



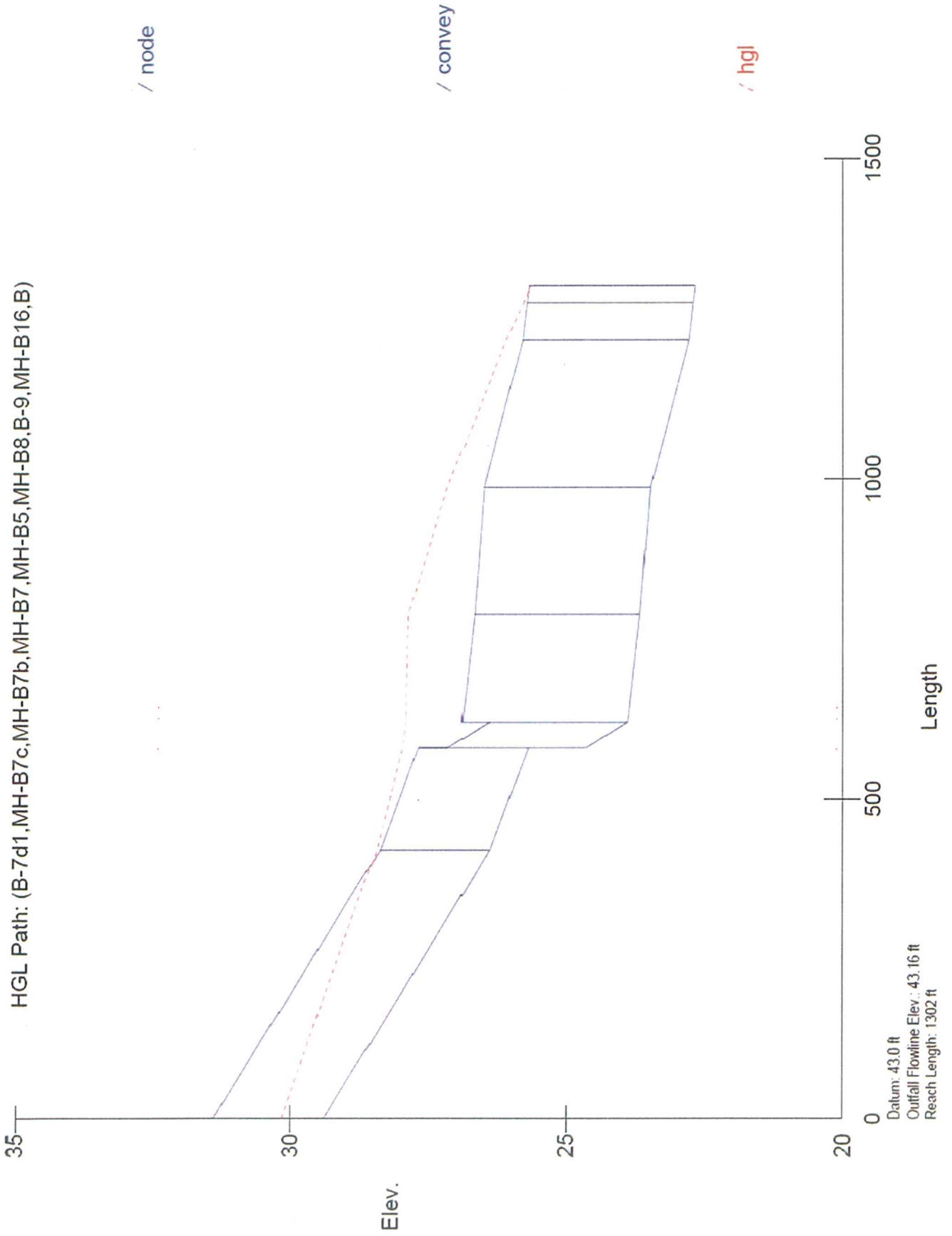
APPENDIX C
DRAINAGE



Appendix C.1
Existing Kimberley Lane Storm Sewer HGL Profile

APPENDIX C.1 - EXISTING KIMBERLEY LANE STORM SEWER HGL PROFILE

HGL Path: (B-7d1, MH-B7c, MH-B7b, MH-B7, MH-B5, MH-B8, B-9, MH-B16, B)





Appendix C.2
Hydraulic Calculations- HouStorm Output

Existing 2-Year Results.txt
Appendix C.2.a - Existing Conditions - 2 year

HouStorm (City Of Houston STORM DRAIN DESIGN)
Nov/01/2007

Version 2.1, Update:

Run @ 5/4/2010 9:40:51 AM

PROJECT NAME : Kimberley Lane
JOB NUMBER :
PROJECT DESCRIPTION : Kimberley Lane Drainage Improvements PER - Existing Conditions
PROJECT File: L:\120214\120-10308-000\469\4-0-Production\4-06-Ref-Studies-Repo
ANALYSYS FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

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OUTPUT FOR ANALYSYS FREQUENCY of: 2 Years

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Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-14	0.59	0.40	23.50	23.50	3.51	0.000	0.829
B-15	0.62	0.20	22.50	22.50	3.59	0.000	0.445
MH-B16	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-1a	0.59	0.43	23.60	23.60	3.51	0.000	0.889
B-1a1	0.76	1.02	25.00	25.00	3.41	0.000	2.641
B-1b	0.56	0.11	21.80	21.80	3.64	0.000	0.224
B-1b1	0.55	0.35	23.30	23.30	3.53	0.000	0.679
B-1c	0.57	0.33	23.22	23.22	3.53	0.000	0.665
B-2a	0.61	0.19	22.50	22.50	3.59	0.000	0.416
B-2a1	0.76	1.48	25.70	25.70	3.36	0.000	3.779
B-2b	0.59	0.29	23.00	23.00	3.55	0.000	0.608
MH-E1	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-E2	0.5	0.00	10.00	10.00	4.96	0.000	0.000
MH-B1	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B2	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B3	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B4	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B5	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-2b1	0.66	0.78	24.60	24.60	3.43	0.000	1.768
B-3a	0.65	0.27	23.00	23.00	3.55	0.000	0.623
B-3a1	0.79	0.41	23.60	23.60	3.51	0.000	1.136
B-3b	0.75	0.69	24.40	24.40	3.45	0.000	1.785
B-3b1	0.51	0.15	22.20	22.20	3.61	0.000	0.276
B-4a	0.63	0.22	22.60	22.60	3.58	0.000	0.496
B-4b	0.57	0.08	21.50	21.50	3.67	0.000	0.167
B-4b1	0.76	0.51	23.90	23.90	3.48	0.000	1.350
B-4c	0.52	0.17	22.30	22.30	3.60	0.000	0.319
B-5a	0.66	0.26	22.90	22.90	3.56	0.000	0.611
B-5b	0.57	0.36	23.30	23.30	3.53	0.000	0.724
B-5b1	0.8	0.13	22.00	22.00	3.63	0.000	0.377
B-7a	0.62	0.53	23.90	23.90	3.48	0.000	1.145
B-7b	0.67	1.53	25.80	25.80	3.35	0.000	3.437
B-7c1	0.76	0.89	24.80	24.80	3.42	0.000	2.314
B-8a	0.59	0.22	22.60	22.60	3.58	0.000	0.465
B-8b	0.7	0.38	23.40	23.40	3.52	0.000	0.937

Existing 2-Year Results.txt

B-8c1	0.76	2.04	26.30	26.30	3.32	0.000	5.147
B-9b	0.78	0.22	22.70	22.70	3.57	0.000	0.613
B-12a1	0.73	1.09	25.20	25.20	3.39	0.000	2.700
B-13a1	0.71	0.65	24.27	24.27	3.46	0.000	1.596
B-14a1	0.79	0.49	23.80	23.80	3.49	0.000	1.352
MH-A8	0.8	37.03	33.90	33.90	2.90	0.000	85.772
A-1	0.47	1.14	25.20	25.20	3.39	0.000	1.818
MH-B	0.5	0.00	10.00	10.00	4.96	0.000	0.000
B	0.8	0.00	10.00	10.00	4.96	0.000	0.004
C-1	0.76	44.66	34.50	34.50	2.87	0.000	97.305
MH-D1	0.8	0.00	34.60	34.60	2.86	0.000	0.000
D-1	0.47	47.99	34.80	34.80	2.85	0.000	64.346
B-9c1	0.77	0.39	23.50	23.50	3.51	0.000	1.055
B-14a2	0.68	0.46	23.70	23.70	3.50	0.000	1.094
B-1c1	0.76	0.65	24.30	24.30	3.46	0.000	1.707
MH-B7d	0.8	0.00	10.00	10.00	4.96	0.000	0.004
B-7d1	0.62	2.33	26.60	26.60	3.30	0.000	4.768
E-1	0.57	20.49	31.90	31.90	3.00	0.000	34.981
MH-B7	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B8	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-9	0.65	0.12	21.90	21.90	3.64	0.000	0.284
B-10	0.68	0.23	22.70	22.70	3.57	0.000	0.559
B-11	0.64	0.36	23.30	23.30	3.53	0.000	0.813
B-12	0.66	0.28	23.00	23.00	3.55	0.000	0.656
B-13	0.59	1.03	25.00	25.00	3.41	0.000	2.070
MH-B7b	0.8	0.00	10.00	10.00	4.96	0.000	0.004
MH-B7c	0.8	0.00	10.00	10.00	4.96	0.000	0.004
B-7d2	0.56	2.12	26.40	26.40	3.31	0.000	3.934
B-7d3	0.49	4.05	27.80	27.80	3.23	0.000	6.401
B-9b1	0.8	0.51	23.90	23.90	3.48	0.000	1.422

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Depr. (ft)	Grate width (ft)	Type	Pond Width Allowed (ft)
B-10	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-11	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A-1	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
B-2a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-2b	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-3b1	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-4a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-4b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-4c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-8a	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-8b	Grate	2.67	0.30	2.00	0.014	n/a	1.50	Reticu	12.00
B-12	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-14	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-15	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-1c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00

On Grade Inlets Computation Data.

Inlet	Inlet	Total Q	Intercept	Q Bypass	To Inlet Required	Actual	Ponded

Existing 2-Year Results.txt

ID	Type	(cfs)	Capacity (cfs)	Allow (cfs)	Actual (cfs)	ID	Length (ft)	Length (ft)	width (ft)
B-10	Combi	0.559	0.883	0.224	0.000	B-9	n/a	5.00	6.90
B-11	Curb	0.813	0.813	0.325	0.000	B-12	3.45	5.00	7.95
A-1	Curb	1.818	1.818	0.000	0.000		6.08	10.00	9.75
B-2a	Curb	0.524	0.517	0.209	0.006	B-3a	2.73	2.50	6.75
B-2b	Curb	0.719	0.670	0.000	0.050	B-3b1	3.23	2.50	7.60
B-3a	Curb	0.629	0.604	0.252	0.025	B-4a	3.01	2.50	7.20
B-3b	Grate	1.785	0.466	0.714	1.319	B-4c	n/a	0.00	10.65
B-3b1	Combi	0.326	0.552	0.130	0.000	B-3b	n/a	5.00	5.65
B-4a	Curb	0.522	0.516	0.209	0.006	B-5a	2.73	2.50	6.75
B-4b	Grate	0.167	0.091	0.067	0.076	B-5b	n/a	0.00	4.40
B-4c	Combi	1.637	1.886	0.655	0.000	B-4b	n/a	5.00	10.35
B-8a	Grate	0.465	0.189	0.186	0.276	B-9	n/a	0.00	6.45
B-8b	Grate	0.937	0.623	0.375	0.314	B-9b	n/a	0.00	8.40
B-12	Curb	0.656	0.624	0.262	0.032	B-13	3.08	2.50	7.35
B-14	Curb	0.829	0.829	0.332	0.000	B-15	3.49	5.00	8.00
B-15	Curb	0.445	0.445	0.178	0.000	B-10	2.51	5.00	6.35
B-1a	Curb	0.889	0.782	0.356	0.108	B-2a	3.62	2.50	8.20
B-1b	Grate	0.224	0.113	0.090	0.112	B-2b	n/a	0.00	4.90
B-1c	Combi	0.665	1.010	0.266	0.000	B-1b	n/a	5.00	7.35

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Right-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter Deprw (ft)	Head Allowed (ft)
B-9	Combi	5.00	2.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5a	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5b	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-9b	Combi	5.00	3.11	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-13	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
B-9	Combi	5.00	4.17	2.00	0.560	4.551	0.132	3.80	6.35
B-5a	Curb	2.50	n/a	n/a	0.617	2.057	0.159	6.60	3.90
B-5b	Curb	2.50	n/a	n/a	0.800	2.057	0.182	4.30	7.25
B-7a	Curb	5.00	n/a	n/a	1.145	4.114	0.154	6.95	6.95
B-7b	Curb	5.00	n/a	n/a	3.437	4.114	0.387	10.50	10.50
B-9b	Combi	5.00	5.00	3.11	0.927	5.457	0.144	6.45	6.45
B-13	Curb	2.50	n/a	n/a	2.102	2.057	0.517	8.75	8.75

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-B1	CrcMh	0.680	2.89	25.30	3.39		0.00	6.655
MH-B2	CrcMh	0.691	5.63	25.85	3.35		0.00	13.034
MH-B3	CrcMh	0.697	7.15	26.60	3.30		0.00	16.452

Existing 2-Year Results.txt

MH-B4	CrcMh	0.694	8.13	27.46	3.25	0.00	18.325
MH-B5	CrcMh	0.628	20.33	29.67	3.12	0.00	39.800
MH-B7	CrcMh	0.581	11.45	28.72	3.17	0.00	21.077
MH-B8	CrcMh	0.641	22.97	30.26	3.08	0.00	45.381
B-9	Combi	0.648	24.44	30.86	3.05	0.00	48.299
B-10	Combi	0.680	0.23	22.70	3.57	0.00	0.559
B-11	Curb	0.798	37.39	34.23	2.88	0.00	85.968
MH-A8	CrcMh	0.800	37.03	33.90	2.90	0.00	85.772
A-1	Curb	0.000	0.00	0.00	0.00	0.00	0.000
MH-B	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B	CrcMh	0.735	66.43	35.57	2.82	0.00	137.485
C-1	CrcMh	0.745	111.09	38.11	2.71	0.00	224.025
MH-D1	CrcMh	0.745	111.09	38.11	2.71	0.00	224.025
D-1	CrcMh	0.662	159.08	39.67	2.64	0.00	278.443
MH-E1	CrcMh	0.651	179.57	40.65	2.61	111.40	416.311
MH-E2	CrcMh	0.651	179.57	40.65	2.61	111.40	416.311
E-1	CrcMh	0.651	179.57	40.65	2.61	111.40	416.311
B-2a	Curb	0.743	1.67	25.79	3.35	0.00	4.161
B-2a1	CrcMh	0.760	1.48	25.70	3.36	0.00	3.779
B-2b	Curb	0.641	1.07	24.97	3.41	0.00	2.338
B-2b1	CrcMh	0.660	0.78	24.60	3.43	0.00	1.768
B-3a	Curb	0.734	0.68	23.85	3.49	0.00	1.742
B-3a1	CrcMh	0.790	0.41	23.60	3.51	0.00	1.136
B-3b	Grate	0.707	0.84	24.40	3.45	0.00	2.048
B-3b1	Combi	0.510	0.15	22.20	3.61	0.00	0.276
B-4a	Curb	0.630	0.22	22.60	3.58	0.00	0.496
B-4b	Grate	0.686	0.76	24.13	3.47	0.00	1.809
B-12a1	CrcMh	0.730	1.09	25.20	3.39	0.00	2.700
B-13a1	CrcMh	0.710	0.65	24.27	3.46	0.00	1.596
B-14a1	CrcMh	0.737	0.95	24.59	3.44	0.00	2.404
B-4b1	CrcMh	0.760	0.51	23.90	3.48	0.00	1.350
B-4c	Combi	0.520	0.17	22.30	3.60	0.00	0.319
B-5a	Curb	0.660	0.26	22.90	3.56	0.00	0.611
B-5b	Curb	0.631	0.49	23.30	3.53	0.00	1.091
B-5b1	CrcMh	0.800	0.13	22.00	3.63	0.00	0.377
B-7a	Curb	0.657	2.06	25.91	3.35	0.00	4.528
B-7b	Curb	0.670	1.53	25.80	3.35	0.00	3.437
B-7c1	CrcMh	0.760	0.89	24.80	3.42	0.00	2.314
B-8a	Grate	0.660	0.60	23.78	3.49	0.00	1.383
B-8b	Grate	0.700	0.38	23.40	3.52	0.00	0.937
B-8c1	CrcMh	0.760	2.04	26.30	3.32	0.00	5.147
B-9b	Combi	0.794	0.73	24.05	3.47	0.00	2.013
B-9c1	CrcMh	0.770	0.39	23.50	3.51	0.00	1.055
B-14a2	CrcMh	0.680	0.46	23.70	3.50	0.00	1.094
B-1c1	CrcMh	0.760	0.65	24.30	3.46	0.00	1.707
MH-B7d	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-7d1	CrcMh	0.620	2.33	26.60	3.30	0.00	4.768
MH-B7b	CrcMh	0.543	8.50	28.60	3.18	0.00	14.673
MH-B7c	CrcMh	0.591	4.45	27.98	3.21	0.00	8.462
B-7d2	CrcMh	0.560	2.12	26.40	3.31	0.00	3.934
B-7d3	CrcMh	0.490	4.05	27.80	3.23	0.00	6.401
B-9b1	CrcMh	0.800	0.51	23.90	3.48	0.00	1.422
B-12	Curb	0.796	38.76	34.50	2.87	0.00	88.397
B-13	Curb	0.789	40.44	34.74	2.86	0.00	91.106
B-14	Curb	0.786	41.79	35.31	2.83	0.00	92.908
B-15	Curb	0.785	41.99	35.31	2.83	0.00	93.259
MH-B16	CrcMh	0.648	24.44	30.86	3.05	0.00	48.299
B-1a	Curb	0.710	1.45	25.18	3.39	0.00	3.493
B-1a1	CrcMh	0.760	1.02	25.00	3.41	0.00	2.641
B-1b	Grate	0.650	1.44	24.79	3.42	0.00	3.203
B-1b1	CrcMh	0.687	1.00	24.55	3.44	0.00	2.360
B-1c	Combi	0.570	0.33	23.22	3.53	0.00	0.665
OUT	Outlt	0.651	179.57	40.65	2.61	111.40	416.311

