	Velocity (m/s)	Qd Full (L/s)	% Capacity	Velocity	Capacity
1	Harmony Hall FM	AM11	PS02	L002	0	0.001	0.00	0	0	5.00	0.00	0.00	0.00	87.80	87.80	200	1.00	0.015	0.90	28.43	309	OK	UNDER
2	Southcote Road	AN10	A002	A001	62	10.53	10.53	653	653	5.00	2.72	13.61	2.11	0.00	103.52	250	1.20	0.015	1.15	56.46	183	OK	UNDER
3	"	AN10	A001	A001	62	0.96	11.49	60	712	5.00	2.97	14.85	2.30	0.00	104.95	250	0.96	0.015	1.03	50.50	208	OK	UNDER
4	"	AM10	A001	A002	60	3.32	14.81	199	912	5.00	3.80	19.01	2.96	0.00	109.77	300	0.45	0.015	0.80	56.23	195	OK	UNDER
5	"	AM10	A002	A003	60	0.78	15.59	47	958	5.00	4.00	19.98	3.12	0.00	110.90	300	0.61	0.015	0.93	65.46	169	OK	UNDER
6	"	AM10	A003	A004	60	0.77	16.36	46	1005	5.00	4.19	20.93	3.27	0.00	112.00	350	1.00	0.015	1.31	126.43	89	OK	OK
7	"	AM10	A004	A005	60	0.62	16.98	37	1042	4.96	4.34	21.54	3.40	0.00	112.74	350	1.11	0.015	1.38	133.21	85	OK	OK
8	"	AM10	A005	A001	60	12.66	29.64	760	1801	4.44	7.51	33.39	5.93	0.00	127.12	525	0.50	0.015	1.22	263.59	48	OK	OK
9	"	AM09	A001	A002	62	4.21	33.85	261	2062	4.33	8.60	37.21	6.77	0.00	131.78	525	0.39	0.015	1.08	232.79	57	OK	OK
10	"	AM09	A002	A079	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	525	1.42	0.015	2.05	444.21	30	OK	OK
11	"	AM09	A079	A003	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	450	1.42	0.015	1.85	294.48	45	OK	OK
12	"	AM09	A003	A004	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	450	0.37	0.015	0.95	150.32	88	OK	OK
13	"	AM09	A004	A005	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	450	0.34	0.015	0.91	144.10	91	OK	OK
14	"	AM09	A005	A006	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	525	0.38	0.015	1.06	229.79	57	OK	OK
15	"	AM09	A006	A007	0	0.00	33.85	0	2062	4.33	8.60	37.21	6.77	0.00	131.78	450	0.33	0.015	0.89	141.96	93	OK	OK
16	Dorval Drive	AM09	A007	A008	60	4.08	37.93	245	2307	4.23	9.62	40.70	7.59	0.00	136.08	450	0.53	0.015	1.13	179.91	76	OK	OK
17	"	AM09	A008	A012	60	5.05	42.98	303	2610	4.13	10.88	44.92	8.60	0.00	141.32	450	0.24	0.015	0.76	121.07	117	OK	UNDER
18	Elm Hill Boulevard	AM09	A012	A011	60	0.89	43.87	53	2664	4.11	11.11	45.65	8.77	0.00	142.23	375	1.15	0.015	1.48	162.97	87	OK	OK
19	"	AM09	A011	A009	60	0.24	44.11	14	2678	4.11	11.17	45.85	8.82	0.00	142.47	375	0.97	0.015	1.36	149.68	95	OK	OK
20	"	AM09	A009	A005	60	1.02	45.13	61	2739	4.09	11.42	46.69	9.03	0.00	143.51	375	0.96	0.015	1.35	148.90	96	OK	OK
21	"	AM08	A005	A006	60	0.81	45.94	49	2788	4.07	11.63	47.35	9.19	0.00	144.34	375	1.05	0.015	1.41	155.73	93	OK	OK
22	Golf Links Road	AM08	A006	A007	60	3.26	49.20	196	2983	4.02	12.44	49.99	9.84	0.00	147.63	450	0.58	0.015	1.18	188.20	78	OK	OK
23	"	AM08	A007	A001	0	0.00	49.20	0	2983	4.02	12.44	49.99	9.84	0.00	147.63	450	0.16	0.015	0.62	98.85	149	OK	UNDER
24	"	AL08	A001	A020	60	13.24	62.44	794	3778	3.83	15.75	60.38	12.49	0.00	160.67	450	1.00	0.015	1.55	247.12	65	OK	OK
25	"	AL09	A020	A019	60	0.50	62.94	30	3808	3.83	15.88	60.76	12.59	0.00	161.15	525	0.21	0.015	0.79	170.82	94	OK	OK
26	"	AL09	A019	A015	60	9.82	72.76	589	4397	3.72	18.34	68.18	14.55	0.00	170.53	525	0.34	0.015	1.00	217.36	78	OK	OK
27	Easement	AL09	A015	A014	60	9.93	82.69	596	4993	3.62	20.82	75.47	16.54	0.00	179.81	600	0.92	0.013	2.08	589.02	31	OK	OK
28	"	AL09	A014	A048	0	1.34	84.03	0	4993	3.62	20.82	75.47	16.81	0.00	180.08	600	0.19	0.013	0.95	267.68	67	OK	OK
29	"	AL08	A048	A049	23	5.34	89.37	123	5116	3.61	21.33	76.95	17.87	0.00	182.63	600	0.17	0.013	0.90	253.20	72	OK	OK
30	"	AL08	A049	A051	0	3.88	93.25	0	5116	3.61	21.33	76.95	18.65	0.00	183.40	600	0.07	0.013	0.57	162.47	113	LOW	UNDER
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City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (03)

Projects WW-06 and WW-07

Winona SPS (HC016)
and Forcemain Upgrades

KMK
220 Advance Boulevard, Brampton ON L6T 4J5
tel 905 459 4780 fax 905 459 7869 web www.kmk.ca

MEMORANDUM

Design Flows to Winona SPS (HC016) – Full Buildout

		Existing		Ultimate
Number of Residential Units				
(A)	Entire Service Area	317		317
Other Land Uses				
(B)	Commercial	4.80 ha		4.80 ha
(C)	Future Residential Development	0 ha		21.57 ha
Design Population				
(D)	[(A) * 3 pers/unit] + [(B) * 70 pers/ha] + [(C) * 100 pers/ha]	1,287		3,444
Design Flow				
(E)	Average Flow (360 Lpcd)	5.4 L/s		14.4 L/s
(F)	Peak Factor, M = 5/[(D/1000)^0.2]	4.75		3.91
(G)	Domestic Peak Flow, (E) * (F)	25.7 L/s		56.3 L/s
	Developed Area	47.2 ha		68.8 ha
(H)	External Infiltration (at 0.2 L/ha/s)	9.4 L/s		13.8 L/s
TOTAL PEAK FLOW, (G) + (H)		**35.1 L/s**		**70.1 L/s**
Flow from Shippee-McCollum PS		60.0 L/s		80.0 L/s
Design Flow for Winona PS		**95.1 L/s**		**150.1 L/s**

The existing capacity of the Winona PS forcemain is approximately 126 L/s

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (04)

Projects WW-08, WW-09 and WW-10

Waterdown WWTP Decommissioning and SPS/Forcemain Construction

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW - 8,9,10,16 & 17 Forcemain & Gravity Sewer

KMK Consultants Limited

22 NOV 06
1:12,500
2590-D-87


FN17PS01.2
FM18A063.2
FN16A001.1
FN18A018.1
FM17PS01 / FC001
FJ21A001.2
FM18A063.1
FN17PS01 / DC014
A
FM19A051.1
B
FN19PS01.1
C
FK21A004.1
FM19A014.1
FN19PS01 / DC013
FJ23A001.4
FL20A130.2
D
FJ21A001.1
E
F
FN20PS01 / FC003
FK21A103.2
FL21A069.1
FJ23A001.3
FK21A103.1
FL23PS01 / DC015
FJ23A001.1
FJ27A005.1
FK24PS01.1
FK24PS01 / DC016
FK25A002.1
FJ26A005.2

Waterdown Wastewater Flows

2001

Catchment	Status	Node/Manhole Applied	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]	Trunk Flow Capacity
FN17PS01.1	Active	FN17PS01.1	12.93	248	0.9	5	0.0	0.9	5.0	4.4	2.6	7.0	0
FN18A018.1	Undeveloped	FN18A018.1	139.38	9	0.0	30	0.1	0.1	5.0	0.6	27.9	28.5	207
FN17PS01.2	Undeveloped	FN16A001.1	203.38	2115	7.3	433	1.3	8.6	4.1	35.9	40.7	76.5	104
FM18A063.2	Active	FM18A063.1	85.39	1866	6.5	241	0.7	7.2	4.3	31.0	17.1	48.1	102
FN16A001.1	Active	FN16A001.1	35.1	305	1.1	102	0.3	1.4	5.0	6.8	7.0	13.9	100
(A) Flows Total			**476.18**	**4543**	**15.8**	**812**	**2.4**	**18.2**	**3.6**	**65.1**	**95.2**	**160.3**	400
FM19A051.1	Active	FM19A051.1	35.52	642	2.2	214	0.6	2.9	5.0	14.4	7.1	21.5	148
FM18A063.1	Active	FM18A063.1	37.44	1035	3.6	138	0.4	4.0	4.8	19.4	7.5	26.9	102
FM17PS01.1	Active	FN17PS01.1	12.93	248	0.9	5	0.0	0.9	5.0	4.4	2.6	7.0	0
(B) Flows Total			**85.89**	**1926**	**6.7**	**357**	**1.1**	**7.8**	4.2	32.9	**17.2**	**50.1**	123
FN19PS01.1	Active	FN19PS01.1	29.95	538	1.9	33	0.1	2.0	5.0	9.9	6.0	15.8	282
(C) Flows Total			**115.84**	**2464**	**8.6**	**391**	**1.2**	**9.7**	4.1	39.4	**23.2**	**62.6**	133
FN19A005.1	Active	FN19A005.1	8.53	145	0.5	6	0.0	0.5	5.0	2.6	1.7	4.3	161
(D) Flows Total			**124.37**	**2609**	**9.1**	**397**	**1.2**	**10.3**	4.0	41.1	**30.9**	**72.0**	
FM19A007.1	Active	FM19A014.1	10.9	238	0.8	107	0.3	1.1	5.0	5.7	2.2	7.9	277
FM19A014.1	Active	FM19A014.1	32.55	539	1.9	260	0.8	2.7	5.0	13.3	6.5	19.8	277
E) Flows Total			**43.45**	**777**	**2.7**	**368**	**1.1**	**3.8**	4.9	18.5	**8.7**	**27.2**	277
FM19A026.1	Active	FM19A026.1	15.59	297	1.0	28	0.1	1.1	5.0	5.6	3.1	8.7	472
FN20PS01.1	Active	FM19A026.1	10.97	251	0.9	2	0.0	0.9	5.0	4.4	2.2	6.6	472
(F) Flows Total			**70.01**	**1324**	**4.6**	**397**	**1.2**	**5.8**	4.5	26.0	**14.0**	**40.0**	472
NEW PS totals			**194.4**	**3,933.7**	**13.7**	**794.0**	**2.4**	**16.0**	**3.7**	**58.8**	**44.9**	**103.7**	

2011

Catchment	Status	Node/Manhole Applied	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]	Truck Flow capacity
FN17PS01.1	Active	FN17PS01.1	12.93	256	0.9	6	0.0	0.9	5.0	4.5	2.6	7.1	0
FN18A018.1	Undeveloped	FN18A018.1	139.38	8	0.0	31	0.1	0.1	5.0	0.6	27.9	28.5	207
FN17PS01.2	Undeveloped	FN16A001.1	203.38	2201	7.6	484	1.5	9.1	4.1	37.3	40.7	78.0	104
FM18A063.2	Active	FM18A063.1	85.39	1930	6.7	257	0.8	7.5	4.3	32.0	17.1	49.0	102
FN16A001.1	Active	FN16A001.1	35.1	316	1.1	123	0.4	1.5	5.0	7.3	7.0	14.4	100
(A) Flows Total			**476.18**	**4711**	**16.4**	**902**	**2.7**	**19.1**	**3.5**	**67.5**	**95.2**	**162.8**	400
FM19A051.1	Active	FM19A051.1	35.52	653	2.3	212	0.6	2.9	5.0	14.5	7.1	21.6	148
FM18A063.1	Active	FM18A063.1	37.44	1051	3.7	135	0.4	4.1	4.8	19.6	7.5	27.1	102
FM17PS01.1	Active	FN17PS01.1	12.93	256	0.9	6	0.0	0.9	5.0	4.5	2.6	7.1	0
(B) Flows Total			**85.89**	**1961**	**6.8**	**354**	**1.1**	**7.9**	4.2	33.3	**17.2**	**50.5**	123
FN19PS01.1	Active	FN19PS01.1	29.95	549	1.9	35	0.1	2.0	5.0	10.1	6.0	16.1	282
(C) Flows Total			**115.84**	**2510**	**8.7**	**389**	**1.2**	**9.9**	4.0	39.9	**23.2**	**63.1**	133
FN19A005.1	Active	FN19A005.1	8.53	148	0.5	6	0.0	0.5	5.0	2.7	1.7	4.4	161
(D) Flows Total			**124.37**	**2658**	**9.2**	**395**	**1.2**	**10.4**	4.0	41.7	**30.9**	**72.5**	
FM19A007.1	Active	FM19A014.1	10.9	238	0.8	107	0.3	1.1	5.0	5.7	2.2	7.9	277
FM19A014.1	Active	FM19A014.1	32.55	539	1.9	260	0.8	2.7	5.0	13.3	6.5	19.8	277
E) Flows Total			**43.45**	**777**	**2.7**	**368**	**1.1**	**3.8**	4.9	18.5	**8.7**	**27.2**	277
FM19A026.1	Active	FM19A026.1	15.59	297	1.0	28	0.1	1.1	5.0	5.6	3.1	8.7	472
FN20PS01.1	Active	FM19A026.1	10.97	251	0.9	2	0.0	0.9	5.0	4.4	2.2	6.6	472
(F) Flows Total			**70.01**	**1324**	**4.6**	**397**	**1.2**	**5.8**	4.5	26.0	**14.0**	**40.0**	472
NEW PS totals			**194.4**	**3,982.2**	**13.8**	**792.8**	**2.4**	**16.2**	**3.7**	**59.3**	**44.9**	**104.2**	

2021

Catchment	Status	Node/Manhole Applied	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]	Truck Flow capacity
FN17PS01.1	Active	FN17PS01.1	12.93	360	1.3	7	0.0	1.3	5.0	6.4	2.6	9.0	0
FN18A018.1	Undeveloped	FN18A018.1	139.38	8	0.0	957	2.9	2.9	5.0	14.5	27.9	42.4	207
FN17PS01.2	Undeveloped	FN16A001.1	203.38	2645	9.2	1150	3.5	12.6	3.8	48.4	40.7	89.1	104
FM18A063.2	Active	FM18A063.1	85.39	2306	8.0	277	0.8	8.8	4.1	36.6	17.1	53.6	102
FN16A001.1	Active	FN16A001.1	35.1	445	1.5	143	0.4	2.0	5.0	9.9	7.0	16.9	100
(A) Flows Total			**476.18**	**5763**	**20.0**	**2534**	**7.6**	**27.6**	**3.3**	**90.5**	**95.2**	**185.7**	400
FM19A051.1	Active	FM19A051.1	35.52	654	2.3	242	0.7	3.0	5.0	15.0	7.1	22.1	148
FM18A063.1	Active	FM18A063.1	37.44	1054	3.7	149	0.4	4.1	4.8	19.8	7.5	27.3	102
FM17PS01.1	Active	FN17PS01.1	12.93	360	1.3	7	0.0	1.3	5.0	6.4	2.6	9.0	0
(B) Flows Total			**85.89**	**2069**	**7.2**	**398**	**1.2**	**8.4**	4.2	35.0	**17.2**	**52.2**	123
FN19PS01.1	Active	FN19PS01.1	29.95	554	1.9	38	0.1	2.0	5.0	10.2	6.0	16.2	282
(C) Flows Total			**115.84**	**2622**	**9.1**	**436**	**1.3**	**10.4**	4.0	41.7	**23.2**	**64.8**	133
FN19A005.1	Active	FN19A005.1	8.53	149	0.5	7	0.0	0.5	5.0	2.7	1.7	4.4	161
(D) Flows Total			**124.37**	**2771**	**9.6**	**443**	**1.3**	**11.0**	4.0	43.4	**30.9**	**74.2**	
FM19A007.1	Active	FM19A014.1	10.9	238	0.8	107	0.3	1.1	5.0	5.7	2.2	7.9	277
FM19A014.1	Active	FM19A014.1	32.55	539	1.9	260	0.8	2.7	5.0	13.3	6.5	19.8	277
E) Flows Total			**43.45**	**777**	**2.7**	**368**	**1.1**	**3.8**	4.9	18.5	**8.7**	**27.2**	277
FM19A026.1	Active	FM19A026.1	15.59	297	1.0	28	0.1	1.1	5.0	5.6	3.1	8.7	472
FN20PS01.1	Active	FM19A026.1	10.97	251	0.9	2	0.0	0.9	5.0	4.4	2.2	6.6	472
(F) Flows Total			**70.01**	**1324**	**4.6**	**397**	**1.2**	**5.8**	4.5	26.0	**14.0**	**40.0**	472
NEW PS totals			**194.4**	**4,095.8**	**14.2**	**840.8**	**2.5**	**16.8**	**3.6**	**60.9**	**44.9**	**105.7**	

2031

Catchment	Status	Node/Manhole Applied	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]	Truck Flow capacity
FN17PS01.1	Active	FN17PS01.1	12.93	360	1.3	8	0.0	1.3	5.0	6.4	2.6	9.0	104
FN18A018.1	Undeveloped	FN18A018.1	139.38	3850	13.4	1021	3.1	16.4	3.6	59.9	27.9	87.8	207
FN17PS01.2	Undeveloped	FN16A001.1	203.38	8074	28.0	1226	3.7	31.7	3.2	101.5	40.7	142.2	104
FM18A063.2	Active	FM18A063.1	85.39	2306	8.0	296	0.9	8.9	4.1	36.7	17.1	53.8	102
FN16A001.1	Active	FN16A001.1	35.1	445	1.5	152	0.5	2.0	5.0	10.0	7.0	17.0	100
(A) Flows Total			**476.18**	**15035**	**52.2**	**2703**	**8.1**	**60.3**	**2.8**	**169.7**	**95.2**	**265.0**	400
FM19A051.1	Active	FM19A051.1	35.52	654	2.3	265	0.8	3.1	5.0	15.3	7.1	22.4	148
FM18A063.1	Active	FM18A063.1	37.44	1055	3.7	162	0.5	4.1	4.8	19.9	7.5	27.4	102
FM17PS01.1	Active	FM18A063.1	9.93	267	0.9	31	0.1	1.0	5.0	5.1	2.0	7.1	102
(B) Flows Total			**82.89**	**1975**	**6.9**	**458**	**1.4**	**8.2**	4.2	34.5	**16.6**	**51.1**	123
FN19PS01.1	Active	FN19PS01.1	29.95	554	1.9	41	0.1	2.0	5.0	10.2	6.0	16.2	282
(C) Flows Total			**112.84**	**2529**	**8.8**	**499**	**1.5**	**10.3**	4.0	41.2	**22.6**	**63.8**	133
FN19A005.1	Active	FN19A005.1	8.53	149	0.5	7	0.0	0.5	5.0	2.7	1.7	4.4	161
(D) Flows Total			**121.37**	**2678**	**9.3**	**506**	**1.5**	**10.8**	4.0	42.9	**30.3**	**73.2**	
FM19A007.1	Active	FM19A014.1	10.9	238	0.8	107	0.3	1.1	5.0	5.7	2.2	7.9	277
FM19A014.1	Active	FM19A014.1	32.55	539	1.9	260	0.8	2.7	5.0	13.3	6.5	19.8	277
E) Flows Total			**43.45**	**777**	**2.7**	**368**	**1.1**	**3.8**	4.9	18.5	**8.7**	**27.2**	277
FM19A026.1	Active	FM19A026.1	15.59	297	1.0	28	0.1	1.1	5.0	5.6	3.1	8.7	472
FN20PS01.1	Active	FM19A026.1	10.97	251	0.9	2	0.0	0.9	5.0	4.4	2.2	6.6	472
(F) Flows Total			**70.01**	**1324**	**4.6**	**397**	**1.2**	**5.8**	4.5	26.0	**14.0**	**40.0**	472
NEW PS totals			**191.4**	**4,002.7**	**13.9**	**903.6**	**2.7**	**16.6**	**3.6**	**60.4**	**44.3**	**104.7**	

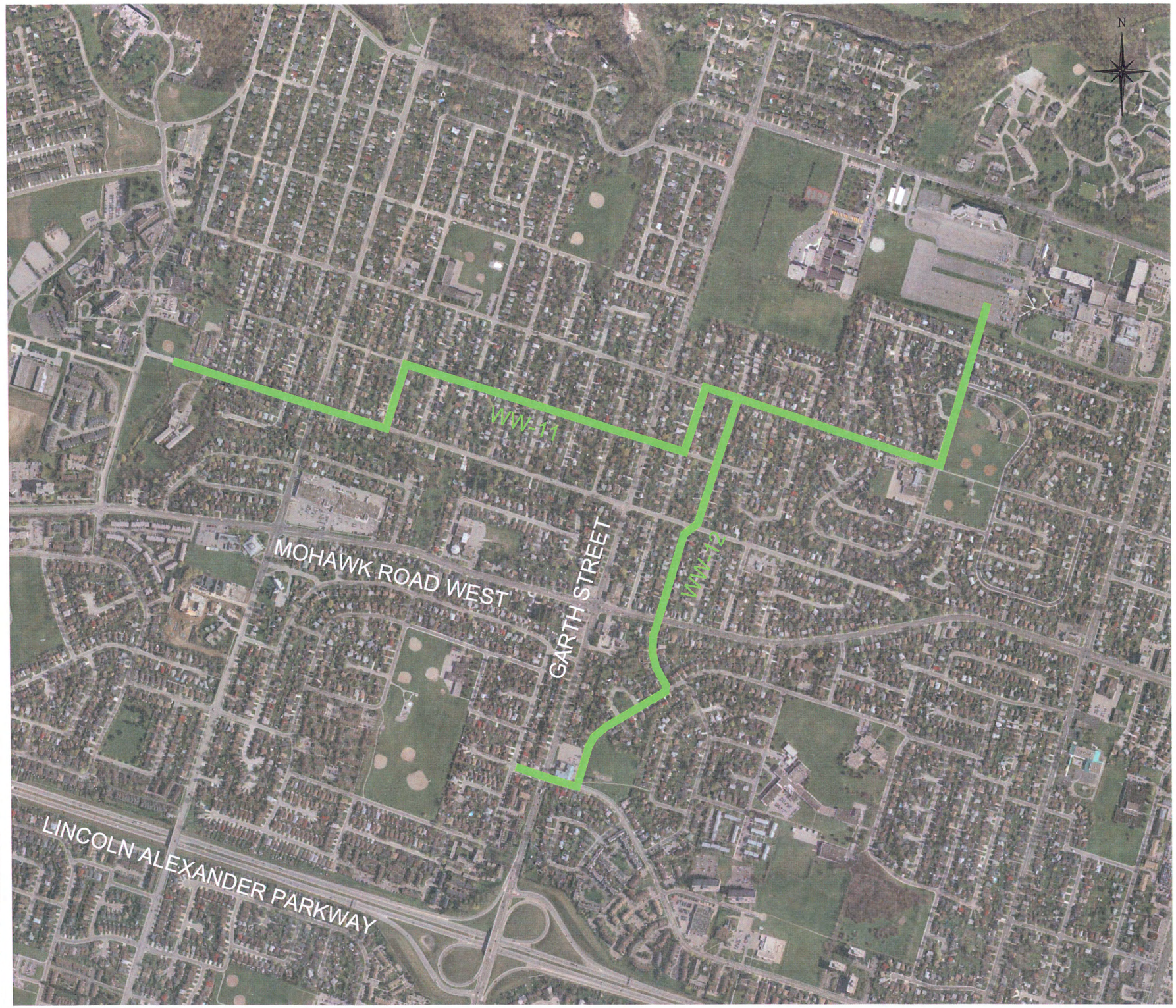
City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (05)

Project WW-11

Ancaster-to-Fennell Trunk Sewer Upgrades



Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

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Wastewater Servicing

WW - 11 & 12
Gravity Sewer

KMK Consultants Limited

22 NOV 06
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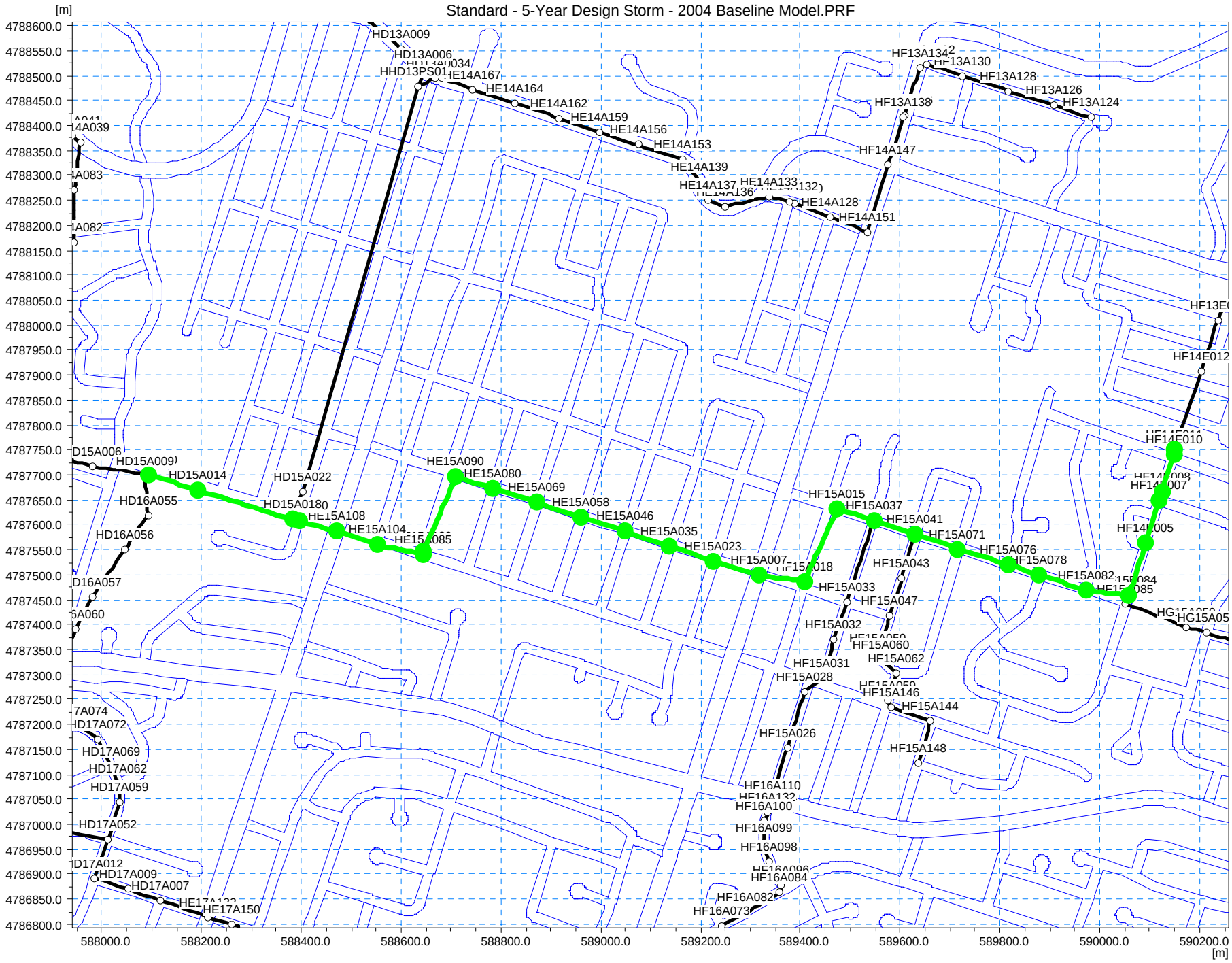
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Link Water Level - 1-6-2004 00:00:00 5-Year Design Storm - 2004 Baseline Model.PRF

