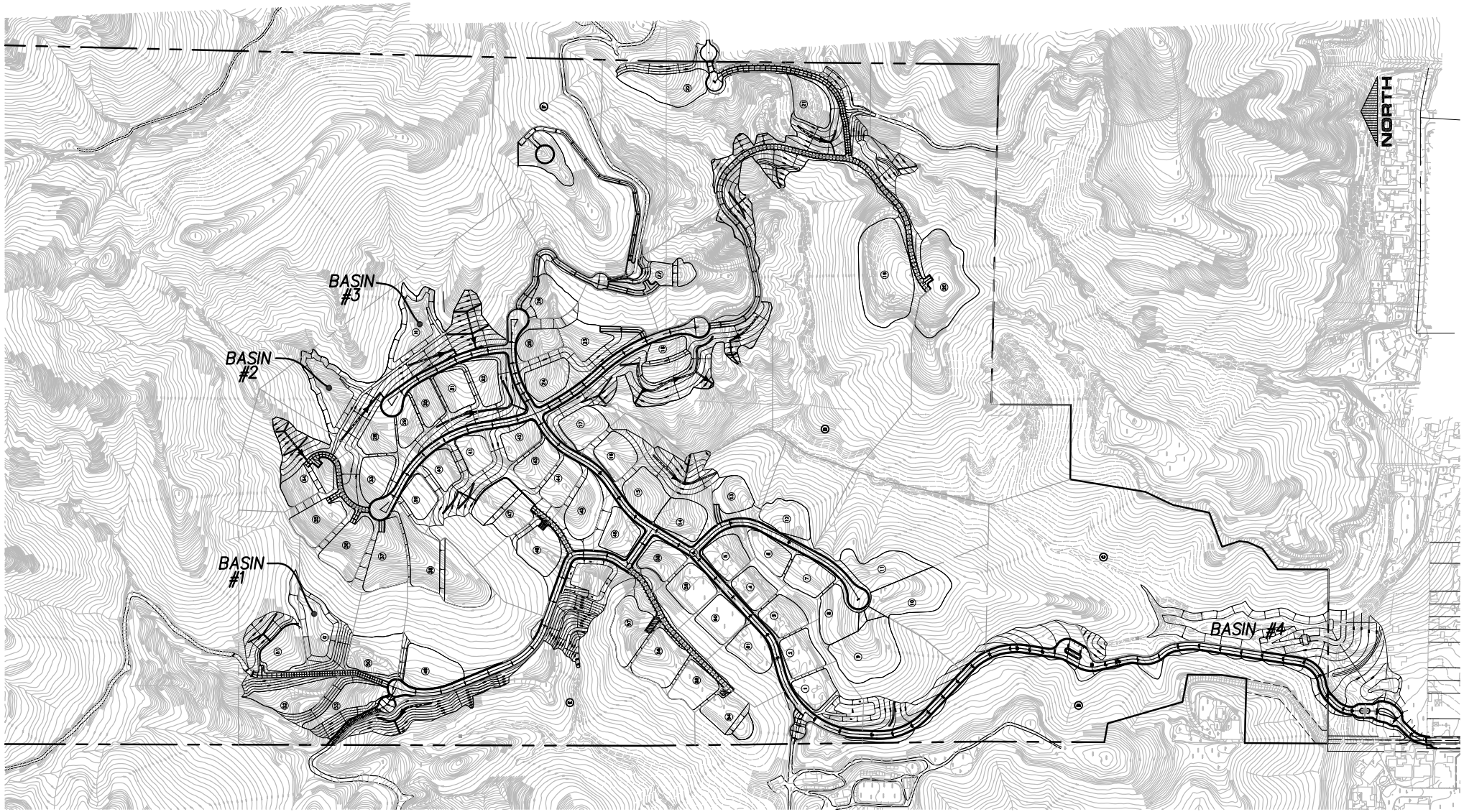
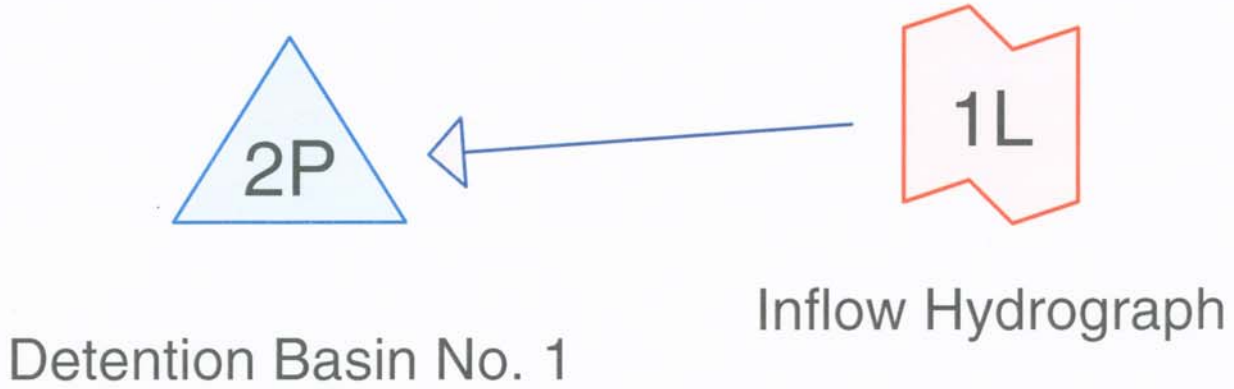
Appendix F



BRASADA
SAN DIMAS, CA.
DEBRIS/DESILTING BASIN EXHIBIT

P:\PROJECTS\349\04\ENG_FILE CABINET\REPORTS\HYDROLOGY\34904-XH-DEBRIS-BASIN-61-LOTS.DWG (07-13-10 5:18:44PM) Plotted by: Michelle Desai



Drainage Diagram for Wildwood Canyon
Prepared by Fuscoe Engineering, Printed 7/11/2010
HydroCAD® 9.10 s/n 05904 © 2009 HydroCAD Software Solutions LLC

Summary for Pond 2P: Detention Basin No. 1

Inflow	=	133.94 cfs @	19.31 hrs,	Volume=	13.647 af
Outflow	=	86.91 cfs @	19.48 hrs,	Volume=	11.394 af, Atten= 35%, Lag= 10.1 min
Primary	=	86.91 cfs @	19.48 hrs,	Volume=	11.394 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,267.52' @ 19.48 hrs Surf.Area= 0.620 ac Storage= 3.860 af

Plug-Flow detention time= 131.6 min calculated for 11.385 af (83% of inflow)
Center-of-Mass det. time= 89.7 min (1,053.5 - 963.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,260.00'	5.494 af	**120.00'W x 150.00'L x 10.00'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,260.00'	**36.0" Round Culvert** L= 300.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,260.00' / 1,180.00' S= 0.2667 '/' Cc= 0.900 n= 0.013
#2	Device 1	1,264.00'	**42.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=86.54 cfs @ 19.48 hrs HW=1,267.49' (Free Discharge)
└─**1=Culvert** (Passes 86.54 cfs of 113.59 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 86.54 cfs @ 9.00 fps)

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	2P	1,260.00	1,180.00	300.0	0.2667	0.013	36.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 2P: Detention Basin No. 1 — Peak Elev=1,267.52' Storage=3.860 af Inflow=133.94 cfs 13.647 af
Outflow=86.91 cfs 11.394 af

Link 1L: Inflow Hydrograph — Manual Hydrograph Inflow=133.94 cfs 13.647 af
Primary=133.94 cfs 13.647 af

Summary for Pond 2P: Detention Basin No. 1

Inflow	=	133.94 cfs @	19.31 hrs,	Volume=	13.647 af
Outflow	=	86.91 cfs @	19.48 hrs,	Volume=	11.394 af, Atten= 35%, Lag= 10.1 min
Primary	=	86.91 cfs @	19.48 hrs,	Volume=	11.394 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,267.52' @ 19.48 hrs Surf.Area= 0.620 ac Storage= 3.860 af

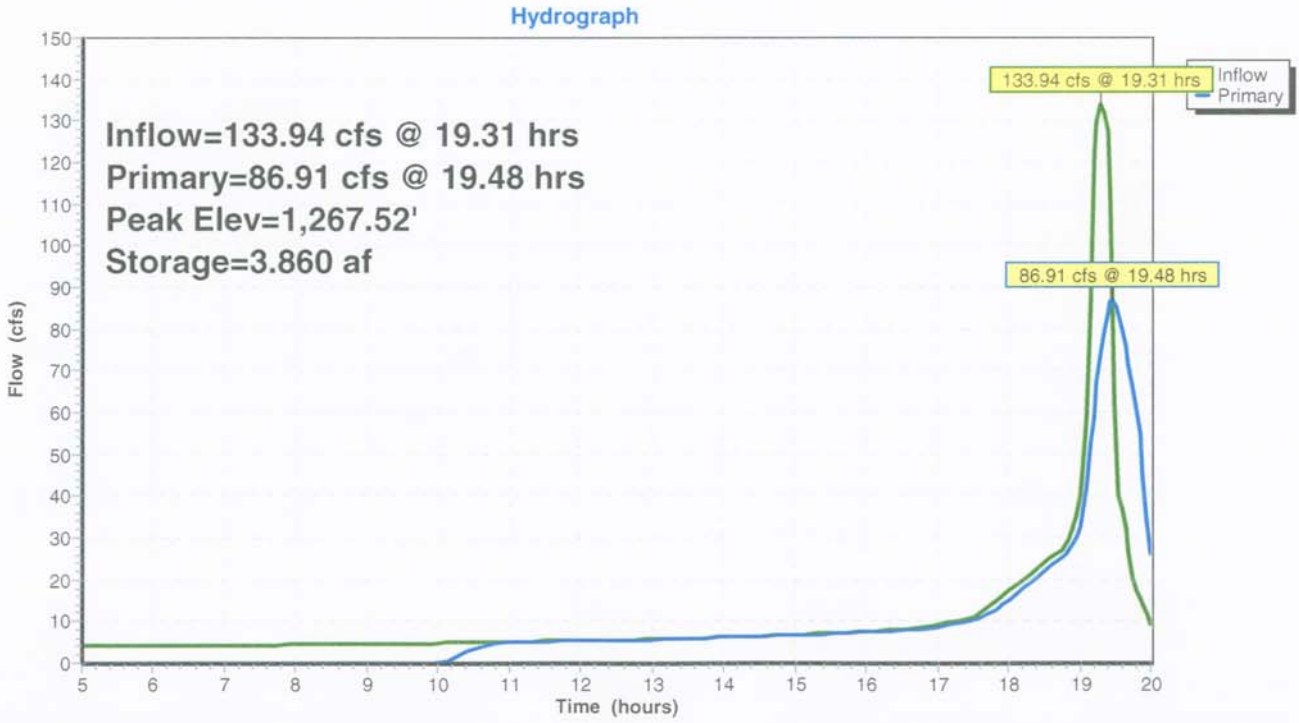
Plug-Flow detention time= 131.6 min calculated for 11.385 af (83% of inflow)
Center-of-Mass det. time= 89.7 min (1,053.5 - 963.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,260.00'	5.494 af	**120.00'W x 150.00'L x 10.00'H Prismatoid Z=2.0**

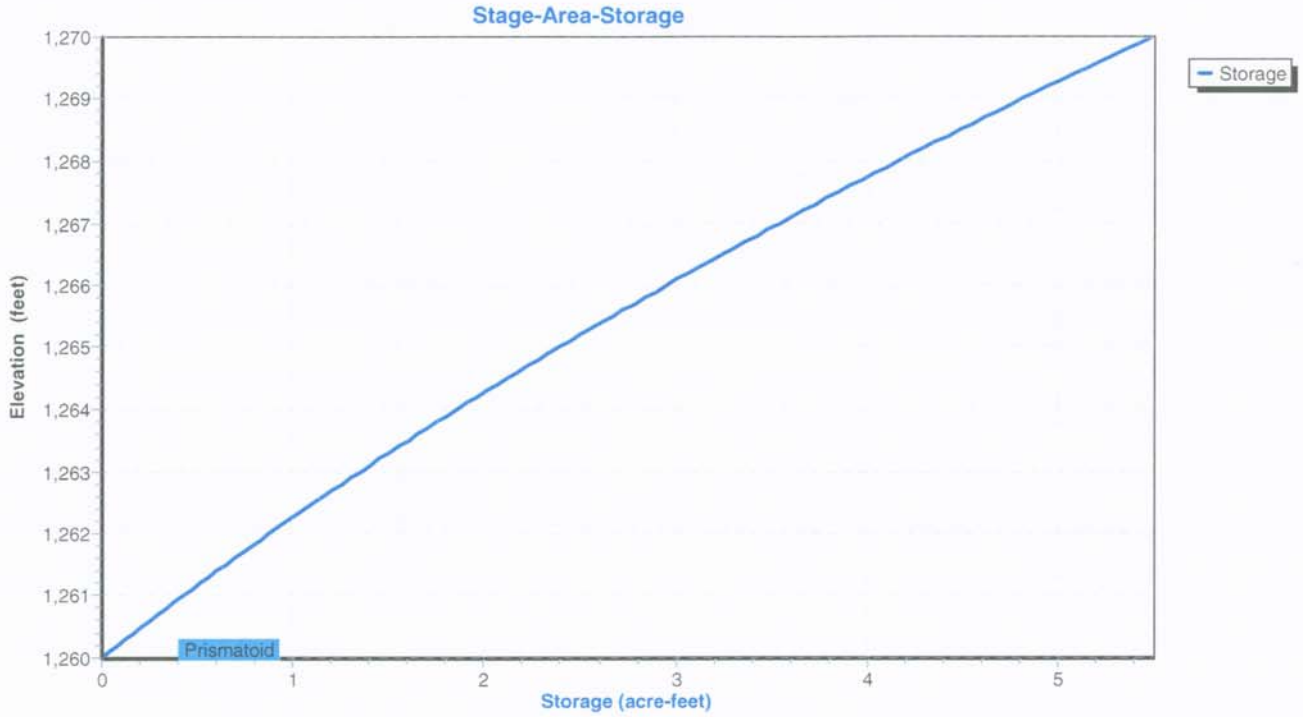
Device	Routing	Invert	Outlet Devices
#1	Primary	1,260.00'	**36.0" Round Culvert** L= 300.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,260.00' / 1,180.00' S= 0.2667 '/' Cc= 0.900 n= 0.013
#2	Device 1	1,264.00'	**42.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=86.54 cfs @ 19.48 hrs HW=1,267.49' (Free Discharge)
└─**1=Culvert** (Passes 86.54 cfs of 113.59 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 86.54 cfs @ 9.00 fps)

