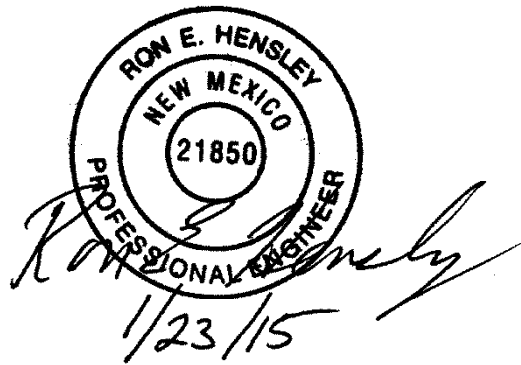


DRAINAGE REPORT
FOR
PARADISE RV PARK PHASE I
ALBUQUERQUE, NM
January 23, 2015



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EXHIBITS

Back Sleeve

EXHIBIT A Grading and Drainage Plan

I. INTRODUCTION & PROJECT DESCRIPTION

This report is submitted as support for Paradise RV Park Site Plan and Building Permit. As depicted on Figure 1 Zone Atlas Page K-8 below, the project is a RV Park located at Volcano Rd. and Leonidas Ave.

The runoff from the site will be directed to the depressed landscape areas along the site boundaries and routed to an inlet at the southeast corner of the site. Offsite runoffs to the northwest will be routed to the temporary retention pond west of the site. Offsite runoffs to the west will continue in the existing condition until development requires improvements.

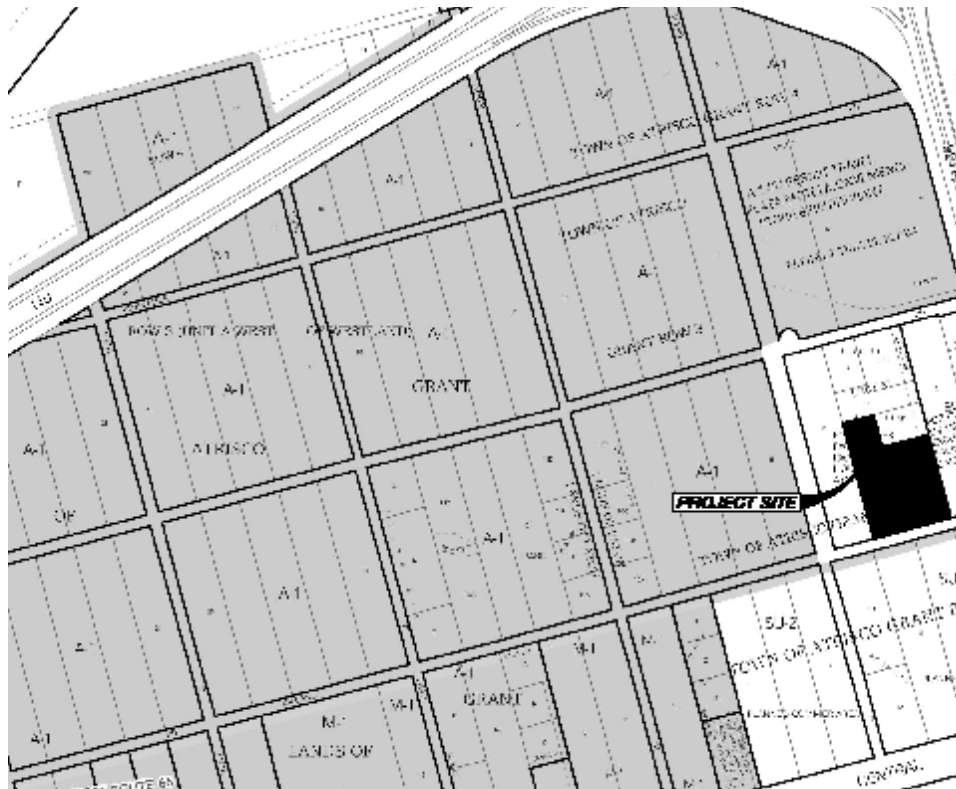


Figure 1 Zone Atlas Page K-8

Legal Description

Tract 3E, ROW A, UNIT A, West of Westland, Town of Atrisco Grant

Flood Zone

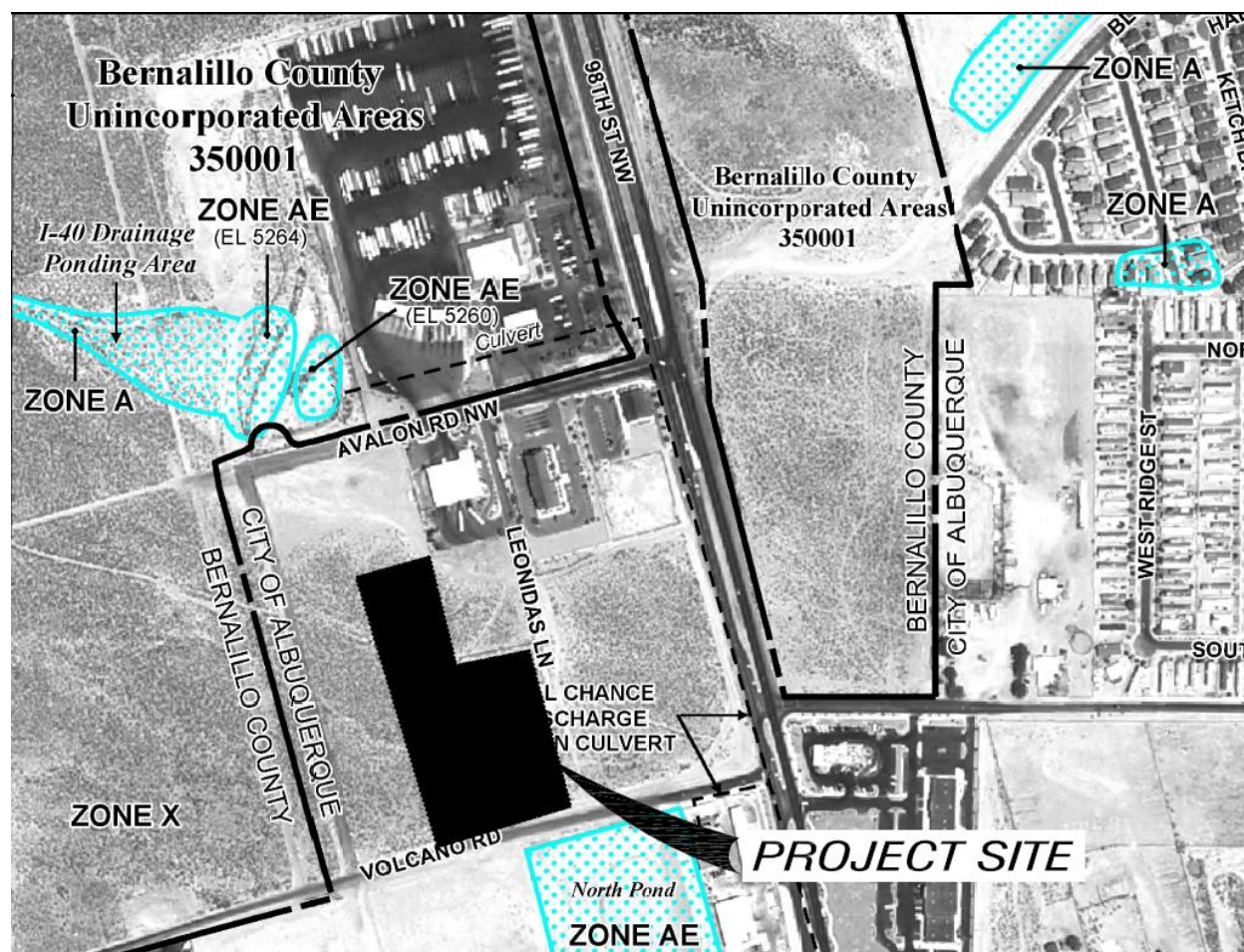


Figure 2 - FEMA's FIRM 35001C0328H

This project, as shown on Figure 2 - FEMA's FIRM 35001C0328H, dated August 16, 2012 is not within a designated 100-year floodplain.