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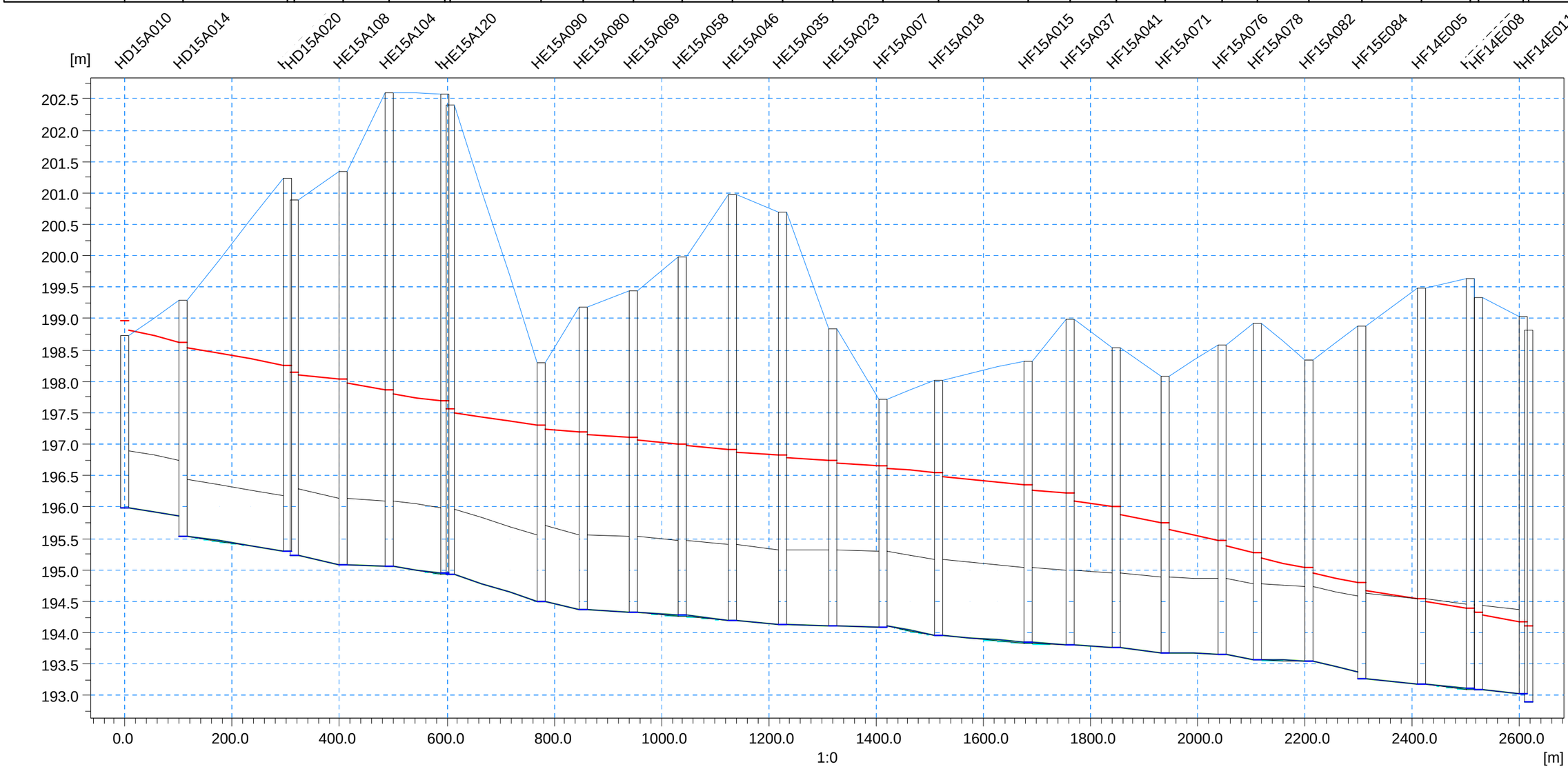

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Invert lev.	195.99	195.54		195.29	195.08	195.05	194.94		194.50	194.36	194.33	194.27	194.20	194.13	194.11	194.09	193.96		193.84	193.80	193.76	193.68	193.66	193.57	193.54	193.27	193.18	193.10	193.02	[m]
Length	108.51	194.00		90.07	86.11	103.39	170.78		78.18	92.96	93.09	93.65	92.66	94.03	92.44	103.02	169.22		77.14	87.33	90.43	105.37		96.62	97.84	111.40	89.60	82.30		[m]
Diameter	0.90	0.90		1.05	1.05	1.05	1.05		1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20		1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.35	1.35	1.35		[m]
Slope o/oo	1.29	1.29		1.67	0.35	1.06	2.46		1.79	0.32	0.64	0.75	0.76	0.21	0.22	1.36	0.71		0.52	0.46	0.88	0.19	1.35	0.31	1.64	0.82	0.88	0.81		

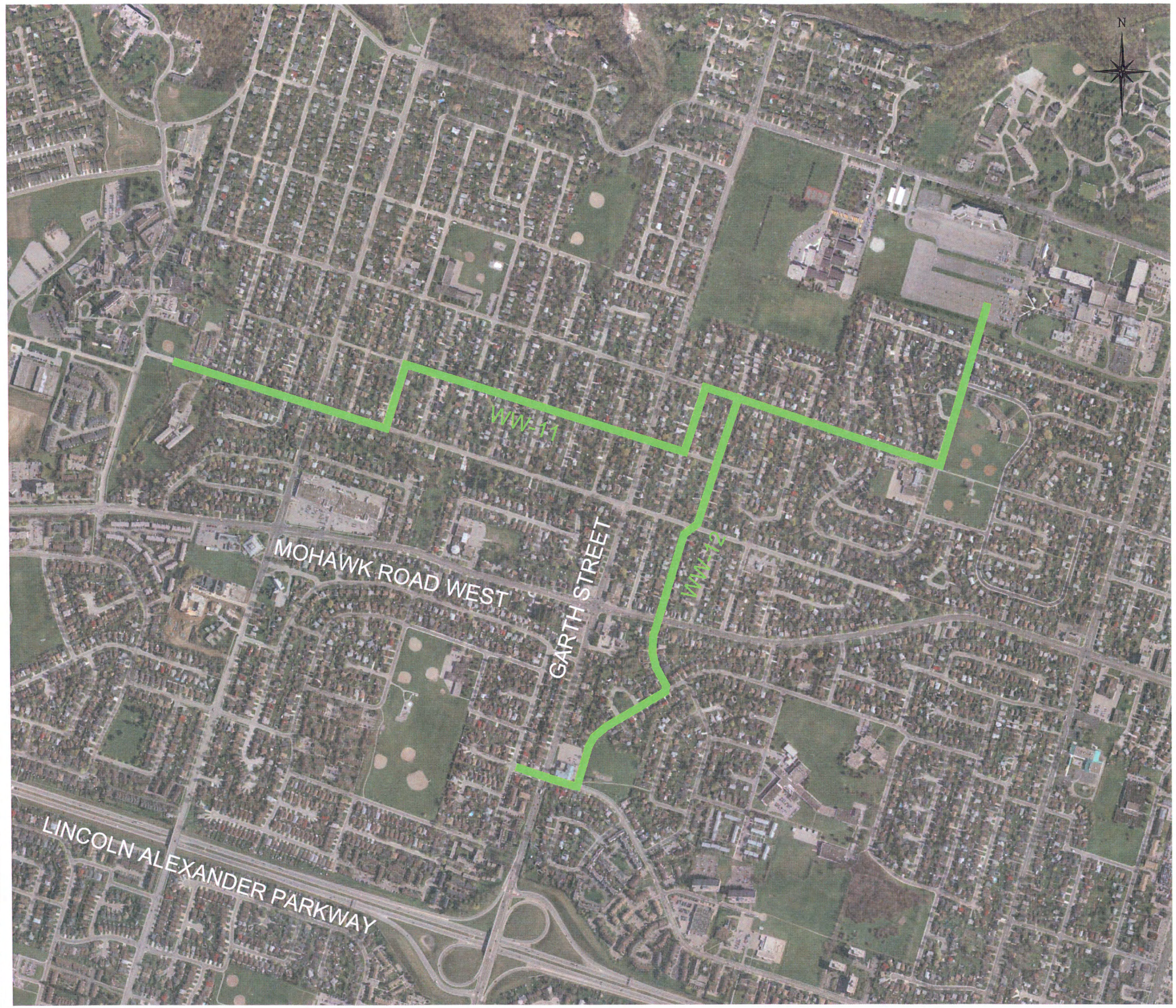
City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (06)

Project WW-12

West 18th St. Sewer Upgrades



Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

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Wastewater Servicing

WW - 11 & 12
Gravity Sewer

KMK Consultants Limited

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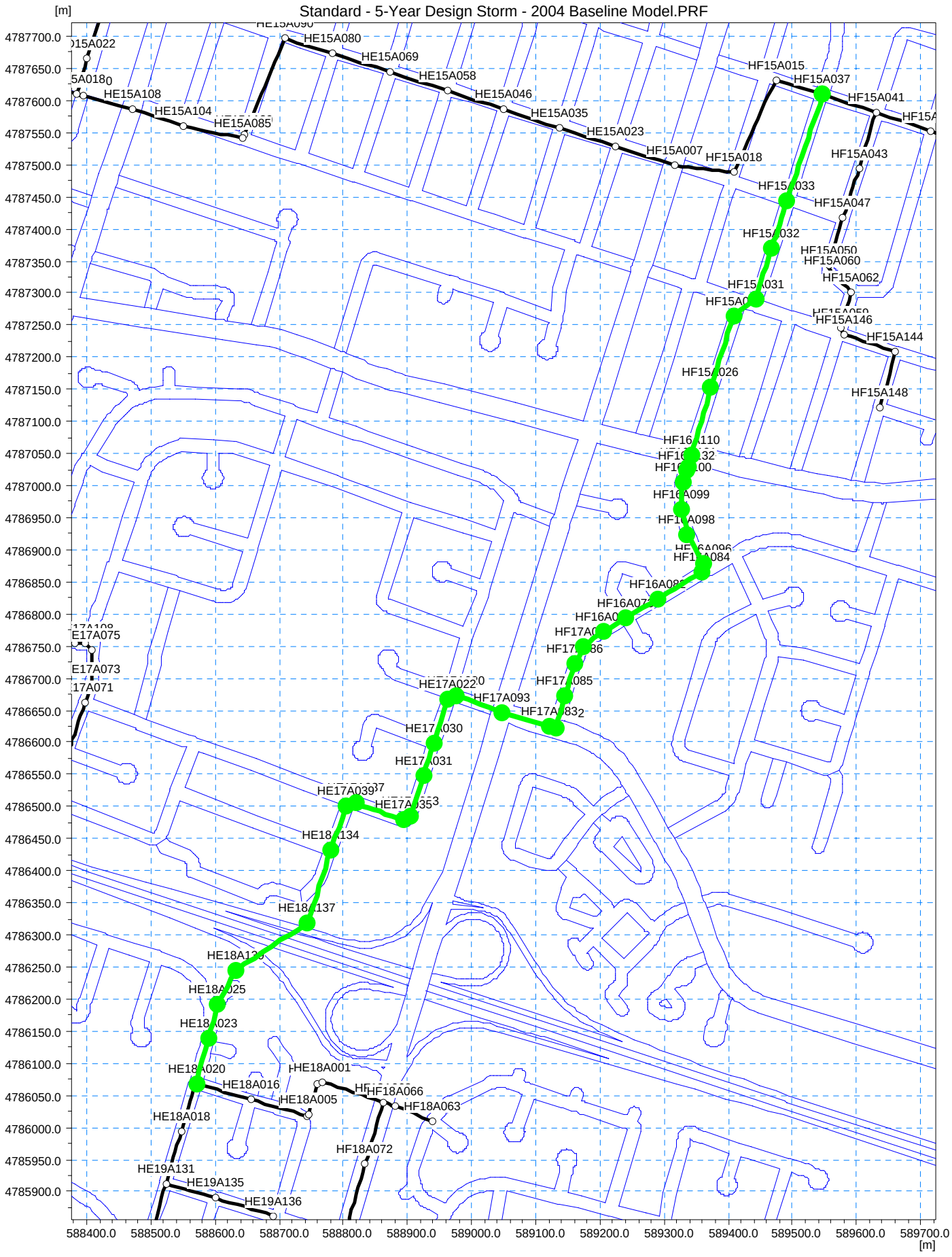
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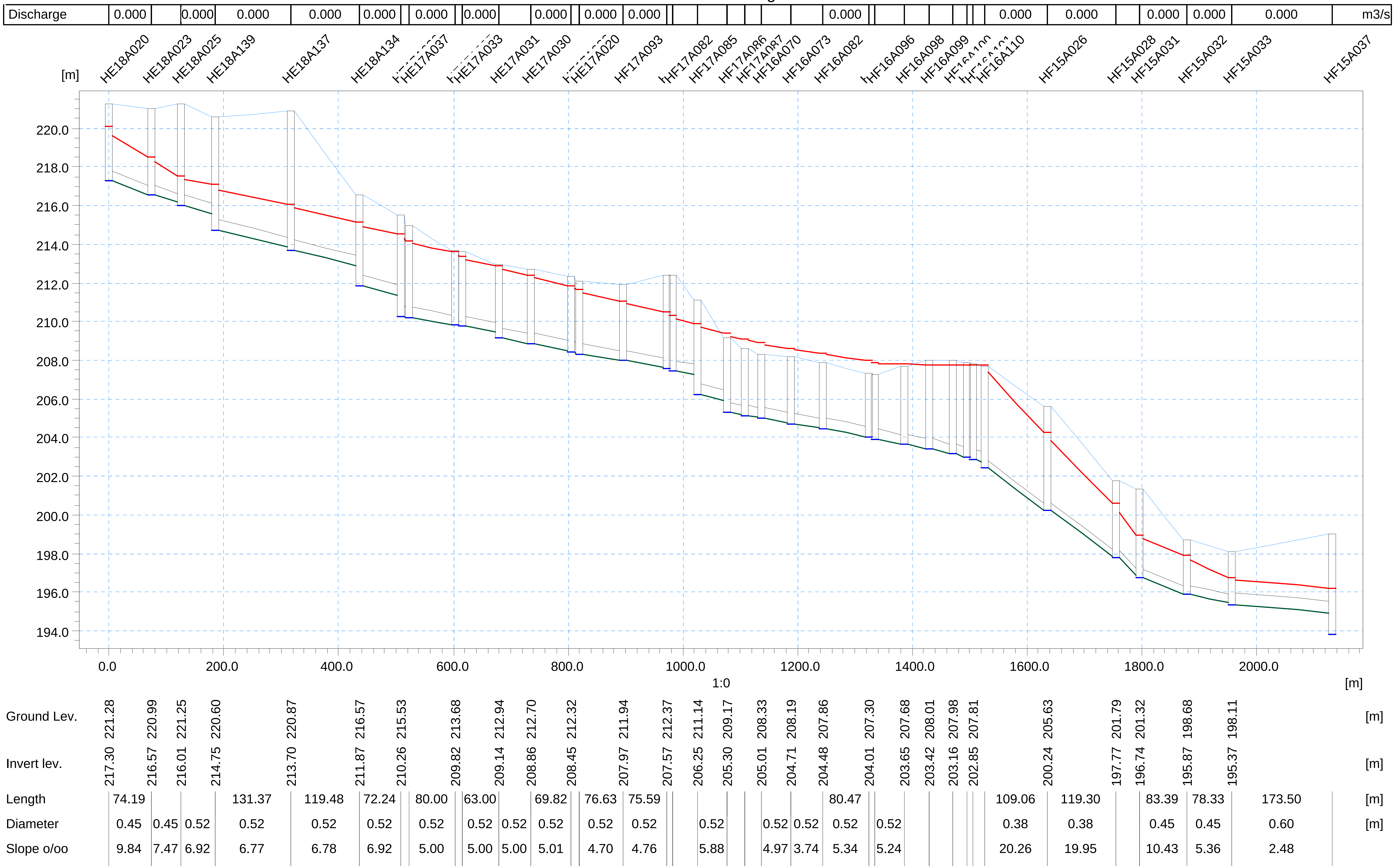

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (07)

Project WW-13

Trunk CSO and Collection System Improvements

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (08)

Project WW-14

New Centennial Trunk Sewer

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

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Wastewater Servicing

WW-14
Gravity Sewer

KMK Consultants Limited

22 NOV 06
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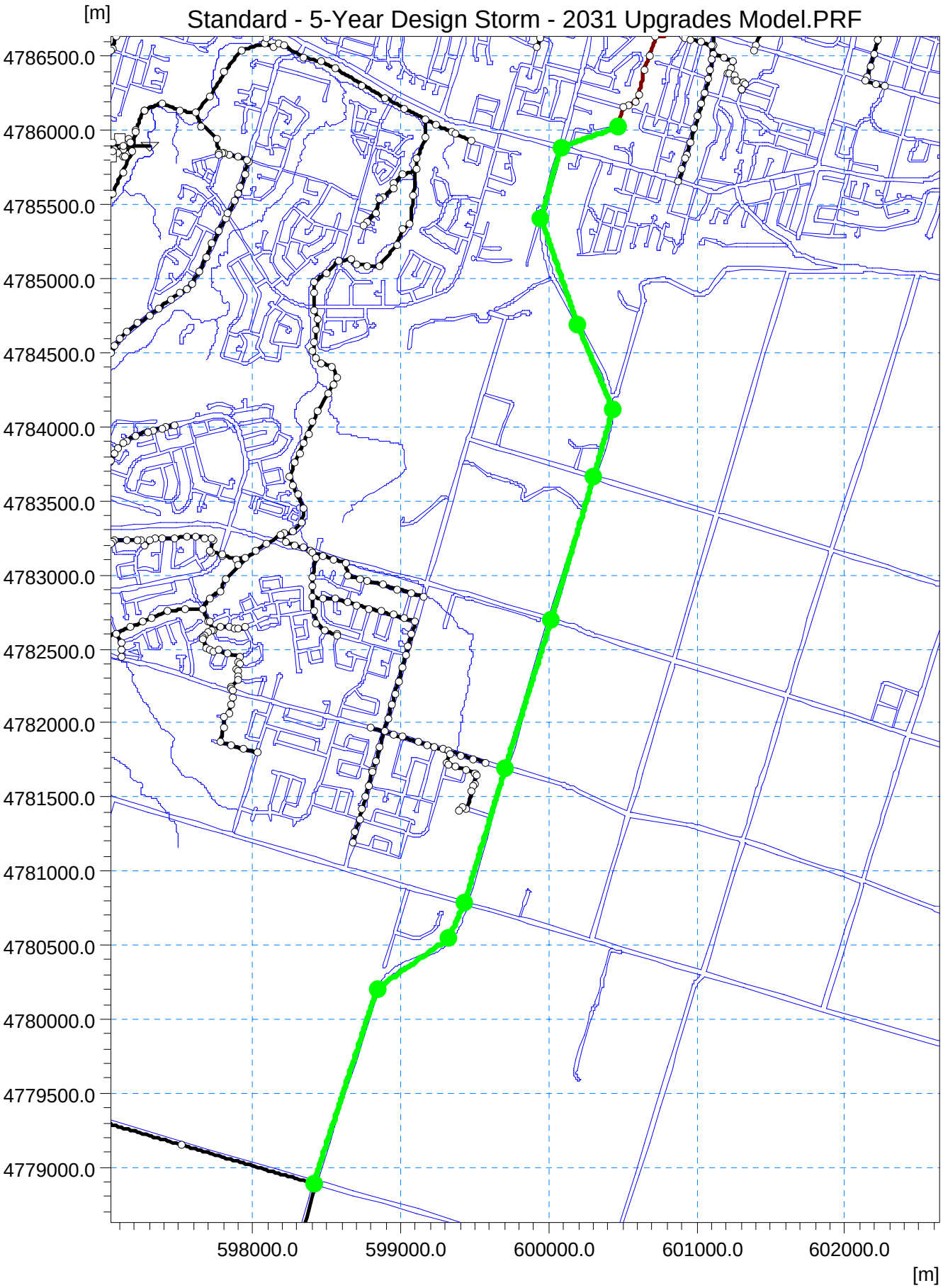
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Link Water Level - 1-6-2004 00:00:00 5-Year Design Storm - 2031 Upgrades Model.PRF

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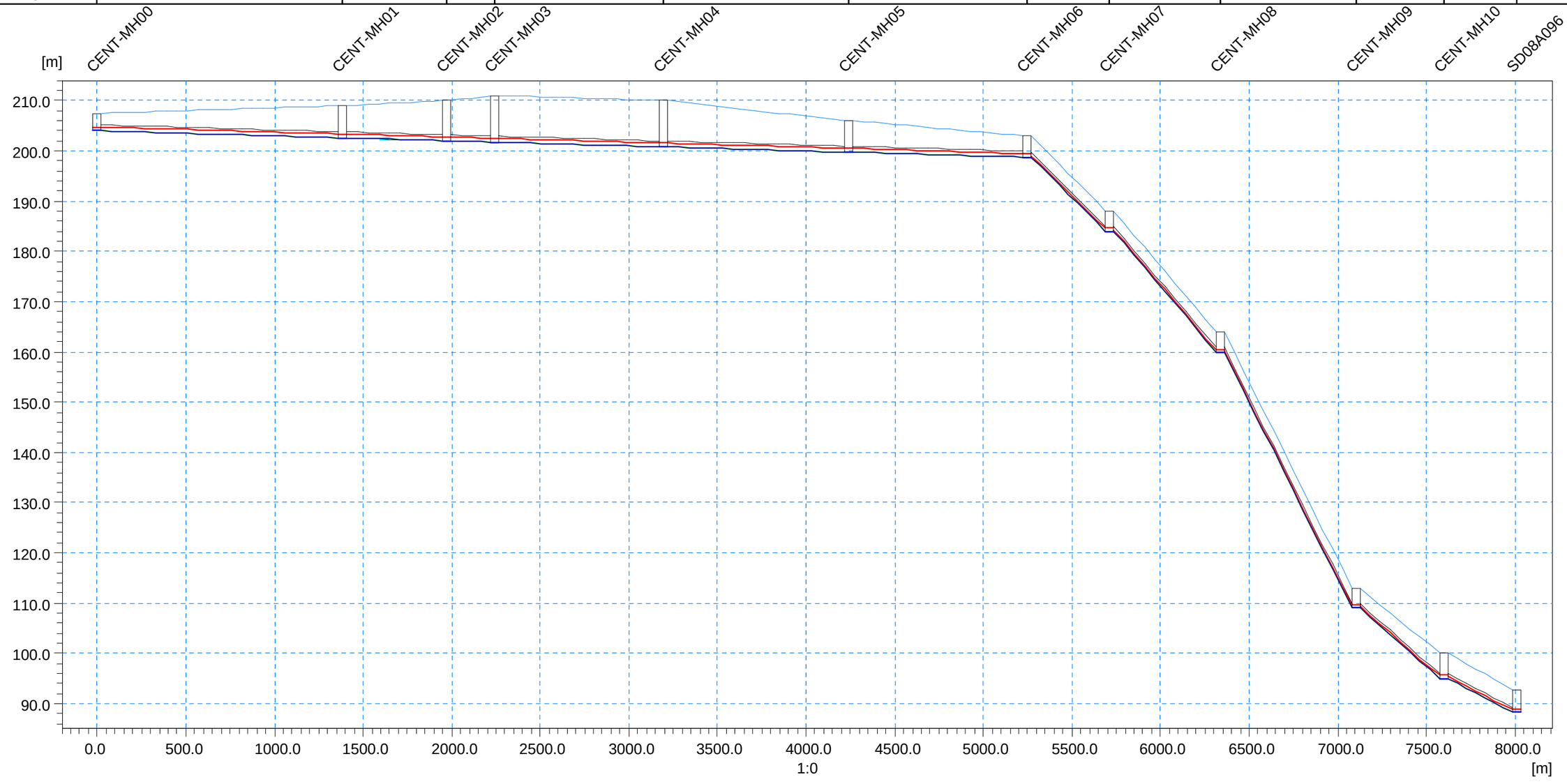


Ground Lev.	207.47	209.00	210.00	211.00	210.00	206.00	203.00	188.00	164.00	113.00	100.00	[m]
Invert lev.	203.97	202.59	202.00	201.73	200.78	199.73	198.72	184.00	160.00	109.00	95.00	[m]
Length	1384.79	590.10		948.76	1051.10	1006.04	465.23	622.20	766.50	495.47	408.94	[m]
Diameter	1.20	1.20	1.20	1.20	1.20	1.20	0.90	0.90	0.90	0.90	0.90	[m]
Slope o/oo	1.00	1.00	1.01	1.00	1.00	1.00	31.64	38.57	66.54	28.26	16.38	

City of Hamilton Water and Wastewater Master Plan

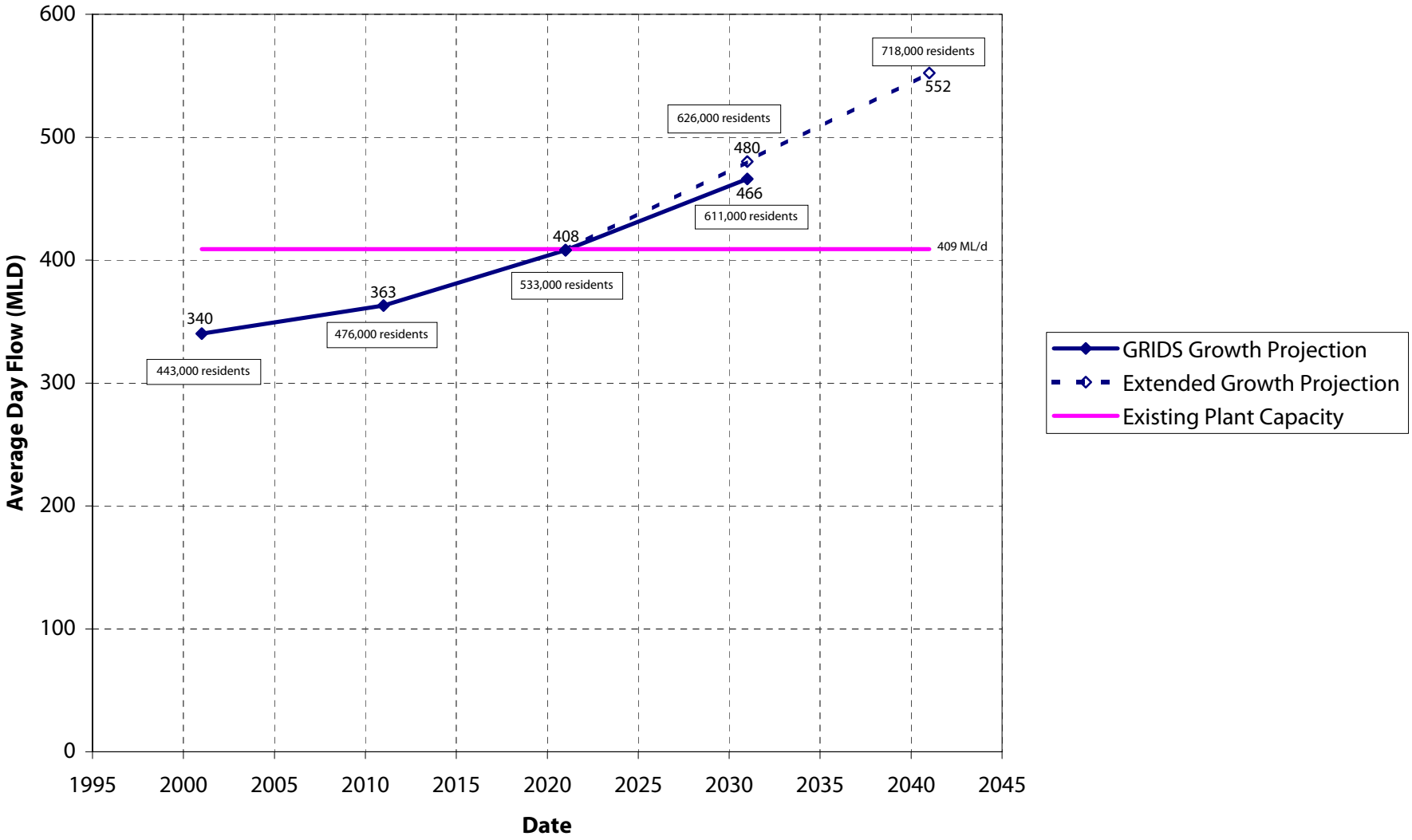
Report III - Master Plan Class EA Report

Appendix A-2 (09)

Project WW-15

Woodward Avenue WWTP Expansion

Woodward Avenue WWTP Capacity Assessment



Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

KMK Consultants Limited

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (10)

Project WW-16

New Mountain Brow Trunk Sewer

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW - 8,9,10,16 & 17 Forcemain & Gravity Sewer

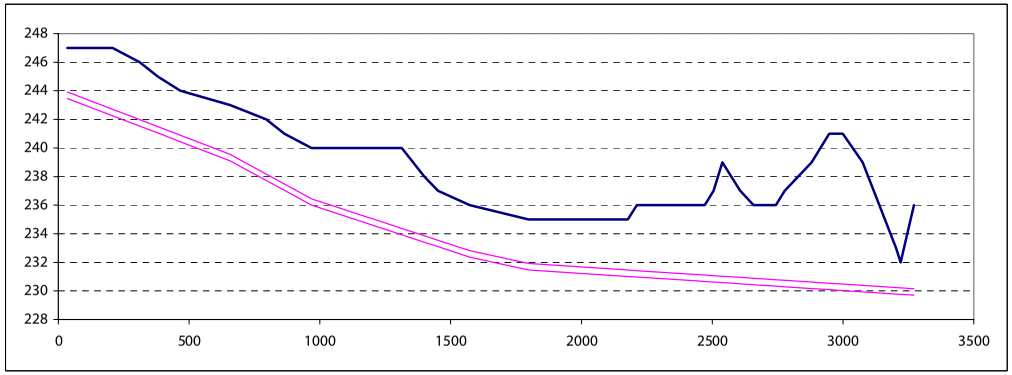
KMK Consultants Limited

22 NOV 06
1:12,500
2590-D-87

Alternative 1 B

	Measured	Actual Chainage	Elevation (	Grade %)	Invert	Obvert	Cover	Pipe dia. (mm)	Velocity (m/s)
	2	35	247	0.70%	243.46	243.91	3.09	375	1.3
	12	207	247	0.70%	242.25	242.70	4.30	375	1.3
	18	311	246	0.70%	241.53	241.98	4.02	375	1.3
	22	380	245	0.70%	241.04	241.49	3.51	375	1.3
	27	467	244	0.70%	240.44	240.89	3.11	375	1.3
	38	657	243	0.70%	239.11	239.56	3.44	375	1.3
	46	795	242	1.00%	237.72	238.17	3.83	450	1.79
	50	864	241	1.00%	237.03	237.48	3.52	450	1.79
	56	968	240	1.00%	236.00	236.45	3.55	450	1.79
	68	1175	240	0.60%	234.75	235.20	4.80	450	1.39
	71	1227	240	0.60%	234.44	234.89	5.11	450	1.39
	76	1314	240	0.60%	233.92	234.37	5.63	450	1.39
	81	1400	238	0.60%	233.40	233.85	4.15	450	1.39
	84	1452	237	0.60%	233.09	233.54	3.46	450	1.39
	91	1573	236	0.60%	232.37	232.82	3.18	450	1.39
	104	1798	235	0.40%	231.47	231.92	3.08	450	1.13
	126	2178	235	0.12%	231.01	231.46	3.54	450	0.62
	128	2212	236	0.12%	230.97	231.42	4.58	450	0.62
	141	2437	236	0.12%	230.70	231.15	4.85	450	0.62
0	0	2471	236	0.12%	230.66	231.11	4.89	450	0.62
2	34	2505	237	0.12%	230.62	231.07	5.93	450	0.62
4	68	2539	239	0.12%	230.58	231.03	7.97	450	0.62
8	136	2607	237	0.12%	230.50	230.95	6.05	450	0.62
11	187	2658	236	0.12%	230.44	230.89	5.11	450	0.62
16	272	2743	236	0.12%	230.33	230.78	5.22	450	0.62
18	306	2777	237	0.12%	230.29	230.74	6.26	450	0.62
24	409	2880	239	0.12%	230.17	230.62	8.38	450	0.62
28	477	2948	241	0.12%	230.09	230.54	10.46	450	0.62
31	528	2999	241	0.12%	230.03	230.48	10.52	450	0.62
35.5	604	3075	239	0.12%	229.93	230.38	8.62	450	0.62
43	732	3203	233	0.12%	229.78	230.23	**2.77**	450	0.62
44	749	3220	232	0.12%	229.76	230.21	**1.79**	450	0.62
47	800	3271	236	0.12%	229.70	230.15	5.85	450	0.62