Existing 2-Year Results.txt

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
			US (ft)	DS (ft)						
27	B-1a	MH-B1	69.68	69.43	Cir 1	0.00	1.50	34.0	0.735	0.013
28	B-1a1	B-1a	71.45	69.68	Cir 1	0.00	1.00	74.0	2.393	0.013
29	B-1b	MH-B1	69.65	69.36	Cir 1	0.00	1.50	47.0	0.617	0.013
30	B-1b1	B-1b	70.44	69.83	Cir 1	0.00	1.50	67.0	0.910	0.013
31	B-1c	B-1b	72.07	71.70	Cir 1	0.00	1.50	40.0	0.925	0.013
32	B-2a	MH-B2	69.30	68.68	Cir 1	0.00	1.50	29.0	2.138	0.013
33	B-2a1	B-2a	70.90	69.30	Cir 2	0.00	1.00	40.0	4.003	0.013
34	B-2b	MH-B2	69.50	68.69	Cir 1	0.00	1.50	50.0	1.620	0.013
35	B-2b1	B-2b	70.34	69.50	Cir 1	0.00	1.50	94.0	0.894	0.013
36	B-3a	MH-B3	70.50	67.75	Cir 1	0.00	1.50	32.0	8.626	0.013
37	B-3a1	B-3a	70.80	70.50	Cir 1	0.00	1.00	50.0	0.600	0.013
38	B-3b	MH-B3	68.80	67.76	Cir 1	0.00	1.50	47.0	2.213	0.013
39	B-3b1	B-3b	70.32	69.85	Cir 1	0.00	7.50	55.0	0.855	0.013
40	B-4a	MH-B4	70.50	67.11	Cir 1	0.00	1.50	30.0	11.373	0.013
42	B-4b	MH-B4	68.24	67.21	Cir 1	0.00	1.50	47.0	2.192	0.013
43	B-4b1	B-4b	69.21	68.96	Cir 1	0.00	1.00	46.0	0.543	0.013
44	B-4c	B-4b	69.57	69.33	Cir 1	0.00	1.50	47.0	0.511	0.013
45	B-5a	MH-B5	67.58	67.51	Cir 1	0.00	1.50	39.0	0.179	0.013
46	B-5b	MH-B5	68.53	67.41	Cir 1	0.00	1.50	51.0	2.197	0.013
47	B-5b1	B-5b	69.16	68.68	Cir 1	0.00	1.00	60.0	0.800	0.013
48	B-7a	MH-B7	67.58	67.58	Cir 1	0.00	2.00	5.0	0.020	0.013
49	B-7b	B-7a	67.80	67.21	Cir 1	0.00	2.00	40.0	1.475	0.013
50	B-7c1	MH-B7	68.50	67.58	Cir 1	0.00	1.50	40.0	2.301	0.013
51	B-8a	MH-B8	67.14	67.04	Cir 1	0.00	2.00	5.0	2.000	0.013
52	B-8b	B-8a	67.19	67.14	Cir 1	0.00	2.00	39.0	0.128	0.013
53	B-8c1	MH-B8	68.75	67.11	Cir 1	0.00	2.00	40.0	4.103	0.013
54	B-9b	B-9	66.43	66.35	Cir 1	0.00	2.00	42.0	0.190	0.013
55	B-12a1	B-12	70.97	70.71	Cir 1	0.00	1.00	64.0	0.406	0.013
56	B-13a1	B-13	71.95	71.67	Cir 1	0.00	1.00	71.0	0.394	0.013
57	B-14a1	B-14	70.76	70.49	Cir 1	0.00	1.00	68.0	0.397	0.013
59	B-9c1	B-9	71.07	66.35	Cir 1	0.00	2.00	54.0	8.774	0.013
60	B-14a2	B-14a1	71.95	71.31	Cir 1	0.00	0.83	168.0	0.381	0.011
61	B-1c1	B-1b1	71.11	70.63	Cir 1	0.00	1.00	61.0	0.787	0.013
62	B-10	B-9	68.69	68.63	Cir 1	0.00	2.00	29.0	0.207	0.013
2	MH-A8	B-11	68.17	67.60	Cir 1	0.00	3.50	177.0	0.322	0.013
4	B	C-1	64.21	61.36	Cir 1	0.00	5.00	1140.0	0.250	0.013
5	C-1	MH-D1	58.84	56.27	Cir 1	0.00	6.50	1227.0	0.209	0.013
6	MH-D1	D-1	55.77	54.37	Cir 1	0.00	7.00	750.0	0.187	0.013
7	D-1	E-1	53.87	52.86	Cir 1	0.00	7.50	506.0	0.200	0.013
8	E-1	MH-E1	52.36	49.52	Box 1	9.00	8.00	1387.0	0.205	0.015
9	MH-E1	MH-E2	49.52	43.66	Box 1	9.00	8.00	129.0	4.547	0.015
10	MH-E2	OUT	43.66	43.16	Cir 2	0.00	7.00	120.0	0.417	0.024
11	MH-B1	MH-B2	69.24	68.71	Cir 1	0.00	2.00	144.0	0.368	0.013
12	MH-B2	MH-B3	68.30	67.84	Cir 1	0.00	2.50	195.0	0.236	0.013
13	MH-B3	MH-B4	67.73	67.64	Cir 1	0.00	2.50	173.0	0.051	0.013
14	MH-B4	MH-B5	67.64	67.41	Cir 1	0.00	2.50	178.0	0.130	0.013
64	MH-B7c	MH-B7b	68.97	68.43	Cir 1	0.00	3.00	161.6	0.334	0.013
15	MH-B5	MH-B8	67.41	67.09	Cir 1	0.00	3.00	198.3	0.161	0.013
17	MH-B7	MH-B5	67.58	67.56	Cir 1	0.00	3.00	170.1	0.012	0.013
18	MH-B8	B-9	67.04	66.22	Cir 1	0.00	3.00	230.8	0.355	0.013
19	B-9	MH-B16	66.22	66.22	Cir 1	0.00	3.00	56.6	0.000	0.013
20	MH-B16	B	66.22	66.13	Cir 1	0.00	3.00	28.8	0.313	0.013
21	B-11	B-12	67.20	66.97	Cir 1	0.00	4.00	111.0	0.207	0.013
22	B-12	B-13	66.90	66.07	Cir 1	0.00	4.00	140.0	0.593	0.013

Existing 2-Year Results.txt

23	B-13	B-14	66.02	64.93	Cir 1	0.00	4.00	280.0	0.389	0.013
24	B-14	B-15	64.81	64.49	Cir 1	0.00	4.00	130.0	0.246	0.013
25	B-15	B	64.49	64.21	Cir 1	0.00	5.00	112.0	0.250	0.013
63	MH-B7b	MH-B7	67.58	67.58	Cir 1	0.00	2.50	43.4	0.000	0.013
65	B-7d1	MH-B7c	72.39	69.38	Cir 1	0.00	2.00	420.0	0.717	0.013
66	B-7d3	MH-B7b	67.72	67.65	Cir 1	0.00	2.00	37.0	0.189	0.013
67	B-7d2	MH-B7c	69.63	69.38	Cir 1	0.00	2.00	55.0	0.455	0.013
68	B-9b1	B-9b	66.47	66.43	Cir 1	0.00	2.00	20.0	0.200	0.013

Conveyance Hydraulic Computations. Tailwater = 50.160 (ft)

Run #	Hyd. Gr.line		Crit.Elev US (ft)	Fr.Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)
	US (ft)	DS (ft)			Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)			
27*	72.38	72.34	75.13	0.110	0.65	1.50	4.78	4.22	3.5	9.0	0.000
28*	72.78	72.38	79.40	0.545	0.49	1.00	6.94	4.52	2.6	5.5	0.000
29*	72.39	72.34	74.75	0.092	0.65	1.50	4.37	4.10	3.2	8.3	0.000
30*	72.42	72.39	76.10	0.050	0.50	1.50	4.64	3.73	2.4	10.1	0.000
31*	72.39	72.39	75.13	0.004	0.26	0.69	3.23	2.73	0.7	10.1	0.000
32*	71.98	71.94	74.49	0.156	0.53	1.50	7.39	4.47	4.2	15.4	0.000
33*	72.09	71.98	75.86	0.279	0.35	1.00	7.67	3.95	3.8	14.3	0.000
34*	71.96	71.94	74.49	0.049	0.42	1.50	5.69	3.73	2.3	13.4	0.000
35*	71.99	71.96	75.17	0.028	0.43	1.50	4.25	3.43	1.8	10.0	0.000
36*	71.68	71.67	74.05	0.027	0.24	1.50	9.43	3.41	1.7	31.0	0.000
37*	71.73	71.68	75.16	0.101	0.45	1.00	3.34	3.34	1.1	2.8	0.000
38*	71.69	71.67	73.75	0.038	0.37	1.50	6.12	3.48	2.0	15.7	0.000
39*	71.69	71.69	74.01	0.000	0.12	1.84	1.91	1.03	0.3	712.9	0.000
40*	71.40	71.40	74.62	0.002	0.12	1.50	7.14	2.30	0.5	35.6	0.000
42*	71.41	71.40	73.10	0.029	0.35	1.50	5.88	3.46	1.8	15.6	0.000
43	71.59	71.41	74.32	0.142	0.51	1.00	3.37	1.72	1.4	2.6	0.000
44	71.65	71.41	73.55	0.001	0.21	1.50	2.11	0.18	0.3	7.5	0.000
45	71.11	71.04	72.60	0.003	0.38	1.50	1.77	0.35	0.6	4.5	0.000
46*	71.05	71.04	72.60	0.011	0.27	1.50	5.07	2.99	1.1	15.6	0.000
47*	71.05	71.05	74.46	0.011	0.23	1.00	2.73	1.40	0.4	3.2	0.000
48	71.21	71.21	72.98	0.040	2.00	2.00	1.44	1.44	4.5	3.2	0.000
49*	71.22	71.21	72.98	0.023	0.48	2.00	5.97	3.89	3.4	27.6	0.000
50*	71.23	71.21	73.38	0.048	0.39	1.50	6.42	3.71	2.3	16.0	0.000
51*	70.34	70.34	72.81	0.004	0.28	2.00	5.08	3.02	1.4	32.1	0.000
52	70.39	70.34	72.81	0.002	0.46	2.00	1.72	0.30	0.9	8.1	0.000
53*	70.36	70.34	73.65	0.051	0.45	2.00	9.65	4.39	5.1	46.0	0.000
54	69.36	69.28	72.33	0.008	0.61	2.00	2.46	0.64	2.0	9.9	0.000
55	72.03	70.93	75.25	0.569	1.00	1.00	3.44	3.44	2.7	2.3	0.000
56	72.81	72.67	75.30	0.199	0.62	1.00	3.10	2.03	1.6	2.2	0.000
57	71.80	71.49	75.34	0.452	0.91	1.00	3.19	3.06	2.4	2.3	0.000
59*	71.43	69.28	74.05	0.002	0.17	2.00	7.86	0.34	1.1	67.3	0.000
60	72.46	71.80	73.50	0.178	0.51	0.51	3.15	3.15	1.1	1.6	0.000
61*	72.56	72.42	75.74	0.228	0.52	1.00	4.10	3.78	1.7	3.2	0.000
62*	69.28	69.28	72.48	0.001	0.32	0.65	1.75	1.37	0.6	10.3	0.000
2	72.62	71.35	74.57	0.721	3.50	3.50	8.92	8.92	85.8	57.3	0.000
4	68.62	63.82	73.20	0.276	4.41	4.41	7.49	7.49	137.5	130.8	0.000
5	63.82	60.56	72.20	0.181	4.98	4.98	8.22	8.22	224.0	241.0	0.000
6	60.56	59.00	68.20	0.122	4.79	4.79	7.99	7.99	224.0	277.2	0.000
7	59.00	57.97	68.20	0.130	5.13	5.13	8.65	8.65	278.4	344.5	0.000
8	57.97	53.57	67.00	0.125	5.61	5.61	8.25	8.25	416.3	532.3	0.000
9*	53.57	50.25	67.20	0.125	1.83	6.59	25.21	7.02	416.3	2508.3	0.000
10	50.25	50.16	69.20	0.359	5.35	7.00	6.60	5.41	416.3	448.6	0.000
11	72.34	71.94	75.49	0.086	0.98	2.00	4.33	2.12	6.7	13.8	0.000
12	71.94	71.67	75.86	0.100	1.47	2.50	4.33	2.66	13.0	20.0	0.000
13	71.67	71.40	75.16	0.160	2.50	2.50	3.35	3.35	16.5	9.3	0.000
14	71.40	71.04	74.62	0.198	2.50	2.50	3.73	3.73	18.3	14.9	0.000

Existing 2-Year Results.txt

64	71.78	71.27	74.77	0.016	0.96	2.84	4.37	1.22	8.5	38.7	0.000
15	71.04	70.34	73.38	0.353	3.00	3.00	5.63	5.63	39.8	26.9	0.000
17	71.21	71.04	73.90	0.099	3.00	3.00	2.98	2.98	21.1	7.3	0.000
18	70.34	69.28	73.19	0.459	3.00	3.00	6.42	6.42	45.4	39.9	0.000
19*	69.28	68.99	72.33	0.520	1.50	2.77	13.67	8.44	48.3	0.3	0.000
20	68.99	68.62	72.84	0.520	3.00	3.00	6.83	6.83	48.3	37.4	0.000
21	71.35	70.93	74.21	0.355	4.00	4.00	6.84	6.84	86.0	65.7	0.000
22*	70.93	70.41	74.30	0.375	2.70	4.00	9.78	9.23	88.4	111.1	0.000
23	70.41	69.29	75.30	0.399	3.34	4.00	8.12	7.25	91.1	90.0	0.000
24	69.29	68.75	73.43	0.415	4.00	4.00	7.39	7.39	92.9	71.6	0.000
25	68.75	68.62	73.50	0.127	3.13	4.41	7.21	5.08	93.3	130.8	0.000
63*	71.27	71.21	73.89	0.127	1.25	2.50	5.98	2.99	14.7	0.2	0.000
65*	73.16	71.78	74.30	0.044	0.68	2.00	5.06	1.52	4.8	19.2	0.000
66	71.31	71.27	75.50	0.079	1.18	2.00	3.33	2.04	6.4	9.9	0.000
67*	71.80	71.78	74.75	0.030	0.69	2.00	4.07	4.05	3.9	15.3	0.000
68	69.40	69.36	72.33	0.004	0.51	2.00	2.28	0.45	1.4	10.2	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:

The convey length should be from upstream to downstream inside box.
 This length may also be used as Pay Item.
 Using hydraulic length, from node center to node center, may result in profile error,
 and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.5	0.0	15	694.0
Circular	Concrete	1.0	0.0	9	574.0
Circular	Concrete	7.5	0.0	2	561.0
Circular	Concrete	2.0	0.0	13	930.0
Circular	Plastic	0.833	0.0	1	168.0
Circular	Concrete	3.5	0.0	1	177.0
Circular	Concrete	5.0	0.0	2	1252.0
Circular	Concrete	6.5	0.0	1	1227.0
Circular	Concrete	7.0	0.0	1	750.0
Box	Concrete	8.0	9.0	2	1516.0
Circular	Other	7.0	0.0	1	240.0
Circular	Concrete	2.5	0.0	4	589.37
Circular	Concrete	3.0	0.0	6	846.18
Circular	Concrete	4.0	0.0	4	661.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	39
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	2.0	4.17	1
Curb And Grate On Grade	Reticuline	5.0	0.75	2.67	0.0	0.0	4
Curb On Grade		5.0	0.0	0.0	0.0	0.0	3
Curb On Grade		10.0	0.0	0.0	0.0	0.0	1
Curb On Grade		2.5	0.0	0.0	0.0	0.0	6
Grate On Grade	Reticuline	0.0	0.75	1.33	0.0	0.0	4
Curb In Sag		2.5	0.0	0.0	0.0	0.0	3

		Existing 2-Year Results.txt					
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2
Grate On Grade	Reticuline	0.0	1.5	2.67	0.0	0.0	1
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	3.11	5.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1
=====END=====							

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Decreasing conduit size @ downstream Run# 38
Discharge decreased downstream node Id= B-15 Previous intensity used.
Decreasing conduit size @ downstream Run# 63
Discharge decreased downstream node Id= MH-B16 Previous intensity used.
Discharge decreased downstream node Id= MH-D1 Previous intensity used.
Discharge decreased downstream node Id= MH-E1 Previous intensity used.
Discharge decreased downstream node Id= MH-E2 Previous intensity used.
Decreasing conduit size @ downstream Run# 10
Capacity of grade inlet exceeded at inlet Id= B-2a
Capacity of grade inlet exceeded at inlet Id= B-2b
Capacity of grade inlet exceeded at inlet Id= B-3a
Capacity of grade inlet exceeded at inlet Id= B-3b
Capacity of grade inlet exceeded at inlet Id= B-4a
Capacity of grade inlet exceeded at inlet Id= B-4b
Capacity of grade inlet exceeded at inlet Id= B-8a
Capacity of grade inlet exceeded at inlet Id= B-8b
Capacity of grade inlet exceeded at inlet Id= B-12
Capacity of grade inlet exceeded at inlet Id= B-1a
Capacity of grade inlet exceeded at inlet Id= B-1b
Capacity of sag inlet exceeded at inlet Id= B-13
Run# 4 Insufficient capacity.
Run# 20 Insufficient capacity.
Run# 19 Insufficient capacity.
Run# 24 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 57
Run# 57 Insufficient capacity.
Run# 18 Insufficient capacity.
Run# 23 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 56
Run# 15 Insufficient capacity.
Run# 17 Insufficient capacity.
Run# 63 Insufficient capacity.
Run# 48 Insufficient capacity.
Run# 55 Insufficient capacity.
Run# 14 Insufficient capacity.
Run# 21 Insufficient capacity.
Run# 2 Insufficient capacity.
Run# 13 Insufficient capacity.

