DENVER
THE MILE HIGH CITY

Department of Public Works
Engineering Division
Wastewater Capital Projects Management

2000 West Third Avenue
Denver, CO 80223
www.denvergov.org/PublicWorks

CE00024 Parkhill Storm Ph. IV / 51st and St. Paul Sanitary
Drainage Narrative

Parkhill Storm Ph IV is the 4th phase of the Park Hill Storm. The project begins at Colorado Blvd and 48th Ave. where it will tie into an existing 78" RCP that was constructed with Parkhill Phase II in 2002. The 84" RCP will then head east in 48th Ave. to Dahlia St. and then head south down Dahlia to Smith Rd. Where the existing 30" Storm will be temporarily connected to it until the 84" RCP pipe will be continued in a future project.

The 84" storm main will be Jacked under three Burlington Northern Sante Fe (BNSF) railroad spurs and under the Union Pacific (UP). It will also be Jacked Under I-70 and Stapleton Drive North and South.

The 5 year flows at Dahlia St. and Smith Rd and 48th Ave and Colorado Blvd. were taken from the City and County of Denver Storm Drainage Master Plan-2009. The project is located in Basin 0060-01 The basin is a mix of industrial and residential land uses. Parkhill Ph. IV is located entirely in industrial land use area.

The upstream flows (DP 311) had a 5 year flow of 347 cfs. The downstream end of the project, Colorado Blvd and 48th Ave, has a 5 year flow of 462 cfs (DP 341).

5 year storm flows at the inlets were calculated using the Rational Method, CCD Standards and UDFCD standards. Inlets were sized using the CCD Nomographs.

5 year HGL calculations we done with Hydraflow extension of Civil 3D 2009.

Street flow calculations were done with Hydraflow Express extension of Civil 3D 2009.

Basin Description

Basin A0 is a basin that picks up the parking lot of the Safeway property. An existing 27" Private Storm Main conveys storm runoff across Dahlia Street. This existing 27" Pipe will be connected to the proposed 84" Storm in Dahlia Street. A new dead end manhole will be constructed on the Safeway property west of Dahlia Street.

Basin A1 is located on the east side of Dahlia Street between I-70 and Smith Road. It is primarily Safeway Parking area, and the East half of Dahlia Street. These flows are captured in an inlet at DP 1

Basin A2 is located on the west side of Dahlia Street between I-70 and Smith Road. It is west half of Dahlia Street. These flows are captured in an inlet at DP 2. The flow from Basin A2 combines with Basins A0 and A1 and CCD DP 311 and flows in an 84" RCP pipe to DP 6.

Basin A3 is located on the east side of Dahlia Street north of I-70 and south of the BNSF tracks. It is primarily McMillan Sales Corporation parking lot and Dahlia Street and Stapleton North Drive R.O.W. Flows from this basin are captured in an inlet at DP 4.

Basin A4 is adjacent to Basin A3 and is the west half of Dahlia Street north of I-70 and south of the BNSF tracks. Flows from this basin are captured in an inlet at DP 5. Flows from Basins A3 and A4 combine with flows from DP 3 and are conveyed in the 84" RCP to DP 9.

Basin A5 is north of Basin A3 and is the east half of Dahlia Street and parking area of the adjacent property. Flows from this basin are captured in an inlet at DP 7.

Basin A6 is the west half of Dahlia Street and is adjacent to Basin A5 and north of Basin A4. Flows from this basin are captured in an inlet at DP 8 and then combine with flows from Basins A6 DP 6 then are flow in the 84" RCP to DP 11.

Basin A7 is north of Basins A5 and A6 and is primarily the R.O.W. of Dahlia Street to the intersection of 48th Ave. Flows from this basin flow north in the flowline, then turn west in a crosspan at the south side of 48th to an inlet at the SW curb return of 48th Ave. and Dahlia Street. These flows then combine with flows from DP 9 at DP11 and flow west in the 84" pipe to DP 13.

Basin A8 is the south half of 48th Ave and a portion of the businesses building and parking lot adjacent to 48th Ave. It stretches from the intersection of Dahlia Street to the BNSF railroad spur near the CAT entrance. Storm runoff from this basin flows west in the south flowline to an inlet near the BNSF railroad spur crossing.

Basin A9 is the north half of 48th Ave from the intersection of Dahlia Street to the BNSF railroad spur near the CAT entrance. Storm runoff from this basin flows west in the north flowline to an inlet near the BNSF railroad spur crossing. Flows from Basin A8 and A9 combine with flows from DP 11 and continue west in the 84" RCP pipe until it ties into the existing 78" RCP pipe at the intersection of Colorado Blvd and 48th Ave. The CCD Drainage Master Plan Study has a 5 year storm runoff of 462 cfs (DP 341).

NOTES

1. THE CITY OF DENVER ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

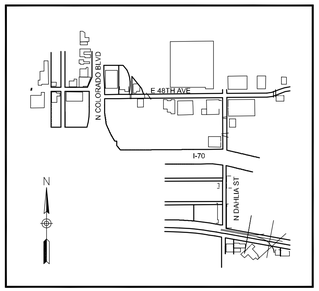
2. STORM SEWER PIPE LENGTHS ARE TWO DIMENSIONAL LENGTHS. LENGTHS ARE CENTER TO CENTER BETWEEN MANHOLES AND TO INSIDE OF BOX FOR INLETS.

