Appendix F

Drainage Concept/Hydrology Report,
Urban Stormwater Management Plan, and
Water Quality Effects Summary Memorandum

DRAINAGE CONCEPT / HYDROLOGY

City of Santa Clarita

NEWHALL AVENUE APARTMENTS

APN: 2827-003-016, -017, -018, -019, -020, -021

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JN 1944

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Project Overview

The Newhall Avenue Apartment project is located in the City of Santa Clarita on Newhall Avenue approximately 0.4 miles east of Pine Street. The project boundary is approximately 9.7 ac in size of which only 6.7 ac is being developed.

The proposed project will be a multi-family apartment site with 9 separate apartment buildings, a recreation center/leasing office and pool, with ac paved drive aisles and covered parking throughout. The existing site is currently a quick oil-change garage and semi-vacant used car lot along the frontage with Newhall Ave and natural open space and hillside to the rear.

Existing Condition Drainage

The existing condition site is mostly natural hillside that drains from south to north toward Newhall Ave and consists of an approximate 13.1 ac watershed. Moderately steep canyons funnel runoff out to Newall Ave in two separate locations and are labeled as Basin A and Basin B on the existing condition drainage map in Appendix D. Basin A is the primary drainage that flows to the northwest of the project site and basin b is the secondary drainage that runs to the north east portion of the site. The hillsides consist of native vegetation and are primarily scrub and bushes with some trees. Soil conditions are considered moderately erosive mainly due to the large amount of rainfall that can be expected in this local area of Santa Clarita per the isohyetal map (8.4” for 50-yr, 24-hr event).

Once flow leaves the canyons and crosses through the business parking lots, runoff spills down into the gutter and flows to one of two curb opening catch basins in Newhall Ave. Flow is then routed to an existing underground MS4 public storm drain system that flows west towards Pine St. The MS4 system discharges beneath Newhall Ave into a box culvert underpass which then flows into Newhall Creek and ultimately into the Santa Clara River.

Developed Condition Drainage

Flow patterns within the site will shift in the developed condition versus the existing condition, but the overall drainage pattern of the entire site remains the same and leaving the site at the north end near the middle of the property. The upstream watershed of the developed site will remain natural hillside and the project site will be developed on the lower 2/3 of the water shed. A slight modification due to grading increases the size of the existing 13.1 ac watershed to a 13.3 ac watershed for the developed condition. Developed grading also results in a primary drainage basin, Basin A, being the predominant drainage area of the entire watershed. Basin B is a 2nd much smaller drainage area that lies at extreme northwest corner of project does not mirror the previous Basin B of the existing condition.

The developed site will consist of a private underground storm drain system that will route water underground and out to the existing public storm drain in Newhall Ave. Runoff from the undeveloped offsite and canyon areas will be routed separately in a dedicated offsite storm drain system so that no comingling with onsite water will occur. Hydrology summary results show that the developed condition site discharge is less runoff than the existing condition site discharge

(Q_{50} DEV = 36.49 cfs < Q_{50} EX = 37.76 cfs). For this reason, the existing storm drain system within Newhall Ave will not be negatively affected.

There is an existing 14' catch basin located in Newhall Ave that will take a relatively small amount of runoff from the onsite slope that runs along the R/W. An existing condition hydrology analysis for this catch basin has been performed to assess the amount of flow being contributed by the roadway. The new onsite component of flow has been added to the existing condition runoff which does not exceed the capacity of the 14' CB. The hydrology and hydraulic calculations for the existing 14' CB analysis are provided in Appendix E.

Onsite water will be treated in an underground water quality chamber and will not be mixed with offsite flow in order to minimize the required size of any water quality facilities. The water quality component of this project is discussed in detail in a separate USMP report for this project.

Methodology

Peak flowrates and runoff volumes for the 25-, and 50-Year events for both the existing and developed conditions have been analyzed using methods prescribed in the LA County Hydrology Manual. The following hydrologic parameters and software have been used during this analysis:

- Storm Event = 25-Yr, 50-Yr (sump)
- 50-year, 24-hour Rainfall Depth = 8.4"
- Soil Classification Area = 020
- Time of concentration = HydroCalc software
- Flow rates and volumes = LAR04 software

Summary tables of the modeling parameters used for each the existing and developed conditions are presented below:

EXISTING CONDITION MODEL PARAMETERS

Subarea	Area	Overland	Slope	Flowpath	Slope	50-Yr Rain	Imp	Soil Type	Tc
#	ac	ft	ft/ft	ft	ft/ft	in	%		min
1A	3.0	684	0.3058	1		8.4	6	20	5
2A	3.0	687	0.2314	601	0.0383	8.4	6	20	5
3A	4.8	860	0.1128	1		8.4	6	20	6
1B	2.3	660	0.1515	1		8.4	6	20	5
ONSITE TTL	13.1								
1C	0.4	405	0.0049	1		8.4	95	20	5

DEVELOPED CONDITION MODEL PARAMETERS

Subarea	Area	Overland	Slope	Flowpath	Slope	50-Yr Rain	Imp	Soil Type	Tc
#	ac	ft	ft/ft	ft	ft/ft	in	%		min
1A	2.8	635	0.2504	80	0.0750	8.4	6	20	5
2A	2.9	615	0.3496	470	0.0319	8.4	6	20	5
3A	4.5	785	0.0561	1		8.4	37	20	6
4A	1.5	400	0.1100	1		8.4	71	20	5
5A	0.8	350	0.1571	125	0.0400	8.4	73	20	5
6A	0.7	570	0.1456	1		8.4	18	20	5
1B	0.1	225	0.0222	1		8.4	6	20	5
ONSITE TTL	13.3								
1C	0.5	425	0.0094	1		8.4	91	20	5

Results

Modeling results for peak flow and runoff volume are presented in the summary tables below :

EXISTING CONDITION MODEL RESULTS

BASIN	25-YR		50-YR	
	Q	V	Q	V
	cfs	ac-ft	cfs	ac-ft
A	24.97	1.30	29.54	1.63
B	7.02	0.21	8.22	0.28
Onsite Total	31.99	1.51	37.76	1.91
C (Offsite CB)	n/a	n/a	1.78	0.24

DEVELOPED CONDITION MODEL RESULTS

BASIN	25-YR		50-YR	
	Q	V	Q	V
	cfs	ac-ft	cfs	ac-ft
A	30.43	2.89	36.13	3.44
B	0.31	0.00	0.36	0.00
TTL	30.74	2.89	36.49	3.44

Peak flowrates for the developed condition are less than those of the existing condition for both the 25-yr and 50-yr events. This is a result of the meandering and flatter path that runoff takes in the developed condition as compared to the existing despite the developed condition having a higher imperviousness. Additionally, the development of the site eliminates debris from the runoff/flowrate for the developed portion of the site. The longer flow paths, along with partial debris elimination, coupled with relatively lower imperviousness of the developed condition work together to minimize any increase in the peak flow discharge rates. The runoff volume for the project in the developed condition is slightly higher than in the existing condition, but the flowrate is lower and therefore the downstream storm drain system will not be negatively impacted.

Hydromodification

This project is exempt from hydromodification mitigation since all developed condition runoff will discharge to the existing MS4 system located within Newhall Avenue.

However, some runoff mitigation will be provided using the projects underground water quality facility. Approximate 0.3 ac-ft of runoff volume will be treated in the water quality chamber and this will assist in providing mitigation to some degree.

In addition, the summary tables above show the developed condition peak flows are below those of the existing condition peak flows.

Debris

A summary of the debris volumes for the basin at far south end of project is shown in the tables below. The upstream debris producing area is open space and is considered stable due to presence of existing vegetation and a historical record for not producing significant debris. The debris volume calculated using the LA County method has been reduced by 50% for this reason.

DEBRIS VOLUME REQUIRED

DEBRIS PRODUCING SUBAREAS	TOTAL AREA	DEBRIS PRODUCING AREA		DEBRIS PRODUCTION RATE (DPA 5)	DEBRIS PRODUCED (VOL_REQ)
	ac	ac	sq mi	cy / sq mi	cy
DEV SUBAREA 1A	2.8	2.8	0.004	82000	359
DEV SUBAREA 2A*	2.9	2.9	0.005	82000	372
LA COUNTY METHOD			0.009		731
50% REDUCTION **					**366**

*Debris producing area is less then the total area because part of the total area is engineered slope from the Needham Ranch Project.

** Debris producing area contains well established vegetation and no historical record of large debris flows.

DEBRIS VOLUME PROVIDED

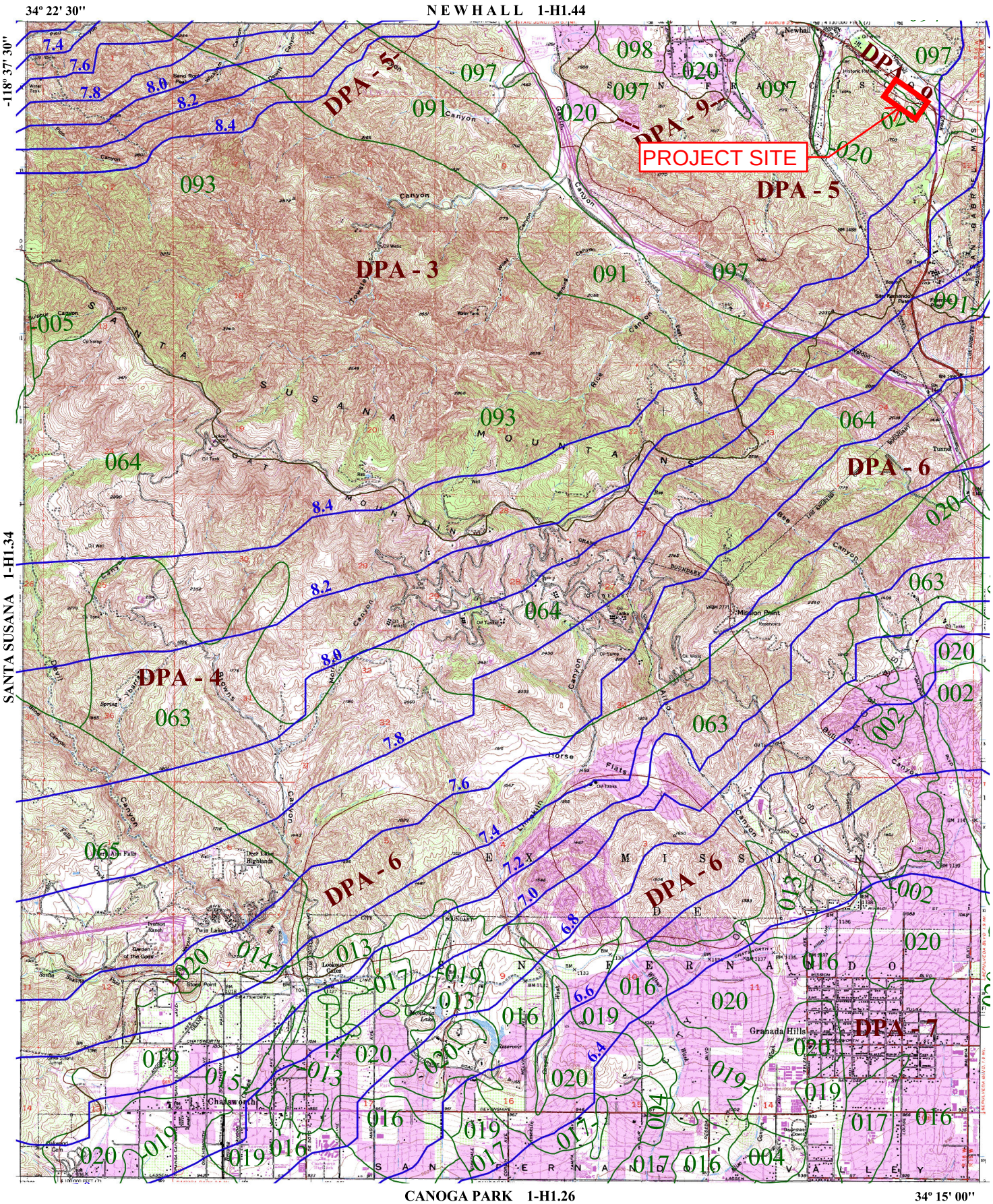
DEBRIS BASIN	depth	TOP	BOTTOM	AVERAGE	VOL_PROV		VOL_REQ
	ft	sf	sf	sf	cf	cy	cy
BASIN A	4.25	2,934	1,887	2,410	10,260	***380***	**366**

Conclusion

Given that developed condition peak flowrates do not exceed those of the existing condition, the drainage design shown for this project is considered acceptable. Water quality treatment will be provided and hydromodifcation mitigation will be provided despite exemption due to existing MS4 system.

APPENDIX A

MAPS AND EXHIBITS



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

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

OAT MOUNTAIN
50-YEAR 24-HOUR ISOHYET

1-H1.35

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

APPENDIX B

TIME OF CONCENTRATION

APPENDIX C

LAR04 MODELS

APPENDIX D

Existing and Developed Condition

Hydrology Exhibits

TIME OF CONCENTRATION

EXISTING CONDITION

Q50

BASIN A & BASIN B

Peak Flow Hydrologic Analysis

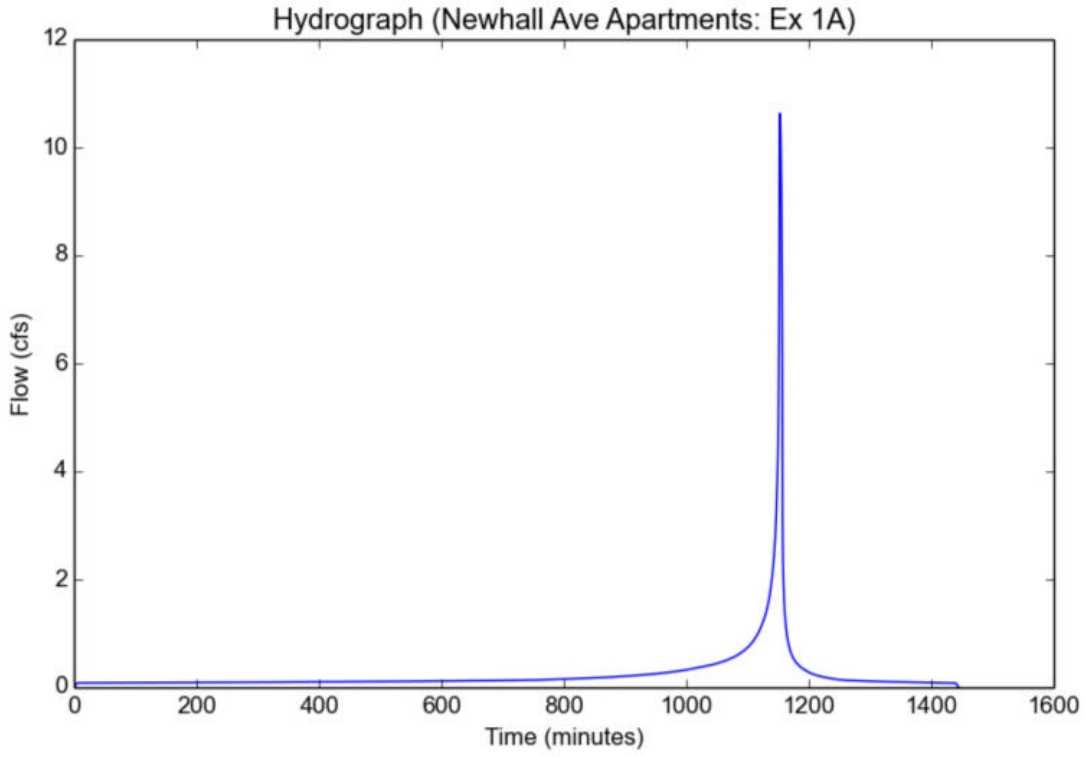
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 1A
Area (ac)	3.0
Flow Path Length (ft)	684.0
Flow Path Slope (vft/hft)	0.3058
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.6257
Burned Peak Flow Rate (cfs)	10.6257
24-Hr Clear Runoff Volume (ac-ft)	0.504
24-Hr Clear Runoff Volume (cu-ft)	21953.5426



Peak Flow Hydrologic Analysis

File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 2A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 2A
Area (ac)	3.0
Flow Path Length (ft)	687.0
Flow Path Slope (vft/hft)	0.2314
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
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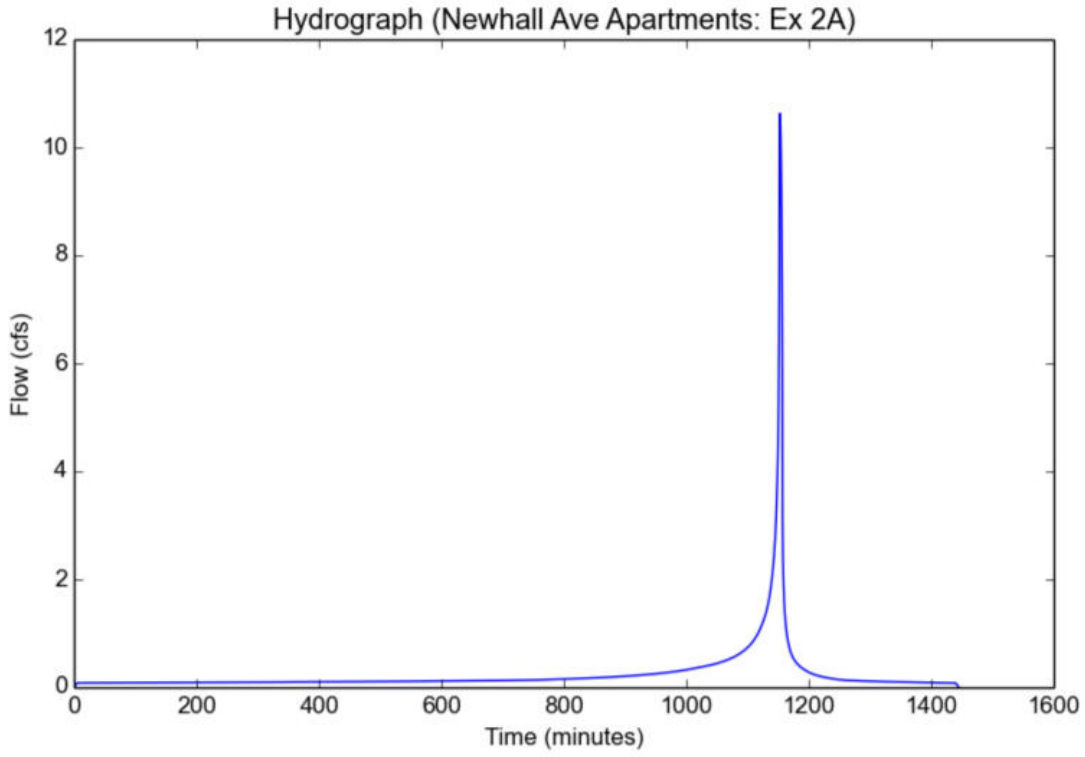
24-Hr Clear Runoff Volume (cu-ft)	21953.5426



Peak Flow Hydrologic Analysis

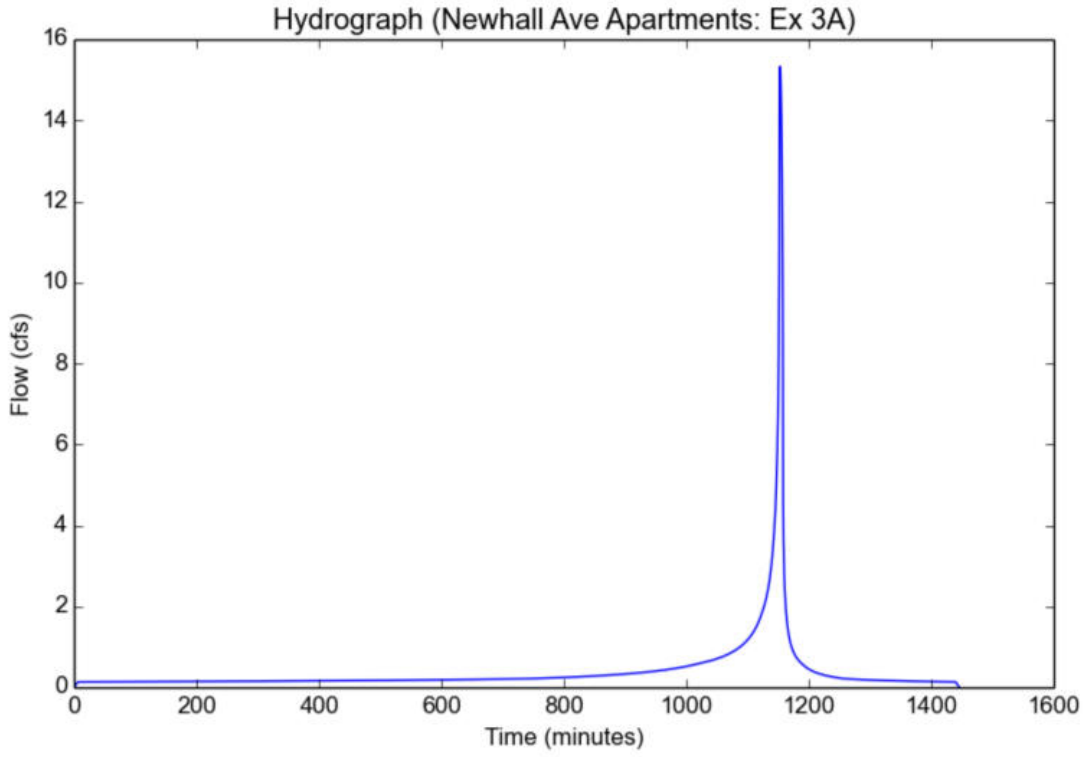
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 3A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 3A
Area (ac)	4.8
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.1128
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	4.6001
Undeveloped Runoff Coefficient (Cu)	0.6812
Developed Runoff Coefficient (Cd)	0.6943
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	15.3312
Burned Peak Flow Rate (cfs)	15.3312
24-Hr Clear Runoff Volume (ac-ft)	0.8059
24-Hr Clear Runoff Volume (cu-ft)	35105.7438