Gravity Sewer



MOE				
Minimum Slope		**NPS18**	**0.12**	**m/100m**
Minimum when flowing full			**0.6**	**m/s**
Maximum Velocity			**3**	**m/s**
	3 to 5 M cover			
	6 to 10 meter cover			
Max wastewater Flows from catchment			87.8	**L/s**

Item	Unit	Size(m)	length/flow	Unit cost	Cost
Pump (First Street Pump station)	L/s		200 (l/s)	$100,000	$100,000
Pump (waterdown pump station)					
Sewer	M	375	657	$425	$279,225
Sewer	M	450	2614	$450	$1,176,300
Sewer (additional cost for depth Between 6M to 10M)	M	450	426	$1,150	$489,900
Manholes	Each		27	$100,000	$2,700,000
Total					$4,745,425

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (11)

Project WW-17

First Street SPS (DC014) Upgrades

LOCATION	CATCHMENTID
FN16A001	FN16A001.1
FN17PS01	FN17PS01.1
FN17PS01	FN17PS01.2

Highway No.5/First Street

Station ID: DC014
Model ID: FN17PS01
Pumps: 2 @ 200 L/s each
Firm Capacity: 200 L/s

2001

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
FN16A001.1	Active	35.1	305	1.1	102	0.3	1.4	3.6	4.9	7.0	11.9
FM18A063.2	Active	85.39	1866	6.5	241	0.7	7.2	3.6	25.8	17.1	42.8
FN17PS01.1	Active	12.93	248	0.9	5	0.0	0.9	3.6	3.1	2.6	5.7
FN17PS01.2	Undeveloped	203.38	2115	7.3	433	1.3	8.6	3.6	30.9	40.7	71.6
FN18A018.1	Undeveloped	139.38	9	0.0	30	0.1	0.1	3.6	0.4	27.9	28.3
TOTAL		**476.18**	**4543**	**16**	**812**	**2**	**18**	**3.6**	**65.1**	**95**	**160.3**

2011

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
FN16A001.1	Active	35.1	316	1.1	123	0.4	1.5	3.5	5.2	7.0	12.2
FM18A063.2	Active	85.39	1930	6.7	257	0.8	7.5	3.5	26.5	17.1	43.5
FN17PS01.1	Active	12.93	256	0.9	6	0.0	0.9	3.5	3.2	2.6	5.8
FN17PS01.2	Undeveloped	203.38	2201	7.6	484	1.5	9.1	3.5	32.2	40.7	72.9
FN18A018.1	Undeveloped	139.38	8	0.0	31	0.1	0.1	3.5	0.4	27.9	28.3
TOTAL		**476.18**	**4711**	**16.4**	**902**	**2.7**	**19.1**	**3.5**	**67.5**	**95.2**	**162.8**

2021

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
FN16A001.1	Active	35.1	445	1.5	143	0.4	2.0	3.3	6.5	7.0	13.5
FM18A063.2	Active	85.39	2306	8.0	277	0.8	8.8	3.3	29.0	17.1	46.0
FN17PS01.1	Active	12.93	360	1.3	7	0.0	1.3	3.3	4.2	2.6	6.8
FN17PS01.2	Undeveloped	203.38	2645	9.2	1150	3.5	12.6	3.3	41.4	40.7	82.1
FN18A018.1	Undeveloped	139.38	8	0.0	957	2.9	2.9	3.3	9.5	27.9	37.4
TOTAL		**476.18**	**5763**	**20.0**	**2534**	**7.6**	**27.6**	**3.3**	**90.5**	**95.2**	**185.7**

2031

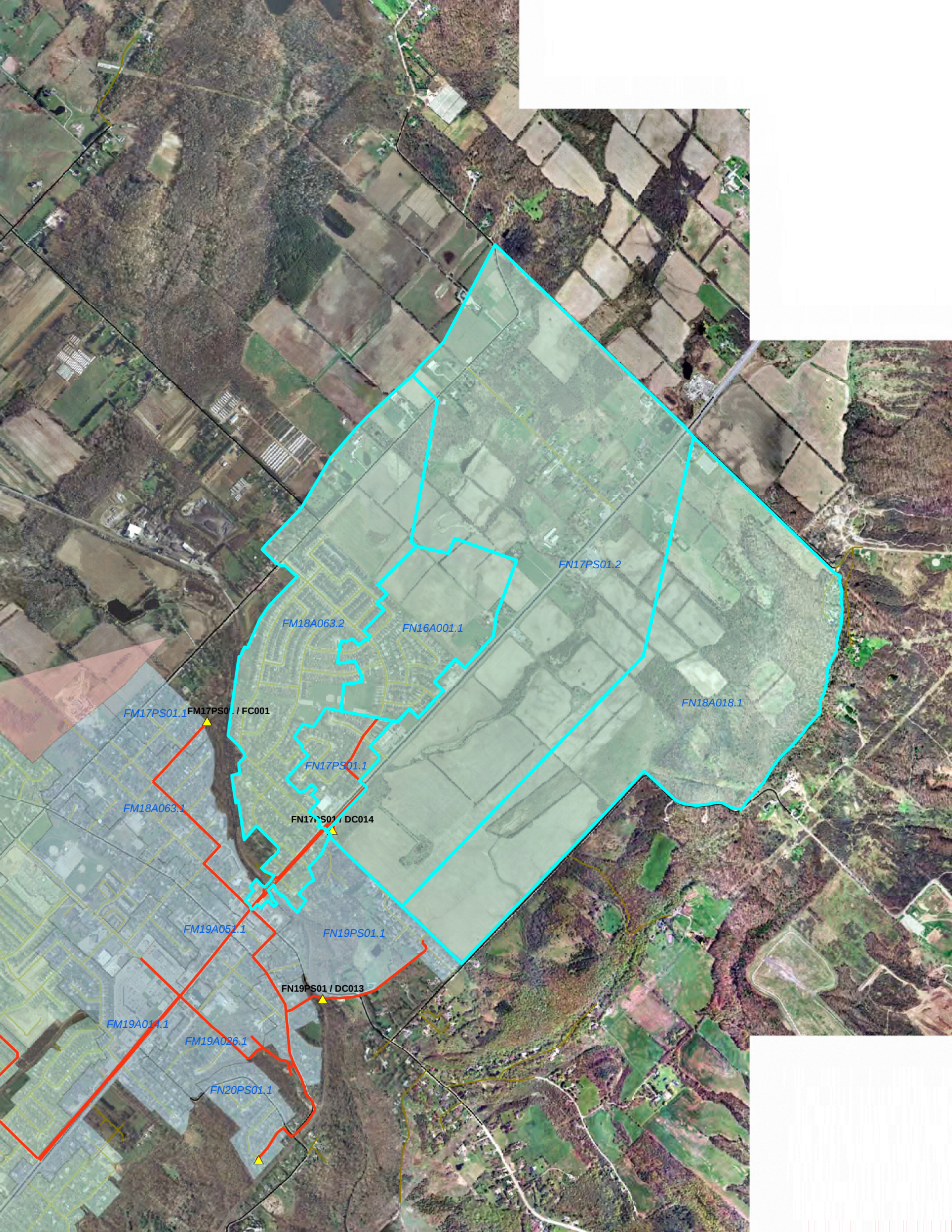
Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
FN16A001.1	Active	35.1	445	1.5	152	0.5	2.0	2.8	5.6	7.0	12.7
FM18A063.2	Active	85.39	2306	8.0	277	0.8	8.8	3.3	29.0	17.1	46.0
FN17PS01.1	Active	12.93	360	1.3	7	0.0	1.3	3.3	4.2	2.6	6.8
FN17PS01.2	Undeveloped	203.38	8074	28.0	1226	3.7	31.7	2.8	89.3	40.7	129.9
FN18A018.1	Undeveloped	139.38	3850	13.4	1021	3.1	16.4	2.8	46.3	27.9	74.1
TOTAL		**476.18**	**15035**	**52.2**	**2684**	**8.1**	**60.3**	**2.8**	**169.6**	**95.2**	**269.5**

Highway No.5/First Street

Pumping Station Attributes

Station ID: DC014
Model ID: FN17PS01
Pumps: 2 @ 200 L/s each
Firm Capacity: 200 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	4543	4711	5763	15035
Employment Projections					
(B)	Number of Jobs	812	902	2534	2684
Design Flow					
(C)	Area	476.2 ha	476.2 ha	476.2 ha	476.2 ha
(D)	Average Residential Flow (300 Lpcd)	15.8 L/s	16.4 L/s	20.0 L/s	52.2 L/s
(E)	Average Employment Flow (260 Lpcd)	2.4 L/s	2.7 L/s	7.6 L/s	8.1 L/s
(F)	Average Flow	18.2 L/s	19.1 L/s	27.6 L/s	60.3 L/s
(G)	Peaking Factor	3.6	3.5	3.3	2.8
(H)	Domestic Peak Flow, (G)*(F)	65.1 L/s	67.5 L/s	90.5 L/s	169.6 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	95.2 L/s	95.2 L/s	95.2 L/s	95.2 L/s
TOTAL PEAK FLOW, (H) + (I)		160.3 L/s	162.8 L/s	185.7 L/s	269.5 L/s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FM17PS0 . / FC001
FN17PS01.1
FM18A063.1
FN17PS01 / DC014
FM19A051.1
FN19PS01.1
FN19PS01 / DC013
FM19A014.1
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City of Hamilton Water and Wastewater Master Plan

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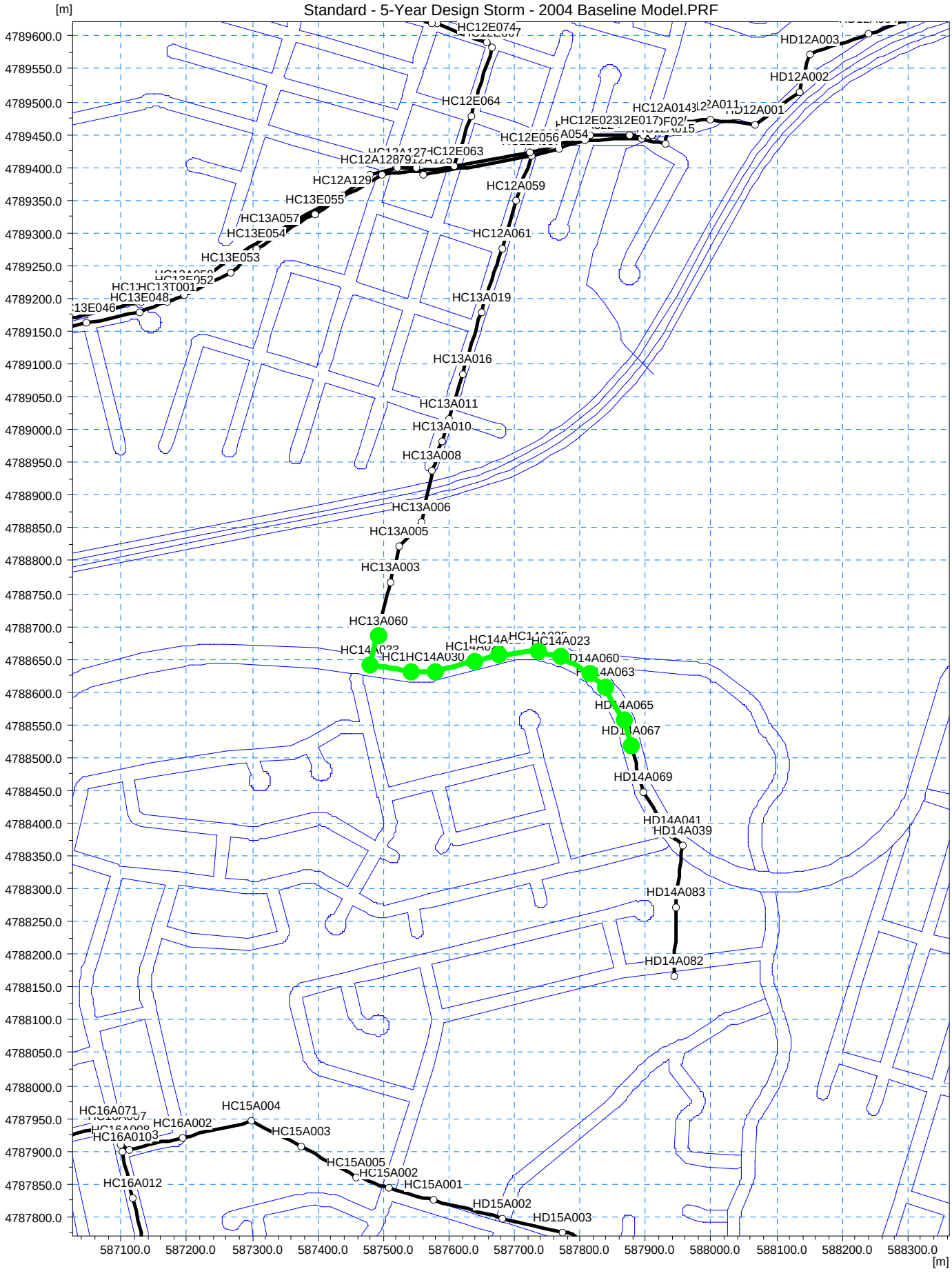
Appendix A-2 (12)

Project WW-18

Scenic Drive Sewer Upgrades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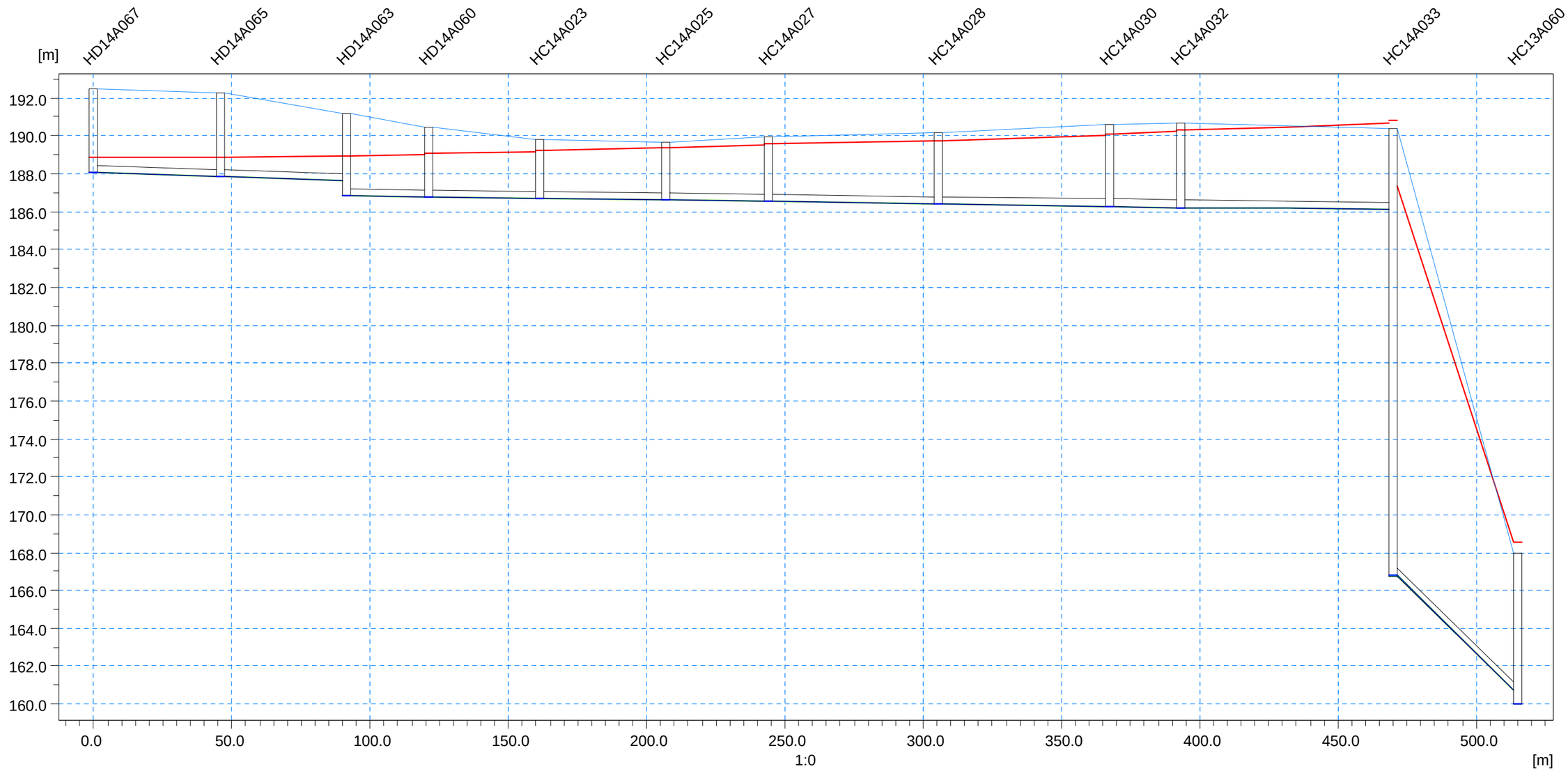
HC16A002
HC15A004
HC15A003
HC15A005
HC15A002
HC15A001
HD15A002
HD15A003
HC16A012

Link Water Level - 1-6-2004 00:00:00 5-Year Design Storm - 2004 Baseline Model.PRF

Discharge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	m3/s



Ground Lev.	192.50		192.28		191.15	190.49	189.83	189.63	189.96	190.16	190.58	190.69	190.38		[m]
Invert lev.	188.06		187.84		186.84	186.78	186.70	186.61	186.54	186.42	186.29	186.22	166.77		[m]
Length		45.72		45.72	29.87	39.93	45.42	37.49	61.26	62.18	25.60	76.81	44.80		[m]
Diameter		0.38		0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		[m]
Slope o/oo		4.81		5.03	2.01	2.00	1.98	1.87	1.96	2.09	2.73	1.69	134.15		

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (13)

Project WW-19

Bowman Street Sewer Upgrades

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW - 19 & 22
Forcemain & Gravity Sewer

KMK Consultants Limited

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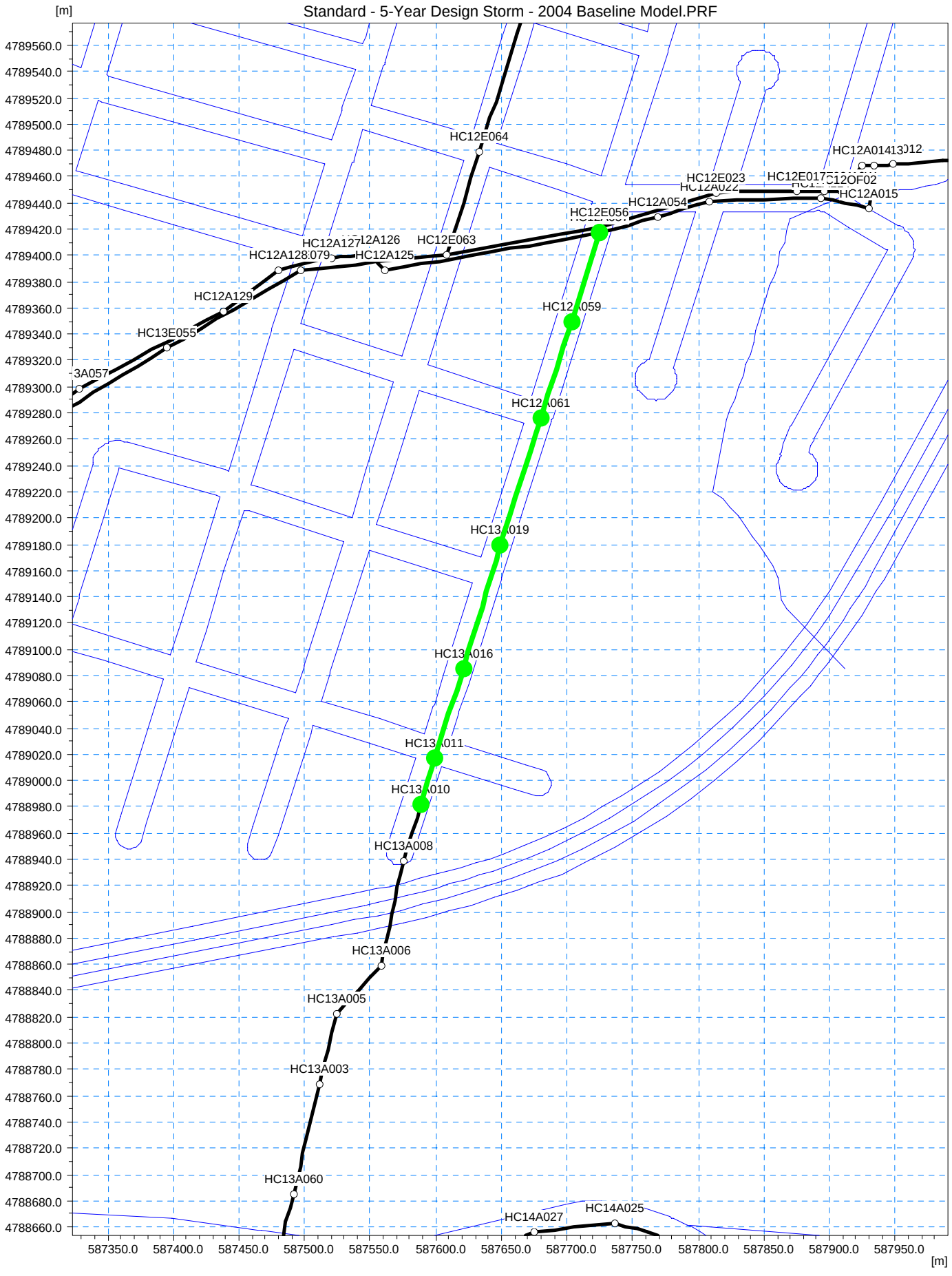
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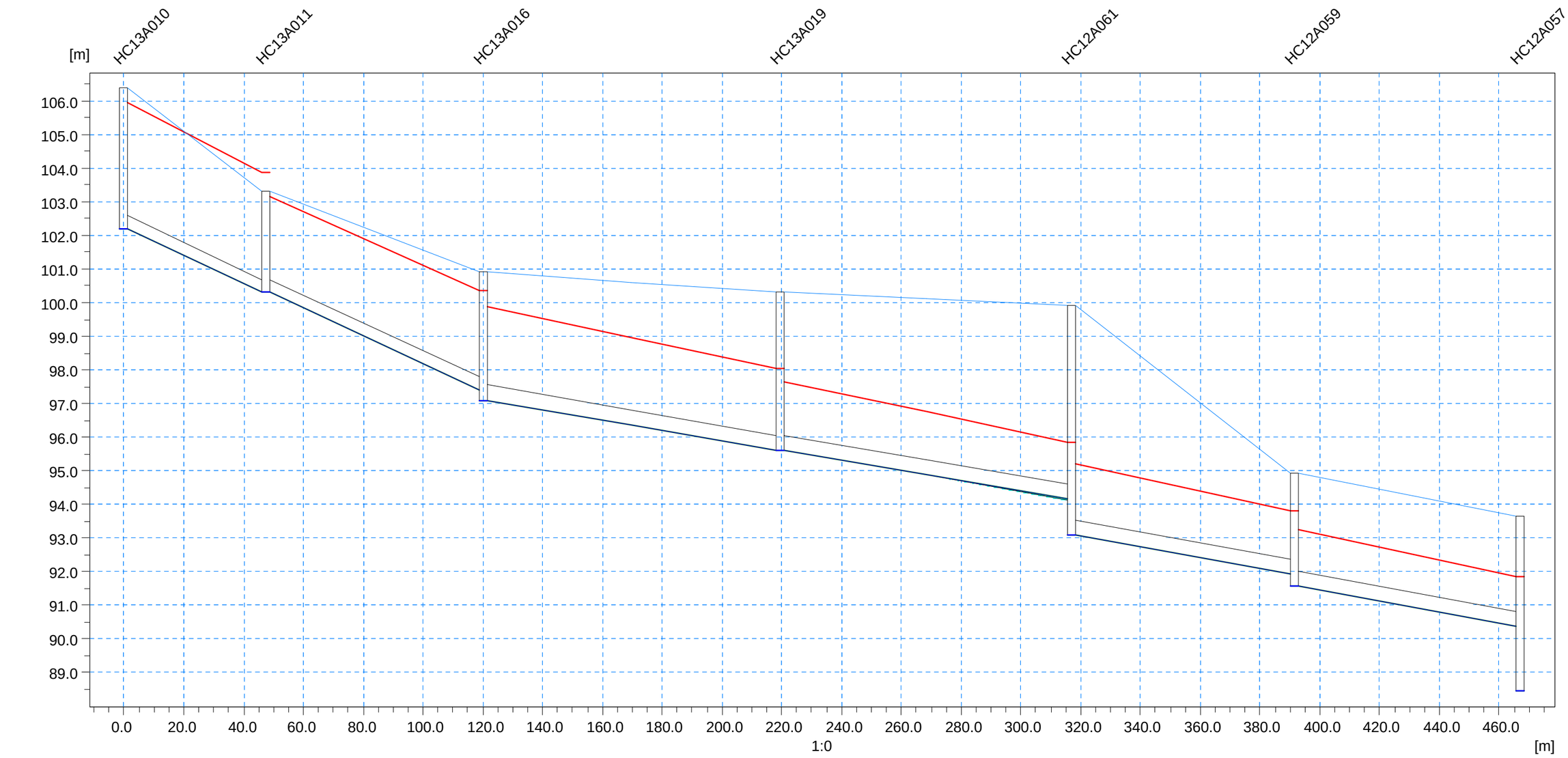
HC14A025

Link Water Level - 1-6-2004 00:00:00 5-Year Design Storm - 2004 Baseline Model.PRF

Discharge	0.000	0.000	0.000	0.000	0.000	0.000	m3/s



Ground Lev.	106.40		103.32		100.91	100.31	99.91	94.93	[m]
Invert lev.	102.21		100.31		97.10	95.61	93.08	91.56	[m]
Length		47.56		72.56	99.39	97.56	74.30	75.40	[m]
Diameter		0.38		0.38	0.45	0.45	0.45	0.45	[m]
Slope o/oo		39.95		39.97	14.99	14.97	15.61	15.78	

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (14)

Projects WW-20 and WW-21

Binbrook SPS (HC058)
and Forcemain Upgrades

Binbrook SPS

Station ID: HC058
Model ID: GP14PS01
Pumps: 2 @ 200 L/s each
Firm Capacity: 200 L/s

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	GS21A003.1	Active	630	2000	6.9	301	0.9	7.9	4.2	33.2	126.0	159.2
	TOTAL		**630**	**2000**	**6.9**	**301**	**0.9**	**7.9**	**4.2**	**33.2**	**126.0**	**159.2**
	GS21PS01											**30.0**
	TOTAL											**189.2**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	GS21A003.1	Active	630	5408	18.8	823	2.5	21.3	4.2	90.0	126.0	216.0
	TOTAL		**630**	**5408**	**18.8**	**823**	**2.5**	**21.3**	**3.5**	**73.7**	**126.0**	**216.0**
	GS21PS01											**30.0**
	TOTAL											**246.0**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	GS21A003.1	Active	630	9957	34.6	1531	4.6	39.2	4.2	165.8	126.0	291.8
	TOTAL		**630**	**9957**	**34.6**	**1531**	**4.6**	**39.2**	**3.1**	**120.2**	**126.0**	**291.8**
	GS21PS01											**30.0**
	TOTAL											**321.8**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	GS21A003.1	Active	630	14425	50.1	2382	7.2	57.3	4.2	242.3	126.0	368.3
	TOTAL		**630**	**14425**	**50.1**	**2382**	**7.2**	**57.3**	**2.8**	**162.8**	**126.0**	**368.3**
	GS21PS01											**30.0**
	TOTAL											**398.3**