3. STORM SEWER LENGTHS WITH FLARED END SECTIONS ARE TO END OF FLARED END SECTION.

4. STORM SEWER MAIN SHALL BE ASTM C-76 CLASS III PIPE UNLESS OTHERWISE NOTED.

DESIGN POINT	BASIN	AREA (AC)	DIRECT FLOW		TOTAL FLOW	
			Q_5	Q_{100}	Q_5	Q_{100}
0	A0	5.37	19.8	X	9.8	X
1	A1	3.43	6.9[0.9]	X	6.9	X
2	A2	0.79	1.7	X	1.7	X
3	A0-A2	9.59	22.6	X	22.6(370)	X
4	A3	1.18	2.8	X	2.8	X
5	A4	0.18	0.5	X	0.5	X
6	A0-A4	12.17	X	X	24.4(371)	X
7	A5	0.92	2.2	X	2.2	X
8	A6	0.30	0.8	X	0.8	X
9	A0-A6	13.39	X	X	26.1(373)	X
10	A7	1.56	3.2	X	3.2	X
11	A0-A7	14.95	X	X	26.6(374)	X
12	A8	3.73	7.0	X	7.0	X
13	A9	2.52	4.4	X	4.4	X
14	A0-A9	21.2	X	X	37.4(384)	X
15	OS1	1.18	3.4	X	3.4[4.3]	X
16	OS2	0.11	0.3	X	0.3	X
17	OS1-OS2	1.29	X	X	3.7[4.6]	X
18	OS3	1.19	3.2	X	3.2	X

* MASTER PLAN 5 YEAR FLOW AT SMITH RD AND DAHLIA ST (DP 311) 347 CFS
MASTER PLAN 5 YEAR FLOW AT COLORADO BLVD AND 48TH(DP 341) 462 CFS
[BYPASS FLOW TO DP 14/TOTAL FLOW INCLUDING BYPASS FLOW FROM DP1]
(363) LOCAL FLOW ADDED TO MASTER PLAN 5 YEAR FLOWS



KEY MAP
N.T.S.

NO.	DESCRIPTION OF REVISIONS	DATE	BY
.	.	.	.

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UTILITY NOTIFICATION CENTER OF COLORADO

CITY AND COUNTY OF DENVER
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
CAPITAL PROJECT MANAGEMENT
2000 W. 3RD AVE. DENVER, CO 80223
TEL.: (303) 446-3617 FAX: (303) 446-3647

DENVER THE MILE HIGH CITY

PARK HILL STORM, PH IV
51ST AND ST PAUL SANITARY
CE00024
PA77610_323, PA80007_141

DRAINAGE PLAN

DRAWN BY:	MWG
DESIGNED BY:	MWG
APPROVED BY:	WDQ
DRAWING NAME:	D-04-323-DRAIN-01.dwg
DATE:	08/01/2009
SHEET NO.:	1 OF 1

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DENVER
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PROJECT: Parkhill Storm Ph. IV/51st and St Paul Sanitary
SUBJECT: COMPOSITE RUNOFF FACTORS

JOB #: CE00024
DATE: 5/18/2010
BY: MWG

SOIL TYPE : C

Pond 1

Basin Name	Square Footage	Acres	Landscaped sf	Landscaped Acres	Roof Area sf	Roof Area Acres	Asphalt sf	Asphalt Acres	Walks sf	Walks Acres	Composite Runoff Factors C_2	C_5	C_{100}	I %
A0	233,705	5.365	0.000	0.000	124,912	2.868	108793.000	2.498		0.000	0.79	0.81	0.88	94.66
A1	149,195	3.425	29839.000	0.685		0.000	119356.000	2.740		0.000	0.60	0.63	0.74	80.40
A2	34,293	0.787	6858.600	0.157		0.000	27434.400	0.630		0.000	0.60	0.63	0.74	80.40
A3	51,459	1.181	10291.800	0.236		0.000	41167.200	0.945		0.000	0.60	0.63	0.74	80.40
A4	7,735	0.178	1547.000	0.036		0.000	6188.000	0.142		0.000	0.60	0.63	0.74	80.40
A5	40,270	0.924	8054.000	0.185		0.000	32216.000	0.740		0.000	0.60	0.63	0.74	80.40
A6	13,227	0.304	2645.400	0.061		0.000	10581.600	0.243		0.000	0.60	0.63	0.74	80.40
A7	68,059	1.562	13611.800	0.312		0.000	54447.200	1.250		0.000	0.60	0.63	0.74	80.40
A8	162,418	3.729	32483.600	0.746		0.000	129934.400	2.983		0.000	0.60	0.63	0.74	80.40
A9	109,758	2.520	21951.600	0.504		0.000	87806.400	2.016		0.000	0.60	0.63	0.74	80.40
Totals:	**636414**	**14.610**		**2.922**		**0.000**		**11.688**		**0.000**	**0.60**	**0.63**	**0.74**	**80.40**

Indiana St

Basin Name	Square Footage	Acres	Landscaped sf	Landscaped Acres	Roof Area sf	Roof Area Acres	Asphalt sf	Asphalt Acres	Walks sf	Walks Acres	Composite Runoff Factors C_2	C_5	C_{100}	I %
OS1	51,223	1.176	10244.600	0.235		0.000	40978.400	0.941		0.000	0.62	0.63	0.74	80.40
OS2	4,724	0.108	944.800	0.022		0.000	3779.200	0.087		0.000	0.62	0.63	0.74	80.40
OS3	51,789	1.189	10357.800	0.238		0.000	41431.200	0.951		0.000	0.62	0.63	0.74	80.40
Totals:	**107736**	**2.473**		**0.495**		**0.000**		**1.979**		**0.000**	**0.60**	**0.63**	**0.74**	**80.40**

		Imp., I %
Landscaping		2.00
Roofs		90.00
Asphalt		100.00
Walks		90.00

DENVER
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PROJECT: Parkhill Storm Ph. IV/51st and St Paul Sanitary
SUBJECT: TIME OF CONCENTRATION