Existing 100-Year Results.txt
Appendix C.2.b - Existing Conditions - 100 year

HouStorm (City Of Houston STORM DRAIN DESIGN)
Nov/01/2007

Version 2.1, Update:

Run @ 5/4/2010 9:41:43 AM

PROJECT NAME : Kimberley Lane
JOB NUMBER :
PROJECT DESCRIPTION : Kimberley Lane Drainage Improvements PER - Existing Conditions
PROJECT File: L:\120214\120-10308-000\469\4-0-Production\4-06-Ref-Studies-Repo
ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

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OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

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Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-14	0.59	0.40	23.50	23.50	7.18	0.000	1.695
B-15	0.62	0.20	22.50	22.50	7.30	0.000	0.906
MH-B16	0.8	0.00	10.00	10.00	9.36	0.000	0.000
B-1a	0.59	0.43	23.60	23.60	7.17	0.000	1.819
B-1a1	0.76	1.02	25.00	25.00	7.01	0.000	5.433
B-1b	0.56	0.11	21.80	21.80	7.39	0.000	0.455
B-1b1	0.55	0.35	23.30	23.30	7.21	0.000	1.387
B-1c	0.57	0.33	23.22	23.22	7.22	0.000	1.357
B-2a	0.61	0.19	22.50	22.50	7.30	0.000	0.846
B-2a1	0.76	1.48	25.70	25.70	6.93	0.000	7.796
B-2b	0.59	0.29	23.00	23.00	7.24	0.000	1.239
MH-E1	0.8	0.00	10.00	10.00	9.36	0.000	0.001
MH-E2	0.5	0.00	10.00	10.00	9.36	0.000	0.000
MH-B1	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B2	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B3	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B4	0.8	0.00	10.00	10.00	9.36	0.000	0.001
MH-B5	0.8	0.00	10.00	10.00	9.36	0.000	0.001
B-2b1	0.66	0.78	24.60	24.60	7.05	0.000	3.631
B-3a	0.65	0.27	23.00	23.00	7.24	0.000	1.271
B-3a1	0.79	0.41	23.60	23.60	7.17	0.000	2.322
B-3b	0.75	0.69	24.40	24.40	7.08	0.000	3.662
B-3b1	0.51	0.15	22.20	22.20	7.34	0.000	0.562
B-4a	0.63	0.22	22.60	22.60	7.29	0.000	1.010
B-4b	0.57	0.08	21.50	21.50	7.43	0.000	0.339
B-4b1	0.76	0.51	23.90	23.90	7.13	0.000	2.765
B-4c	0.52	0.17	22.30	22.30	7.33	0.000	0.648
B-5a	0.66	0.26	22.90	22.90	7.25	0.000	1.245
B-5b	0.57	0.36	23.30	23.30	7.21	0.000	1.479
B-5b1	0.8	0.13	22.00	22.00	7.37	0.000	0.766
B-7a	0.62	0.53	23.90	23.90	7.13	0.000	2.344
B-7b	0.67	1.53	25.80	25.80	6.92	0.000	7.093
B-7c1	0.76	0.89	24.80	24.80	7.03	0.000	4.756
B-8a	0.59	0.22	22.60	22.60	7.29	0.000	0.946
B-8b	0.7	0.38	23.40	23.40	7.19	0.000	1.913

Existing 100-Year Results.txt

B-8c1	0.76	2.04	26.30	26.30	6.87	0.000	10.645
B-9b	0.78	0.22	22.70	22.70	7.28	0.000	1.249
B-12a1	0.73	1.09	25.20	25.20	6.99	0.000	5.559
B-13a1	0.71	0.65	24.27	24.27	7.09	0.000	3.273
B-14a1	0.79	0.49	23.80	23.80	7.15	0.000	2.766
MH-A8	0.8	37.03	33.90	33.90	6.15	0.000	182.201
A-1	0.47	1.14	25.20	25.20	6.99	0.000	3.743
MH-B	0.5	0.00	10.00	10.00	9.36	0.000	0.000
B	0.8	0.00	10.00	10.00	9.36	0.000	0.007
C-1	0.76	44.66	34.50	34.50	6.10	0.000	207.085
MH-D1	0.8	0.00	34.60	34.60	6.09	0.000	0.000
D-1	0.47	47.99	34.80	34.80	6.08	0.000	137.067
B-9c1	0.77	0.39	23.50	23.50	7.18	0.000	2.157
B-14a2	0.68	0.46	23.70	23.70	7.16	0.000	2.239
B-1c1	0.76	0.65	24.30	24.30	7.09	0.000	3.501
MH-B7d	0.8	0.00	10.00	10.00	9.36	0.000	0.007
B-7d1	0.62	2.33	26.60	26.60	6.83	0.000	9.872
E-1	0.57	20.49	31.90	31.90	6.32	0.000	73.830
MH-B7	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B8	0.8	0.00	10.00	10.00	9.36	0.000	0.000
B-9	0.65	0.12	21.90	21.90	7.38	0.000	0.575
B-10	0.68	0.23	22.70	22.70	7.28	0.000	1.138
B-11	0.64	0.36	23.30	23.30	7.21	0.000	1.660
B-12	0.66	0.28	23.00	23.00	7.24	0.000	1.338
B-13	0.59	1.03	25.00	25.00	7.01	0.000	4.259
MH-B7b	0.8	0.00	10.00	10.00	9.36	0.000	0.007
MH-B7c	0.8	0.00	10.00	10.00	9.36	0.000	0.007
B-7d2	0.56	2.12	26.40	26.40	6.86	0.000	8.138
B-7d3	0.49	4.05	27.80	27.80	6.71	0.000	13.315
B-9b1	0.8	0.51	23.90	23.90	7.13	0.000	2.911

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes		Gutter		Grate Width (ft)	Type	Pond width Allowed (ft)
			Long (%)	Trans (%)	n	Depr. (ft)			
B-10	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-11	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A-1	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
B-2a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-2b	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-3b1	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-4a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-4b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-4c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-8a	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-8b	Grate	2.67	0.30	2.00	0.014	n/a	1.50	Reticu	12.00
B-12	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-14	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-15	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-1c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00

On Grade Inlets Computation Data.

Inlet	Inlet	Total Q	Intercept	Q Bypass	To Inlet	Required	Actual	Ponded

Existing 100-Year Results.txt

ID	Type	(cfs)	Capacity (cfs)	Allow (cfs)	Actual (cfs)	ID	Length (ft)	Length (ft)	width (ft)
B-10	Combi	1.138	1.485	0.455	0.000	B-9	n/a	5.00	9.00
B-11	Curb	1.660	1.657	0.664	0.003	B-12	5.16	5.00	10.40
A-1	Curb	3.743	3.743	0.000	0.000		9.30	10.00	12.80
B-2a	Curb	1.447	1.068	0.579	0.378	B-3a	4.76	2.50	9.85
B-2b	Curb	1.508	1.095	0.000	0.413	B-3b1	4.87	2.50	10.00
B-3a	Curb	1.649	1.153	0.660	0.496	B-4a	5.13	2.50	10.35
B-3b	Grate	3.662	0.744	1.465	2.918	B-4c	n/a	0.00	14.00
B-3b1	Combi	0.974	1.335	0.390	0.000	B-3b	n/a	5.00	8.50
B-4a	Curb	1.506	1.094	0.602	0.412	B-5a	4.87	2.50	10.00
B-4b	Grate	0.881	0.292	0.352	0.589	B-5b	n/a	0.00	8.20
B-4c	Combi	3.566	3.024	1.426	0.542	B-4b	n/a	5.00	13.85
B-8a	Grate	0.946	0.306	0.379	0.640	B-9	n/a	0.00	8.40
B-8b	Grate	1.913	1.081	0.765	0.833	B-9b	n/a	0.00	10.95
B-12	Curb	1.341	1.020	0.537	0.321	B-13	4.56	2.50	9.60
B-14	Curb	1.695	1.690	0.678	0.005	B-15	5.21	5.00	10.45
B-15	Curb	0.911	0.911	0.364	0.000	B-10	3.67	5.00	8.30
B-1a	Curb	1.819	1.219	0.728	0.600	B-2a	5.44	2.50	10.75
B-1b	Grate	0.455	0.186	0.182	0.269	B-2b	n/a	0.00	6.40
B-1c	Combi	1.357	1.671	0.543	0.000	B-1b	n/a	5.00	9.65

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi Transv (%)	Right-Slope Longi Transv (%)	Gutter n	Deprw (ft)	Head Allowed (ft)		
B-9	Combi	5.00	2.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5a	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5b	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-9b	Combi	5.00	3.11	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-13	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	width Right (ft)
B-9	Combi	5.00	4.17	2.00	1.216	4.551	0.158	5.05	8.50
B-5a	Curb	2.50	n/a	n/a	1.657	2.057	0.368	9.55	5.70
B-5b	Curb	2.50	n/a	n/a	2.067	2.057	0.504	6.15	10.35
B-7a	Curb	5.00	n/a	n/a	2.344	4.114	0.247	9.10	9.10
B-7b	Curb	5.00	n/a	n/a	7.093	4.114	1.240	13.80	13.80
B-9b	Combi	5.00	5.00	3.11	2.082	5.457	0.221	8.70	8.70
B-13	Curb	2.50	n/a	n/a	4.580	2.057	1.984	11.70	11.70

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-B1	CrcMh	0.680	2.89	25.25	6.98		0.00	13.716
MH-B2	CrcMh	0.691	5.63	25.83	6.92		0.00	26.919
MH-B3	CrcMh	0.697	7.15	26.42	6.85		0.00	34.164

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MH-B4	CrcMh	0.694	8.13	26.83	6.81	0.00	38.441
MH-B5	CrcMh	0.628	20.33	28.76	6.61	0.00	84.491
MH-B7	CrcMh	0.581	11.45	28.30	6.66	0.00	44.268
MH-B8	CrcMh	0.641	22.97	29.03	6.59	0.00	96.966
B-9	Combi	0.648	24.44	29.31	6.56	0.00	103.876
B-10	Combi	0.680	0.23	22.70	7.28	0.00	1.138
B-11	Curb	0.798	37.39	34.06	6.14	0.00	183.233
MH-A8	CrcMh	0.800	37.03	33.90	6.15	0.00	182.201
A-1	Curb	0.000	0.00	0.00	0.00	0.00	0.000
MH-B	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B	CrcMh	0.735	66.43	34.96	6.06	0.00	295.935
C-1	CrcMh	0.745	111.09	36.22	5.97	0.00	493.568
MH-D1	CrcMh	0.745	111.09	36.22	5.97	0.00	493.568
D-1	CrcMh	0.662	159.08	37.19	5.89	0.00	620.316
MH-E1	CrcMh	0.651	179.57	37.79	5.85	111.40	795.305
MH-E2	CrcMh	0.651	179.57	37.79	5.85	111.40	795.305
E-1	CrcMh	0.651	179.57	37.79	5.85	111.40	795.304
B-2a	Curb	0.743	1.67	25.77	6.92	0.00	8.589
B-2a1	CrcMh	0.760	1.48	25.70	6.93	0.00	7.796
B-2b	Curb	0.641	1.07	24.90	7.02	0.00	4.815
B-2b1	CrcMh	0.660	0.78	24.60	7.05	0.00	3.631
B-3a	Curb	0.734	0.68	23.81	7.14	0.00	3.568
B-3a1	CrcMh	0.790	0.41	23.60	7.17	0.00	2.322
B-3b	Grate	0.707	0.84	24.40	7.08	0.00	4.203
B-3b1	Combi	0.510	0.15	22.20	7.34	0.00	0.562
B-4a	Curb	0.630	0.22	22.60	7.29	0.00	1.010
B-4b	Grate	0.686	0.76	24.10	7.11	0.00	3.709
B-12a1	CrcMh	0.730	1.09	25.20	6.99	0.00	5.559
B-13a1	CrcMh	0.710	0.65	24.27	7.09	0.00	3.273
B-14a1	CrcMh	0.737	0.95	24.38	7.08	0.00	4.954
B-4b1	CrcMh	0.760	0.51	23.90	7.13	0.00	2.765
B-4c	Combi	0.520	0.17	22.30	7.33	0.00	0.648
B-5a	Curb	0.660	0.26	22.90	7.25	0.00	1.245
B-5b	Curb	0.631	0.49	23.30	7.21	0.00	2.228
B-5b1	CrcMh	0.800	0.13	22.00	7.37	0.00	0.766
B-7a	Curb	0.657	2.06	25.89	6.91	0.00	9.354
B-7b	Curb	0.670	1.53	25.80	6.92	0.00	7.093
B-7c1	CrcMh	0.760	0.89	24.80	7.03	0.00	4.756
B-8a	Grate	0.660	0.60	23.71	7.16	0.00	2.833
B-8b	Grate	0.700	0.38	23.40	7.19	0.00	1.913
B-8c1	CrcMh	0.760	2.04	26.30	6.87	0.00	10.645
B-9b	Combi	0.794	0.73	24.02	7.12	0.00	4.127
B-9c1	CrcMh	0.770	0.39	23.50	7.18	0.00	2.157
B-14a2	CrcMh	0.680	0.46	23.70	7.16	0.00	2.239
B-1c1	CrcMh	0.760	0.65	24.30	7.09	0.00	3.501
MH-B7d	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-7d1	CrcMh	0.620	2.33	26.60	6.83	0.00	9.872
MH-B7b	CrcMh	0.543	8.50	28.25	6.66	0.00	30.777
MH-B7c	CrcMh	0.591	4.45	27.74	6.72	0.00	17.679
B-7d2	CrcMh	0.560	2.12	26.40	6.86	0.00	8.138
B-7d3	CrcMh	0.490	4.05	27.80	6.71	0.00	13.315
B-9b1	CrcMh	0.800	0.51	23.90	7.13	0.00	2.911
B-12	Curb	0.796	38.76	34.18	6.13	0.00	188.930
B-13	Curb	0.789	40.44	34.34	6.11	0.00	195.075
B-14	Curb	0.786	41.79	34.64	6.09	0.00	199.995
B-15	Curb	0.785	41.99	34.77	6.08	0.00	200.388
MH-B16	CrcMh	0.648	24.44	29.31	6.56	0.00	103.876
B-1a	Curb	0.710	1.45	25.15	6.99	0.00	7.193
B-1a1	CrcMh	0.760	1.02	25.00	7.01	0.00	5.433
B-1b	Grate	0.650	1.44	24.73	7.04	0.00	6.590
B-1b1	CrcMh	0.687	1.00	24.53	7.06	0.00	4.848
B-1c	Combi	0.570	0.33	23.22	7.22	0.00	1.357
OUT	Outlt	0.651	179.57	37.79	5.85	111.40	795.305