Peak Flow Hydrologic Analysis

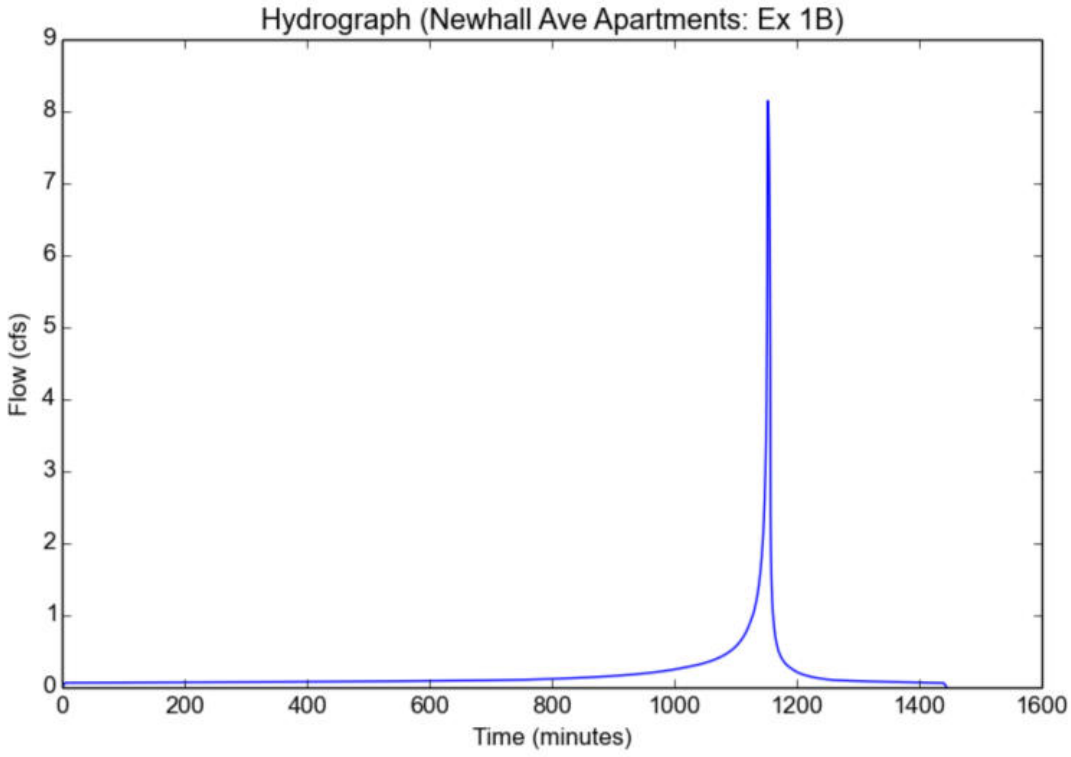
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1B.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 1B
Area (ac)	2.3
Flow Path Length (ft)	660.0
Flow Path Slope (vft/hft)	0.1514
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.1464
Burned Peak Flow Rate (cfs)	8.6356
24-Hr Clear Runoff Volume (ac-ft)	0.3864
24-Hr Clear Runoff Volume (cu-ft)	16831.0493



TIME OF CONCENTRATION

DEVELOPED CONDITION

Q50

BASIN A & BASIN B & BASIN C

Peak Flow Hydrologic Analysis

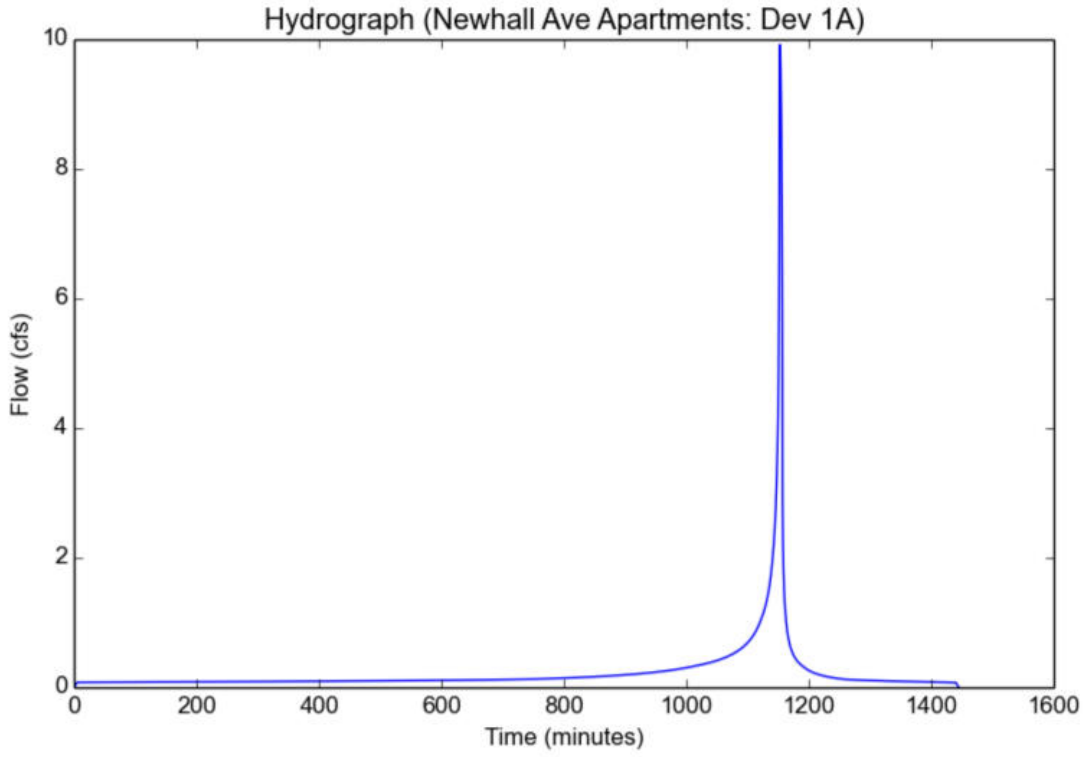
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1A
Area (ac)	2.8
Flow Path Length (ft)	635.0
Flow Path Slope (vft/hft)	0.2504
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.9173
Burned Peak Flow Rate (cfs)	9.9173
24-Hr Clear Runoff Volume (ac-ft)	0.4704
24-Hr Clear Runoff Volume (cu-ft)	20489.9731



Peak Flow Hydrologic Analysis

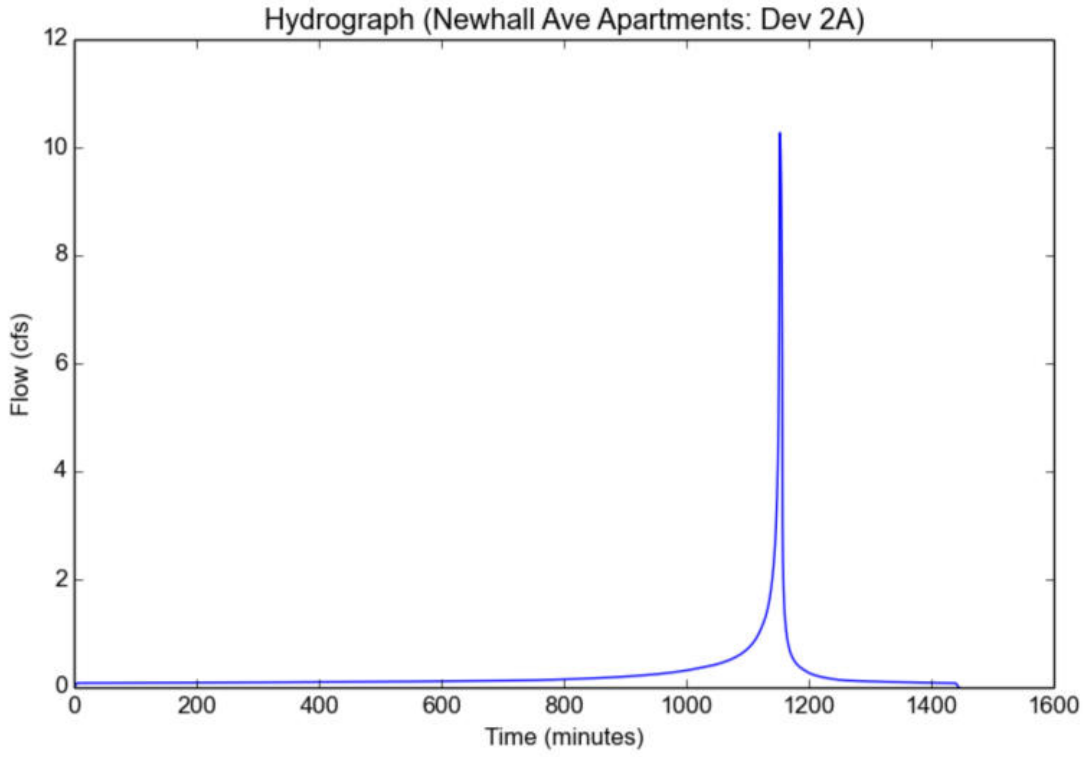
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 2A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 2A
Area (ac)	2.9
Flow Path Length (ft)	615.0
Flow Path Slope (vft/hft)	0.3496
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.2715
Burned Peak Flow Rate (cfs)	10.2715
24-Hr Clear Runoff Volume (ac-ft)	0.4872
24-Hr Clear Runoff Volume (cu-ft)	21221.7578



Peak Flow Hydrologic Analysis

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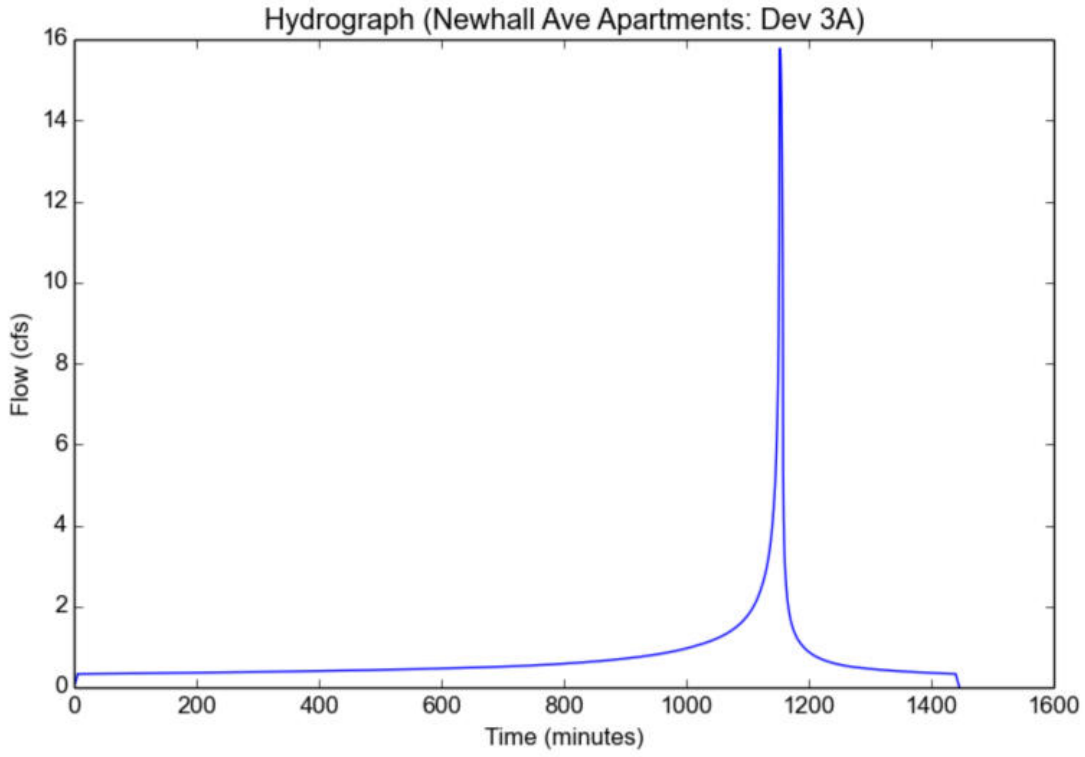
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 3A
Area (ac)	4.5
Flow Path Length (ft)	785.0
Flow Path Slope (vft/hft)	0.0561
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.37
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	4.6001
Undeveloped Runoff Coefficient (Cu)	0.6812
Developed Runoff Coefficient (Cd)	0.7622
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	15.777
Burned Peak Flow Rate (cfs)	15.777
24-Hr Clear Runoff Volume (ac-ft)	1.4336
24-Hr Clear Runoff Volume (cu-ft)	62447.5182



Peak Flow Hydrologic Analysis

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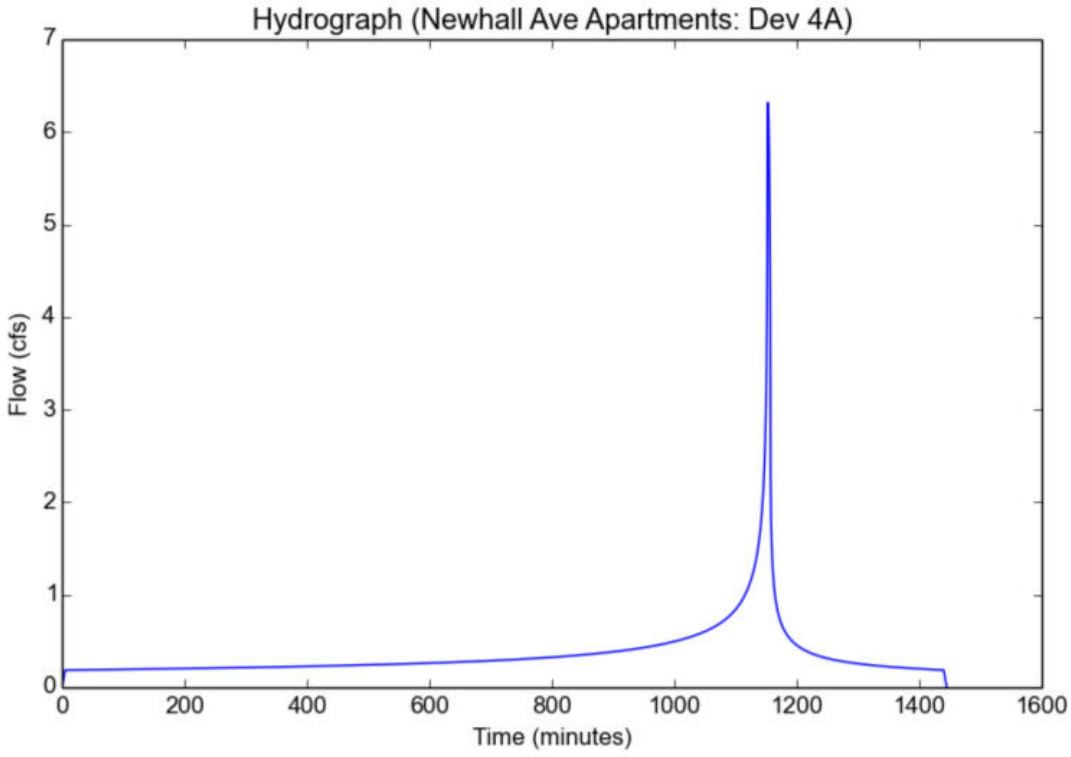
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 4A
Area (ac)	1.5
Flow Path Length (ft)	400.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.71
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8404
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.3175
Burned Peak Flow Rate (cfs)	6.3175
24-Hr Clear Runoff Volume (ac-ft)	0.7258
24-Hr Clear Runoff Volume (cu-ft)	31615.8213



Peak Flow Hydrologic Analysis

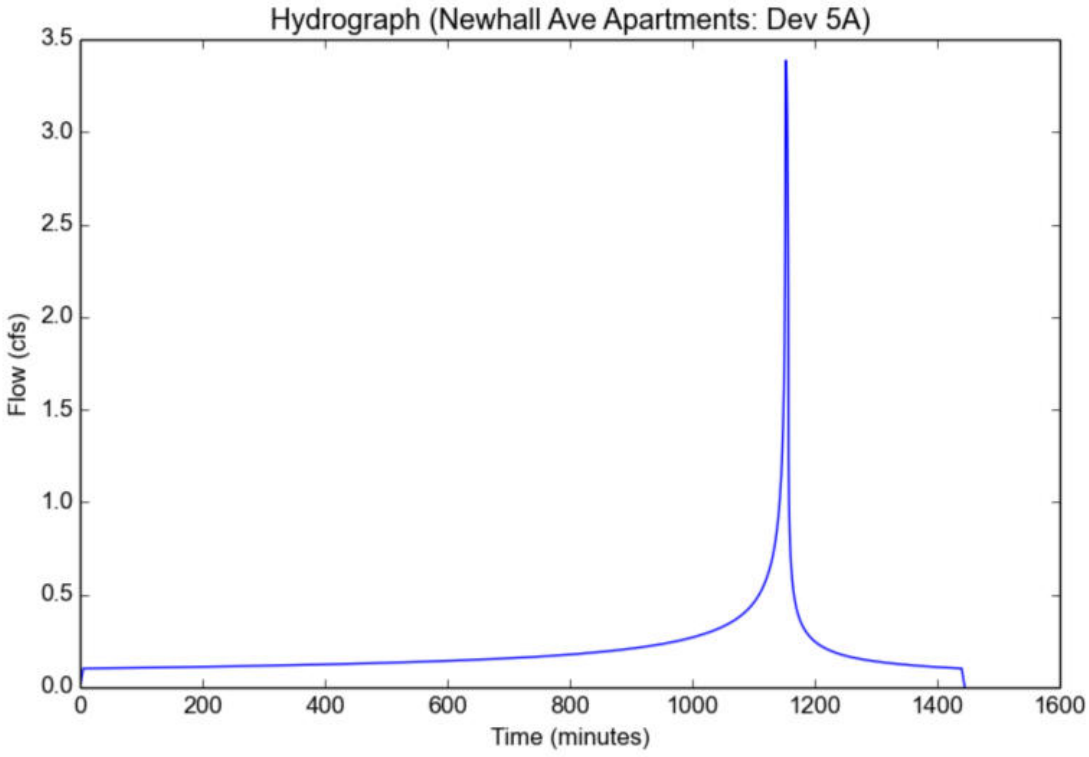
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 5A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 5A
Area (ac)	0.8
Flow Path Length (ft)	350.0
Flow Path Slope (vft/hft)	0.1571
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.73
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8445
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.3858
Burned Peak Flow Rate (cfs)	3.3858
24-Hr Clear Runoff Volume (ac-ft)	0.3949
24-Hr Clear Runoff Volume (cu-ft)	17200.4634



Peak Flow Hydrologic Analysis

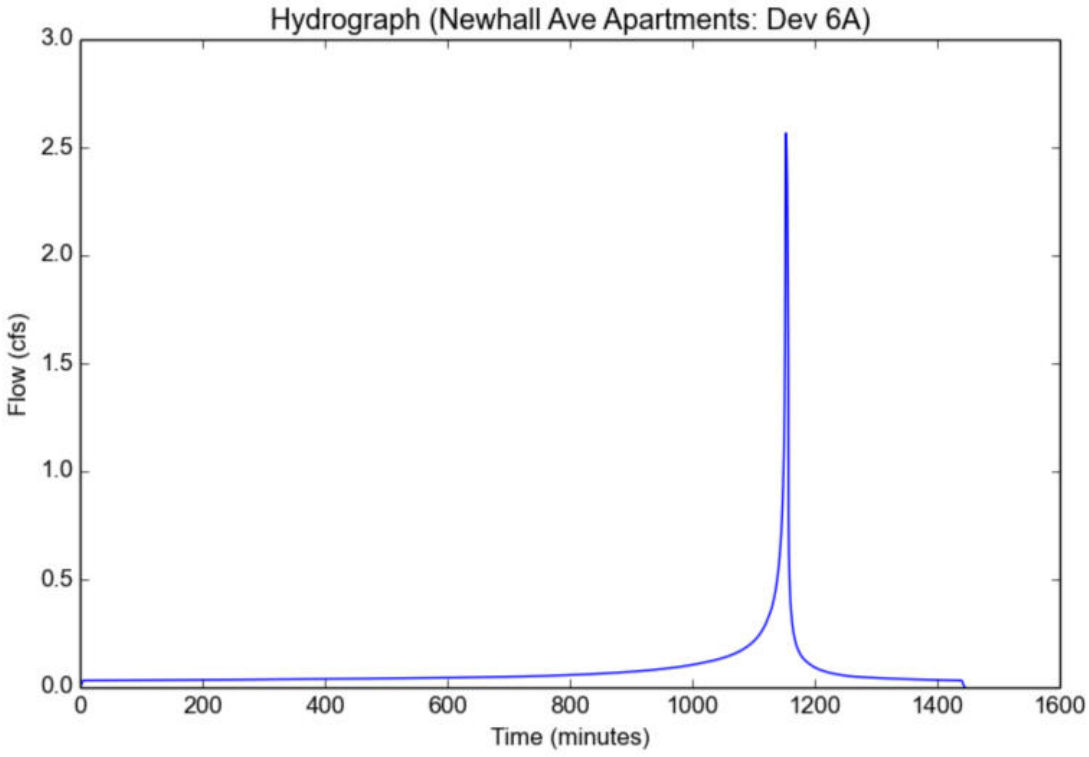
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 9A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 6A
Area (ac)	0.7
Flow Path Length (ft)	570.0
Flow Path Slope (vft/hft)	0.1456
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.18
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7314
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5659
Burned Peak Flow Rate (cfs)	2.5659
24-Hr Clear Runoff Volume (ac-ft)	0.1584
24-Hr Clear Runoff Volume (cu-ft)	6900.6268