JOB #: CE00024
DATE: 5/18/2010
BY: MWG

TIME OF CONCENTRATION

			TIME (Ti) *[Max. 500']*					TRAVEL TIME (Tt)							Tc CHECK (Urbanized Basins)			FINAL Tc	Time to Peak** Flow	Remarks
Basin No.	Area (acres)	5Yr. co-eff.	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (%)	Ti (min)	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (%)	*	Vel. (fps)	Tt (min)	Tc	Length (ft)	Tc (min)	(min)		
A0	5.37	0.81																	5.0	ASSUME MIN Tc
A1	3.43	0.63	5297	5256.3	170	23.9	3.8	5256.3	5247	1085	0.9	6.0	1.9	9.7	13.5	1255	17.0	13.5	13.5	
A2	0.79	0.63	5256.5	5256.3	10	2.0	2.1	5256.3	5247	1085	0.9	6.0	1.9	9.7	11.8	1095	16.1	11.8	11.8	
A3	1.18	0.63	5250	5249	50	2.0	4.7	5249	5241.3	630	1.2	6.0	2.1	4.9	9.7	680	13.8	9.7	9.7	
A4	0.18	0.63	5244.9	5244.6	14	2.1	2.5	5244.6	5241	193	1.9	6.0	2.6	1.3	3.7	207	11.2	3.7	5.0	
A5	0.92	0.63	5242.7	5240.7	100	2.0	6.7	5240.7	5238.5	270	0.8	6.0	1.7	2.6	9.3	370	12.1	9.3	9.3	
A6	0.30	0.63	5240.4	5240	18	2.2	2.8	5240	5238.5	270	0.6	6.0	1.4	3.1	5.9	288	11.6	5.9	5.9	
A7	1.56	0.63	5240.5	5238.54	88	2.2	6.1	5238.54	5236.88	541	0.3	6.0	0.7	12.2	18.3	629	13.5	13.5	13.5	
A8	3.73	0.63	5240.5	5236.88	172	2.1	8.7	5236.88	5231.9	875	0.6	6.0	1.4	10.1	18.8	1047	15.8	15.8	15.8	
A9	2.52	0.63	5241.4	5239.5	88	2.2	6.1	5239.5	5231.9	1386	0.5	6.0	0.7	31.2	37.4	1474	18.2	18.2	18.2	
OS1	1.18	0.63	5253.6	5252.3	62	2.1	5.2	5252.3	5246.4	392	1.5	6.0	2.3	2.9	8.1	454	12.5	8.1	8.1	
OS2	0.11	0.63	5247.1	5246.9	10	2.0	2.1	5246.9	5246.2	137	0.5	6.0	0.7	3.1	5.2	147	10.8	5.2	5.2	
OS3	1.19	0.63	5265	5252.7	50	24.6	2.1	5252.7	5245.4	630	1.2	6.0	2.1	4.9	7.0	680	13.8	7.0	7.0	

**NOTE: ARVADA REQUIRES MIN. Tc=10 MIN.

* Type of Land Surface for Overland Travel Time	VELOCITY COEFFICIENTS	
1 = Heavy Meadow	1	2.5
2 = Tillage / Field	2	5
3 = Short pasture & lawns	3	7
4 = Nearly bare ground	4	10
5 = Grassed waterway	5	15
6 = Paved areas and shallow paved swales	6	20