Existing 100-Year Results.txt

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
			US (ft)	DS (ft)						
27	B-1a	MH-B1	69.68	69.43	Cir 1	0.00	1.50	34.0	0.735	0.013
28	B-1a1	B-1a	71.45	69.68	Cir 1	0.00	1.00	74.0	2.393	0.013
29	B-1b	MH-B1	69.65	69.36	Cir 1	0.00	1.50	47.0	0.617	0.013
30	B-1b1	B-1b	70.44	69.83	Cir 1	0.00	1.50	67.0	0.910	0.013
31	B-1c	B-1b	72.07	71.70	Cir 1	0.00	1.50	40.0	0.925	0.013
32	B-2a	MH-B2	69.30	68.68	Cir 1	0.00	1.50	29.0	2.138	0.013
33	B-2a1	B-2a	70.90	69.30	Cir 2	0.00	1.00	40.0	4.003	0.013
34	B-2b	MH-B2	69.50	68.69	Cir 1	0.00	1.50	50.0	1.620	0.013
35	B-2b1	B-2b	70.34	69.50	Cir 1	0.00	1.50	94.0	0.894	0.013
36	B-3a	MH-B3	70.50	67.75	Cir 1	0.00	1.50	32.0	8.626	0.013
37	B-3a1	B-3a	70.80	70.50	Cir 1	0.00	1.00	50.0	0.600	0.013
38	B-3b	MH-B3	68.80	67.76	Cir 1	0.00	1.50	47.0	2.213	0.013
39	B-3b1	B-3b	70.32	69.85	Cir 1	0.00	7.50	55.0	0.855	0.013
40	B-4a	MH-B4	70.50	67.11	Cir 1	0.00	1.50	30.0	11.373	0.013
42	B-4b	MH-B4	68.24	67.21	Cir 1	0.00	1.50	47.0	2.192	0.013
43	B-4b1	B-4b	69.21	68.96	Cir 1	0.00	1.00	46.0	0.543	0.013
44	B-4c	B-4b	69.57	69.33	Cir 1	0.00	1.50	47.0	0.511	0.013
45	B-5a	MH-B5	67.58	67.51	Cir 1	0.00	1.50	39.0	0.179	0.013
46	B-5b	MH-B5	68.53	67.41	Cir 1	0.00	1.50	51.0	2.197	0.013
47	B-5b1	B-5b	69.16	68.68	Cir 1	0.00	1.00	60.0	0.800	0.013
48	B-7a	MH-B7	67.58	67.58	Cir 1	0.00	2.00	5.0	0.020	0.013
49	B-7b	B-7a	67.80	67.21	Cir 1	0.00	2.00	40.0	1.475	0.013
50	B-7c1	MH-B7	68.50	67.58	Cir 1	0.00	1.50	40.0	2.301	0.013
51	B-8a	MH-B8	67.14	67.04	Cir 1	0.00	2.00	5.0	2.000	0.013
52	B-8b	B-8a	67.19	67.14	Cir 1	0.00	2.00	39.0	0.128	0.013
53	B-8c1	MH-B8	68.75	67.11	Cir 1	0.00	2.00	40.0	4.103	0.013
54	B-9b	B-9	66.43	66.35	Cir 1	0.00	2.00	42.0	0.190	0.013
55	B-12a1	B-12	70.97	70.71	Cir 1	0.00	1.00	64.0	0.406	0.013
56	B-13a1	B-13	71.95	71.67	Cir 1	0.00	1.00	71.0	0.394	0.013
57	B-14a1	B-14	70.76	70.49	Cir 1	0.00	1.00	68.0	0.397	0.013
59	B-9c1	B-9	71.07	66.35	Cir 1	0.00	2.00	54.0	8.774	0.013
60	B-14a2	B-14a1	71.95	71.31	Cir 1	0.00	0.83	168.0	0.381	0.011
61	B-1c1	B-1b1	71.11	70.63	Cir 1	0.00	1.00	61.0	0.787	0.013
62	B-10	B-9	68.69	68.63	Cir 1	0.00	2.00	29.0	0.207	0.013
2	MH-A8	B-11	68.17	67.60	Cir 1	0.00	3.50	177.0	0.322	0.013
4	B	C-1	64.21	61.36	Cir 1	0.00	5.00	1140.0	0.250	0.013
5	C-1	MH-D1	58.84	56.27	Cir 1	0.00	6.50	1227.0	0.209	0.013
6	MH-D1	D-1	55.77	54.37	Cir 1	0.00	7.00	750.0	0.187	0.013
7	D-1	E-1	53.87	52.86	Cir 1	0.00	7.50	506.0	0.200	0.013
8	E-1	MH-E1	52.36	49.52	Box 1	9.00	8.00	1387.0	0.205	0.015
9	MH-E1	MH-E2	49.52	43.66	Box 1	9.00	8.00	129.0	4.547	0.015
10	MH-E2	OUT	43.66	43.16	Cir 2	0.00	7.00	120.0	0.417	0.024
11	MH-B1	MH-B2	69.24	68.71	Cir 1	0.00	2.00	144.0	0.368	0.013
12	MH-B2	MH-B3	68.30	67.84	Cir 1	0.00	2.50	195.0	0.236	0.013
13	MH-B3	MH-B4	67.73	67.64	Cir 1	0.00	2.50	173.0	0.051	0.013
14	MH-B4	MH-B5	67.64	67.41	Cir 1	0.00	2.50	178.0	0.130	0.013
64	MH-B7c	MH-B7b	68.97	68.43	Cir 1	0.00	3.00	161.6	0.334	0.013
15	MH-B5	MH-B8	67.41	67.09	Cir 1	0.00	3.00	198.3	0.161	0.013
17	MH-B7	MH-B5	67.58	67.56	Cir 1	0.00	3.00	170.1	0.012	0.013
18	MH-B8	B-9	67.04	66.22	Cir 1	0.00	3.00	230.8	0.355	0.013
19	B-9	MH-B16	66.22	66.22	Cir 1	0.00	3.00	56.6	0.000	0.013
20	MH-B16	B	66.22	66.13	Cir 1	0.00	3.00	28.8	0.313	0.013
21	B-11	B-12	67.20	66.97	Cir 1	0.00	4.00	111.0	0.207	0.013
22	B-12	B-13	66.90	66.07	Cir 1	0.00	4.00	140.0	0.593	0.013

Existing 100-Year Results.txt

23	B-13	B-14	66.02	64.93	Cir 1	0.00	4.00	280.0	0.389	0.013
24	B-14	B-15	64.81	64.49	Cir 1	0.00	4.00	130.0	0.246	0.013
25	B-15	B	64.49	64.21	Cir 1	0.00	5.00	112.0	0.250	0.013
63	MH-B7b	MH-B7	67.58	67.58	Cir 1	0.00	2.50	43.4	0.000	0.013
65	B-7d1	MH-B7c	72.39	69.38	Cir 1	0.00	2.00	420.0	0.717	0.013
66	B-7d3	MH-B7b	67.72	67.65	Cir 1	0.00	2.00	37.0	0.189	0.013
67	B-7d2	MH-B7c	69.63	69.38	Cir 1	0.00	2.00	55.0	0.455	0.013
68	B-9b1	B-9b	66.47	66.43	Cir 1	0.00	2.00	20.0	0.200	0.013

Conveyance Hydraulic Computations. Tailwater = 50.160 (ft)

Run #	Hyd. Gr.line		Crit.Elev US (ft)	Fr.Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)
	US (ft)	DS (ft)			Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)			
27*	110.37	110.21	75.13	0.465	1.01	1.50	5.66	5.51	7.2	9.0	0.000
28*	112.07	110.37	79.40	2.306	0.81	1.00	8.00	7.11	5.4	5.5	0.000
29	110.31	110.21	74.75	0.390	1.01	1.50	5.19	3.73	6.6	8.3	0.000
30*	110.46	110.31	76.10	0.211	0.74	1.50	5.63	4.72	4.8	10.1	0.000
31*	110.32	110.31	75.13	0.017	0.37	1.50	3.98	3.19	1.4	10.1	0.000
32*	110.39	110.20	74.49	0.663	0.80	1.50	8.94	5.99	8.6	15.4	0.000
33*	110.87	110.39	75.86	1.187	0.53	1.00	9.28	5.54	7.8	14.3	0.000
34*	110.31	110.20	74.49	0.208	0.62	1.50	6.95	4.70	4.8	13.4	0.000
35*	110.42	110.31	75.17	0.118	0.63	1.50	5.18	4.27	3.6	10.0	0.000
36*	109.41	109.37	74.05	0.114	0.34	1.50	11.64	4.23	3.6	31.0	0.000
37	109.50	109.41	75.16	0.421	0.70	1.00	3.94	2.96	2.3	2.8	0.000
38*	109.44	109.37	73.75	0.159	0.53	1.50	7.50	4.49	4.2	15.7	0.000
39*	109.44	109.44	74.01	0.000	0.16	7.50	2.38	2.04	0.6	712.9	0.000
40*	108.18	108.18	74.62	0.009	0.17	1.50	8.84	2.92	1.0	35.6	0.000
42*	108.24	108.18	73.10	0.124	0.50	1.50	7.22	4.30	3.7	15.6	0.000
43	108.51	108.24	74.32	0.597	0.88	1.00	3.78	3.52	2.8	2.6	0.000
44*	108.24	108.24	73.55	0.004	0.30	1.50	2.60	2.59	0.6	7.5	0.000
45	106.69	106.63	72.60	0.014	0.54	1.50	2.16	0.70	1.2	4.5	0.000
46*	106.65	106.63	72.60	0.045	0.38	1.50	6.25	3.67	2.2	15.6	0.000
47*	106.68	106.65	74.46	0.046	0.33	1.00	3.34	2.97	0.8	3.2	0.000
48	107.38	107.37	72.98	0.170	2.00	2.00	2.98	2.98	9.4	3.2	0.000
49*	107.42	107.38	72.98	0.097	0.69	2.00	7.33	4.85	7.1	27.6	0.000
50*	107.45	107.37	73.38	0.203	0.56	1.50	7.87	4.66	4.8	16.0	0.000
51*	103.48	103.47	72.81	0.016	0.40	2.00	6.28	3.68	2.8	32.1	0.000
52	103.52	103.48	72.81	0.007	0.66	2.00	2.11	0.61	1.9	8.1	0.000
53*	103.56	103.47	73.65	0.220	0.66	2.00	11.88	5.58	10.6	46.0	0.000
54	98.70	98.64	72.33	0.033	0.90	2.00	3.00	1.31	4.1	9.9	0.000
55	108.81	107.26	75.25	2.414	1.00	1.00	7.08	7.08	5.6	2.3	0.000
56	105.45	104.86	75.30	0.837	1.00	1.00	4.17	4.17	3.3	2.2	0.000
57	101.04	99.74	75.34	1.917	1.00	1.00	6.31	6.31	5.0	2.3	0.000
59*	98.64	98.64	74.05	0.009	0.25	2.00	9.75	3.41	2.2	67.3	0.000
60	102.29	101.04	73.50	0.743	0.83	0.83	4.11	4.11	2.2	1.6	0.000
61	111.04	110.46	75.74	0.958	1.00	1.00	4.46	4.46	3.5	3.2	0.000
62	98.70	98.64	72.48	0.003	0.45	2.00	2.16	0.36	1.1	10.3	0.000
2	114.81	109.05	74.57	3.252	3.50	3.50	18.94	18.94	182.2	57.3	0.000
4	96.58	81.99	73.20	1.280	5.00	5.00	15.07	15.07	295.9	130.8	0.000
5	81.99	71.21	72.20	0.879	6.50	6.50	14.87	14.87	493.6	241.0	0.000
6	71.21	66.77	68.20	0.592	7.00	7.00	12.83	12.83	493.6	277.2	0.000
7	66.77	63.49	68.20	0.647	7.50	7.50	14.04	14.04	620.3	344.5	0.000
8	63.49	55.76	67.00	0.457	8.00	8.00	11.05	11.05	795.3	532.3	0.000
9*	55.76	51.73	67.20	0.457	2.88	8.00	30.73	11.05	795.3	2508.3	0.000
10	51.73	50.16	69.20	1.309	7.00	7.00	10.33	10.33	795.3	448.6	0.000
11	110.21	110.20	75.49	0.364	1.64	2.00	4.97	4.37	13.7	13.8	0.000
12	110.20	109.37	75.86	0.427	2.50	2.50	5.48	5.48	26.9	20.0	0.000
13	109.37	108.18	75.16	0.688	2.50	2.50	6.96	6.96	34.2	9.3	0.000
14	108.18	106.63	74.62	0.871	2.50	2.50	7.83	7.83	38.4	14.9	0.000

Existing 100-Year Results.txt											
64	108.04	107.61	74.77	0.070	1.43	3.00	5.33	2.50	17.7	38.7	0.000
15	106.63	103.47	73.38	1.591	3.00	3.00	11.95	11.95	84.5	26.9	0.000
17	107.37	106.63	73.90	0.437	3.00	3.00	6.26	6.26	44.3	7.3	0.000
18	103.47	98.64	73.19	2.096	3.00	3.00	13.72	13.72	97.0	39.9	0.000
19*	98.64	97.28	72.33	2.405	1.50	3.00	29.39	14.70	103.9	0.3	0.000
20	97.28	96.58	72.84	2.405	3.00	3.00	14.70	14.70	103.9	37.4	0.000
21	109.05	107.26	74.21	1.613	4.00	4.00	14.58	14.58	183.2	65.7	0.000
22	107.26	104.86	74.30	1.715	4.00	4.00	15.03	15.03	188.9	111.1	0.000
23	104.86	99.74	75.30	1.829	4.00	4.00	15.52	15.52	195.1	90.0	0.000
24	99.74	97.24	73.43	1.922	4.00	4.00	15.92	15.92	200.0	71.6	0.000
25	97.24	96.58	73.50	0.587	5.00	5.00	10.21	10.21	200.4	130.8	0.000
63*	107.61	107.37	73.89	0.558	1.25	2.50	12.54	6.27	30.8	0.2	0.000
65*	108.84	108.04	74.30	0.189	1.02	2.00	6.14	5.43	9.9	19.2	0.000
66	107.74	107.61	75.50	0.343	2.00	2.00	4.24	4.24	13.3	9.9	0.000
67	108.22	108.04	74.75	0.128	1.04	2.00	4.94	2.59	8.1	15.3	0.000
68	98.74	98.70	72.33	0.016	0.73	2.00	2.78	0.93	2.9	10.2	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:

The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error,
and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.5	0.0	15	694.0
Circular	Concrete	1.0	0.0	9	574.0
Circular	Concrete	7.5	0.0	2	561.0
Circular	Concrete	2.0	0.0	13	930.0
Circular	Plastic	0.833	0.0	1	168.0
Circular	Concrete	3.5	0.0	1	177.0
Circular	Concrete	5.0	0.0	2	1252.0
Circular	Concrete	6.5	0.0	1	1227.0
Circular	Concrete	7.0	0.0	1	750.0
Box	Concrete	8.0	9.0	2	1516.0
Circular	Other	7.0	0.0	1	240.0
Circular	Concrete	2.5	0.0	4	589.37
Circular	Concrete	3.0	0.0	6	846.18
Circular	Concrete	4.0	0.0	4	661.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	39
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	2.0	4.17	1
Curb And Grate On Grade	Reticuline	5.0	0.75	2.67	0.0	0.0	4
Curb On Grade		5.0	0.0	0.0	0.0	0.0	3
Curb On Grade		10.0	0.0	0.0	0.0	0.0	1
Curb On Grade		2.5	0.0	0.0	0.0	0.0	6
Grate On Grade	Reticuline	0.0	0.75	1.33	0.0	0.0	4
Curb In Sag		2.5	0.0	0.0	0.0	0.0	3

Existing 100-Year Results.txt

Curb In Sag		5.0	0.0	0.0	0.0	0.0	2
Grate On Grade	Reticuline	0.0	1.5	2.67	0.0	0.0	1
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	3.11	5.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1

=====END=====

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years

Decreasing conduit size @ downstream Run# 38
 Decreasing conduit size @ downstream Run# 63
 Discharge decreased downstream node Id= MH-B16 Previous intensity used.
 Discharge decreased downstream node Id= MH-D1 Previous intensity used.
 Discharge decreased downstream node Id= MH-E1 Previous intensity used.
 Discharge decreased downstream node Id= MH-E2 Previous intensity used.
 Decreasing conduit size @ downstream Run# 10
 Capacity of grade inlet exceeded at inlet Id= B-11
 Computed ponded width exceeds allowable width at inlet Id= A-1
 Capacity of grade inlet exceeded at inlet Id= B-2a
 Capacity of grade inlet exceeded at inlet Id= B-2b
 Capacity of grade inlet exceeded at inlet Id= B-3a
 Capacity of grade inlet exceeded at inlet Id= B-3b
 Computed ponded width exceeds allowable width at inlet Id= B-3b
 Capacity of grade inlet exceeded at inlet Id= B-4a
 Capacity of grade inlet exceeded at inlet Id= B-4b
 Capacity of grade inlet exceeded at inlet Id= B-4c
 Computed ponded width exceeds allowable width at inlet Id= B-4c
 Capacity of grade inlet exceeded at inlet Id= B-8a
 Capacity of grade inlet exceeded at inlet Id= B-8b
 Capacity of grade inlet exceeded at inlet Id= B-12
 Capacity of grade inlet exceeded at inlet Id= B-14
 Capacity of grade inlet exceeded at inlet Id= B-1a
 Capacity of grade inlet exceeded at inlet Id= B-1b
 Capacity of sag inlet exceeded at inlet Id= B-5b
 Computed right ponded width exceeds allowable width at inlet Id= B-7b
 Computed left ponded width exceeds allowable width at inlet Id= B-7b
 Capacity of sag inlet exceeded at inlet Id= B-7b
 Capacity of sag inlet exceeded at inlet Id= B-13
 Run# 10 Insufficient capacity.
 Run# 8 Insufficient capacity.
 Run# 7 Insufficient capacity.
 Run# 6 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-D1 Run # 6
 Run# 5 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= C-1 Run # 5
 Run# 4 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B Run # 4
 Run# 20 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B16 Run # 20
 Run# 25 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-15 Run # 25
 Run# 19 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9 Run # 19
 Run# 24 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14 Run # 24
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9b Run # 54
 Run# 57 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14a1 Run # 57
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9c1 Run # 59
 Run# 60 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14a2 Run # 60

Existing 100-Year Results.txt

Upstream HGL exceeds critical elevation (Analysis)at node Id= B-10 Run # 62
 Run# 18 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B8 Run # 18
 Run# 23 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13 Run # 23
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9b1 Run # 68
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8a Run # 51
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8b Run # 52
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8c1 Run # 53
 Run# 56 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13a1 Run # 56
 Run# 15 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B5 Run # 15
 Run# 17 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7 Run # 17
 Run# 22 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12 Run # 22
 Run# 63 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7b Run # 63
 Run# 66 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7d3 Run # 66
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5a Run # 45
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5b Run # 46
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5b1 Run # 47
 Run# 48 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7a Run # 48
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7b Run # 49
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7c1 Run # 50
 Run# 55 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12a1 Run # 55
 Run# 14 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B4 Run # 14
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7c Run # 64
 Run# 21 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-11 Run # 21
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7d1 Run # 65
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7d2 Run # 67
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4a Run # 40
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4b Run # 42
 Run# 43 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4b1 Run # 43
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4c Run # 44
 Run# 2 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-A8 Run # 2
 Run# 13 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B3 Run # 13
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3a Run # 36
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3a1 Run # 37
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3b Run # 38
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3b1 Run # 39
 Run# 12 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B2 Run # 12
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2a Run # 32
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2a1 Run # 33
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2b Run # 34
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2b1 Run # 35
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B1 Run # 11
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1a Run # 27
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1a1 Run # 28
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1b Run # 29
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1b1 Run # 30
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1c Run # 31
 Run# 61 Insufficient capacity.