Peak Flow Hydrologic Analysis

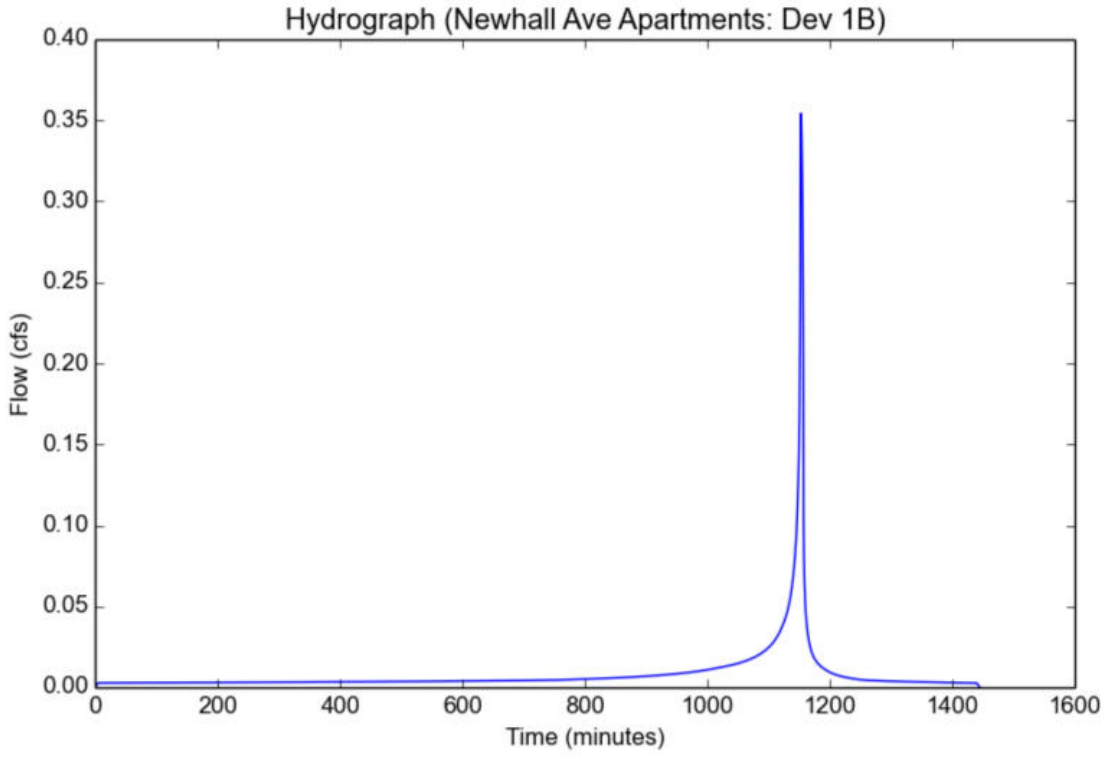
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1B.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1B
Area (ac)	0.1
Flow Path Length (ft)	225.0
Flow Path Slope (vft/hft)	0.0222
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3542
Burned Peak Flow Rate (cfs)	0.3542
24-Hr Clear Runoff Volume (ac-ft)	0.0168
24-Hr Clear Runoff Volume (cu-ft)	731.7848



Peak Flow Hydrologic Analysis

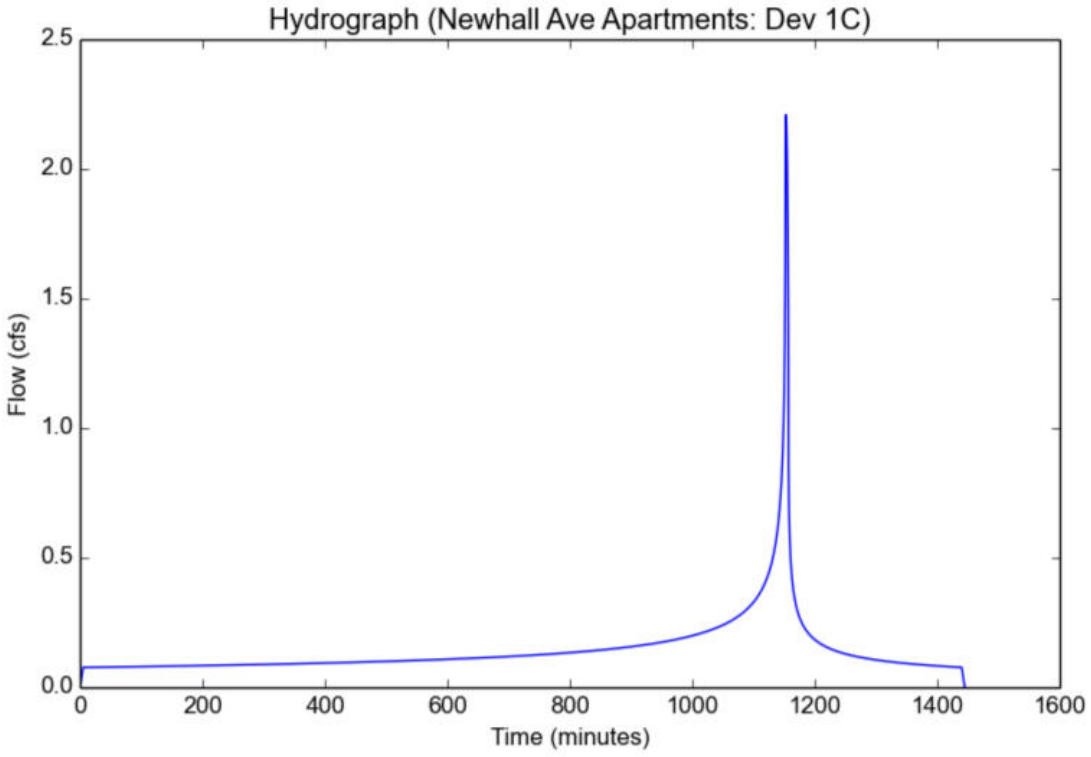
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1C.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1C
Area (ac)	0.5
Flow Path Length (ft)	425.0
Flow Path Slope (vft/hft)	0.0094
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8815
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2089
Burned Peak Flow Rate (cfs)	2.2089
24-Hr Clear Runoff Volume (ac-ft)	0.2905
24-Hr Clear Runoff Volume (cu-ft)	12655.4327



APPENDIX C

LAR04 MODELS

25-YEAR

EXISTING CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN A - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	3.0	9.15	3.0	9.15	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2A	3.0	9.15	6.0	18.26	1	601.	.07290	.00	.00	0.	20	5	A42	.06
1944	3A	4.8	12.96	10.8	24.67	1	1.	.01000	.00	.00	0.	20	6	A42	.06

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN A - 25YR
HYDROGRAPH AT 1944 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.12	200	.12	300	.13	400	.14
500	.15	600	.16	700	.36	800	.43	900	.49
1000	.75	1050	1.08	1100	1.70	1110	2.28	1120	2.82
1130	3.55	1131	3.63	1132	3.71	1133	3.86	1134	4.01
1135	4.16	1136	4.30	1137	4.52	1138	4.77	1139	4.94
1140	5.14	1141	5.47	1142	5.82	1143	6.06	1144	6.34
1145	6.91	1146	7.48	1147	7.94	1148	8.47	1149	10.57
1150	12.79	1151	15.04	1152	18.09	1153	21.76	1154	24.16
1155	24.67	1156	23.79	1157	21.36	1158	17.94	1159	14.18
1160	11.75	1161	9.58	1162	7.85	1163	6.58	1164	5.64
1165	4.93	1166	4.38	1167	3.93	1168	3.58	1169	3.28
1170	3.02	1171	2.84	1172	2.65	1173	2.46	1174	2.34
1175	2.21	1176	2.10	1177	1.99	1178	1.90	1179	1.82
1180	1.72	1181	1.67	1182	1.59	1183	1.53	1184	1.46
1185	1.43	1186	1.38	1187	1.33	1188	1.29	1189	1.25
1190	1.22	1191	1.18	1192	1.16	1193	1.12	1194	1.10
1195	1.07	1196	1.05	1197	1.02	1198	.99	1199	.98
1200	.95	1201	.94	1202	.91	1203	.90	1204	.89
1205	.86	1206	.85	1207	.84	1208	.82	1209	.81
1210	.80	1211	.77	1212	.76	1213	.74	1214	.73
1215	.73	1216	.70	1217	.70	1218	.67	1219	.68
1220	.68	1221	.65	1222	.65	1223	.64	1224	.63
1225	.61	1226	.61	1227	.58	1228	.58	1229	.58
1230	.57	1231	.55	1232	.55	1233	.56	1234	.53
1235	.53	1236	.52	1237	.52	1238	.51	1239	.50
1240	.50	1241	.50	1242	.49	1243	.48	1244	.48
1245	.48	1246	.47	1247	.46	1248	.47	1249	.47
1250	.46	1251	.46	1252	.46	1253	.45	1254	.45
1255	.44	1256	.44	1257	.44	1258	.44	1259	.44
1260	.44	1261	.43	1262	.43	1263	.43	1264	.42
1265	.42	1266	.42	1267	.42	1268	.42	1269	.41
1270	.42	1271	.42	1272	.41	1273	.41	1274	.41
1275	.41	1276	.41	1277	.40	1278	.40	1279	.40
1280	.40	1281	.40	1282	.39	1283	.40	1284	.39
1285	.39	1286	.39	1287	.38	1288	.39	1289	.38
1290	.39	1291	.38	1292	.38	1293	.38	1294	.38
1295	.38	1296	.37	1297	.37	1298	.37	1299	.37
1300	.37	1310	.33	1320	.32	1330	.29	1340	.25
1350	.24	1360	.24	1370	.23	1380	.23	1390	.23
1400	.22	1420	.12	1440	.12	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = 1.30(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN B - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	2.3	7.02	2.3	7.02	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	2.3	6.98	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN B - 25YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.11
1000	.16	1050	.24	1100	.38	1110	.56	1120	.65
1130	.82	1131	.84	1132	.86	1133	.92	1134	.98
1135	1.05	1136	1.06	1137	1.14	1138	1.19	1139	1.22
1140	1.27	1141	1.39	1142	1.47	1143	1.52	1144	1.61
1145	1.81	1146	1.97	1147	2.10	1148	2.25	1149	3.23
1150	4.17	1151	5.06	1152	6.04	1153	6.98	1154	6.12
1155	4.96	1156	3.85	1157	2.61	1158	1.53	1159	1.14
1160	1.01	1161	.83	1162	.80	1163	.69	1164	.68
1165	.59	1166	.58	1167	.52	1168	.51	1169	.45
1170	.46	1171	.42	1172	.42	1173	.37	1174	.38
1175	.35	1176	.34	1177	.31	1178	.32	1179	.29
1180	.28	1181	.28	1182	.27	1183	.26	1184	.25
1185	.25	1186	.24	1187	.23	1188	.23	1189	.22
1190	.22	1191	.21	1192	.21	1193	.20	1194	.21
1195	.20	1196	.20	1197	.19	1198	.18	1199	.18
1200	.18	1201	.17	1202	.17	1203	.17	1204	.16
1205	.16	1206	.16	1207	.16	1208	.15	1209	.15
1210	.15	1211	.14	1212	.14	1213	.14	1214	.13
1215	.13	1216	.13	1217	.13	1218	.12	1219	.13
1220	.13	1221	.12	1222	.13	1223	.12	1224	.12
1225	.11	1226	.12	1227	.11	1228	.11	1229	.11
1230	.11	1231	.10	1232	.11	1233	.11	1234	.10
1235	.10	1236	.10	1237	.10	1238	.00	1239	.10
1240	.10	1241	.10	1242	.10	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .21(Ac.Ft)

50-YEAR

EXISTING CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN A - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	3.0	10.73	3.0	10.73	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2A	3.0	10.73	6.0	21.41	1	601.	.07290	.00	.00	0.	20	5	A42	.06
1944	3A	4.8	15.25	10.8	29.54	1	1.	.01000	.00	.00	0.	20	6	A42	.06

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN A - 50YR
HYDROGRAPH AT 1944 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.13	200	.14	300	.15	400	.16
500	.35	600	.41	700	.43	800	.50	900	.66
1000	.96	1050	1.37	1100	2.15	1110	2.83	1120	3.45
1130	4.38	1131	4.49	1132	4.60	1133	4.77	1134	4.96
1135	5.14	1136	5.32	1137	5.59	1138	5.89	1139	6.09
1140	6.33	1141	6.71	1142	7.14	1143	7.43	1144	7.77
1145	8.46	1146	9.12	1147	9.68	1148	10.33	1149	12.82
1150	15.38	1151	18.12	1152	21.82	1153	26.20	1154	29.09
1155	29.54	1156	28.29	1157	25.19	1158	21.05	1159	16.47
1160	13.56	1161	11.06	1162	9.03	1163	7.58	1164	6.52
1165	5.73	1166	5.11	1167	4.60	1168	4.21	1169	3.87
1170	3.58	1171	3.37	1172	3.17	1173	2.95	1174	2.82
1175	2.67	1176	2.56	1177	2.43	1178	2.33	1179	2.24
1180	2.13	1181	2.07	1182	1.99	1183	1.92	1184	1.83
1185	1.79	1186	1.73	1187	1.67	1188	1.61	1189	1.55
1190	1.52	1191	1.47	1192	1.44	1193	1.39	1194	1.36
1195	1.32	1196	1.30	1197	1.26	1198	1.23	1199	1.21
1200	1.18	1201	1.17	1202	1.14	1203	1.12	1204	1.11
1205	1.07	1206	1.06	1207	1.05	1208	1.02	1209	1.01
1210	1.00	1211	.97	1212	.96	1213	.94	1214	.93
1215	.92	1216	.89	1217	.89	1218	.86	1219	.87
1220	.86	1221	.84	1222	.83	1223	.82	1224	.81
1225	.79	1226	.78	1227	.76	1228	.75	1229	.75
1230	.74	1231	.72	1232	.71	1233	.73	1234	.70
1235	.69	1236	.67	1237	.68	1238	.66	1239	.65
1240	.65	1241	.65	1242	.64	1243	.62	1244	.63
1245	.61	1246	.61	1247	.58	1248	.60	1249	.60
1250	.57	1251	.57	1252	.57	1253	.56	1254	.54
1255	.54	1256	.53	1257	.53	1258	.53	1259	.52
1260	.52	1261	.51	1262	.51	1263	.50	1264	.49
1265	.49	1266	.49	1267	.49	1268	.48	1269	.47
1270	.48	1271	.48	1272	.47	1273	.47	1274	.47
1275	.46	1276	.46	1277	.45	1278	.46	1279	.46
1280	.45	1281	.46	1282	.45	1283	.45	1284	.45
1285	.44	1286	.44	1287	.44	1288	.44	1289	.43
1290	.44	1291	.43	1292	.43	1293	.44	1294	.43
1295	.43	1296	.42	1297	.43	1298	.42	1299	.42
1300	.42	1310	.41	1320	.40	1330	.39	1340	.37
1350	.36	1360	.35	1370	.30	1380	.26	1390	.25
1400	.24	1420	.14	1440	.13	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = 1.63(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN B - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	2.3	8.22	2.3	8.22	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	2.3	8.19	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN B - 50YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.11	900	.14
1000	.21	1050	.30	1100	.48	1110	.68	1120	.79
1130	1.01	1131	1.04	1132	1.07	1133	1.14	1134	1.21
1135	1.28	1136	1.30	1137	1.39	1138	1.45	1139	1.48
1140	1.54	1141	1.69	1142	1.78	1143	1.85	1144	1.96
1145	2.19	1146	2.37	1147	2.52	1148	2.71	1149	3.84
1150	4.95	1151	5.97	1152	7.11	1153	8.19	1154	7.19
1155	5.84	1156	4.56	1157	3.13	1158	1.85	1159	1.39
1160	1.24	1161	1.04	1162	.97	1163	.83	1164	.82
1165	.71	1166	.70	1167	.63	1168	.63	1169	.56
1170	.57	1171	.52	1172	.52	1173	.47	1174	.48
1175	.44	1176	.43	1177	.40	1178	.41	1179	.37
1180	.37	1181	.36	1182	.35	1183	.33	1184	.33
1185	.32	1186	.30	1187	.29	1188	.28	1189	.27
1190	.27	1191	.26	1192	.26	1193	.25	1194	.26
1195	.24	1196	.25	1197	.23	1198	.23	1199	.22
1200	.23	1201	.21	1202	.22	1203	.21	1204	.21
1205	.20	1206	.21	1207	.20	1208	.20	1209	.19
1210	.20	1211	.18	1212	.18	1213	.18	1214	.17
1215	.17	1216	.17	1217	.16	1218	.16	1219	.17
1220	.17	1221	.16	1222	.16	1223	.16	1224	.15
1225	.15	1226	.15	1227	.14	1228	.14	1229	.14
1230	.14	1231	.13	1232	.14	1233	.14	1234	.13
1235	.13	1236	.13	1237	.13	1238	.12	1239	.13
1240	.12	1241	.13	1242	.13	1243	.12	1244	.12
1245	.12	1246	.11	1247	.11	1248	.12	1249	.11
1250	.11	1251	.11	1252	.11	1253	.10	1254	.10
1255	.10	1256	.10	1257	.10	1258	.10	1259	.10
1260	.10	1261	.10	1262	.10	1263	.10	1264	.10
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .28(Ac.Ft)

25-YEAR

DEVELOPED CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	2.8	8.54	2.8	8.54	1	80.	.07500	.00	.00	0.	20	5	A42	.06
1944	2A	2.9	8.85	5.7	16.70	1	470.	.03190	.00	.00	0.	20	5	A42	.06
1944	3A	4.5	13.48	10.2	22.27	1	1.	.01000	.00	.00	0.	20	6	A42	.37
1944	4A	1.5	5.52	11.7	26.62	1	1.	.01000	.00	.00	0.	20	5	A42	.71
1944	5A	.8	2.96	12.5	29.23	1	125.	.04000	.00	.00	0.	20	5	A42	.73
1944	6A	.7	2.22	13.2	30.43	1	1.	.01000	.00	.00	0.	20	5	A42	.18

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 25YR
HYDROGRAPH AT 1944 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.58	200	.61	300	.64	400	.68
500	.72	600	.77	700	.94	800	1.13	900	1.34
1000	1.74	1050	2.29	1100	3.21	1110	3.99	1120	4.80
1130	5.77	1131	5.91	1132	6.04	1133	6.19	1134	6.39
1135	6.63	1136	6.85	1137	7.08	1138	7.34	1139	7.62
1140	7.87	1141	8.19	1142	8.59	1143	9.04	1144	9.44
1145	9.93	1146	10.61	1147	11.37	1148	12.07	1149	13.58
1150	16.37	1151	19.85	1152	23.35	1153	27.19	1154	29.88
1155	30.43	1156	29.52	1157	27.56	1158	24.60	1159	21.20
1160	18.11	1161	15.72	1162	13.71	1163	11.94	1164	10.44
1165	9.19	1166	8.17	1167	7.35	1168	6.69	1169	6.14
1170	5.69	1171	5.31	1172	4.99	1173	4.71	1174	4.46
1175	4.23	1176	4.04	1177	3.86	1178	3.71	1179	3.56
1180	3.43	1181	3.31	1182	3.20	1183	3.11	1184	3.02
1185	2.93	1186	2.84	1187	2.76	1188	2.69	1189	2.62
1190	2.55	1191	2.50	1192	2.45	1193	2.40	1194	2.36
1195	2.32	1196	2.28	1197	2.24	1198	2.20	1199	2.15
1200	2.10	1201	2.07	1202	2.04	1203	2.01	1204	1.98
1205	1.95	1206	1.93	1207	1.90	1208	1.88	1209	1.86
1210	1.83	1211	1.81	1212	1.79	1213	1.76	1214	1.73
1215	1.71	1216	1.69	1217	1.67	1218	1.64	1219	1.62
1220	1.61	1221	1.60	1222	1.59	1223	1.57	1224	1.56
1225	1.54	1226	1.52	1227	1.50	1228	1.48	1229	1.45
1230	1.44	1231	1.43	1232	1.42	1233	1.40	1234	1.40
1235	1.39	1236	1.38	1237	1.36	1238	1.35	1239	1.34
1240	1.33	1241	1.32	1242	1.31	1243	1.31	1244	1.29
1245	1.29	1246	1.28	1247	1.27	1248	1.25	1249	1.24
1250	1.24	1251	1.24	1252	1.23	1253	1.22	1254	1.21
1255	1.20	1256	1.19	1257	1.18	1258	1.17	1259	1.17
1260	1.17	1261	1.17	1262	1.17	1263	1.17	1264	1.16
1265	1.15	1266	1.14	1267	1.13	1268	1.13	1269	1.12
1270	1.12	1271	1.11	1272	1.11	1273	1.11	1274	1.10
1275	1.09	1276	1.09	1277	1.09	1278	1.08	1279	1.07
1280	1.07	1281	1.07	1282	1.07	1283	1.07	1284	1.06
1285	1.06	1286	1.05	1287	1.05	1288	1.04	1289	1.03
1290	1.03	1291	1.03	1292	1.02	1293	1.02	1294	1.02
1295	1.02	1296	1.01	1297	1.00	1298	1.00	1299	1.00
1300	.99	1310	.94	1320	.89	1330	.84	1340	.81
1350	.79	1360	.78	1370	.76	1380	.74	1390	.75
1400	.72	1420	.70	1440	.61	1460	.55	1500	.55