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

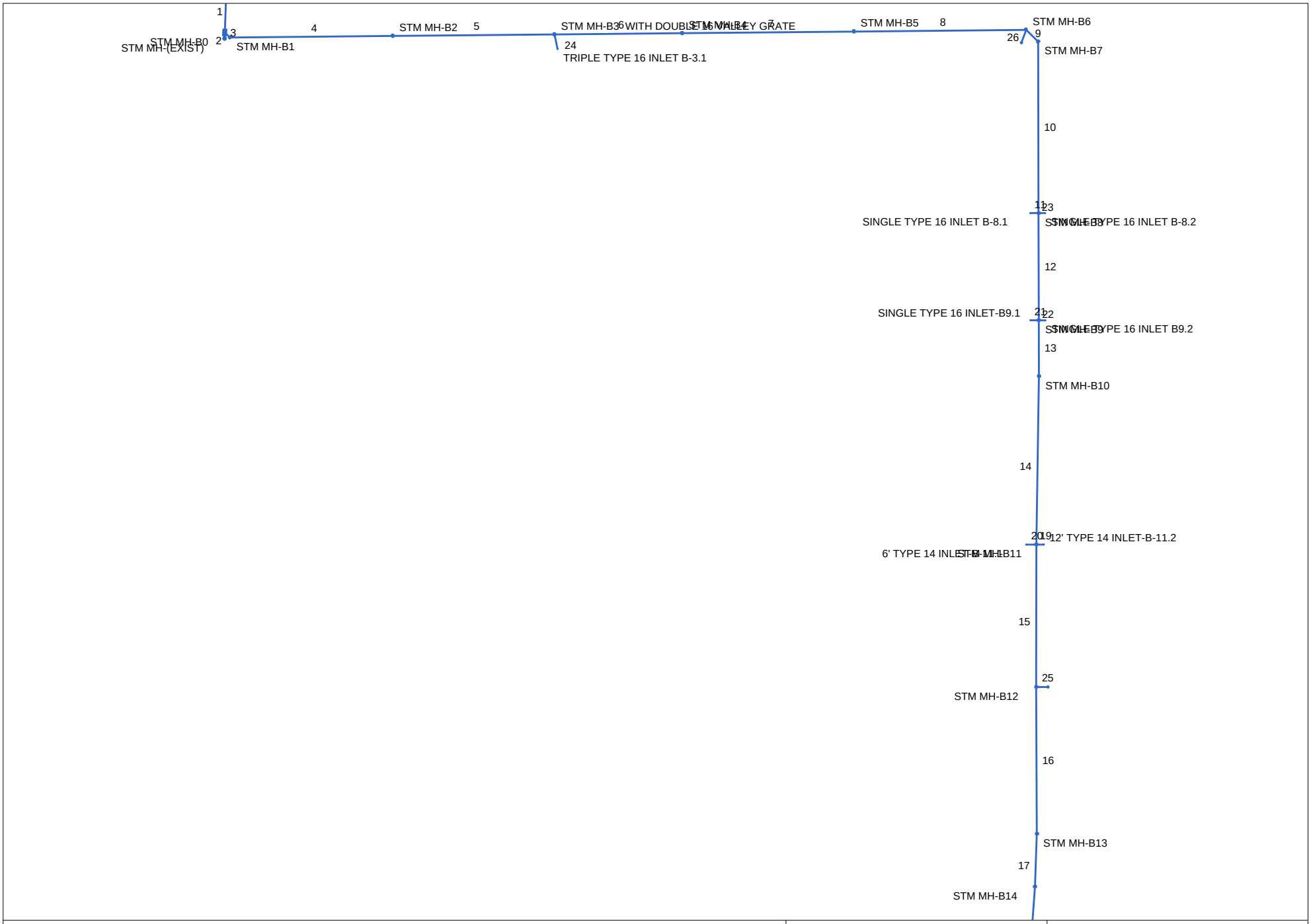
DENVER
THE MILE HIGH CITY

CALCULATED BY MWG
DATE: 5/18/10
CHECKED BY:

JOB NO: CE00024
PROJECT: Parkhill Storm Ph. IV/51st and St Pau
DESIGN STORM: 5 Year

BASIN	DESIGN POINT	DIRECT RUNOFF: AREA DESIG.	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	TOTAL RUNOFF: Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	STREET: SLOPE (%)	STREET FLOW (cfs)	PIPE: DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	TRAVEL TIME: LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A0	0	A0	5.37	0.81	5.00	4.36	4.55	**19.8**				**19.8**									
SAFEWAY FLOWS		SAFEWAY FLOWS	MASTER PLAN 5 YEAR FLOW AT SMITH AND DAHLIA (DP 311)					347.0													INLET
A1	1	A1	3.43	0.63	13.55	2.16	3.22	**6.9**				**6.9**									TO DP 3
														0.9	6.0	5.0	18.0	22.0	3.4	0.1	INLET
A2	2	A2	0.79	0.63	11.85	0.50	3.42	**1.7**				**1.7**	Bypass Flow to DP 14								TO DP 3
															1.7	5.0	18.0	30.0	1.0	0.5	INLET
A0-A2	3	A0-A2							13.5	7.02	3.22	**22.6**									TO DP 3
ROUTE		MASTER PLAN 5 YEAR FLOW AT SMITH AND DAHLIA (DP 311)						347.0				**369.57**		0.9	368.7	0.4	84.0	668.0	9.6	1.2	MANHOLE
A3	4	A3	1.18	0.63	9.65	0.74	3.72	**2.8**				**2.8**									TO DP 6
															2.8	3.0	18.0	20.0	1.6	0.2	INLET
A4	5	A4	0.18	0.63	5.00	0.11	4.55	**0.5**				**0.5**									TO DP 6
															0.5	5.0	18.0	25.0	0.3	1.4	INLET
A0-A4	6	A0-A4							14.7	7.87	3.10	**24.4**									TO DP 6
ROUTE												**371.39**			371.4	0.4	84.0	318.0	9.7	0.5	MANHOLE
A5	7	A5	0.92	0.63	9.33	0.58	3.77	**2.2**				**2.2**									TO DP 9
															2.2	5.0	18.0	20.0	1.2	0.3	INLET
A6	8	A6	0.30	0.63	5.88	0.19	4.41	**0.8**				**0.8**									TO DP 9
															0.8	10.0	18.0	25.0	0.5	0.9	INLET
A0-A6	9	A0-A6							15.3	8.65	3.02	**26.1**									TO DP 9
MULTI FAMILY												**373.11**			373.1	0.4	84.0	1975.0	9.7	3.4	MANHOLE
A7	10	A7	1.56	0.63	13.49	0.98	3.25	**3.2**				**3.2**									TO DP 13
															3.2	10.0	18.0	40.0	1.8	0.4	INLET
A0-A7	11	A0-A7							18.7	9.63	2.76	**26.6**									
ROUTE												**373.58**									
A8	12	A8	3.73	0.63	15.82	2.35	2.98	**7.0**				**7.0**									
ROUTE															7.0	5.0	24.0	44.0	2.2	0.3	INLET
A9	13	A9	2.52	0.63	18.19	1.59	2.80	**4.4**				**4.4**									TO DP 13
A0-A9	13	A0-A9							18.7	13.57	2.76	**37.4**									
ROUTE												**384.44**			37.4	1.0	84.0	960.0	1.0	16.4	INLET/MANHOLE
		MASTER PLAN 5 YEAR FLOW AT COLORADO BLVD AND 48TH AVE (DP 341)						462.0													TO EX 72" RCP
OS1	14	OS1	1.18	0.63	8.07	0.74	4.00	**3.0**				**3.0**									
												Plus Bypass Flow From DP 1			3.9	1.0	15.0	48.0	3.1	0.3	EX INLET
												3.86									
OS2	15	OS2	0.11	0.63	5.21	0.07	4.55	**0.3**				**0.3**									
OS1-OS2	15	OS1-OS2							8.3	0.81	3.95	**3.2**									
ROUTE		ROUTE										**4.1**			3.2	1.0	15.0	652.0	2.6	4.2	EX INLET
OS3	16	OS3	1.19	0.63	6.96	0.75	4.23	**3.2**				**3.2**									
															3.2	1.0	15.0	652.0	2.6	4.2	EX INLET