Previous Studies

A conceptual analysis of the site was completed under "Drainage Report for Paradise RV Park – Phase I", by Larry D. Read P.E., dated October 15, 2013. The study quantified the runoff from the site and upstream basins for the 100-yr 24-hr duration storm. The review of this submittal identified several points to be addressed for Building Permit approval that are addressed in this submittal. The "Amole-Hubbell Drainage Master Plan", dated May 2013, is a drainage master plan for the area that established the drainage infrastructure and design runoff in the vicinity of the site for developed flows of offsite basins.

Methodology

The drainage plan presented in this report has been prepared in accordance with the City of Albuquerque Drainage Ordinances and Chapter 22 of the Development

Process Manual (DPM). Hydrology for the 100-yr 24-hr duration storm was used as the design storm for this analysis. The site is within zone 1 as identified in the city of Albuquerque Development Process Manual, Section 22.2 for rainfall intensity and quantified utilizing AHYMO 97 software.

Rainfall intensities per this report are as follows:

Zone	P_{60}	P_{360}	P_{1440}
1	1.87	2.20	2.66

The proposed storm drain systems included in this report were modeled using hydrology, topographic and planimetric data obtained in the design. The hydraulic analysis for this report was performed to determine capacities and HGL utilizing Hydraflow software.

II. EXISTING CONDITIONS

The proposed site is 4.5 acres located on the north side of Volcano Road. west of Leonidas Lane as seen on the Figure 1 Zone Atlas Page . The site is currently undeveloped and has an approved site plan for an RV Park. There is a developed site to the north. This site has a drainage pattern that is generally southward with surface discharge to Volcano Road. There is a temporary retention pond on the site that will be relocated south of the site.

Hydrology

The previous analysis for the 100-yr 24-hr duration storm was done using AHYMO S4 software. A summary of the result of the onsite and adjacent basins as depicted in the Basin Map on page 5 is listed below.

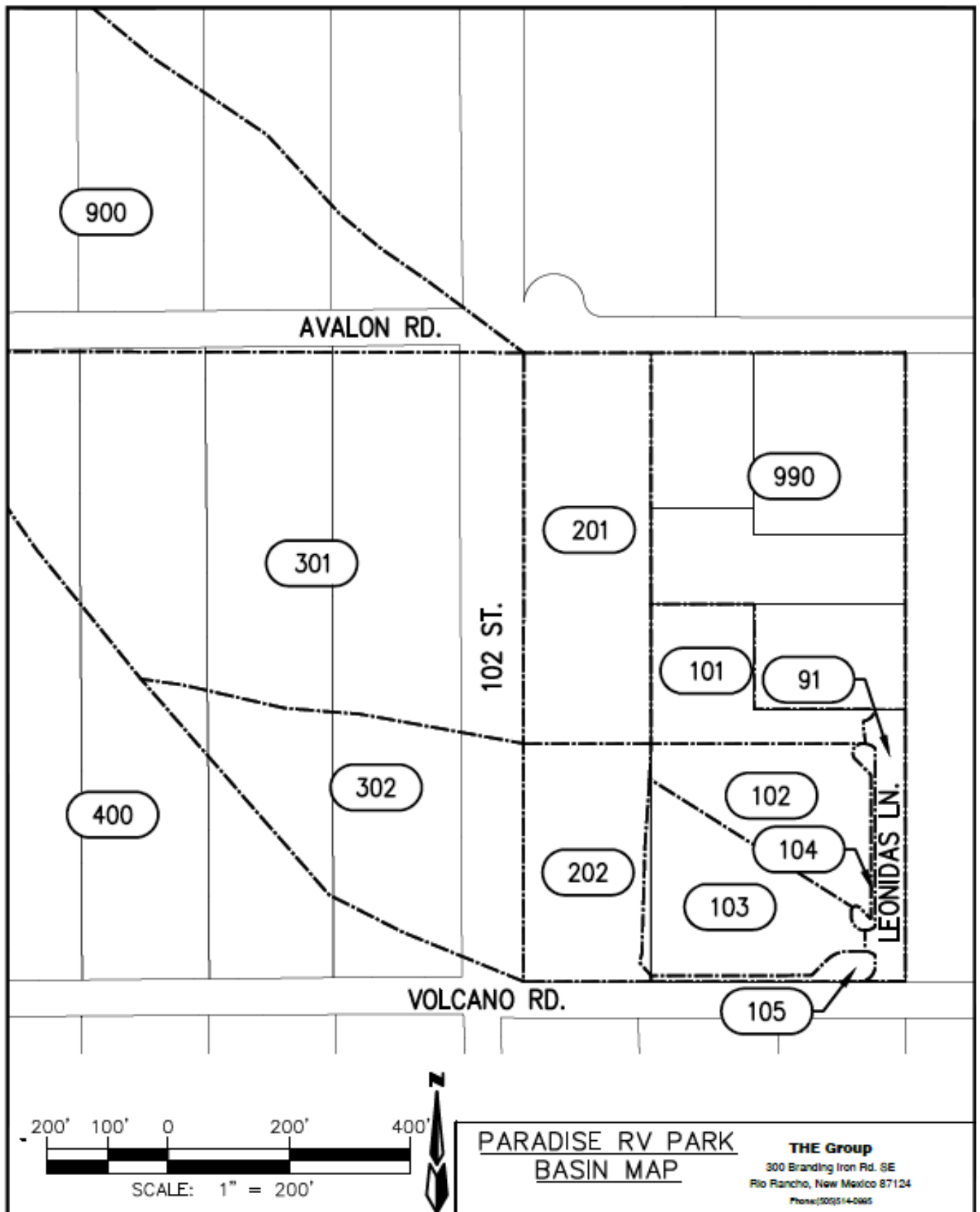
Basin	Area (ac.)	Land Treatment				Yield (cfs/ac.)	Q_{100} (cfs)	V_{100} (cfs)
		A	B	C	D			
101	1.16	0	3	5	92	4.43	5.14	0.182
102	1.18	0	0	22	78	4.25	5.02	0.173
103	2.01	0	0	16	84	4.33	8.19	0.286
104	0.09	0	0	100	0	3.34	0.29	0.008
105	0.15	0	0	100	0	3.29	0.51	0.014
200	5.11	0	5	76	19	3.44	17.57	0.526
300	14.85	100	0	0	0	1.62	17.56	0.795
900	24.90	100	0	0	0	1.68	22.62	0.326
990	5.80	0	3	30	67	4.07	23.61	0.311

Hydraulics

The previous plans and analyses determined the necessity of the construction of infrastructure adjacent to the site. The runoff from the site and the existing development (basins 100-105 and 990) is to be contained in a storm drain in Leonidas Lane with a discharge to the existing City pond south of Volcano Road.

The runoff from the undeveloped upstream basins that directly flow to the site (basins 200, 300, 800 and 900) were to be contained in a retention pond south of the developed site. The additional upstream basins that flow to the City pond are to be contained in a future storm drain in Volcano Road with a discharge to the City pond. The previous studies did not include hydraulic analyses of the systems.

Basin Map



III. DEVELOPED CONDITIONS

The proposed development is an RV park to be developed in two phases. The site will be developed for Phase I with a single structure and RV parking. As shown on Exhibit A: Grading and Drainage Plan, develop runoff from the site and adjacent development is routed to proposed storm drains. Existing runoff from upstream undeveloped basins is intercepted by the proposed temporary retention pond.