Binbrook SPS

Pumping Station Attributes

Station ID: HC058
Model ID: GP14PS01
Pumps: 2 @ 200 L/s each
Firm Capacity: 200 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	2000	5408	9957	14425
Employment Projections					
(B)	Number of Jobs	301	823	1531	2382
Design Flow					
(C)	Area	630.0 ha	630.0 ha	630.0 ha	630.0 ha
(D)	Average Residential Flow (300 Lpcd)	6.9 L/s	18.8 L/s	34.6 L/s	50.1 L/s
(E)	Average Employment Flow (260 Lpcd)	0.9 L/s	2.5 L/s	4.6 L/s	7.2 L/s
(F)	Average Flow	7.9 L/s	21.3 L/s	39.2 L/s	57.3 L/s
(G)	Peaking Factor	4.2	3.5	3.1	2.8
(H)	Domestic Peak Flow, (G)*(F)	33.2 L/s	73.7 L/s	120.2 L/s	162.8 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	126.0 L/s	126.0 L/s	126.0 L/s	126.0 L/s
TOTAL PEAK FLOW, (H) + (I)		189.2 L/s	246.0 L/s	321.8 L/s	398.3 L/s

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (15)

Project WW-22

Highway 403 Trunk Sewer Upgrades

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW - 19 & 22
Forcemain & Gravity Sewer

KMK Consultants Limited

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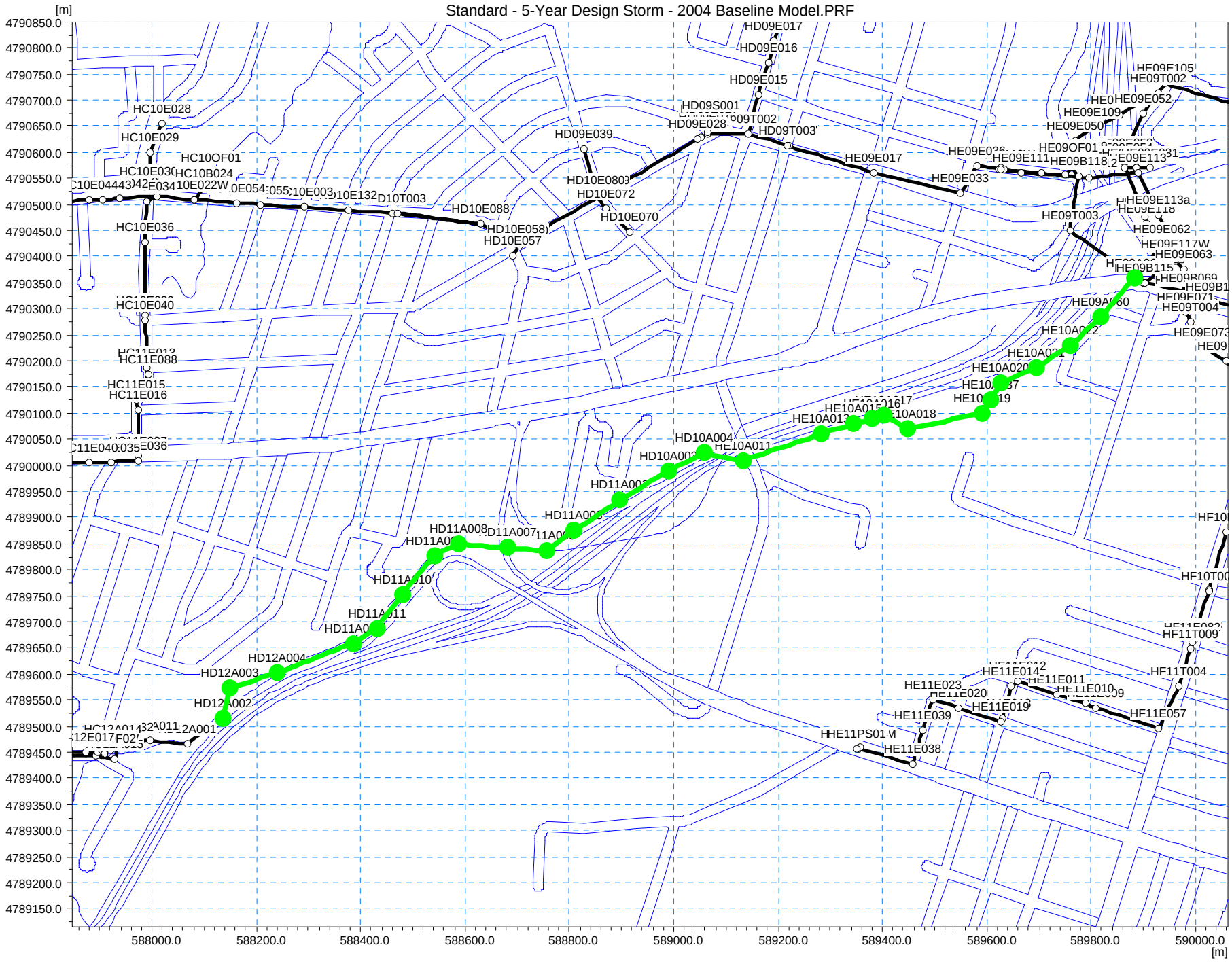
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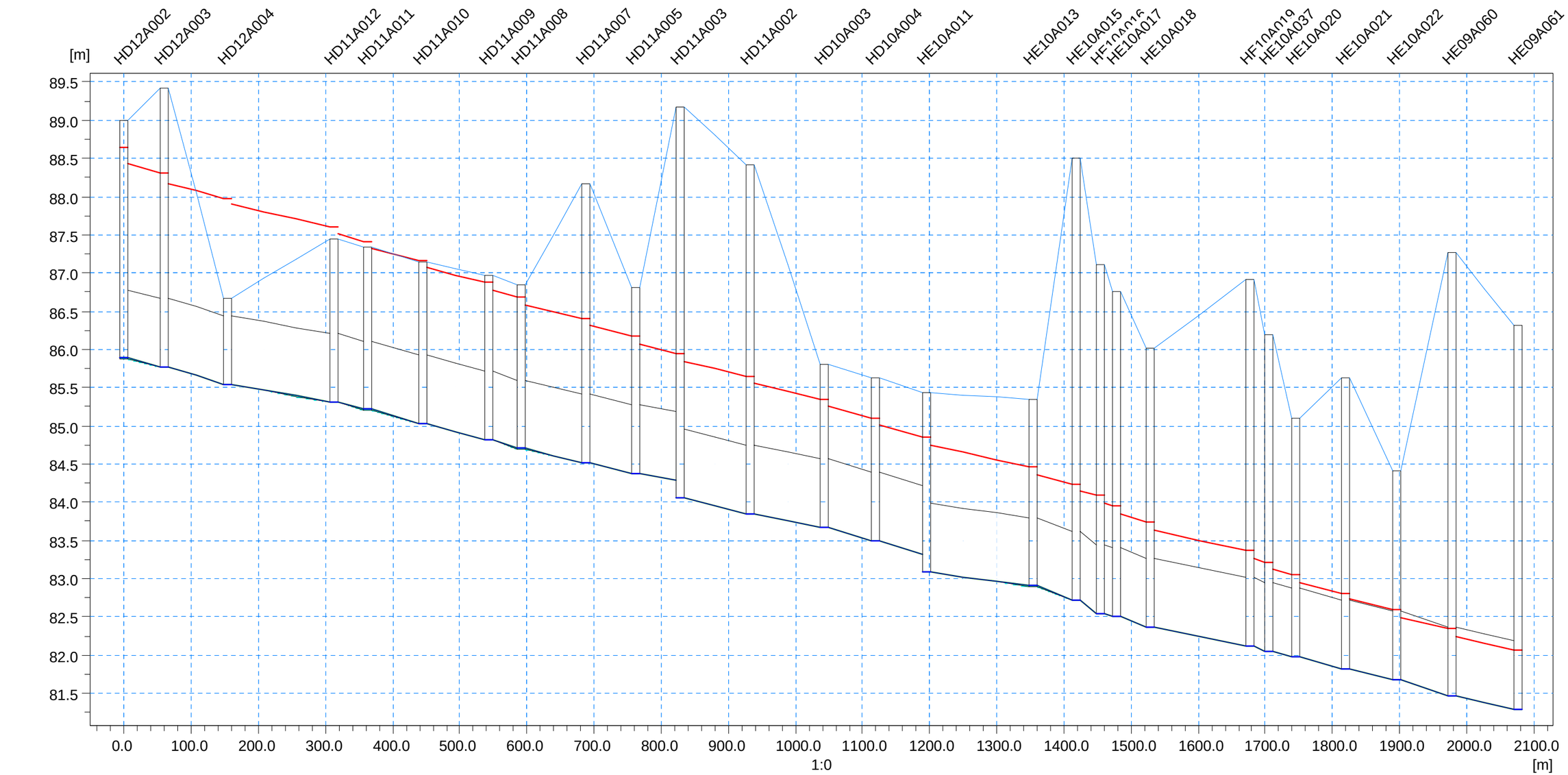

Ground Lev.	89.00	89.42	86.67		87.44	87.34	87.15	86.96	86.84	88.17	86.81	89.17	88.42	85.80	85.63	85.44		85.34	88.51	87.11	86.01		86.91	85.10	85.63	84.42	87.27		[m]
Invert lev.	85.88	85.77	85.54		85.31	85.21	85.02	84.82	84.70	84.51	84.37	84.06	83.85	83.67	83.49	83.08		82.90	82.72	82.54	82.36		82.11	81.97	81.82	81.68	81.47		[m]
Length		94.80		157.20		81.60	98.50		94.50	76.00	64.90	105.60	109.00	77.20	76.50	158.00		64.60				146.80			74.30	77.40	81.90	97.30	[m]
Diameter	0.90	0.90		0.90	0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90			0.90	0.90			0.90	0.90	0.90	0.90	[m]
Slope o/oo	1.85	2.43		1.46	1.95	2.33	2.03		2.01	1.84	1.23	1.99	1.65	2.33	2.35	1.14		2.79			2.71	1.70			2.02	1.81	2.56	1.85	

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (16)

Project WW-23

New Airport Lands SPS

New Airport Lands SPS

Station ID:
Model ID:
Pumps:
Firm Capacity:

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	811	2.4	2.4	4.0	9.7	102.8	112.5
	TZ-2649	Undeveloped	1170	0	0.0	2301	6.9	6.9	4.0	27.6	234.0	261.6
	TOTAL		**1684.00**	**0**	**0.0**	**3112**	**9.4**	**9.4**	**4.0**	**37.3**	**336.8**	**374.1**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	938	2.8	2.8	3.8	10.8	102.8	113.6
	TZ-2649	Undeveloped	1170	0	0.0	2818	8.5	8.5	3.8	32.5	234.0	266.5
	TOTAL		**1684.00**	**0**	**0.0**	**3756**	**11.3**	**11.3**	**3.8**	**43.4**	**336.8**	**380.2**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	2520	7.6	7.6	3.3	25.3	102.8	128.1
	TZ-2649	Undeveloped	1170	0	0.0	5078	15.3	15.3	3.3	50.9	234.0	284.9
	TOTAL		**1684.00**	**0**	**0.0**	**7598**	**22.9**	**22.9**	**3.3**	**76.2**	**336.8**	**413.0**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	7168	21.6	21.6	2.8	60.4	102.8	163.2
	TZ-2649	Undeveloped	1170	0	0.0	10932	32.9	32.9	2.8	92.2	234.0	326.2
	TOTAL		**1684.00**	**0**	**0.0**	**18100**	**54.5**	**54.5**	**2.8**	**152.6**	**336.8**	**489.4**

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (17)

Projects WW-24 and WW-25

New Highway 6 Forcemain and Trunk Sewer

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW - 23 & 24
Highway 6 Forcemain

KMK Consultants Limited

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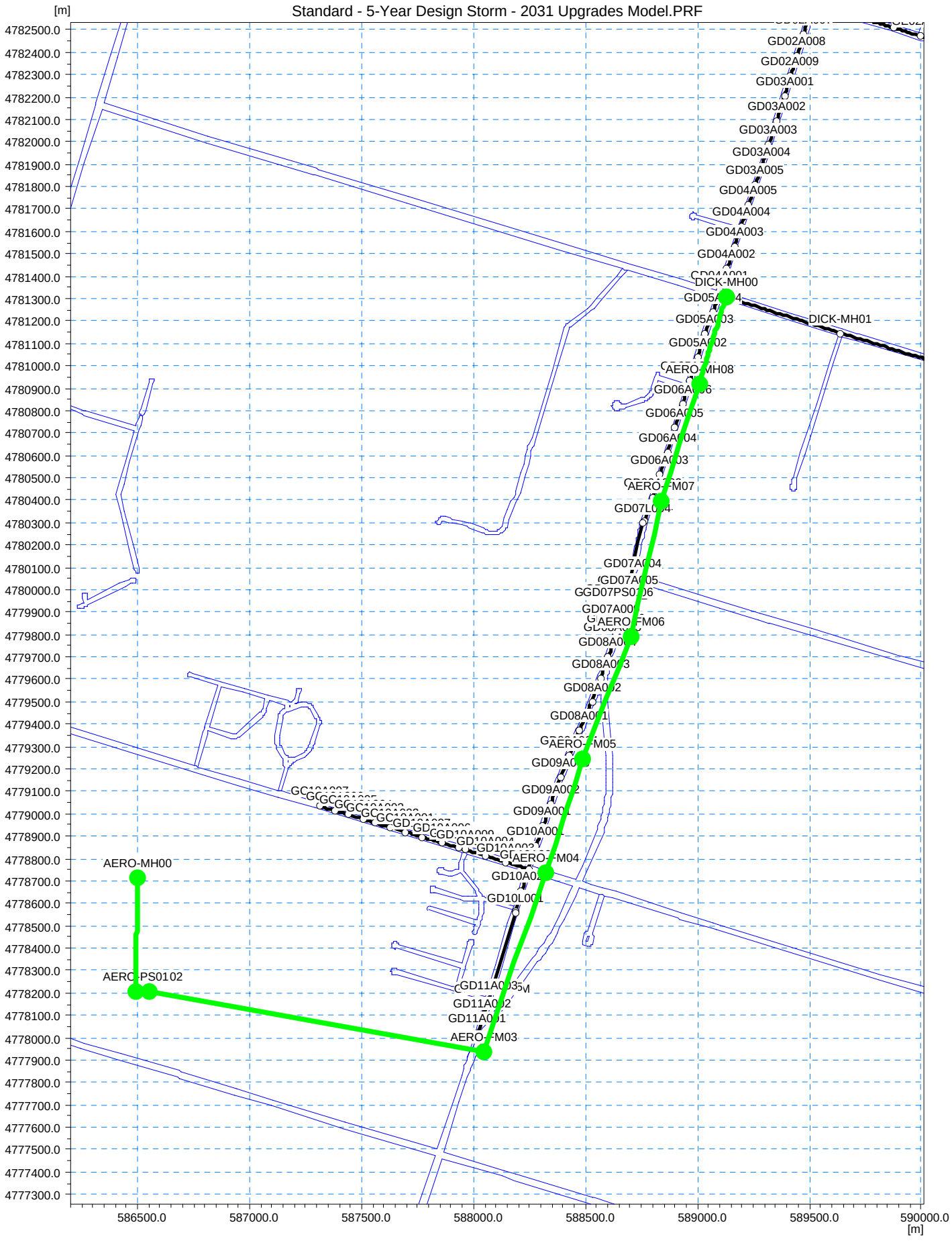
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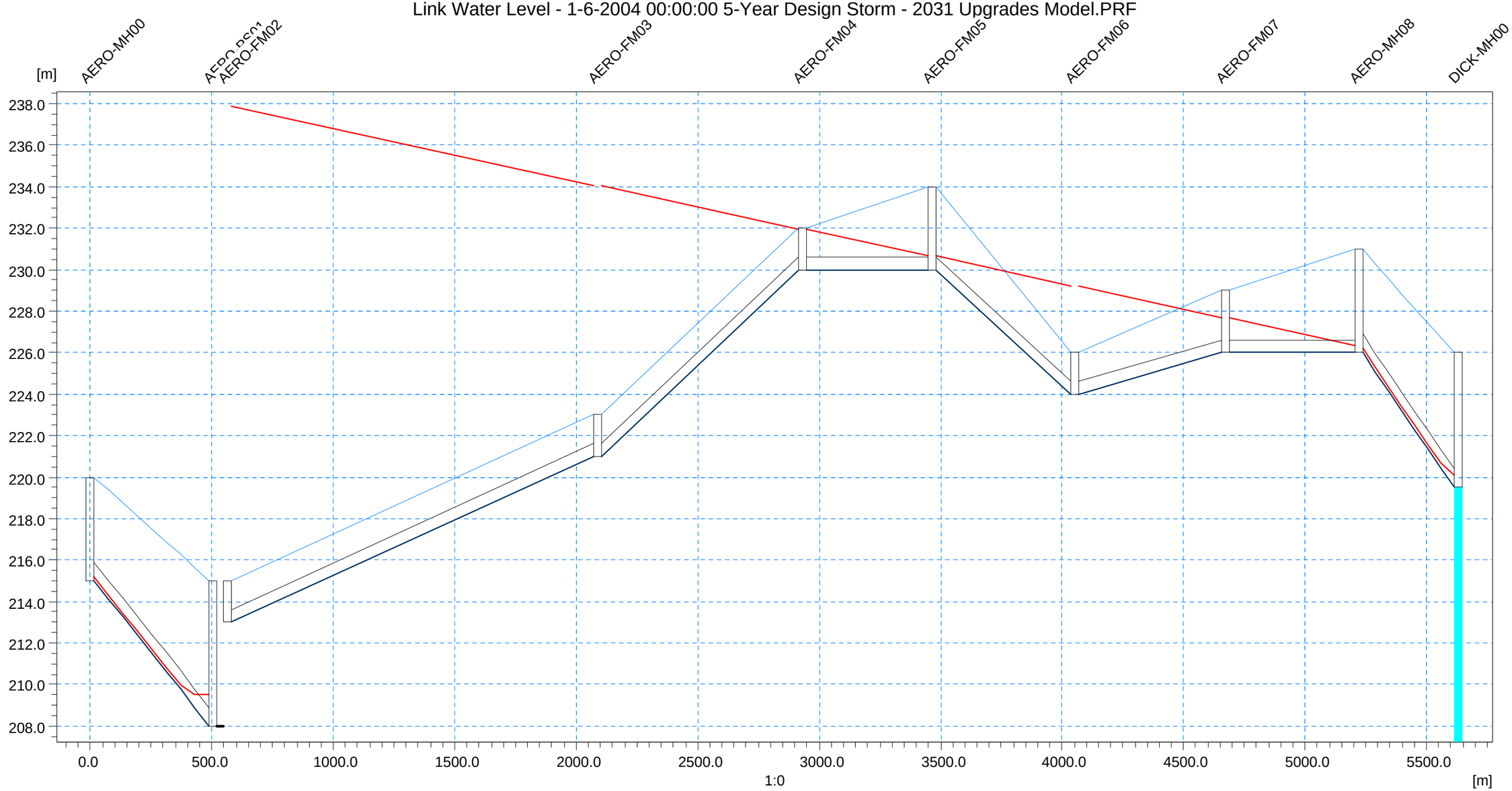

Ground Lev.	220.00	215.00		223.00	232.00	234.00	226.00	229.00	231.00		[m]
Invert lev.	215.00	208.00		221.00	230.00	230.00	224.00	226.00	226.00		[m]
Length	506.13		1520.26	847.59	529.68	588.23	624.45	545.00	408.42		[m]
Diameter	0.90		0.60	0.60	0.60	0.60	0.60	0.60	0.90		[m]
Slope o/oo	13.83		5.26	10.62	0.00	10.20	3.20	0.00	15.91		

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (18)

Projects WW-26, WW-27 and WW-28

Dickenson Road Gravity Sewer,
Pumping Station and Forcemain

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

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Wastewater Servicing

WW - 14,26,27 & 28 Forcemain & Gravity Sewer

KMK Consultants Limited

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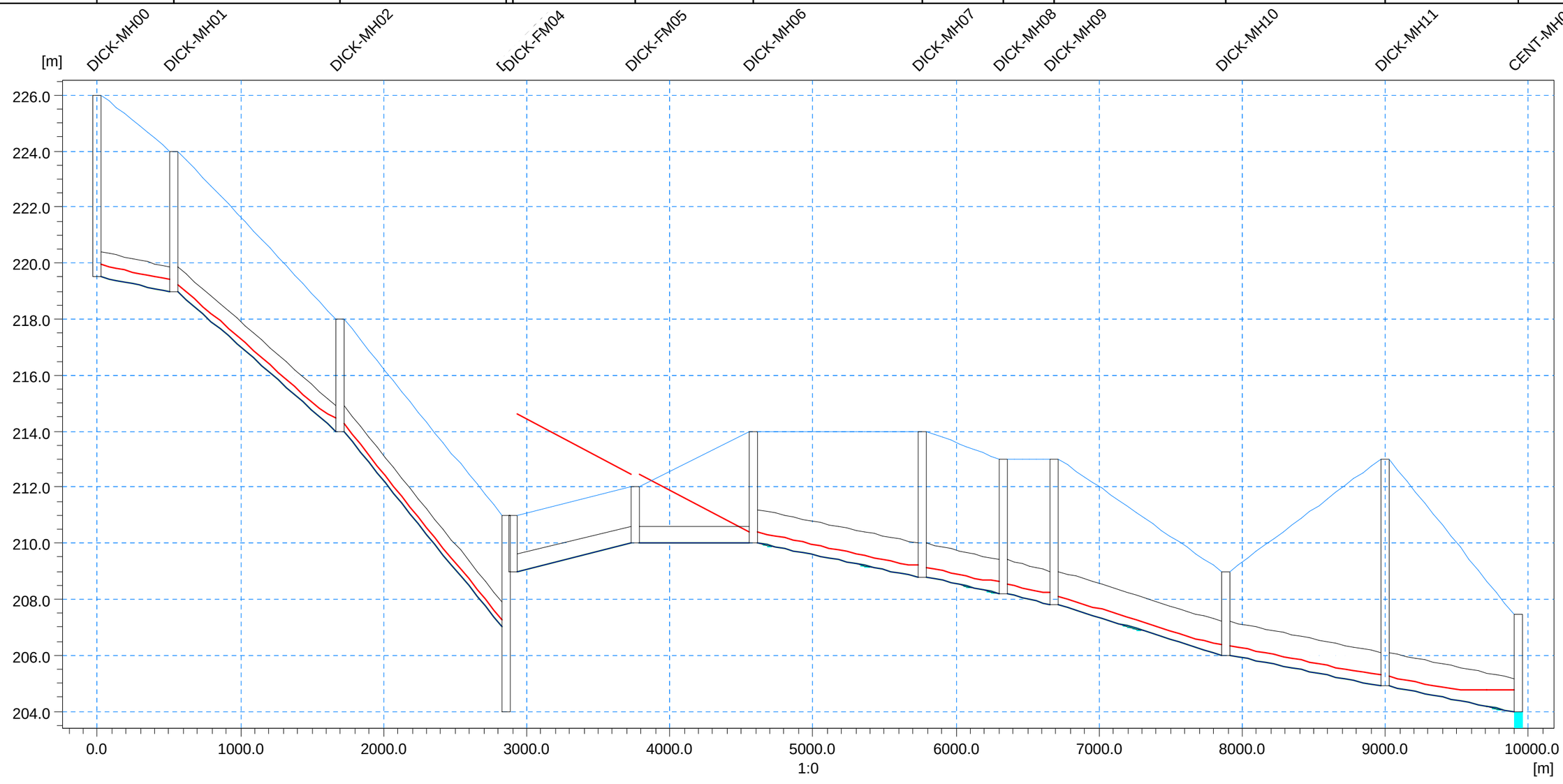
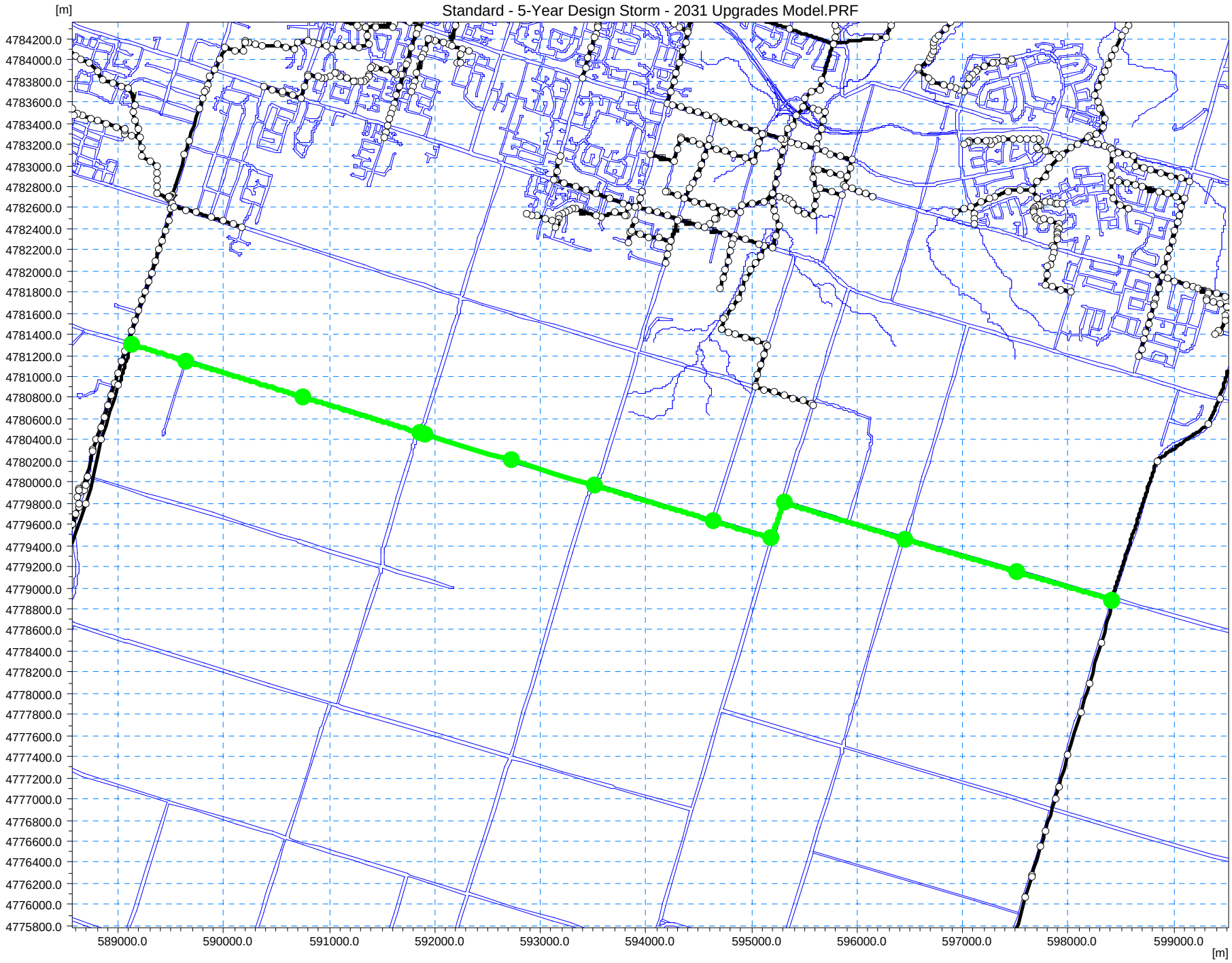
Link Water Level - 1-6-2004 00:00:00 5-Year Design Storm - 2031 Upgrades Model.PRF

Discharge	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	m3/s



Ground Lev.	226.00	224.00	218.00	211.00	212.00	214.00	214.00	213.00	213.00	209.00	213.00		[m]
Invert lev.	219.50	218.96	214.00	204.00	210.00	210.00	208.80	208.20	207.80	206.00	204.90		[m]
Length	537.37	1157.48	1159.15	857.74	826.83	1178.51	567.32		1194.56	1112.58	929.50		[m]
Diameter	0.90	0.90	0.90	0.60	0.60	1.20	1.20	1.20	1.20	1.20	1.20		[m]
Slope o/oo	1.00	4.29	6.04	1.17	0.00	1.02	1.06	1.12	1.51	0.99	1.00		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New Dickenson Road SPS

Station ID:
Model ID:
Pumps:
Firm Capacity:

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	811	2.4	2.4	4.0	9.7	102.8	112.5
	TZ-2649	Undeveloped	1170	0	0.0	2301	6.9	6.9	4.0	27.6	234.0	261.6
	TOTAL		**1684.00**	**0**	**0.0**	**3112**	**9.4**	**9.4**	**4.0**	**37.3**	**336.8**	**374.1**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	938	2.8	2.8	3.8	10.8	102.8	113.6
	TZ-2649	Undeveloped	1170	0	0.0	2818	8.5	8.5	3.8	32.5	234.0	266.5
	TOTAL		**1684.00**	**0**	**0.0**	**3756**	**11.3**	**11.3**	**3.8**	**43.4**	**336.8**	**380.2**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	2520	7.6	7.6	3.3	25.3	102.8	128.1
	TZ-2649	Undeveloped	1170	0	0.0	5078	15.3	15.3	3.3	50.9	234.0	284.9
	TOTAL		**1684.00**	**0**	**0.0**	**7598**	**22.9**	**22.9**	**3.3**	**76.2**	**336.8**	**413.0**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	TZ-2645	Undeveloped	514	0	0.0	7168	21.6	21.6	2.8	60.4	102.8	163.2
	TZ-2649	Undeveloped	1170	0	0.0	10932	32.9	32.9	2.8	92.2	234.0	326.2
	TOTAL		**1684.00**	**0**	**0.0**	**18100**	**54.5**	**54.5**	**2.8**	**152.6**	**336.8**	**489.4**

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (19)