Pond 2P: Detention Basin No. 1



Pond 2P: Detention Basin No. 1



Summary for Link 1L: Inflow Hydrograph

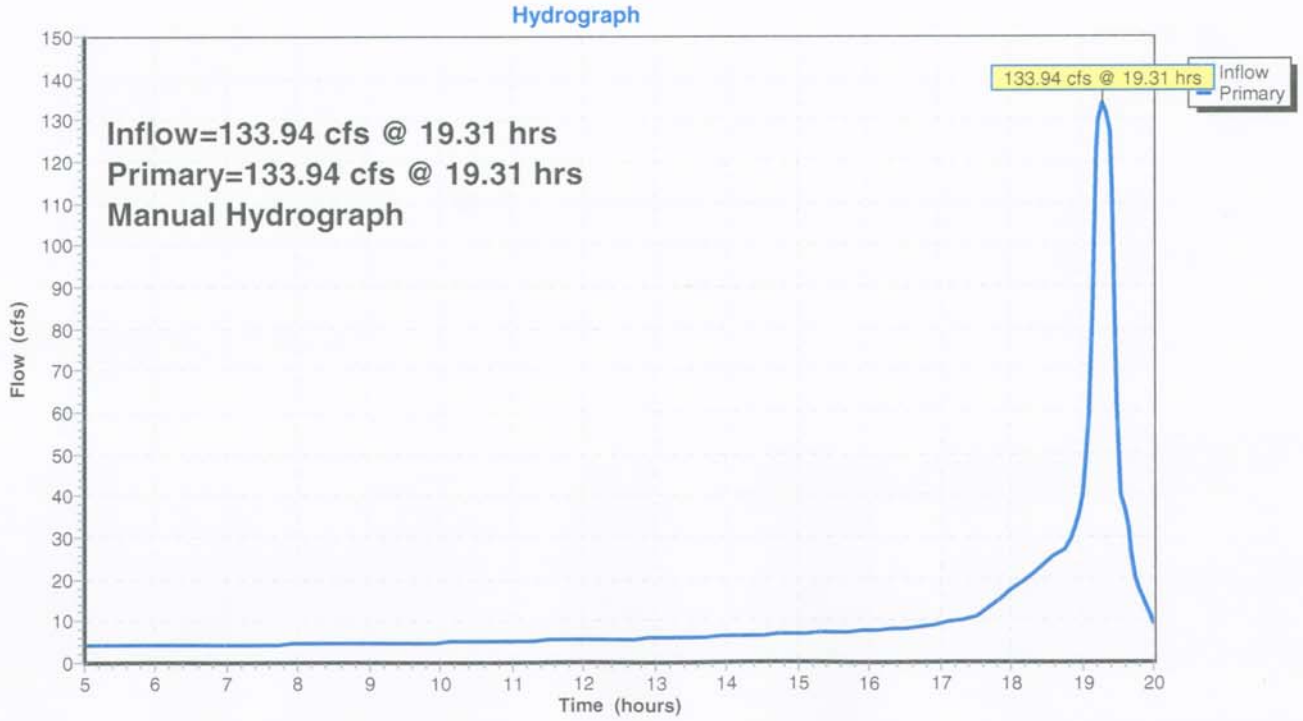
Inflow = 133.94 cfs @ 19.31 hrs, Volume= 13.647 af
Primary = 133.94 cfs @ 19.31 hrs, Volume= 13.647 af, Atten= 0%, Lag= 0.0 min

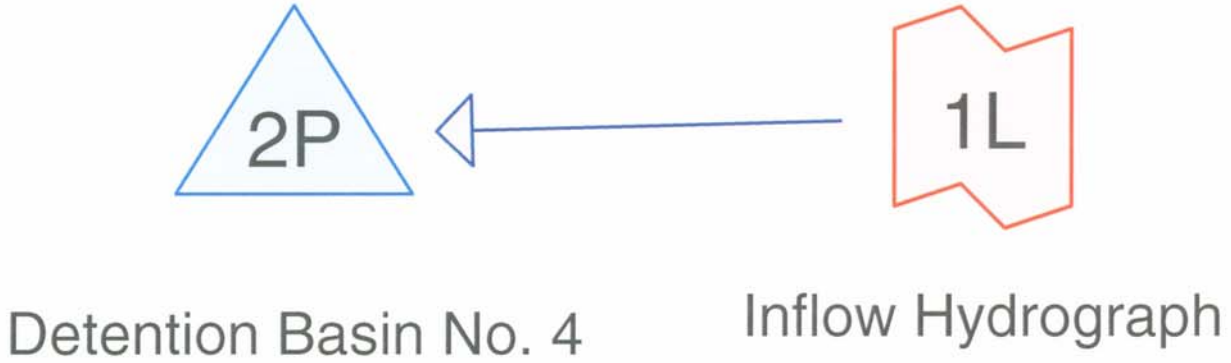
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

313 Point manual hydrograph, To= 0.00 hrs, dt= 0.08 hrs, cfs =

0.00	0.17	0.35	0.52	0.70	0.87	1.05	1.22	1.40	1.57	1.75	1.92	2.10	2.27	2.45
2.62	2.80	2.97	3.15	3.32	3.50	3.67	3.68	3.69	3.69	3.70	3.71	3.72	3.73	3.73
3.74	3.75	3.76	3.77	3.77	3.78	3.79	3.80	3.81	3.81	3.82	3.83	3.84	3.85	3.86
3.87	3.88	3.88	3.89	3.90	3.91	3.92	3.93	3.94	3.95	3.96	3.97	3.98	3.98	3.99
4.00	4.01	4.02	4.03	4.04	4.05	4.06	4.08	4.09	4.10	4.11	4.12	4.13	4.14	4.16
4.17	4.18	4.19	4.20	4.21	4.23	4.24	4.25	4.26	4.27	4.29	4.30	4.31	4.32	4.34
4.35	4.36	4.38	4.39	4.40	4.41	4.43	4.44	4.45	4.47	4.48	4.49	4.50	4.52	4.53
4.55	4.56	4.58	4.59	4.61	4.63	4.64	4.66	4.68	4.69	4.71	4.72	4.74	4.76	4.77
4.79	4.81	4.82	4.84	4.85	4.87	4.89	4.91	4.94	4.96	4.98	5.00	5.02	5.05	5.07
5.09	5.11	5.13	5.16	5.18	5.20	5.22	5.24	5.27	5.29	5.31	5.34	5.36	5.39	5.42
5.45	5.47	5.50	5.53	5.55	5.58	5.61	5.64	5.66	5.69	5.72	5.74	5.77	5.80	5.83
5.85	5.88	5.92	5.96	6.00	6.05	6.09	6.13	6.17	6.21	6.25	6.29	6.34	6.38	6.42
6.46	6.50	6.54	6.58	6.63	6.67	6.71	6.75	6.82	6.88	6.95	7.02	7.08	7.15	7.22
7.28	7.35	7.42	7.48	7.55	7.62	7.68	7.75	7.82	7.88	7.95	8.02	8.08	8.15	8.39
8.62	8.86	9.10	9.34	9.57	9.81	10.05	10.29	10.52	10.76	11.83	12.89	13.96	15.02	16.09
17.15	18.22	19.29	20.35	21.42	22.48	23.55	24.61	25.68	26.74	27.81	30.74	35.96	44.16	63.03
122.01	134.61	131.58	123.04	42.22	36.62	29.41	19.05	15.68	13.52	9.49	8.83	8.36	7.95	7.64
7.41	7.12	6.87	6.66	6.45	6.29	6.16	6.01	5.84	5.72	5.59	5.49	5.37	5.26	5.21
5.15	5.05	5.00	4.95	4.88	4.81	4.74	4.67	4.60	4.52	4.47	4.42	4.38	4.33	4.28
4.22	4.15	4.09	4.06	4.03	3.99	3.95	3.92	3.90	3.87	3.84	3.79	3.75	3.70	3.54
3.38	3.23	3.07	2.91	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75		

Link 1L: Inflow Hydrograph





Drainage Diagram for Shuler Canyon
Prepared by Fuscoe Engineering, Printed 7/12/2010
HydroCAD® 9.10 s/n 05904 © 2009 HydroCAD Software Solutions LLC

Summary for Pond 2P: Detention Basin No. 4

Inflow	=	285.59 cfs @	19.39 hrs, Volume=	30.382 af	
Outflow	=	47.64 cfs @	19.95 hrs, Volume=	1.980 af,	Atten= 83%, Lag= 33.8 min
Primary	=	47.64 cfs @	19.95 hrs, Volume=	1.980 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,046.96' @ 19.95 hrs Surf.Area= 2.606 ac Storage= 28.436 af

Plug-Flow detention time= 810.5 min calculated for 1.955 af (6% of inflow)
Center-of-Mass det. time= 216.6 min (1,185.9 - 969.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,030.00'	36.915 af	**60.00'W x 600.00'L x 20.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,030.00'	**24.0" Round Culvert** L= 400.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,030.00' / 1,000.00' S= 0.0750 '/' Cc= 0.900 n= 0.013
#2	Device 1	1,045.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=47.65 cfs @ 19.95 hrs HW=1,046.96' (Free Discharge)
└─**1=Culvert** (Passes 47.65 cfs of 68.53 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 47.65 cfs @ 6.74 fps)

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	2P	1,030.00	1,000.00	400.0	0.0750	0.013	24.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 2P: Detention Basin No. 4 — Peak Elev=1,046.96' Storage=28.436 af Inflow=285.59 cfs 30.382 af
Outflow=47.64 cfs 1.980 af

Link 1L: Inflow Hydrograph — Manual Hydrograph Inflow=285.59 cfs 30.382 af
Primary=285.59 cfs 30.382 af

Summary for Pond 2P: Detention Basin No. 4

Inflow	=	285.59 cfs @	19.39 hrs,	Volume=	30.382 af
Outflow	=	47.64 cfs @	19.95 hrs,	Volume=	1.980 af, Atten= 83%, Lag= 33.8 min
Primary	=	47.64 cfs @	19.95 hrs,	Volume=	1.980 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,046.96' @ 19.95 hrs Surf.Area= 2.606 ac Storage= 28.436 af