Hydrology

The analysis for the 100-yr 24-hr duration storm was done using AHYMO 97 software. A summary of the result is listed below and detailed in the Appendix. The assumptions included accurately describe the developed conditions of the project.

Basin	Area (ac.)	Land Treatment				Yield (cfs/ac.)	Q ₁₀₀ (cfs)	V ₁₀₀ (cfs)
		A	B	C	D			
91	0.55	0	0	100	90	4.18	2.30	0.105
101	1.14	0	3	5	92	4.17	4.75	0.219
102	1.43	0	0	22	78	3.99	5.69	0.251
103	1.66	0	0	16	84	4.07	6.74	0.303
104	0.09	0	0	100	0	2.93	0.27	0.008
105	0.15	0	0	100	0	2.89	0.45	0.013
201	3.11	0	0	100	0	2.85	8.86	0.257
202	1.87	0	0	100	0	2.85	5.33	0.155
301	9.90	100	0	0	0	0.83	8.21	0.362
302	4.95	100	0	0	0	0.83	4.11	0.181
900	24.90	100	0	0	0	0.63	15.60	0.913
990	5.80	0	3	30	67	3.79	22.01	0.939

The following table summarizes the variations in runoff from the previous study.

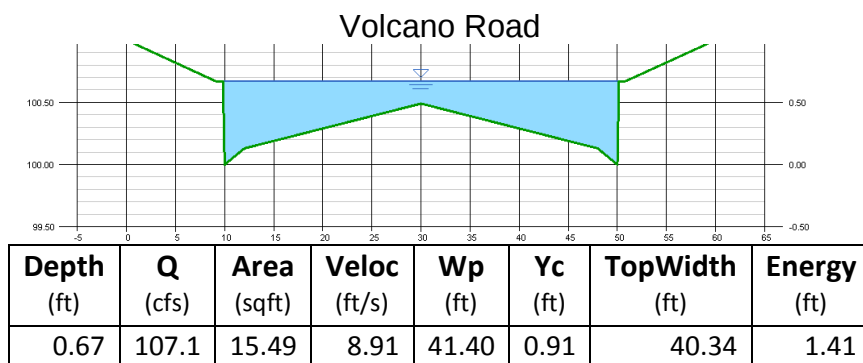
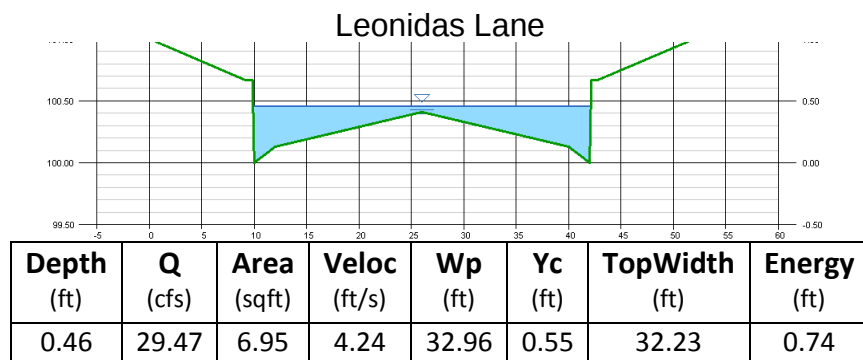
Basin	Previous (cfs.)	Proposed (cfs)	Diff. (cfs)
91	0	2.30	+2.30
101	5.14	4.75	-0.39
102	5.02	5.69	+0.67
103	8.19	6.74	-1.45
104	0.29	0.27	-0.02
105	0.51	0.45	-0.06
200	17.57	15.19	-2.28
300	17.56	12.32	-5.26
900	22.62	15.60	-7.02
990	23.61	22.01	-1.60

As shown, there are significant differences in peak flows from the previous study. This is due to the difference in AHYMO software versions. The source of the anomaly is not known. The AHYMO 97 version has been previously accepted as standard and is used as the basis for analysis of the onsite and adjacent basins to the site. The flows previously reported for the offsite basins which due not directly impact the site have remained unchanged.

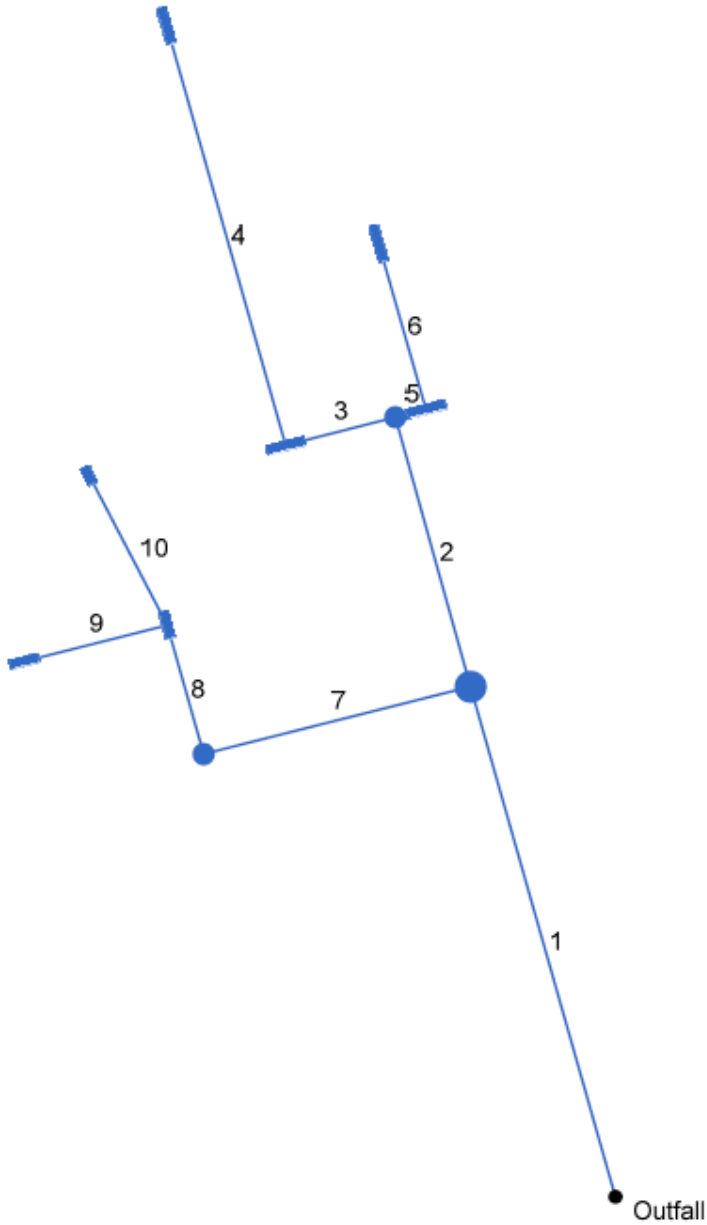
Hydraulics

The analysis included in this report for developed condition is based on the developed conditions of the site and accommodation of existing offsite runoff. Inlets have been placed to intercept surface flows where surface capacity is reached. Basins 990 and 101 surface discharge to basin 91 and flow to inlets in Leonidas Lane. The remaining onsite basins, 102 through 105, discharge via the inlet in the southeast corner of the site to a storm drain connection in Volcano Road. The inlets intercepting flow in Volcano Road and Leonidas Lane are combined and directed to the City pond south of Volcano Road. Although developed flows may be intercepted at upstream locations, the inlets and connections in Volcano Road are analyzed based on the maximum flow capacity (100 cfs) of the street section and the future installation of opposite curb inlets.

