

JUNE 19, 2013

SUPPLEMENTAL/AMENDED INFORMATION
TO DRAINAGE REPORT
DATED APRIL 23, 2013

FOR

INLAND KENWORTH
Fortuna Rd West of 76th Street NW

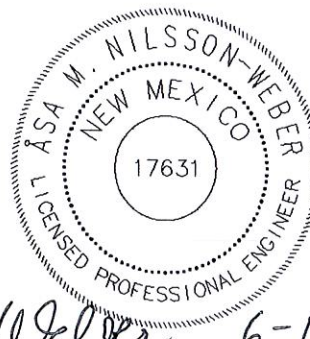
BY



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE (Ret.) & LS
Fred C. Arfman, PE
Åsa Nilsson-Weber, PE



Prepared by:

Åsa Nilsson-Weber

Åsa Nilsson-Weber, PE

6-19-13

Date

SUMMARY OF SUPPLEMENTAL/AMENDED INFORMATION

This supplemental/amended information submittal includes the following revisions to the drainage report dated April 23, 2013 and grading plan dated May 29, 2013:

- Channel at east property line was eliminated and replaced with 2-Type C inlets and storm drain.
- Storm drain from inlet #1 was extended to pick up flows from loading dock area and roof drains.
- Onsite Basin Map (Appendix B) was revised.
- Hydraflow Storm Sewer Calculations (Appendix D) were revised.
- Inlet Capacity Calculations were added

RESPONSES OF CITY OF ALBUQUERQUE COMMENTS:

Responses to comments No. 1-4 in letter dated May 13, 2013, for the drainage report dated April 23, 2013 (attached).

1. The storm drain has been revised to provide a max. 30 degree angle of confluence—see attached grading plan and storm drain calculations.
2. Capacity calculations for inlets are included.
3. Channel has been eliminated and replaced with 2- Type C inlets and storm drain.
4. Channel has been eliminated.

Responses to comments No. 1) - 8) in letter dated June 5, 2013, for the grading plan for rough earthwork signed May 29, 2013 (attached).

- 1) A new grading plan is attached—Sheets CG-101, CG-102, CG-103 and CG-105.
- 2) Flowline and back of sidewalk grades along Fortuna are included.
- 3) Capacity calculations for inlets are included.
- 4) Curb opening sizes are included on plan.
- 5) Channel has been eliminated and replaced with 2-Type C inlets and storm drain.

- 6) Storm drain sizes have been added to the plan—see sheet CG-103 for details.
- 7) There is a small stilling basin at the outlet of the culverts at the northwest corner of the site. Inverts of the culverts are 33.4 and 33.6, and storm water will overflow to the drainage swale in the NMDOT easement at an elevation of 34.
- 8) Drainage calculations on grading plan were incorrect. Calculations included in approved drainage report dated April 23, 2013 are correct showing 32.2 cfs discharging from site which is less than the 33.3 cfs allowable.

CITY OF ALBUQUERQUE



May 13, 2013

Asa Nilsson-Weber, P.E.
Isaacson & Arfman, P.A.
128 Monroe St NE
Albuquerque, NM 87108

**Re: Inland Kenworth, Fortuna Road, Drainage Report and Conceptual Grading
and Drainage Plan**

Engineer's Stamp 4-23-13 (J10D044)

Dear Ms. Nilsson-Weber,

Based upon the information provided in your submittal received 4-24-13, the above referenced report and plan are approved for Site Plan for Building Permit action by the DRB.

Hydrology did not perform a Building Permit level review of this plan as it is conceptual. However, Hydrology provides the following comments for DRC and Building Permit approvals:

1. Per the DPM, p. 22-106, where the peak flow in the proposed lateral exceeds 10 percent of the main line, the angle of confluence should not exceed 30 degrees. This can be worked out at DRC.

2. Provide calculations for the "D" inlets assuming a 50% clogging factor.

3. Flows from Basin 2 may have difficulty turning 90 degrees as they enter the channel at the northern end. Improving this entry point should help maintain flow in the channel.