Existing 100-Year Results.txt
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1c1 Run # 61

Proposed 2-Year Results.txt
Appendix C.2.c - Proposed Conditions - 2 year

HouStorm (City Of Houston STORM DRAIN DESIGN)
Nov/01/2007

Version 2.1, Update:

Run @ 5/4/2010 9:42:35 AM

PROJECT NAME : Kimberley Lane
JOB NUMBER :
PROJECT DESCRIPTION : Kimberley Lane Drainage Improvements PER

PROJECT File: L:\120214\120-10308-000\469\4-0-Production\4-06-Ref-Studies-Repo

ANALYSYS FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

=====

OUTPUT FOR ANALYSYS FREQUENCY of: 2 Years

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Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-14	0.59	0.40	23.50	23.50	3.51	0.000	0.829
B-15	0.62	0.20	22.50	22.50	3.59	0.000	0.445
MH-B16	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-1a	0.59	0.43	23.60	23.60	3.51	0.000	0.889
B-1a1	0.76	1.02	25.00	25.00	3.41	0.000	2.641
B-1b	0.56	0.11	21.80	21.80	3.64	0.000	0.224
B-1b1	0.55	0.35	23.30	23.30	3.53	0.000	0.679
B-1c	0.57	0.33	23.22	23.22	3.53	0.000	0.665
B-2a	0.61	0.19	22.50	22.50	3.59	0.000	0.416
B-2a1	0.76	1.48	25.70	25.70	3.36	0.000	3.779
B-2b	0.59	0.29	23.00	23.00	3.55	0.000	0.608
MH-E1	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-E2	0.5	0.00	10.00	10.00	4.96	0.000	0.000
MH-B1	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B2	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B3	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B4	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B5	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-2b1	0.66	0.78	24.60	24.60	3.43	0.000	1.768
B-3a	0.65	0.27	23.00	23.00	3.55	0.000	0.623
B-3a1	0.79	0.41	23.60	23.60	3.51	0.000	1.136
B-3b	0.75	0.69	24.40	24.40	3.45	0.000	1.785
B-3b1	0.51	0.15	22.20	22.20	3.61	0.000	0.276
B-4a	0.63	0.22	22.60	22.60	3.58	0.000	0.496
B-4b	0.57	0.08	21.50	21.50	3.67	0.000	0.167
B-4b1	0.76	0.51	23.90	23.90	3.48	0.000	1.350
B-4c	0.52	0.17	22.30	22.30	3.60	0.000	0.319
B-5a	0.66	0.26	22.90	22.90	3.56	0.000	0.611
B-5b	0.57	0.36	23.30	23.30	3.53	0.000	0.724
B-5b1	0.8	0.13	22.00	22.00	3.63	0.000	0.377
B-7a	0.62	0.53	23.90	23.90	3.48	0.000	1.145
B-7b	0.67	1.53	25.80	25.80	3.35	0.000	3.437
B-7c1	0.76	0.89	24.80	24.80	3.42	0.000	2.314
B-8a	0.59	0.22	22.60	22.60	3.58	0.000	0.465
B-8b	0.7	0.38	23.40	23.40	3.52	0.000	0.937

Proposed 2-Year Results.txt

B-8c1	0.76	2.04	26.30	26.30	3.32	0.000	5.147
B-9b	0.78	0.22	22.70	22.70	3.57	0.000	0.613
B-12a1	0.73	1.09	25.20	25.20	3.39	0.000	2.700
B-13a1	0.71	0.65	24.27	24.27	3.46	0.000	1.596
B-14a1	0.79	0.49	23.80	23.80	3.49	0.000	1.352
MH-A8	0.8	37.03	33.90	33.90	2.90	0.000	85.772
A-1	0.47	1.14	25.20	25.20	3.39	0.000	1.818
MH-B	0.5	0.00	10.00	10.00	4.96	0.000	0.000
B	0.8	0.00	10.00	10.00	4.96	0.000	0.004
C-1	0.76	44.66	34.50	34.50	2.87	0.000	97.305
MH-D1	0.8	0.00	34.60	34.60	2.86	0.000	0.000
D-1	0.47	47.99	34.80	34.80	2.85	0.000	64.346
B-9c1	0.77	0.39	23.50	23.50	3.51	0.000	1.055
B-14a2	0.68	0.46	23.70	23.70	3.50	0.000	1.094
B-1c1	0.76	0.65	24.30	24.30	3.46	0.000	1.707
MH-B7d	0.8	0.00	10.00	10.00	4.96	0.000	0.004
E-1	0.57	20.49	31.90	31.90	3.00	0.000	34.981
MH-B7	0.8	0.00	10.00	10.00	4.96	0.000	0.000
MH-B8	0.8	0.00	10.00	10.00	4.96	0.000	0.000
B-9	0.65	0.12	21.90	21.90	3.64	0.000	0.284
B-10	0.68	0.23	22.70	22.70	3.57	0.000	0.559
B-11	0.64	0.36	23.30	23.30	3.53	0.000	0.813
B-12	0.66	0.28	23.00	23.00	3.55	0.000	0.656
B-13	0.59	1.03	25.00	25.00	3.41	0.000	2.070
MH-B7b	0.8	0.00	10.00	10.00	4.96	0.000	0.004
MH-B7c	0.8	6.17	10.00	10.00	4.96	0.000	24.481
B-7d2	0.56	2.12	26.40	26.40	3.31	0.000	3.934
B-9b1	0.8	0.51	23.90	23.90	3.48	0.000	1.422
B-7d1	0.62	2.33	10.00	10.00	4.96	0.000	7.170

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Depr. (ft)	Grate Width (ft)	Type	Pond Width Allowed (ft)
B-10	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-11	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A-1	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
B-2a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-2b	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-3b1	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-4a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-4b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-4c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-8a	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-8b	Grate	2.67	0.30	2.00	0.014	n/a	1.50	Reticu	12.00
B-12	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-14	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-15	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-1c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q	Intercept Capacity	Q Bypass Allow	Actual	To Inlet ID	Required Length	Actual Length	Ponded Width

Proposed 2-Year Results.txt

		(cfs)	(cfs)	(cfs)	(cfs)		(ft)	(ft)	(ft)
B-10	Combi	0.559	0.883	0.224	0.000	B-9	n/a	5.00	6.90
B-11	Curb	0.813	0.813	0.325	0.000	B-12	3.45	5.00	7.95
A-1	Curb	1.818	1.818	0.000	0.000		6.08	10.00	9.75
B-2a	Curb	0.524	0.517	0.209	0.006	B-3a	2.73	2.50	6.75
B-2b	Curb	0.719	0.670	0.000	0.050	B-3b1	3.23	2.50	7.60
B-3a	Curb	0.629	0.604	0.252	0.025	B-4a	3.01	2.50	7.20
B-3b	Grate	1.785	0.466	0.714	1.319	B-4c	n/a	0.00	10.65
B-3b1	Combi	0.326	0.552	0.130	0.000	B-3b	n/a	5.00	5.65
B-4a	Curb	0.522	0.516	0.209	0.006	B-5a	2.73	2.50	6.75
B-4b	Grate	0.167	0.091	0.067	0.076	B-5b	n/a	0.00	4.40
B-4c	Combi	1.637	1.886	0.655	0.000	B-4b	n/a	5.00	10.35
B-8a	Grate	0.465	0.189	0.186	0.276	B-9	n/a	0.00	6.45
B-8b	Grate	0.937	0.623	0.375	0.314	B-9b	n/a	0.00	8.40
B-12	Curb	0.656	0.624	0.262	0.032	B-13	3.08	2.50	7.35
B-14	Curb	0.829	0.829	0.332	0.000	B-15	3.49	5.00	8.00
B-15	Curb	0.445	0.445	0.178	0.000	B-10	2.51	5.00	6.35
B-1a	Curb	0.889	0.782	0.356	0.108	B-2a	3.62	2.50	8.20
B-1b	Grate	0.224	0.113	0.090	0.112	B-2b	n/a	0.00	4.90
B-1c	Combi	0.665	1.010	0.266	0.000	B-1b	n/a	5.00	7.35

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
B-9	Combi	5.00	2.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5a	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5b	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-9b	Combi	5.00	3.11	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-13	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
B-9	Combi	5.00	4.17	2.00	0.560	4.551	0.132	3.80	6.35
B-5a	Curb	2.50	n/a	n/a	0.617	2.057	0.159	6.60	3.90
B-5b	Curb	2.50	n/a	n/a	0.800	2.057	0.182	4.30	7.25
B-7a	Curb	5.00	n/a	n/a	1.145	4.114	0.154	6.95	6.95
B-7b	Curb	5.00	n/a	n/a	3.437	4.114	0.387	10.50	10.50
B-9b	Combi	5.00	5.00	3.11	0.927	5.457	0.144	6.45	6.45
B-13	Curb	2.50	n/a	n/a	2.102	2.057	0.517	8.75	8.75

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-B1	CrcMh	0.680	2.89	25.30	3.39		0.00	6.655
MH-B2	CrcMh	0.691	5.63	25.85	3.35		0.00	13.034
MH-B3	CrcMh	0.697	7.15	26.60	3.30		0.00	16.452
MH-B4	CrcMh	0.694	8.13	27.15	3.27		0.00	18.435

Proposed 2-Year Results.txt

MH-B5	CrcMh	0.718	19.80	27.68	3.23	0.00	45.921
MH-B7	CrcMh	0.740	10.92	13.05	4.53	0.00	36.591
MH-B8	CrcMh	0.721	22.22	28.65	3.17	0.00	50.861
B-9	Combi	0.723	23.69	29.76	3.11	0.00	53.302
B-10	Combi	0.680	0.23	22.70	3.57	0.00	0.559
B-11	Curb	0.798	37.39	34.23	2.88	0.00	85.968
MH-A8	CrcMh	0.800	37.03	33.90	2.90	0.00	85.772
A-1	Curb	0.000	0.00	0.00	0.00	0.00	0.000
MH-B	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B	CrcMh	0.763	65.68	35.57	2.82	0.00	141.151
C-1	CrcMh	0.762	110.34	38.22	2.70	0.00	227.173
MH-D1	CrcMh	0.762	110.34	38.22	2.70	0.00	227.173
D-1	CrcMh	0.673	158.33	39.78	2.64	0.00	281.441
MH-E1	CrcMh	0.661	178.82	40.75	2.60	111.40	419.233
MH-E2	CrcMh	0.661	178.82	40.75	2.60	111.40	419.233
E-1	CrcMh	0.661	178.82	40.75	2.60	111.40	419.233
B-2a	Curb	0.743	1.67	25.79	3.35	0.00	4.161
B-2a1	CrcMh	0.760	1.48	25.70	3.36	0.00	3.779
B-2b	Curb	0.641	1.07	24.97	3.41	0.00	2.338
B-2b1	CrcMh	0.660	0.78	24.60	3.43	0.00	1.768
B-3a	Curb	0.734	0.68	23.85	3.49	0.00	1.742
B-3a1	CrcMh	0.790	0.41	23.60	3.51	0.00	1.136
B-3b	Grate	0.707	0.84	24.40	3.45	0.00	2.048
B-3b1	Combi	0.510	0.15	22.20	3.61	0.00	0.276
B-4a	Curb	0.630	0.22	22.60	3.58	0.00	0.496
B-4b	Grate	0.686	0.76	24.13	3.47	0.00	1.809
B-12a1	CrcMh	0.730	1.09	25.20	3.39	0.00	2.700
B-13a1	CrcMh	0.710	0.65	24.27	3.46	0.00	1.596
B-14a1	CrcMh	0.737	0.95	24.59	3.44	0.00	2.404
B-4b1	CrcMh	0.760	0.51	23.90	3.48	0.00	1.350
B-4c	Combi	0.520	0.17	22.30	3.60	0.00	0.319
B-5a	Curb	0.660	0.26	22.90	3.56	0.00	0.611
B-5b	Curb	0.631	0.49	23.30	3.53	0.00	1.091
B-5b1	CrcMh	0.800	0.13	22.00	3.63	0.00	0.377
B-7a	Curb	0.000	0.00	0.00	0.00	0.00	0.000
B-7b	Curb	0.670	1.53	25.80	3.35	0.00	3.437
B-7c1	CrcMh	0.760	0.89	24.80	3.42	0.00	2.314
B-8a	Grate	0.000	0.00	0.00	0.00	0.00	0.000
B-8b	Grate	0.700	0.38	23.40	3.52	0.00	0.937
B-8c1	CrcMh	0.760	2.04	26.30	3.32	0.00	5.147
B-9b	Combi	0.794	0.73	24.05	3.47	0.00	2.013
B-9c1	CrcMh	0.770	0.39	23.50	3.51	0.00	1.055
B-14a2	CrcMh	0.680	0.46	23.70	3.50	0.00	1.094
B-1c1	CrcMh	0.760	0.65	24.30	3.46	0.00	1.707
MH-B7d	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
MH-B7b	CrcMh	0.751	8.50	13.05	4.53	0.00	28.885
MH-B7c	CrcMh	0.751	8.50	13.05	4.53	0.00	28.881
B-7d3	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-9b1	CrcMh	0.800	0.51	23.90	3.48	0.00	1.422
B-12	Curb	0.796	38.76	34.50	2.87	0.00	88.397
B-13	Curb	0.789	40.44	34.74	2.86	0.00	91.106
B-14	Curb	0.786	41.79	35.31	2.83	0.00	92.908
B-15	Curb	0.785	41.99	35.31	2.83	0.00	93.259
Beg. 5x3	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
MH-B16	CrcMh	0.723	23.69	29.76	3.11	0.00	53.302
B-1a	Curb	0.710	1.45	25.18	3.39	0.00	3.493
B-1a1	CrcMh	0.760	1.02	25.00	3.41	0.00	2.641
B-1b	Grate	0.650	1.44	24.79	3.42	0.00	3.203
B-1b1	CrcMh	0.687	1.00	24.55	3.44	0.00	2.360
B-1c	Combi	0.570	0.33	23.22	3.53	0.00	0.665
WB-Model	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-7d1	CrcMh	0.620	2.33	10.00	4.96	0.00	7.170
B-7d2	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000

OUT Outlt 0.661 178.82 40.75 2.60 111.40 419.233

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev.		shape #	Span (ft)	Rise (ft)	Length (ft)	slope (%)	n_value
			US (ft)	DS (ft)						
27	B-1a	MH-B1	69.68	69.43	Cir 1	0.00	1.50	34.0	0.735	0.013
28	B-1a1	B-1a	71.45	69.68	Cir 1	0.00	1.00	74.0	2.393	0.013
29	B-1b	MH-B1	69.65	69.36	Cir 1	0.00	1.50	47.0	0.617	0.013
30	B-1b1	B-1b	70.44	69.83	Cir 1	0.00	1.50	67.0	0.910	0.013
31	B-1c	B-1b	72.07	71.70	Cir 1	0.00	1.50	40.0	0.925	0.013
32	B-2a	MH-B2	69.30	68.68	Cir 1	0.00	1.50	29.0	2.138	0.013
33	B-2a1	B-2a	70.90	69.30	Cir 2	0.00	1.00	40.0	4.003	0.013
34	B-2b	MH-B2	69.50	68.69	Cir 1	0.00	1.50	50.0	1.620	0.013
35	B-2b1	B-2b	70.34	69.50	Cir 1	0.00	1.50	94.0	0.894	0.013
36	B-3a	MH-B3	70.50	67.75	Cir 1	0.00	1.50	32.0	8.626	0.013
37	B-3a1	B-3a	70.80	70.50	Cir 1	0.00	1.00	50.0	0.600	0.013
38	B-3b	MH-B3	68.80	67.76	Cir 1	0.00	1.50	47.0	2.213	0.013
39	B-3b1	B-3b	70.32	69.85	Cir 1	0.00	7.50	55.0	0.855	0.013
40	B-4a	MH-B4	70.50	67.11	Cir 1	0.00	1.50	30.0	11.373	0.013
42	B-4b	MH-B4	68.24	67.21	Cir 1	0.00	1.50	47.0	2.192	0.013
43	B-4b1	B-4b	69.21	68.96	Cir 1	0.00	1.00	46.0	0.543	0.013
44	B-4c	B-4b	69.57	69.33	Cir 1	0.00	1.50	47.0	0.511	0.013
45	B-5a	MH-B5	65.91	65.83	Cir 1	0.00	2.00	57.7	0.139	0.013
46	B-5b	MH-B5	68.53	68.42	Cir 1	0.00	2.00	59.5	0.185	0.013
47	B-5b1	B-5b	69.16	68.68	Cir 1	0.00	1.00	60.0	0.800	0.013
49	B-7b	MH-B7	66.98	66.93	Cir 1	0.00	2.00	29.7	0.182	0.013
50	B-7c1	MH-B7	68.50	68.41	Cir 1	0.00	2.00	48.5	0.186	0.013
52	B-8b	MH-B8	67.19	67.14	Cir 1	0.00	2.00	32.0	0.156	0.013
53	B-8c1	MH-B8	68.75	68.66	Cir 1	0.00	2.00	49.0	0.184	0.013
54	B-9b	B-9	66.43	66.35	Cir 1	0.00	2.00	42.0	0.190	0.013
55	B-12a1	B-12	70.97	70.71	Cir 1	0.00	1.00	64.0	0.406	0.013
56	B-13a1	B-13	71.95	71.67	Cir 1	0.00	1.00	71.0	0.394	0.013
57	B-14a1	B-14	70.76	70.49	Cir 1	0.00	1.00	68.0	0.397	0.013
59	B-9c1	B-9	71.07	66.35	Cir 1	0.00	2.00	54.0	8.774	0.013
60	B-14a2	B-14a1	71.95	71.31	Cir 1	0.00	0.83	168.0	0.381	0.011
61	B-1c1	B-1b1	71.11	70.63	Cir 1	0.00	1.00	61.0	0.787	0.013
62	B-10	B-9	68.69	68.63	Cir 1	0.00	2.00	29.0	0.207	0.013
2	MH-A8	B-11	68.17	67.60	Cir 1	0.00	3.50	177.0	0.322	0.013
4	B	C-1	64.21	61.36	Cir 1	0.00	5.00	1140.0	0.250	0.013
5	C-1	MH-D1	58.84	56.27	Cir 1	0.00	6.50	1227.0	0.209	0.013
6	MH-D1	D-1	55.77	54.37	Cir 1	0.00	7.00	750.0	0.187	0.013
7	D-1	E-1	53.87	52.86	Cir 1	0.00	7.50	506.0	0.200	0.013
8	E-1	MH-E1	52.36	49.52	Box 1	9.00	8.00	1387.0	0.205	0.015
9	MH-E1	MH-E2	49.52	43.66	Box 1	9.00	8.00	129.0	4.547	0.015
10	MH-E2	OUT	43.66	43.16	Cir 2	0.00	7.00	120.0	0.417	0.024
11	MH-B1	MH-B2	69.24	68.71	Cir 1	0.00	2.00	144.0	0.368	0.013
12	MH-B2	MH-B3	68.30	67.84	Cir 1	0.00	2.50	195.0	0.236	0.013
13	MH-B3	MH-B4	67.73	67.14	Cir 1	0.00	2.50	173.0	0.341	0.013
14	MH-B4	MH-B5	67.14	66.80	Cir 1	0.00	2.00	186.5	0.182	0.013
64	MH-B7c	MH-B7b	66.87	66.74	Box 1	5.00	3.00	165.4	0.080	0.015
15	MH-B5	MH-B8	66.57	66.41	Box 1	5.00	3.00	194.7	0.080	0.015
17	MH-B7	MH-B5	66.71	66.57	Box 1	5.00	3.00	172.9	0.080	0.015
18	MH-B8	B-9	66.41	66.23	Box 1	5.00	3.00	229.8	0.080	0.015
19	B-9	MH-B16	65.80	65.72	Cir 1	0.00	3.00	58.0	0.138	0.013
20	MH-B16	B	65.72	65.68	Cir 1	0.00	3.00	27.0	0.148	0.013
21	B-11	B-12	67.20	66.97	Cir 1	0.00	4.00	111.0	0.207	0.013
22	B-12	B-13	66.90	66.07	Cir 1	0.00	4.00	140.0	0.593	0.013
23	B-13	B-14	66.02	64.93	Cir 1	0.00	4.00	280.0	0.389	0.013