As shown below, the street sections of have the capacity to convey the flows indicated, and the analysis of the storm drain flows are summarized in the following pages:



Storm Drain Layout



Storm Drain Summary

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (1)	79.18	36	Cir	113.67	5210.00	5221.04	9.713	5212.77	5223.81	n/a	5227.89 i	End	Manhole
2	Pipe - (2)	27.93	24	Cir	59.96	5222.04	5223.98	3.239	5227.89*	5228.67*	1.23	5229.89	1	Manhole
3	Pipe - (3)	13.94	18	Cir	23.00	5224.48	5224.92	1.913	5230.15*	5230.50*	1.45	5231.95	2	Combination
4	Pipe - (4)	10.46	18	Cir	93.41	5225.02	5229.52	4.818	5232.38*	5233.17*	0.54	5233.71	3	Combination
5	Pipe - (5)	13.98	18	Cir	6.50	5224.48	5226.73	34.630	5230.15*	5230.25*	1.46	5231.71	2	Combination
6	Pipe - (6)	10.46	18	Cir	36.98	5226.83	5228.47	4.435	5232.14*	5232.45*	0.54	5232.99	5	Combination
7	Pipe - (7)	51.25	36	Cir	55.67	5221.04	5223.49	4.401	5227.89*	5228.17*	0.82	5228.98	1	Manhole
8	Pipe - (8)	51.25	30	Cir	28.75	5223.99	5224.85	2.991	5228.98*	5229.37*	n/a	5230.51 i	7	Combination
9	Pipe - (9)	23.98	18	Cir	30.00	5225.85	5228.29	8.133	5230.51*	5231.84*	n/a	5236.49 i	8	Combination
10	Pipe - (10)	13.15	18	Cir	35.90	5225.85	5227.50	4.595	5230.51*	5230.99*	0.86	5231.85	8	Grate

Storm Drain Inlets

Line No	Inlet ID	Q =	Q	Q	Q	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
		CIA	carry	capt	Byp		Ht	L	Area	L	W	So	W	Sw	Sx	n	Depth	Spread	Depth	Spread	Depr	
		(cfs)	(cfs)	(cfs)	(cfs)		(in)	(ft)	(sqft)	(ft)	(ft)	(ft/ft)	(ft)	(ft/ft)	(ft/ft)		(ft)	(ft)	(ft)	(ft)	(in)	
1	SD MH 2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	SD MH 3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	CB 3	0.00	4.28	3.48	0.80	Comb	8.0	8.00	0.00	8.00	2.00	0.017	2.00	0.050	0.020	0.017	0.28	11.10	0.37	10.17	2.0	Off
4	CB 5	14.74*	0.00	10.46	4.28	Comb	8.0	10.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.44	17.95	0.52	17.52	2.0	Off
5	CB 4	0.00	4.28	3.52	0.76	Comb	8.0	8.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.30	10.90	0.37	10.17	2.0	Off
6	CB 6	14.74*	0.00	10.46	4.28	Comb	8.0	10.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.44	17.95	0.52	17.52	2.0	Off
7	SD MH 1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
8	CB 2	0.00	26.02	14.12	11.90	Comb	8.0	8.00	0.00	8.00	2.00	0.030	2.00	0.063	0.020	0.017	0.49	20.05	0.56	19.67	2.0	Off
9	CB 1	50.00*	0.00	23.98	26.02	Comb	8.0	10.00	0.00	8.00	2.00	0.030	2.00	0.063	0.020	0.017	0.60	25.80	0.68	25.52	2.0	Off
10	CB 7	13.15*	0.00	13.15	0.00	Grate	0.0	0.00	4.47	4.00	2.00	Sag	2.00	0.050	0.020	0.000	0.67	30.47	0.67	30.47	0.0	Off

IV. GRADING PLAN

The Grading and Drainage Plan included in Appendix A depicts the developed grading and drainage characteristics of the area affected by the project. The plan demonstrates that the runoff from the site is directed to appropriate points of discharge and the proposed facilities are adequate to accommodate the flows impacted by the site. In addition, the Grading plan and Drainage Plan included in Appendix A is provided in support of building permit and construction of the improvements.

V. CONCLUSION

As, shown, the capacity of the proposed infrastructure is adequate to accommodate the runoff from the site as described. The flow is contained within the street sections and the downstream storm drain has adequate capacity to accept the runoff.

VI. Appendix A

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

Hydrologic Calculations

AHYMO Summary

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -				- VERSION: 1997.02c		RUN DATE (MON/DAY/YR) =01/23/2015		CFS PAGE = 1	
COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	NOTATION
START									
	RAINFALL TYPE= 2								TIME= .00 RAIN24= 2.660
*S									
*S									
*S									
COMPUTE NM HYD		91.00	- 1	.00086	2.30	.105	2.28382	1.500	4.179 PER IMP= 90.00
*S									
*S									
COMPUTE NM HYD		101.00	- 2	.00178	4.75	.219	2.30156	1.500	4.169 PER IMP= 92.00
*S									
*S									
COMPUTE NM HYD		102.00	- 3	.00223	5.69	.251	2.11172	1.500	3.988 PER IMP= 78.00
*S									
*S									
COMPUTE NM HYD		103.00	- 4	.00259	6.74	.303	2.19777	1.500	4.074 PER IMP= 84.00
*S									
*S									
COMPUTE NM HYD		104.00	- 5	.00014	.27	.008	.99307	1.500	2.938 PER IMP= .00
*S									
*S									
COMPUTE NM HYD		105.00	- 6	.00024	.45	.013	.99307	1.500	2.894 PER IMP= .00
*S									
*S									
COMPUTE NM HYD		990.00	- 7	.00907	22.01	.939	1.94219	1.500	3.794 PER IMP= 67.00
*S									
*S									
ADD HYD		91.10	1& 7 8	.00993	24.32	1.044	1.97177	1.500	3.828
*S									
*S									
ADD HYD		91.20	8& 2 1	.01171	29.07	1.262	2.02191	1.500	3.879
*S									
*S									
ADD HYD		104.10	3& 5 2	.00237	5.96	.259	2.04452	1.500	3.926
*S									
*S									
ADD HYD		105.10	4& 6 1	.00283	7.19	.316	2.09490	1.500	3.973

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 2 NOTATION
*S	*****									
*S	COMBINE SITE RUNOFF TO INLET									
ADD HYD	105.10 1& 2 3			.00520	13.15	.574	2.07192	1.500	3.952	
*S	*****									
*S	RUNOFF TO TEMPORARY RETENTION POND									
*S	COMPUTE RUNOFF NORTH PHASE II									
COMPUTE NM HYD	201.00 - 1			.00486	8.86	.257	.99307	1.500	2.848 PER IMP=	.00
*S	*****									
*S	COMPUTE RUNOFF SOUTH PHASE II									
COMPUTE NM HYD	202.00 - 2			.00292	5.33	.155	.99307	1.500	2.850 PER IMP=	.00
*S	*****									
*S	COMPUTE RUNOFF WEST OFFSITE									
COMPUTE NM HYD	301.00 - 3			.01547	8.21	.362	.43936	1.600	.830 PER IMP=	.00
*S	*****									
*S	COMPUTE RUNOFF WEST OFFSITE									
COMPUTE NM HYD	302.00 - 4			.00773	4.11	.181	.43936	1.600	.830 PER IMP=	.00
*S	*****									
*S	COMPUTE RUNOFF FAR NORTHWEST OFFSITE									
COMPUTE NM HYD	800.00 - 5			.05700	30.78	1.336	.43936	1.600	.844 PER IMP=	.00
*S	*****									
*S	COMPUTE RUNOFF NORTHWEST OFFSITE									
COMPUTE NM HYD	900.00 - 6			.03890	15.60	.912	.43936	1.700	.627 PER IMP=	.00
*S	*****									
*S	ADD RUNOFF FOR NORTHWEST OFFSITE									
ADD HYD	900.10 5& 6 7			.09590	45.39	2.247	.43936	1.600	.740	
*S	*****									
*S	ADD RUNOFF TO WEST OFFSITE									
ADD HYD	301.10 3& 7 8			.11137	53.61	2.610	.43936	1.600	.752	
*S	*****									
*S	RUNOFF ROUTED THROUGH CULVERT TO POND									
ADD HYD	201.10 1& 8 9			.11623	60.06	2.867	.46251	1.600	.807	
*S	*****									
*S	COMBINE RUNOFF FROM CULVERT AND POND									
ADD HYD	202.10 9& 2 1			.11915	63.94	3.022	.47552	1.600	.838	
*S	*****									
*S	ADD RUNOFF FROM OFFSITE FOR POND TOTAL									
ADD HYD	202.20 1& 4 2			.12688	68.05	3.203	.47332	1.600	.838	