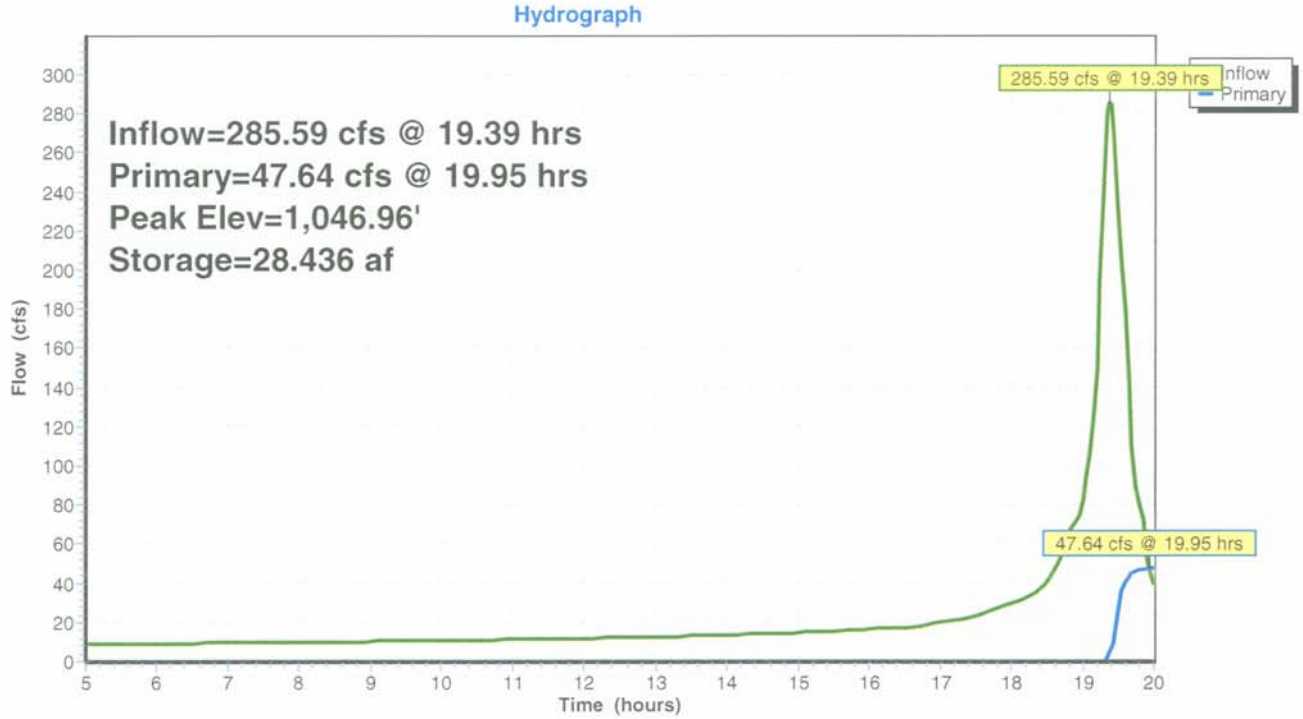
Plug-Flow detention time= 810.5 min calculated for 1.955 af (6% of inflow)
Center-of-Mass det. time= 216.6 min (1,185.9 - 969.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,030.00'	36.915 af	**60.00'W x 600.00'L x 20.00'H Prismatoid Z=3.0**

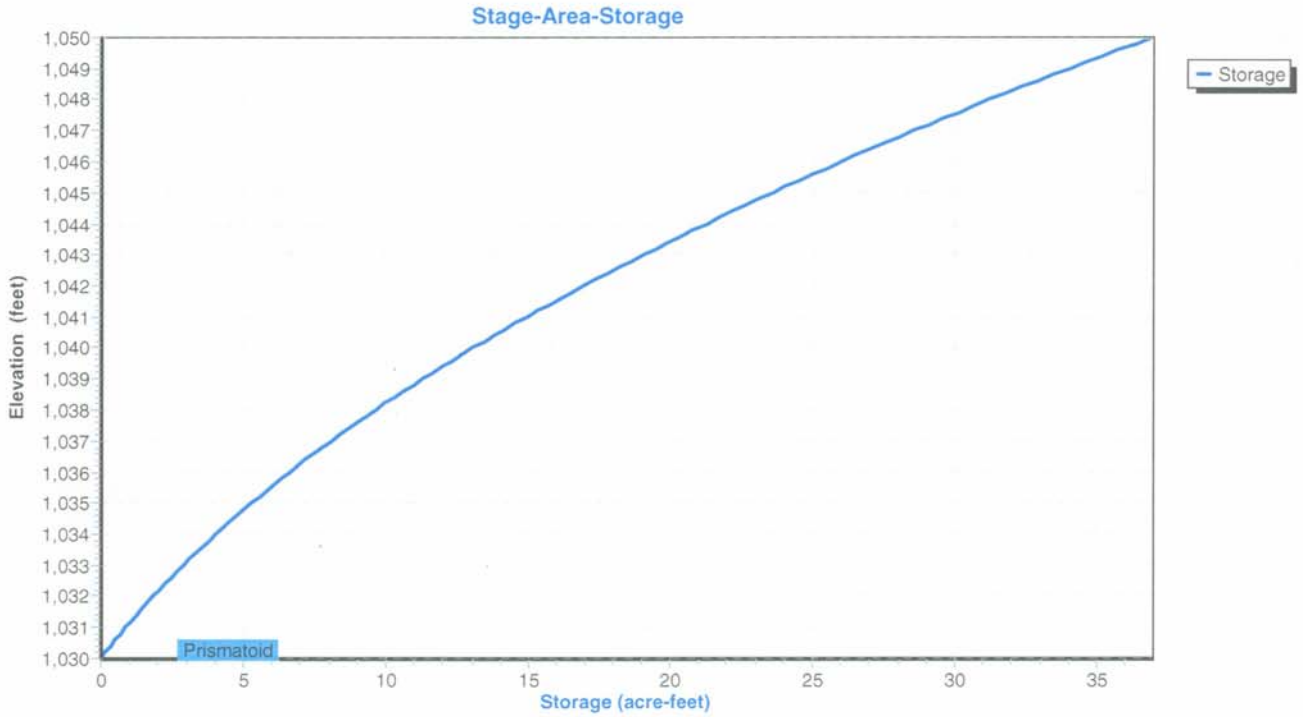
Device	Routing	Invert	Outlet Devices
#1	Primary	1,030.00'	**24.0" Round Culvert** L= 400.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,030.00' / 1,000.00' S= 0.0750 '/' Cc= 0.900 n= 0.013
#2	Device 1	1,045.00'	**36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=47.65 cfs @ 19.95 hrs HW=1,046.96' (Free Discharge)
└─**1=Culvert** (Passes 47.65 cfs of 68.53 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 47.65 cfs @ 6.74 fps)

Pond 2P: Detention Basin No. 4



Pond 2P: Detention Basin No. 4



Summary for Link 1L: Inflow Hydrograph

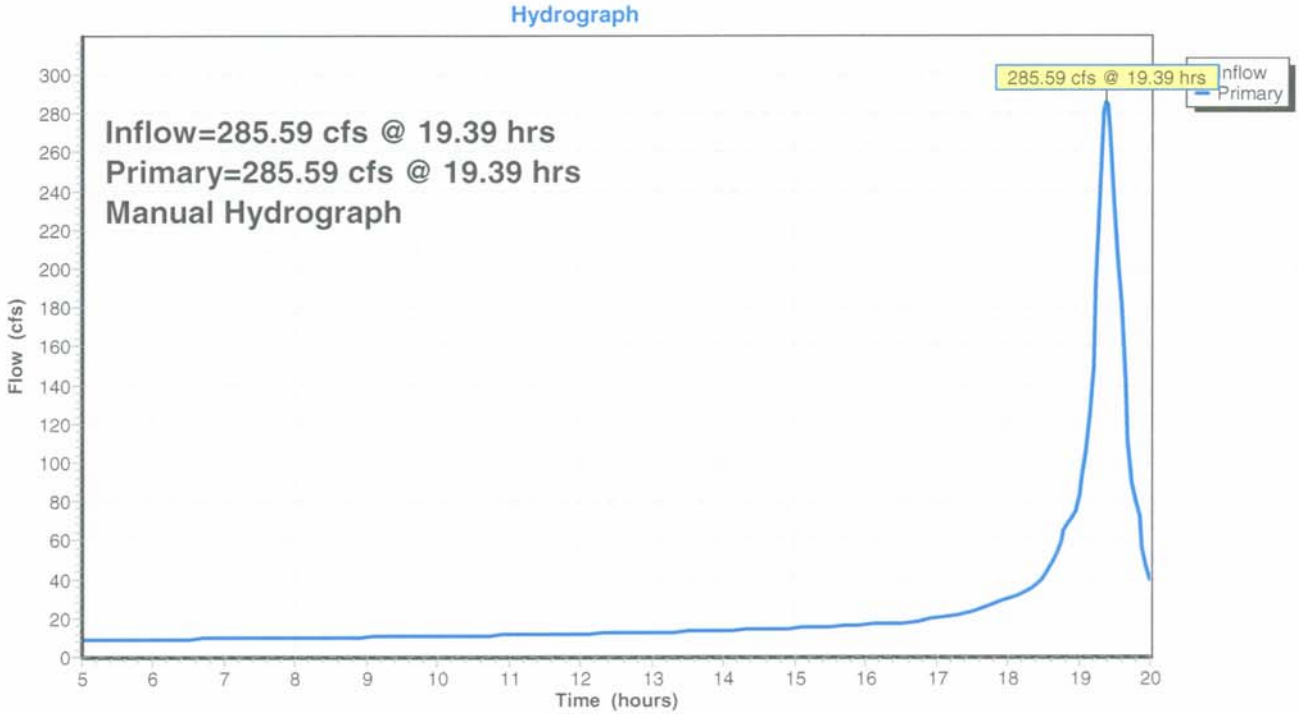
Inflow	=	285.59 cfs @	19.39 hrs, Volume=	30.382 af	
Primary	=	285.59 cfs @	19.39 hrs, Volume=	30.382 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

461 Point manual hydrograph, To= 0.00 hrs, dt= 0.08 hrs, cfs =

0.00	0.39	0.79	1.18	1.57	1.97	2.36	2.75	3.15	3.54	3.93	4.33	4.72	5.11	5.51
5.90	6.29	6.69	7.08	7.47	7.87	8.26	8.27	8.28	8.29	8.31	8.32	8.33	8.34	8.35
8.36	8.37	8.39	8.40	8.41	8.42	8.43	8.44	8.45	8.47	8.48	8.49	8.50	8.52	8.55
8.57	8.59	8.62	8.64	8.66	8.68	8.71	8.73	8.75	8.78	8.80	8.82	8.85	8.87	8.89
8.91	8.94	8.96	8.98	9.01	9.03	9.05	9.08	9.10	9.12	9.15	9.17	9.19	9.22	9.24
9.26	9.29	9.31	9.33	9.36	9.38	9.40	9.43	9.45	9.48	9.51	9.54	9.56	9.59	9.62
9.65	9.68	9.71	9.74	9.76	9.79	9.82	9.85	9.88	9.91	9.94	9.96	9.99	10.02	10.05
10.09	10.12	10.16	10.19	10.23	10.26	10.30	10.33	10.37	10.40	10.44	10.47	10.51	10.54	10.58
10.61	10.65	10.68	10.72	10.75	10.79	10.84	10.88	10.93	10.97	11.02	11.06	11.11	11.15	11.20
11.24	11.29	11.33	11.38	11.42	11.47	11.51	11.56	11.60	11.65	11.69	11.74	11.80	11.87	11.93
11.99	12.05	12.12	12.18	12.24	12.30	12.37	12.43	12.49	12.55	12.62	12.68	12.74	12.80	12.87
12.93	12.99	13.07	13.15	13.23	13.32	13.40	13.48	13.56	13.64	13.72	13.80	13.89	13.97	14.05
14.13	14.21	14.29	14.37	14.45	14.54	14.62	14.70	14.78	14.93	15.08	15.23	15.37	15.52	15.67
15.82	15.97	16.12	16.27	16.41	16.56	16.71	16.86	17.01	17.16	17.30	17.45	17.60	17.75	18.21
18.66	19.12	19.57	20.03	20.48	20.94	21.39	21.85	22.30	22.76	23.95	25.14	26.34	27.53	28.72
29.91	31.10	32.30	33.49	34.68	37.25	39.82	43.20	48.34	56.20	65.00	70.00	75.00	90.00	110.00
150.00	220.00	290.00	280.00	220.00	180.00	120.00	85.00	75.00	50.00	40.00	31.74	27.78	24.73	22.49
20.79	19.45	18.34	17.40	16.70	16.37	15.81	15.28	14.92	14.50	14.14	13.83	13.45	13.22	12.91
12.80	12.55	12.30	12.05	11.80	11.61	11.42	11.24	11.05	10.86	10.80	10.71	10.55	10.42	10.30
10.18	10.06	9.94	9.83	9.71	9.59	9.47	9.35	9.31	9.16	9.09	9.03	8.96	8.89	8.83
8.76	8.70	8.63	8.56	8.50	8.43	8.36	8.30	8.23	8.17	8.10	8.03	7.97	7.90	7.37
6.85	6.32	5.79	5.27	4.74	4.21	3.69	3.16	2.63	2.11	1.58	1.05	0.53	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

Link 1L: Inflow Hydrograph



Appendix G

4/19/07

PRELIMINARY DRAINAGE STUDY
AND
HYDRAULIC CALCULATIONS

PREPARED FOR:

TRACT NO. 62872

CITY OF SAN DIMAS

PREPARED BY:

SITETECH, INC.
38248 POTATO CANYON RD.
OAK GLEN, CA. 92399
PH: (909) 864-3180

REGISTERED PROFESSIONAL ENGINEER
BERNHARD K. MAYER
No. 36866
Exp. 6-30-06
CIVIL
STATE OF CALIFORNIA

8-10-06

BERNHARD K. MAYER | R.C.E. 36866 | DATE

INTRODUCTION

TTM 62872 is located in the City of San Dimas near the northerly terminus of Cataract Avenue. The project is comprised of 33.36 Ac (gross) and 6.18 Ac (developed). Development will consist of the construction of 9 residential lots and 1 debris basin located upstream of the lots with a storm drain to convey flows through the development.