4. Provide calculations to support the sizing of the channel draining Basin 2.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Curtis Cherne, P.E.
Principal Engineer
Development Review Services

C: asaw@iacivil.com

CITY OF ALBUQUERQUE



June 5, 2013

Fred Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St NE
Albuquerque, NM 87108

Re: Inland Kenworth, Grading and Drainage Plan
Engineer's Stamp 5-29-13 (J10/D044)

Dear Mr. Arfman,

Based upon the information provided in your submittal received 5-29-13, the above referenced plan is approved for rough grading. The following items should be addressed prior to building permit approval:

- 1) Two sheets are numbered CG-101.
- 2) Please include proposed flow lines and back of sidewalk elevations along Fortuna Rd.
- 3) Provide inlet capacity calculations. Assume 50% clogging factor in your calculations.
- 4) Add all the curb opening sizes on the plans.
- 5) Provide calculations for the channel located east side of Basin 2. Include a section for the channel on the plan. Can the runoff overflow the channel when making a 90 degree turn?
- 6) Add all the storm drain pipe sizes to the plan.
- 7) The runoff appears to be block at the north east corner of the property where the offsite runoff enters the site.
- 8) Based on the documents provided the allowable discharge is 3.76 cfs/ac. Therefore, the total discharge is (8.86 ac x 3.76 cfs/ac) 33.31 cfs, and the plan shows an allowable discharge of 34.60 cfs. Please clarify.

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

If you have any questions, you can contact me at 924-3986.

Sincerely,

Shahab Blazar, P.E.
Senior Engineer
Development Review Services

C: e-mail

EXHIBITS/CALCULATIONS

- **REVISED ONSITE BASIN MAP
(APPENDIX B)**
- **REVISED STORM DRAIN CALCULATIONS
(APPENDIX D)**
- **INLET CAPACITY CALCULATIONS**

NMDOT OFFSITE=
12.9 CFS

Basin 10
Area=0.25 Ac.
Q100=0.75 cfs

NMDOT OFFSITE=49.1 cfs

SGL C 2A

8.8 cfs

Basin 2
Area=2.42 Ac.
Q100=9.93 cfs

SGL C 2B

1.1 cfs

Basin 3
Area=1.05 Ac.
Q100=4.43 cfs

Basin 4
Area=1.01 Ac.
Q100=4.25 cfs

Basin 5
Area=0.77 Ac.
Q100=3.16

Basin 6
Area=0.34 Ac.
Q100=0.93 cfs

INTERSTATE

40

Basin 1
Area=2.14 Ac.
Q100=8.84 cfs

0.1 cfs

8"SD

1.6 cfs

8"SD

8.0 cfs

DBL D

AP-1

9.7 cfs

FORTUNA ROAD N.W.