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I
 AHYMO Calculations

AHYMO PROGRAM (AHYMO_97) -

- Version: 1997.02c

```

*
*          *100 YEAR PROPOSED CONDITIONS
*          *****
*          *** TC = 12 MIN ***
*          *****
START      TIME=0.0 HR PUNCH CODE=0 PRINT LINES=-6
*S          *****
*S
RAINFALL   TYPE=2 RAIN QUARTER=0.0
           RAIN ONE=1.87 IN RAIN SIX=2.20 IN
           RAIN DAY=2.66 IN DT=0.05 HRS
  
```

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
 DT = .050000 HOURS END TIME = 24.000000 HOURS

.0000	.0025	.0050	.0076	.0103	.0131	.0160
.0190	.0222	.0254	.0289	.0324	.0362	.0401
.0443	.0487	.0534	.0584	.0637	.0695	.0758
.0837	.0924	.1176	.1773	.2798	.4384	.6668
.9790	1.2253	1.3366	1.4295	1.5109	1.5836	1.6495
1.7096	1.7648	1.8156	1.8624	1.9057	1.9458	1.9548
1.9631	1.9708	1.9780	1.9848	1.9912	1.9973	2.0031
2.0087	2.0140	2.0191	2.0240	2.0287	2.0333	2.0377
2.0420	2.0462	2.0502	2.0542	2.0580	2.0617	2.0653
2.0689	2.0724	2.0757	2.0791	2.0823	2.0855	2.0886
2.0916	2.0946	2.0976	2.1005	2.1033	2.1061	2.1088
2.1115	2.1142	2.1168	2.1193	2.1219	2.1244	2.1268
2.1293	2.1316	2.1340	2.1363	2.1386	2.1409	2.1431
2.1453	2.1475	2.1497	2.1518	2.1539	2.1560	2.1580
2.1601	2.1621	2.1641	2.1660	2.1680	2.1699	2.1718
2.1737	2.1756	2.1774	2.1793	2.1811	2.1829	2.1847
2.1864	2.1882	2.1899	2.1916	2.1933	2.1950	2.1967
2.1984	2.2000	2.2020	2.2039	2.2059	2.2078	2.2097
2.2117	2.2136	2.2155	2.2174	2.2193	2.2212	2.2231
2.2249	2.2268	2.2287	2.2305	2.2324	2.2342	2.2361
2.2379	2.2398	2.2416	2.2434	2.2452	2.2470	2.2488
2.2506	2.2524	2.2542	2.2559	2.2577	2.2595	2.2612
2.2630	2.2647	2.2665	2.2682	2.2700	2.2717	2.2734
2.2751	2.2768	2.2785	2.2802	2.2819	2.2836	2.2853
2.2870	2.2887	2.2903	2.2920	2.2937	2.2953	2.2970
2.2986	2.3002	2.3019	2.3035	2.3051	2.3068	2.3084
2.3100	2.3116	2.3132	2.3148	2.3164	2.3180	2.3196
2.3212	2.3227	2.3243	2.3259	2.3274	2.3290	2.3305

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

2.3321	2.3336	2.3352	2.3367	2.3383	2.3398	2.3413
2.3428	2.3444	2.3459	2.3474	2.3489	2.3504	2.3519
2.3534	2.3549	2.3563	2.3578	2.3593	2.3608	2.3622
2.3637	2.3652	2.3666	2.3681	2.3695	2.3710	2.3724
2.3739	2.3753	2.3767	2.3782	2.3796	2.3810	2.3824
2.3839	2.3853	2.3867	2.3881	2.3895	2.3909	2.3923
2.3937	2.3951	2.3965	2.3978	2.3992	2.4006	2.4020
2.4033	2.4047	2.4061	2.4074	2.4088	2.4101	2.4115
2.4128	2.4142	2.4155	2.4168	2.4182	2.4195	2.4208
2.4222	2.4235	2.4248	2.4261	2.4274	2.4287	2.4300
2.4314	2.4327	2.4340	2.4352	2.4365	2.4378	2.4391
2.4404	2.4417	2.4430	2.4442	2.4455	2.4468	2.4480
2.4493	2.4506	2.4518	2.4531	2.4543	2.4556	2.4568
2.4581	2.4593	2.4606	2.4618	2.4630	2.4643	2.4655
2.4667	2.4680	2.4692	2.4704	2.4716	2.4728	2.4740
2.4753	2.4765	2.4777	2.4789	2.4801	2.4813	2.4825
2.4837	2.4849	2.4860	2.4872	2.4884	2.4896	2.4908
2.4919	2.4931	2.4943	2.4955	2.4966	2.4978	2.4990
2.5001	2.5013	2.5024	2.5036	2.5047	2.5059	2.5070
2.5082	2.5093	2.5105	2.5116	2.5127	2.5139	2.5150
2.5161	2.5172	2.5184	2.5195	2.5206	2.5217	2.5229
2.5240	2.5251	2.5262	2.5273	2.5284	2.5295	2.5306
2.5317	2.5328	2.5339	2.5350	2.5361	2.5372	2.5383
2.5394	2.5404	2.5415	2.5426	2.5437	2.5448	2.5458
2.5469	2.5480	2.5490	2.5501	2.5512	2.5522	2.5533
2.5544	2.5554	2.5565	2.5575	2.5586	2.5596	2.5607
2.5617	2.5628	2.5638	2.5649	2.5659	2.5669	2.5680
2.5690	2.5700	2.5711	2.5721	2.5731	2.5741	2.5752
2.5762	2.5772	2.5782	2.5792	2.5803	2.5813	2.5823
2.5833	2.5843	2.5853	2.5863	2.5873	2.5883	2.5893
2.5903	2.5913	2.5923	2.5933	2.5943	2.5953	2.5963
2.5973	2.5982	2.5992	2.6002	2.6012	2.6022	2.6031
2.6041	2.6051	2.6061	2.6070	2.6080	2.6090	2.6099
2.6109	2.6119	2.6128	2.6138	2.6148	2.6157	2.6167
2.6176	2.6186	2.6195	2.6205	2.6214	2.6224	2.6233
2.6243	2.6252	2.6261	2.6271	2.6280	2.6290	2.6299
2.6308	2.6318	2.6327	2.6336	2.6346	2.6355	2.6364
2.6373	2.6383	2.6392	2.6401	2.6410	2.6419	2.6428
2.6438	2.6447	2.6456	2.6465	2.6474	2.6483	2.6492
2.6501	2.6510	2.6519	2.6528	2.6537	2.6546	2.6555
2.6564	2.6573	2.6582	2.6591	2.6600		

*S	*****
*S	RUNOFF TO LEONIDAS LANE STORM DRAIN
*S	COMPUTE RUNOFF LEONIDAS LANE
COMPUTE NM HYD	ID=1 HYD NO=91 DA=0.000861 SQ MI

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

PER A=0 PER B=0 PER C=10 PER D=90
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.0593 CFS UNIT VOLUME = .9959 B = 526.28 P60 = 1.8700
AREA = .000775 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
UNIT PEAK = .25071 CFS UNIT VOLUME = .9512 B = 388.14 P60 = 1.8700
AREA = .000086 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

OUTFLOW HYDROGRAPH REACH 91.00

RUNOFF VOLUME = 2.28382 INCHES = .1049 ACRE-FEET
PEAK DISCHARGE RATE = 2.30 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

*S *****
*S COMPUTE RUNOFF SITE PARKING AREA
COMPUTE NM HYD ID=2 HYD NO=101 DA=0.001781 SQ MI
PER A=0 PER B=3 PER C=5 PER D=92
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.4690 CFS UNIT VOLUME = .9975 B = 526.28 P60 = 1.8700
AREA = .001639 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115289HR TP = .133300HR K/TP RATIO = .864882 SHAPE CONSTANT, N = 4.109594
UNIT PEAK = .38737 CFS UNIT VOLUME = .9681 B = 362.41 P60 = 1.8700
AREA = .000142 SQ MI IA = .40625 INCHES INF = .98750 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 101.00

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

RUNOFF VOLUME = 2.30156 INCHES = .2186 ACRE-FEET
PEAK DISCHARGE RATE = 4.75 CFS AT 1.500 HOURS BASIN AREA = .0018 SQ. MI.