TOTAL VOLUME THIS HYDROGRAPH = 2.89(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	.1	.31	.1	.31	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	.1	.30	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 25YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.00
1000	.00	1050	.00	1100	.00	1110	.00	1120	.00
1130	.00	1131	.00	1132	.00	1133	.00	1134	.00
1135	.00	1136	.00	1137	.00	1138	.00	1139	.00
1140	.00	1141	.00	1142	.00	1143	.00	1144	.00
1145	.00	1146	.00	1147	.00	1148	.00	1149	.14
1150	.18	1151	.22	1152	.26	1153	.30	1154	.27
1155	.22	1156	.17	1157	.12	1158	.10	1159	.00
1160	.00	1161	.00	1162	.00	1163	.00	1164	.00
1165	.00	1166	.00	1167	.00	1168	.00	1169	.00
1170	.00	1171	.00	1172	.00	1173	.00	1174	.00
1175	.00	1176	.00	1177	.00	1178	.00	1179	.00
1180	.00	1181	.00	1182	.00	1183	.00	1184	.00
1185	.00	1186	.00	1187	.00	1188	.00	1189	.00
1190	.00	1191	.00	1192	.00	1193	.00	1194	.00
1195	.00	1196	.00	1197	.00	1198	.00	1199	.00
1200	.00	1201	.00	1202	.00	1203	.00	1204	.00
1205	.00	1206	.00	1207	.00	1208	.00	1209	.00
1210	.00	1211	.00	1212	.00	1213	.00	1214	.00
1215	.00	1216	.00	1217	.00	1218	.00	1219	.00
1220	.00	1221	.00	1222	.00	1223	.00	1224	.00
1225	.00	1226	.00	1227	.00	1228	.00	1229	.00
1230	.00	1231	.00	1232	.00	1233	.00	1234	.00
1235	.00	1236	.00	1237	.00	1238	.00	1239	.00
1240	.00	1241	.00	1242	.00	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .00(Ac.Ft)

50-YEAR

DEVELOPED CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 50YR STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1944	1A	2.8	10.01	2.8	10.01	1	80.	.07500	.00	.00	0.	20	5	A42	.06
1944	2A	2.9	10.37	5.7	19.63	1	470.	.03190	.00	.00	0.	20	5	A42	.06
1944	3A	4.5	15.66	10.2	26.74	1	1.	.01000	.00	.00	0.	20	6	A42	.37
1944	4A	1.5	6.34	11.7	31.72	1	1.	.01000	.00	.00	0.	20	5	A42	.71
1944	5A	.8	3.40	12.5	34.72	1	125.	.04000	.00	.00	0.	20	5	A42	.73
1944	6A	.7	2.59	13.2	36.13	1	1.	.01000	.00	.00	0.	20	5	A42	.18

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 50YR
HYDROGRAPH AT 1944 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.66	200	.69	300	.73	400	.77
500	.91	600	1.07	700	1.19	800	1.32	900	1.61
1000	2.08	1050	2.73	1100	3.85	1110	4.76	1120	5.70
1130	6.87	1131	7.05	1132	7.21	1133	7.40	1134	7.64
1135	7.92	1136	8.18	1137	8.46	1138	8.77	1139	9.11
1140	9.41	1141	9.78	1142	10.27	1143	10.80	1144	11.27
1145	11.87	1146	12.67	1147	13.56	1148	14.37	1149	16.21
1150	19.54	1151	23.60	1152	27.71	1153	32.30	1154	35.52
1155	36.13	1156	35.03	1157	32.61	1158	28.89	1159	24.69
1160	20.95	1161	18.08	1162	15.67	1163	13.57	1164	11.83
1165	10.41	1166	9.28	1167	8.38	1168	7.64	1169	7.04
1170	6.53	1171	6.11	1172	5.75	1173	5.45	1174	5.16
1175	4.92	1176	4.70	1177	4.51	1178	4.33	1179	4.18
1180	4.03	1181	3.89	1182	3.78	1183	3.68	1184	3.57
1185	3.46	1186	3.36	1187	3.27	1188	3.18	1189	3.10
1190	3.02	1191	2.96	1192	2.90	1193	2.84	1194	2.79
1195	2.74	1196	2.70	1197	2.64	1198	2.59	1199	2.53
1200	2.48	1201	2.44	1202	2.41	1203	2.37	1204	2.34
1205	2.31	1206	2.28	1207	2.25	1208	2.23	1209	2.20
1210	2.16	1211	2.14	1212	2.11	1213	2.08	1214	2.05
1215	2.03	1216	2.00	1217	1.98	1218	1.95	1219	1.93
1220	1.91	1221	1.91	1222	1.89	1223	1.87	1224	1.86
1225	1.84	1226	1.82	1227	1.79	1228	1.77	1229	1.74
1230	1.72	1231	1.71	1232	1.70	1233	1.68	1234	1.68
1235	1.67	1236	1.65	1237	1.63	1238	1.61	1239	1.60
1240	1.58	1241	1.58	1242	1.57	1243	1.56	1244	1.54
1245	1.53	1246	1.52	1247	1.50	1248	1.48	1249	1.47
1250	1.47	1251	1.46	1252	1.45	1253	1.43	1254	1.42
1255	1.41	1256	1.39	1257	1.38	1258	1.37	1259	1.37
1260	1.36	1261	1.36	1262	1.35	1263	1.35	1264	1.35
1265	1.33	1266	1.31	1267	1.30	1268	1.30	1269	1.29
1270	1.28	1271	1.28	1272	1.28	1273	1.27	1274	1.25
1275	1.25	1276	1.25	1277	1.24	1278	1.23	1279	1.22
1280	1.22	1281	1.22	1282	1.22	1283	1.22	1284	1.21
1285	1.21	1286	1.20	1287	1.19	1288	1.18	1289	1.17
1290	1.17	1291	1.17	1292	1.17	1293	1.16	1294	1.16
1295	1.16	1296	1.15	1297	1.14	1298	1.13	1299	1.13
1300	1.13	1310	1.09	1320	1.08	1330	1.04	1340	1.01
1350	.98	1360	.95	1370	.88	1380	.84	1390	.84
1400	.81	1420	.78	1440	.77	1460	.63	1500	.63

TOTAL VOLUME THIS HYDROGRAPH = 3.44(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1944	1B	.1	.36	.1	.36	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	.1	.35	2	1.	.01000	.00	.00	0.	20	99	A29	.00

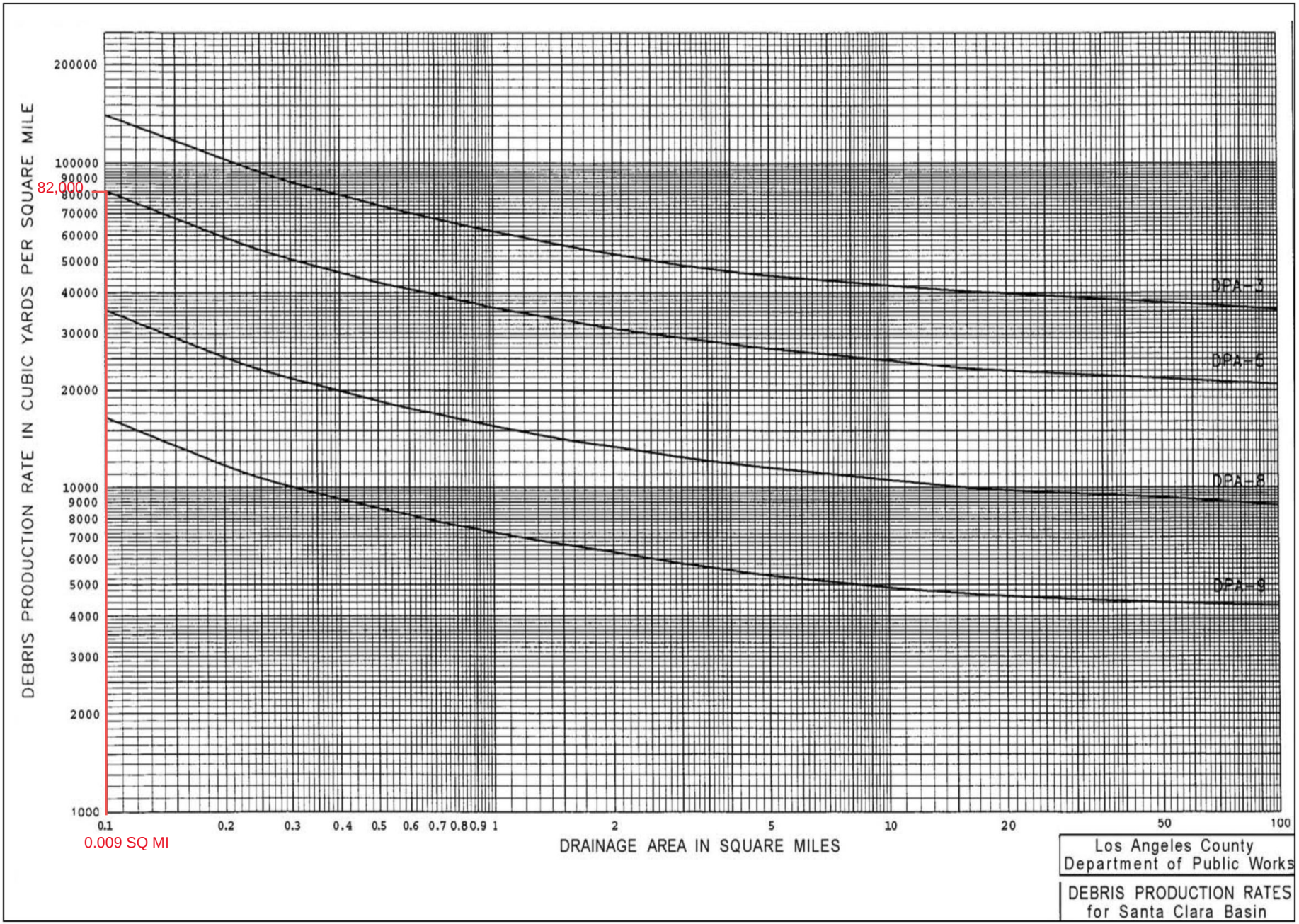
Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 50YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.00
1000	.00	1050	.00	1100	.00	1110	.00	1120	.00
1130	.00	1131	.00	1132	.00	1133	.00	1134	.00
1135	.00	1136	.00	1137	.00	1138	.00	1139	.00
1140	.00	1141	.00	1142	.00	1143	.00	1144	.00
1145	.00	1146	.10	1147	.11	1148	.12	1149	.16
1150	.21	1151	.26	1152	.31	1153	.35	1154	.32
1155	.26	1156	.20	1157	.14	1158	.10	1159	.00
1160	.00	1161	.00	1162	.00	1163	.00	1164	.00
1165	.00	1166	.00	1167	.00	1168	.00	1169	.00
1170	.00	1171	.00	1172	.00	1173	.00	1174	.00
1175	.00	1176	.00	1177	.00	1178	.00	1179	.00
1180	.00	1181	.00	1182	.00	1183	.00	1184	.00
1185	.00	1186	.00	1187	.00	1188	.00	1189	.00
1190	.00	1191	.00	1192	.00	1193	.00	1194	.00
1195	.00	1196	.00	1197	.00	1198	.00	1199	.00
1200	.00	1201	.00	1202	.00	1203	.00	1204	.00
1205	.00	1206	.00	1207	.00	1208	.00	1209	.00
1210	.00	1211	.00	1212	.00	1213	.00	1214	.00
1215	.00	1216	.00	1217	.00	1218	.00	1219	.00
1220	.00	1221	.00	1222	.00	1223	.00	1224	.00
1225	.00	1226	.00	1227	.00	1228	.00	1229	.00
1230	.00	1231	.00	1232	.00	1233	.00	1234	.00
1235	.00	1236	.00	1237	.00	1238	.00	1239	.00
1240	.00	1241	.00	1242	.00	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .00(Ac.Ft)

APPENDIX D

Debris Calculations


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
82,000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
DFA-3
DFA-6
DFA-8
DFA-9
0.1
0.009 SQ MI
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Santa Clara Basin

DEBRIS VOLUME REQUIRED

DEBRIS PRODUCING SUBAREAS	TOTAL AREA	DEBRIS PRODUCING AREA		DEBRIS PRODUCTION RATE	DEBRIS PRODUCED (VOL_REQ)
	ac	ac	sq mi	cy / sq mi	cy
DEV SUBAREA 1A	2.8	2.8	0.004	82000	359
DEV SUBAREA 2A*	2.9	2.9	0.005	82000	372
LA COUNTY METHOD			0.009		731
50% REDUCTION **					366

*Debris producing area is less then the total area because part of the total area is engineered slope from the Needham Ranch Project

** Debris producing area contains well established vegetaion and no historical record of large debris flows

DEBRIS VOLUME PROVIDED

DEBRIS BASIN	depth	TOP(CONE LIMIT)	BOTTOM	AVERAGE	VOL_PROV		VOL_REQ
	ft	sf	sf	sf	cf	cy	cy
BASIN A	4.25	2934.412	1886.524	2410	10244.489	380	366

APPENDIX E

Existing 14’ Catch Basin in Newhall Ave

Hydrology and Hydraulic Analysis

Peak Flow Hydrologic Analysis

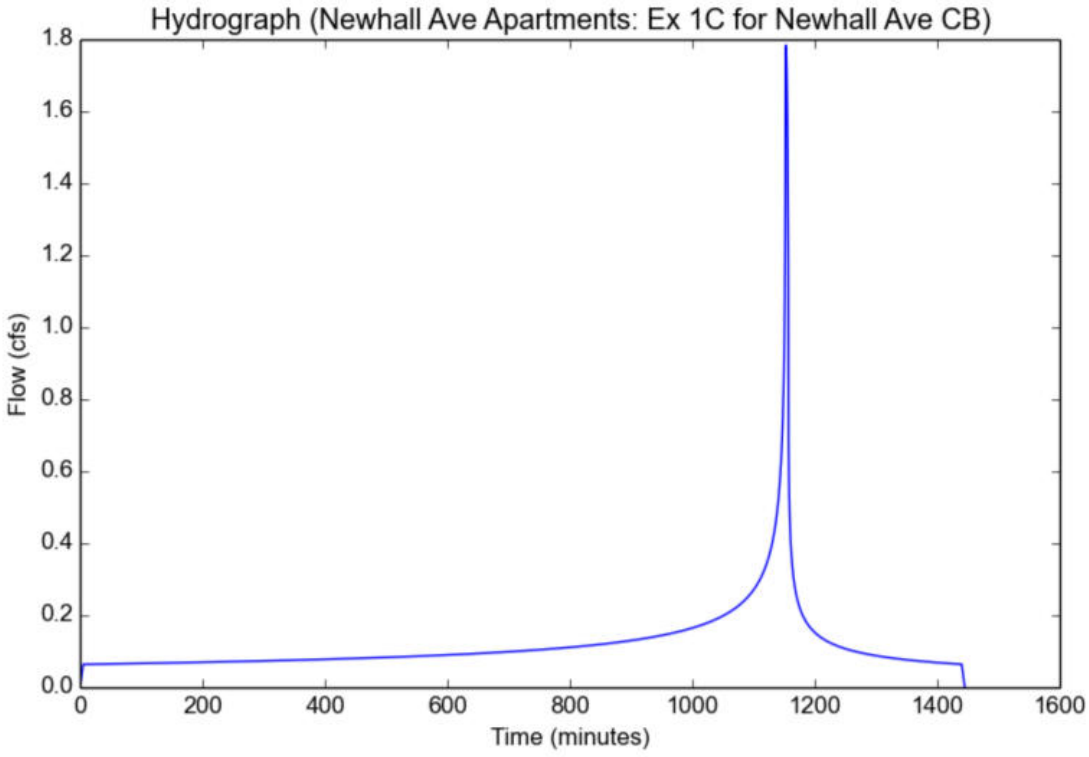
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1C for Offsite CB.pdf
Version: HydroCalc 1.0.3

Input Parameters

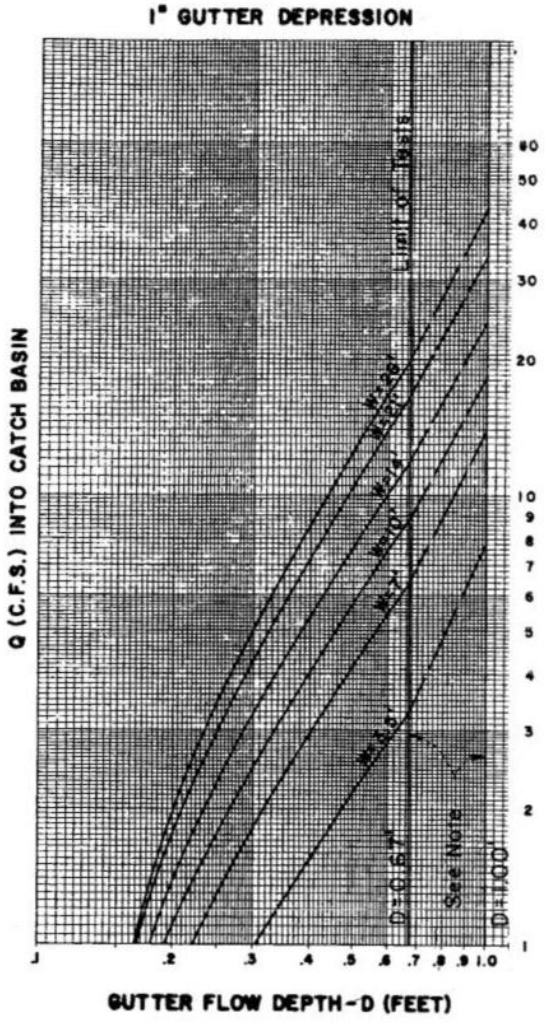
Project Name	Newhall Ave Apartments
Subarea ID	Ex 1C for Newhall Ave CB
Area (ac)	0.4
Flow Path Length (ft)	405.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.95
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

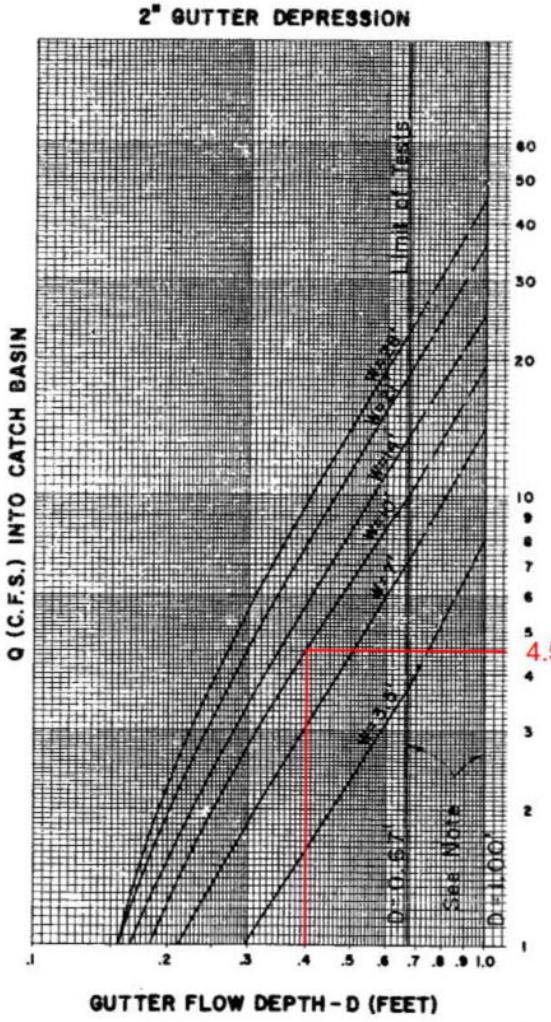
Output Results

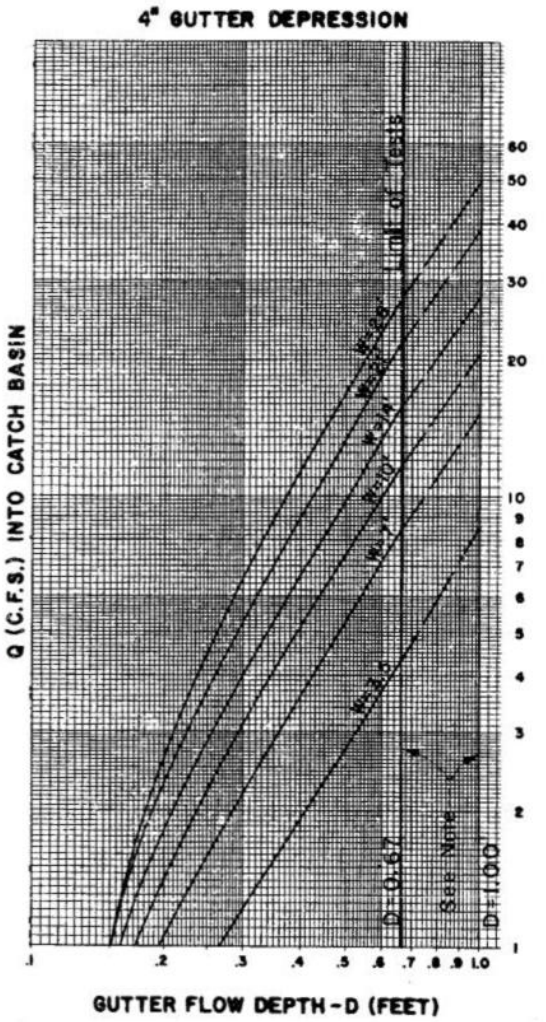
Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8897
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7836
Burned Peak Flow Rate (cfs)	1.7836
24-Hr Clear Runoff Volume (ac-ft)	0.2402
24-Hr Clear Runoff Volume (cu-ft)	10463.0383



NEWHALL AVE APARTMENTS
8/15/22







NOTE: Curves between D=0.67' and 1.0' are not from model test data and will be revised in the future when additional model test data are available.