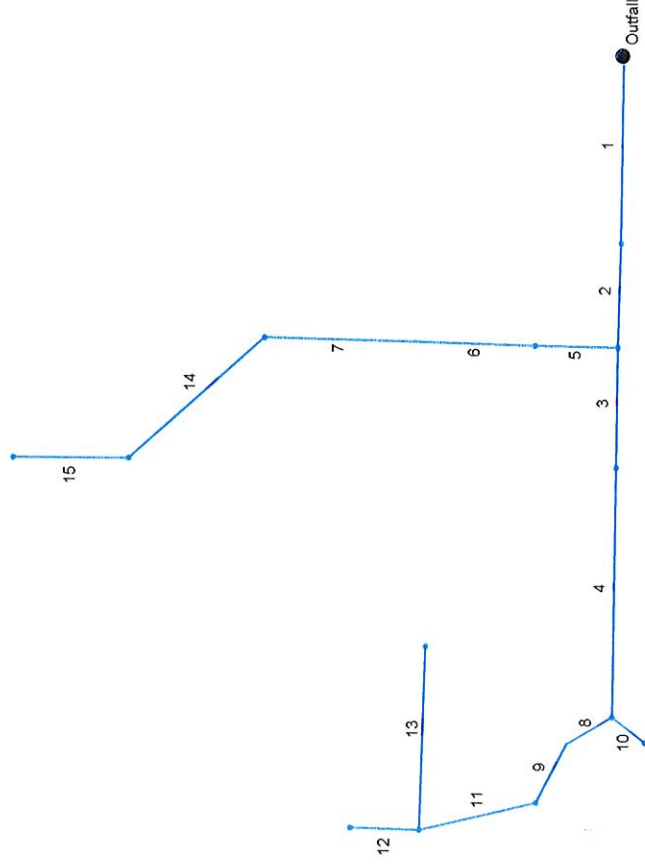
Basin 7
Area=0.32 Ac.
Q100=0.88 cfs

18"SD

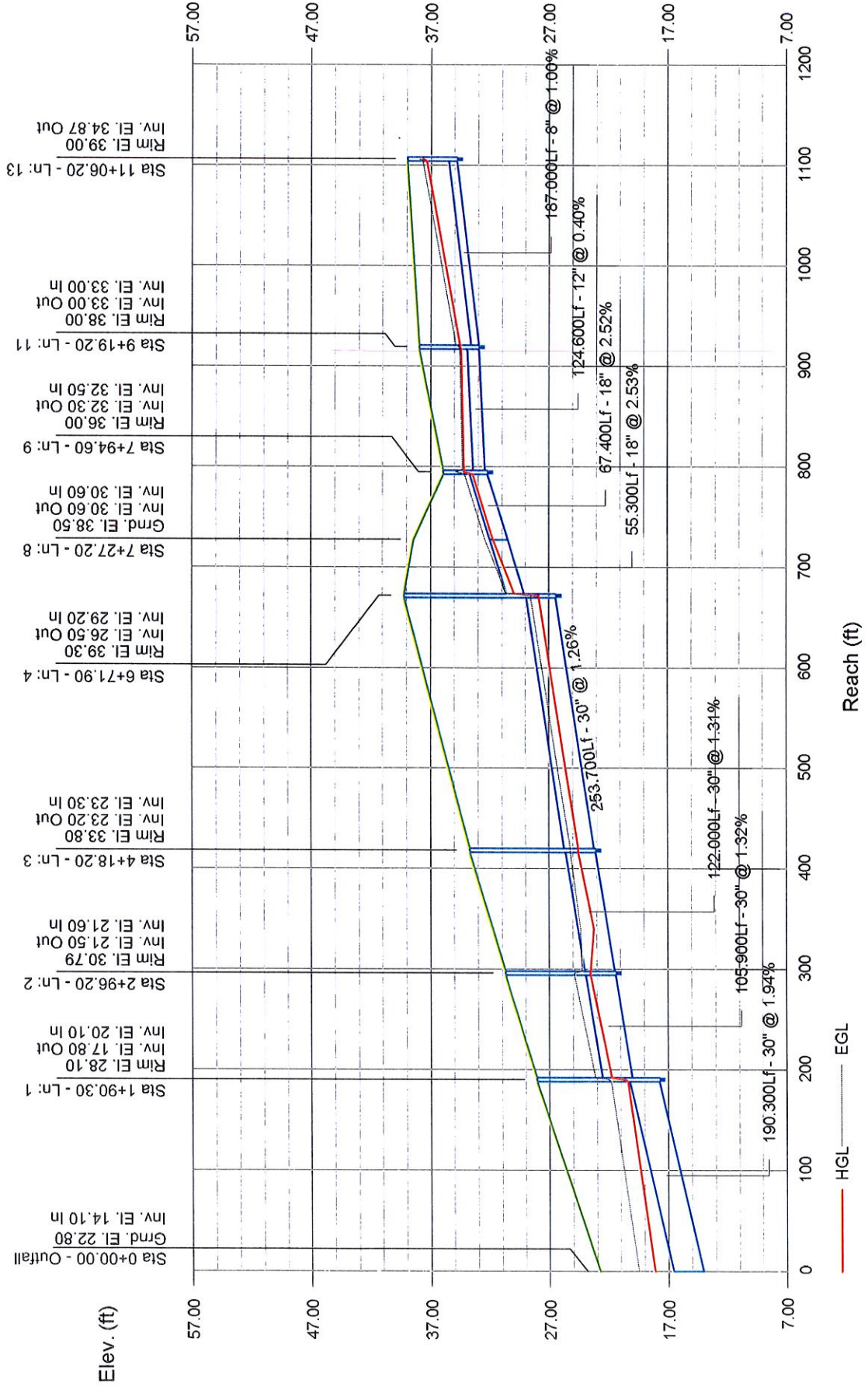
GALLATIN

MERID

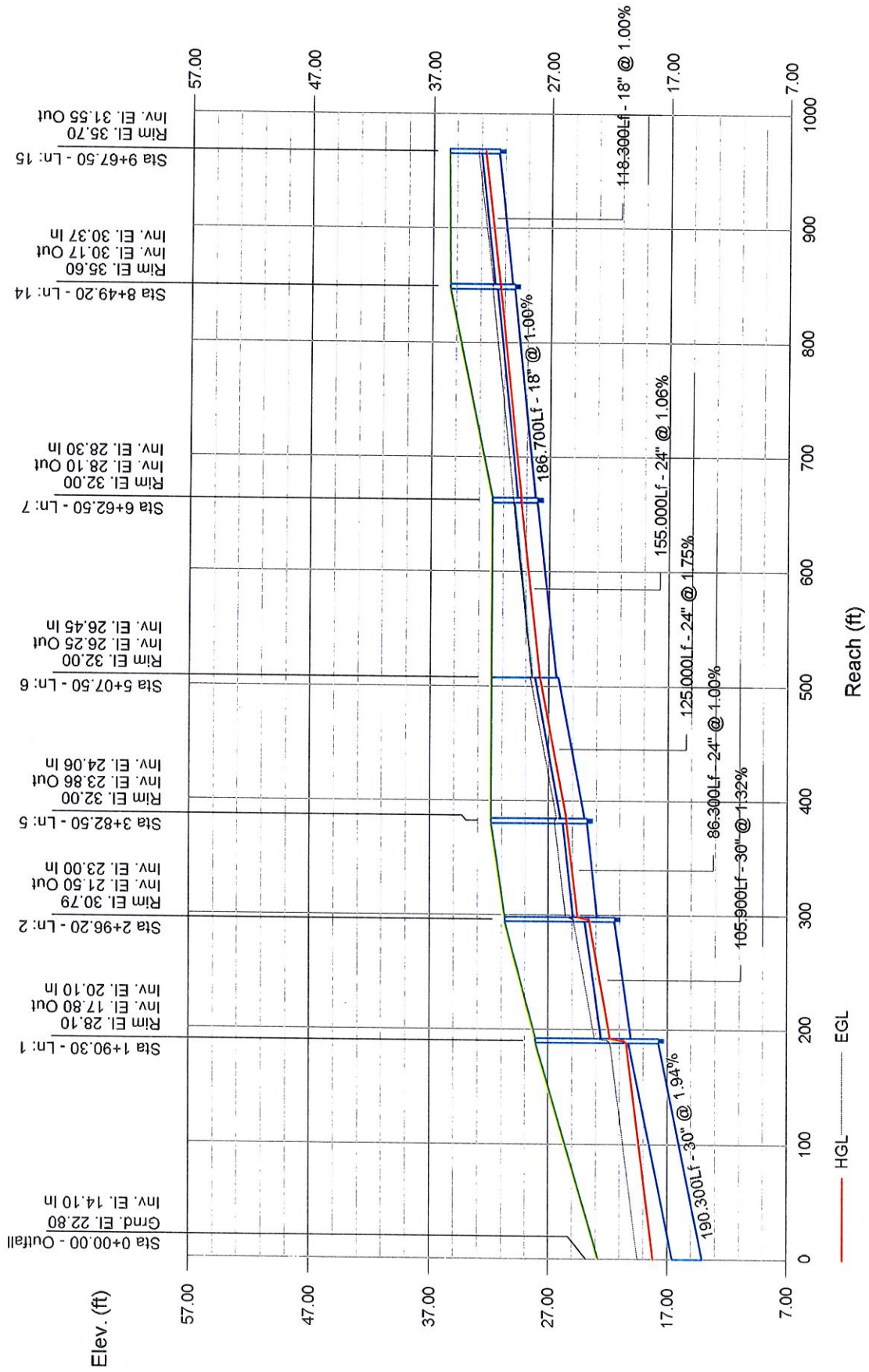
LOT 15
UNISED TOWNE CROSSING



West Storm Drain



East Storm
Drain



Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID		
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)		Inlet/ Rim El (ft)	
1	End	190.300	-179.285	MH	5.40	0.00	0.00	0.0	14.10	1.94	17.80	30	Cir	0.013	0.15	28.10		
2	1	105.900	0.510	MH	0.00	0.00	0.00	0.0	20.10	1.32	21.50	30	Cir	0.013	1.00	30.79		
3	2	122.000	-0.490	MH	0.00	0.00	0.00	0.0	21.60	1.31	23.20	30	Cir	0.013	0.15	33.80		
4	3	253.700	-0.010	MH	0.00	0.00	0.00	0.0	23.30	1.26	26.50	30	Cir	0.013	0.88	39.30		
5	2	86.300	90.000	Genr	3.20	0.00	0.00	0.0	23.00	1.00	23.86	24	Cir	0.013	0.50	32.00		
6	5	125.000	0.000	Genr	4.20	0.00	0.00	0.0	24.06	1.75	26.25	24	Cir	0.013	0.50	32.00		
7	6	155.000	0.000	Genr	4.40	0.00	0.00	0.0	26.45	1.06	28.10	24	Cir	0.013	1.09	32.00		