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2009 Plan



Project File: Parkhill-PH-IV-Storm7-28-10.stm	Number of lines: 26	Date: 02-23-2011

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	Pipe - (46) (1) (STORM-1)	466.0	78	Cir	158.00	5204.85	5205.76	0.576	5211.35*	5212.60*	2.39	5214.99	End	Manhole
2	Pipe - (46) (STORM-1)	69.70	78	Cir	17.98	5205.76	5205.86	0.557	5214.99*	5214.99*	0.07	5215.06	1	Manhole
3	Pipe - (138) (STORM-1)	396.3	84	Cir	21.21	5207.09	5207.20	0.520	5214.99*	5215.07*	1.24	5216.31	1	Manhole
4	Pipe - (45) (STORM-1)	396.3	84	Cir	483.89	5207.60	5215.07	1.544	5216.31	5220.16	0.41	5220.16	3	Manhole
5	Pipe - (44) (STORM-1)	396.3	84	Cir	480.00	5215.39	5217.31	0.400	5221.01	5222.93	3.29	5226.23	4	Generic
6	Pipe - (43) (STORM-1)	384.9	84	Cir	379.00	5217.51	5219.02	0.398	5226.23*	5227.60*	0.23	5227.83	5	Manhole
7	Pipe - (42) (STORM-1)	384.9	84	Cir	510.00	5219.02	5221.06	0.400	5227.83*	5229.69*	0.23	5229.92	6	Manhole
8	Pipe - (41) (STORM-1)	384.9	84	Cir	511.10	5221.06	5223.11	0.401	5229.92*	5231.77*	1.56	5233.33	7	Manhole
9	Pipe - (40) (STORM-1)	381.7	84	Cir	49.62	5223.11	5223.31	0.403	5233.33*	5233.51*	1.16	5234.67	8	Manhole
10	Pipe - (39) (STORM-1)	381.7	84	Cir	509.16	5223.31	5225.33	0.397	5234.67*	5236.49*	1.53	5238.02	9	Manhole
11	Pipe - (110) (STORM-1)	0.80	18	Cir	24.46	5230.83	5233.22	9.770	5238.02*	5238.02*	0.00	5238.02	10	Generic
12	Pipe - (38) (4) (STORM-1)	378.7	84	Cir	318.47	5225.33	5226.55	0.383	5238.02*	5239.14*	1.51	5240.64	10	Manhole
13	Pipe - (38) (STORM-1)	375.4	84	Cir	166.00	5226.56	5227.28	0.434	5240.64*	5241.22*	0.22	5241.44	12	Manhole
14	Pipe - (37) (STORM-1)	375.4	84	Cir	500.09	5227.48	5231.97	0.898	5241.44*	5243.17*	1.48	5244.64	13	Manhole
15	Pipe - (36) (STORM-1)	366.8	84	Cir	423.00	5232.17	5233.86	0.400	5244.64*	5246.04*	1.41	5247.45	14	Manhole
16	Pipe - (35) (1) (STORM-1)	347.0	84	Cir	435.16	5234.06	5235.80	0.400	5247.45*	5248.74*	0.19	5248.93	15	Manhole
17	Pipe - (35) (STORM-1)	347.0	84	Cir	157.20	5236.00	5236.63	0.401	5248.93*	5249.39*	0.19	5249.58	16	Manhole
18	Pipe - (33) (STORM-1)	347.0	84	Cir	251.00	5236.83	5237.84	0.402	5249.58*	5250.32*	1.26	5251.58	17	Manhole
19	Pipe - (163) (STORM-1)	6.90	18	Cir	22.00	5237.47	5238.57	4.998	5244.64*	5244.74*	0.24	5244.98	14	Generic
20	Pipe - (164) (STORM-1)	1.70	18	Cir	29.88	5237.47	5238.96	4.987	5244.64*	5244.65*	0.01	5244.67	14	Generic
21	Pipe - (111) (STORM-1)	0.50	18	Cir	24.74	5231.86	5233.14	5.174	5240.64*	5240.64*	0.00	5240.64	12	Generic
22	Pipe - (112) (STORM-1)	2.80	18	Cir	19.69	5231.86	5232.45	2.998	5240.64*	5240.66*	0.04	5240.70	12	Generic
23	Pipe - (114) (STORM-1)	2.20	18	Cir	19.53	5230.83	5231.90	5.477	5238.02*	5238.03*	0.02	5238.05	10	Generic
24	Pipe - (102) (STORM-1)	7.00	24	Cir	43.71	5222.51	5224.81	5.263	5226.23	5226.22	0.14	5226.35	5	Generic

Project File: Parkhill-PH-IV-Storm7-28-10.stm | Number of lines: 26 | Run Date: 02-23-2011

NOTES: Return period = 5 Yrs. ; *Surcharged (HGL above crown).

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
25		19.80	27	Cir	34.91	5239.17	5239.36	0.544	5247.45*	5247.59*	0.39	5247.98	15	Manhole
26		3.20	18	Cir	40.24	5225.99	5230.01	9.989	5233.33*	5233.37*	0.05	5233.42	8	Grate