Los Angeles County Flood Control District

CURB OPENING CATCH BASIN CAPACITIES

STREET SLOPE = .005
Rev. 6-12-84

D-10A

EX 14' CB IN NEWHALL AVE
ASSUME 5" DEPTH OF FULL IN GUTTER
CAPACITY = 4.5 CFS
SUM Q = 2.14 CFS

APPENDIX F

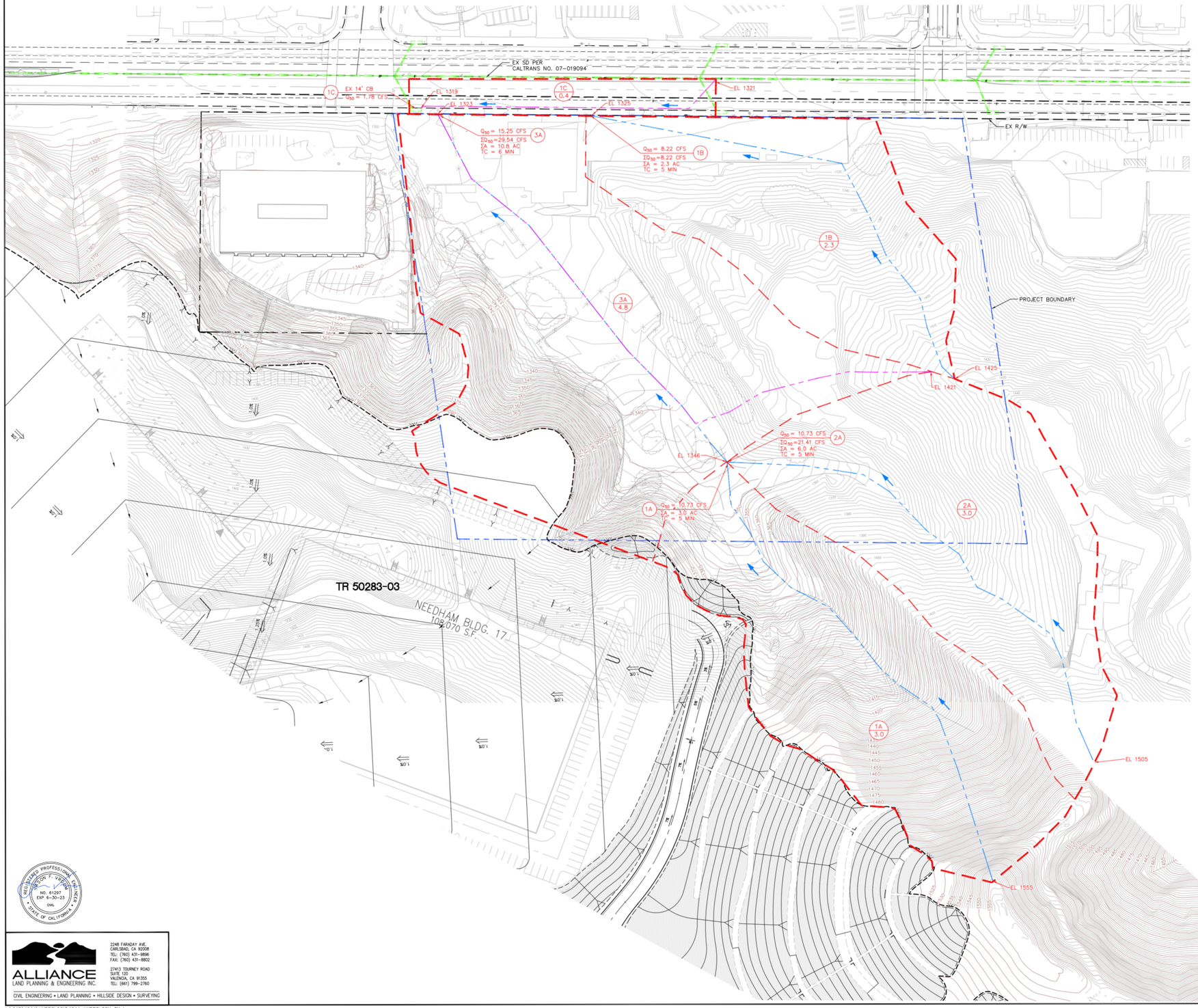
Existing and Developed Condition

Hydrology Exhibits

NEWHALL AVENUE APARTMENTS
EXISTING CONDITION HYDROLOGY
8/15/22

Σ ONSITE EXISTING CONDITION:
ΣQ_{50} = 37.76 CFS
ΣA = 13.1 AC

Σ AT EXISTING 14' CB:
ΣQ_{50} = 1.78 CFS



EXISTING CONDITION MODEL PARAMETERS

Subarea #	Area ac	Overland ft	Slope ft/ft	Flowpath ft	Slope ft/ft	50-Yr Rain in	Imp %	Soil Type	Tc min
1A	3.0	684	0.3058	1		8.4	6	20	5
2A	3.0	687	0.2314	601	0.0383	8.4	6	20	5
3A	4.8	860	0.1128	1		8.4	6	20	6
1B	2.3	660	0.1515	1		8.4	6	20	5
ONSITE TTL	13.1								
1C	0.4	405	0.0049	1		8.4	95	20	5

LEGEND

- PROJECT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-BASIN LIMITS
- OVERLAND PATH (TC)
- FLOW PATH
- TC — TIME OF CONCENTRATION (MIN.)
- ΣA — CUMULATIVE TRIBUTARY AREA (AC)
- Q_{50} — 50 YR. CLEAR FLOWRATE (CFS)
- Q_{50B} — 50 YR. BURNED FLOWRATE (CFS)
- ΣQ — CUMULATIVE FLOWRATE (CFS)
- (1A / 3.0) — DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
- EXISTING STORM DRAIN LINE
- DIRECTION OF FLOW

DESIGN CRITERIA:

STORM EVENT	50 YR – SUMP LOCATIONS 25 YR – NON-SUMP LOCATIONS
50-YR RAINFALL ISOHYET	8.4"
SOIL TYPE	020
DEBRIS PRODUCTION AREA	DPA 5/DPA 9

SCALE: 1"=30'

REGISTERED PROFESSIONAL ENGINEER — BRIAN F. YERMAN — NO. 61297 EXP 6-30-23 — CIVIL — STATE OF CALIFORNIA

ALLIANCE
LAND PLANNING & ENGINEERING INC.
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802

27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760

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NEWHALL AVENUE APARTMENTS
DEVELOPED CONDITION HYDROLOGY
12/9/22

BASIN A AND BASIN B:
Σ EXISTING CONDITION: ΣQ_{50} = 37.76 AC, ΣA = 13.1 AC
Σ DEVELOPED CONDITION: ΣQ_{50} = 36.49 AC, ΣA = 13.3 AC

CARL CT.
VALLE DEL ORO
NEWHALL AVENUE
EX SD PER CALTRANS NO. 07-019094
PROPOSED SD LATERAL
EX R/W
PROP R/W
BASIN B
BASIN A
EXISTING 14' CB 1C
Q_{0x50}=1.78 CFS
ΣQ_{50}=2.14 CFS
14' CB CAPAX =4.5 CFS
1C 0.4
Q_{50}=2.59 CFS
ΣQ_{50}=36.13 CFS
ΣA = 13.2 AC
TC = 5 MIN
6A
Q_{50}=0.36 CFS
ΣQ_{50}=0.36 CFS
ΣA = 0.1 AC
TC = 5 MIN
1B 0.1
4' RET WALL
5' RET WALL
INFILTRATION UNIT
Q_{50}=34.72 CFS
5A
Q_{50} = 3.40 CFS
ΣA = 12.5 AC
TC = 5 MIN
5A 0.8
4A
Q_{50} = 6.34 CFS
ΣA = 11.7 AC
TC = 5 MIN
4A 1.5
6A 0.7
Q_{50}=15.66 CFS
ΣQ_{50}=26.74 CFS
ΣA = 10.2 AC
TC = 6 MIN
3A
3A 4.5
EL 1360
EL 1403
EL 1369
EL 1340
FIRE DEPARTMENT TURNAROUND
6' RET WALL
11' RET WALL
Q_{50} = 10.01 CFS
ΣA = 2.8 AC
TC = 5 MIN
DPV = 359 CY
1A
1A 2.8
Q_{50} = 10.37 CFS
ΣQ_{50} =19.63 CFS
ΣA = 5.7 AC
TC = 5 MIN
DEBRIS VOL PROV. = 380 CY
DEBRIS VOL REQ * = 366 AC
2A
2A 2.9
* DEBRIS VOLUME HAS BEEN REDUCED BY 50% DUE TO EXISTING SITE CONDITIONS OF DEBRIS PRODUCING AREA
SEE EXISTING CONDITION HYDROLOGY FOR UPSTREAM HALF OF SUBAREA 1A AND SUBAREA 2A
PROJECT BOUNDARY
TR 50283-03
NEEDHAM BLDG. 17
108,070 S.F.

LEGEND

- PROJECT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-BASIN LIMITS
- OVERLAND PATH (TC)
- FLOW PATH
- TC — TIME OF CONCENTRATION (MIN.)
- ΣA — CUMULATIVE TRIBUTARY AREA (AC)
- Q50 — 50 YR. CLEAR FLOWRATE (CFS)
- Q50e — 50 YR. BURNED FLOWRATE (CFS)
- ΣQ — CUMULATIVE FLOWRATE (CFS)
- (1A / 2.8) — DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
- EXISTING STORM DRAIN LINE
- EXISTING STORM DRAIN LINE
- EXISTING STORM DRAIN LINE
- DIRECTION OF FLOW

DESIGN CRITERIA:

STORM EVENT	50 YR
50-YR RAINFALL ISOHYET	8.4"
SOIL TYPE	020
DEBRIS PRODUCTION AREA	DPA 5/DPA 9

DEVELOPED CONDITION MODEL PARAMETERS

Subarea #	Area ac	Overland ft	Slope ft/ft	Flowpath ft	Slope ft/ft	50-Yr Rain in	Imp %	Soil Type	Tc min
1A	2.8	635	0.2504	80	0.0750	8.4	6	20	5
2A	2.9	615	0.3496	470	0.0319	8.4	6	20	5
3A	4.5	785	0.0561	1		8.4	37	20	6
4A	1.5	400	0.1100	1		8.4	71	20	5
5A	0.8	350	0.1571	125	0.0400	8.4	73	20	5
6A	0.7	570	0.1456	1		8.4	18	20	5
1B	0.1	225	0.0222	1		8.4	6	20	5
ONSITE TTL	13.3								
1C	0.5	425	0.0094	1		8.4	91	20	5

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CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

SCALE: 1"=30'

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URBAN STORMWATER MANAGEMENT PLAN
U.S.M.P.

City of Santa Clarita

NEWHALL AVENUE APARTMENTS

APN 2827-003-016

Prepared For:
Chandler Partners
4116 West Magnolia Blvd, Ste 203
Burbank, CA 91505

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

December 8, 2023
JN 1944

Table Of Contents

Appendices

Project Description

The Newhall Avenue Apartment project is located in the City of Santa Clarita on Newhall Avenue approximately 0.4 miles east of Pine Street. The project boundary is approximately 9.7 ac in size of which only 6.7 ac is being developed.

The proposed project will be a multi-family apartment site, retail building, 36 condominium units with, a recreation center/leasing office and pool, with ac paved drive aisles and parking throughout.

Infiltration will be the method of water quality treatment for this project and is discussed in further detail below.

Methodology

Storm Event	= 85th %
85th % rainfall depth	= 1.00"
Soil Classification Area	= 020

HydroCalc software approved by the City/County was used to calculate the required stormwater quality design volume (SWQDv) and stormwater quality design flowrate (SWQDf) as prescribed per the Low Impact Development (LID) Standards Manual of the County of Los Angeles, Department of Public Works (LACDPW). The 85th percentile design storm of 1.0 inches is determined from the LA County 85th Percentile Analysis Google Earth .KMZ file. The Soil Classification of 020 was acquired from the Mint Canyon 50-yr, 24-hr Isohyetal map. See appendix A for the full HydroCalc output.

A summary of modeling input parameters and output results are provided below:

Area		overland	Slope	85th %	Vreq		Qreq
sf	ac	ft	ft/ft	"	cf	ac-ft	cfs
210,992	4.84	770	0.04675	1.0	13,312	0.31	1.02

Existing Condition

The existing condition site is mostly natural hillside that drains from south to north toward Newhall Ave and consists of an approximate 13.1 ac watershed. The hillsides consist of native vegetation and are primarily scrub and bushes with some trees. The existing site out along Newhall Avenue is currently a quick oil-change garage and semi-vacant used car lot. Once flow leaves the canyons and crosses through the business parking lots, runoff spills down into the gutter and flows to one of two curb opening catch basins in Newhall Ave.

There are currently no known water quality facilities implemented within the existing project site.

Developed Condition

The developed site will consist of a private underground storm drain system that will route water underground and out to the existing public storm drain in Newhall Ave. Runoff from the undeveloped offsite and canyon areas will be routed separately in a dedicated offsite storm drain system so that no comingling with onsite water will occur. Onsite water will be treated in an underground water quality chamber and will not be mixed with offsite flow in order to minimize the required size of any water quality facilities.

Infiltration

The method of treatment for this project is infiltration. Preliminary recommendations by soils engineer estimate a factored perc rate of greater than 0.75 in/hr. In addition, groundwater was not found within 25 ft of the ground surface elevations at the site.

Formal infiltration testing yielded an average percolation rate of 7.87 in/hr, with a 2.5x factor of safety the site infiltration rate is 3.15 in/hr.

Underground Infiltration Chambers

An underground infiltration system consisting of 72" perforated CMP pipes (Contech) is located at the northeast corner of the project. The required water quality component of runoff will be routed to this unit and will then percolate down into the ground below for treatment.

The infiltration unit has been divided into two units that are hydraulically connected via a pipe. This is due to spatial constraints and the nearby covered parking structure (and its post footings) in this area.

The design and performance data for the proposed infiltration chamber are provided in the table below.

WQT Volume Required (SWQDv)	13,312	cf
Underground Chamber Volume Provided	13,483	cf
Required Low Flow (SWQDf)	1.02	cfs

USMP Specific Requirements

The following list discusses additional aspects of the project's SUSMP specific requirements:

Hydromodification

This project is exempt from hydromodification mitigation since all developed condition runoff will discharge to the existing MS4 system located within Newhall Avenue.

However, some runoff mitigation will be provided using the projects underground water quality facility. Approximate 0.3 ac-ft of runoff volume will be treated in the water quality chamber and this will assist in providing mitigation to some degree.

In addition, the summary tables above show the developed condition peak flows are below those of the existing condition peak flows.

Natural Areas

The site consists of natural hillside areas that will be preserved to maximum extent possible. Landscaped medians and parkways are provided and will add to the natural areas.

Stormwater Pollutants of Concern

The primary pollutants of concern anticipated for this project are associated with landscaped areas, residential/commercial buildings and alleys/parking areas. These pollutants have been listed below for regions both onsite and downstream of the proposed development.

Pollutants of concern:

Pathogens; nutrients; pesticides; organic compounds; oxygen demanding substances; trash and debris; oils and grease; sediments; and metals.

Pollutant Removal

The infiltration chambers will remove pathogens, nutrients, pesticides, organic compounds, oxygen demanding substances, trash and debris, oils and grease, sediments, and metals by filtering the runoff though natural earth/soil prior to entering the underground aquifer.

Pollutants shall be removed via the underground infiltration chamber with high effectiveness per CASQA's BMP handbook on New Development and Redevelopment section on infiltration.

Slopes and Channels

Natural slopes to the sides and rear of the project site do exist and will be preserved as discussed above. There are no channels that exist.

Storm Drain System Stenciling and Parking

Multiple Catch Basins are proposed for this Soledad Commercial project. "NO DUMPING. DRAINS TO RIVER" stencils will be painted at the catch basin drain locations per the provided USMP Map.

Outdoor Material Storage Areas

No outdoor material storage areas are proposed for this project.

Properly Design Fueling Areas

No fueling areas are proposed on for this project.

Properly Design Trash Storage Areas

Trash storage areas are proposed for the project and will have three (3) side walls and covered roofs per the City of Santa Clarita guidelines. This is done to prevent contact with stormwater.

Properly Design Vehicle Wash Areas

No vehicle wash areas are proposed for this project.

Landscape Irrigation Practices and Hardscape Runoff

Landscaped areas are designed to minimize/eliminate runoff and the need for fertilizer/pesticides. Where possible, hardscape runoff from the rooftops will be routed through landscaped medians around the main building. All other hardscaped runoff is routed to the underground treatment chamber directly. Landscaped areas are designed to include comprehensive irrigation systems that only water areas as needed to ensure healthy vegetation growth.

Bmp Maintenance (O&M)

An operation and maintenance manual for the proposed underground infiltration chamber is provided in Appendix C of this report.

Conclusion

This report concludes that the Newhall Avenue Apartment project is considered acceptable for development in terms of water quality design. All areas of development will be treated per methods outlined by the City of Santa Clarita and the proposed underground infiltration chamber will treat the project's required water quality runoff volume.