8	4	55.300	59.000	None	0.00	0.00	0.00	0.0	29.20	2.53	30.60	18	Cir	0.013	0.58	38.50		
9	8	67.400	-32.000	Genr	8.00	0.00	0.00	0.0	30.60	2.52	32.30	18	Cir	0.013	1.19	36.00		
10	4	42.800	-53.522	Genr	8.10	0.00	0.00	0.0	34.00	1.17	34.50	18	Cir	0.013	1.00	40.20		
11	9	124.600	49.000	MH	0.00	0.00	0.00	0.0	32.50	0.40	33.00	12	Cir	0.012	1.00	38.00		
12	11	70.700	15.000	Genr	0.10	0.00	0.00	0.0	33.00	0.40	33.28	8	Cir	0.012	1.00	35.40		
13	11	187.000	105.000	Genr	1.60	0.00	0.00	0.0	33.00	1.00	34.87	8	Cir	0.012	1.00	39.00		
14	7	186.700	-42.682	Genr	1.10	0.00	0.00	0.0	28.30	1.00	30.17	18	Cir	0.013	1.06	35.60		
15	14	118.300	41.457	Genr	8.80	0.00	0.00	0.0	30.37	1.00	31.55	18	Cir	0.013	1.00	35.70		
1941											Number of lines: 15							Date: 6/19/2013

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		44.90	30	Cir	190.300	14.10	17.80	1.944	18.20*	20.48*	0.20	20.68	End	Manhole
2		39.50	30	Cir	105.900	20.10	21.50	1.322	21.85	23.62	1.24	23.62	1	Manhole
3		17.80	30	Cir	122.000	21.60	23.20	1.311	23.62	24.63	n/a	24.63 j	2	Manhole