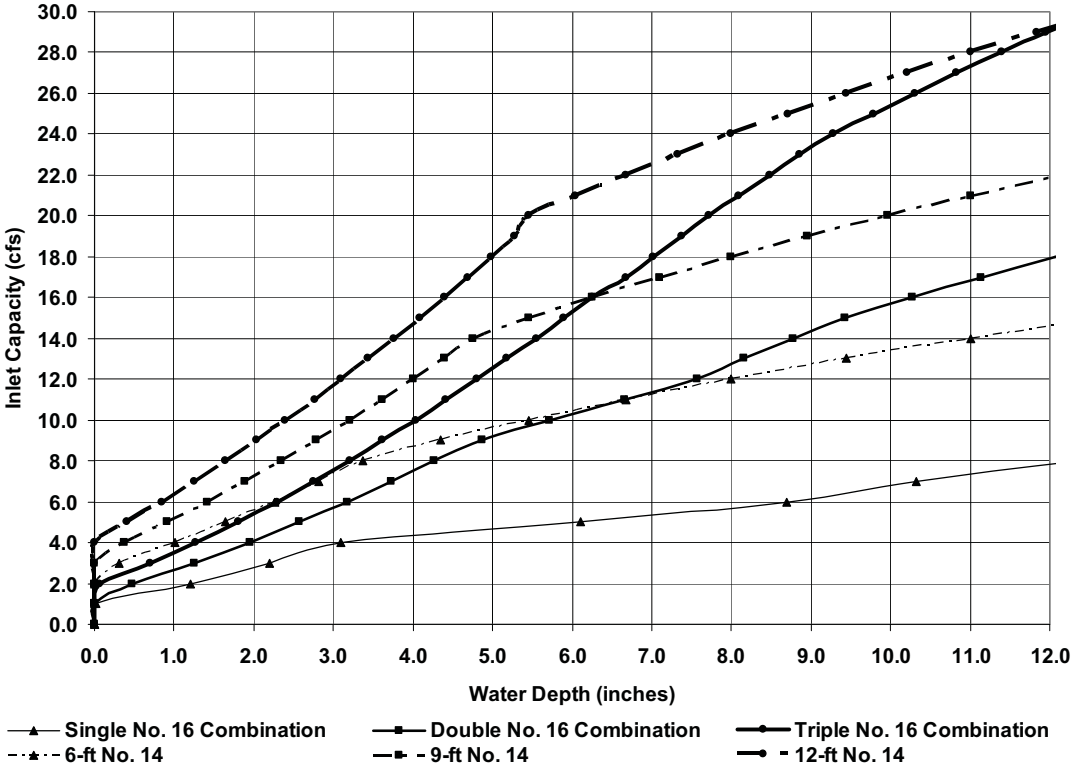
Project File: Parkhill-PH-IV-Storm7-28-10.stm | Number of lines: 26 | Run Date: 02-23-2011

NOTES: Return period = 5 Yrs. ; *Surcharged (HGL above crown).

Figure 8.1. Allowable Inlet Capacity— Sump Conditions

Note: See Section 8.3.2 for assumptions.