APPENDIX A

HydroCalc for Water Quality

Peak Flow Hydrologic Analysis

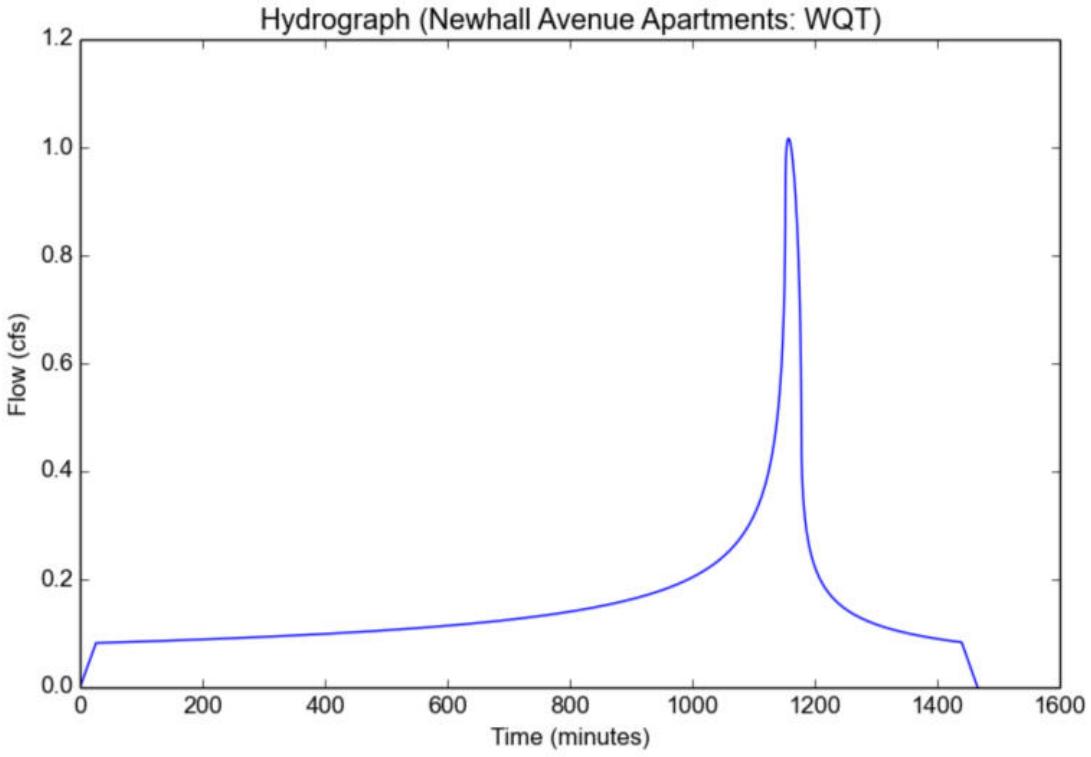
File location: I:/Project Files/1944 - NEWHALL AVENUE/USMP/1944-Wqt HydroCalc_013122.pdf
Version: HydroCalc 1.0.3

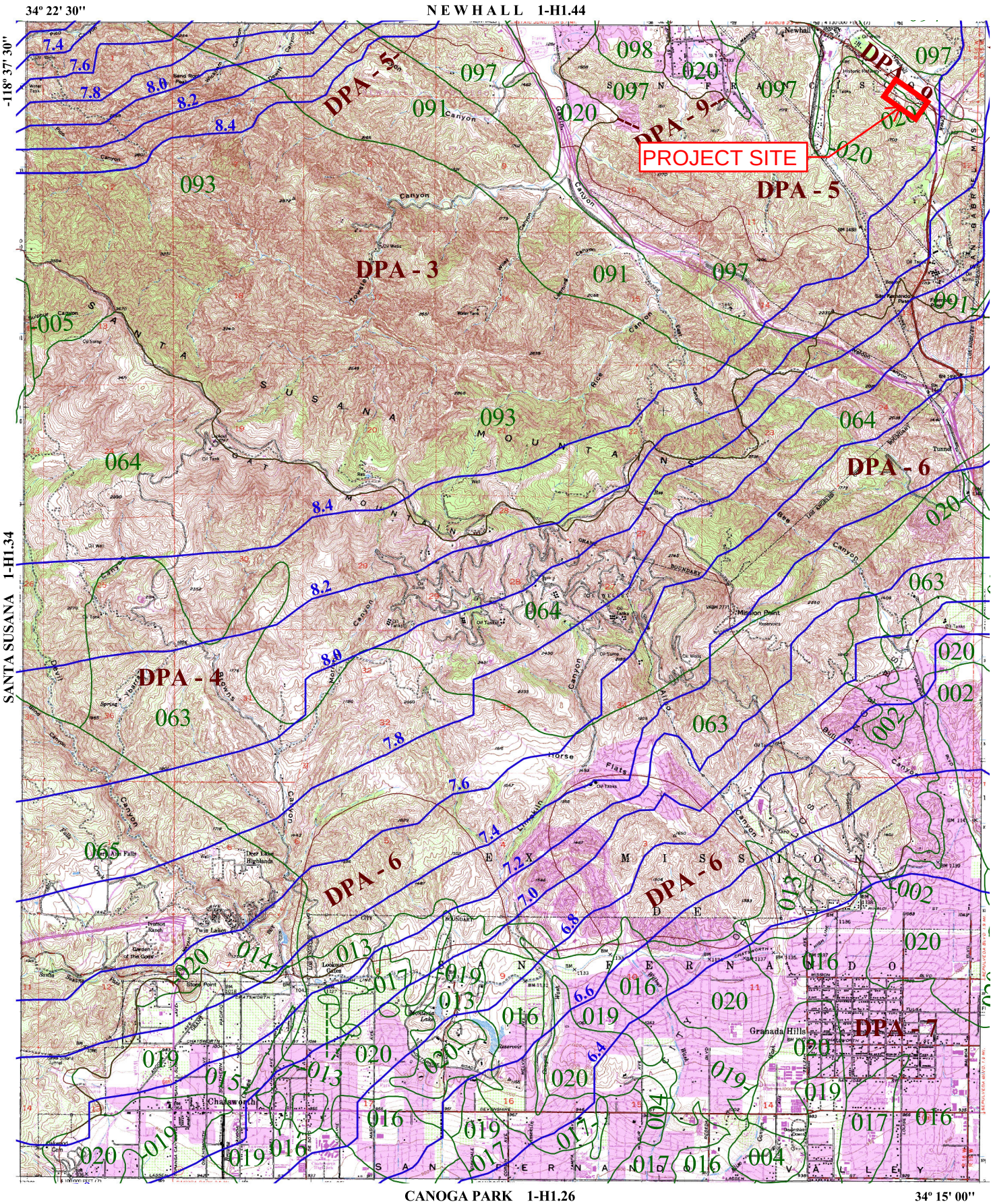
Input Parameters

Project Name	Newhall Avenue Apartments
Subarea ID	WQT
Area (ac)	4.84
Flow Path Length (ft)	770.0
Flow Path Slope (vft/hft)	0.04675
85th Percentile Rainfall Depth (in)	1.0
Percent Impervious	0.83
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.0
Peak Intensity (in/hr)	0.2749
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.764
Time of Concentration (min)	26.0
Clear Peak Flow Rate (cfs)	1.0165
Burned Peak Flow Rate (cfs)	1.0165
24-Hr Clear Runoff Volume (ac-ft)	0.3056
24-Hr Clear Runoff Volume (cu-ft)	13312.0505





016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

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

OAT MOUNTAIN
50-YEAR 24-HOUR ISOHYET

1-H1.35

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

APPENDIX B

INFILTRATION REPORT

INFILTRATION REPORT IN PROCESS

APPENDIX C

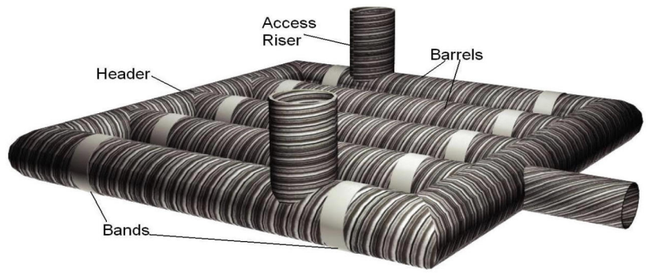
Contech Infiltration Unit Design and O & M

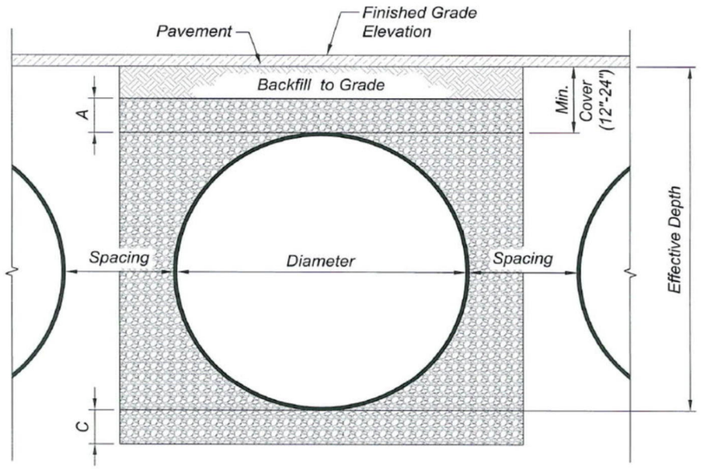
DYODS™
Design Your Own Detention System

CONTECH CMP DETENTION SYSTEMS

CONTECH STORMWATER SOLUTIONS INC.

For design assistance, drawings,
and pricing send completed worksheet to:
dyods@contech-cpi.com





Project Summary		
Date:	1/31/2022	
Project Name:	Newhall Ave Apartments	
City / County:	Santa Clarita, LA County	
State:	CA	
Designed By:	CVH	
Company:	Alliance Land Planning & Engineering	**Enter Information in Blue Cells**
Telephone:	760-431-9876	

Corrugated Metal Pipe Calculator		
Storage Volume Required (cf):	13,312	
Limiting Width (ft):	28.00	
Invert Depth Below Asphalt (ft):	7.00	
Solid or Perforated Pipe:	Perforated	
Shape Or Diameter (in):	72	28.27 ft^2 Pipe Area
Number Of Headers:	1	
Spacing between Barrels (ft):	3.00	
Stone Width Around Perimeter of System (ft):	1	
Depth A: Porous Stone Above Pipe (in):	6	
Depth C: Porous Stone Below Pipe (in):	6	
Stone Porosity (0 to 40%):	40	

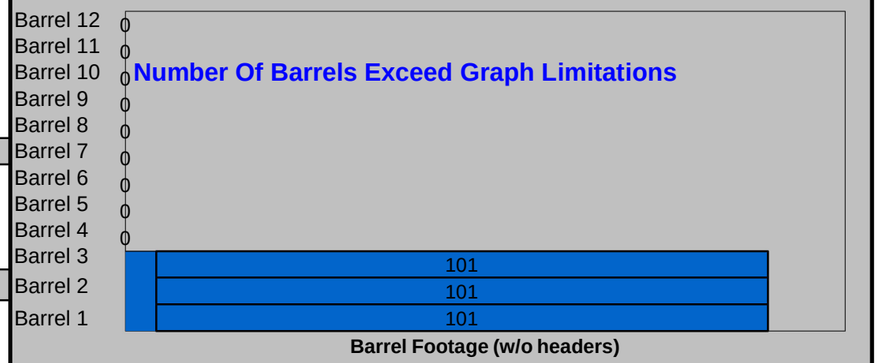
System Sizing			
Pipe Storage:	9,246	cf	
Porous Stone Storage:	4,237	cf	
Total Storage Provided:	13,483	cf	101.3% Of Required Storage
Number of Barrels:	3	barrels	
Length per Barrel:	101.0	ft	
Length Per Header:	24.0	ft	
Rectangular Footprint (W x L):	26. ft x 109. ft		

CONTECH Materials		
Total CMP Footage:	327	ft
Approximate Total Pieces:	16	pcs
Approximate Coupling Bands:	15	bands
Approximate Truckloads:	8	trucks

Construction Quantities**		
Total Excavation:	735	cy
Porous Stone Backfill For Storage:	392	cy stone
Backfill to Grade Excluding Stone:	0	cy fill

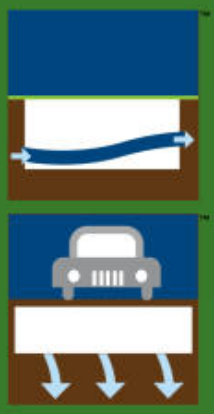
***Construction quantities are approximate and should be verified upon final design*

System Layout



UrbanGreen™

Metal Detention and Infiltration Products



Scan Me!

CONTECH®
ENGINEERED SOLUTIONS

Corrugated Metal Pipe for Stormwater Detention and Infiltration

Selecting the right stormwater solution just got easier...

It's simple to choose the right low impact development (LID) solution to achieve your runoff reduction goals with the Contech UrbanGreen™ Staircase. First, select the runoff reduction practices that are most appropriate for your site, paying particular attention to pretreatment needs. If the entire design storm cannot be retained, select a treatment best management practice (BMP) for the balance. Finally, select a detention system to address any outstanding downstream erosion.

Learn more about our low impact development at:
www.ContechES.com/lid

Meet your stormwater quantity and runoff reduction requirements with ease.

Contech's corrugated metal pipe (CMP) underground detention/infiltration systems can be sized and shaped to meet your site-specific needs. The versatile material provides almost limitless opportunities to match individual site requirements while lowering site development costs.

Durable

- Proven service life – Exceeds 100-years with proper specification that meets all AASHTO and ASTM pipe specifications
- Handles fill heights in excess of 100 feet – steel combines strength with soil
- 100% traceable material – maintains performance even when recycled
- Homogenous material – eliminates failures due to stress cracks, shrinkage cracks and air voids
- Various coatings available with predictable service life
  - Aluminized Steel™ Type 2
  - Galvanized
  - CORLIX®
  - TRENCHCOAT®

Learn more about our available coatings at:
www.ContechES.com/cmp

various coatings available

Versatile

- Wide range of shapes and sizes – round and pipe-arch in diameters from 6 to 144 inches
- Variety of layouts – rectangular, L-shape and staggered cells are frequently used
- Array of fittings – tees, wyes, elbow, saddle branches, manifolds, reducers and custom fabrication available

Sustainable

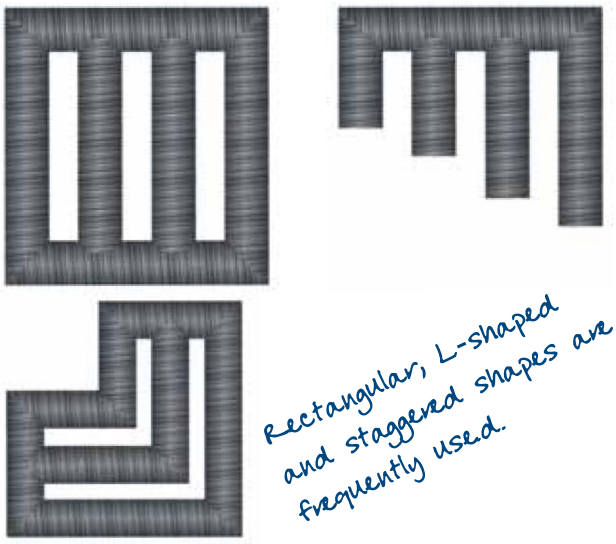
- World's most recycled content – can count towards LEED® credits
- Requires less energy and materials to produce – lowers carbon footprint

Learn how Contech products can help contribute to LEED credits at: www.ContechES.com/LEED

Easy to Install and Maintain

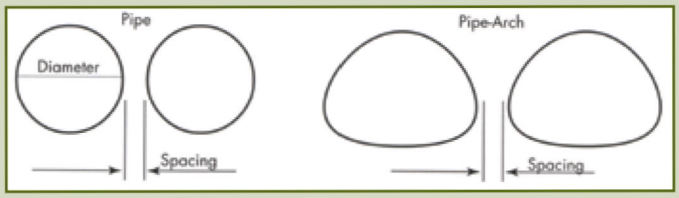
- Flexible and forgiving during installation
- Lightweight for easy handling
- Quick assembly shortens site development time
- Integrated outlet control structure eliminates need for downstream control structure
- Manhole riser sections, complete with ladders facilitate any access and scheduled maintenance

Tees, wyes, elbows, saddle branches, manifolds and reducers are available.



Rectangular, L-shaped and staggered shapes are frequently used.

Typical Spacing for Multiple Barrels



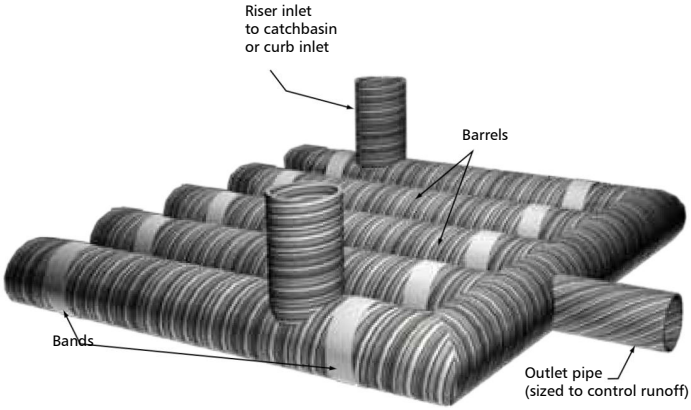
Diameter	Spacing*	Pipe-Arch Span	Spacing*
Up to 24"	12"	Up to 36"	12"
24" to 72"	1/2 Diameter of Pipe	36" to 108"	1/3 Span of Pipe-Arch
72" +	36"	108" to 189"	36"

* Spacing shown provides room for proper backfill to enable the structure to develop adequate side support. Spacing with AASHTO M-145, A-1, A-2, A-3 granular fill. Closer spacing is possible depending on quality of backfill and placing and compaction methods.

Applications

Detention

Contech CMP detention systems store stormwater runoff exceeding a site's allowable discharge rate and release it slowly over time. Installed belowgrade, the systems maximize property usage and meet your specific water quantity requirements. CMP detention systems are available in all AASHTO M-36 Types.



CMP detention system

High Volume Storage

Contech plate systems allow for high volume stormwater storage in small footprint areas. The systems are offered in a wide variety of shapes and sizes in both aluminum and galvanized steel. Full-pipe systems and three-sided structures with open bottoms can be used for infiltration.

Typically, Contech plate systems are used on high vertical rise applications or in areas where the smallest possible footprint is of the greatest concern. The systems are bolted together in the field, which reduces the number of freight loads. Remote sites or projects with challenging accessibility often utilize plate systems.

Plate system for high volume storage

Perforated CMP infiltration system

Infiltration

CMP pipe and pipe-arch is available fully or partially perforated to meet your Low Impact Development (LID) requirements. Subsurface perforated CMP infiltration systems store stormwater runoff in the pipe and surrounding stone during a storm until it can be slowly released into the surrounding native soil.

Stormwater runoff is stored in the pipe and surrounding stone.

Meet Your Low Impact Development Requirements

Pipe-arch for low profile application.

Low Profile

When vertical space must be maximized, the CMP can be utilized in a pipe-arch shape. The low, wide pipe-arch design allows for greater storage in a shallow profile than typical round pipe without losing any structural integrity. Like our round pipe, pipe arch is produced in six wall thicknesses including 18, 16, 14, 12, 10 and 8 gage, which are available with either helical or annular corrugations.

Applications

On-Site Manufacturing

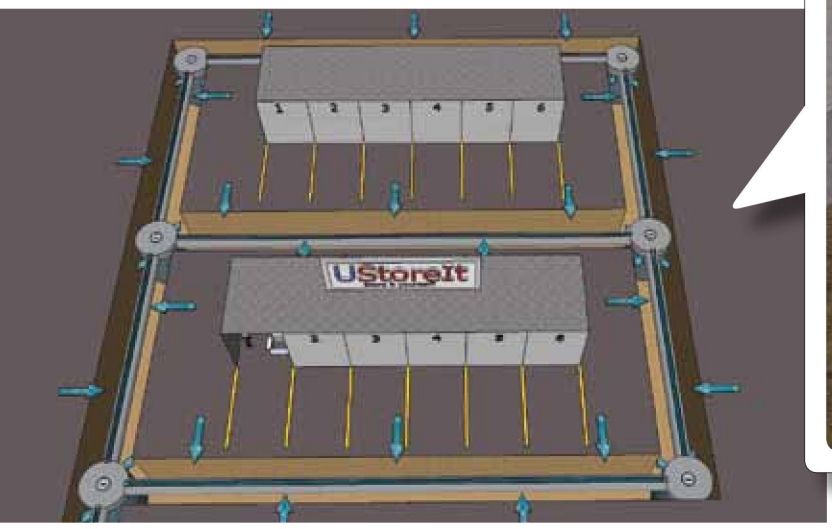
If your job site is remote or you have limited storage space or restricted traffic patterns, take advantage of our Mobile Production Vehicle (MPV) for fast and cost effective on-site steel pipe manufacturing. The PIPE MPV® is designed to be a self-supporting factory that can be quickly deployed and put into production. Once on site, pipe manufacturing progresses quickly enough to allow pipe installation within four hours.

The PIPE MPV can produce corrugated metal pipe in a variety of sizes. Diameters from 36" – 192" and lengths up to 35' can be accommodated. This pipe meets the same levels of quality construction as does all Contech manufactured pipe, with high coil feedrate speeds and the same lock-seem edge process used in conventional pipe manufacturing.

Mobile Production Vehicle

Innovative Solutions for Challenging Sites

The flexibility of CMP allows you to create innovative solutions when dealing with challenging sites. For example, when trying to meet runoff reduction requirements, your site may be mostly impervious or you may have a thin, shallow clay layer just below the surface, limiting the infiltration capacity of surface BMPs. One solution is to utilize CMP infiltration wells. First, collect the site runoff using our Slotted Drain™ around the perimeter of each drive isle. The Slotted Drain then directs water into vertical lengths of perforated CMP. The vertical perforated CMP is long enough to penetrate the clay layer and infiltrate the stormwater into a highly permeable alluvial layer about 12'-14' belowground. This allows the developer to meet the LID requirements and eliminate the need for the extended detention basin.