The purpose of this study is determine the rate of stormwater runoff (both onsite and offsite), and to provide calculations to determine the sizes of the proposed storm drain facilities including the proposed debris basin, in conformance with local regulations.

WATERSHED DESCRIPTION

Existing Condition

The development area in the existing condition is gradually sloped from 5% to 15% grade and covered with perennial grasses and bordered with steep hills to the north. Off-site storm runoff generated in the foothills amount to 135 acres of tributary drainage area. In this condition, the site drains generally to the southwest corner of the site and toward Cataract Avenue.

The total study area comprises 146 acres in the existing condition.

Developed Condition

When developed, on-site runoff will be conveyed through the proposed streets, then into catch basins to be conveyed downstream through an underground storm drain.

Off-site runoff is collected in a proposed debris basin and then conveyed by a proposed storm drain in the streets and outlet downstream of the development back into a natural drainage course.

METHODOLOGY

Modified Rational Method Hydrology

Modified Rational method hydrology calculations were undertaken in conformance with the Los Angeles Department of Public Works Hydrology Manual (December 1991). The following scenario was modeled:

Off-site Existing condition	50-year
On-site Existing condition	50-year
On-site Developed condition	50-year

Rainfall depth was derived from the Manual's isohyetal maps and intensity-duration charts.

Hydrologic soil classification was no. 80 which is described as Upper San Gabriel River (USGR-F).

Modified Rational method computations were performed using the Tc Calculator ver. 2.03. Intensity, runoff coefficients, and discharge were calculated for each sub area by the software, based on user input of rainfall, soil type, acreage, and land use parameters.

Printouts of the modified rational method calculations, as well as applicable tables from the Manual, are included in this report.

Discharges for each subarea are shown on the Drainage Area Maps included with this report. The proposed storm drain system, with catch basin locations, are shown on the map for reference.

Preliminary Design of Debris/Detention Basin

The proposed debris/detention basin is designed to mitigate the debris production and also mitigate increased run-off due to this development for storms up to and including the 50-year event. The outlet works will be designed to convey up to 50-year flows. Flows greater than the 50-year storm are conveyed through a secondary outlet structure which also acts as an emergency spillway in the event of the failure of the outlet works.

The debris production is determined based on being in a debris potential area zone of DPA-1 and the tributary drainage area to the basin of 0.21 sq. mi. The design volume of the basin is determine based on a calculated debris cone slope finish surface.

In accordance with Los Angeles County Department of Public Works procedures, preliminary calculations resulted in the following:

Offsite debris production: 37,170 cu. yd.
Actual design volume: ~~37,170~~ 40,570 cu. yd. **OK**

Additional analysis was performed to quantify the reduction in downstream flow due to the detention capabilities of the basin. The minimum detention requirements were determined by comparing the following 2 calculations:

Onsite: 50-year / 24-hour existing and developed condition

In accordance with Los Angeles County Department of Public Works procedures, preliminary calculations resulted in the following:

Onsite increased volume from development: 61,942 cu. ~~yd.~~ ft. 2,355
Actual design volume in excess of debris storage: 91,851 cu. ~~yd.~~ ft. **OK** 3,400 C.Y.

CONCLUSIONS

This preliminary study and the calculations presented herein demonstrate the adequacy of the proposed drainage improvements to protect structures from flooding in the 50-year storm event, and conformance to hydrologic and hydraulic concepts and criteria, as mandated by the participating regulatory agencies.

TC CALCULATOR ANALYSIS

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1A	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
135.37	0	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.7	4548	0.1396

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
135.37	0	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.7	4548	0.1396

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1A	2.45	0.63	0.63

☑ Calculate Runoff Volume

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
19	208.94	255.84	16.59

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1B	1	
Area (Acres)	**Rroportion Impervious**	**Soil Type**
2.305	0.10	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	607	0.2883

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
2.305	0.1	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	607	0.2883

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

☑ Calculate Runoff Volume

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1B	4.53	0.75	0.77

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
5	8.04	9	0.38

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1C	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
0.903	0.10	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	565	0.1717

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
0.903	0.1	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	565	0.1717

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

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○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

☑ Calculate Runoff Volume

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1C	4.53	0.75	0.77

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24 Hour Runoff Volume (acre-ft)
5	3.15	3.53	0.15

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1D	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
3.599	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	885	0.2186

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
3.599	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	885	0.2186

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1D	4.53	0.75	0.8

☑ Calculate Runoff Volume

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24 Hour Runoff Volume (acre-ft)
5	13.04	n/a	0.92

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1E	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
1.678	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	810	0.0496

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
1.678	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	810	0.0496

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

☑ Calculate Runoff Volume

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1E	3.87	0.73	0.78

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
7	5.07	n/a	0.43

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1F	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
1.049	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	429	0.0513

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
1.049	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	429	0.0513

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

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○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1F	4.53	0.75	0.8

☑ Calculate Runoff Volume

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
5	3.8	n/a	0.27

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1G	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
0.982	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	668	0.0737

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
0.982	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	668	0.0737

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1G	4.53	0.75	0.8

☑ Calculate Runoff Volume

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
5	3.56	n/a	0.25

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
1H	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
2.574	0.15	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	962	0.1881

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
2.574	0.15	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	962	0.1881

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

☑ Calculate Runoff Volume

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
1H	4.16	0.74	0.76

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
6	8.14	9.14	0.48

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
2A	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
13.089	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	1334	0.1672

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
13.089	0.3	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	1334	0.1672

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

☑ Calculate Runoff Volume

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
2A	3.87	0.73	0.78

Calculate Tc

Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
7	39.51	n/a	3.37

Tc Calculator

Subarea Parameters Manual Input

Subarea Number	Fire Factor	
2B	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
13.089	0.05	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	1334	0.1672

Subarea Parameters Selected

Subarea Number	Fire Factor	
1a	1	
Area (Acres)	**Proportion Impervious**	**Soil Type**
13.089	0.05	80
Rainfall Isohyet (in.)	**Flow Path Length (ft.)**	**Flow Path Slope**
7.6	1334	0.1672

Input File

☐ Check Here If Subarea Parameters Are Defined In An Input File

Import "tcdata.xls" File

○ Calculate Single Tc From Subarea Parameters Provided In Input File

◉ Calculate Tc's For Multiple Subareas And Create Tc Results File

Calculation Results

Subarea Number	Intensity	Undeveloped Runoff Coefficient (Cu)	Developed Runoff Coefficient (Cd)
2B	3.64	0.71	0.72

☑ Calculate Runoff Volume

Calculate Tc

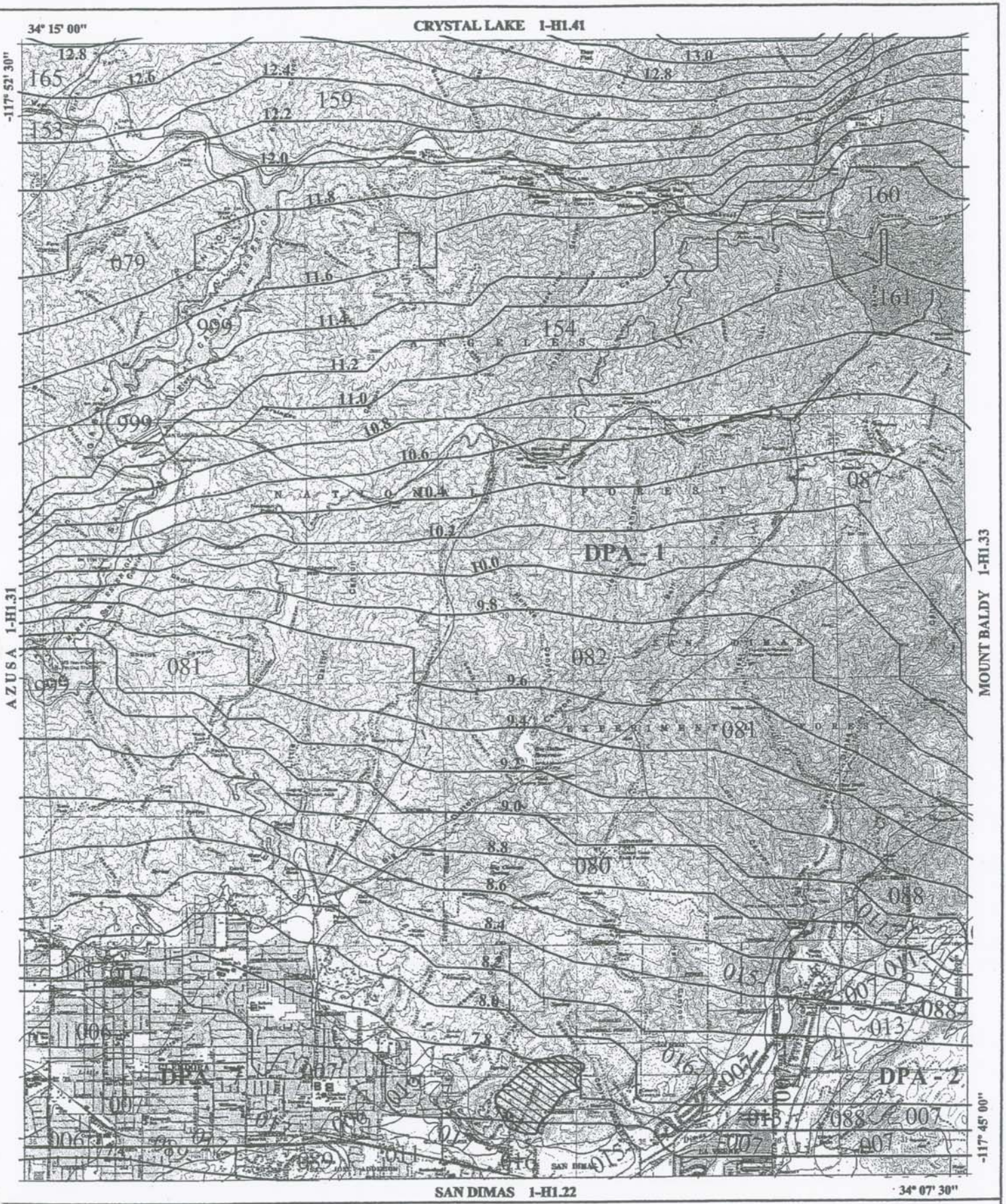
Cancel

Tc Equation

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Tc Value (min.)	Peak Flow Rate (cfs)	Burned Peak Flow Rate (cfs)	24-Hour Runoff Volume (acre-ft)
8	34.3	39.63	1.91

LADPW REFERENCE MAPS & TABLES



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

GLENDORA
50-YEAR 24-HOUR ISOHYET

1-H1.32

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

DEBRIS BASIN DETENTION CAPACITY

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Tuesday, Aug 1 2006, 4:3 PM

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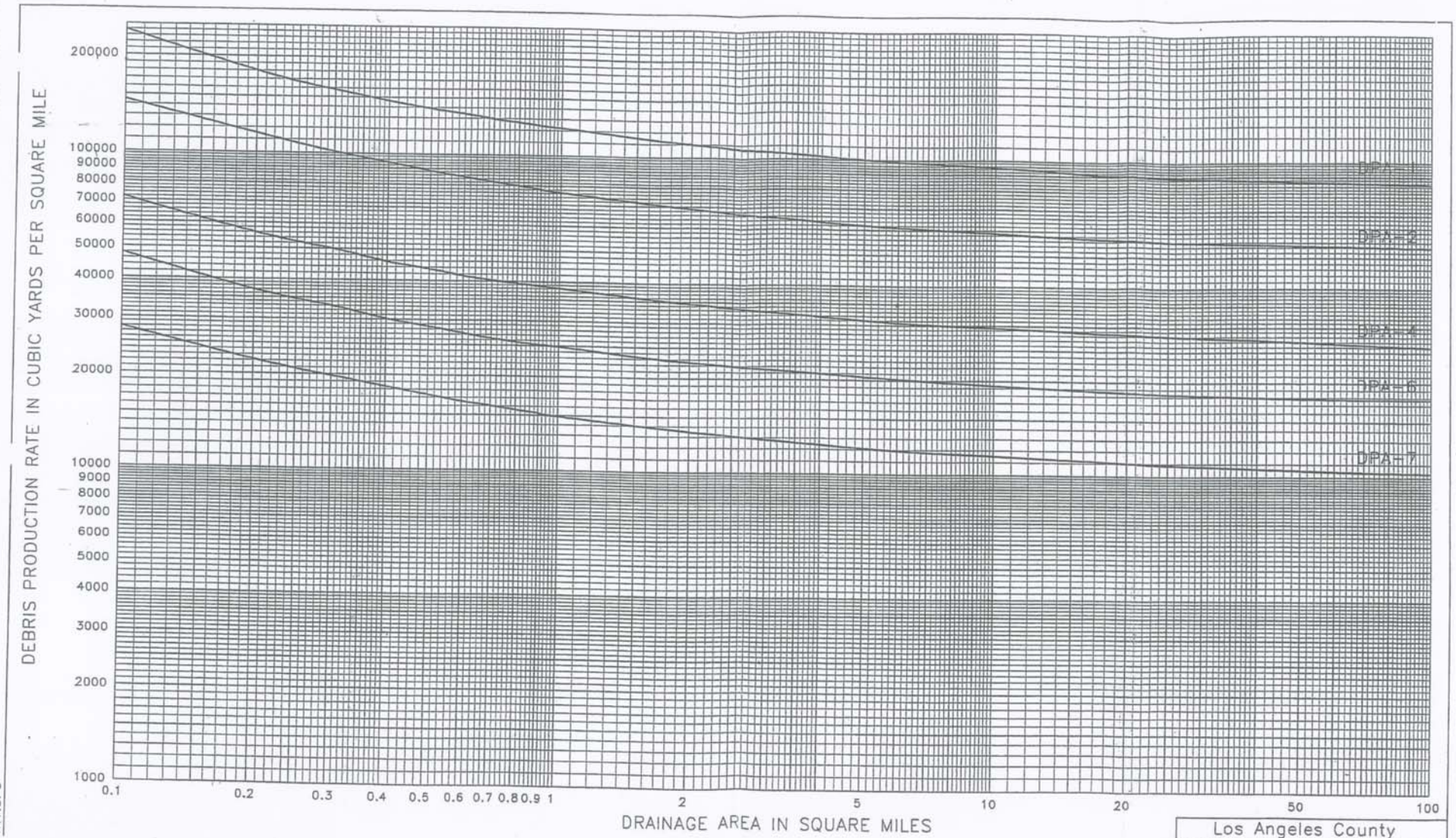
Pond Report 6