*S *****
*S COMPUTE RUNOFF NORTH RV AREA
COMPUTE NM HYD ID=3 HYD NO=102 DA=0.002229 SQ MI
PER A=0 PER B=0 PER C=22 PER D=78
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.8642 CFS UNIT VOLUME = .9975 B = 526.28 P60 = 1.8700
AREA = .001739 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
UNIT PEAK = 1.4279 CFS UNIT VOLUME = .9928 B = 388.14 P60 = 1.8700
AREA = .000490 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = 2.11172 INCHES = .2510 ACRE-FEET
PEAK DISCHARGE RATE = 5.69 CFS AT 1.500 HOURS BASIN AREA = .0022 SQ. MI.

*S *****
*S COMPUTE RUNOFF SOUTH RV AREA
COMPUTE NM HYD ID=4 HYD NO=103 DA=0.002586 SQ MI
PER A=0 PER B=0 PER C=16 PER D=84
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 8.5761 CFS UNIT VOLUME = .9978 B = 526.28 P60 = 1.8700
AREA = .002172 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
UNIT PEAK = 1.2048 CFS UNIT VOLUME = .9913 B = 388.14 P60 = 1.8700

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

AREA = .000414 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 103.00

RUNOFF VOLUME = 2.19777 INCHES = .3031 ACRE-FEET
PEAK DISCHARGE RATE = 6.74 CFS AT 1.500 HOURS BASIN AREA = .0026 SQ. MI.

*S *****
*S COMPUTE RUNOFF EAST LANDSCAPE AREA
COMPUTE NM HYD ID=5 HYD NO=104 DA=0.000142 SQ MI
PER A=0 PER B=0 PER C=100 PER D=0
TP=-0.1333 HR MASS RAIN=-1

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
UNIT PEAK = .41347 CFS UNIT VOLUME = .9702 B = 388.14 P60 = 1.8700
AREA = .000142 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 104.00

RUNOFF VOLUME = .99307 INCHES = .0075 ACRE-FEET
PEAK DISCHARGE RATE = .27 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

*S *****
*S COMPUTE RUNOFF SOUTH LANDSCAPE AREA
COMPUTE NM HYD ID=6 HYD NO=105 DA=0.000241 SQ MI
PER A=0 PER B=0 PER C=100 PER D=0
TP=-0.1333 HR MASS RAIN=-1

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
UNIT PEAK = .70174 CFS UNIT VOLUME = .9849 B = 388.14 P60 = 1.8700
AREA = .000241 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=6 CODE=1

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = .99307 INCHES = .0128 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

*S *****
*S COMPUTE RUNOFF NORTH OFFSITE
COMPUTE NM HYD ID=7 HYD NO=990 DA=0.009065 SQ MI
PER A=0 PER B=3 PER C=30 PER D=67
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 23.979 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.8700
AREA = .006074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .108151HR TP = .133300HR K/TP RATIO = .811334 SHAPE CONSTANT, N = 4.408174
UNIT PEAK = 8.5620 CFS UNIT VOLUME = 1.000 B = 381.52 P60 = 1.8700
AREA = .002991 SQ MI IA = .36364 INCHES INF = .86818 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA 990.00

RUNOFF VOLUME = 1.94219 INCHES = .9390 ACRE-FEET
PEAK DISCHARGE RATE = 22.01 CFS AT 1.500 HOURS BASIN AREA = .0091 SQ. MI.

*S *****
*S ADD RUNOFF TO START LEONIDAS LANE
ADD HYD ID=8 HYD NO=91.1 IDS=1 AND 7
PRINT HYD ID=8 CODE=1

OUTFLOW HYDROGRAPH REACH 91.10

RUNOFF VOLUME = 1.97177 INCHES = 1.0438 ACRE-FEET
PEAK DISCHARGE RATE = 24.32 CFS AT 1.500 HOURS BASIN AREA = .0099 SQ. MI.

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

```
*S *****
*S      ADD RUNOFF FROM SITE TO LEONIDAS LANE
ADD HYD ID=1 HYD NO=91.2 IDS=8 AND 2
PRINT HYD ID=1 CODE=1
```

OUTFLOW HYDROGRAPH REACH 91.20

RUNOFF VOLUME = 2.02191 INCHES = 1.2624 ACRE-FEET
PEAK DISCHARGE RATE = 29.07 CFS AT 1.500 HOURS BASIN AREA = .0117 SQ. MI.

```
*S *****
*S      ADD RUNOFF FROM RV AREA TO EAST LANDSCAPE
ADD HYD ID=2 HYD NO=104.1 IDS=3 AND 5
PRINT HYD ID=2 CODE=1
```

PARTIAL HYDROGRAPH 104.10

RUNOFF VOLUME = 2.04452 INCHES = .2585 ACRE-FEET
PEAK DISCHARGE RATE = 5.96 CFS AT 1.500 HOURS BASIN AREA = .0024 SQ. MI.

```
*S *****
*S      ADD RUNOFF FROM RV AREA TO SOUTH LANDSCAPE
ADD HYD ID=1 HYD NO=105.1 IDS=4 AND 6
PRINT HYD ID=1 CODE=1
```

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 2.09490 INCHES = .3159 ACRE-FEET
PEAK DISCHARGE RATE = 7.19 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

```
*S *****
*S      COMBINE SITE RUNOFF TO INLET
ADD HYD ID=3 HYD NO=105.1 IDS=1 AND 2
PRINT HYD ID=3 CODE=1
```

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

PARTIAL HYDROGRAPH 105.10

RUNOFF VOLUME = 2.07192 INCHES = .5744 ACRE-FEET
 PEAK DISCHARGE RATE = 13.15 CFS AT 1.500 HOURS BASIN AREA = .0052 SQ. MI.

```
*S *****
*S      RUNOFF TO TEMPORARY RETENTION POND
*S      COMPUTE RUNOFF NORTH PHASE II
COMPUTE NM HYD ID=1 HYD NO=201 DA=0.004860 SQ MI
                PER A=0 PER B=0 PER C=100 PER D=0
                TP=-0.1333 HR MASS RAIN=-1
```

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
 UNIT PEAK = 14.151 CFS UNIT VOLUME = 1.001 B = 388.14 P60 = 1.8700
 AREA = .004860 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 201.00

RUNOFF VOLUME = .99307 INCHES = .2574 ACRE-FEET
 PEAK DISCHARGE RATE = 8.86 CFS AT 1.500 HOURS BASIN AREA = .0049 SQ. MI.

```
*S *****
*S      COMPUTE RUNOFF SOUTH PHASE II
COMPUTE NM HYD ID=2 HYD NO=202 DA=0.002923 SQ MI
                PER A=0 PER B=0 PER C=100 PER D=0
                TP=-0.1333 HR MASS RAIN=-1
```

K = .105867HR TP = .133300HR K/TP RATIO = .794199 SHAPE CONSTANT, N = 4.514851
 UNIT PEAK = 8.5112 CFS UNIT VOLUME = 1.000 B = 388.14 P60 = 1.8700
 AREA = .002923 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 202.00

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

RUNOFF VOLUME = .99307 INCHES = .1548 ACRE-FEET
PEAK DISCHARGE RATE = 5.33 CFS AT 1.500 HOURS BASIN AREA = .0029 SQ. MI.