Type 16 and Type 14 Inlets for Sump Conditions



Allowable Inlet Capacity for Type C and D Inlets for Sump Conditions

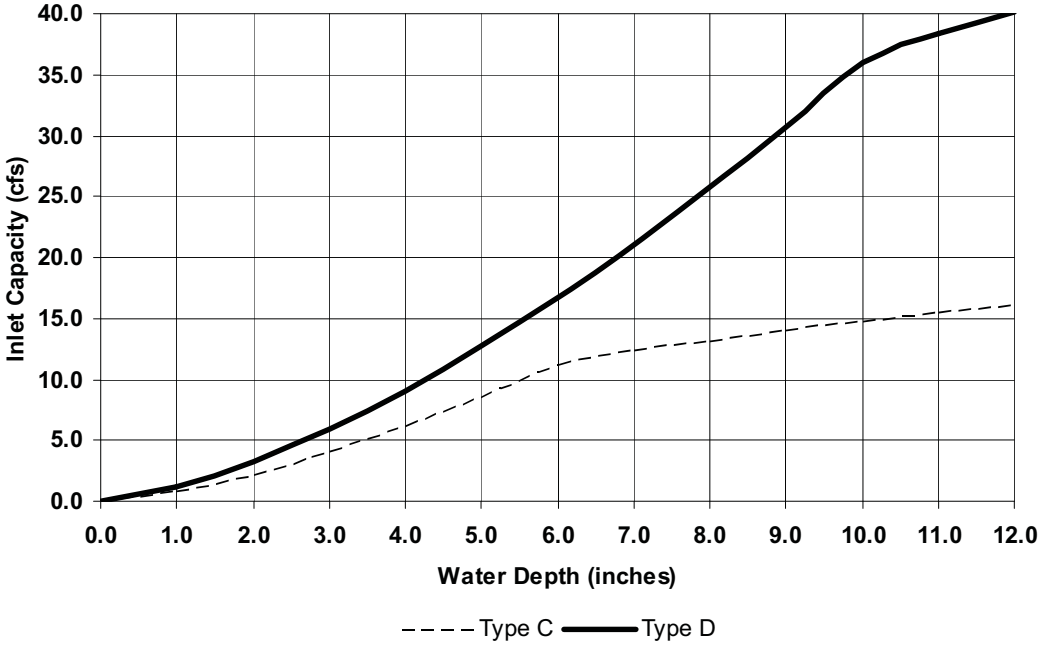
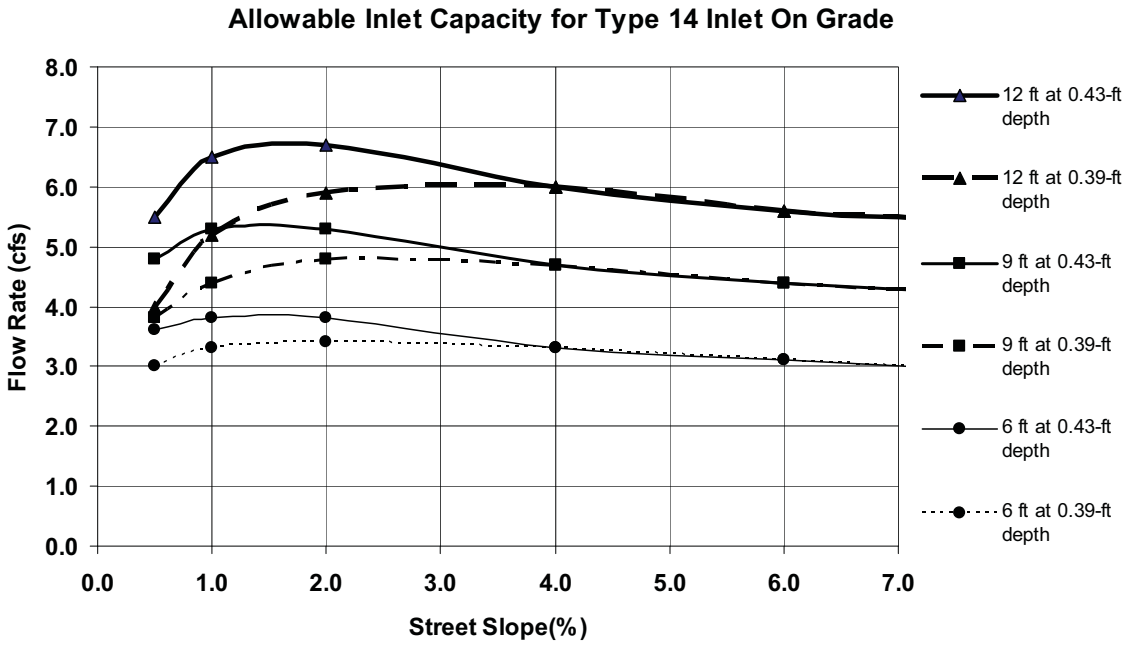
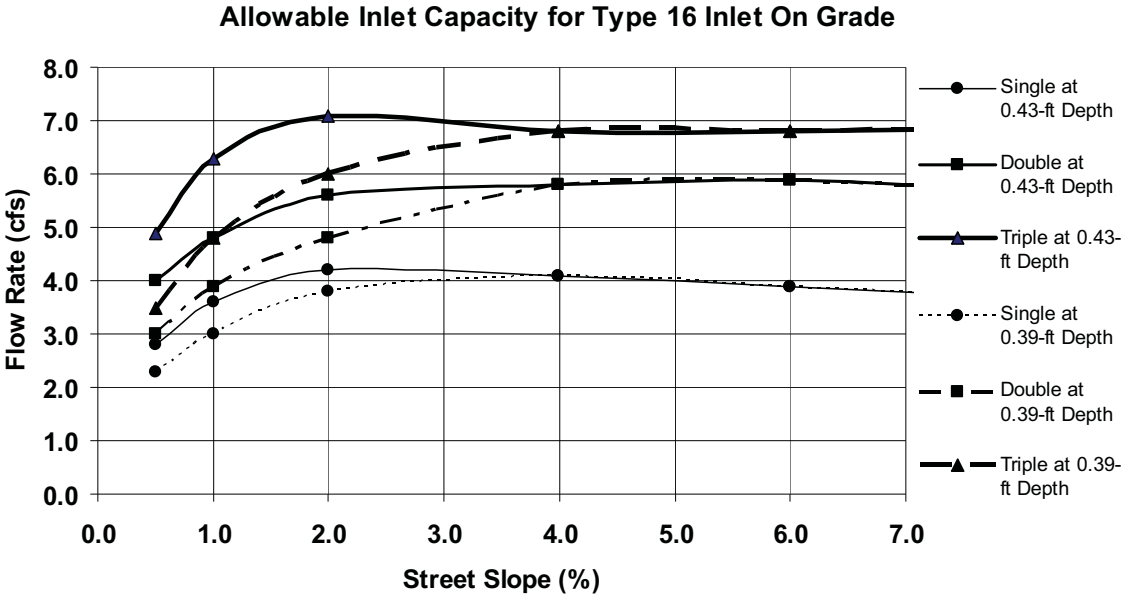


Figure 8.2. Allowable Inlet Capacity—On Grade Conditions

Note: See Section 8.3.2 for assumptions.