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Mod. Rational	----	----	----	----	----	----	----	219.38	----	1A
2	Reservoir	1	----	----	----	----	----	----	83.99	----	BASIN

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Mod. Rational	219.38	1	19	250,091	---	-----	-----	1A
2	Reservoir	83.99	1	31	250,090	1	1063.88	126,778	BASIN



Los Angeles County
Department of Public Works

DEBRIS PRODUCTION RATES
for Los Angeles Basin

DP JH1.SPG

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Mod. Rational	219.38	1	19	250,091	---	-----	-----	1A
2	Reservoir	185.85	1	22	242,113	1	1079.00	61,942	BASIN

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Aug 1 2006, 4:3 PM

Hyd. No. 1

1A

Hydrograph type	= Mod. Rational	Peak discharge	= 219.38 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Drainage area	= 134.9 ac	Runoff coeff.	= 0.63
Intensity	= 2.582 in/hr	Tc by User	= 19 min
IDF Curve	= TR62872.IDF	Storm duration	= 1 x Tc

Hydrograph Volume = 250,091 cuft

(Printed values >= 1% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (min	cfs)	Time -- Outflow (min	cfs)
1	11.55	35	34.64
2	23.09	36	23.09
3	34.64	37	11.55
4	46.18		
5	57.73		
6	69.28	...*End*	
7	80.82		
8	92.37		
9	103.92		
10	115.46		
11	127.01		
12	138.55		
13	150.10		
14	161.65		
15	173.19		
16	184.74		
17	196.29		
18	207.83		
19	219.38 <<		
20	207.83		
21	196.29		
22	184.74		
23	173.19		
24	161.65		
25	150.10		
26	138.55		
27	127.01		
28	115.46		
29	103.92		
30	92.37		
31	80.82		
32	69.28		
33	57.73		
34	46.18		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Aug 1 2006, 4:3 PM

Hyd. No. 2

BASIN

Hydrograph type	= Reservoir	Peak discharge	= 83.99 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Inflow hyd. No.	= 1	Reservoir name	= BASIN
Max. Elevation	= 1063.88 ft	Max. Storage	= 126,778 cuft

Storage Indication method used.

Outflow hydrograph volume = 250,090 cuft

(Printed values >= 1% of Qp.)

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
2	23.09	1050.47	1.58	-----	-----	-----	-----	-----	-----	-----	-----	1.58
3	34.64	1051.00	6.28	-----	-----	-----	-----	-----	-----	-----	-----	6.28
4	46.18	1051.64	14.94	-----	-----	-----	-----	-----	-----	-----	-----	14.94
5	57.73	1052.33	24.37	-----	-----	-----	-----	-----	-----	-----	-----	24.37
6	69.28	1053.09	32.01	-----	-----	-----	-----	-----	-----	-----	-----	32.01
7	80.82	1053.94	38.73	-----	-----	-----	-----	-----	-----	-----	-----	38.73
8	92.37	1054.90	45.10	-----	-----	-----	-----	-----	-----	-----	-----	45.10
9	103.92	1055.32	47.67	-----	-----	-----	-----	-----	-----	-----	-----	47.67
10	115.46	1055.74	50.06	-----	-----	-----	-----	-----	-----	-----	-----	50.06
11	127.01	1056.22	52.68	-----	-----	-----	-----	-----	-----	-----	-----	52.68
12	138.55	1056.76	55.48	-----	-----	-----	-----	-----	-----	-----	-----	55.48
13	150.10	1057.37	58.43	-----	-----	-----	-----	-----	-----	-----	-----	58.43
14	161.65	1058.03	61.51	-----	-----	-----	-----	-----	-----	-----	-----	61.51
15	173.19	1058.74	64.68	-----	-----	-----	-----	-----	-----	-----	-----	64.68
16	184.74	1059.52	67.95	-----	-----	-----	-----	-----	-----	-----	-----	67.95
17	196.29	1060.17	70.59	-----	-----	-----	-----	-----	-----	-----	-----	70.59
18	207.83	1060.61	72.31	-----	-----	-----	-----	-----	-----	-----	-----	72.31
19	219.38 <<	1061.09	74.11	-----	-----	-----	-----	-----	-----	-----	-----	74.11
20	207.83	1061.55	75.85	-----	-----	-----	-----	-----	-----	-----	-----	75.85
21	196.29	1061.97	77.39	-----	-----	-----	-----	-----	-----	-----	-----	77.39
22	184.74	1062.35	78.74	-----	-----	-----	-----	-----	-----	-----	-----	78.74
23	173.19	1062.69	79.92	-----	-----	-----	-----	-----	-----	-----	-----	79.92
24	161.65	1062.98	80.94	-----	-----	-----	-----	-----	-----	-----	-----	80.94
25	150.10	1063.23	81.80	-----	-----	-----	-----	-----	-----	-----	-----	81.80
26	138.55	1063.44	82.51	-----	-----	-----	-----	-----	-----	-----	-----	82.51
27	127.01	1063.61	83.08	-----	-----	-----	-----	-----	-----	-----	-----	83.08
28	115.46	1063.74	83.50	-----	-----	-----	-----	-----	-----	-----	-----	83.50
29	103.92	1063.82	83.80	-----	-----	-----	-----	-----	-----	-----	-----	83.80
30	92.37	1063.87	83.96	-----	-----	-----	-----	-----	-----	-----	-----	83.96
31	80.82	1063.88 <<	83.99	-----	-----	-----	-----	-----	-----	-----	-----	83.99 <<
32	69.28	1063.85	83.89	-----	-----	-----	-----	-----	-----	-----	-----	83.89
33	57.73	1063.78	83.66	-----	-----	-----	-----	-----	-----	-----	-----	83.66
34	46.18	1063.68	83.30	-----	-----	-----	-----	-----	-----	-----	-----	83.30
35	34.64	1063.53	82.82	-----	-----	-----	-----	-----	-----	-----	-----	82.82
36	23.09	1063.35	82.21	-----	-----	-----	-----	-----	-----	-----	-----	82.21
37	11.55	1063.14	81.47	-----	-----	-----	-----	-----	-----	-----	-----	81.47
38	0.00	1062.88	80.60	-----	-----	-----	-----	-----	-----	-----	-----	80.60
39	0.00	1062.61	79.66	-----	-----	-----	-----	-----	-----	-----	-----	79.66

Continues on next page...

BASIN

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
40	0.00	1062.35	78.72	-----	-----	-----	-----	-----	-----	-----	-----	78.72
41	0.00	1062.08	77.78	-----	-----	-----	-----	-----	-----	-----	-----	77.78
42	0.00	1061.82	76.84	-----	-----	-----	-----	-----	-----	-----	-----	76.84
43	0.00	1061.57	75.90	-----	-----	-----	-----	-----	-----	-----	-----	75.90
44	0.00	1061.31	74.95	-----	-----	-----	-----	-----	-----	-----	-----	74.96
45	0.00	1061.06	74.02	-----	-----	-----	-----	-----	-----	-----	-----	74.02
46	0.00	1060.81	73.08	-----	-----	-----	-----	-----	-----	-----	-----	73.07
47	0.00	1060.57	72.14	-----	-----	-----	-----	-----	-----	-----	-----	72.14
48	0.00	1060.33	71.20	-----	-----	-----	-----	-----	-----	-----	-----	71.20
49	0.00	1060.09	70.26	-----	-----	-----	-----	-----	-----	-----	-----	70.26
50	0.00	1059.70	68.71	-----	-----	-----	-----	-----	-----	-----	-----	68.71
51	0.00	1059.24	66.78	-----	-----	-----	-----	-----	-----	-----	-----	66.78
52	0.00	1058.79	64.86	-----	-----	-----	-----	-----	-----	-----	-----	64.86
53	0.00	1058.35	62.94	-----	-----	-----	-----	-----	-----	-----	-----	62.94
54	0.00	1057.92	61.02	-----	-----	-----	-----	-----	-----	-----	-----	61.02
55	0.00	1057.51	59.11	-----	-----	-----	-----	-----	-----	-----	-----	59.11
56	0.00	1057.11	57.18	-----	-----	-----	-----	-----	-----	-----	-----	57.18
57	0.00	1056.72	55.25	-----	-----	-----	-----	-----	-----	-----	-----	55.25
58	0.00	1056.35	53.33	-----	-----	-----	-----	-----	-----	-----	-----	53.33
59	0.00	1055.98	51.42	-----	-----	-----	-----	-----	-----	-----	-----	51.42
60	0.00	1055.64	49.48	-----	-----	-----	-----	-----	-----	-----	-----	49.48
61	0.00	1055.30	47.56	-----	-----	-----	-----	-----	-----	-----	-----	47.56
62	0.00	1054.95	45.43	-----	-----	-----	-----	-----	-----	-----	-----	45.43
63	0.00	1054.04	39.45	-----	-----	-----	-----	-----	-----	-----	-----	39.45
64	0.00	1053.26	33.42	-----	-----	-----	-----	-----	-----	-----	-----	33.42
65	0.00	1052.61	27.45	-----	-----	-----	-----	-----	-----	-----	-----	27.45
66	0.00	1052.08	21.31	-----	-----	-----	-----	-----	-----	-----	-----	21.31
67	0.00	1051.69	15.64	-----	-----	-----	-----	-----	-----	-----	-----	15.64
68	0.00	1051.40	11.50	-----	-----	-----	-----	-----	-----	-----	-----	11.49
69	0.00	1051.18	8.65	-----	-----	-----	-----	-----	-----	-----	-----	8.65
70	0.00	1051.02	6.51	-----	-----	-----	-----	-----	-----	-----	-----	6.51
71	0.00	1050.89	5.28	-----	-----	-----	-----	-----	-----	-----	-----	5.28
72	0.00	1050.79	4.34	-----	-----	-----	-----	-----	-----	-----	-----	4.34
73	0.00	1050.71	3.57	-----	-----	-----	-----	-----	-----	-----	-----	3.57
74	0.00	1050.64	2.93	-----	-----	-----	-----	-----	-----	-----	-----	2.93
75	0.00	1050.58	2.41	-----	-----	-----	-----	-----	-----	-----	-----	2.41
76	0.00	1050.53	1.98	-----	-----	-----	-----	-----	-----	-----	-----	1.98
77	0.00	1050.49	1.66	-----	-----	-----	-----	-----	-----	-----	-----	1.67
78	0.00	1050.46	1.55	-----	-----	-----	-----	-----	-----	-----	-----	1.55
79	0.00	1050.43	1.44	-----	-----	-----	-----	-----	-----	-----	-----	1.44
80	0.00	1050.40	1.34	-----	-----	-----	-----	-----	-----	-----	-----	1.34
81	0.00	1050.37	1.25	-----	-----	-----	-----	-----	-----	-----	-----	1.25
82	0.00	1050.34	1.16	-----	-----	-----	-----	-----	-----	-----	-----	1.16
83	0.00	1050.32	1.08	-----	-----	-----	-----	-----	-----	-----	-----	1.08
84	0.00	1050.30	1.00	-----	-----	-----	-----	-----	-----	-----	-----	1.00
85	0.00	1050.28	0.93	-----	-----	-----	-----	-----	-----	-----	-----	0.93
86	0.00	1050.26	0.87	-----	-----	-----	-----	-----	-----	-----	-----	0.87