Sizing

Round Pipe - CMP and Plate (CMP → 12-in to 144-in; Plate → 60-in to 240-in)

Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height
12	.78	12″	60	19.6	12″	120	78.5	18″	180	176	24″
15	1.22	12″	66	23.7	12″	126	86.5	18″	186	188	24″
18	1.76	12″	72	28.2	12″	132	95.0	18″	192	201	24″
21	2.40	12″	78	33.1	12″	138	103.8	18″	198	213	30″
24	3.14	12″	84	38.4	12″	144	113.1	18″	204	227	30″
30	4.9	12″	90	44.1	12″	150	122	24″	210	240	30″
36	7.0	12″	96	50.2	12″	156	132	24″	216	254	30″
42	9.6	12″	102	56.7	18″	162	143	24″	222	268	30″
48	12.5	12″	108	63.6	18″	168	153	24″	228	283	30″
54	15.9	12″	114	70.8	18″	174	165	24″	234	298	30″

Pipe-Arch - CMP

1/2″ Deep Corrugations											
Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height
17 x 13	1.1	12″	28 x 20	2.9	12″	49 x 33	8.9	12″	71 x 47	18.1	12″
21 x 15	1.6	12″	35 x 24	4.5	12″	57 x 38	11.6	12″	77 x 52	21.9	12″
24 x 18	2.2	12″	42 x 29	6.5	12″	64 x 43	14.7	12″	83 x 57	26.0	12″
1″ Deep Corrugations											
60 x 46	15.6	15″	81 x 59	27.4	18″	103 x 71	42.4	18″	128 x 83	60.5	24″
66 x 51	19.3	15″	87 x 63	32.1	18″	112 x 75	48.0	21″	137 x 87	67.4	24″
73 x 55	23.2	18″	95 x 67	37.0	18″	117 x 79	54.2	21″	142 x 91	74.5	24″

Pipe-Arch - MULTI-PLATE®

2″ Deep Corrugations												
	Shape (ft-in)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height
18-in Corner Radius (Rc)	6-1 x 4-7	22	12″	8-7 x 5-11	41	18″	8-7 x 5-11	41	18″	14-1 x 8-9	97	24″
	6-4 x 4-9	24	12″	8-10 x 6-1	43	18″	8-10 x 6-1	43	18″	14-3 x 8-11	101	24″
	6-9 x 4-11	26	12″	9-4 x 6-3	46	18″	9-4 x 6-3	46	18″	14-10 x 9-1	105	24″
	7-0 x 5-1	29	12″	9-6 x 6-5	49	18″	9-6 x 6-5	49	18″	15-4 x 9-3	109	24″
	7-3 x 5-3	31	12″	9-9 x 6-7	52	18″	9-9 x 6-7	52	18″	15-6 x 9-5	114	24″
	7-8 x 5-5	33	12″	10-3 x 6-9	55	18″	10-3 x 6-9	55	18″	15-8 x 9-7	118	24″
	7-11 x 5-7	36	12″	10-8 x 6-11	58	18″	10-8 x 6-11	58	18″	15-10 x 9-10	122	24″
	8-2 x 5-9	38	18″	10-11 x 7-1	61	18″	10-11 x 7-1	61	18″	16-5 x 9-11	126	30″
							13-11 x 8-7	93	24″	16-7 x 10-1	131	30″
31-in Corner Radius (Rc)	13-3 x 9-4	98	24″	15-4 x 10-4	124	24″	17-2 x 11-4	153	30″	19-3 x 12-4	185	30″
	13-6 x 9-6	102	24″	15-7 x 10-6	129	24″	17-5 x 11-6	158	30″	19-6 x 12-6	191	30″
	14-0 x 9-8	106	24″	15-10 x 10-8	134	24″	17-11 x 11-8	163	30″	19-8 x 12-8	196	30″
	14-2 x 9-10	111	24″	16-3 x 10-10	138	30″	18-1 x 11-10	168	30″	19-11 x 12-10	202	30″
	14-5 x 10-0	115	24″	16-6 x 11-0	143	30″	18-7 x 12-0	174	30″	20-5 x 13-0	208	30″
	14-11 x 10-2	120	24″	17-0 x 11-2	148	30″	18-9 x 12-2	179	30″	20-7 x 13-2	214	36″

Next Steps

Learn more

Read our white paper, *Economic Optimization of Infiltration Systems*, to learn more. You'll receive free PDH credits for completing a quick quiz.

Available at www.ContechES.com/cmp

Quick Links:

- LEED information – www.ContechES.com/leed
- LID Application Guide – www.ContechES.com/lid
- Articles – www.ContechES.com/pdh

Connect with us

We're here to make your job easier – and that includes being able to get in touch with us when you need to. Search for your local rep at **www.ContechES.com**

While you're there, be sure to check out our upcoming seminar schedule or request an in-house technical presentation.

Links to Stormwater Tools:

To use the Design Your Own Detention System tool, visit: www.ContechES.com/dyods

To use the Land Value Calculator, visit: www.ContechES.com/lvc

(Please scroll to the bottom right to download the Land Value Calculator)

To use the Rain Water Harvesting Runoff Reduction Calculator tool, visit: www.ContechES.com/rwh-calculator

Start a Project

If you are ready to begin a project, contact your local representative to get started. Or you can check out our design toolbox for all our online resources at www.ContechES.com/designtoolbox.

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Contech® CMP Detention & Infiltration Maintenance Guide

CONTECH®
CMP DETENTION SYSTEMS

Contech® CMP Detention

Underground stormwater detention/infiltration and retention systems must be properly inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance and is easily performed. Contech recommends ongoing quarterly inspections. The rate at which the system collects pollutants will depend more heavily on site specific activities rather than the size or configuration of the system. Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in various other instances in which higher accumulations of sediment or abrasive / corrosive conditions may exist. Inspection and maintenance records should be maintained for the life of the system.

Maintenance

Systems should be cleaned when inspection reveals that accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

If inspectors observe any salt or other corrosive substance concentrations or accumulations in the system, or if salt or other corrosive substance is used or prevalent near the system, it is recommended to rinse the system above the spring line annually between late spring and early summer as part of the maintenance program. This maintenance is required for infiltration systems. Excessive salting should be avoided and pavement should be sealed to reduce salt infiltration from the surface.

Maintaining an underground detention or retention system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.

Inspection & Maintenance Log Sample Template

_____" Diameter System			Location: Anywhere, USA		
Date	**Depth of Sediment**	**Accumulated Trash**	**Maintenance Performed**	**Maintenance Personnel**	**Comments**
12/01/10	2"	None	Removed Sediment	B. Johnson	Installed
03/01/11	1"	Some	Removed Sediment and Trash	B. Johnson	Swept parking lot
06/01/11	0"	None	None		
09/01/11	0"	Heavy	Removed Trash	S. Riley	
12/01/11	1"	None	Removed Sediment	S. Riley	
04/01/12	0"	None	None	S. Riley	
04/15/01	2	Some	Removed Sediment and Trash	ACE Environmental Services	

CONTECH®
CMP DETENTION SYSTEMS

Support

Drawings and specifications are available at www.ContechES.com.
Site-specific support is available from our engineers.

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www.ContechES.com

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products. For information, visit www.ContechES.com or call 800.338.1122.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

APPENDIX D

Maintenance Covenant

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Space above this line for Recorder's use

TITLE(S)

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Recording Fee: _____ Space above this line for Recorder's use

Documentary Transfer Tax:

The property is located in the City of Santa Clarita.

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

Pursuant to Section 17.95.110 of the Santa Clarita Municipal Code and Title 10, Chapter 10.04 of the Santa Clarita Municipal Code relating to the control of pollutants carried by storm water runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

Assessor Parcel No(s): _____

Tract/Parcel Map No.: _____, Lot No.: _____

Address: (insert number and street)
(insert city, state, and zip)

I/We (insert owner(s) name(s)), hereby certify that I/we am/are the legal owner(s) of property described above, and as such owners for the mutual benefit of future purchasers and transferees, their heirs, successors, and assigns (collectively "owner"), do hereby affix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed:

1. That the owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, down-drains, pipes, and water quality devices on the property described above and as shown on plans submitted to the City of Santa Clarita, in a good and functional condition to safeguard the property and adjoining properties from damage and pollution.
2. That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. The annual maintenance inspections shall verify the legibility of all required stencils and signs and the owner shall repaint and label as necessary.
3. That owner(s) shall provide to new owner(s) with any conveyance of the property printed educational materials giving information on which storm water management facilities are present, the type(s) and location(s) of required maintenance signs, and required maintenance instructions.

(type name of company/corporation/partnership/agency - leave blank for all others)

_____ Date:_____
(owner signs and dates above, type name and title here)

_____ Date:_____
(owner signs and dates above, type name and title here)

_____ Date:_____
(owner signs and dates above, type name and title here)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of _____ }

On _____ before me, _____, Notary Public,
Date Name of Notary

personally appeared _____
Name(s) of Signer(s)

_____,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
Signature of Notary Public

Place Notary Seal Above

---------- *OPTIONAL* ----------

Though the information below is not required by law, it may prove valuable to person relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
☐ Individual
☐ Corporate Officer --Title(s): _____
☐ Partner -- ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____

Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
☐ Individual
☐ Corporate Officer -- Title(s): _____
☐ Partner – ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____

Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

APPENDIX E

DEVELOPED CONDITION USMP EXHIBIT

NEWHALL AVENUE APARTMENTS
USMP EXHIBIT

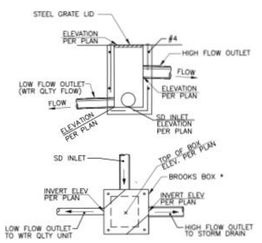
CARL CT.

VALLE DEL ORO

NEWHALL AVENUE

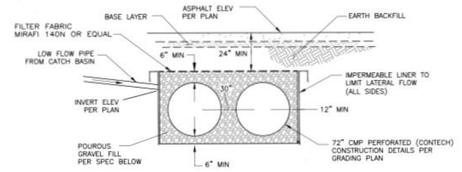
BASIN B

EX. TRAFFIC SIGNAL
EX. 12" D.I.P WATER (SCVWA)
EX. STREET LIGHT
EX. 8" SAN DIST. TRUNK SEWER MAIN
EX. SEWER LINE
EX. GAS LINE
EX. WATER LINE
EX SD PER CALTRANS NO. 07-015894
EXISTING STORM DRAIN (CITY)
PROPOSED SD LATERAL
PROP. FIRE LINE (PVT.)
PROP. WATER LINE (PVT.)
PROP. DRAIN LINE (PVT.)
PROP. SEWER LINE (PUBLIC)
PROPOSED 8' RIGHT OF WAY DEDICATION
EX. ONSITE LIGHTING TO BE REMOVED (TYP.)
EMERGENCY VEHICLE ACCESS COMMERCIAL DWY PER APWA STD. PLAN 110-2,TYPE C
PROPOSED 8' RIGHT OF WAY DEDICATION
EX. R/W
EX. F/H
PROP. R/W
PROP. F/H
PROP. 10' SETBACK FOR PARKING
PROP. 5' BLDG. SETBACK
5' BLDG. SETBACK
10' PARKING AREA SETBACK
5' WIDE EMERGENCY ACCESS
4-STORY RESIDENTIAL H=61.5'
H=23.5'
4.0' DF RETAINING WALL
(16) 6" STEPS
(8) 6" STEPS
(4) 6" STEPS
(4) 6" STEPS
(2) 6" STEPS
(11) 6" STEPS
(11) 6" STEPS
10" @ 1.0%
6" STEP
STEP
LIMIT OF BASEMENT PARKING LEVEL
TOT LOT
FIRE DEPARTMENT TURNAROUND
FIRE DEPARTMENT TURNAROUND
PROJECT BOUNDARY
INFILTRATION UNIT
CONTECH 6' PERF PIPE
VOL REQ = 13,312 CF
VOL PROV = 13,483 CF
SPLITTER UNIT AT MH
TR 50283-03
NEEDHAM BLDG. 17
108,070 S.F.



* RECOMMENDED PROPRIETARY UNIT BY BROOKS PRODUCTS. KNOCKOUT SIZES, KNOCKOUT LOCATIONS, AND BOX DEPTHS ARE CUSTOMIZABLE PER CONTRACTORS NEEDS.

③ **LOW FLOW SPLITTER CB DETAIL**
NOT TO SCALE



GRAVEL SPECIFICATION: GRAVEL SHALL CONSIST OF CLASS 2 PERMEABLE MATERIAL PER CALTRANS SPEC. 68-1.025.

② **UNDERGROUND INFILTRATION CHAMBER (CONTECH, OR EQUAL)**
NOT TO SCALE

LEGEND:

- PROPERTY LINE
- BASIN BOUNDARY
- OVERLAND FLOWPATH
- D — PROPOSED STORM DRAIN
- LF — PROPOSED LOWFLOW DRAIN
- PROPOSED SPLITTER MANHOLE
- PROPOSED SPLITTER CATCH BASIN
- SURFACE FLOW DIRECTION
- WATER QUALITY TREATMENT (UNDERGROUND INFILTRATION CHAMBERS)

LID/WATER QUALITY

85th PERCENTILE STORM	1.0 IN
HYDROMOD DESIGN STORM	85th %
TOTAL DESIGN STORM VOLUME REQUIRED	13,312 CF
TOTAL STORAGE VOLUME PROVIDED	13,483 CF

USMP NOTES

1. ALL STRUCTURAL BMP'S SHALL BE ACCESSIBLE FOR INSPECTION AND MAINTENANCE AND SHALL BEAR A "NO DUMPING - DRAINS TO OCEAN" SIGN OR EQUIVALENT STENCIL AS DETAILED HEREIN. STENCIL IS AVAILABLE AT ANY OF THE BUILDING AND SAFETY'S DISTRICT OFFICES.
2. PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE ROAD RIGHT OF WAY AND/OR CONNECTION TO A COUNTY - MAINTAINED STORMDRAIN, AN ENCROACHMENT PERMIT FROM CONSTRUCTION DIVISION IS REQUIRED. FOR MORE INFORMATION CALL (626) 458-3129
3. PRIOR TO COMMENCEMENT OF ANY WORK AND/OR DISCHARGE OF DRAINAGE TO A NATURAL DRAINAGE COURSE, APPROVAL BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME AND U.S. ARMY CORPS OF ENGINEERS MAY BE REQUIRED.

① **CATCH BASIN STENCIL DETAIL**
ALL CATCH BASIN AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

ONSITE CONTAINS APPROXIMATELY 26 INLETS

SCALE: 1"=30'

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802
27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

E:\CAD\1944\USMP\1944-USMP.dwg

MEMORANDUM

Date: January 10, 2023

To: Mr. William Heistand
Chandler Partners

From: Envicom Corporation

Subj: 23755 Newhall Avenue Mixed-Use Project Water Quality Effects Summary
(*Envicom Project No. 2022-059-01*)

This memorandum has been prepared to document potential water quality effects of the proposed 23755 Newhall Avenue Mixed-Use Project. The evaluation is based primarily on information provided within the project's Drainage Concept/Hydrology report, and the project's Urban Stormwater Management Plan (USMP), which were both prepared by Alliance Land Planning & Engineering, Inc. and are dated December 2022. These reports are included as Attachments 1 and 2, respectively. For the purposes of this memorandum, only potential water quality effects and proposed treatment will be addressed.

I. PROJECT DESCRIPTION

The 23755 Newhall Avenue Mixed-Use Project, located at 23755 Newhall Avenue in the City of Santa Clarita, proposes to redevelop an infill property consisting of approximately 9.7 acres, of which only 6.7 ac would be developed. The subject property is currently partially developed with existing structures and parking lot areas associated with a quick oil-change facility and a used car lot located along the frontage with Newhall Avenue. Undeveloped hillsides comprise the remainder of the property.

The proposed project will remove the existing structures and construct a mixed-use development of multi-family residential and commercial uses providing a total of 106 residential units and a total of 4,000 square feet of commercial space with associated amenities. The residential units would consist of a 70-unit apartment building and 36 townhome units distributed throughout the development area. The commercial use component of the development would be provided within a stand-alone structure along Newhall Avenue and a portion of the ground level of the proposed apartment building. Onsite parking spaces would be provided within the site, including private garages within each of the townhome units, a parking garage level beneath the residential levels of the apartment building, and parking lot spaces located along the paved driveway aisles.

The project will install an underground stormwater infiltration system consisting of 72-inch diameter perforated corrugated metal pipes (CMP) to be buried beneath portions of the parking lot and driveway near the northeast boundary of the property. The required volume of runoff from the developed portions of the property will be conveyed to the stormwater infiltration system to percolate into the ground below for water quality treatment.

II. CEQA GUIDELINES CHECKLIST CRITERIA

The criteria for this evaluation of potential water quality effects are based on the CEQA Guidelines Appendix G Environmental Checklist Form, specifically the following questions associated with water quality environmental factors:

Would the Project:

a) Violate any water quality standards or waste discharge requirements?
b) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?
c) Create or contribute runoff water that would provide substantial additional sources of polluted runoff?
d) Otherwise substantially degrade water quality?

III. EXISTING CONDITIONS

The approximately 9.7-acre subject property lies within an approximate 13.1-acre watershed, the majority of which currently consists of undeveloped vegetated hillsides that drain from south to north toward Newhall Avenue. The project site also includes a developed area located along Newhall Avenue, with existing structures and paved areas associated with a quick oil-change commercial use and a used car sales lot.

Under existing conditions, runoff flows from undeveloped hillside areas of the project site generally cross the relatively level paved parking lots and other hardscape areas of the developed portion of the site, exiting the project site via the existing street gutter at Newhall Avenue. The street gutter conveys runoff flows from the site to one of two catch basins in the curb along Newhall Avenue that connects with the existing public storm drain system. There are no known existing water quality facilities within the project site for treatment of stormwater flows.

IV. PROPOSED CONDITIONS

The project does not propose commercial or industrial uses that would typically use or manufacture products in substantial quantities that could significantly affect water quality. The project would be connected to the City's municipal wastewater sewer line that would convey wastewater generated by the project to the City's wastewater treatment facilities. The proposed project would replace the existing commercial development and parking lots with new residential and retail structures and associated paved driveways and parking spaces, which would increase the overall imperviousness of the site. Approximately three acres of the undeveloped hillside portion of the site would be retained in its existing condition, thus minimizing the increase in the imperviousness of the site. As reported in the project's Drainage Concept/Hydrology report (Attachment 1), although the project would increase the total imperviousness of the site, peak flowrates for the developed condition would be less than the existing condition for both the 25-year and 50-year storm events. This is a result of the meandering and flatter path that runoff takes in the developed condition as compared

to the existing condition despite the developed condition having a higher level of imperviousness.

Pollutants of Concern

Potential stormwater pollutants generated by residential and commercial uses such as those proposed for this proposed mixed-use project would primarily be associated with landscaped areas and paved driveways/parking lot areas. The potential pollutants of concern would include, but not be limited to pathogens; nutrients; pesticides; organic compounds; oxygen demanding substances; trash and debris; oils and grease; sediments; and metals.

Proposed Storm Drain System

The project would construct a private underground storm drain system to collect and convey stormwater runoff to the existing public storm drain facilities in the Newhall Avenue right-of-way. Runoff from undeveloped offsite hillside areas of the watershed, as well as onsite hillside areas to remain undeveloped, would be collected and conveyed in a dedicated "offsite" storm drain system so that no comingling with runoff from developed portions of the project site will occur. Since runoff flows from undeveloped areas would not be comingled with runoff flows from the proposed development area, no water quality treatment of stormwater from areas beyond the proposed development area would be warranted. As no water quality treatment for such flows would be necessary, runoff flows from undeveloped areas would be routed directly to the existing public storm drain facilities in Newhall Avenue.

Runoff from the proposed development footprint area, including impervious surfaces such as rooftops and pavement, would be collected and conveyed by an underground stormwater drain system that would keep such flows separate from the runoff of undeveloped areas of the site as discussed above. The runoff from developed portions of the site would be conveyed to the project's onsite underground infiltration chambers for water quality treatment to meet applicable standards and regulations. The proposed water quality treatment infiltration chambers capacity are discussed below.

Proposed Water Quality Treatment System

Pollutants of concern that could be present in runoff from the proposed mixed-use development and parking areas include sediment, metals, organic compounds, nutrients, bacteria, pesticides, trash and debris, and petroleum hydrocarbons (i.e., fuels). The project would install an underground stormwater infiltration system to meet applicable Low Impact Development (LID) standards per the County of Los Angeles Department of Public Works (LADPW) LID Standards Manual (February 2014). As discussed above in the Project Description, the proposed stormwater infiltration system would consist of 72-inch perforated CMPs to be buried beneath portions of the parking lot and driveway near the northeast boundary of the property. All runoff from the developed areas of the project site would be routed to the infiltration system, where it would then percolate down into the ground below for treatment by infiltration.

According to the project's USMP (Attachment 2), the project would be required to provide water quality treatment for a stormwater quality design volume (SWQDv)[1] of 13,312 cubic feet as prescribed per the Low Impact Development (LID) Standards Manual of the County of Los Angeles. The project's proposed water quality infiltration system has been designed to accommodate a total volume of 13,483 cubic feet, which would exceed the required volume to sufficiently provide water quality treatment of stormwater runoff to meet applicable requirements and standards.

V. CONCLUSION

The project would be required to comply with applicable regulations and standards for management and treatment of stormwater runoff, and it has been designed with appropriate BMPs to ensure compliance. Therefore, the proposed project would not result in any significant effects relating to water quality.

ATTACHMENTS:

Attachment 1- Alliance Land Planning and Engineering, Inc., Drainage Concept/Hydrology City of Santa Clarita Newhall Avenue Apartments APN 2827-003-016, -017, -018, -019, -020, -021, December 2022.

Attachment 2 - Alliance Land Planning and Engineering, Inc., Urban Stormwater Management Plan U.S.M.P. City of Santa Clarita Newhall Avenue Apartments APN 2827-003-016, December 2022.

[1] Water quality treatment is only warranted for runoff from developed areas of the site. Thus, by providing separate drainage systems for developed and undeveloped areas of the site to prevent comingling of runoff, the project has minimized the required size of the water quality treatment facilities.

Attachment 1

Drainage Concept/Hydrology

DRAINAGE CONCEPT / HYDROLOGY

City of Santa Clarita

NEWHALL AVENUE APARTMENTS

APN: 2827-003-016, -017, -018, -019, -020, -021

Prepared For:
Chandler Partners
4116 West Magnolia Blvd, Ste 203
Burbank, CA 91505

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

December 2022
JN 1944

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List of Appendices

Project Overview

The Newhall Avenue Apartment project is located in the City of Santa Clarita on Newhall Avenue approximately 0.4 miles east of Pine Street. The project boundary is approximately 9.7 ac in size of which only 6.7 ac is being developed.