Proposed 2-Year Results.txt

24	B-14	B-15	64.81	64.49	Cir 1	0.00	4.00	130.0	0.246	0.013
25	B-15	B	64.49	64.21	Cir 1	0.00	5.00	112.0	0.250	0.013
63	MH-B7b	MH-B7	66.74	66.71	Box 1	5.00	3.00	43.1	0.081	0.015
68	B-9b1	B-9b	66.47	66.43	Cir 1	0.00	2.00	20.0	0.200	0.013
65	B-7d1	MH-B7c	67.16	66.87	Box 1	5.00	3.00	352.8	0.080	0.015

Conveyance Hydraulic Computations. Tailwater = 50.160 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Actual (ft)	Velocity Unif. (f/s)	Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
27*	72.84	72.80	75.13	0.110	0.65	1.50	4.78	4.22	3.5	9.0	0.000
28*	73.24	72.84	79.40	0.545	0.49	1.00	6.94	4.52	2.6	5.5	0.000
29*	72.84	72.80	74.75	0.092	0.65	1.50	4.37	4.10	3.2	8.3	0.000
30*	72.88	72.84	76.10	0.050	0.50	1.50	4.64	3.73	2.4	10.1	0.000
31*	72.85	72.84	75.13	0.004	0.26	1.14	3.23	2.73	0.7	10.1	0.000
32*	72.44	72.39	74.49	0.156	0.53	1.50	7.39	4.47	4.2	15.4	0.000
33*	72.55	72.44	75.86	0.279	0.35	1.00	7.67	3.95	3.8	14.3	0.000
34*	72.42	72.39	74.49	0.049	0.42	1.50	5.69	3.73	2.3	13.4	0.000
35*	72.44	72.42	75.17	0.028	0.43	1.50	4.25	3.43	1.8	10.0	0.000
36*	72.14	72.13	74.05	0.027	0.24	1.50	9.43	3.41	1.7	31.0	0.000
37*	72.19	72.14	75.16	0.101	0.45	1.00	3.34	3.34	1.1	2.8	0.000
38*	72.15	72.13	73.75	0.038	0.37	1.50	6.12	3.48	2.0	15.7	0.000
39*	72.15	72.15	74.01	0.000	0.12	2.30	1.91	1.03	0.3	712.9	0.000
40*	71.81	71.81	74.62	0.002	0.12	1.50	7.14	2.30	0.5	35.6	0.000
42*	71.83	71.81	73.10	0.029	0.35	1.50	5.88	3.46	1.8	15.6	0.000
43	72.01	71.83	74.32	0.142	0.51	1.00	3.37	1.72	1.4	2.6	0.000
44	72.07	71.83	73.55	0.001	0.21	1.50	2.11	0.18	0.3	7.5	0.000
45	70.67	70.59	72.60	0.001	0.36	2.00	1.56	0.19	0.6	8.5	0.000
46	70.69	70.59	72.60	0.002	0.45	2.00	2.05	0.35	1.1	9.8	0.000
47*	70.70	70.69	74.46	0.011	0.23	1.00	2.73	1.40	0.4	3.2	0.000
49	70.66	70.61	72.98	0.023	0.82	2.00	2.81	1.09	3.4	9.7	0.000
50	70.70	70.61	73.38	0.010	0.66	2.00	2.54	0.74	2.3	9.8	0.000
52	70.43	70.38	72.81	0.002	0.44	2.00	1.84	0.30	0.9	9.0	0.000
53	70.45	70.38	73.65	0.051	1.04	1.72	3.14	1.79	5.1	9.7	0.000
54	70.17	70.09	72.33	0.008	0.61	2.00	2.46	0.64	2.0	9.9	0.000
55	72.24	71.87	75.25	0.569	1.00	1.00	3.44	3.44	2.7	2.3	0.000
56	72.81	72.67	75.30	0.199	0.62	1.00	3.10	2.03	1.6	2.2	0.000
57	71.80	71.49	75.34	0.452	0.91	1.00	3.19	3.06	2.4	2.3	0.000
59*	71.43	70.09	74.05	0.002	0.17	2.00	7.86	0.34	1.1	67.3	0.000
60	72.46	71.80	73.50	0.178	0.51	0.51	3.15	3.15	1.1	1.6	0.000
61*	73.02	72.88	75.74	0.228	0.52	1.00	4.10	3.78	1.7	3.2	0.000
62*	70.09	70.09	72.48	0.001	0.32	1.46	1.75	1.37	0.6	10.3	0.000
2	73.54	72.27	74.57	0.721	3.50	3.50	8.92	8.92	85.8	57.3	0.000
4	69.55	63.88	73.20	0.291	5.00	5.00	7.19	7.19	141.2	130.8	0.000
5	63.88	60.61	72.20	0.186	5.04	5.04	8.23	8.23	227.2	241.0	0.000
6	60.61	59.04	68.20	0.125	4.84	4.84	8.00	8.00	227.2	277.2	0.000
7	59.04	58.00	68.20	0.133	5.17	5.17	8.66	8.66	281.4	344.5	0.000
8	58.00	53.59	67.00	0.127	5.64	5.64	8.26	8.26	419.2	532.3	0.000
9*	53.59	50.24	67.20	0.127	1.84	6.58	25.26	7.07	419.2	2508.3	0.000
10	50.24	50.16	69.20	0.364	5.39	7.00	6.60	5.45	419.2	448.6	0.000
11	72.80	72.39	75.49	0.086	0.98	2.00	4.33	2.12	6.7	13.8	0.000
12	72.39	72.13	75.86	0.100	1.47	2.50	4.33	2.66	13.0	20.0	0.000
13	72.13	71.81	75.16	0.160	1.52	2.50	5.26	3.35	16.5	24.1	0.000
14	71.81	70.59	74.62	0.658	2.00	2.00	5.87	5.87	18.4	9.7	0.000
64	70.69	70.63	74.77	0.041	1.95	3.00	2.97	1.93	28.9	40.4	0.000
15	70.59	70.38	73.38	0.104	2.74	3.00	3.35	3.06	45.9	40.3	0.000
17	70.61	70.59	73.90	0.066	2.30	3.00	3.19	2.44	36.6	40.4	0.000
18	70.38	70.09	73.19	0.128	2.95	3.00	3.44	3.39	50.9	40.4	0.000
19	70.09	69.72	72.33	0.633	3.00	3.00	7.54	7.54	53.3	24.9	0.000

Proposed 2-Year Results.txt

20	69.72	69.55	72.84	0.633	3.00	3.00	7.54	7.54	53.3	25.8	0.000
21	72.27	71.87	74.21	0.355	4.00	4.00	6.84	6.84	86.0	65.7	0.000
22*	71.87	71.35	74.30	0.375	2.70	4.00	9.78	9.23	88.4	111.1	0.000
23	71.35	70.23	75.30	0.399	3.34	4.00	8.12	7.25	91.1	90.0	0.000
24	70.23	69.69	73.43	0.415	4.00	4.00	7.39	7.39	92.9	71.6	0.000
25	69.69	69.55	73.50	0.127	3.13	5.00	7.21	4.75	93.3	130.8	0.000
63	70.63	70.61	73.89	0.041	1.93	3.00	2.99	1.93	28.9	40.6	0.000
68	70.21	70.17	72.33	0.004	0.51	2.00	2.28	0.45	1.4	10.2	0.000
65	70.97	70.69	2.00	0.003	0.74	3.00	1.93	0.48	7.2	40.3	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:

The convey length should be from upstream to downstream inside box.
 This length may also be used as Pay Item.
 Using hydraulic length, from node center to node center, may result in profile error,
 and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.5	0.0	12	564.0
Circular	Concrete	1.0	0.0	9	574.0
Circular	Concrete	7.5	0.0	2	561.0
Circular	Concrete	2.0	0.0	12	751.939
Circular	Plastic	0.833	0.0	1	168.0
Circular	Concrete	3.5	0.0	1	177.0
Circular	Concrete	5.0	0.0	2	1252.0
Circular	Concrete	6.5	0.0	1	1227.0
Circular	Concrete	7.0	0.0	1	750.0
Box	Concrete	8.0	9.0	2	1516.0
Circular	Other	7.0	0.0	1	240.0
Circular	Concrete	2.5	0.0	2	368.0
Box	Concrete	3.0	5.0	6	1158.69
Circular	Concrete	3.0	0.0	2	85.0
Circular	Concrete	4.0	0.0	4	661.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	41
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	2.0	4.17	1
Curb And Grate On Grade	Reticuline	5.0	0.75	2.67	0.0	0.0	4
Curb On Grade		5.0	0.0	0.0	0.0	0.0	3
Curb On Grade		10.0	0.0	0.0	0.0	0.0	1
Curb On Grade		2.5	0.0	0.0	0.0	0.0	6
Grate On Grade	Reticuline	0.0	0.75	1.33	0.0	0.0	4
Curb In Sag		2.5	0.0	0.0	0.0	0.0	3
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2
Grate On Grade	Reticuline	0.0	1.5	2.67	0.0	0.0	1
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	3.11	5.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

Proposed 2-Year Results.txt

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years

Decreasing conduit size @ downstream Run# 38
Discharge decreased downstream node Id= B-15 Previous intensity used.
Discharge decreased downstream node Id= MH-B7b Previous intensity used.
Decreasing conduit size @ downstream Run# 14
Discharge decreased downstream node Id= MH-B7 Previous intensity used.
Discharge decreased downstream node Id= MH-B16 Previous intensity used.
Discharge decreased downstream node Id= MH-D1 Previous intensity used.
Discharge decreased downstream node Id= MH-E1 Previous intensity used.
Discharge decreased downstream node Id= MH-E2 Previous intensity used.
Decreasing conduit size @ downstream Run# 10
Capacity of grade inlet exceeded at inlet Id= B-2a
Capacity of grade inlet exceeded at inlet Id= B-2b
Capacity of grade inlet exceeded at inlet Id= B-3a
Capacity of grade inlet exceeded at inlet Id= B-3b
Capacity of grade inlet exceeded at inlet Id= B-4a
Capacity of grade inlet exceeded at inlet Id= B-4b
Capacity of grade inlet exceeded at inlet Id= B-8a
Capacity of grade inlet exceeded at inlet Id= B-8b
Capacity of grade inlet exceeded at inlet Id= B-12
Capacity of grade inlet exceeded at inlet Id= B-1a
Capacity of grade inlet exceeded at inlet Id= B-1b
Capacity of sag inlet exceeded at inlet Id= B-13
Run# 4 Insufficient capacity.
Run# 20 Insufficient capacity.
Run# 19 Insufficient capacity.
Run# 24 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 57
Run# 57 Insufficient capacity.
Run# 18 Insufficient capacity.
Run# 23 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 56
Run# 15 Insufficient capacity.
Run# 55 Insufficient capacity.
Run# 14 Insufficient capacity.
Run# 21 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7d1 Run # 65
Run# 2 Insufficient capacity.

Proposed 100-Year Results.txt
Appendix C.2.d - Proposed Conditions - 100 year

HouStorm (City Of Houston STORM DRAIN DESIGN)
Nov/01/2007

Version 2.1, Update:

Run @ 5/4/2010 9:43:07 AM

PROJECT NAME : Kimberley Lane
JOB NUMBER :
PROJECT DESCRIPTION : Kimberley Lane Drainage Improvements PER

PROJECT File: L:\120214\120-10308-000\469\4-0-Production\4-06-Ref-Studies-Repo

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

=====

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

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Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-14	0.59	0.40	23.50	23.50	7.18	0.000	1.695
B-15	0.62	0.20	22.50	22.50	7.30	0.000	0.906
MH-B16	0.8	0.00	10.00	10.00	9.36	0.000	0.000
B-1a	0.59	0.43	23.60	23.60	7.17	0.000	1.819
B-1a1	0.76	1.02	25.00	25.00	7.01	0.000	5.433
B-1b	0.56	0.11	21.80	21.80	7.39	0.000	0.455
B-1b1	0.55	0.35	23.30	23.30	7.21	0.000	1.387
B-1c	0.57	0.33	23.22	23.22	7.22	0.000	1.357
B-2a	0.61	0.19	22.50	22.50	7.30	0.000	0.846
B-2a1	0.76	1.48	25.70	25.70	6.93	0.000	7.796
B-2b	0.59	0.29	23.00	23.00	7.24	0.000	1.239
MH-E1	0.8	0.00	10.00	10.00	9.36	0.000	0.001
MH-E2	0.5	0.00	10.00	10.00	9.36	0.000	0.000
MH-B1	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B2	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B3	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B4	0.8	0.00	10.00	10.00	9.36	0.000	0.001
MH-B5	0.8	0.00	10.00	10.00	9.36	0.000	0.001
B-2b1	0.66	0.78	24.60	24.60	7.05	0.000	3.631
B-3a	0.65	0.27	23.00	23.00	7.24	0.000	1.271
B-3a1	0.79	0.41	23.60	23.60	7.17	0.000	2.322
B-3b	0.75	0.69	24.40	24.40	7.08	0.000	3.662
B-3b1	0.51	0.15	22.20	22.20	7.34	0.000	0.562
B-4a	0.63	0.22	22.60	22.60	7.29	0.000	1.010
B-4b	0.57	0.08	21.50	21.50	7.43	0.000	0.339
B-4b1	0.76	0.51	23.90	23.90	7.13	0.000	2.765
B-4c	0.52	0.17	22.30	22.30	7.33	0.000	0.648
B-5a	0.66	0.26	22.90	22.90	7.25	0.000	1.245
B-5b	0.57	0.36	23.30	23.30	7.21	0.000	1.479
B-5b1	0.8	0.13	22.00	22.00	7.37	0.000	0.766
B-7a	0.62	0.53	23.90	23.90	7.13	0.000	2.344
B-7b	0.67	1.53	25.80	25.80	6.92	0.000	7.093
B-7c1	0.76	0.89	24.80	24.80	7.03	0.000	4.756
B-8a	0.59	0.22	22.60	22.60	7.29	0.000	0.946
B-8b	0.7	0.38	23.40	23.40	7.19	0.000	1.913