...End

Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Aug 1 2006, 4:3 PM

Pond No. 1 - BASIN

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1050.00	953	0	0
5.00	1055.00	4,651	14,010	14,010
10.00	1060.00	12,785	43,590	57,600
15.00	1065.00	22,869	89,135	146,735
20.00	1070.00	34,031	142,250	288,985
25.00	1075.00	48,558	206,473	495,458
30.00	1080.00	63,751	280,773	776,230

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 30.00	0.00	0.00	0.00
Span (in)	= 30.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1050.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 1080.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	1050.00	0.00	---	---	---	0.00	---	---	---	---	0.00
0.50	1,401	1050.50	1.69	---	---	---	0.00	---	---	---	---	1.69
1.00	2,802	1051.00	6.25	---	---	---	0.00	---	---	---	---	6.25
1.50	4,203	1051.50	12.84	---	---	---	0.00	---	---	---	---	12.84
2.00	5,604	1052.00	20.28	---	---	---	0.00	---	---	---	---	20.28
2.50	7,005	1052.50	26.42	---	---	---	0.00	---	---	---	---	26.42
3.00	8,406	1053.00	31.26	---	---	---	0.00	---	---	---	---	31.26
3.50	9,807	1053.50	35.45	---	---	---	0.00	---	---	---	---	35.45
4.00	11,208	1054.00	39.19	---	---	---	0.00	---	---	---	---	39.19
4.50	12,609	1054.50	42.60	---	---	---	0.00	---	---	---	---	42.60
5.00	14,010	1055.00	45.76	---	---	---	0.00	---	---	---	---	45.76
5.50	18,369	1055.50	48.72	---	---	---	0.00	---	---	---	---	48.72
6.00	22,728	1056.00	51.51	---	---	---	0.00	---	---	---	---	51.51
6.50	27,087	1056.50	54.15	---	---	---	0.00	---	---	---	---	54.15
7.00	31,446	1057.00	56.67	---	---	---	0.00	---	---	---	---	56.67
7.50	35,805	1057.50	59.08	---	---	---	0.00	---	---	---	---	59.08
8.00	40,164	1058.00	61.40	---	---	---	0.00	---	---	---	---	61.40
8.50	44,523	1058.50	63.63	---	---	---	0.00	---	---	---	---	63.63
9.00	48,882	1059.00	65.79	---	---	---	0.00	---	---	---	---	65.79
9.50	53,241	1059.50	67.88	---	---	---	0.00	---	---	---	---	67.88
10.00	57,600	1060.00	69.91	---	---	---	0.00	---	---	---	---	69.91
10.50	66,514	1060.50	71.88	---	---	---	0.00	---	---	---	---	71.88
11.00	75,427	1061.00	73.79	---	---	---	0.00	---	---	---	---	73.79
11.50	84,341	1061.50	75.66	---	---	---	0.00	---	---	---	---	75.66
12.00	93,254	1062.00	77.48	---	---	---	0.00	---	---	---	---	77.48
12.50	102,168	1062.50	79.27	---	---	---	0.00	---	---	---	---	79.27
13.00	111,081	1063.00	81.01	---	---	---	0.00	---	---	---	---	81.01
13.50	119,995	1063.50	82.71	---	---	---	0.00	---	---	---	---	82.71
14.00	128,908	1064.00	84.38	---	---	---	0.00	---	---	---	---	84.38
14.50	137,822	1064.50	86.02	---	---	---	0.00	---	---	---	---	86.02
15.00	146,735	1065.00	87.63	---	---	---	0.00	---	---	---	---	87.63

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BASIN

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
15.50	160,960	1065.50	89.21	—	—	—	0.00	—	—	—	—	89.21
16.00	175,185	1066.00	90.76	—	—	—	0.00	—	—	—	—	90.76
16.50	189,410	1066.50	92.29	—	—	—	0.00	—	—	—	—	92.29
17.00	203,635	1067.00	93.79	—	—	—	0.00	—	—	—	—	93.79
17.50	217,860	1067.50	95.27	—	—	—	0.00	—	—	—	—	95.27
18.00	232,085	1068.00	96.72	—	—	—	0.00	—	—	—	—	96.72
18.50	246,310	1068.50	98.15	—	—	—	0.00	—	—	—	—	98.15
19.00	260,535	1069.00	99.57	—	—	—	0.00	—	—	—	—	99.57
19.50	274,760	1069.50	100.96	—	—	—	0.00	—	—	—	—	100.96
20.00	288,985	1070.00	102.33	—	—	—	0.00	—	—	—	—	102.33
20.50	309,632	1070.50	103.69	—	—	—	0.00	—	—	—	—	103.69
21.00	330,280	1071.00	105.03	—	—	—	0.00	—	—	—	—	105.03
21.50	350,927	1071.50	106.35	—	—	—	0.00	—	—	—	—	106.35
22.00	371,574	1072.00	107.65	—	—	—	0.00	—	—	—	—	107.65
22.50	392,221	1072.50	108.94	—	—	—	0.00	—	—	—	—	108.94
23.00	412,869	1073.00	110.21	—	—	—	0.00	—	—	—	—	110.21
23.50	433,516	1073.50	111.47	—	—	—	0.00	—	—	—	—	111.47
24.00	454,163	1074.00	112.72	—	—	—	0.00	—	—	—	—	112.72
24.50	474,810	1074.50	113.95	—	—	—	0.00	—	—	—	—	113.95
25.00	495,458	1075.00	115.17	—	—	—	0.00	—	—	—	—	115.17
25.50	523,535	1075.50	116.38	—	—	—	0.00	—	—	—	—	116.38
26.00	551,612	1076.00	117.57	—	—	—	0.00	—	—	—	—	117.57
26.50	579,689	1076.50	118.75	—	—	—	0.00	—	—	—	—	118.75
27.00	607,767	1077.00	119.92	—	—	—	0.00	—	—	—	—	119.92
27.50	635,844	1077.50	121.08	—	—	—	0.00	—	—	—	—	121.08
28.00	663,921	1078.00	122.23	—	—	—	0.00	—	—	—	—	122.23
28.50	691,998	1078.50	123.37	—	—	—	0.00	—	—	—	—	123.37
29.00	720,076	1079.00	124.49	—	—	—	0.00	—	—	—	—	124.49
29.50	748,153	1079.50	125.61	—	—	—	0.00	—	—	—	—	125.61
30.00	776,230	1080.00	126.72	—	—	—	0.00	—	—	—	—	126.72

...End

HYDRAULIC & BASIN CALCULATIONS

HYDRAULIC CALCULATIONS

DETERMINE CAPACITY OF 42" RCP AT 5.0% MIN. GRADE:

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	3.5000 ft
Flowrate	208.9400 cfs
Slope	0.0500 ft/ft
Manning's n	0.0130

Computed Results:

Depth	2.6675 ft
Area	9.6211 ft2
Wetted Area	7.8678 ft2
Wetted Perimeter	7.4293 ft
Perimeter	10.9956 ft
Velocity	26.5562 fps
Hydraulic Radius	1.0590 ft
Percent Full	76.2132 %
Full flow Flowrate	224.9703 cfs
Full flow velocity	23.3829 fps

DETERMINE CAPACITY OF 48" RCP AT 2.4% MIN. GRADE:

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	4.0000 ft
Flowrate	208.9400 cfs
Slope	0.0240 ft/ft
Manning's n	0.0130

Computed Results:

Depth	3.0786 ft
Area	12.5664 ft2
Wetted Area	10.3784 ft2
Wetted Perimeter	8.5617 ft
Perimeter	12.5664 ft
Velocity	20.1323 fps
Hydraulic Radius	1.2122 ft
Percent Full	76.9660 %
Full flow Flowrate	222.5312 cfs
Full flow velocity	17.7085 fps

DEBRIS BASIN CALCULATIONS

DETERMINE THE DESIGN DEBRIS EVENT (DDE):

DPA Zone 1 (per hydrologic map)

Tributary Area = 134.88 AC. = 0.21 sq. mi.

Debris Production Rate = 177,000 C.Y. (per appx. P-1)

DDE = 177,000 X 0.21 = 37,170 C.Y.

DETERMINE THE DEBRIS SLOPE FOR THE BASIN:

Elevation of spillway crest (EL_s) = 1076.0 ft

Natural ground below spillway (EL_g) = 1044.5 ft

Height of spillway above natural ground (H_s) = EL_s - EL_g = 1076.0 – 1044.5 = 31.5 ft

Elevation Difference (H_c) = 2 H_s = 2 (31.5) = 63.0 ft

Upstream cone elevation = EL_g + H_c = 1044.5 + 63.0 = 1107.5 ft

Horizontal distance from spillway crest to upstream cone (L) = 840.0 ft

Natural Slope (S_N) = H_C / L = 63.0 / 840.0 = 0.0750

Debris Cone Slope (S_D) = 0.5 x S_N = 0.5 (0.0750) = 0.0375 = 3.75%

DEBRIS BASIN DETENTION CAPACITY
AFTER FULL OF DEBRIS

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TRACT 62872 FULL.gpw

Hydraflow Hydrographs by Intelisolve

Thursday, Aug 10 2006, 4:19 PM

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50 - Year

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Hydrograph No. 2, Reservoir, BASIN 3

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Mod. Rational	----	----	----	----	----	----	----	219.38	----	1A
2	Reservoir	1	----	----	----	----	----	----	185.85	----	BASIN

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Thursday, Aug 10 2006, 4:19 PM

Hyd. No. 2

BASIN

Hydrograph type	= Reservoir	Peak discharge	= 185.85 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Inflow hyd. No.	= 1	Reservoir name	= BASIN
Max. Elevation	= 1079.00 ft	Max. Storage	= 61,942 cuft

Storage Indication method used.

Outflow hydrograph volume = 242,113 cuft

(Printed values >= 1% of Qp.)

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
6	69.28	1076.77	250.51	-----	-----	-----	6.55	-----	-----	-----	-----	6.55
7	80.82	1077.00	250.51	-----	-----	-----	16.82	-----	-----	-----	-----	16.81
8	92.37	1077.19	250.51	-----	-----	-----	27.05	-----	-----	-----	-----	27.05
9	103.92	1077.38	250.51	-----	-----	-----	38.90	-----	-----	-----	-----	38.90
10	115.46	1077.57	250.51	-----	-----	-----	51.90	-----	-----	-----	-----	51.91
11	127.01	1077.75	250.51	-----	-----	-----	65.68	-----	-----	-----	-----	65.68
12	138.55	1077.93	250.51	-----	-----	-----	79.88	-----	-----	-----	-----	79.88
13	150.10	1078.08	250.51	-----	-----	-----	92.94	-----	-----	-----	-----	92.94
14	161.65	1078.21	250.51	-----	-----	-----	105.09	-----	-----	-----	-----	105.10
15	173.19	1078.34	250.51	-----	-----	-----	117.59	-----	-----	-----	-----	117.60
16	184.74	1078.47	250.51	-----	-----	-----	130.28	-----	-----	-----	-----	130.28
17	196.29	1078.60	250.51	-----	-----	-----	143.10	-----	-----	-----	-----	143.09
18	207.83	1078.73	250.51	-----	-----	-----	156.02	-----	-----	-----	-----	156.01
19	219.38 <<	1078.85	250.51	-----	-----	-----	168.94	-----	-----	-----	-----	168.93
20	207.83	1078.94	250.51	-----	-----	-----	179.17	-----	-----	-----	-----	179.16
21	196.29	1078.99	250.51	-----	-----	-----	184.47	-----	-----	-----	-----	184.47
22	184.74	1079.00 <<	250.51	-----	-----	-----	185.83	0.02	-----	-----	-----	185.85 <<
23	173.19	1078.99	250.51	-----	-----	-----	184.27	-----	-----	-----	-----	184.27
24	161.65	1078.95	250.51	-----	-----	-----	180.36	-----	-----	-----	-----	180.37
25	150.10	1078.90	250.51	-----	-----	-----	174.70	-----	-----	-----	-----	174.69
26	138.55	1078.84	250.51	-----	-----	-----	167.80	-----	-----	-----	-----	167.80
27	127.01	1078.76	250.51	-----	-----	-----	159.93	-----	-----	-----	-----	159.93
28	115.46	1078.68	250.51	-----	-----	-----	151.36	-----	-----	-----	-----	151.35
29	103.92	1078.59	250.51	-----	-----	-----	142.28	-----	-----	-----	-----	142.28
30	92.37	1078.50	250.51	-----	-----	-----	132.85	-----	-----	-----	-----	132.85
31	80.82	1078.40	250.51	-----	-----	-----	123.19	-----	-----	-----	-----	123.19
32	69.28	1078.30	250.51	-----	-----	-----	113.37	-----	-----	-----	-----	113.37
33	57.73	1078.19	250.51	-----	-----	-----	103.46	-----	-----	-----	-----	103.46
34	46.18	1078.08	250.51	-----	-----	-----	93.53	-----	-----	-----	-----	93.53
35	34.64	1077.96	250.51	-----	-----	-----	83.07	-----	-----	-----	-----	83.07
36	23.09	1077.82	250.51	-----	-----	-----	71.37	-----	-----	-----	-----	71.36
37	11.55	1077.68	250.51	-----	-----	-----	60.25	-----	-----	-----	-----	60.25
38	0.00	1077.54	250.51	-----	-----	-----	49.67	-----	-----	-----	-----	49.66
39	0.00	1077.41	250.51	-----	-----	-----	40.53	-----	-----	-----	-----	40.53
40	0.00	1077.30	250.51	-----	-----	-----	33.52	-----	-----	-----	-----	33.52
41	0.00	1077.21	250.51	-----	-----	-----	28.06	-----	-----	-----	-----	28.06
42	0.00	1077.13	250.51	-----	-----	-----	23.75	-----	-----	-----	-----	23.74
43	0.00	1077.07	250.51	-----	-----	-----	20.25	-----	-----	-----	-----	20.25

Continues on next page...