Projects WW-29, WW-30, WW-31 and WW-32

**New Shaver Road SPS, Forcemain,
and Trunk Sewer**

Shaver Road Pumping Station

Station ID: HC053
Model ID: AH12PS01
Pumps: 2 @ 6 L/s each
Firm Capacity: 6 L/s

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AH12PS01.1	Undeveloped	16.18	321	1.1	0	0.0	1.1	5.0	5.6	3.2	8.8
	AI12A079.1	Undeveloped	25.39	517	1.8	4	0.0	1.8	5.0	9.0	5.1	14.1
	TOTAL		**41.57**	**838**	**2.9**	**5**	**0.0**	**2.9**	5.0	**14.6**	**8.3**	**22.9**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AH12PS01.1	Undeveloped	16.18	378	1.3	0	0.0	1.3	5.0	6.6	3.2	9.8
	AI12A079.1	Undeveloped	25.39	608	2.1	5	0.0	2.1	5.0	10.6	5.1	15.7
	TOTAL		**41.57**	**986**	**3.4**	**5**	**0.0**	**3.4**	**5.0**	**17.2**	**8.3**	**25.5**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AH12PS01.1	Undeveloped	16.18	422	1.5	0	0.0	1.5	4.9	7.2	3.2	10.4
	AI12A079.1	Undeveloped	25.39	678	2.4	5	0.0	2.4	4.9	11.6	5.1	16.7
	TOTAL		**41.57**	**1100**	**3.8**	**6**	**0.0**	**3.8**	**4.9**	**18.8**	**8.3**	**27.1**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AH12PS01.1	Undeveloped	16.18	417	1.4	0	0.0	1.4	4.9	7.1	3.2	10.3
	AI12A079.1	Undeveloped	25.39	670	2.3	6	0.0	2.3	4.9	11.5	5.1	16.6
	TOTAL		**41.57**	**1087**	**3.8**	**6**	**0.0**	**3.8**	**4.9**	**18.6**	**8.3**	**26.9**

Shaver Road Pumping Station

Pumping Station Attributes
Station ID: HC053
Model ID: AH12PS01
Pumps: 2 @ 6 L/s each
Firm Capacity: 6 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	838	986	1100	1087
Employment Projections					
(B)	Number of Jobs	5	5	6	6
Design Flow					
(C)	Area	41.6 ha	41.6 ha	41.6 ha	41.6 ha
(D)	Average Residential Flow (300 Lpcd)	2.9 L/s	3.4 L/s	3.8 L/s	3.8 L/s
(E)	Average Employment Flow (260 Lpcd)	0.0 L/s	0.0 L/s	0.0 L/s	0.0 L/s
(F)	Average Flow	2.9 L/s	3.4 L/s	3.8 L/s	3.8 L/s
(G)	Peaking Factor	5.0	5.0	4.9	4.9
(H)	Domestic Peak Flow, (G)*(F)	14.6 L/s	17.2 L/s	18.8 L/s	18.6 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	8.3 L/s	8.3 L/s	8.3 L/s	8.3 L/s
TOTAL PEAK FLOW, (H) + (I)		22.9 L/s	25.5 L/s	27.1 L/s	26.9 L/s

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (20)

Project WW-33

Battlefield Trunk Sewer Upgrades

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

BUILDING A STRONG FOUNDATION HAMILTON

Wastewater Servicing

WW-33
Gravity Sewer

KMK Consultants Limited

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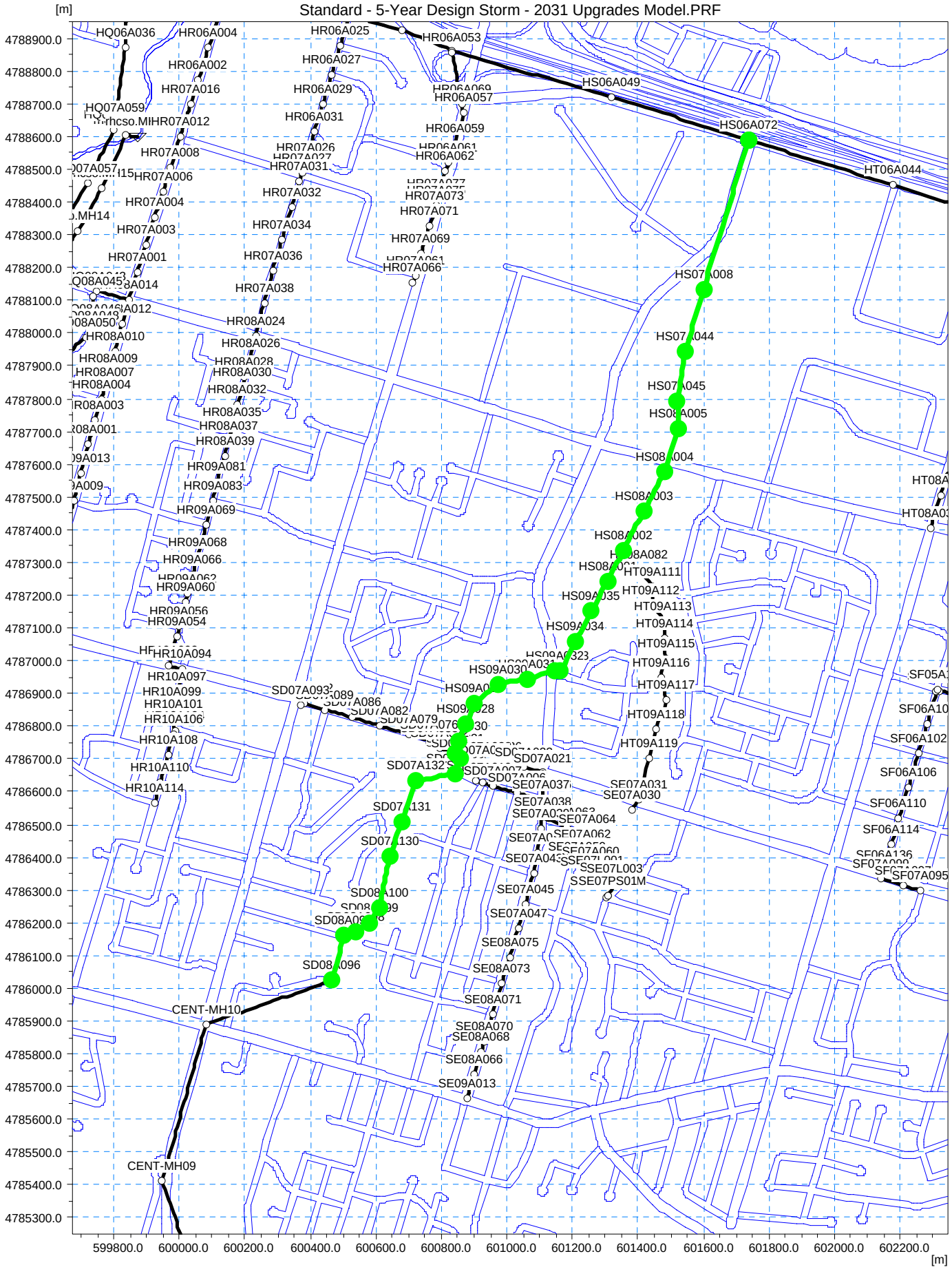
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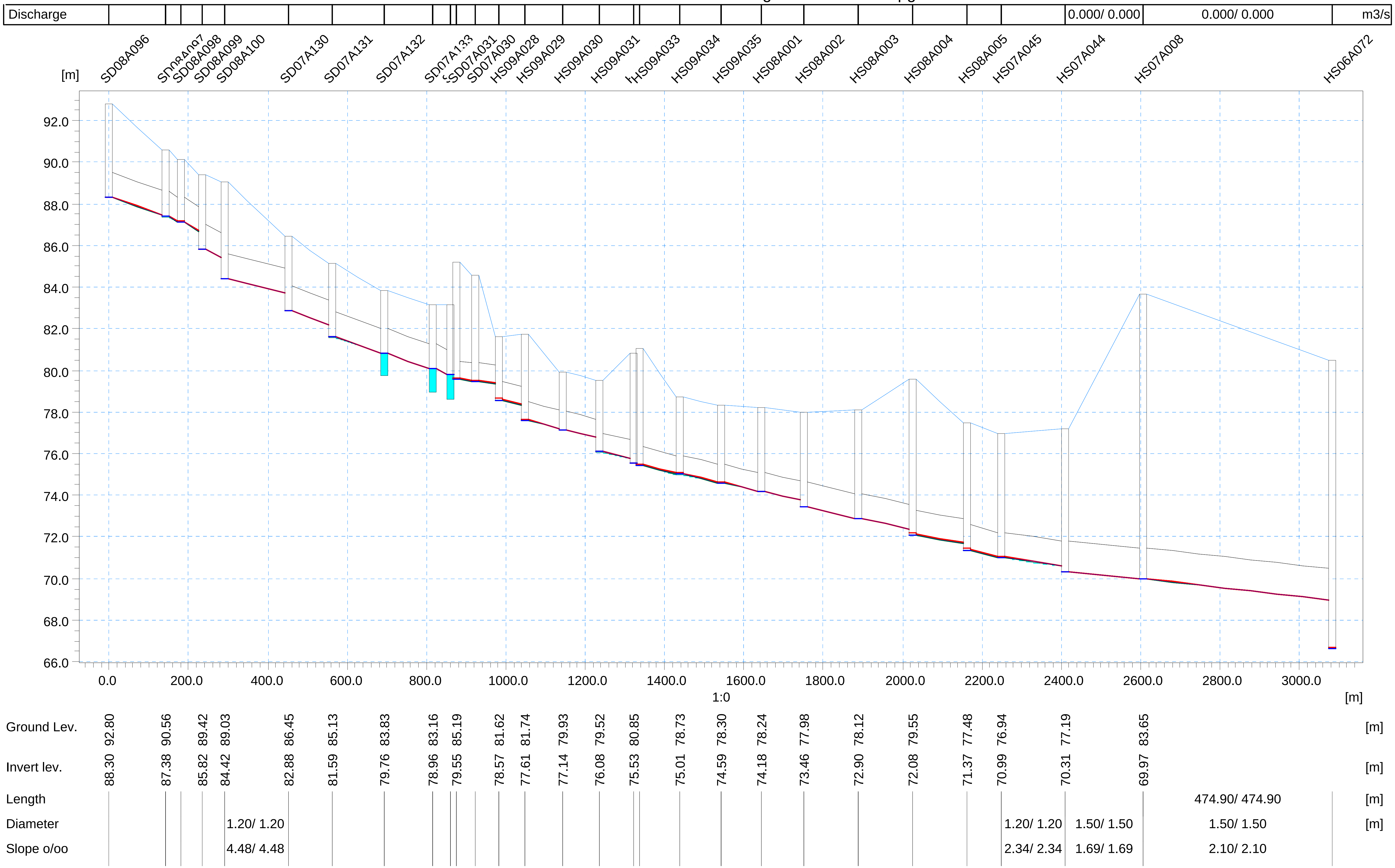

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (21)

Project WW-34

Scenic Drive SPS (HC002) Upgrades

West 31st Street and Scenic Drive Pumping Station

Station ID: HC002
Model ID: HD13PS01
Pumps: 2 @ 57 L/s each
Firm Capacity: 57 L/s

2001

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
HD13PS01.1	Active	141.74	2634	9.1	953	2.9	12.0	3.7	44.7	28.3	73.0
HD13PS01.2	Active	21.37	580	2.0	44	0.1	2.1	3.7	8.0	4.3	12.3
HD13A022.1	Active	5.09	151	0.5	0	0.0	0.5	3.7	1.9	1.0	3.0
HF13A124.1	Active	2.12	29	0.1	2	0.0	0.1	3.7	0.4	0.4	0.8
TOTAL		**170.32**	**3394**	**11.8**	**999**	**3.0**	**14.8**	**3.7**	**55.0**	**34.1**	**89.1**

2011

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
HD13PS01.1	Active	141.74	2600	9.0	1016	3.1	12.1	3.7	44.9	28.3	73.3
HD13PS01.2	Active	21.37	570	2.0	43	0.1	2.1	3.7	7.8	4.3	12.1
HD13A022.1	Active	5.09	148	0.5	0	0.0	0.5	3.7	1.9	1.0	2.9
HF13A124.1	Active	2.12	29	0.1	2	0.0	0.1	3.7	0.4	0.4	0.8
TOTAL		**170.32**	**3346**	**11.6**	**1061**	**3.2**	**14.8**	**3.7**	**55.0**	**34.1**	**89.1**

2021

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
HD13PS01.1	Active	141.74	2601	9.0	1122	3.4	12.4	3.7	45.3	28.3	73.6
HD13PS01.2	Active	21.37	571	2.0	42	0.1	2.1	3.7	7.7	4.3	12.0
HD13A022.1	Active	5.09	453	1.6	0	0.0	1.6	3.7	5.7	1.0	6.8
HF13A124.1	Active	2.12	29	0.1	2	0.0	0.1	3.7	0.4	0.4	0.8
TOTAL		**170.32**	**3653**	**12.7**	**1166**	**3.5**	**16.2**	**3.7**	**59.1**	**34.1**	**93.2**

2031

Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
HD13PS01.1	Active	141.74	2845	9.9	1217	3.7	13.5	3.6	49.1	28.3	77.5
HD13PS01.2	Active	21.37	571	2.0	44	0.1	2.1	3.6	7.7	4.3	11.9
HD13A022.1	Active	5.09	277	1.0	0	0.0	1.0	3.6	3.5	1.0	4.5
HF13A124.1	Active	2.12	29	0.1	2	0.0	0.1	3.6	0.4	0.4	0.8
TOTAL		**170.32**	**3721**	**12.9**	**1263**	**3.8**	**16.7**	**3.6**	**60.6**	**34.1**	**94.7**

West 31st and Scenic Drive Pumping Station

Pumping Station Attributes
Station ID: HC002
Model ID: HD13PS01
Pumps: 2 @ 57 L/s each
Firm Capacity: 57 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	3394	3346	3653	3721
Employment Projections					
(B)	Number of Jobs	999	1061	1166	1263
Design Flow					
(C)	Area	170.3 ha	170.3 ha	170.3 ha	170.3 ha
(D)	Average Residential Flow (300 Lpcd)	11.8 L/s	11.6 L/s	12.7 L/s	12.9 L/s
(E)	Average Employment Flow (260 Lpcd)	3.0 L/s	3.2 L/s	3.5 L/s	3.8 L/s
(F)	Average Flow	14.8 L/s	14.8 L/s	16.2 L/s	16.7 L/s
(G)	Peaking Factor	3.7	3.7	3.7	3.6
(H)	Domestic Peak Flow, (G)*(F)	55.0 L/s	55.0 L/s	59.1 L/s	60.6 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	34.1 L/s	34.1 L/s	34.1 L/s	34.1 L/s
TOTAL PEAK FLOW, (H) + (I)		89.1 L/s	89.1 L/s	93.2 L/s	94.7 L/s

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-2 (22)

Project WW-35

Calvin Street SPS (HC011) Upgrades

Calvin Street Pumping Station

Station ID: HC011
Model ID: AL12PS01
Pumps: 2 @ 59 L/s each
Firm Capacity: 59 L/s

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AL12PS01.1	Active	42.61	650	2.3	50	0.2	2.4	4.8	11.4	8.5	20.0
	AL12A006.1	Active	39.19	551	1.9	39	0.1	2.0	4.8	9.7	7.8	17.5
	TOTAL		**81.8**	**1201**	**4.2**	**89**	**0.3**	**4.4**	**4.8**	**21.1**	**16.4**	**37.5**
	Braithwaite SPS											37.0
	TOTAL											**74.5**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AL12PS01.1	Active	42.61	648	2.2	54	0.2	2.4	4.7	11.4	8.5	19.9
	AL12A006.1	Active	39.19	566	2.0	44	0.1	2.1	4.7	9.9	7.8	17.8
	TOTAL		**81.8**	**1214**	**4.2**	**98**	**0.3**	**4.5**	**4.8**	**21.4**	**16.4**	**37.8**
	Braithwaite SPS											37.0
	TOTAL											**74.8**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AL12PS01.1	Active	42.61	925	3.2	71	0.2	3.4	4.4	15.2	8.5	23.7
	AL12A006.1	Active	39.19	758	2.6	56	0.2	2.8	4.4	12.4	7.8	20.3
	TOTAL		**81.8**	**1682**	**5.8**	**127**	**0.4**	**6.2**	**4.8**	**29.6**	**16.4**	**45.9**
	Braithwaite SPS											37.0
	TOTAL											**82.9**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	AL12PS01.1	Active	42.61	977	3.4	76	0.2	3.6	4.4	15.9	8.5	24.4
	AL12A006.1	Active	39.19	790	2.7	69	0.2	3.0	4.4	13.0	7.8	20.8
	TOTAL		**81.8**	**1768**	**6.1**	**144**	**0.4**	**6.6**	**4.8**	**31.2**	**16.4**	**47.6**
	Braithwaite SPS											37.0
	TOTAL											**84.6**

Calvin Street Pumping Station

Pumping Station Attributes
Station ID: HC011
Model ID: AL12PS01
Pumps: 2 @ 59 L/s each
Firm Capacity: 59 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	1201	1214	1682	1768
Employment Projections					
(B)	Number of Jobs	89	98	127	144
Design Flow					
(C)	Area	81.8 ha	81.8 ha	81.8 ha	81.8 ha
(D)	Average Residential Flow (300 Lpcd)	4.2 L/s	4.2 L/s	5.8 L/s	6.1 L/s
(E)	Average Employment Flow (260 Lpcd)	0.3 L/s	0.3 L/s	0.4 L/s	0.4 L/s
(F)	Average Flow	4.4 L/s	4.5 L/s	6.2 L/s	6.6 L/s
(G)	Peaking Factor	4.8	4.8	4.8	4.8
(H)	Domestic Peak Flow, (G)*(F)	21.1 L/s	21.4 L/s	29.6 L/s	31.2 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	16.4 L/s	16.4L/s	16.4 L/s	16.4 L/s
TOTAL PEAK FLOW, (H) + (I)		74.5 L/s	74.8 L/s	82.9 L/s	84.6 L/s

City of Hamilton Water and Wastewater Master Plan

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Appendix A-2 (23)

Projects WW-36 and WW-37

Green Road SPS (HC056)
and Forcemain Upgrades

LOCATION	CATCHMENTID
SF03A005	SF03A005.1
SF03PS01	SF03PS01.1
SF03PS01	SF03PS01.2

Green Road

Station ID: HC056
Model ID: SF03PS01
Pumps: 2 @ 62 L/s each
Firm Capacity: 62 L/s

2001	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	SF03A005.1											
	SF03PS01.1	Active	11.39	198	0.7	72	0.2	0.9	4.1	3.7	2.3	6.0
	SF03PS01.2	Active	54.84	1562	5.4	951	2.9	8.3	4.1	33.8	11.0	44.7
	TOTAL		**66.23**	**1760**	**6.1**	**1023**	**3.1**	**9.2**	**4.1**	**37.4**	**13.2**	**50.7**

2011	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	SF03A005.1											
	SF03PS01.1	Active	11.39	220	0.8	86	0.3	1.0	4.0	4.1	2.3	6.4
	SF03PS01.2	Active	54.84	1598	5.5	1095	3.3	8.8	4.0	35.5	11.0	46.5
	TOTAL		**66.23**	**1818**	**6.3**	**1180**	**3.6**	**9.9**	**4.0**	**39.6**	**13.2**	**52.8**

2021	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	SF03A005.1											
	SF03PS01.1	Active	11.39	317	1.1	99	0.3	1.4	3.9	5.5	2.3	7.8
	SF03PS01.2	Active	54.84	1603	5.6	1266	3.8	9.4	3.9	37.0	11.0	47.9
	TOTAL		**66.23**	**1920**	**6.7**	**1365**	**4.1**	**10.8**	**3.9**	**42.5**	**13.2**	**55.7**

2031	Catchment	Status	Area [ha]	Pop	Pop Flow [L/s]	Jobs	Jobs Flow [L/s]	Avg. Flow [L/s]	Peaking Factor	Peak Flow [L/s]	Infiltration [L/s]	Total Flow [L/s]
	SF03A005.1											
	SF03PS01.1	Active	11.39	317	1.1	112	0.3	1.4	3.6	5.2	2.3	7.5
	SF03PS01.2	Active	54.84	2948	10.2	1469	4.4	14.7	3.6	53.4	11.0	64.4
	TOTAL		**66.23**	**3264**	**11.3**	**1581**	**4.8**	**16.1**	**3.6**	**58.7**	**13.2**	**71.9**

Green Road

Pumping Station Attributes
Station ID: HC056
Model ID: SF03PS01
Pumps: 2 @ 62 L/s each
Firm Capacity: 62 L/s

		2001 (active only)	2011	2021	2031 (Active & Undeveloped)
Population Projections					
(A)	Total Serviced Population	1760	1818	1920	3264
Employment Projections					
(B)	Number of Jobs	1023	1180	1365	1581
Design Flow					
(C)	Area	66.2 ha	66.2 ha	66.2 ha	66.2 ha
(D)	Average Residential Flow (300 Lpcd)	6.1 L/s	6.3 L/s	6.7 L/s	11.3 L/s
(E)	Average Employment Flow (260 Lpcd)	3.1 L/s	3.6 L/s	4.1 L/s	4.8 L/s
(F)	Average Flow	9.2 L/s	9.9 L/s	10.8 L/s	16.1 L/s
(G)	Peaking Factor	4.1	4.0	3.9	3.6
(H)	Domestic Peak Flow, (G)*(F)	37.4 L/s	39.6 L/s	42.5 L/s	58.7 L/s
(I)	External Infiltration, (C)*0.2 L/ha/s	13.2 L/s	13.2 L/s	13.2 L/s	13.2 L/s
TOTAL PEAK FLOW, (H) + (I)		50.7 L/s	52.8 L/s	55.7 L/s	71.9 L/s

City of Hamilton Water and Wastewater Master Plan

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Appendix A-3

Capital Program

City of Hamilton Water and Wastewater Master Plan

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Appendix A-3 (01)

Water Capital Program
Master Plan Water Servicing Projects

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

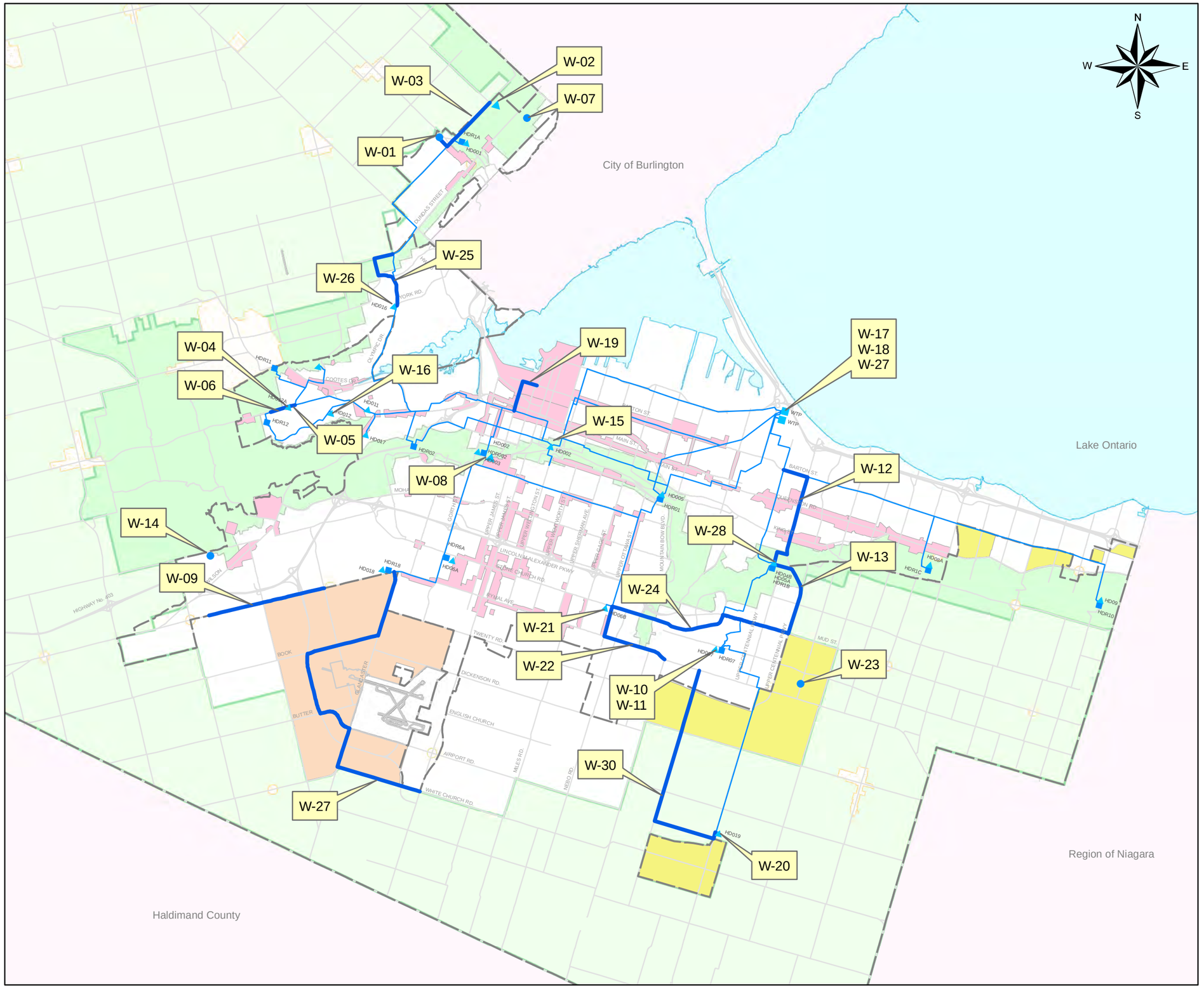
MASTER PLAN WATER SERVICING CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

Year Req'd in Service	Code	Master Plan Project No.	Type	Ward	Project	Description	Size / Total Capacity	Quantity / Additional Capacity	Total Estimated Cost (Millions)	Class EA Schedule	Trigger	Comments
2008	MP	W-01	T	15	Waterdown North Elevated Tank	New Elevated Tank, North of Parkside Dr. and west of Centre Rd.	8 ML	8 MLD	$6.0M	B	Growth in Waterdown North	Location is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
2008	MP	W-02	PS	15	New HD16A Pumping Station	New Pumping Station for PD16A	9.74 MLD	9.8 MLD	$3.0M	B	Growth in UpCountry and Waterdown South	Location is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
2008	MP	W-03	F	15	Parkside Drive Watermain	New watermain on Parkside Dr. crossing Grindstone Creek and Railway Line	400 mm	2000 m	$1.5M	B	Growth in Waterdown North	Project requires rail and river crossing. Project will support pressures and flows in Waterdown North as well as supply to new booster pumping station.
2008	MP	W-04	PS	13	HD12A Governor's Road Pumping Station Upgrades	Additional PD12 pumping capacity, new PD22 pump and new standby power	4.3 MLD	3 MLD	$2.1M	B	Growth in Dundas, security of supply	Project required to support peak demand needs for PD12 and PD22
2008	MP	W-05	F	13	Governor's Road PD11 Watermain Extension	Twin watermain feeding HD12A	400 mm	220 m	$0.2M	A	Growth in Dundas, security of supply	Based on the potential peak flow from HD012A, additional supply-side distribution capacity is required
2008	MP	W-06	F	13	Governor's Road PD22 Watermain Extension	New Watermain from HD12A to PD22 on Governor's Road and Moss Blvd.	300 mm	1000 m	$0.7M	A	Growth in Dundas, security of supply	This feed will provide additional supply security to PD22
2009	MP	W-07	T	15	Waterdown South Elevated Tank	New Elevated Tank, South of Dundas St E and west of Kerns Rd.	6.3 ML	6.3 ML	$4.5M	B	Growth in UpCountry and Waterdown South	Location is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
2009	MP	W-08	PS	1	New HD03B Highland Gardens Pumping Station	New Pumping Station for PD3	7 MLD	7 MLD	$4.0M	B	Peak demands and security of supply in PD3	Project is being completed under independent Class EA Study
2009	MP	W-09	F	12	Garner Road Watermain	New watermain from Southcote on Garner Rd East to Wilson Rd.	500 mm	5100 m	$6.2M	A	Peak demands and system pressures in PD18	Project required to support peak demand needs for PD18 and maintain system pressures
2009	MP	W-10	PS	9	HD007 Highland Pumping Station Upgrades	Pumping Station expansion including additional pumping capacity and new standby power	32 MLD	10 MLD	$6.9M	B	Growth in ROPA9 and Southeast Mountain	Project was confirmed through independent Class EA Study. PS Upgrades will also address new PD7 HGL and PRVs.
2009	MP	W-11	T	9	HD007 Highland Reservoir Expansion	HD007 Reservoir expansion	27 ML	16 ML	$8.2M	B	Growth in ROPA9 and Southeast Mountain	Project was confirmed through independent Class EA Study
2010	MP	W-12	F	5	Centennial Pkwy Trunk Feedermain	New watermain on Centennial Parkway from Barton Street to HD05A	1200 mm	3500 m	$11.3M	B	Growth in Hamilton Mountain, Ancaster, Airport Lands, Binbrook, security of supply	This feed will provide additional capacity and supply security to PD5 which ultimately feeds Southeast Mountain, Airport Lands and Binbrook
2010	MP	W-13	F	5,9	Centennial Pkwy Trunk Feedermain	New watermain on Centennial Parkway from HD05A up escarpment to Mud St. W	1200 mm	3000 m	$9.9M	B	Growth in Hamilton Mountain, Ancaster, Airport Lands, Binbrook, security of supply	This feed will provide additional capacity and supply security to PD5 which ultimately feeds Southeast Mountain, Airport Lands and Binbrook
2011	MP	W-14	T	12	Pressure District 18 Elevated Tank	New Elevated Tank, on Jerseyville Road	7 ML	7 ML	$5.3M	B	Growth in Ancaster, security of supply	Project required to equalize system pressures and provide additional system storage
2011	MP	W-15	PS	2	HD002 Ferguson Pumping Station Upgrades (Standby Power)	New Standby Power	1000 kW	1000 KW	$1.5M	B	Security of supply to PD2, 3	As a critical pumping station for supply to PD2, 3, standby power is required for security of supply
2011	MP	W-16	PS	13	HD012 Lynden Ave Pumping Station Upgrades	Additional pumping capacity and new standby power	4.3 MLD	3 MLD	$2.1M	B	Growth in Dundas, security of supply	This pumping station will continue to provide a secondary feed to PD12. Based on the isolated service area, this pumping station should be maintained in service and upgraded
2011	MP	W-17	WTP	4	Sedimentation Tank upgrades	Woodward Ave. WTP Improvements			$15.0M	A	Growth in Hamilton	Process upgrades are required to maintain rated capacity of the WTP
2011	MP	W-18	WTP	4	Pre-Chlorination system upgrades	Woodward Ave. WTP Improvements			$1.0M	A	Growth in Hamilton	Process upgrades are required to maintain rated capacity of the WTP
2014	MP	W-19	F	9	Locke St Watermain	New watermain on Locke St N from Barton St to Main St	400 mm	1500 m	$1.4M	A	Intensification in downtown Hamilton	Required to provide additional distribution capacity
2014	MP	W-20	PS	11	HD019 Binbrook/Hwy56 Pumping Station Upgrades	Additional pumping capacity	15 MLD	9 MLD	$6.4M	B	Growth in Binbrook	Required to provide additional pumping capacity to PD19