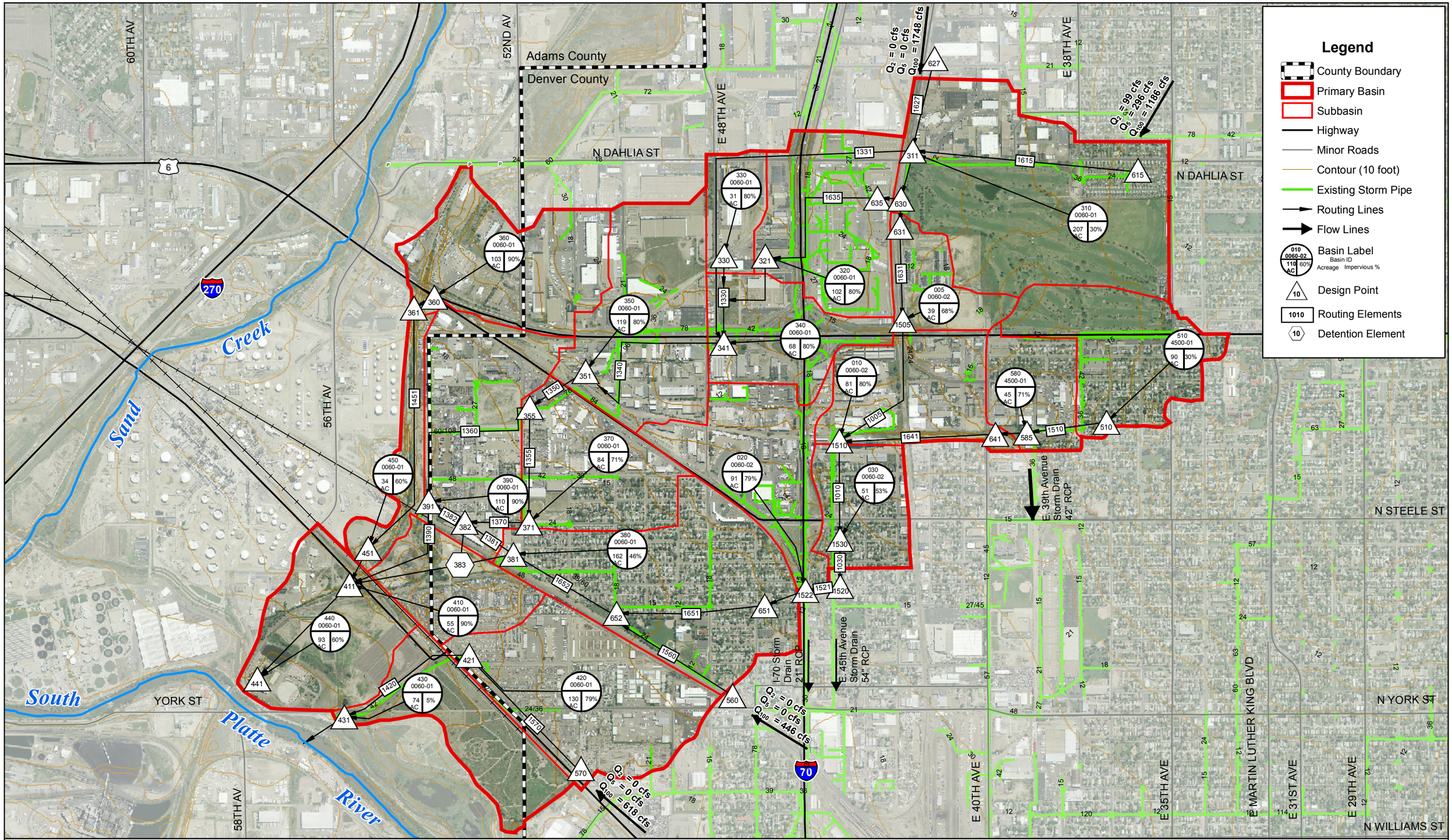


FIGURE 3
EPA-SWMM ROUTING SCHEMATIC AND SUB-WATERSHED MAP

Enginuity ENGINEERING SOLUTIONS

Matrix Design Group, Inc. Integrated Design Solutions

Node Inflow **5-year**

Node	Type	Maximum Total Inflow CFS
JUNCT_440	JUNCTION	148
JUNCT_340	JUNCTION	150
JUNCT_321	JUNCTION	213
JUNCT_651	JUNCTION	305
JUNCT_631	JUNCTION	0
JUNCT_350	JUNCTION	238
JUNCT_430	JUNCTION	16
JUNCT_1330	JUNCTION	265
JUNCT_310	JUNCTION	130
JUNCT_361	JUNCTION	230
JUNCT_627	JUNCTION	0
JUNCT_380	JUNCTION	147
JUNCT_391	JUNCTION	483
JUNCT_410	JUNCTION	130
JUNCT_390	JUNCTION	230
JUNCT_411	JUNCTION	767
JUNCT_635	JUNCTION	0
JUNCT_360	JUNCTION	230
JUNCT_330	JUNCTION	52
JUNCT_450	JUNCTION	13
JUNCT_420	JUNCTION	244
JUNCT_615	JUNCTION	296
JUNCT_370	JUNCTION	172
JUNCT_320	JUNCTION	213
JUNCT_451	JUNCTION	180
JUNCT_1627	JUNCTION	0
JUNCT_20	JUNCTION	174
JUNCT_30	JUNCTION	77
JUNCT_641	JUNCTION	81
JUNCT_10	JUNCTION	180
JUNCT_1505	JUNCTION	69
JUNCT_5	JUNCTION	69
JUNCT_1521	JUNCTION	177
JUNCT_580	JUNCTION	91
JUNCT_560	JUNCTION	0
JUNCT_652	JUNCTION	273
JUNCT_570	JUNCTION	0
JUNCT_441	OUTFALL	744
JUNCT_431	OUTFALL	241
ROOT_JUNCT_1522	OUTFALL	13
ROOT_JUNCT_1520	OUTFALL	81
ROOT_JUNCT_585	OUTFALL	63
JUNCT_1331	DIVIDER	347
JUNCT_1635	DIVIDER	0
JUNCT_630	DIVIDER	0
JUNCT_311	DIVIDER	347
JUNCT_421	DIVIDER	244
JUNCT_351	DIVIDER	581
JUNCT_341	DIVIDER	462
JUNCT_371	DIVIDER	332
JUNCT_1522	DIVIDER	318
JUNCT_1520	DIVIDER	258
JUNCT_1510	DIVIDER	211
JUNCT_1530	DIVIDER	258
JUNCT_355	DIVIDER	571
JUNCT_1360	DIVIDER	369
JUNCT_381	DIVIDER	355
JUNCT_382	DIVIDER	450
JUNCT_585	DIVIDER	144
JUNCT_510	DIVIDER	70
JUNCT_383	STORAGE	451

Gehrke, Mark W. - WMD

From: Hung Teng Ho [hungteng_ho@matrixdesigngroup.com]
Sent: Wednesday, June 16, 2010 2:52 PM
To: Gehrke, Mark W. - WMD
Cc: Robert Krehbiel
Subject: Park Hill Hydrology
Attachments: Summary Table.xls; ParkHill_Basin_Map.pdf

Mark,

I attached the work map of the Park Hill basin and a summary table for 5-year discharge for your information.
The discharges at the upstream end and downstream end of the named area are 347 cfs (DP 311) and 462 cfs (DP 341), respectively. Hope this is of help for you. Let me know if you have any question.

Thanks,

Hung-Teng (Tim) Ho, P.E. | **Water Resources Engineer** |

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