BASIN

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
44	0.00	1077.02	250.51	-----	-----	-----	17.39	-----	-----	-----	-----	17.39
45	0.00	1076.96	250.51	-----	-----	-----	14.68	-----	-----	-----	-----	14.67
46	0.00	1076.91	250.51	-----	-----	-----	12.28	-----	-----	-----	-----	12.28
47	0.00	1076.87	250.51	-----	-----	-----	10.45	-----	-----	-----	-----	10.45
48	0.00	1076.83	250.51	-----	-----	-----	8.93	-----	-----	-----	-----	8.93
49	0.00	1076.80	250.51	-----	-----	-----	7.65	-----	-----	-----	-----	7.65
50	0.00	1076.77	250.51	-----	-----	-----	6.70	-----	-----	-----	-----	6.70
51	0.00	1076.75	250.51	-----	-----	-----	5.87	-----	-----	-----	-----	5.87
52	0.00	1076.73	250.51	-----	-----	-----	5.14	-----	-----	-----	-----	5.14
53	0.00	1076.71	250.51	-----	-----	-----	4.50	-----	-----	-----	-----	4.50
54	0.00	1076.69	250.51	-----	-----	-----	4.00	-----	-----	-----	-----	4.00
55	0.00	1076.68	250.51	-----	-----	-----	3.61	-----	-----	-----	-----	3.61
56	0.00	1076.67	250.51	-----	-----	-----	3.26	-----	-----	-----	-----	3.26
57	0.00	1076.65	250.51	-----	-----	-----	2.95	-----	-----	-----	-----	2.94
58	0.00	1076.64	250.51	-----	-----	-----	2.66	-----	-----	-----	-----	2.66
59	0.00	1076.63	250.51	-----	-----	-----	2.40	-----	-----	-----	-----	2.40
60	0.00	1076.63	250.51	-----	-----	-----	2.17	-----	-----	-----	-----	2.17
61	0.00	1076.62	250.51	-----	-----	-----	1.96	-----	-----	-----	-----	1.96

...End

Pond Report

Hydraflow Hydrographs by Intelisolve

Thursday, Aug 10 2006, 4:19 PM

Pond No. 1 - BASIN

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1076.00	13,618	0	0
1.00	1077.00	18,290	15,954	15,954
2.00	1078.00	22,963	20,627	36,581
3.00	1079.00	27,635	25,299	61,880
4.00	1080.00	32,307	29,971	91,851

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 42.00	0.00	0.00	0.00
Span (in)	= 42.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1045.00	0.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 5.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.10	10.00	0.00	0.00
Crest El. (ft)	= 1076.50	1079.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Rect	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	1076.00	0.00	—	—	—	0.00	0.00	—	—	—	0.00
0.10	1,595	1076.10	250.51	—	—	—	0.00	0.00	—	—	—	0.00
0.20	3,191	1076.20	250.51	—	—	—	0.00	0.00	—	—	—	0.00
0.30	4,786	1076.30	250.51	—	—	—	0.00	0.00	—	—	—	0.00
0.40	6,382	1076.40	250.51	—	—	—	0.00	0.00	—	—	—	0.00
0.50	7,977	1076.50	250.51	—	—	—	0.00	0.00	—	—	—	0.00
0.60	9,572	1076.60	250.51	—	—	—	1.48	0.00	—	—	—	1.48
0.70	11,168	1076.70	250.51	—	—	—	4.19	0.00	—	—	—	4.19
0.80	12,763	1076.80	250.51	—	—	—	7.71	0.00	—	—	—	7.71
0.90	14,359	1076.90	250.51	—	—	—	11.87	0.00	—	—	—	11.87
1.00	15,954	1077.00	250.51	—	—	—	16.60	0.00	—	—	—	16.60
1.10	18,017	1077.10	250.51	—	—	—	21.82	0.00	—	—	—	21.82
1.20	20,079	1077.20	250.51	—	—	—	27.50	0.00	—	—	—	27.50
1.30	22,142	1077.30	250.51	—	—	—	33.59	0.00	—	—	—	33.59
1.40	24,205	1077.40	250.51	—	—	—	40.08	0.00	—	—	—	40.08
1.50	26,267	1077.50	250.51	—	—	—	46.94	0.00	—	—	—	46.94
1.60	28,330	1077.60	250.51	—	—	—	54.16	0.00	—	—	—	54.16
1.70	30,393	1077.70	250.51	—	—	—	61.71	0.00	—	—	—	61.71
1.80	32,455	1077.80	250.51	—	—	—	69.58	0.00	—	—	—	69.58
1.90	34,518	1077.90	250.51	—	—	—	77.76	0.00	—	—	—	77.76
2.00	36,581	1078.00	250.51	—	—	—	86.26	0.00	—	—	—	86.26
2.10	39,110	1078.10	250.51	—	—	—	95.02	0.00	—	—	—	95.02
2.20	41,640	1078.20	250.51	—	—	—	104.07	0.00	—	—	—	104.07
2.30	44,170	1078.30	250.51	—	—	—	113.38	0.00	—	—	—	113.38
2.40	46,700	1078.40	250.51	—	—	—	122.96	0.00	—	—	—	122.96
2.50	49,230	1078.50	250.51	—	—	—	132.79	0.00	—	—	—	132.79
2.60	51,760	1078.60	250.51	—	—	—	142.87	0.00	—	—	—	142.87
2.70	54,290	1078.70	250.51	—	—	—	153.20	0.00	—	—	—	153.20
2.80	56,820	1078.80	250.51	—	—	—	163.76	0.00	—	—	—	163.76
2.90	59,350	1078.90	250.51	—	—	—	174.55	0.00	—	—	—	174.55
3.00	61,880	1079.00	250.51	—	—	—	185.60	0.00	—	—	—	185.60
3.10	64,877	1079.10	250.51	—	—	—	196.84	1.05	—	—	—	197.89
3.20	67,874	1079.20	250.51	—	—	—	208.30	2.98	—	—	—	211.28

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BASIN

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
3.30	70,871	1079.30	250.51	—	—	—	219.98	5.47	—	—	—	225.45
3.40	73,868	1079.40	250.51	—	—	—	231.87	8.42	—	—	—	240.29
3.50	76,865	1079.50	250.51	—	—	—	243.96	11.77	—	—	—	255.73
3.60	79,862	1079.60	253.77	—	—	—	253.77	15.47	—	—	—	269.24
3.70	82,859	1079.70	255.92	—	—	—	255.92	19.50	—	—	—	275.41
3.80	85,856	1079.80	257.49	—	—	—	257.49	23.82	—	—	—	281.31
3.90	88,853	1079.90	258.81	—	—	—	258.81	28.42	—	—	—	287.23
4.00	91,851	1080.00	259.96	—	—	—	259.96	33.30	—	—	—	293.26

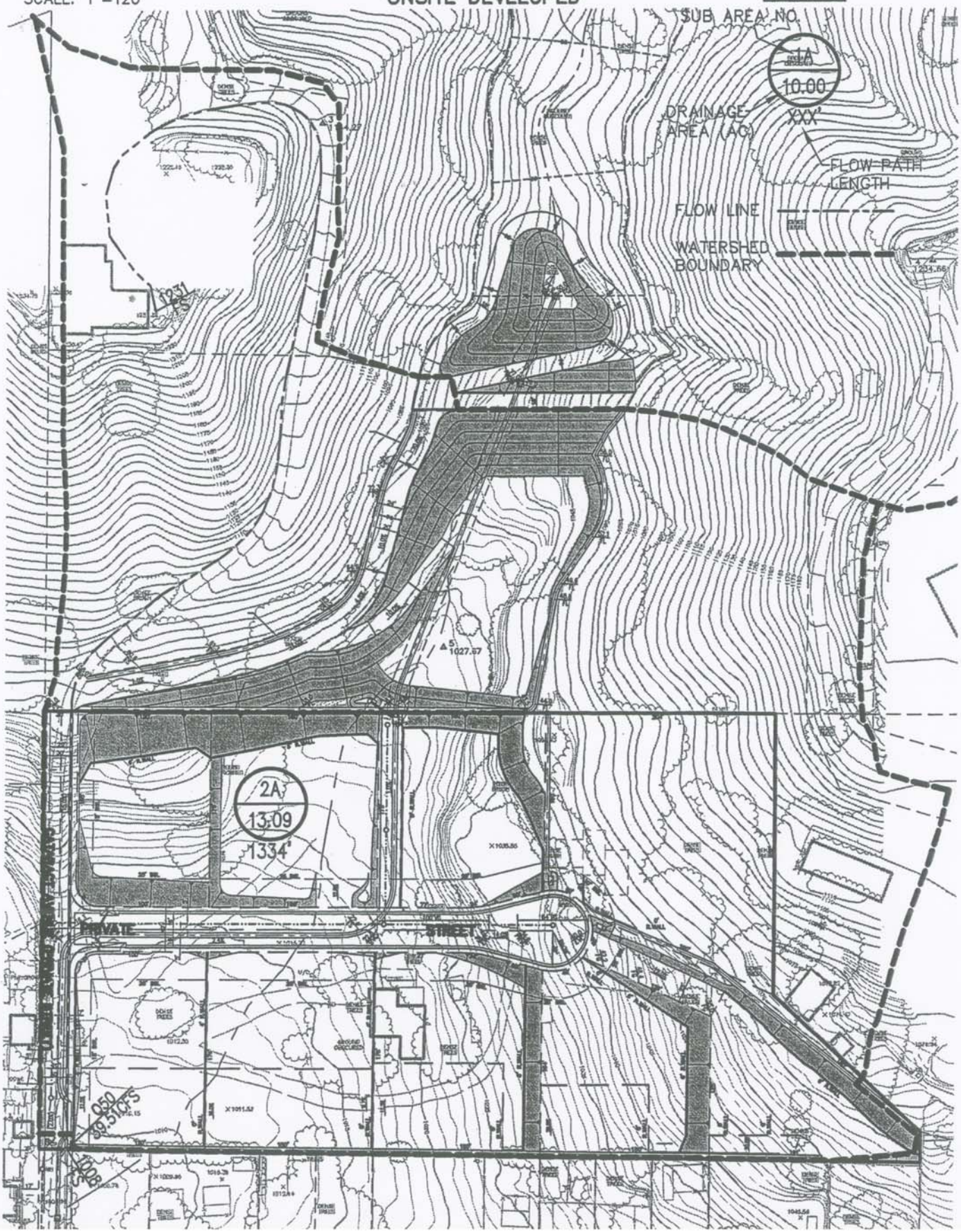
...End

DRAINAGE AREA MAPS

DRAINAGE AREA MAP
TRACT NO. 62872

SCALE: 1"=120'