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

MASTER PLAN WATER SERVICING CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

Year Req'd in Service	Code	Master Plan Project No.	Type	Ward	Project	Description	Size / Total Capacity	Quantity / Additional Capacity	Total Estimated Cost (Millions)	Class EA Schedule	Trigger	Comments
2016	MP	W-21	PS	6	HD06B Tunbridge Pumping Station Upgrades (HD07A)	New pumping capacity and suction/discharge piping upgrades for PD7	50 MLD	50 MLD	$3.5M	B	Growth in ROPA9 and Southeast Mountain	This project will provide additional pumping capacity and supply security to PD7
2016	MP	W-22	F	6,9,11	HD07A Feedermain	New watermain from HD06B on Anchor Rd. to Rymal Rd. then on Rymal Rd. to Trinity Church Rd.	750 mm	3100 m	$5.7M	A	Growth in ROPA9 and Southeast Mountain	This project will provide additional supply distribution capacity and supply security to PD7
2016	MP	W-23	T	11	Pressure District 7 Elevated Tank	New Elevated Tank, south of Highland Rd and west of First Rd. E	7 ML	7 ML	$5.3M	B	Growth in ROPA9 and Southeast Mountain	This project will provide additional storage capacity and supply security to PD7. Location will be reviewed as part of Secondary Plan.
2016	MP	W-24	F	6,9	Stone Church Trunk Feedermain	New watermain from Centennial on Mud St W, Paramount Drive, Stone Church Rd to HD06B	1200 mm	7500 m	$22.1M	B	Growth in ROPA9 and Southeast Mountain	Based on the additional flows from HD06B, additional supply-side distribution capacity is required
2019	MP	W-25	F	13,15	HD016 Trunk Feedermain	New watermain up Valley Rd. and Rock Chapel Rd. to Dundas St/Algonquin Ave.	600 mm	3900 m	$6.7M	B	Growth in Waterdown and security of supply	This project is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process. It is required for security of supply in order to offset additional storage.
2019	MP	W-26	PS	13	HD016 York/Valley Road Pumping Station upgrades	Additional pumping capacity and new standby power	20.52 MLD	3 MLD	$6.0M	B	Growth in Waterdown and security of supply	This project is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process. It is required for security of supply in order to offset additional storage.
2021	MP	W-27	F	11,12	Airport Lands Trunk Watermain	New Airport lands Trunk Watermain	400 mm	12200 m	$11.7M	A	Growth in the Airport Lands	The alignment will need to be updated as the Secondary Plan for this area is completed. An internal trunk watermain will be required to support servicing for this area.
2022	MP	W-28	PS	5	HD05A Greenhill Pumping Station Upgrades	Additional pumping capacity and new standby power	155 MLD	57 MLD	$5.0M	B	Growth in Southeast Mountain, Ancaster, Airport Lands, Binbrook, security of supply	Additional supply capacity and supply security is required for PD5 which ultimately feeds Southeast Mountain, Airport Lands and Binbrook
2023	MP	W-29	PS/WTP	4	Woodward Ave. WTP Expansion	Additional high lift pumping capacity	592 MLD	23 MLD	$2.0M	C	Growth in Hamilton	Additional high lift pumping capacity is required to meet buildout growth needs
2023	MP	W-30	F	9	Binbrook Trunk Feedermain	New watermain from PD7 to HD019 along Fletchers Road and Cemetary Road	400 mm	7200 m	$5.5M	A	Growth in Binbrook, security of supply	A secondary feed is required to provide additional distribution capacity and security of supply to Binbrook. This feed could be coordinate with a future booster pumping station.
					Total Cost				**$171.0M**			



Legend

- Pump
- Reservoir
- Plant
- Watermain
- Watermain Upgrades
- Rural Settlement Area
- Potential Urban Boundary Expansion
- Potential New Business Park
- Intensification Area
- Niagara Escarpment
- Greenbelt
- Urban Boundary

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

Integrated Water & Wastewater Master Plan

Water Servicing

Preferred Solution

KMK Consultants Limited

Nov 22, 2006
1:125,000
2590-D-100

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-3 (02)

Water Capital Program
Development Related Water System Improvements

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

DEVELOPMENT-RELATED WATER SYSTEM IMPROVEMENTS CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

The following capital program was identified under the City of Hamilton Development Charge Background Study completed in 2004 by C. N. Watson in association with Earth Tech Canada and Philips Engineering. The capital program has been reviewed in coordination with the development of the Master Plan capital program. The total estimated costs have bee updated to reflect 2006 dollars.

Many of the projects listed below are not typically considered Master Plan trunk infrastructure. However, they are considered integral in servicing new growth areas and would be part of costs for servicing new development. The details, including final alignments, sizing and timing, will be reviewed and updated as part of Secondary Plans and local servicing processes.

Year Req'd in Service	Code	DC Project No.	Project	Description	Size / Capacity	Quantity	Total Estimated Cost (Millions)	Comments
0-5 Years	DC	W1	North Waterdown Tower	New 12 ML Elevated Water Tower				Covered by Master Plan Project No. W-01
0-5 Years	DC	W2	North Waterdown	New 400 mm WM through North Waterdown	400 mm	2300 m	$2.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	W3	Up Country Estates	New 400 mm WM from Parkside Dr. to Hwy. 5	400 mm	925 m	$0.9M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	W4	Parkside Dr	New 400 mm WM from Main St. to Upcountry Estates.				Covered by Master Plan Project No. W-03
0-5 Years	DC	W5	Water Tower	New Pressure District Water Tower @ Hwy. 5 and Upcountry Estates				Covered by Master Plan Project No. W-07
0-5 Years	DC	W6	South Waterdown	New 400 mm WM from Upcountry to New Pressure District Water Tower	400 mm	475 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	W7	South Waterdown	New 400 mm WM from 470 m west of Kerns Rd. to 1070m west of Kerns Rd.	400 mm	600 m	$0.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	W8	South Waterdown	New 400 mm WM from Flanders Dr. to 1300m east of Flanders Dr.	400 mm	1300 m	$1.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	W9	Watermain	New 300 mm WM from North Waterdown Tower to 500m East of Hwy. 6	300 mm	1000 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	W10	Booster Station Upgrade	Upgrade of HD016 Booster Pumping Station from 208 L/s to 309 L/s				Covered by Master Plan Project No. W-26
6 Years to UBBO	DC	W11	W-H2 PS Replacement	P.S. W-H2 (replace existing)				The Master Plan has reviewed all required pumping capacity upgrades
0-5 Years	DC	A1	Garner Rd. Watermain	New 500 mm WM from Fiddlers Green Rd. to Hamilton Dr.				Covered by Master Plan Project No. W-09
0-5 Years	DC	A2	Garner Rd. Watermain	New 600 mm WM from Southcote Rd. to Fiddlers Green Rd.				Covered by Master Plan Project No. W-09
0-5 Years	DC	A3	Garner Rd. Watermain	New 500 mm WM from Hamilton Dr. to Shaver Rd.				Covered by Master Plan Project No. W-09
0-5 Years	DC	A4	Meadowlands - Phase 7B	New 400 mm WM From Meadowlands Phase 7A to Garner Rd	400 mm	500 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A5	Meadowlands- Neighbourhood 4	New 400 mm WM from Stonehenge St. to Garner Rd	400 mm	1200 m	$1.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A6	Ancaster Industrial Park - Tradewind Dr.	New 300 mm WM from Sandhill Dr. to Cormorant	400 mm	370 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A7	Ancaster Ind. Park- Cormorant Dr. Extension (west)	New 300 mm WM from Tradewind Dr. to 400 m west of Tradewind Dr.	300 mm	400 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A8	Ancaster Ind. Park- Cormorant Dr. Extension (west)	New 300 mm WM from 400 m west of Tradewind Dr. to Trinity Rd. South	300 mm	400 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A9	Ancaster Ind. Park- Cormorant Dr. Extension (east)	New 300 mm WM from Bittern to 370 m east of Bittern	300 mm	370 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A10	Ancaster Ind. Park. - Trinity Rd South	New 300 mm WM from Claybar Rd. to Wilson St.	300 mm	700 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	A11	Kitty Murray Lane	New 400 mm WM from Holkem to Garner Rd.	400 mm	750 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A12	Ancaster Industrial Park	New 300 mm WM from Shaver Rd. to 600 m west of Shaver Rd.	300 mm	600 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A13	Ancaster Industrial Park	New 400 mm WM from Shaver Rd. to 600 m west of Shaver Rd.	400 mm	200 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A14	Ancaster Industrial Park	New 400 mm WM from Garner Rd. to Cormorant Dr. Extension	400 mm	700 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A15	Pumping Station W-H18	Additional Pump				The Master Plan has determined that additional HD018 pumping capacity is not required
6 Years to UBBO	DC	A16	Reservoir W-H18	Additional Storage				Additional PD18 storage is covered by Master Plan Project No. W-14
6 Years to UBBO	DC	A17	Shaver Road	New 300 mm WM on Shaver Rd.	300 mm	700 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	B1	SW Quadrant of Binbrook Rd./Hwy 56	New 400 mm WM from 550 m west of Hwy. 56 to 700 m south of Binbrook Rd.	400 mm	1530 m	$1.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	B2	Binbrook Rd.	New 400 mm WM from existing elevated tank to Fletcher Rd.	400 mm	1700 m	$1.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	B3	Binbrook Looping - Fletcher Rd	New 400 mm Watermain from Binbrook Rd. to Golf Club Rd. /Trinity Church Rd.				Covered by Master Plan Project No. W-30
6 Years to UBBO	DC	B4	Reservoir P.S. & Feedermain	On Fletcher Rd. 580 m north of Binbrook Rd.			$4.0M	Additional pumping capacity to Binbrook has been covered by Master Plan Project No. W-20. Additional booster pumping capacity should be reviewed as development proceeds.

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

DEVELOPMENT-RELATED WATER SYSTEM IMPROVEMENTS CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

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Many of the projects listed below are not typically considered Master Plan trunk infrastructure. However, they are considered integral in servicing new growth areas and would be part of costs for servicing new development. The details, including final alignments, sizing and timing, will be reviewed and updated as part of Secondary Plans and local servicing processes.

Year Req'd in Service	Code	DC Project No.	Project	Description	Size / Capacity	Quantity	Total Estimated Cost (Millions)	Comments
0-5 Years	DC	MH1	White Church Rd. E	New 150 mm WM from 250 m west of Hwy. 6 to 590 m west of Hwy. 6				Covered by Master Plan Project No. W-27
0-5 Years	DC	MH2	Airport Looping Trunk WM - Airport Rd.	New 500 mm WM from 1700 m east of Glancaster to Glancaster				Covered by Master Plan Project No. W-27
0-5 Years	DC	MH3	Airport Looping Trunk WM - Glancaster Rd.	New 600 mm WM from Airport Rd. to Twenty Rd.				Covered by Master Plan Project No. W-27
0-5 Years	DC	MH4	Airport Looping Trunk WM - Twenty Rd.	New 600 mm WM from 1165 m East of Glancaster Rd. to Glancaster Rd.				Covered by Master Plan Project No. W-27
0-5 Years	DC	MH5	Airport Industrial Park	New 300 mm WM from 700 m west of Homestead Dr. to English Church Rd.	300 mm	2000 m	$1.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	MH6	Airport Water Reservoir					Pumping and storage capacity for PD6/18 has been confirmed under the Master Plan analysis
6 Years to UBBO	DC	MH7	Deferral 11				$4.0M	Servicing needs and timing to be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	MH8	SPA 1	From Dickenson to North Airport Property Line			$2.0M	Servicing needs and timing to be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	MH9	SPA 2	From Airport Rd to Hwy 6			$2.5M	Servicing needs and timing to be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM1	Crerar Dr.	New 400 mm WM from 160 m North of Stone Church Rd. to Stone Church Rd.	400 mm	160 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM2	Acadia Dr	From Upper Sherman to n/s leg Acadia Dr.	400 mm	320 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM3	Terni Blvd./Cadham Blvd.	New 400 mm WM from 125 m west of Upper Gage to Miles Rd.	400 mm	370 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM4	Extension of Terni Blvd.	New 400 mm WM from Miles Rd. to 300 m west of Miles Rd.	400 mm	300 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM5	Upper Wentworth St./ Twenty Rd.	New 400 mm WM from South End of Upper Wentworth St. to Highway 6	400 mm	2450 m	$2.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM6	Vineberg Dr.	New 400mm WM from 140m east of Upper Wentworth to 590 m east of Upper Wentworth	400 mm	450 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM7	Shermal Estates	New 600mm WM from Stone Church Rd. to Rymal	600 mm	1000 m	$1.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM8	Portland Dr.	New 300mm WM from Pritchard Rd. to Anchor Rd.	300 mm	220 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	HM9	Ditton Dr. Extension	New 200mm WM from Hempstead to Lancing	200 mm	680 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM10	Terni Blvd. Extension	New 400 mm WM from 590 m east of Upper Wentworth to 300 m west of Miles Rd.	400 mm	450 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM11	P.S. W-H6B Additional Pump					Pumping and storage capacity for PD6 has been confirmed under the Master Plan analysis
6 Years to UBBO	DC	HM12	Reservoir W-H5 Additional Storage					Pumping and storage capacity at the Stonechurch pumping station and reservoir has been confirmed under the Master Plan analysis and no reservoir expansion is required
6 Years to UBBO	DC	HM13	First Rd. W, Rymal, Upper Ottawa, Tunbridge	New 1200 mm WM from P.S. W-H6B to P.S. W-H5A				Covered by Master Plan Project No. W-13 and W-24
6 Years to UBBO	DC	HM14	Upper Ottawa, Hydro Corr., Christie St. Fifth St. Stone Church Rd.	New 1200 mm WM from Rymal Rd. East to P.S. W-H6A	1200 mm	7800 m	$23.0M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM15	P.S. W-H5A	Add Pump #5	877 L/s		$0.7M	Covered by Master Plan Project No. W-28
6 Years to UBBO	DC	HM16	P.S. W-H1 Additional Pumps		2625 L/s		$2.2M	Covered by Master Plan Project No. W-23
6 Years to UBBO	DC	HM17	P.S. W-H5A	Add Pump #3	877 L/s		$0.7M	Covered by Master Plan Project No. W-28
6 Years to UBBO	DC	HM18	Reservoir H1B					Pumping and storage capacity at the Greenhill pumping station and reservoir has been confirmed under the Master Plan analysis and no reservoir expansion is required
6 Years to UBBO	DC	HM19	Twenty Rd.	New 400 mm WM from Glover Rd. to Trinity Church Rd.	400 mm	580 m	$0.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM20	Twenty Rd.	New 400 mm WM from Glover Rd. to 680 m west of Glover Rd.	400 mm	680 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM21	Twenty Rd.	New 400 mm WM from 680 m west of Glover Rd. to Nebo Rd.	400 mm	500 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM22	Twenty Rd.	New 300mm WM from Nebo Rd. to 900m west of Nebo Rd.	300 mm	900 m	$0.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM23	Nebo Rd	New 400 mm WM from Twenty Rd. to Dickinson Rd.	400 mm	1350 m	$1.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM24	Dickinson Rd.	New 200mm WM from Nebo Rd. to 800 mm east of Nebo Rd.	200 mm	800 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

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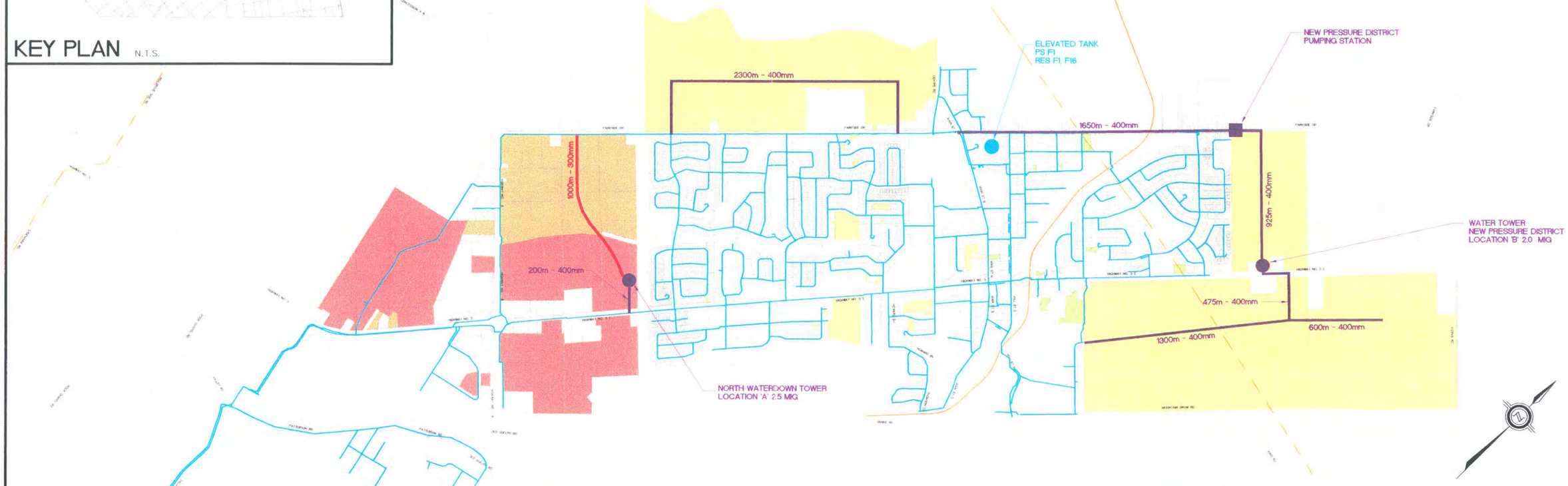
Year Req'd in Service	Code	DC Project No.	Project	Description	Size / Capacity	Quantity	Total Estimated Cost (Millions)	Comments
0-5 Years	DC	SCU1	ROPA-9 Area-Summit Park East	New 400mm WM from Fletcher Rd. to 815 m east of Fletcher Rd.	400 mm	800 m	$0.8M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
0-5 Years	DC	SCU2	ROPA-9 Area-Summit Park West	New 400 mm WM from Fletcher Rd. to Trinity Church Rd.	400 mm	1200 m	$1.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
0-5 Years	DC	SCU3	North Extension of Isaac Brock Dr.	New 300 mm WM from Green Mountain Rd. to Escarpment	300 mm	375 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCU4	Green Mountain Rd.	New 400 mm WM from Isaac Brock Dr. to First Rd. W	400 mm	750 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCU5	First Rd. West	New 300 mm WM from Green Mountain Rd. to Escarpment	300 mm	850 m	$0.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCU6	Nash Planning Neighbourhood	New 400 mm WM from North Extension of Isaac Brock Dr. to First Rd. W	400 mm	850 m	$0.8M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCU7	Reservoir W-H7 Additional Storage					Covered by Master Plan Project No. W-11. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
0-5 Years	DC	SCU8	P.S. W-H7 Pump Replacement					Covered by Master Plan Project No. W-10. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
0-5 Years	DC	SCU9	Upper Mount Albino Rd. Extension	New 300 mm WM from 235 m south of Highland Rd. W to Highland Rd W	300 mm	235 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCU10	Booster Station in ROPA - 9					Covered by Master Plan Project No. W-10. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
0-5 Years	DC	SCU11	Heritage Green	New 600 mm WM from Reservoir H7 (Highland Rd.) to 150 m south of H7	600 mm	150 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCU12	ROPA - 9 Area- The crossing/Brooks at Rymal	New 400 mm WM from 800m east of Fletcher Rd. to Swayze Rd.	400 mm	1250 m	$1.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. Servicing requirements have also been reviewed as part of the ROPA9 Class EA.
6 Years to UBBO	DC	SCU13	Heritage Green	New 400 mm WM from 200 m south of Highland Rd. to 300 m north of Rymal Rd.	400 mm	945 m	$0.9M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. Environmental concerns including construction through Karst will need to be confirmed.
6 Years to UBBO	DC	SCU14	Heritage Green	New 400 mm WM from 200 m north of Rymal Rd. to 2nd Rd. west, 200 m north of Rymal Rd.	400 mm	900 m	$0.9M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. Environmental concerns including construction through Karst will need to be confirmed.
0-5 Years	DC	SCL1	Winona Rd	New 400 mm WM from Hwy 8 to Barton	400 mm	440 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL2	Glover Rd.	New 300 mm WM from Lakeshore Rd. to South Service Rd.	300 mm	420 m	$0.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL3	Fifty Rd.	New 400 mm WM from Barton St. To North Service Rd.	400 mm	1400 m	$1.3M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL4	Arvin Ave. Extension	New 300 mm WM from 350 m west of McNeilly Rd. to McNeilly Rd	300 mm	350 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL5	Arvin Ave. Extension	New 300 mm WM from 550 m east of Jones Rd. to Jones Rd.	300 mm	550 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL6	Arvin Ave. Extension	New 300 mm WM McNeilly Rd. to 335 m west of Winona Rd	300 mm	1500 m	$1.1M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL7	Replacement on Hwy. 8	New 400 mm WM from 420 m east of Glover Rd. to NcNeilly Rd.	400 mm	450 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL8	Replacement on Hwy. 8	New 300 mm WM from McNeilly to Lewis Rd.	300 mm	1000 m	$0.7M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL9	Replacement on Lewis Rd.	New 300 mm WM from Hwy. 8 to Barton St.	300 mm	500 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL10	McNeilly Rd.	New 300 mm WM from Barton St to Railway	300 mm	550 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0-5 Years	DC	SCL11	Glover Rd.	New 300 mm WM from Barton St. to Service Rd. Extension	300 mm	700 m	$0.5M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL12	Millen Rd.	New 400 mm WM from South Service Rd. to Barton St.	400 mm	1000 m	$1.0M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL13	South Service Rd.	New 400 mm WM from Jones Rd. to Millen Rd.	400 mm	2745 m	$2.6M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL14	Dewitt Rd.	New 300 mm WM from CNR Tracks to Barton St.	300 mm	610 m	$0.4M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL15	Jones Rd.	New 400 mm WM from South Service Rd. to Barton St.	400 mm	915 m	$0.9M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL16	Winona Rd	New 300 mm WM from Service Rd. to Petit Rd.	300 mm	250 m	$0.2M	The watermain alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
			Total Cost				**$84.8M**	

KEY PLAN N.T.S.



LEGEND

RESIDENTIAL
- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL
- 0 – 5 YEARS
- 6 PLUS YEARS

- WATERMAIN EXISTING
- WATER TOWER
- WATERMAIN 0 – 5 YEARS
- WATER TOWER 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

0 1000 2000m

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April 28 2004
Project No. 68329

C.N. WATSON AND ASSOCIATES LTD.
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Hamilton Development Charges Background Study

Figure 1-1 Waterdown Watermain

KEY PLAN

700m - 300mm

500m - 300mm

700m - 300mm

400m - 300mm

400m - 300mm

370m - 400mm

370m - 300mm

800m - 300mm

850m - 500mm

1680m - 500mm

2060m - 600mm

750m - 400mm

1300m - 400mm

1200m - 400mm

PS H18
RES H18

LEGEND

RESIDENTIAL

- 0 - 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 - 5 YEARS
- 6 PLUS YEARS

- WATERMAIN EXISTING
- PUMPING STATION
- WATERMAIN 0 - 5 YEARS
- WATER TOWER 0 - 5 YEARS
- PUMPING STATION 0 - 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

0 1000 2000m

1: 25000

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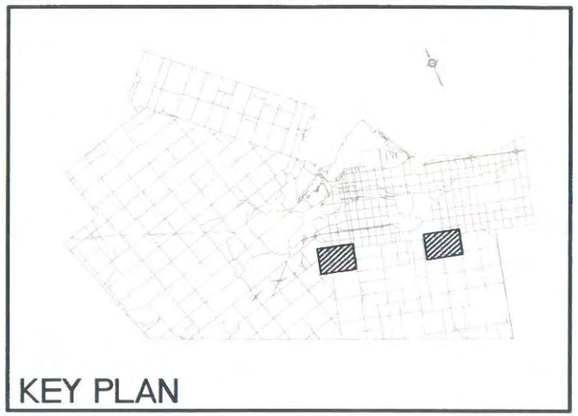
Figure 1-2
Ancaster
Watermain