Proposed 100-Year Results.txt

B-8c1	0.76	2.04	26.30	26.30	6.87	0.000	10.645
B-9b	0.78	0.22	22.70	22.70	7.28	0.000	1.249
B-12a1	0.73	1.09	25.20	25.20	6.99	0.000	5.559
B-13a1	0.71	0.65	24.27	24.27	7.09	0.000	3.273
B-14a1	0.79	0.49	23.80	23.80	7.15	0.000	2.766
MH-A8	0.8	37.03	33.90	33.90	6.15	0.000	182.201
A-1	0.47	1.14	25.20	25.20	6.99	0.000	3.743
MH-B	0.5	0.00	10.00	10.00	9.36	0.000	0.000
B	0.8	0.00	10.00	10.00	9.36	0.000	0.007
C-1	0.76	44.66	34.50	34.50	6.10	0.000	207.085
MH-D1	0.8	0.00	34.60	34.60	6.09	0.000	0.000
D-1	0.47	47.99	34.80	34.80	6.08	0.000	137.067
B-9c1	0.77	0.39	23.50	23.50	7.18	0.000	2.157
B-14a2	0.68	0.46	23.70	23.70	7.16	0.000	2.239
B-1c1	0.76	0.65	24.30	24.30	7.09	0.000	3.501
MH-B7d	0.8	0.00	10.00	10.00	9.36	0.000	0.007
E-1	0.57	20.49	31.90	31.90	6.32	0.000	73.830
MH-B7	0.8	0.00	10.00	10.00	9.36	0.000	0.000
MH-B8	0.8	0.00	10.00	10.00	9.36	0.000	0.000
B-9	0.65	0.12	21.90	21.90	7.38	0.000	0.575
B-10	0.68	0.23	22.70	22.70	7.28	0.000	1.138
B-11	0.64	0.36	23.30	23.30	7.21	0.000	1.660
B-12	0.66	0.28	23.00	23.00	7.24	0.000	1.338
B-13	0.59	1.03	25.00	25.00	7.01	0.000	4.259
MH-B7b	0.8	0.00	10.00	10.00	9.36	0.000	0.007
MH-B7c	0.8	6.17	10.00	10.00	9.36	0.000	46.185
B-7d2	0.56	2.12	26.40	26.40	6.86	0.000	8.138
B-9b1	0.8	0.51	23.90	23.90	7.13	0.000	2.911
B-7d1	0.62	2.33	10.00	10.00	9.36	0.000	13.528

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate width (ft)	Grate Type	Pond width Allowed (ft)
B-10	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-11	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A-1	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
B-2a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-2b	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-3b1	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-4a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-4b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-4c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00
B-8a	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-8b	Grate	2.67	0.30	2.00	0.014	n/a	1.50	Reticu	12.00
B-12	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-14	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-15	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1a	Curb	2.50	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-1b	Grate	1.33	0.30	2.00	0.014	n/a	0.75	Reticu	12.00
B-1c	Combi	5.00	0.30	2.00	0.014	0.33	0.75	Reticu	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q	Intercept Capacity	Q Bypass Allow	Q Actual	To Inlet ID	Required Length	Actual Length	Ponded width

Proposed 100-Year Results.txt

		(cfs)	(cfs)	(cfs)	(cfs)		(ft)	(ft)	(ft)
B-10	Combi	1.138	1.485	0.455	0.000	B-9	n/a	5.00	9.00
B-11	Curb	1.660	1.657	0.664	0.003	B-12	5.16	5.00	10.40
A-1	Curb	3.743	3.743	0.000	0.000		9.30	10.00	12.80
B-2a	Curb	1.447	1.068	0.579	0.378	B-3a	4.76	2.50	9.85
B-2b	Curb	1.508	1.095	0.000	0.413	B-3b1	4.87	2.50	10.00
B-3a	Curb	1.649	1.153	0.660	0.496	B-4a	5.13	2.50	10.35
B-3b	Grate	3.662	0.744	1.465	2.918	B-4c	n/a	0.00	14.00
B-3b1	Combi	0.974	1.335	0.390	0.000	B-3b	n/a	5.00	8.50
B-4a	Curb	1.506	1.094	0.602	0.412	B-5a	4.87	2.50	10.00
B-4b	Grate	0.881	0.292	0.352	0.589	B-5b	n/a	0.00	8.20
B-4c	Combi	3.566	3.024	1.426	0.542	B-4b	n/a	5.00	13.85
B-8a	Grate	0.946	0.306	0.379	0.640	B-9	n/a	0.00	8.40
B-8b	Grate	1.913	1.081	0.765	0.833	B-9b	n/a	0.00	10.95
B-12	Curb	1.341	1.020	0.537	0.321	B-13	4.56	2.50	9.60
B-14	Curb	1.695	1.690	0.678	0.005	B-15	5.21	5.00	10.45
B-15	Curb	0.911	0.911	0.364	0.000	B-10	3.67	5.00	8.30
B-1a	Curb	1.819	1.219	0.728	0.600	B-2a	5.44	2.50	10.75
B-1b	Grate	0.455	0.186	0.182	0.269	B-2b	n/a	0.00	6.40
B-1c	Combi	1.357	1.671	0.543	0.000	B-1b	n/a	5.00	9.65

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
B-9	Combi	5.00	2.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5a	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-5b	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-7b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-9b	Combi	5.00	3.11	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B-13	Curb	2.50	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	width Right (ft)
B-9	Combi	5.00	4.17	2.00	1.216	4.551	0.158	5.05	8.50
B-5a	Curb	2.50	n/a	n/a	1.657	2.057	0.368	9.55	5.70
B-5b	Curb	2.50	n/a	n/a	2.067	2.057	0.504	6.15	10.35
B-7a	Curb	5.00	n/a	n/a	2.344	4.114	0.247	9.10	9.10
B-7b	Curb	5.00	n/a	n/a	7.093	4.114	1.240	13.80	13.80
B-9b	Combi	5.00	5.00	3.11	2.082	5.457	0.221	8.70	8.70
B-13	Curb	2.50	n/a	n/a	4.580	2.057	1.984	11.70	11.70

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-B1	CrcMh	0.680	2.89	25.25	6.98		0.00	13.716
MH-B2	CrcMh	0.691	5.63	25.83	6.92		0.00	26.919
MH-B3	CrcMh	0.697	7.15	26.42	6.85		0.00	34.164
MH-B4	CrcMh	0.694	8.13	26.83	6.81		0.00	38.441

Proposed 100-Year Results.txt

MH-B5	CrcMh	0.718	19.80	27.09	6.78	0.00	96.350
MH-B7	CrcMh	0.740	10.92	12.47	8.85	0.00	71.526
MH-B8	CrcMh	0.721	22.22	27.59	6.73	0.00	107.835
B-9	Combi	0.723	23.69	28.12	6.68	0.00	114.411
B-10	Combi	0.680	0.23	22.70	7.28	0.00	1.138
B-11	Curb	0.798	37.39	34.06	6.14	0.00	183.233
MH-A8	CrcMh	0.800	37.03	33.90	6.15	0.00	182.201
A-1	Curb	0.000	0.00	0.00	0.00	0.00	0.000
MH-B	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B	CrcMh	0.763	65.68	34.96	6.06	0.00	303.825
C-1	CrcMh	0.762	110.34	36.19	5.97	0.00	501.541
MH-D1	CrcMh	0.762	110.34	36.19	5.97	0.00	501.542
D-1	CrcMh	0.673	158.33	37.14	5.89	0.00	628.366
MH-E1	CrcMh	0.661	178.82	37.74	5.85	111.40	803.399
MH-E2	CrcMh	0.661	178.82	37.74	5.85	111.40	803.399
E-1	CrcMh	0.661	178.82	37.74	5.85	111.40	803.398
B-2a	Curb	0.743	1.67	25.77	6.92	0.00	8.589
B-2a1	CrcMh	0.760	1.48	25.70	6.93	0.00	7.796
B-2b	Curb	0.641	1.07	24.90	7.02	0.00	4.815
B-2b1	CrcMh	0.660	0.78	24.60	7.05	0.00	3.631
B-3a	Curb	0.734	0.68	23.81	7.14	0.00	3.568
B-3a1	CrcMh	0.790	0.41	23.60	7.17	0.00	2.322
B-3b	Grate	0.707	0.84	24.40	7.08	0.00	4.203
B-3b1	Combi	0.510	0.15	22.20	7.34	0.00	0.562
B-4a	Curb	0.630	0.22	22.60	7.29	0.00	1.010
B-4b	Grate	0.686	0.76	24.10	7.11	0.00	3.709
B-12a1	CrcMh	0.730	1.09	25.20	6.99	0.00	5.559
B-13a1	CrcMh	0.710	0.65	24.27	7.09	0.00	3.273
B-14a1	CrcMh	0.737	0.95	24.38	7.08	0.00	4.954
B-4b1	CrcMh	0.760	0.51	23.90	7.13	0.00	2.765
B-4c	Combi	0.520	0.17	22.30	7.33	0.00	0.648
B-5a	Curb	0.660	0.26	22.90	7.25	0.00	1.245
B-5b	Curb	0.631	0.49	23.30	7.21	0.00	2.228
B-5b1	CrcMh	0.800	0.13	22.00	7.37	0.00	0.766
B-7a	Curb	0.000	0.00	0.00	0.00	0.00	0.000
B-7b	Curb	0.670	1.53	25.80	6.92	0.00	7.093
B-7c1	CrcMh	0.760	0.89	24.80	7.03	0.00	4.756
B-8a	Grate	0.000	0.00	0.00	0.00	0.00	0.000
B-8b	Grate	0.700	0.38	23.40	7.19	0.00	1.913
B-8c1	CrcMh	0.760	2.04	26.30	6.87	0.00	10.645
B-9b	Combi	0.794	0.73	24.02	7.12	0.00	4.127
B-9c1	CrcMh	0.770	0.39	23.50	7.18	0.00	2.157
B-14a2	CrcMh	0.680	0.46	23.70	7.16	0.00	2.239
B-1c1	CrcMh	0.760	0.65	24.30	7.09	0.00	3.501
MH-B7d	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
MH-B7b	CrcMh	0.751	8.50	12.47	8.85	0.00	56.462
MH-B7c	CrcMh	0.751	8.50	12.47	8.85	0.00	56.455
B-7d3	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-9b1	CrcMh	0.800	0.51	23.90	7.13	0.00	2.911
B-12	Curb	0.796	38.76	34.18	6.13	0.00	188.930
B-13	Curb	0.789	40.44	34.34	6.11	0.00	195.075
B-14	Curb	0.786	41.79	34.64	6.09	0.00	199.995
B-15	Curb	0.785	41.99	34.77	6.08	0.00	200.388
Beg. 5x3	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
MH-B16	CrcMh	0.723	23.69	28.12	6.68	0.00	114.411
B-1a	Curb	0.710	1.45	25.15	6.99	0.00	7.193
B-1a1	CrcMh	0.760	1.02	25.00	7.01	0.00	5.433
B-1b	Grate	0.650	1.44	24.73	7.04	0.00	6.590
B-1b1	CrcMh	0.687	1.00	24.53	7.06	0.00	4.848
B-1c	Combi	0.570	0.33	23.22	7.22	0.00	1.357
WB-Model	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000
B-7d1	CrcMh	0.620	2.33	10.00	9.36	0.00	13.528
B-7d2	CrcMh	0.000	0.00	0.00	0.00	0.00	0.000

Proposed 100-Year Results.txt

OUT outlt 0.661 178.82 37.74 5.85 111.40 803.399

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine US (ft)	Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
27	B-1a	MH-B1	69.68	69.43	Cir 1	0.00	1.50	34.0	0.735	0.013
28	B-1a1	B-1a	71.45	69.68	Cir 1	0.00	1.00	74.0	2.393	0.013
29	B-1b	MH-B1	69.65	69.36	Cir 1	0.00	1.50	47.0	0.617	0.013
30	B-1b1	B-1b	70.44	69.83	Cir 1	0.00	1.50	67.0	0.910	0.013
31	B-1c	B-1b	72.07	71.70	Cir 1	0.00	1.50	40.0	0.925	0.013
32	B-2a	MH-B2	69.30	68.68	Cir 1	0.00	1.50	29.0	2.138	0.013
33	B-2a1	B-2a	70.90	69.30	Cir 2	0.00	1.00	40.0	4.003	0.013
34	B-2b	MH-B2	69.50	68.69	Cir 1	0.00	1.50	50.0	1.620	0.013
35	B-2b1	B-2b	70.34	69.50	Cir 1	0.00	1.50	94.0	0.894	0.013
36	B-3a	MH-B3	70.50	67.75	Cir 1	0.00	1.50	32.0	8.626	0.013
37	B-3a1	B-3a	70.80	70.50	Cir 1	0.00	1.00	50.0	0.600	0.013
38	B-3b	MH-B3	68.80	67.76	Cir 1	0.00	1.50	47.0	2.213	0.013
39	B-3b1	B-3b	70.32	69.85	Cir 1	0.00	7.50	55.0	0.855	0.013
40	B-4a	MH-B4	70.50	67.11	Cir 1	0.00	1.50	30.0	11.373	0.013
42	B-4b	MH-B4	68.24	67.21	Cir 1	0.00	1.50	47.0	2.192	0.013
43	B-4b1	B-4b	69.21	68.96	Cir 1	0.00	1.00	46.0	0.543	0.013
44	B-4c	B-4b	69.57	69.33	Cir 1	0.00	1.50	47.0	0.511	0.013
45	B-5a	MH-B5	65.91	65.83	Cir 1	0.00	2.00	57.7	0.139	0.013
46	B-5b	MH-B5	68.53	68.42	Cir 1	0.00	2.00	59.5	0.185	0.013
47	B-5b1	B-5b	69.16	68.68	Cir 1	0.00	1.00	60.0	0.800	0.013
49	B-7b	MH-B7	66.98	66.93	Cir 1	0.00	2.00	29.7	0.182	0.013
50	B-7c1	MH-B7	68.50	68.41	Cir 1	0.00	2.00	48.5	0.186	0.013
52	B-8b	MH-B8	67.19	67.14	Cir 1	0.00	2.00	32.0	0.156	0.013
53	B-8c1	MH-B8	68.75	68.66	Cir 1	0.00	2.00	49.0	0.184	0.013
54	B-9b	B-9	66.43	66.35	Cir 1	0.00	2.00	42.0	0.190	0.013
55	B-12a1	B-12	70.97	70.71	Cir 1	0.00	1.00	64.0	0.406	0.013
56	B-13a1	B-13	71.95	71.67	Cir 1	0.00	1.00	71.0	0.394	0.013
57	B-14a1	B-14	70.76	70.49	Cir 1	0.00	1.00	68.0	0.397	0.013
59	B-9c1	B-9	71.07	66.35	Cir 1	0.00	2.00	54.0	8.774	0.013
60	B-14a2	B-14a1	71.95	71.31	Cir 1	0.00	0.83	168.0	0.381	0.011
61	B-1c1	B-1b1	71.11	70.63	Cir 1	0.00	1.00	61.0	0.787	0.013
62	B-10	B-9	68.69	68.63	Cir 1	0.00	2.00	29.0	0.207	0.013
2	MH-A8	B-11	68.17	67.60	Cir 1	0.00	3.50	177.0	0.322	0.013
4	B	C-1	64.21	61.36	Cir 1	0.00	5.00	1140.0	0.250	0.013
5	C-1	MH-D1	58.84	56.27	Cir 1	0.00	6.50	1227.0	0.209	0.013
6	MH-D1	D-1	55.77	54.37	Cir 1	0.00	7.00	750.0	0.187	0.013
7	D-1	E-1	53.87	52.86	Cir 1	0.00	7.50	506.0	0.200	0.013
8	E-1	MH-E1	52.36	49.52	Box 1	9.00	8.00	1387.0	0.205	0.015
9	MH-E1	MH-E2	49.52	43.66	Box 1	9.00	8.00	129.0	4.547	0.015
10	MH-E2	OUT	43.66	43.16	Cir 2	0.00	7.00	120.0	0.417	0.024
11	MH-B1	MH-B2	69.24	68.71	Cir 1	0.00	2.00	144.0	0.368	0.013
12	MH-B2	MH-B3	68.30	67.84	Cir 1	0.00	2.50	195.0	0.236	0.013
13	MH-B3	MH-B4	67.73	67.14	Cir 1	0.00	2.50	173.0	0.341	0.013
14	MH-B4	MH-B5	67.14	66.80	Cir 1	0.00	2.00	186.5	0.182	0.013
64	MH-B7c	MH-B7b	66.87	66.74	Box 1	5.00	3.00	165.4	0.080	0.015
15	MH-B5	MH-B8	66.57	66.41	Box 1	5.00	3.00	194.7	0.080	0.015
17	MH-B7	MH-B5	66.71	66.57	Box 1	5.00	3.00	172.9	0.080	0.015
18	MH-B8	B-9	66.41	66.23	Box 1	5.00	3.00	229.8	0.080	0.015
19	B-9	MH-B16	65.80	65.72	Cir 1	0.00	3.00	58.0	0.138	0.013
20	MH-B16	B	65.72	65.68	Cir 1	0.00	3.00	27.0	0.148	0.013
21	B-11	B-12	67.20	66.97	Cir 1	0.00	4.00	111.0	0.207	0.013
22	B-12	B-13	66.90	66.07	Cir 1	0.00	4.00	140.0	0.593	0.013
23	B-13	B-14	66.02	64.93	Cir 1	0.00	4.00	280.0	0.389	0.013

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24	B-14	B-15	64.81	64.49	Cir 1	0.00	4.00	130.0	0.246	0.013
25	B-15	B	64.49	64.21	Cir 1	0.00	5.00	112.0	0.250	0.013
63	MH-B7b	MH-B7	66.74	66.71	Box 1	5.00	3.00	43.1	0.081	0.015
68	B-9b1	B-9b	66.47	66.43	Cir 1	0.00	2.00	20.0	0.200	0.013
65	B-7d1	MH-B7c	67.16	66.87	Box 1	5.00	3.00	352.8	0.080	0.015