*S *****
*S COMPUTE RUNOFF WEST OFFSITE
COMPUTE NM HYD ID=3 HYD NO=301 DA=0.015467 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=-0.22 HR MASS RAIN=-1

K = .270146HR TP = .220000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 19.231 CFS UNIT VOLUME = .9990 B = 273.54 P60 = 1.8700
AREA = .015467 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=3 CODE=1

HYDROGRAPH FROM AREA 301.00

RUNOFF VOLUME = .43936 INCHES = .3624 ACRE-FEET
PEAK DISCHARGE RATE = 8.21 CFS AT 1.600 HOURS BASIN AREA = .0155 SQ. MI.

*S *****
*S COMPUTE RUNOFF WEST OFFSITE
COMPUTE NM HYD ID=4 HYD NO=302 DA=0.007733 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=-0.22 HR MASS RAIN=-1

K = .270146HR TP = .220000HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 9.6151 CFS UNIT VOLUME = .9982 B = 273.54 P60 = 1.8700
AREA = .007733 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=4 CODE=1

HYDROGRAPH FROM AREA 302.00

RUNOFF VOLUME = .43936 INCHES = .1812 ACRE-FEET
PEAK DISCHARGE RATE = 4.11 CFS AT 1.600 HOURS BASIN AREA = .0077 SQ. MI.

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

```
*S *****
*S      COMPUTE RUNOFF FAR NORTHWEST OFFSITE
COMPUTE NM HYD  ID=5 HYD NO=800 DA=0.0570 SQ MI
                  PER A=100 PER B=0 PER C=0 PER D=0
                  TP=-0.216 HR MASS RAIN=-1

K = .265234HR    TP = .216000HR    K/TP RATIO = 1.227936    SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 72.185 CFS    UNIT VOLUME = .9994    B = 273.54    P60 = 1.8700
AREA = .057000 SQ MI    IA = .65000 INCHES    INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000
```

PRINT HYD ID=5 CODE=1

HYDROGRAPH FROM AREA 800.00

RUNOFF VOLUME = .43936 INCHES = 1.3356 ACRE-FEET
PEAK DISCHARGE RATE = 30.78 CFS AT 1.600 HOURS BASIN AREA = .0570 SQ. MI.

```
*S *****
*S      COMPUTE RUNOFF NORTHWEST OFFSITE
COMPUTE NM HYD  ID=6 HYD NO=900 DA=0.0389 SQ MI
                  PER A=100 PER B=0 PER C=0 PER D=0
                  TP=-0.293 HR MASS RAIN=-1

K = .359785HR    TP = .293000HR    K/TP RATIO = 1.227936    SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 36.317 CFS    UNIT VOLUME = .9995    B = 273.54    P60 = 1.8700
AREA = .038900 SQ MI    IA = .65000 INCHES    INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000
```

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA 900.00

RUNOFF VOLUME = .43936 INCHES = .9115 ACRE-FEET
PEAK DISCHARGE RATE = 15.60 CFS AT 1.700 HOURS BASIN AREA = .0389 SQ. MI.

```
*S *****
*S      ADD RUNOFF FOR NORTHWEST OFFSITE
```

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

ADD HYD ID=7 HYD NO=900.1 IDS=5 AND 6
PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA 900.10

RUNOFF VOLUME = .43936 INCHES = 2.2472 ACRE-FEET
PEAK DISCHARGE RATE = 45.39 CFS AT 1.600 HOURS BASIN AREA = .0959 SQ. MI.

*S *****
*S ADD RUNOFF TO WEST OFFSITE
ADD HYD ID=8 HYD NO=301.1 IDS=3 AND 7
PRINT HYD ID=8 CODE=1

HYDROGRAPH FROM AREA 301.10

RUNOFF VOLUME = .43936 INCHES = 2.6096 ACRE-FEET
PEAK DISCHARGE RATE = 53.61 CFS AT 1.600 HOURS BASIN AREA = .1114 SQ. MI.

*S *****
*S RUNOFF ROUTED THROUGH CULVERT TO POND
ADD HYD ID=9 HYD NO=201.1 IDS=1 AND 8
PRINT HYD ID=9 CODE=1

PARTIAL HYDROGRAPH 201.10

RUNOFF VOLUME = .46251 INCHES = 2.8670 ACRE-FEET
PEAK DISCHARGE RATE = 60.06 CFS AT 1.600 HOURS BASIN AREA = .1162 SQ. MI.

*S *****
*S COMBINE RUNOFF FROM CULVERT AND POND
ADD HYD ID=1 HYD NO=202.1 IDS=9 AND 2
PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 202.10

RUNOFF VOLUME = .47552 INCHES = 3.0218 ACRE-FEET

DRAINAGE REPORT FOR PARADISE RV PARK PHASE I

PEAK DISCHARGE RATE = 63.94 CFS AT 1.600 HOURS BASIN AREA = .1192 SQ. MI.

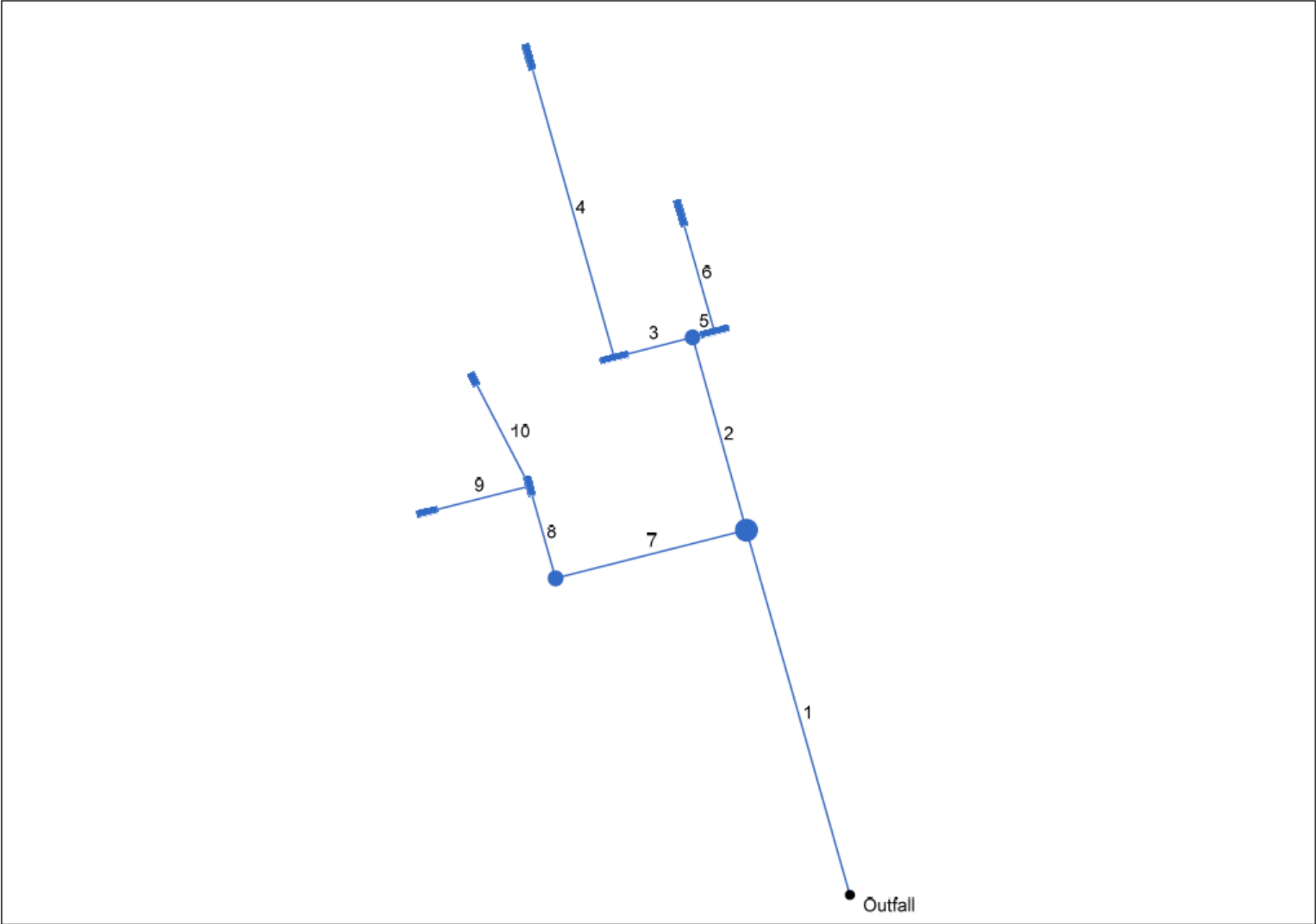
*S *****
*S ADD RUNOFF FROM OFFSITE FOR POND TOTAL
ADD HYD ID=2 HYD NO=202.2 IDS=1 AND 4
PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 202.20