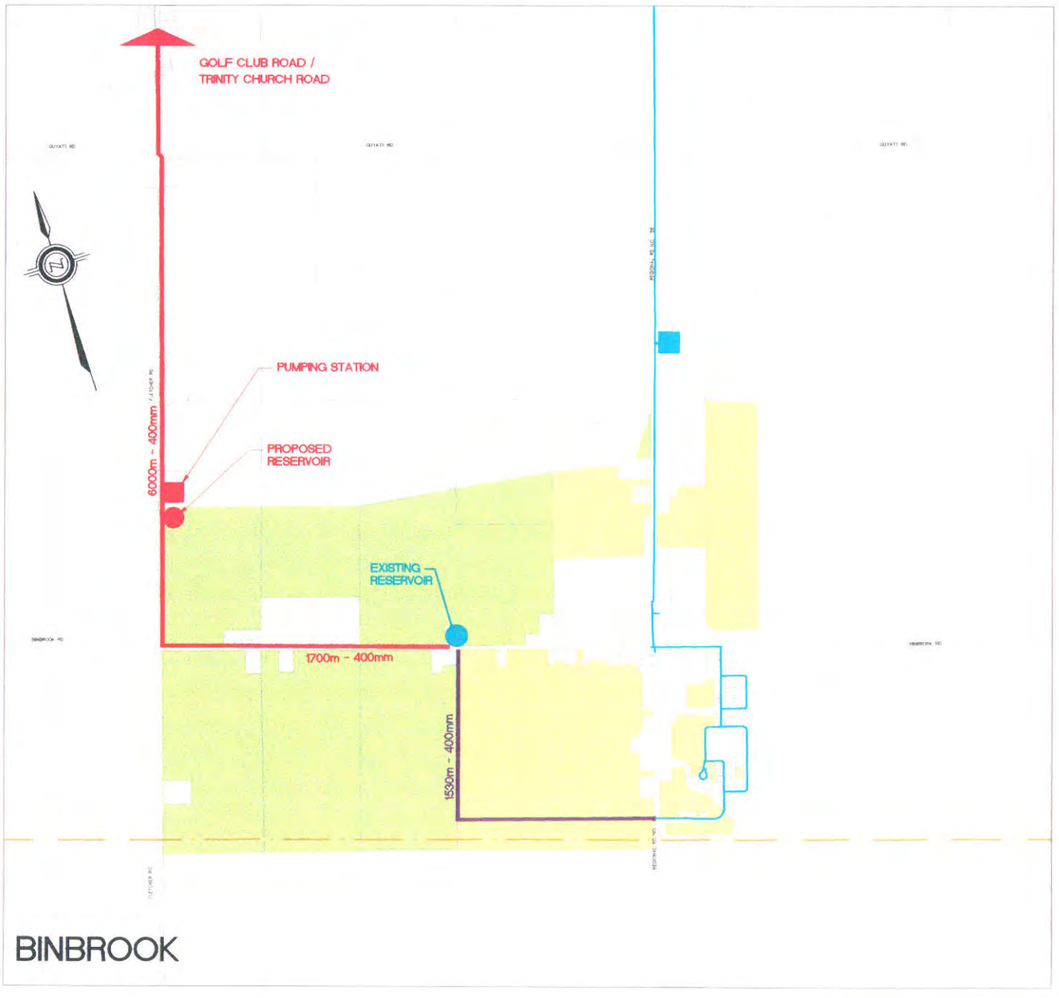


KEY PLAN

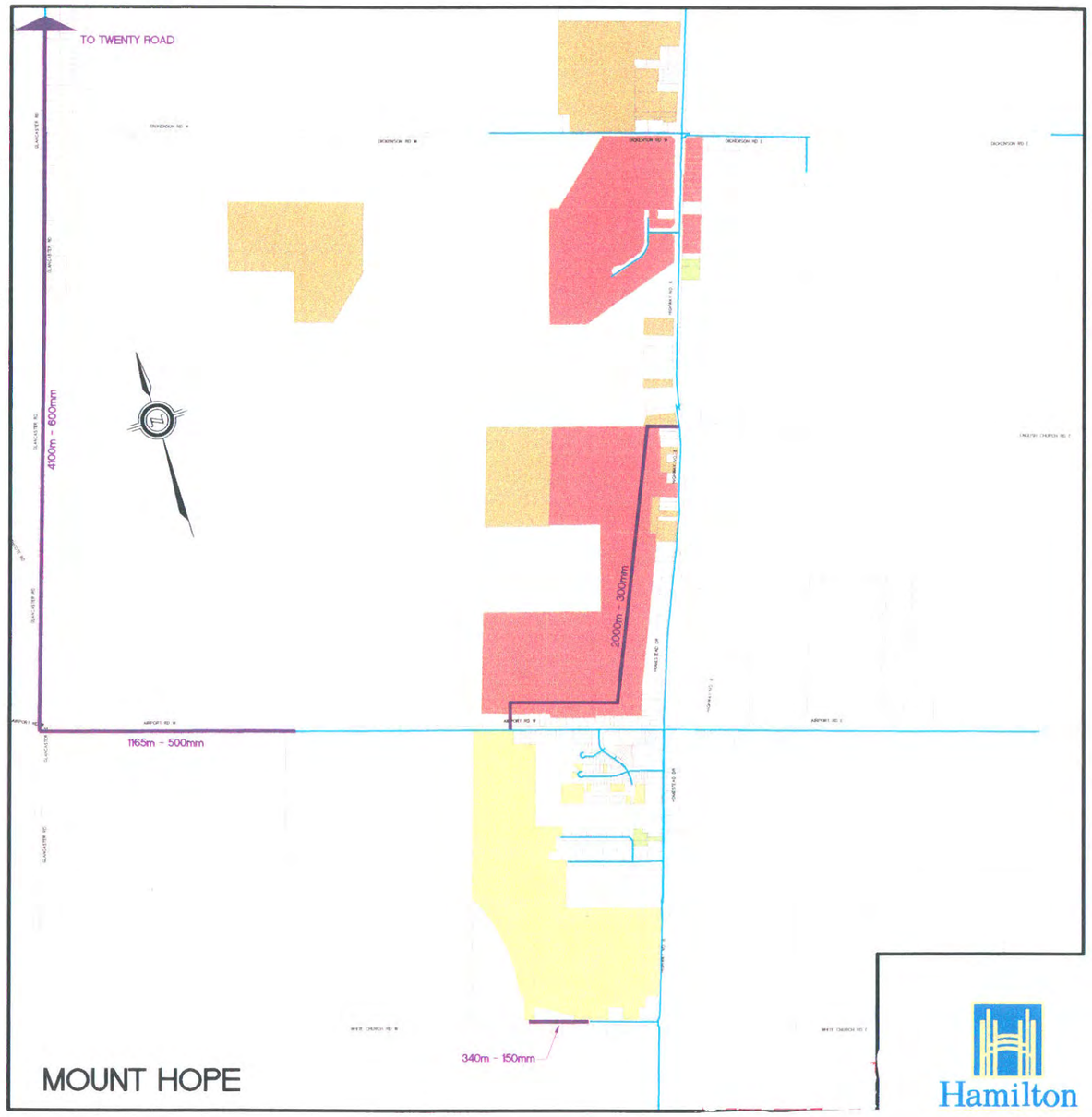
LEGEND

RESIDENTIAL		NON-RESIDENTIAL	
	0 – 5 YEARS		0 – 5 YEARS
	6 PLUS YEARS		6 PLUS YEARS

WATERMAIN EXISTING
PUMPING STATION
WATER TOWER / RESERVOIR 6 PLUS YEARS
WATERMAIN 0 – 5 YEARS
WATER TOWER 0 – 5 YEARS
PUMPING STATION 0 – 5 YEARS
WATERMAIN 6 PLUS YEARS
WATER TOWER / RESERVOIR 6 PLUS YEARS
PUMPING STATION 6 PLUS YEARS



BINBROOK



MOUNT HOPE

Hamilton

Hamilton Development Charges Background Study

Figure 1-3
Binbrook / Mount Hope Watermain

0 1000 2000m
1: 25000

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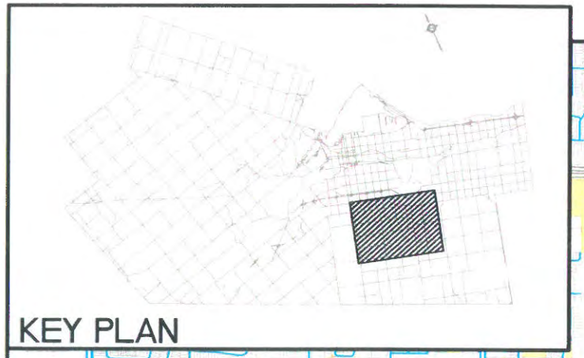
Project No. 68329



KEY PLAN

LEGEND

RESIDENTIAL
- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL
- 0 – 5 YEARS
- 6 PLUS YEARS

- WATERMAIN EXISTING
- PUMPING STATION
- WATERMAIN 0 – 5 YEARS
- WATER TOWER 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

PS H6A
RES H5

3700m - 600mm

160m - 400mm

320m - 400mm

1000m - 600mm

PS H6B

650m - 300mm

400m - 300mm

TO EXISTING PS H5A

10,325m - 1200mm

7800m - 1200mm

450m - 400mm

300m - 400mm

450m - 400mm

370m - 400mm

2450m - 400mm

TO GLANCASTER ROAD

500m - 400mm

680m - 400mm

580m - 400mm

900m - 300mm

1350m - 400mm

800m - 200mm

Stoney Creek Upper - See Figure 1-5

0 1000 2000m

1: 25000

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Hamilton

Hamilton Development Charges Background Study
Figure 1-4
Hamilton Mountain Watermain

KEY PLAN

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- WATERMAIN EXISTING
- PUMPING STATION
- WATERMAIN 0 – 5 YEARS
- WATER TOWER 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

PS H5A

850m – 400mm

850m – 300mm

375m – 300mm

750m – 400mm

10400m – 1200mm

PS H6B

230m – 300mm

PUMPING STATION H7 UPGRADE AND RESERVOIR

150m – 600mm

TO EXISTING PS H6B

945m – 400mm

900m – 400mm

360m–400mm

1200m – 400mm

800m – 400mm

1250m – 400mm

Hamilton Mountain – See Figure 1-4

0 1000 2000m

1: 25000

April 28 2004
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Hamilton Development Charges Background Study

Figure 1-5
Stoney Creek Upper Watermain

KEY PLAN

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- WATERMAIN EXISTING
- PUMPING STATION
- WATERMAIN 0 – 5 YEARS
- WATER TOWER 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER 6 PLUS YEARS
- PUMPING STATION 0 – 5 YEARS

N

2745m - 400mm
1000m - 400mm
375m - 300mm
915m - 400mm
550m - 300mm
420m - 300mm
700m - 300mm
350m - 300mm
1500m - 300mm
250m - 300mm
1400m - 400mm
245m - 300mm
550m - 300mm
500m - 300mm
440m - 400mm
450m - 400mm
1000m - 300mm
PS H8A
RES H1C

0 1000 2000m

1: 25000

April 28 2004
Project No. 68329

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Planning for Growth

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Earth Tech (Canada) Inc St. Catharines, Ontario 905.688.1272

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Hamilton Development Charges Background Study

Figure 1-6
Stoney Creek Lower Watermain

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-3 (03)

Wastewater Capital Program
Master Plan Wastewater Servicing Projects

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

MASTER PLAN WASTEWATER SERVICING CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

Year Req'd in Service	Code	Master Plan Project No.	Type	Ward	Project	Description	Size / Total Capacity	Quantity / Additional Capacity	Total Estimated Cost (Millions)	Class EA Schedule	Trigger	Comments
2007	MP	WW-1	P	11, 12	HC018 - Twenty Road SPS Upgrades	Interim Upgrades and Ultimate Upgrades to Increase Capacity	590 L/s	590 L/s	$2.6M	B	Growth in Hamilton Mountain (Mount Hope) and security/reliability of wastewater system operations	This project will address existing constraints as well as support localized growth in the SPS catchment including part of the Airport Lands.
2007	MP	WW-2	FM	11, 12	HC018 - Twenty Road SPS Forcemain	Twin Forcemain from Twenty Road SPS to MH-GD06A001	300 mm	1,400 m	$1.4M	B	Growth in Hamilton Mountain (Mount Hope) and security/reliability of wastewater system operations	This project will address existing constraints as well as support localized growth in the SPS catchment including part of the Airport Lands.
2008	MP	WW-3	SPS	12	New HC008 - Harmony Hall SPS	Build a new SPS	100 L/s	100 L/s	$5.5M	A	Growth in Ancaster and Airport Lands plus security/reliability of wastewater system operations	In order to most efficiently service the Harmony Hall catchment, a single SPS at a more southerly location is proposed. This project is being addressed under local servicing upgrades.
2008	MP	WW-4	FM	12	New HC008 - Harmony Hall Forcemain	Install a new forcemain from new Harmony Hall SPS to MH-AM10A003	300 mm	1,000 m	$0.7M	A	Growth in Ancaster and Airport Lands plus security/reliability of wastewater system operations	The new forcemain will be connected to a more northerly section of sewer to avoid upgrading sections of sewer with lower capacities. This project is being addressed under local servicing upgrades.
2008	MP	WW-5	SPS	12	HC008 - Harmony Hall SPS Decommission	Decomission existing SPS		1 each	$0.1M	B	Upgrades and relocation of HC008 Harmony Hall SPS	In order to most efficiently service the Harmony Hall catchment, a single SPS at a more southerly location is proposed. It is recommended that the new SPS replace the old SPS and that the old SPS be decommissioned.
2008	MP	WW-6	P	11	HC016 - Winona SPS Upgrades	Install a third pump (88 L/s) at the existing HC016 SPS	176 L/s	1 each	$0.2M	A	Growth in Stoney Creek	This project will provide additional pumping capacity as well as increase the flexibility and security of operations of the station with an additional pump
2008	MP	WW-7	FM	11	HC016 - Winona SPS Forcemain Twinning	Twin Existing Forcemain from Winona SPS to MH-SN02A003	300 mm	500 m	$0.9M	A	Growth in Stoney Creek	This project will provide additional pumping capacity as well as increase the flexibility and security of operations of the station with twinned forcemains
2008	MP	WW-8	WWTP	15	New Waterdown SPS	Build a new SPS	150 L/s	150 L/s	$6.0M	B	Growth in Waterdown plus optimization of operations costs	This facility will be located at the existing WWTP site. All flows to the old WWTP will be pumped to the existing sewer on Dundas Street and conveyed to Hamilton
2008	MP	WW-9	FM	15	New Waterdown Forcemain	Build a new forcemain from new Waterdown SPS to MH-FL21A097	450 mm	1,600 m	$1.8M	B	Growth in Waterdown plus optimization of operations costs	This project will convey flows to the existing sewer on Dundas Street
2008	MP	WW-10	WWTP	15	Waterdown WWTP	Decomission Plant		1 each	$0.5M	B	Growth in Waterdown plus optimization of operations costs	It was determined that it is more cost efficient (long term life cycle costs) to decommission the plant than to expand and continue operating
2009	MP	WW-11	S	8	Ancaster-to-Fennell Trunk Sewer Twinning	Twin Existing Sewer from MH-HD15A010 to HD15A020	900 mm	400 m	$0.8M	B	Growth in Hamilton Mountain, Ancaster and the Airport Lands	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
					Ancaster-to-Fennell Trunk Sewer Twinning	Twin Existing Sewer from MH-HD15A020 to HE15A090	1,050 mm	500 m	$1.2M	B	Growth in Hamilton Mountain, Ancaster and the Airport Lands	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
					Ancaster-to-Fennell Trunk Sewer Twinning	Twin Existing Sewer from MH-HE15A090 to HF15E084	1,200 mm	1,500 m	$3.9M	B	Growth in Hamilton Mountain, Ancaster and the Airport Lands	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
					Ancaster-to-Fennell Trunk Sewer Twinning	Twin Existing Sewer from MH-HF15E084 to HF14E011	1,350 mm	300 m	$0.9M	B	Growth in Hamilton Mountain, Ancaster and the Airport Lands	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
2010	MP	WW-12	S	8	West 18th Street Sewer Twinning	Twin Existing Sewer from MH-HE18A020 to HF15A037	525 mm	2,000 m	$3.3M	A	Growth in Hamilton Mountain	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
2010	MP	WW-13	S	2, 3, 4	Combined Sewer Overflow Control	Trunk CSO and collection system improvements in the East Harbour Area (Wellington Street to Dunn Avenue)			$80.0M	C	Growth in Hamilton, Ancaster, Dundas, Waterdown, Stoney Creek plus providing wet weather flow control and meeting provincial treatment/capture targets	This project will involve a combination of system improvements in the East Harbour Area. The deisgn concept will be updated under a separate Phase 3 and 4 Class EA study.
2010	MP	WW-14	S	9, 11	New Centennial Trunk Sewer	New Gravity Trunk Sewer (open cut sections)	1,200 mm	7,000 m	$24.5M	B	Growth in Hamilton Mountain, Airport Lands and Binbrook	This project will provide additional conveyance capacity to the Woodward Ave. WWTP for growth on the Mountain and will alleviate potential constraints on the Red Hill Creek Inteceptor
					New Centennial Trunk Sewer	New Gravity Trunk Sewer (sections requiring tunnelling)	1,200 mm	1,000 m	$10.0M	B	Growth in Hamilton Mountain, Airport Lands and Binbrook	This project will provide additional conveyance capacity to the Woodward Ave. WWTP for growth on the Mountain and will alleviate potential constraints on the Red Hill Creek Inteceptor

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

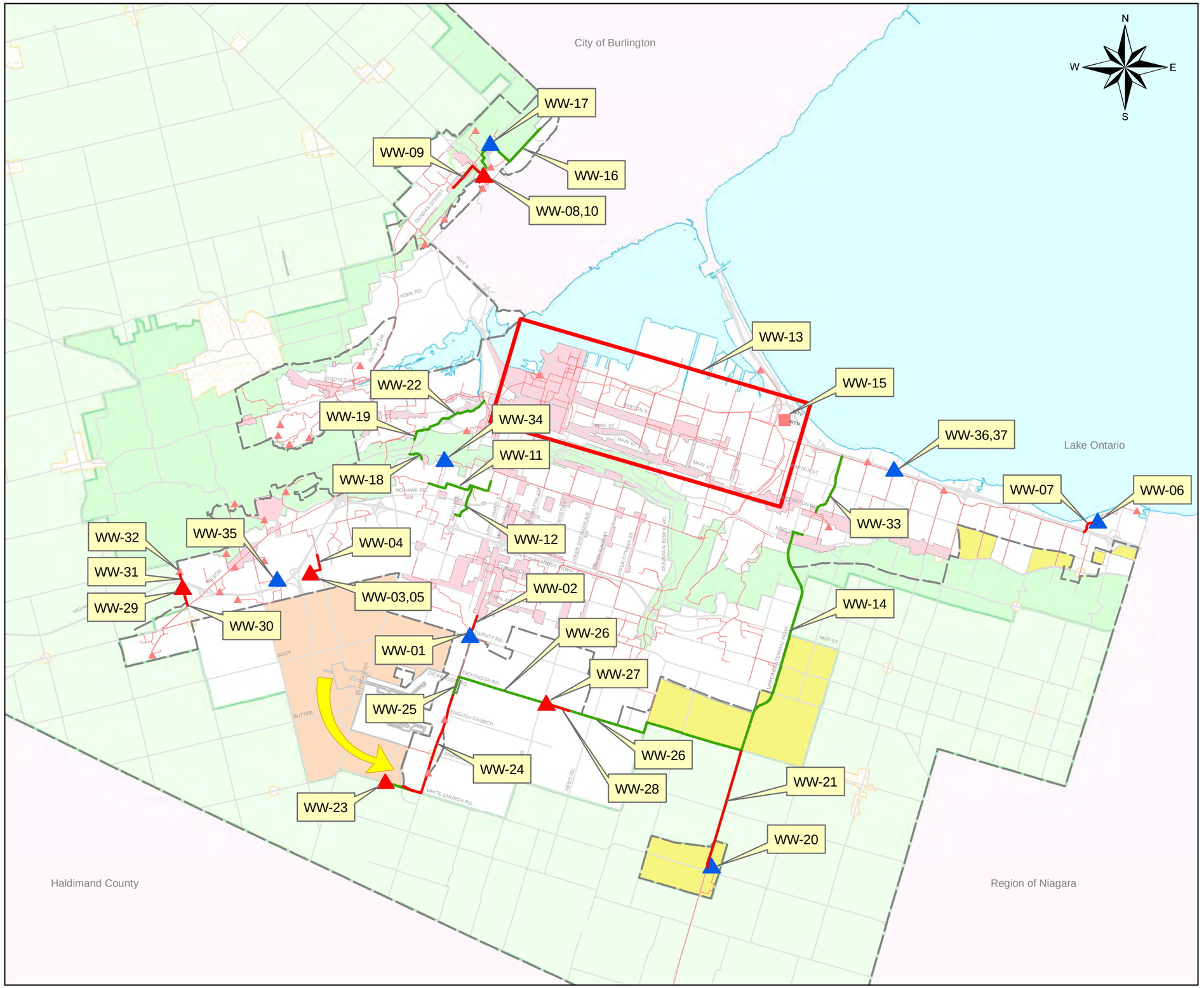
MASTER PLAN WASTEWATER SERVICING CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

Year Req'd in Service	Code	Master Plan Project No.	Type	Ward	Project	Description	Size / Total Capacity	Quantity / Additional Capacity	Total Estimated Cost (Millions)	Class EA Schedule	Trigger	Comments
2010	MP	WW-15	WWTP	4	Woodward Ave. WWTP Upgrades	WWTP Expansion			$340.1M	C	Growth in Hamilton, Ancaster, Dundas, Waterdown, Stoney Creek plus providing wet weather flow control and meeting provincial treatment/capture targets	This project will be coordinated with the combination of system improvements in the East Harbour Area. The deisgn concept will be updated under a separate Phase 3 and 4 Class EA study.
2010	MP	WW-16	S	15	Mountain Brow Trunk Sewer	New Gravity Sewer to Service Waterdown South from the eastern limits to the First Street SPS	450 mm	3,000 m	$2.3M	B	Growth in Waterdown South	This project's timing, location and capacity is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
					Mountain Brow Trunk Sewer	New Gravity Sewer to Service Waterdown South (Sections of Deep Sewers)	450 mm	500 m	$1.6M	B	Growth in Waterdown South	This project's timing, location and capacity is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
2010	MP	WW-17	P	15	DC014 - First Street SPS Upgrades	Install a third pump (200 L/s) and associated upgrades at the existing DC014 SPS	400 L/s	1 each	$0.4M	B	Growth in Waterdown South and UpCounty	This project's timing and capacity is being coordinated through the Waterdown Class EA Study and OPA28 Secondary Plan process
2011	MP	WW-18	S	8	Scenic Drive Sewer Twinning	Sewer Twinning (MH-HD14A067 to MH HC13A060)	750 mm	500 m	$1.3M	A	Growth in Hamilton Mountain	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
2012	MP	WW-19	S	1	Bowman Street Sewer Twinning	Sewer Twinning (MH HC13A010 to MH-HC12A057)	900 mm	500 m	$1.0M	A	Growth in Hamilton Mountain	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
2011	MP	WW-20	P	11	HC058 - Binbrook SPS Upgrades	Install a third pump (200 L/s) at the existing HC058 SPS	400 L/s	1 each	$0.2M	B	Growth in Binbrook	This project will provide additional wastewater servicing capacity and security
2011	MP	WW-21	FM	11	Highway 56 Forcemain Twinning	Twin Existing 450mm Forcemain from HC058 to Golf Club Road	450 mm	4,200 m	$3.8M	A	Growth in Binbrook	This project will provide additional wastewater servicing capacity and security. The forcemain will connect to the new Centennial Trunk Sewer. The existing forcemain will also be connected to the new Centennial Trunk Sewer.
2012	MP	WW-22	S	1	Hwy 403 Trunk Sewer Twinning	Twin Existing 900mm Sewer from Royal to Main-King (MH-HD12A002 to HE09A061)	900 mm	2,100 m	$6.6M	B	Growth in Hamilton Mountain, Ancaster, the Airport Lands and west Hamilton	This sewer is located within the combined wastewater system and as such, receives high wet weather flows. Sewer twinning is required to meet peak wet weather flows.
2012	MP	WW-23	SPS	11	New Airport Lands SPS	New SPS in SE corner of the Airport Lands	500 L/s	500 L/s	$7.5M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor
2012	MP	WW-24	FM	11	New Airport Lands Highway 6 Forcemain	New forcemain from new Airport Lands SPS to 1 km south of Dickenson Road	600 mm	4,700 m	$4.7M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor. The alignment and length of forcemain will preclude other pumping station and forcemain upgrades on Hwy 6.
2012	MP	WW-25	S	11	New Highway 6 Trunk Sewer	New Gravity Sewer from 1 km south of Dickenson Road to Dickenson Road	900 mm	1,000 m	$2.0M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor
2012	MP	WW-26	S	11	New Dickenson Road Trunk Sewer	New Gravity Sewer, all sections from Hwy 6 to Upper Centennial Pkwy	900 mm	9,600 m	$15.4M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor. The infrastructure along Dickenson Road will preclude upgrades downstream and along Hwy 6. The infrastructure will also provide opportunity for servicing areas north of Dickenson Road.
2012	MP	WW-27	SPS	11	New Dickenson Road SPS	New SPS near Dickenson Road and Miles Road	500 L/s	500 L/s	$7.5M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor. The infrastructure along Dickenson Road will preclude upgrades downstream and along Hwy 6. The infrastructure will also provide opportunity for servicing areas north of Dickenson Road.
2012	MP	WW-28	FM	11	New Dickenson Road Forcemain	New Forcemain from the new Dickenson Road SPS to approximately 400 m east of Miles Road	600 mm	400 m	$0.5M	B	Growth in the Airport Lands	This project will provide sufficient capacity for the ultimate catchment area of the Airport Lands south of the existing utility corridor. The infrastructure along Dickenson Road will preclude upgrades downstream and along Hwy 6. The infrastructure will also provide opportunity for servicing areas north of Dickenson Road.

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

MASTER PLAN WASTEWATER SERVICING CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

Year Req'd in Service	Code	Master Plan Project No.	Type	Ward	Project	Description	Size / Total Capacity	Quantity / Additional Capacity	Total Estimated Cost (Millions)	Class EA Schedule	Trigger	Comments
2014	MP	WW-29	SPS	12	New HC053 - Shaver Road SPS	New SPS including additional pumping capacity	30 L/s	30 L/s	$1.2M	B	Growth in Ancaster	The new SPS location will maximize the potential catchment area for servicing. This project will be updated as part of local servicing upgrades.
2014	MP	WW-30	FM	12	New HC053 - Shaver Road Forcemain	New Forcemain to Westview Drive	300 mm	500 m	$0.4M	B	Growth in Ancaster	This project is required to support the new location for the SPS. This project will be updated as part of the local servicing upgrades
2014	MP	WW-31	S	12	New Shaver Road Sewer	New Gravity Sewer from old HC053 across Hwy 403 to new HC053 SPS	300 mm	500 m	$1.2M	B	Growth in Ancaster	This project is required to support the new location for the SPS. This project will be updated as part of the local servicing upgrades
2014	MP	WW-32	SPS	12	HC053 - Shaver Road SPS Decommission	Decommission existing SPS		1 each	$0.1M	B	Upgrades and relocation of HC053 Shaver Road SPS	In order to most efficiently service the Shaver Road catchment, a single SPS at a more southerly location is proposed. It is recommended that the new SPS replace the old SPS and that the old SPS be decommissioned.
2014	MP	WW-33	S	5,9	Battlefield Trunk Sewer Twinning	Twin Existing Sewer from MH-SD07A031 to HS08A002	900 mm	900 m	$2.2M	A	Growth in Hamilton Mountain and Airport Lands	This project will provide additional wastewater servicing capacity and security
					Battlefield Trunk Sewer Twinning	Twin Existing Sewer from MH-HS08A002 to HS07A044	1,200 mm	500 m	$1.8M	A	Growth in Hamilton Mountain and Airport Lands	This project will provide additional wastewater servicing capacity and security
2016	MP	WW-34	P	8	HC002 - Scenic Drive SPS Upgrades	Install a third pump (57 L/s) at the existing HC002 SPS	114 L/s	1 each	$0.2M	B	Growth in Hamilton Mountain	This project will provide additional wastewater servicing capacity and security
2016	MP	WW-35	p	12	HC011 - Calvin Street SPS Upgrades	Install a third pump (59 L/s) at the existing HC011 SPS	118 L/s	1 each	$0.2M	B	Growth in Ancaster and Airport Lands	This project will provide additional wastewater servicing capacity and security
2021	MP	WW-36	P	10	HC056 - Green Road Upgrades	Install three new pumps (100 L/s each) at the existing HC056 SPS	200 L/s	3 each	$0.8M	B	Growth in Stoney Creek	This project will provide additional wastewater servicing capacity and security
2021	MP	WW-37	FM	10	HC056 - Green Road Forcemain Twinning	Twin Existing Forcemain from Green Road SPS to SF03A011	300 mm	10 m	$0.1M	B	Growth in Stoney Creek	This project will provide additional wastewater servicing capacity and security
					TOTAL COST				**$547.4M**			



Legend

- Pumping Station
- New SPS
- SPS Upgrades Required
- Existing Sewer
- New or Upgraded Gravity Sewer
- New or Upgraded Forcemain
- Rural Settlement Area
- Potential Urban Boundary Expansion
- Potential New Business Park
- Intensification Area
- Niagara Escarpment
- Greenbelt
- Urban Boundary

Note:
The proposed infrastructure has been depicted approximately for Master Planning purposes. The exact location of the proposed infrastructure will be determined in the subsequent project detailed phases.

Hamilton

Integrated Water & Wastewater Master Plan

Wastewater Servicing

Preferred Solution

KMK Consultants Limited

Nov 22, 2006
1:125,000
2590-D-99

City of Hamilton Water and Wastewater Master Plan

Report III - Master Plan Class EA Report

Appendix A-3 (04)

Wastewater Capital Program
Development Related Wastewater System Improvements

CITY OF HAMILTON
WATER AND WASTEWATER MASTER PLAN

DEVELOPMENT-RELATED WASTEWATER SYSTEM IMPROVEMENTS CAPITAL PROGRAM - 22 NOVEMBER 2006
2006 DOLLARS

The following capital program was identified under the City of Hamilton Development Charge Background Study completed in 2004 by C. N. Watson in association with Earth Tech Canada and Philips Engineering. The capital program has been reviewed in coordination with the development of the Master Plan capital program. The total estimated costs have bee updated to reflect 2006 dollars.

Many of the projects listed below are not typically considered Master Plan trunk infrastructure. However, they are considered integral in servicing new growth areas and would be part of costs for servicing new development. The details, including final alignments, sizing and timing, will be reviewed and updated as part of Secondary Plans and local servicing processes.