4		17.80	30	Cir	253.700	23.30	26.50	1.261	24.63	27.93	n/a	27.93	3	Manhole
5		21.70	24	Cir	86.300	23.00	23.86	0.997	24.57	25.52	n/a	25.52	2	Generic
6		18.50	24	Cir	125.000	24.06	26.25	1.752	25.52	27.80	0.39	27.80	5	Generic
7		14.30	24	Cir	155.000	26.45	28.10	1.065	27.80	29.46	n/a	29.46	6	Generic
8		9.70	18	Cir	55.300	29.20	30.60	2.532	30.02	31.80	n/a	31.80	4	None
9		9.70	18	Cir	67.400	30.60	32.30	2.522	31.80	33.50	n/a	34.26	8	Generic
10		8.10	18	Cir	42.800	34.00	34.50	1.168	34.94	35.60	0.53	35.60	4	Generic
11		1.70	12	Cir	124.600	32.50	33.00	0.401	34.26*	34.50*	0.07	34.57	9	Manhole
12		0.10	8	Cir	70.700	33.00	33.28	0.396	34.57*	34.58*	0.00	34.58	11	Generic
13		1.60	8	Cir	187.000	33.00	34.87	1.000	34.57*	37.37*	0.33	37.70	11	Generic
14		9.90	18	Cir	186.700	28.30	30.17	1.002	29.46	31.38	n/a	31.38	7	Generic
15		8.80	18	Cir	118.300	30.37	31.55	0.997	31.42	32.70	n/a	32.70	14	Generic
1941														
Number of lines: 15										Run Date: 6/19/2013				