Conveyance Hydraulic Computations. Tailwater = 50.160 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Actual (ft)	Velocity Unif. (f/s)	Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
27*	110.31	110.15	75.13	0.465	1.01	1.50	5.66	5.51	7.2	9.0	0.000
28*	112.02	110.31	79.40	2.306	0.81	1.00	8.00	7.11	5.4	5.5	0.000
29	110.26	110.15	74.75	0.390	1.01	1.50	5.19	3.73	6.6	8.3	0.000
30*	110.40	110.26	76.10	0.211	0.74	1.50	5.63	4.72	4.8	10.1	0.000
31*	110.27	110.26	75.13	0.017	0.37	1.50	3.98	3.19	1.4	10.1	0.000
32*	110.34	110.15	74.49	0.663	0.80	1.50	8.94	5.99	8.6	15.4	0.000
33*	110.81	110.34	75.86	1.187	0.53	1.00	9.28	5.54	7.8	14.3	0.000
34*	110.25	110.15	74.49	0.208	0.62	1.50	6.95	4.70	4.8	13.4	0.000
35*	110.36	110.25	75.17	0.118	0.63	1.50	5.18	4.27	3.6	10.0	0.000
36*	109.35	109.31	74.05	0.114	0.34	1.50	11.64	4.23	3.6	31.0	0.000
37	109.44	109.35	75.16	0.421	0.70	1.00	3.94	2.96	2.3	2.8	0.000
38*	109.39	109.31	73.75	0.159	0.53	1.50	7.50	4.49	4.2	15.7	0.000
39*	109.39	109.39	74.01	0.000	0.16	7.50	2.38	2.04	0.6	712.9	0.000
40*	108.13	108.12	74.62	0.009	0.17	1.50	8.84	2.92	1.0	35.6	0.000
42*	108.18	108.12	73.10	0.124	0.50	1.50	7.22	4.30	3.7	15.6	0.000
43	108.46	108.18	74.32	0.597	0.88	1.00	3.78	3.52	2.8	2.6	0.000
44*	108.18	108.18	73.55	0.004	0.30	1.50	2.60	2.59	0.6	7.5	0.000
45	102.86	102.78	72.60	0.003	0.52	2.00	1.92	0.40	1.2	8.5	0.000
46	102.89	102.78	72.60	0.010	0.65	2.00	2.51	0.71	2.2	9.8	0.000
47*	102.92	102.89	74.46	0.046	0.33	1.00	3.34	2.97	0.8	3.2	0.000
49	103.25	103.22	72.98	0.097	1.27	2.00	3.36	2.26	7.1	9.7	0.000
50	103.29	103.22	73.38	0.044	0.98	2.00	3.09	1.51	4.8	9.8	0.000
52	101.94	101.89	72.81	0.007	0.63	2.00	2.26	0.61	1.9	9.0	0.000
53	102.00	101.89	73.65	0.220	2.00	2.00	3.39	3.39	10.6	9.7	0.000
54	100.64	100.57	72.33	0.033	0.90	2.00	3.00	1.31	4.1	9.9	0.000
55	110.32	108.77	75.25	2.414	1.00	1.00	7.08	7.08	5.6	2.3	0.000
56	106.96	106.37	75.30	0.837	1.00	1.00	4.17	4.17	3.3	2.2	0.000
57	102.55	101.25	75.34	1.917	1.00	1.00	6.31	6.31	5.0	2.3	0.000
59*	100.58	100.57	74.05	0.009	0.25	2.00	9.75	3.41	2.2	67.3	0.000
60	103.80	102.55	73.50	0.743	0.83	0.83	4.11	4.11	2.2	1.6	0.000
61	110.98	110.40	75.74	0.958	1.00	1.00	4.46	4.46	3.5	3.2	0.000
62	100.63	100.57	72.48	0.003	0.45	2.00	2.16	0.36	1.1	10.3	0.000
2	116.32	110.56	74.57	3.252	3.50	3.50	18.94	18.94	182.2	57.3	0.000
4	98.09	82.71	73.20	1.349	5.00	5.00	15.47	15.47	303.8	130.8	0.000
5	82.71	71.58	72.20	0.907	6.50	6.50	15.11	15.11	501.5	241.0	0.000
6	71.58	66.99	68.20	0.611	7.00	7.00	13.03	13.03	501.5	277.2	0.000
7	66.99	63.63	68.20	0.664	7.50	7.50	14.22	14.22	628.4	344.5	0.000
8	63.63	55.80	67.00	0.467	8.00	8.00	11.16	11.16	803.4	532.3	0.000
9*	55.80	51.76	67.20	0.467	2.90	8.00	30.82	11.16	803.4	2508.3	0.000
10	51.76	50.16	69.20	1.336	7.00	7.00	10.44	10.44	803.4	448.6	0.000
11	110.15	110.15	75.49	0.364	1.64	2.00	4.97	4.37	13.7	13.8	0.000
12	110.15	109.31	75.86	0.427	2.50	2.50	5.48	5.48	26.9	20.0	0.000
13	109.31	108.12	75.16	0.688	2.50	2.50	6.96	6.96	34.2	24.1	0.000
14	108.12	102.78	74.62	2.863	2.00	2.00	12.24	12.24	38.4	9.7	0.000
64	103.55	103.29	74.77	0.157	3.00	3.00	3.76	3.76	56.5	40.4	0.000
15	102.78	101.89	73.38	0.458	3.00	3.00	6.42	6.42	96.3	40.3	0.000
17	103.22	102.78	73.90	0.252	3.00	3.00	4.77	4.77	71.5	40.4	0.000
18	101.89	100.57	73.19	0.574	3.00	3.00	7.19	7.19	107.8	40.4	0.000
19	100.57	98.88	72.33	2.917	3.00	3.00	16.19	16.19	114.4	24.9	0.000

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20	98.88	98.09	72.84	2.917	3.00	3.00	16.19	16.19	114.4	25.8	0.000
21	110.56	108.77	74.21	1.613	4.00	4.00	14.58	14.58	183.2	65.7	0.000
22	108.77	106.37	74.30	1.715	4.00	4.00	15.03	15.03	188.9	111.1	0.000
23	106.37	101.25	75.30	1.829	4.00	4.00	15.52	15.52	195.1	90.0	0.000
24	101.25	98.75	73.43	1.922	4.00	4.00	15.92	15.92	200.0	71.6	0.000
25	98.75	98.09	73.50	0.587	5.00	5.00	10.21	10.21	200.4	130.8	0.000
63	103.29	103.22	73.89	0.157	3.00	3.00	3.76	3.76	56.5	40.6	0.000
68	100.68	100.64	72.33	0.016	0.73	2.00	2.78	0.93	2.9	10.2	0.000
65	103.80	103.55	2.00	0.009	1.14	3.00	2.38	0.90	13.5	40.3	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:

The convey length should be from upstream to downstream inside box.
 This length may also be used as Pay Item.
 Using hydraulic length, from node center to node center, may result in profile error,
 and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.5	0.0	12	564.0
Circular	Concrete	1.0	0.0	9	574.0
Circular	Concrete	7.5	0.0	2	561.0
Circular	Concrete	2.0	0.0	12	751.939
Circular	Plastic	0.833	0.0	1	168.0
Circular	Concrete	3.5	0.0	1	177.0
Circular	Concrete	5.0	0.0	2	1252.0
Circular	Concrete	6.5	0.0	1	1227.0
Circular	Concrete	7.0	0.0	1	750.0
Box	Concrete	8.0	9.0	2	1516.0
Circular	Other	7.0	0.0	1	240.0
Circular	Concrete	2.5	0.0	2	368.0
Box	Concrete	3.0	5.0	6	1158.69
Circular	Concrete	3.0	0.0	2	85.0
Circular	Concrete	4.0	0.0	4	661.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	41
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	2.0	4.17	1
Curb And Grate On Grade	Reticuline	5.0	0.75	2.67	0.0	0.0	4
Curb On Grade		5.0	0.0	0.0	0.0	0.0	3
Curb On Grade		10.0	0.0	0.0	0.0	0.0	1
Curb On Grade		2.5	0.0	0.0	0.0	0.0	6
Grate On Grade	Reticuline	0.0	0.75	1.33	0.0	0.0	4
Curb In Sag		2.5	0.0	0.0	0.0	0.0	3
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2
Grate On Grade	Reticuline	0.0	1.5	2.67	0.0	0.0	1
Curb And Grate In Sag	Reticuline	5.0	0.0	0.0	3.11	5.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years

Decreasing conduit size @ downstream Run# 38
Discharge decreased downstream node Id= MH-B7b Previous intensity used.
Decreasing conduit size @ downstream Run# 14
Discharge decreased downstream node Id= MH-B7 Previous intensity used.
Discharge decreased downstream node Id= MH-B16 Previous intensity used.
Discharge decreased downstream node Id= MH-D1 Previous intensity used.
Discharge decreased downstream node Id= MH-E1 Previous intensity used.
Discharge decreased downstream node Id= MH-E2 Previous intensity used.
Decreasing conduit size @ downstream Run# 10
Capacity of grade inlet exceeded at inlet Id= B-11
Computed ponded width exceeds allowable width at inlet Id= A-1
Capacity of grade inlet exceeded at inlet Id= B-2a
Capacity of grade inlet exceeded at inlet Id= B-2b
Capacity of grade inlet exceeded at inlet Id= B-3a
Capacity of grade inlet exceeded at inlet Id= B-3b
Computed ponded width exceeds allowable width at inlet Id= B-3b
Capacity of grade inlet exceeded at inlet Id= B-4a
Capacity of grade inlet exceeded at inlet Id= B-4b
Capacity of grade inlet exceeded at inlet Id= B-4c
Computed ponded width exceeds allowable width at inlet Id= B-4c
Capacity of grade inlet exceeded at inlet Id= B-8a
Capacity of grade inlet exceeded at inlet Id= B-8b
Capacity of grade inlet exceeded at inlet Id= B-12
Capacity of grade inlet exceeded at inlet Id= B-14
Capacity of grade inlet exceeded at inlet Id= B-1a
Capacity of grade inlet exceeded at inlet Id= B-1b
Capacity of sag inlet exceeded at inlet Id= B-5b
Computed right ponded width exceeds allowable width at inlet Id= B-7b
Computed left ponded width exceeds allowable width at inlet Id= B-7b
Capacity of sag inlet exceeded at inlet Id= B-7b
Capacity of sag inlet exceeded at inlet Id= B-13
Run# 10 Insufficient capacity.
Run# 8 Insufficient capacity.
Run# 7 Insufficient capacity.
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-D1 Run # 6
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= C-1 Run # 5
Run# 4 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B Run # 4
Run# 20 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B16 Run # 20
Run# 25 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-15 Run # 25
Run# 19 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9 Run # 19
Run# 24 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9b Run # 54
Run# 57 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14a1 Run # 57
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9c1 Run # 59
Run# 60 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14a2 Run # 60
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-10 Run # 62
Run# 18 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B8 Run # 18
Run# 23 Insufficient capacity.

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Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13 Run # 23
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9b1 Run # 68
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8b Run # 52
 Run# 53 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8c1 Run # 53
 Run# 56 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13a1 Run # 56
 Run# 15 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B5 Run # 15
 Run# 17 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7 Run # 17
 Run# 22 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12 Run # 22
 Run# 63 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7b Run # 63
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5a Run # 45
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5b Run # 46
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-5b1 Run # 47
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7b Run # 49
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7c1 Run # 50
 Run# 55 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12a1 Run # 55
 Run# 14 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B4 Run # 14
 Run# 64 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B7c Run # 64
 Run# 21 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-11 Run # 21
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7d1 Run # 65
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4a Run # 40
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4b Run # 42
 Run# 43 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4b1 Run # 43
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-4c Run # 44
 Run# 2 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-A8 Run # 2
 Run# 13 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B3 Run # 13
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3a Run # 36
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3a1 Run # 37
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3b Run # 38
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-3b1 Run # 39
 Run# 12 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B2 Run # 12
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2a Run # 32
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2a1 Run # 33
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2b Run # 34
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-2b1 Run # 35
 Upstream HGL exceeds critical elevation (Analysis)at node Id= MH-B1 Run # 11
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1a Run # 27
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1a1 Run # 28
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1b Run # 29
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1b1 Run # 30
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1c Run # 31
 Run# 61 Insufficient capacity.
 Upstream HGL exceeds critical elevation (Analysis)at node Id= B-1c1 Run # 61



Appendix C.3
Extreme Overland Sheetflow Analysis

Extreme Event Overland Sheetflow Analysis

Method 3 100 - Year Analysis from Chapter 9 of City of Houston Infrastructure Design Manual

$$Q_t = Q_o + Q_c + \frac{\Delta S}{T}$$

Where:

Q_t is the total flow conveyed

Q_o is the overland flow component*

Q_c is the calculated flow in the conduit for the 2-Year design***

$\frac{\Delta S}{T}$ is the change in storage volume relative to time upstream of point of analysis.

*Computed using Manning's Equation to a critical roadway cross section(See Below)

**Capacity of Run #20 in Houstorm Model

Manning's Equation To Find Q_o

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Where:

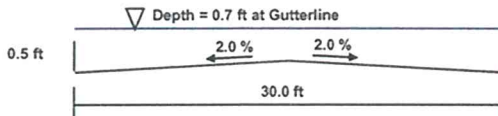
$n = 0.015$ for street component and 0.02 for outside street component

A = Area in square feet

R = Hydraulic Radius in feet

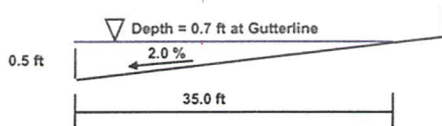
S = Longitudinal slope

Overland Outlet Location 1 - Town and Country Boulevard (south of Kimberly)



Area	$30 \times (0.7) - 1/2 \times (30) \times (15 \times 0.02) = 16.5 \text{ sf}$
Wetted Perimeter	$30 + 0.5 + 0.5 = 31.0 \text{ ft}$
Hydraulic Radius	$16.5/31 = 0.532$
Slope (from lidar)	0.003 ft/ft
Manning's n	0.015
Manning's Capacity:	$1.49/0.015 \times 16.5 \times 0.532^{2/3} \times 0.003^{1/2} = 59 \text{ cfs}$
$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$	

Overland Outlet Location 2 - Beltway 8 Frontage Road (south of Kimberly)



Area	$1/2 \times (0.7) \times (0.7/0.02) = 12.25 \text{ sf}$
Wetted Perimeter	$0.5 + 0.7/0.02 = 35.5 \text{ ft}$
Hydraulic Radius	$12.25/35.5 = 0.345$
Slope (from lidar)	0.001 ft/ft
Manning's n	0.015
Manning's Capacity:	$1.49/0.015 \times 12.25 \times 0.345^{2/3} \times 0.001^{1/2} = 18.9 \text{ cfs}$
$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$	

Extreme Event Overland Sheetflow Analysis

Drainage Area and Storm Sewer	
Drainage Area ID	MH-B16
Run #	20
Diameter (in)	36
Length (ft)	27
Slope (%)	0.148
Cumulative Drainage Area (ac)	24.17
Cumulative Tc (min)	32.71
Cumulative C-value	0.648
100-Yr Intensity (in/hr)	6.3
Qt	97.9
Qc	48.6

Method 1			Method 2				
Maximum Ponding Elevation (MPE) (ft)	100-Yr HGL Elevation (ft)	Check Is MPE > HGL Yes = Acceptable No = Unacceptable	Required Overland Flow $Q_{O, Required}$ (cfs)	Overland Outlet Location	Overland Flow Q_o $C_o b H^{1.5} - Weir$ $\frac{1.49}{n} AR^{2/3} S^{1/2} - Mannings$ (cfs)	Cumulative Overland Flow $Q_{O, allow}$ (cfs)	Is $Q_{O, allow} > Q_{O, Required}?$ Yes = Acceptable No = Unacceptable
74.5	94.73	No	49.3	1 2	59.0 18.9	77.9	Yes
		IF "YES", design for storm sewer segment meets City of Houston requirements. IF "NO", design for storm sewer segment does not meet City of Houston requirements and adjustment in storm sewer size or additional analysis are needed	$Q_{O, required} = Q_t - Q_c$	Outlet Location 1: Town and Country Boulevard (south of Kimberly) Outlet Location 2: Ballway 8 Frontage Road (south of Kimberly)		Sum of Overland flows	IF "YES", design for storm sewer segment meets City of Houston requirements. IF "NO", design for storm sewer segment does not meet City of Houston requirements and adjustment in storm sewer size or additional analysis are needed

Method 3						
Percent Impervious (%)	Runoff Depth (in)	Runoff Volume (Vt) (ac-ft)	Available Storage Volume $V_{s, avail}$ (ac-ft)	Change in Available Storage Relative to Time $\frac{\Delta S}{T}$ (cfs)	Required Overland Flow $Q_{O, Required}$ (cfs)	Is $Q_o > Q_{O, Required}?$ Yes = Acceptable No = Unacceptable
85	6.1	12.29	1.50	23.73	25.6	Yes
	Runoff Depth based on Values listed below.		$V_t = \text{Runoff Depth} \times \text{Accum}$			IF "YES", design for storm sewer segment meets City of Houston requirements. IF "NO", design for storm sewer segment does not meet City of Houston requirements and adjustment in storm sewer size or additional analysis are needed
100-Year Rainfall Depth (in)			found by calculating volume under $V_{s, avail}$ fill sinks in lidar.			
% Impervious Cover	SCS Curve No.	3-hr duration				
0%	75	3.9				
25%	85	5				
40%	87	5.2				
70%	93	5.9				
85%	95	6.1				
100%	98	6.5				
				$\frac{\Delta S}{T} = \frac{V_{s, avail} \times Q_c^2}{V_r (Q_r - Q_c)}$	$Q_{O, req} = Q_r - Q_c - ((V_{s, avail} \times Q_c^2) / (V_r (Q_r - Q_c)))$ $V_{s, avail} \& V_r \text{ are cumulative values}$	