Year Req'd in Service	Code	DC Project No.	Project	Description	Size / Capacity	Quantity	Total Estimated Cost (Millions)	Comments
0 to 5 Years	DC	W1	North Waterdown Area	600 mm sewer from 700 m north of Parkside Dr. to Parkside Dr.	600 mm	700 m	$0.54M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W2	North Waterdown Area	450 mm sewer from East to West	450 mm	900 m	$0.59M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W3	North Waterdown Area	450 mm sewer from 700 m north of Parkside Dr. to Parkside Dr.	450 mm	700 m	$0.46M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W4	South Waterdown	450 mm sewer from Evans Side Rd. to 480 m west of Evans Side Rd.	450 mm	480 m	$0.32M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W5	South of Hwy. 5 E	525 mm sewer from 480 m west of Evans Side Rd. to 950 m east of Evans Side Rd.	525 mm	470 m	$0.33M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W6	South of Hwy. 5 E	600 mm sewer from 950 m east of Evans Side Rd. to DC014 P.S.	600 mm	920 m	$0.70M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	W7	North of Mountain Brow Rd.	375 mm sewer from 465 m West of Kerns Rd to 1405 m west of Kerns Rd.				Covered by Master Plan Project No. WW-16
0 to 5 Years	DC	W8	North of Mountain Brow Rd.	450 mm sewer from 930 m west of Kerns Rd. to 1405 m west of Kerns Rd.				Covered by Master Plan Project No. WW-16
0 to 5 Years	DC	W9	North of Mountain Brow Rd.	525 mm sewer from 1405 m west of Kerns Rd. to proposed pumping station				Covered by Master Plan Project No. WW-16
0 to 5 Years	DC	W10	Proposed P.S.	P.S. at western boundary of South Waterdown				Master Plan determined that South Waterdown can be most efficiently serviced by deep sewer and the SPS and forcemain are not required
0 to 5 Years	DC	W11	Forcemain	300 mm forcemain from prop. P.S. to existing P.S.				Master Plan determined that South Waterdown can be most efficiently serviced by deep sewer and the SPS and forcemain are not required
0 to 5 Years	DC	W12	DC014 Upgrade	Additional Standby Pump				Covered by Master Plan Project No. WW-17
0 to 5 Years	DC	W13	DC014 Wet Well Upgrade	Additional Storage				Covered by Master Plan Project No. WW-17
6 Years to UBBO	DC	W14	Hwy. 6/Parkside Dr. Corner	375 mm sewer from 200 m south of Parkside Dr. to existing trunk north of Hwy. 5	375 mm	500 m	$0.32M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	W15	Hwy. 6/Parkside Dr. Corner	375 mm sewer from 300 m south of Parkside Dr. to existing trunk north of Hwy. 5	375 mm	300 m	$0.19M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A1	Garner Rd	375 mm sewer from 480 m east of ex. PS to ex. PS	375 mm	450 m	$0.29M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A2	Shaver Rd	250 mm sewer from 400 m north of Garner to Garner Rd.	250 mm	400 m	$0.24M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A3	Garner Rd	375 mm sewer from Shaver Rd. to 100 m west of Shaver Rd.	375 mm	100 m	$0.06M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A4	North of Garner Grove	600 mm sewer from North/West of development to south of Hwy. 403	600 mm	225 m	$0.17M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A5	North of Garner Rd.	600 mm sewer from Garner Rd. to 225 m north of Garner Rd.	600 mm	225 m	$0.17M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A6	Wilson St Replacement/Upgrade	750 mm sewer from 110 m south of Amberly to Radial Line	750 mm	2200 m	$2.07M	Master Plan modeling analysis indicates that the Wilson Street Sewer Replacement is not required for additional capacity
0 to 5 Years	DC	A7	Hamilton Dr.	250 mm sewer from Garner Rd. to 320 m North of Garner Rd.	250 mm	320 m	$0.20M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A8	Ancaster Ind Park	375 mm sewer from 400 m east of Trinity Rd. to Cormorant Dr.	375 mm	800 m	$0.51M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	A9	Garner Rd	250 mm sewer from Hamilton Dr. to 350 m west	250 mm	350 m	$0.21M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A10	Ancaster Ind Park	375 mm sewer from 300 m south of Garner Rd. to 100 m west of Shaver Rd.	375 mm	500 m	$0.32M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	A11	HC053 PS	Replacement of HC053				Covered by Master Plan Project No. WW-29
6 Years to UBBO	DC	A12	Shaver Rd	300 mm sewer from HC053 to 500 m south of Shaver Rd.				Covered by Master Plan Project No. WW-31
6 Years to UBBO	DC	A13	Shaver Rd. Forcemain	150 mm FM from PS to Westview				Covered by Master Plan Project No. WW-30
6 Years to UBBO	DC	A14	PS HC008 Upgrade	Additional Standby Pump				Covered by Master Plan Project No. WW-03
6 Years to UBBO	DC	A15	PS-H26F				$0.63M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.
6 Years to UBBO	DC	A16	Forcemain for PS H26F	300 mm FM from PS to Wilson 750 m east of Trinity	300 mm	1300 m	$0.56M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.

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2006 DOLLARS

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Year Req'd in Service	Code	DC Project No.	Project	Description	Size / Capacity	Quantity	Total Estimated Cost (Millions)	Comments
6 Years to UBBO	DC	A17	Trunk Sewer from HC053 to PS S-H26F	300 mm sewer from HC053 to Wilson Rd.	300 mm	600 m	$0.37M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.
6 Years to UBBO	DC	A18	Trunk Sewer from HC053 to PS S-H26F	450 mm sewer from Shaver to Garner	450 mm	1100 m	$0.76M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.
6 Years to UBBO	DC	A19	Trunk Sewer from HC053 to PS S-H26F	600 mm sewer from Garner Rd. to Trinity Rd.	600 mm	1500 m	$1.26M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.
6 Years to UBBO	DC	A20	Trunk Sewer from HC053 to PS S-H26F	600 mm sewer from Wilson St. to PS H26F	600 mm	1300 m	$1.09M	The needs for this project will be reviewed as part of Secondary Planning and/or local servicing requirements. Based on the limits of the Greenbelt, this project may be re-located or not required.
0 to 5 Years	DC	B1	Jackson Heights	250 mm sewer from 550 m north of Binbrook Rd to 260 m east of RR56	250 mm	260 m	$0.16M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B2	Jackson Heights	375 mm sewer from 550 m north of Binbrook Rd. to Binbrook Rd.	375 mm	550 m	$0.35M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B3	Elizabeth Gardens	750 mm sewer from 1650 m east of Fletcher Rd. to Regional Rd. 56	750 mm	420 m	$0.39M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B4	Elizabeth Gardens	375 mm sewer from 400 m west of Regional Rd. 56 to Regional Rd 56	375 mm	400 m	$0.25M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B5	Development South of Binbrook Rd.	450 mm sewer from Binbrook Rd to 450 m south	450 mm	750 m	$0.49M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B6	Development South of Binbrook Rd.	675 mm sewer from Binbrook Rd to 1650 m east of Fletcher Rd.	675 mm	400 m	$0.34M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	B7	Regional Rd. 56	450 mm sewer from 400 m south of Binbrook Rd. to 900 m south of Binbrook Rd.	450 mm	500 m	$0.45M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	B8	Development South of Binbrook Rd.	450 mm sewer from Binbrook Rd. to 450 m south	450 mm	750 m	$0.49M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	B9	Development South of Binbrook Rd.	525 mm sewer from 420 m east of Fletcher Rd. to 1220 m East of Fletcher Rd.	525 mm	800 m	$0.56M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	B10	PS HC058 upgrade	2 additional Pumps				Covered by Master Plan Project No. WW-20
6 Years to UBBO	DC	B11	Forcemain	450 mm FM from PS HC058 to Trinity Church Rd.				Covered by Master Plan Project No. WW-21
0 to 5 Years	DC	MH1	Southampton Estates	450 mm sewer from 600 m west of Homestead Dr. to Homestead Dr.	450 mm	680 m	$0.45M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	MH2	Airport Ind Park	Trunk sewers			$6.00M	The project requirements and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	MH3	PS HC059 and Forcemain	From PS HC059 to PS HC027				Covered by Master Plan Project No. WW-23, WW24
6 Years to UBBO	DC	MH4	Upgrades downstream of HC018					Covered by Master Plan Project No. WW-25, WW-26, WW-27, WW-28, WW-14, WW-33
6 Years to UBBO	DC	MH5	Upgrade to HC018					Covered by Master Plan Project No. WW-01
6 Years to UBBO	DC	MH6	Deferral 11	Twenty Rd to Dickinson			$8.00M	The project needs, capacity and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	MH7	SPA 1 Non Res	Dickinson Rd. to Northern Airport Property Line			$5.00M	The project needs, capacity and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	MH8	SPA 2 Non Res	Airport Rd., south to Hwy. 6			$4.00M	The project needs, capacity and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	MH9	PS/FM Upgrades				$0.70M	The project needs, capacity and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	HM1	Rymal Rd.	675 mm sewer from Trinity Church Rd. to 200 m west of Glover	675 mm	845 m	$0.74M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	HM2	Miles/Sheral/Chappel Estates	300 mm sewer from 750 m west of Miles Rd. to Miles Rd	300 mm	750 m	$0.47M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	HM3	Anchor Rd	375 mm sewer from Miles Rd. to 350 m east	375 mm	350 m	$0.22M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	HM4	West 5th St.	250 mm sewer from 250 m west of West 5th St. to West 5th St. 500 m north	250 mm	750 m	$0.46M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	HM5	West 5th St.	375 mm sewer from south of Stone Church Rd. W to West of Upper James St.	375 mm	260 m	$0.23M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM6	Commercial Dev between Dickenson Rd. and Twenty Rd.	450 mm sewer from Dickinson Rd. to 600 m north of Dickinson	450 mm	600 m	$0.39M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.
6 Years to UBBO	DC	HM7	Commercial Dev between Dickenson Rd. and Twenty Rd.	525 mm sewer from 600 m north of Dickinson Rd. to 1120 m north of Dickinson	525 mm	520 m	$0.37M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.

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6 Years to UBBO	DC	HM8	Glanbrook Ind Park	600 mm sewer from 1120 m north of Dickinson to Existing Trunk	600 mm	600 m	$0.46M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.
6 Years to UBBO	DC	HM9	Nebo Rd.	375 mm sewer from 800 m south of Twenty Rd. to Twenty Rd.	375 mm	825 m	$0.52M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.
6 Years to UBBO	DC	HM10	Nebo Rd.	375 mm sewer from 250 m north of Twenty Rd. to 425 m south of Rymal Rd.	375 mm	630 m	$0.40M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM11	Upper Ottawa St.	375 mm sewer from 275 m north of Twenty Rd. to 350 m south of Rymal	375 mm	675 m	$0.43M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM12	Twenty Rd.	375 mm sewer from 100 m west of Nebo Rd. to Nebo Rd.	375 mm	100 m	$0.06M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.
6 Years to UBBO	DC	HM13	Twenty Rd.	450 mm sewer from Nebo Rd. to 650 m east of Nebo Rd.	450 mm	650 m	$0.43M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. With the recommended Master Plan servicing strategy along Dickenson Road, the design of this project could be updated to coordinate with infrastructure to the south.
6 Years to UBBO	DC	HM14	Upper Sherman Ave.	250 mm sewer from 250 m north of Rymal Rd. to Acadia Dr.	250 mm	500 m	$0.31M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM15	Properties east of Glover	375 mm sewer from 450 m south of Rymal Rd. to Rymal Rd.	375 mm	450 m	$0.29M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM16	Properties north of Rymal	375 mm sewer from Hydro corridor to 340 m west of Hydro corridor	375 mm	340 m	$0.22M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM17	Pritchard Rd.	375 mm sewer from 140 m north of Rymal Rd. to 400 m north of Rymal Rd	375 mm	260 m	$0.16M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	HM18	PS HC018 Upgrade	2 Pumps				Covered by Master Plan Project No. WW-01
6 Years to UBBO	DC	HM19	PS HC018 FM Twinning					Covered by Master Plan Project No. WW-02
6 Years to UBBO	DC	HM20	Hwy. 6 north of HC018	250 mm sewer from HC018 to 100 m north	250 mm	300 m	$0.18M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCU1	Properties north of Green Mountain Rd.	300 mm sewer from 400 m west of First Rd. to First Rd.	300 mm	750 m	$0.47M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. This project will need to be coordinated with the recommended Master Plan servicing strategy to service the Nash neighbourhood with the new Centennial Trunk sewer.
0 to 5 Years	DC	SCU2	Drop Structure	450 mm sewer from Escarpment to Greenhill Ave	450 mm	150 m	$1.44M	The recommended Master Plan servicing strategy is to service the Nash neighbourhood with the new Centennial Trunk sewer. Local servicing requirements such as a SPS in lieu of the drop structure may be required to support this strategy.
0 to 5 Years	DC	SCU3	Properties south of Mud St.	375 mm sewer from 200 m west of Upper Centennial Pkwy to First Rd.	375 mm	775 m	$0.49M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCU4	Properties east of Fletcher Rd.	375 mm sewer from 150 m east of Fletcher Rd. to Fletcher Rd.	375 mm	300 m	$0.19M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCU5	Rymal Rd.	450 mm sewer from 320 m west of First Rd. to 2nd Rd.			$1.50M	This strategy was confirmed through the ROPA9 Class EA. However, the recommended long term solution from the Master Plan provides for the eastern part of ROPA9 to be serviced by gravity by the Centennial Trunk Sewer.
0 to 5 Years	DC	SCU6	Rymal Rd.	600 mm sewer from 2nd Rd. to 820 m west of 2nd Rd.			$2.00M	This strategy was confirmed through the ROPA9 Class EA. However, the recommended long term solution from the Master Plan provides for the eastern part of ROPA9 to be serviced by gravity by the Centennial Trunk Sewer.
0 to 5 Years	DC	SCU7	Rymal Rd.	675 mm sewer from 820 m west of 2nd Rd. to Trinity Church Rd.			$2.30M	This strategy was confirmed through the ROPA9 Class EA. However, the recommended long term solution from the Master Plan provides for the eastern part of ROPA9 to be serviced by gravity by the Centennial Trunk Sewer.
0 to 5 Years	DC	SCU8	Upper Mount Albion	250 mm sewer from 310 m south of Mud St. to 75 m north of Mud St.	250 mm	385 m	$0.46M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCU9	Highland Rd. W	375 mm sewer from Upper Mount Albion to east of Upper Mount Albion	375 mm	390 m	$0.25M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCU10	Candlewood Dr.	300 mm sewer	300 mm	160 m	$0.10M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCU11	Properties east of First Rd.	375 mm sewer from 150 m north of Green Mountain to First Rd.	375 mm	1075 m	$0.68M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. This project will need to be coordinated with the recommended Master Plan servicing strategy to service the Nash neighbourhood with the new Centennial Trunk sewer.
6 Years to UBBO	DC	SCU12	Properties east of Fletcher Rd.	375 mm sewer from 500 m north of Rymal Rd. to 150 m east of Fletcher	375 mm	415 m	$0.26M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCU13	Proposed P.S.				$1.00M	This strategy was confirmed through the ROPA9 Class EA. However, the recommended long term solution from the Master Plan provides for the eastern part of ROPA9 to be serviced by gravity by the Centennial Trunk Sewer.
6 Years to UBBO	DC	SCU14	Forcemain	250 mm FM from 350 m south of Rymal to 320 m west of First Rd			$1.10M	This strategy was confirmed through the ROPA9 Class EA. However, the recommended long term solution from the Master Plan provides for the eastern part of ROPA9 to be serviced by gravity by the Centennial Trunk Sewer.

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0 to 5 Years	DC	SCL1	Falcon Rd	250 mm sewer from Fifty Rd. to Existing Gravity Sewer	250 mm	220 m	$0.13M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL2	Arvin Ave Extension	375 mm sewer from 250 m east of McNeilly Rd to McNeilly Rd.	375 mm	250 m	$0.16M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL3	Arvin Ave Extension	375 mm sewer from 300 m west of Lewis Rd. to Lewis Rd.	375 mm	300 m	$0.19M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL4	Arvin Ave Extension	375 mm sewer from 250 m west of McNeilly Rd. to McNeilly Rd.	375 mm	250 m	$0.16M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL5	Lands East of Jones Rd	375 mm sewer from Jones Rd. to 250 m east of Jones Rd.	375 mm	250 m	$0.16M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL6	Lands East of Lewis Rd	375 mm sewer from Lewis Rd. to 300 m east of Lewis Rd.	375 mm	490 m	$0.31M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	SCL7	Extension to Bridge Port Subdivision	300 mm sewer from Ex. Off Jones Rd. to Bridge Port Subdivision	300 mm	230 m	$0.14M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL8	Lakeside Dr.	250 mm sewer from 300 m west of Jones Rd. to Jones Rd.	250 mm	300 m	$0.18M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL9	Commercial Dev	375 mm sewer	375 mm	330 m	$0.15M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL10	South Service Rd	600 mm sewer from Fifty Rd. to 250 m west of Winona	600 mm	1100 m	$0.84M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL11	North Service Rd.	250 mm sewer from Millen Rd to Dewitt Rd.	250 mm	900 m	$0.55M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL12	Forcemain - South Service Rd.	200 mm FM from PS to Fifty Rd.	200 mm	450 m	$0.27M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
6 Years to UBBO	DC	SCL13	PS at South Service Rd. and Fifty Rd.		235 L/s		$0.53M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements
0 to 5 Years	DC	New	Longwood Road	1200 mm sewer for the McMaster Innovation Park to the Hwy 403 trunk sewer	1200 mm	500 m	$0.53M	The sewer alignment and timing will be reviewed as part of Secondary Planning and/or local servicing requirements. This project could be coordinated with Master Plan Project No. WW-22.
			Total Cost				**$62.88M**	

KEY PLAN

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS

0 1000 2000m

1: 25000

March 30 2004
Project No. 68329

C.N. WATSON AND ASSOCIATES LTD.
Planning for Growth

EARTH TECH
Earth Tech (Canada) Inc St. Catharines, Ontario 905.688.4272

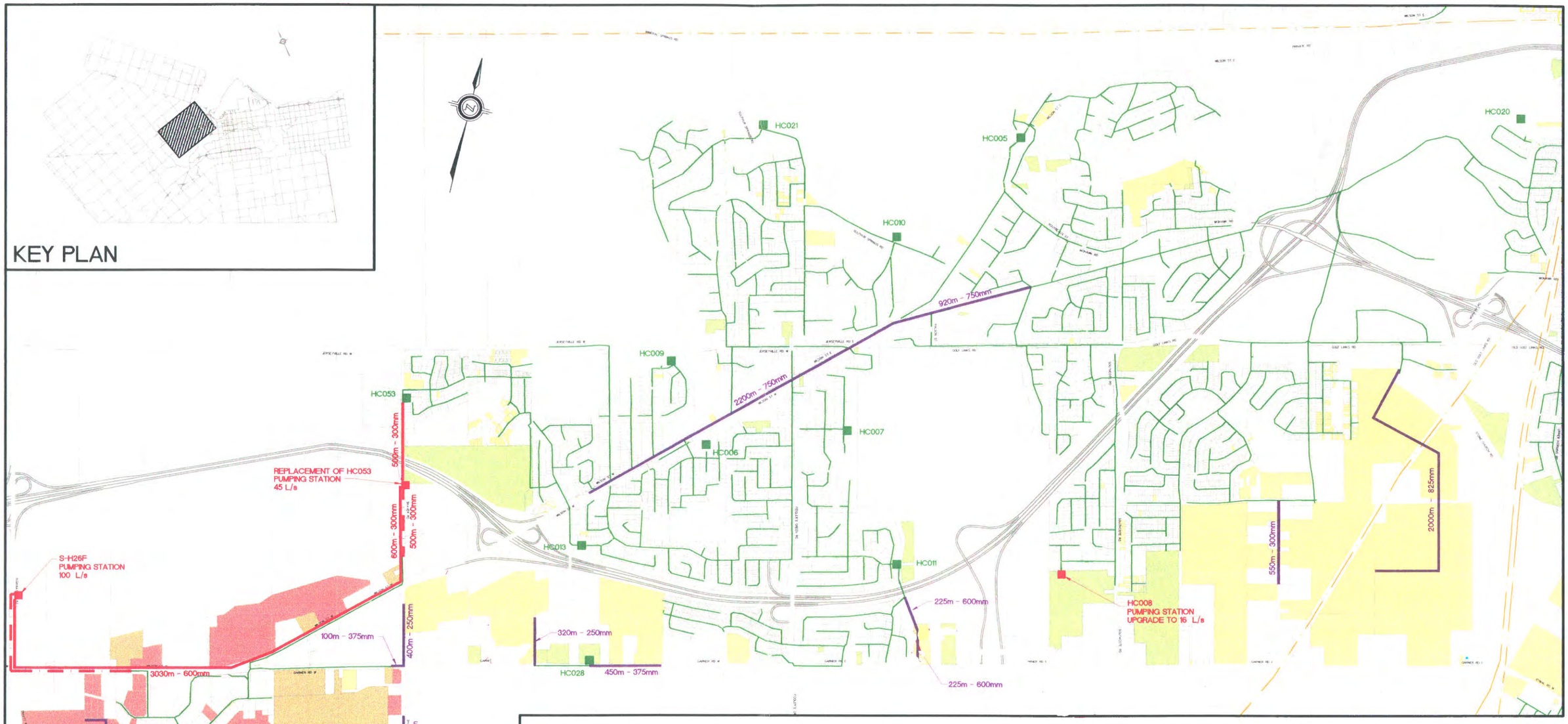
PHILIPS ENGINEERING

Hamilton

Hamilton Development Charges Background Study

Figure 2-1
Waterdown Sanitary Sewer

KEY PLAN



LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

0 1000 2000m

1: 25000

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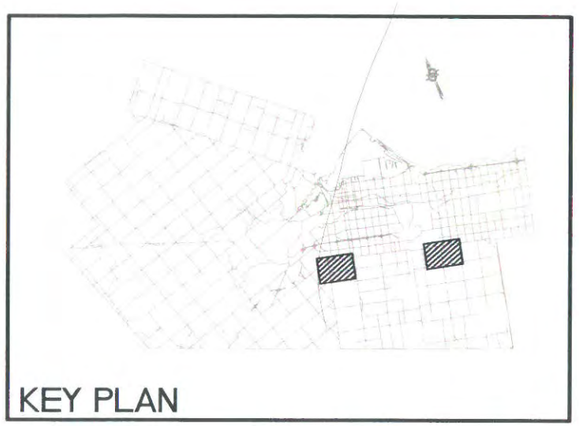
Figure 2-2
Ancaster
Sanitary Sewer

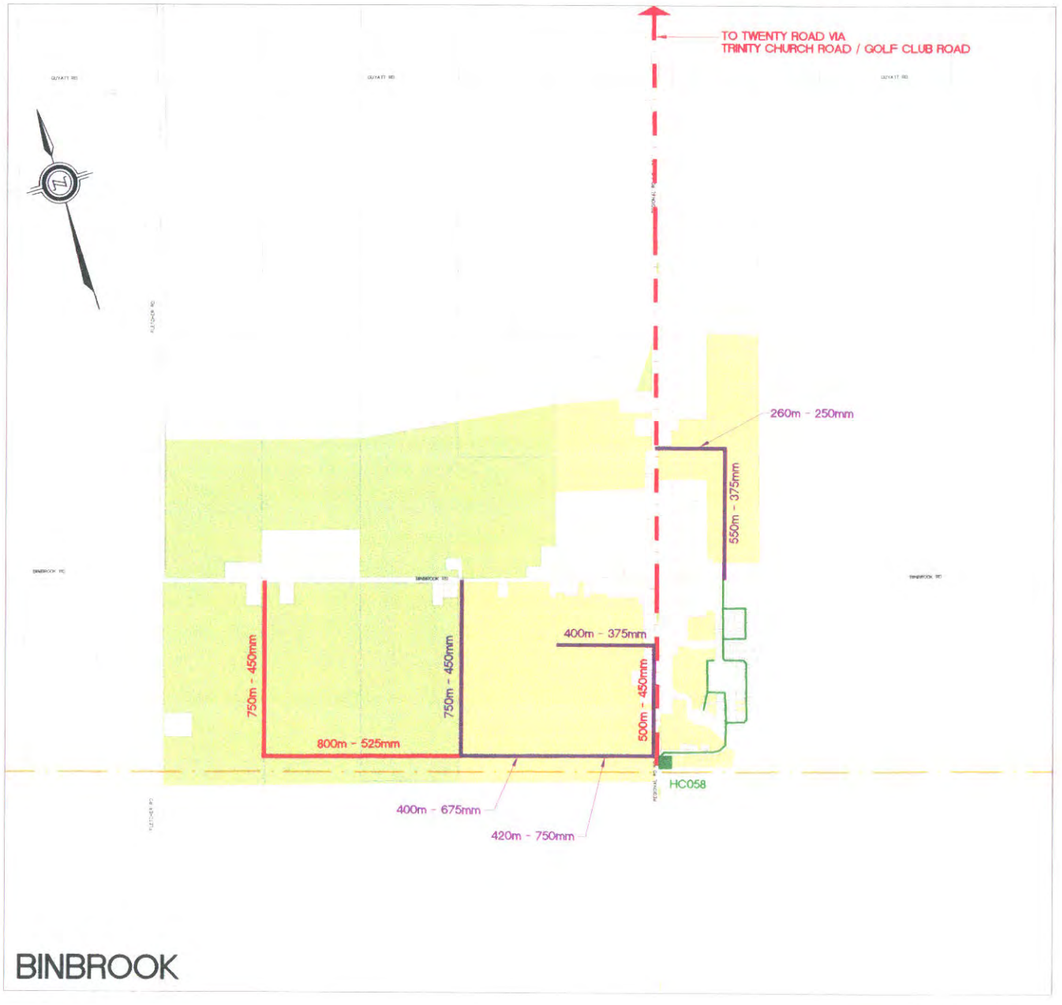


KEY PLAN

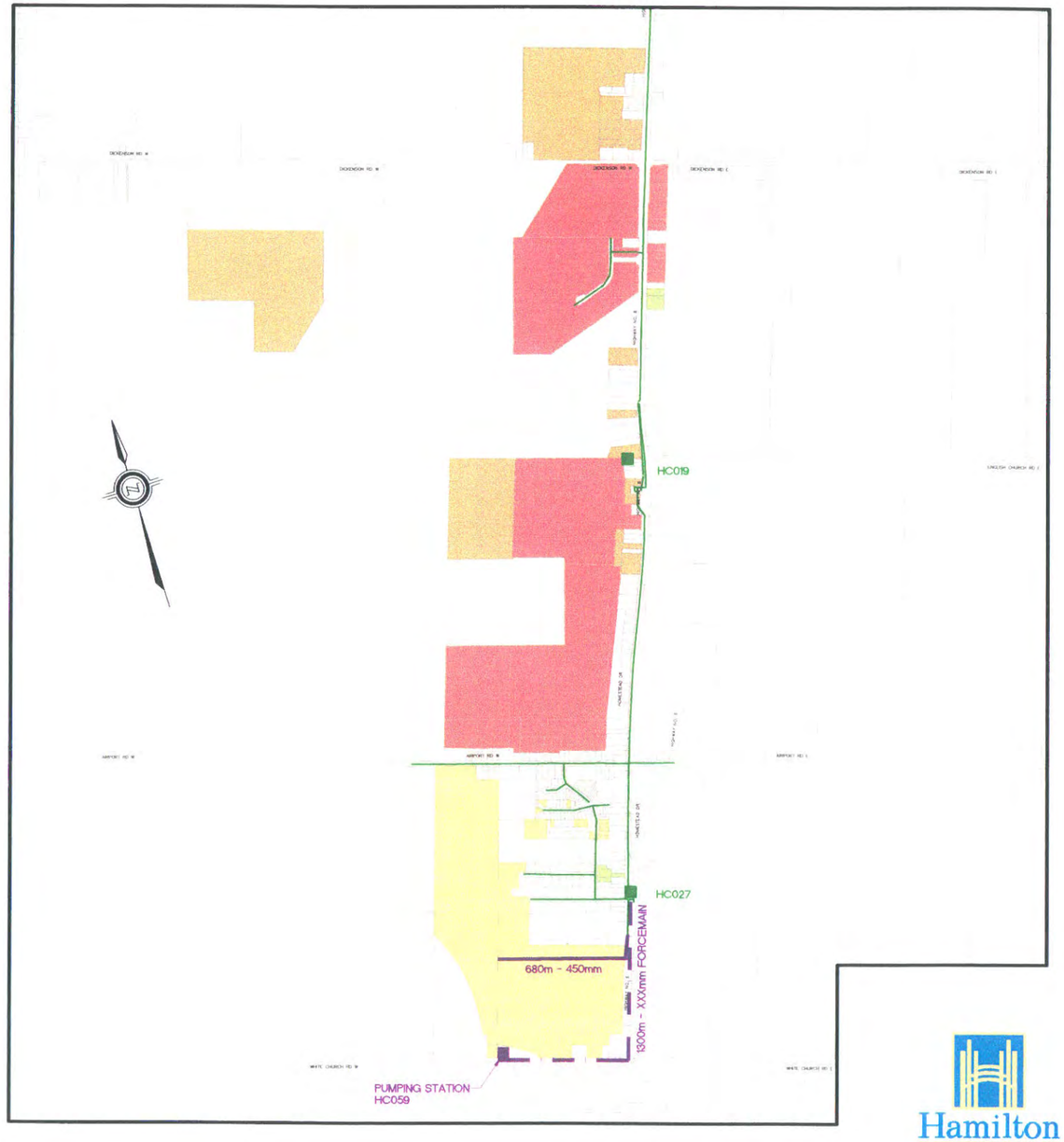
LEGEND

RESIDENTIAL	NON-RESIDENTIAL
0 – 5 YEARS	0 – 5 YEARS
6 PLUS YEARS	6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS



BINBROOK



0 1000 2000m

1: 25000

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Figure 2-3
Binbrook / Mount Hope Sanitary Sewer

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

260m - 375mm
750m - 250mm
500m - 250mm
100m - 250mm
HC018
750m - 300mm
350m - 375mm
340m - 375mm
260m - 375mm
845m - 675mm
675m - 375mm
630m - 375mm
450m - 375mm
100m - 375mm
650m - 450mm
600m - 600mm
825m - 375mm
520m - 525mm
600m - 450mm

Stoney Creek Upper - See Figure 2-5

0 1000 2000m

1: 25000

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Figure 2-4
Hamilton Mountain Sanitary Sewer

KEY PLAN

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

250m - 450mm
DROP STRUCTURE

1075m - 375mm

750m - 300mm

775m - 375mm

385m - 250mm

450m - 250mm

390m - 375mm

300m - 375mm

415m - 375mm

1200m - 675mm

850m - 600mm

500m - 450mm

800m - 250mm

S-H23F

PUMPING STATION
110 L/s

Hamilton Mountain - See Figure 2-4

FROM BINBROOK
FROM GOLF CLUB ROAD

0 1000 2000m

1: 25000

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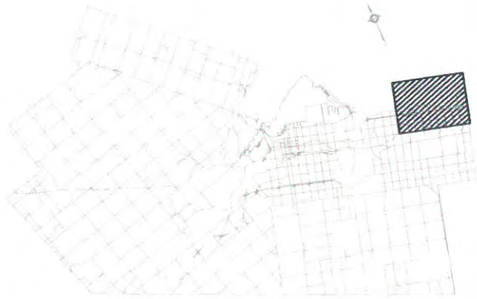
Figure 2-5
Stoney Creek Upper Sanitary Sewer



KEY PLAN

LEGEND

RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

NON-RESIDENTIAL

- 0 – 5 YEARS
- 6 PLUS YEARS

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS

N

900m - 250mm
300m - 250mm
230m - 300mm
260m - 250mm
PS
S-H24F
HC016
1100m - 600mm
PUMPING STATION
235 l/s
450m - 400mm
330m - 375mm
250m - 375mm
345m - 375mm
250m - 375mm
300m - 375mm
490m - 375mm
HC004

0 1000 2000m

1: 25000

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Figure 2-6
Stoney Creek Lower Sanitary Sewer