NOTES: Return period = 2 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station Line	To Line	Len (ft)	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
			Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
			(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	190.300	0.00	0.00	0.00	0.00	0.00	0.0	7.4	0.0	44.90	57.19	9.15	30	1.94	14.10	17.80	18.20	20.48	22.80	28.10	
2	1	105.900	0.00	0.00	0.00	0.00	0.00	0.0	7.2	0.0	39.50	47.15	9.84	30	1.32	20.10	21.50	21.85	23.62	28.10	30.79	
3	2	122.000	0.00	0.00	0.00	0.00	0.00	0.0	6.6	0.0	17.80	46.97	5.17	30	1.31	21.60	23.20	23.62	24.63	30.79	33.80	
4	3	253.700	0.00	0.00	0.00	0.00	0.00	0.0	5.4	0.0	17.80	46.06	6.44	30	1.26	23.30	26.50	24.63	27.93	33.80	39.30	
5	2	86.300	0.00	0.00	0.00	0.00	0.00	0.0	1.9	0.0	21.70	22.58	7.98	24	1.00	23.00	23.86	24.57	25.52	30.79	32.00	
6	5	125.000	0.00	0.00	0.00	0.00	0.00	0.0	1.5	0.0	18.50	29.94	7.30	24	1.75	24.06	26.25	25.52	27.80	32.00	32.00	
7	6	155.000	0.00	0.00	0.00	0.00	0.00	0.0	1.0	0.0	14.30	23.34	6.32	24	1.06	26.45	28.10	27.80	29.46	32.00	32.00	
8	4	55.300	0.00	0.00	0.00	0.00	0.00	0.0	5.3	0.0	9.70	16.71	8.10	18	2.53	29.20	30.60	30.02	31.80	39.30	38.50	
9	8	67.400	0.00	0.00	0.00	0.00	0.00	0.0	5.1	0.0	9.70	16.68	6.40	18	2.52	30.60	32.30	31.80	33.50	38.50	36.00	
10	4	42.800	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	8.10	11.35	6.40	18	1.17	34.00	34.50	34.94	35.60	39.30	40.20	
11	9	124.600	0.00	0.00	0.00	0.00	0.00	0.0	4.1	0.0	1.70	2.44	2.16	12	0.40	32.50	33.00	34.26	34.50	36.00	38.00	
12	11	70.700	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.10	0.82	0.29	8	0.40	33.00	33.28	34.57	34.58	38.00	35.40	
13	11	187.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	1.60	1.31	4.58	8	1.00	33.00	34.87	34.57	37.37	38.00	39.00	
14	7	186.700	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	9.90	10.51	6.61	18	1.00	28.30	30.17	29.46	31.38	32.00	35.60	
15	14	118.300	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	8.80	10.49	6.36	18	1.00	30.37	31.55	31.42	32.70	35.60	35.70	

1941

Number of lines: 15

Run Date: 6/19/2013

NOTES: Intensity = 69.87 / (Inlet time + 13.10) ^ 0.87 ; Return period = Yrs. 2 ; c = cir e = ellip b = box

ANALYZE SUMP INLETS

GRATE OPEN AREA:

(per COA std dwg #2220, single grate)

$$\begin{aligned} \text{GROSS AREA FOR ONE GRATE} &= (25 \text{ in}/12)(40 \text{ in}/12) = 6.94 \text{ SF} \\ \text{LESS BEARING BARS} &= (0.5 \text{ in}/12)(3.33 \text{ ft})(13) = 1.80 \text{ SF} \\ \text{LESS CROSS BARS} &= (0.5 \text{ in}/12)(7)[(25 \text{ in}/12)-(13)(0.5 \text{ in}/12)] = 0.45 \text{ SF} \end{aligned}$$

$$\text{NET GRATE OPEN AREA} = 4.69 \text{ SF}$$

$$\text{GRATE OPEN AREA (assuming 50\% clogging factor)} = 2.35 \text{ SF}$$

ORIFICE EQUATION:

$$Q = CA(2gh)^{1/2}$$

Where:

$$C = 0.67$$

$$A = 2.35 \text{ ft}^2$$

$$g = 32.2 \text{ ft/sec}^2$$

h = height of the water surface above the grate

CAPACITY CALCULATIONS:

INLET #	1
TYPE:	DBL D
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	8 cfs
NUMBER OF GRATES REQUIRED =	1
Note: DBL D used	

INLET #	2A
TYPE:	SGL C
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	8.8 cfs
NUMBER OF GRATES REQUIRED =	1

INLET #	2B
TYPE:	SGL C
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	1.1 cfs
NUMBER OF GRATES REQUIRED =	1

INLET #	2C
TYPE:	SGL D
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	4.4 cfs
NUMBER OF GRATES REQUIRED =	1

INLET #	3
LOCATION:	SGL D
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	4.2 cfs
NUMBER OF GRATES REQUIRED =	1

INLET #	4
LOCATION:	SGL D
h =	0.5 ft
Q _(capacity) =	8.917478 cfs
REQUIRED Q =	3.2 cfs
NUMBER OF GRATES REQUIRED =	1