RUNOFF VOLUME = .47332 INCHES = 3.2030 ACRE-FEET
PEAK DISCHARGE RATE = 68.05 CFS AT 1.600 HOURS BASIN AREA = .1269 SQ. MI.

*
FINISH

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2010 Plan



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (1)	79.18	36	Cir	113.67	5210.00	5221.04	9.713	5212.77	5223.81	n/a	5227.89 i	End	Manhole
2	Pipe - (2)	27.93	24	Cir	59.96	5222.04	5223.98	3.239	5227.89*	5228.67*	1.23	5229.89	1	Manhole
3	Pipe - (3)	13.94	18	Cir	23.00	5224.48	5224.92	1.913	5230.15*	5230.50*	1.45	5231.95	2	Combination
4	Pipe - (4)	10.46	18	Cir	93.41	5225.02	5229.52	4.818	5232.38*	5233.17*	0.54	5233.71	3	Combination
5	Pipe - (5)	13.98	18	Cir	6.50	5224.48	5226.73	34.630	5230.15*	5230.25*	1.46	5231.71	2	Combination
6	Pipe - (6)	10.46	18	Cir	36.98	5226.83	5228.47	4.435	5232.14*	5232.45*	0.54	5232.99	5	Combination
7	Pipe - (7)	51.25	36	Cir	55.67	5221.04	5223.49	4.401	5227.89*	5228.17*	0.82	5228.98	1	Manhole
8	Pipe - (8)	51.25	30	Cir	28.75	5223.99	5224.85	2.991	5228.98*	5229.37*	n/a	5230.51 i	7	Combination
9	Pipe - (9)	23.98	18	Cir	30.00	5225.85	5228.29	8.133	5230.51*	5231.84*	n/a	5236.49 i	8	Combination
10	Pipe - (10)	13.15	18	Cir	35.90	5225.85	5227.50	4.595	5230.51*	5230.99*	0.86	5231.85	8	Grate

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NOTES: Return period = 2 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	SD MH 2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	SD MH 3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	CB 3	0.00	4.28	3.48	0.80	Comb	8.0	8.00	0.00	8.00	2.00	0.017	2.00	0.050	0.020	0.017	0.28	11.10	0.37	10.17	2.0	Off
4	CB 5	14.74*	0.00	10.46	4.28	Comb	8.0	10.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.44	17.95	0.52	17.52	2.0	3
5	CB 4	0.00	4.28	3.52	0.76	Comb	8.0	8.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.30	10.90	0.37	10.17	2.0	Off
6	CB 6	14.74*	0.00	10.46	4.28	Comb	8.0	10.00	0.00	8.00	2.00	0.017	2.00	0.063	0.020	0.017	0.44	17.95	0.52	17.52	2.0	5
7	SD MH 1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
8	CB 2	0.00	26.02	14.12	11.90	Comb	8.0	8.00	0.00	8.00	2.00	0.030	2.00	0.063	0.020	0.017	0.49	20.05	0.56	19.67	2.0	Off
9	CB 1	50.00*	0.00	23.98	26.02	Comb	8.0	10.00	0.00	8.00	2.00	0.030	2.00	0.063	0.020	0.017	0.60	25.80	0.68	25.52	2.0	3
10	CB 7	13.15*	0.00	13.15	0.00	Grate	0.0	0.00	4.47	4.00	2.00	Sag	2.00	0.050	0.020	0.000	0.67	30.47	0.67	30.47	0.0	Off

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NOTES: Inlet N-Values = 0.016; Intensity = 69.87 / (Inlet time + 13.10) ^ 0.87; Return period = 2 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	36	79.18	5210.00	5212.77	2.77	6.81	11.62	2.10	5214.87	n/a	113.67	5221.04	5223.81	2.77**	6.81	11.62	2.10	5225.91i	n/a	n/a	8.940	1.00	n/a
2	24	27.93	5222.04	5227.89	2.00	3.14	8.89	1.23	5229.12	1.300	59.96	5223.98	5228.67	2.00	3.14	8.89	1.23	5229.89	1.299	1.299	0.779	1.00	1.23
3	18	13.94	5224.48	5230.15	1.50	1.77	7.89	0.97	5231.12	1.503	23.00	5224.92	5230.50	1.50	1.77	7.89	0.97	5231.47	1.503	1.503	0.346	1.50	1.45
4	18	10.46	5225.02	5232.38	1.50	1.77	5.92	0.55	5232.92	0.846	93.41	5229.52	5233.17	1.50	1.77	5.92	0.54	5233.71	0.846	0.846	0.790	1.00	0.54
5	18	13.98	5224.48	5230.15	1.50	1.77	7.91	0.97	5231.12	1.511	6.50	5226.73	5230.25	1.50	1.77	7.91	0.97	5231.22	1.511	1.511	0.098	1.50	1.46
6	18	10.46	5226.83	5232.14	1.50	1.77	5.92	0.55	5232.68	0.846	36.98	5228.47	5232.45	1.50	1.77	5.92	0.54	5232.99	0.846	0.846	0.313	1.00	0.54
7	36	51.25	5221.04	5227.89	3.00	7.07	7.25	0.82	5228.70	0.503	55.67	5223.49	5228.17	3.00	7.07	7.25	0.82	5228.98	0.503	0.503	0.280	1.00	0.82
8	30	51.25	5223.99	5228.98	2.50	4.91	10.44	1.70	5230.68	n/a	28.75	5224.85	5229.37	2.50	4.91	10.44	1.70	5231.06i	n/a	n/a	-1.312	1.50	n/a
9	18	23.98	5225.85	5230.51	1.50	1.77	13.57	2.86	5233.37	n/a	30.00	5228.29	5231.84	1.50	1.77	13.57	2.86	5234.71i	n/a	n/a	-1.530	1.00	n/a
10	18	13.15	5225.85	5230.51	1.50	1.77	7.44	0.86	5231.37	1.337	35.90	5227.50	5230.99	1.50	1.77	7.44	0.86	5231.85	1.336	1.336	0.480	1.00	0.86

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Notes: ; ** Critical depth. ; c = cir e = ellip b = box

VII. EXHIBITS