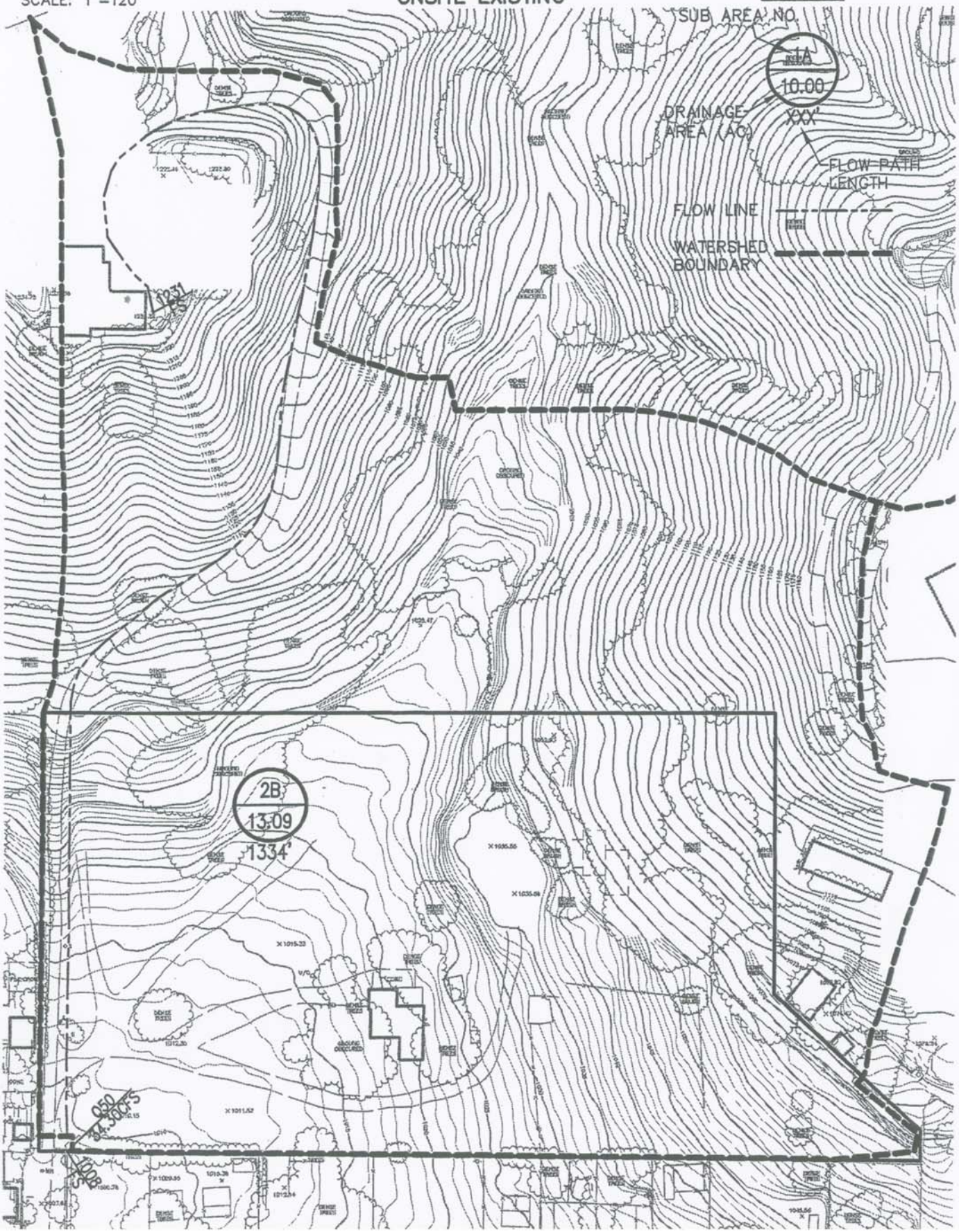
ONSITE DEVELOPED



DRAINAGE AREA MAP
TRACT NO. 62872

SCALE: 1"=120'

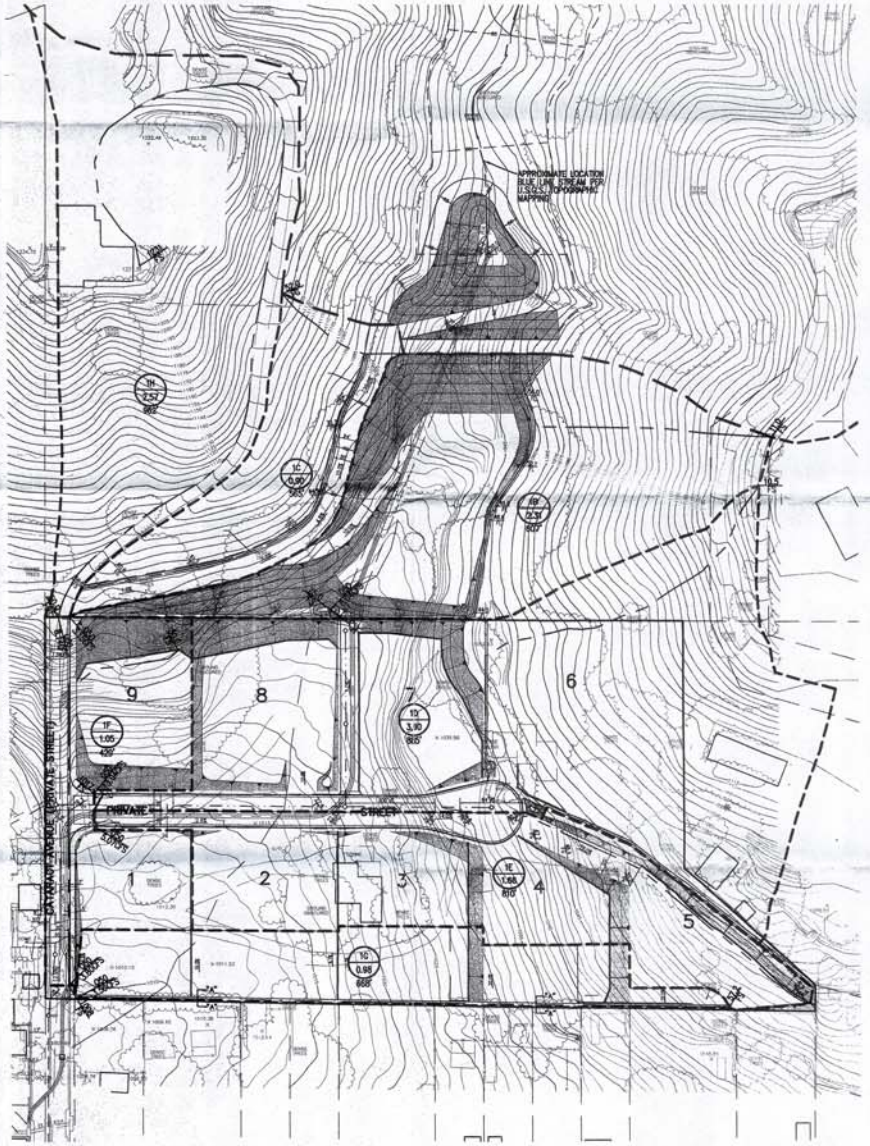
ONSITE EXISTING

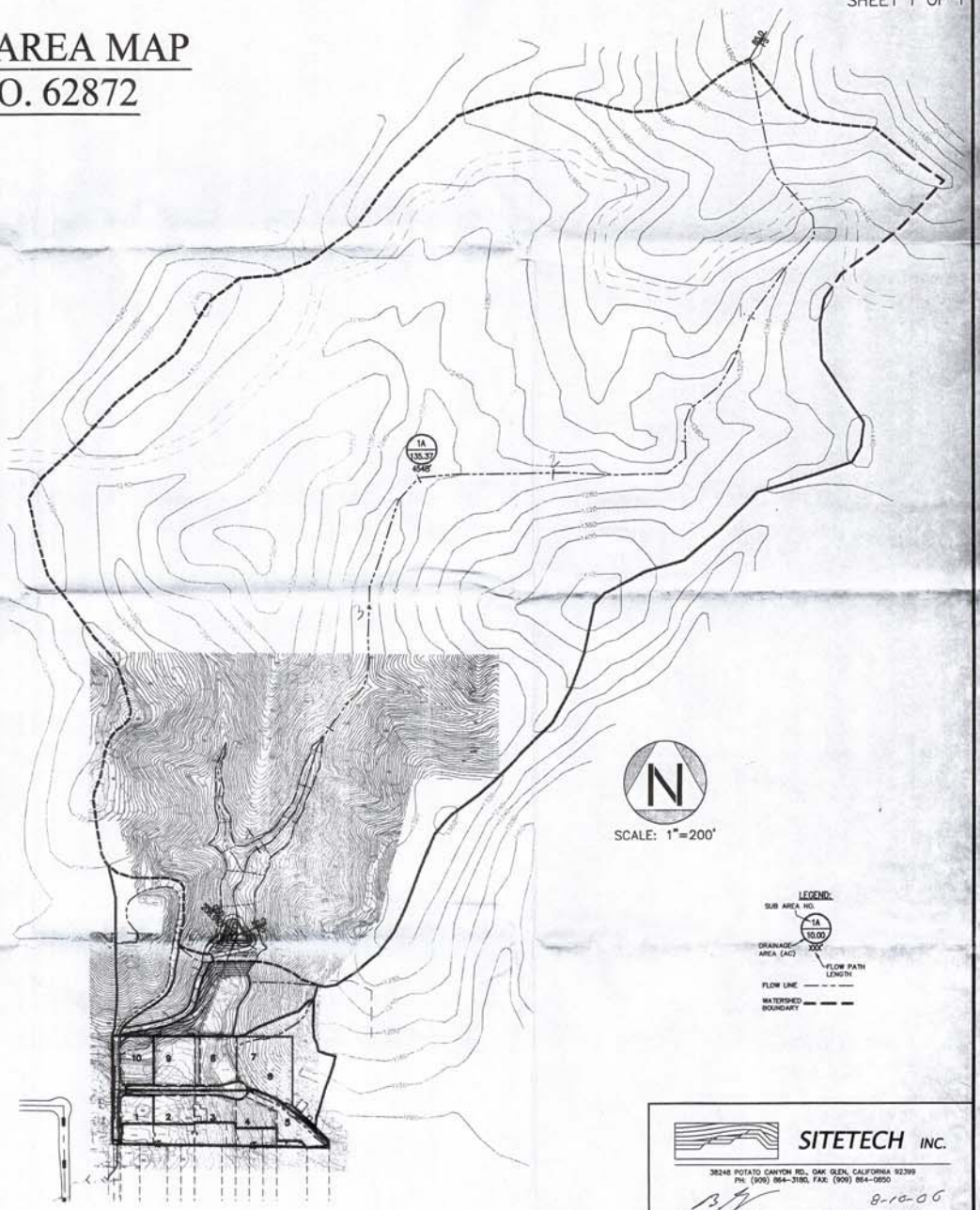


DRAINAGE AREA MAP
TRACT NO. 62872

N

SCALE: 1"=60'





N

SCALE: 1"=200'

LEGEND:

SUB AREA NO.

1A

10.00

DRAINAGE AREA (AC)

200'

FLOW PATH LENGTH

FLOW LINE

WATERSHED BOUNDARY

SITETECH INC.

38248 POTATO CANYON RD., OAK GLEN, CALIFORNIA 92399
PH: (909) 864-3180, FAX: (909) 864-0850

BERNHARD A. MAYER R.C.E. 36866 DATE 8-10-06

Appendix H

BUD WHEELER DRAINAGE STUDY

INCLUDES CAPACITY OF EXISTING CATCH BASINS

Bud Wheeler, 2658 Country Club Drive, Glendora
Catch Basin/Storm Drain Hydraulic Calculations
Final Design - January 24, 2001

Background: The discharge from the two existing catch basins on Cataract Avenue into the Wheeler's property is controlled by a 36" diameter outlet (limiting orifice) as designed by San Dimas. It was decided during our discussions with Glendora that we would design a new pipe to convey storm water under the Wheeler's property that would not impede the maximum capacity flow of the existing 36" outlet.

Design Goal: To ensure that the proposed private drain does not impede the upstream flow from the existing 36" catch basin outlet on Cataract Street.

Step 1: **Calculate the capacity of the existing catch basins.**

The capacity of the inlet of each catch basin was analyzed using Haestad Methods Quick HEC 12. The streets were assumed to be flowing full and the peak discharge into each catch basin is calculated. See Appendix A for the HEC output.

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North Catch Basin = 44 cfs
South Catch Basin = 49 cfs
Total Flow = 93 cfs

The calculated capacity of the 36" diameter catch basin outlet is about 94 cfs.

Step 2: **Calculate the size of the proposed storm drain**

The HY8 – FHWA Culvert Analysis Program was used to run various scenarios to determine the design size. A 42" Corrugated Plastic Pipe (CPP) was selected. See Appendix B for final culvert analysis. At the maximum catch basin capacity (93cfs) normal flow was achieved throughout the length of the pipe and no impedance of flow was calculated.

Step 3: **Specify a new catch basin along Country Club Drive.**

A new catch basin will be constructed on Country Club Drive in order act as both a structure to connect the new 42" CPP private drain and the existing dual 30" Corrugated Metal Pipe drains, and to accommodate for surface flow. The existing curb return

INTEGRATED ENGINEERING SOLUTIONS, Inc.
(626)331-9970 Covina, CA

Bud Wheeler, 2658 Country Club Drive, Glendora
Catch Basin/Storm Drain Hydraulic Calculations
Final Design - January 24, 2001

that allows surface flow from the street is approximately 4' wide and 8" tall. The proposed catch basin curb face opening has been sized to handle the surface flow historically taken in by the existing opening. The proposed opening is also intended to act as an overflow in the event that the two 30" lines underneath Country Club Drive were to become blocked. In addition the driveway has been designed to act as a surface overflow channel to further relieve any congested flow from Cataract Avenue to Country Club Drive.

Private Drain Maintenance

The new private drain system will have two access points for maintenance purposes. One access point is located at the existing catch basin on Cataract Avenue and the second will be at the new catch basin on Country Club Dive. The two access points are approximately 190' apart. Los Angeles County typically requires storm drain manholes a distance of 500' apart. The 42" pipe is large enough to provide easy access inside for maintenance purposes.

Respectfully submitted,
Integrated Engineering Solutions, Inc.

Bart Sperry, P.E.

REGISTERED PROFESSIONAL ENGINEER
BART SPERRY
No. 53865
Exp. 6/30/03
CIVIL
STATE OF CALIFORNIA
2/9/02

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