The proposed project will be a multi-family apartment site with 9 separate apartment buildings, a recreation center/leasing office and pool, with ac paved drive aisles and covered parking throughout. The existing site is currently a quick oil-change garage and semi-vacant used car lot along the frontage with Newhall Ave and natural open space and hillside to the rear.

Existing Condition Drainage

The existing condition site is mostly natural hillside that drains from south to north toward Newhall Ave and consists of an approximate 13.1 ac watershed. Moderately steep canyons funnel runoff out to Newall Ave in two separate locations and are labeled as Basin A and Basin B on the existing condition drainage map in Appendix D. Basin A is the primary drainage that flows to the northwest of the project site and basin b is the secondary drainage that runs to the north east portion of the site. The hillsides consist of native vegetation and are primarily scrub and bushes with some trees. Soil conditions are considered moderately erosive mainly due to the large amount of rainfall that can be expected in this local area of Santa Clarita per the isohyetal map (8.4” for 50-yr, 24-hr event).

Once flow leaves the canyons and crosses through the business parking lots, runoff spills down into the gutter and flows to one of two curb opening catch basins in Newhall Ave. Flow is then routed to an existing underground MS4 public storm drain system that flows west towards Pine St. The MS4 system discharges beneath Newhall Ave into a box culvert underpass which then flows into Newhall Creek and ultimately into the Santa Clara River.

Developed Condition Drainage

Developed condition flow patterns remain mostly unchanged when compared to those of the existing condition. The upstream watershed of the developed site will remain natural hillside and the project site will be developed on the lower 2/3 of the water shed. A slight modification due to grading increases the size of the existing 13.1 ac watershed to a 13.3 ac watershed for the developed condition. Developed grading also results in a primary drainage basin, Basin A, being the predominant drainage area of the entire watershed. Basin B is a 2nd much smaller drainage area that lies at extreme northwest corner of project does not mirror the previous Basin B of the existing condition.

The developed site will consist of a private underground storm drain system that will route water underground and out to the existing public storm drain in Newhall Ave. Runoff from the undeveloped offsite and canyon areas will be routed separately in a dedicated offsite storm drain system so that no comingling with onsite water will occur. Hydrology summary results show that the developed condition site discharge is less runoff than the existing condition site discharge (Q_{50} DEV = 36.49 cfs < Q_{50} EX = 37.76 cfs). For this reason, the existing storm drain

system within Newhall Ave will not be negatively affected and furthermore. no capacity calculation for the existing storm drain has been performed.

There is an existing 14' catch basin located in Newhall Ave that will take a relatively small amount of runoff from the onsite slope that runs along the R/W. An existing condition hydrology analysis for this catch basin has been performed to assess the amount of flow being contributed by the roadway. The new onsite component of flow has been added to the existing condition runoff which does not exceed the capacity of the 14' CB. The hydrology and hydraulic calculations for the existing 14' CB analysis are provided in Appendix E.

Onsite water will be treated in an underground water quality chamber and will not be mixed with offsite flow in order to minimize the required size of any water quality facilities. The water quality component of this project is discussed in detail in a separate USMP report for this project.

Methodology

Peak flowrates and runoff volumes for the 25-, and 50-Year events for both the existing and developed conditions have been analyzed using methods prescribed in the LA County Hydrology Manual. The following hydrologic parameters and software have been used during this analysis:

- Storm Event = 25-Yr, 50-Yr (sump)
- 50-year, 24-hour Rainfall Depth = 8.4"
- Soil Classification Area = 020
- Time of concentration = HydroCalc software
- Flow rates and volumes = LAR04 software

Summary tables of the modeling parameters used for each the existing and developed conditions are presented below:

EXISTING CONDITION MODEL PARAMETERS

Subarea	Area	Overland	Slope	Flowpath	Slope	50-Yr Rain	Imp	Soil Type	Tc
#	ac	ft	ft/ft	ft	ft/ft	in	%		min
1A	3.0	684	0.3058	1		8.4	6	20	5
2A	3.0	687	0.2314	601	0.0383	8.4	6	20	5
3A	4.8	860	0.1128	1		8.4	6	20	6
1B	2.3	660	0.1515	1		8.4	6	20	5
ONSITE TTL	13.1								
1C	0.4	405	0.0049	1		8.4	95	20	5

DEVELOPED CONDITION MODEL PARAMETERS

Subarea	Area	Overland	Slope	Flowpath	Slope	50-Yr Rain	Imp	Soil Type	Tc
#	ac	ft	ft/ft	ft	ft/ft	in	%		min
1A	2.8	635	0.2504	80	0.0750	8.4	6	20	5
2A	2.9	615	0.3496	470	0.0319	8.4	6	20	5
3A	4.5	785	0.0561	1		8.4	37	20	6
4A	1.5	400	0.1100	1		8.4	71	20	5
5A	0.8	350	0.1571	125	0.0400	8.4	73	20	5
6A	0.7	570	0.1456	1		8.4	18	20	5
1B	0.1	225	0.0222	1		8.4	6	20	5
ONSITE TTL	13.3								
1C	0.5	425	0.0094	1		8.4	91	20	5

Results

Modeling results for peak flow and runoff volume are presented in the summary tables below :

EXISTING CONDITION MODEL RESULTS

BASIN	25-YR		50-YR	
	Q	V	Q	V
	cfs	ac-ft	cfs	ac-ft
A	24.97	1.30	29.54	1.63
B	7.02	0.21	8.22	0.28
Onsite Total	31.99	1.51	37.76	1.91
C (Offsite CB)	n/a	n/a	1.78	0.24

DEVELOPED CONDITION MODEL RESULTS

BASIN	25-YR		50-YR	
	Q	V	Q	V
	cfs	ac-ft	cfs	ac-ft
A	30.43	2.89	36.13	3.44
B	0.31	0.00	0.36	0.00
TTL	30.74	2.89	36.49	3.44

Peak flowrates for the developed condition are less than those of the existing condition for both the 25-yr and 50-yr events. This is a result of the meandering and flatter path that runoff takes in the developed condition as compared to the existing despite the developed condition having a higher imperviousness. Furthermore, the hillside characteristics of the developed project reduce the overall imperviousness relative to typical apartment projects that are located on flatter sites that are able to be designed at a denser level. The longer flow paths, coupled with relatively lower imperviousness of the developed condition work together to minimize peak flow discharge rates.

Hydromodification

This project is exempt from hydromodification mitigation since all developed condition runoff will discharge to the existing MS4 system located within Newhall Avenue.

However, some runoff mitigation will be provided using the projects underground water quality facility. Approximate 0.3 ac-ft of runoff volume will be treated in the water quality chamber and this will assist in providing mitigation to some degree.

In addition, the summary tables above show the developed condition peak flows are below those of the existing condition peak flows.

Debris

A summary of the debris volumes for the basin at far south end of project is shown in the tables below. The upstream debris producing area is open space and is considered stable due to presence of existing vegetation and a historical record for not producing significant debris. The debris volume calculated using the LA County method has been reduced by 50% for this reason.

DEBRIS VOLUME REQUIRED

DEBRIS PRODUCING SUBAREAS	TOTAL AREA	DEBRIS PRODUCING AREA		DEBRIS PRODUCTION RATE (DPA 5)	DEBRIS PRODUCED (VOL_REQ)
	ac	ac	sq mi	cy / sq mi	cy
DEV SUBAREA 1A	2.8	2.8	0.004	82000	359
DEV SUBAREA 2A*	2.9	2.9	0.005	82000	372
LA COUNTY METHOD			0.009		731
50% REDUCTION **					366

*Debris producing area is less then the total area because part of the total area is engineered slope from the Needham Ranch Project.

** Debris producing area contains well established vegetation and no historical record of large debris flows.

DEBRIS VOLUME PROVIDED

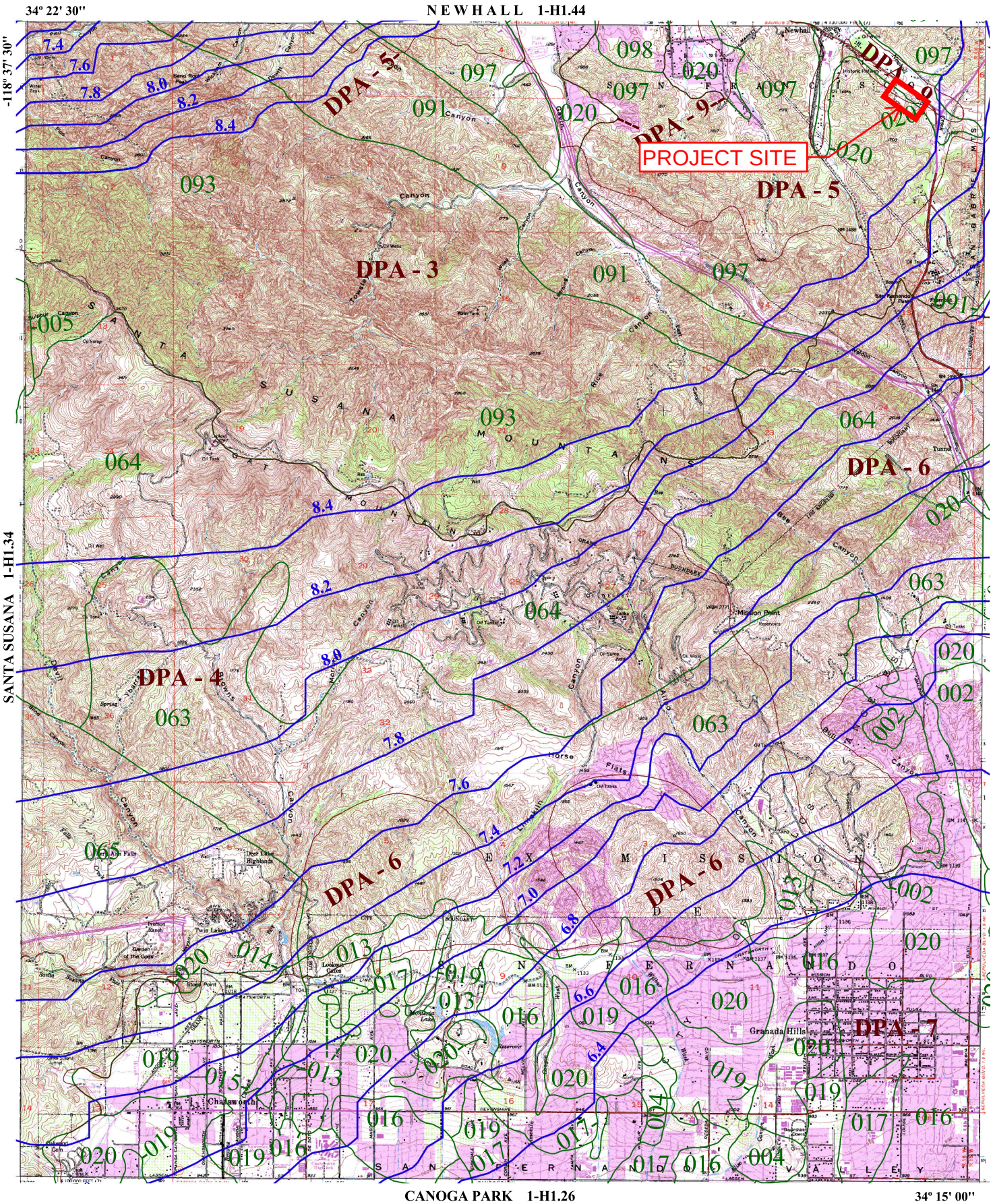
DEBRIS BASIN	depth	TOP	BOTTOM	AVERAGE	VOL_PROV		VOL_REQ
	ft	sf	sf	sf	cf	cy	cy
BASIN A	4.25	2,934	1,887	2,410	10,260	380	366

Conclusion

Given that developed condition peak flowrates do not exceed those of the existing condition, the drainage design shown for this project is considered acceptable. Water quality treatment will be provided and hydromodifcation mitigation will be provided despite exemption due to existing MS4 system.

APPENDIX A

MAPS AND EXHIBITS



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

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

OAT MOUNTAIN
50-YEAR 24-HOUR ISOHYET

1-H1.35

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

APPENDIX B

TIME OF CONCENTRATION

APPENDIX C

LAR04 MODELS

APPENDIX D

Existing and Developed Condition

Hydrology Exhibits

TIME OF CONCENTRATION

EXISTING CONDITION

Q50

BASIN A & BASIN B

Peak Flow Hydrologic Analysis

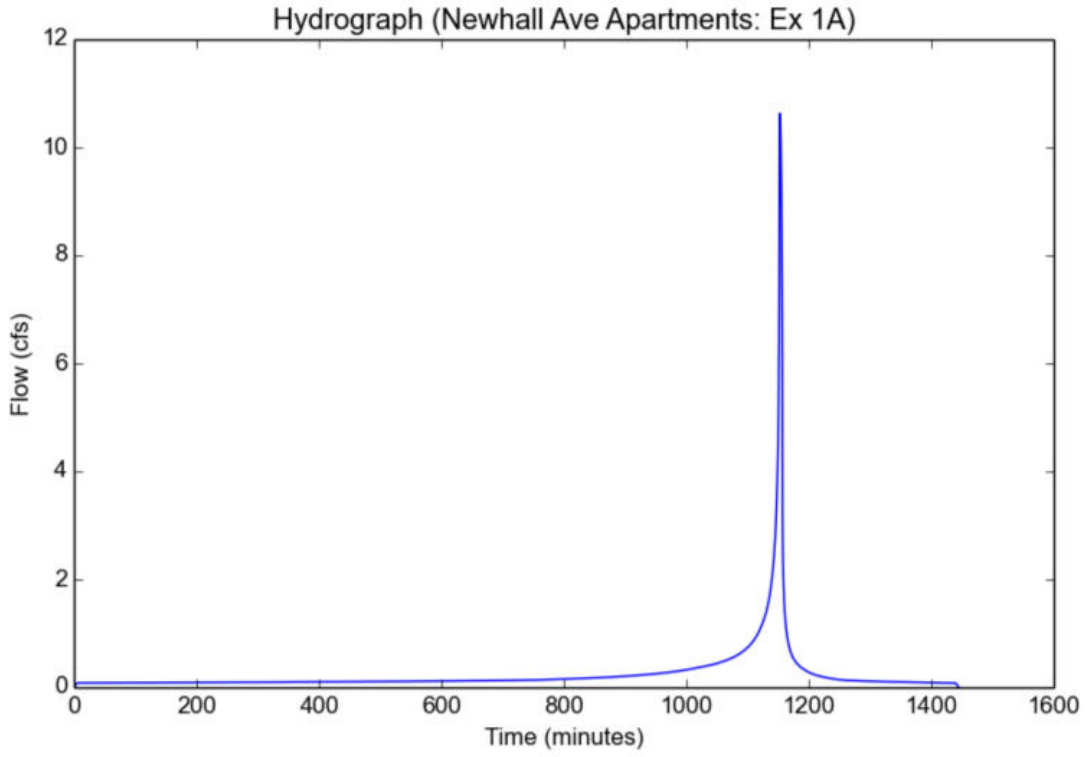
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 1A
Area (ac)	3.0
Flow Path Length (ft)	684.0
Flow Path Slope (vft/hft)	0.3058
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.6257
Burned Peak Flow Rate (cfs)	10.6257
24-Hr Clear Runoff Volume (ac-ft)	0.504
24-Hr Clear Runoff Volume (cu-ft)	21953.5426



Peak Flow Hydrologic Analysis

File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 2A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 2A
Area (ac)	3.0
Flow Path Length (ft)	687.0
Flow Path Slope (vft/hft)	0.2314
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
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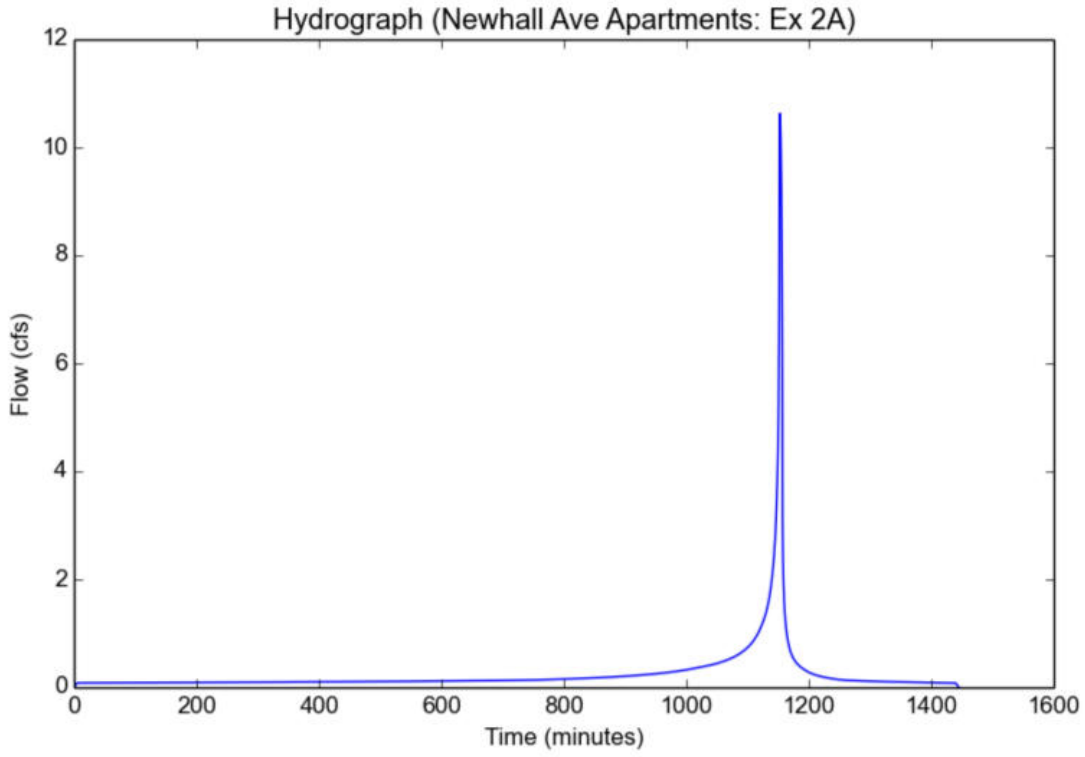
24-Hr Clear Runoff Volume (cu-ft)	21953.5426



Peak Flow Hydrologic Analysis

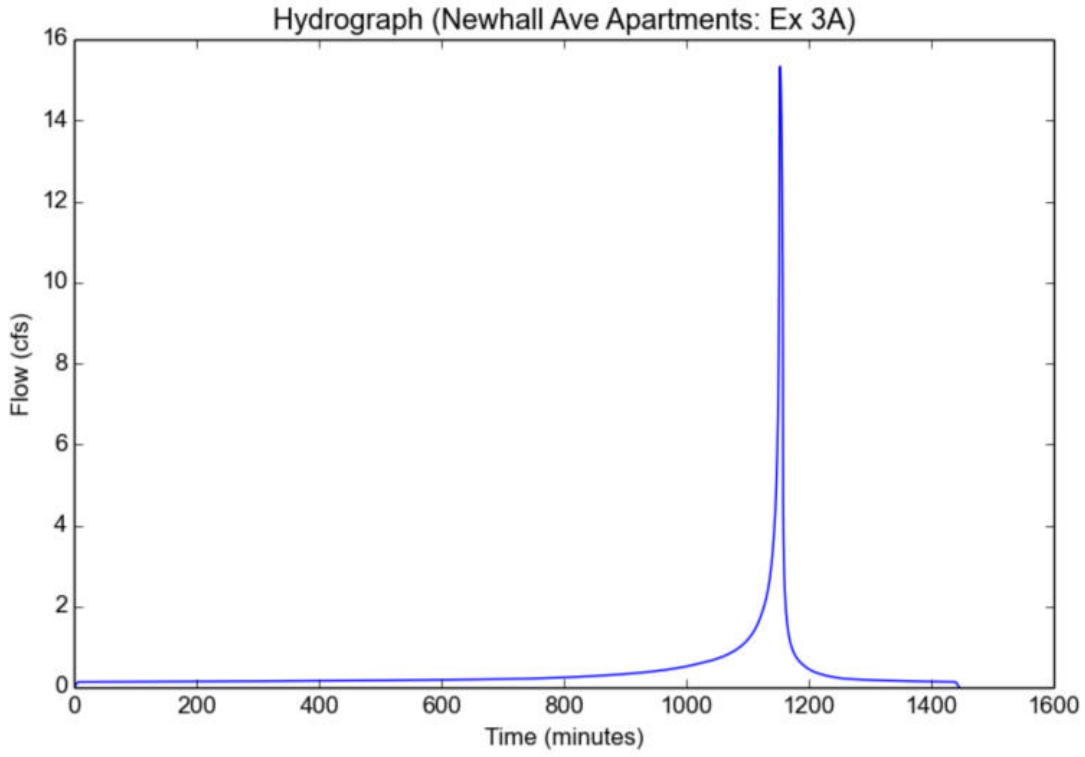
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 3A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 3A
Area (ac)	4.8
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.1128
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	4.6001
Undeveloped Runoff Coefficient (Cu)	0.6812
Developed Runoff Coefficient (Cd)	0.6943
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	15.3312
Burned Peak Flow Rate (cfs)	15.3312
24-Hr Clear Runoff Volume (ac-ft)	0.8059
24-Hr Clear Runoff Volume (cu-ft)	35105.7438



Peak Flow Hydrologic Analysis

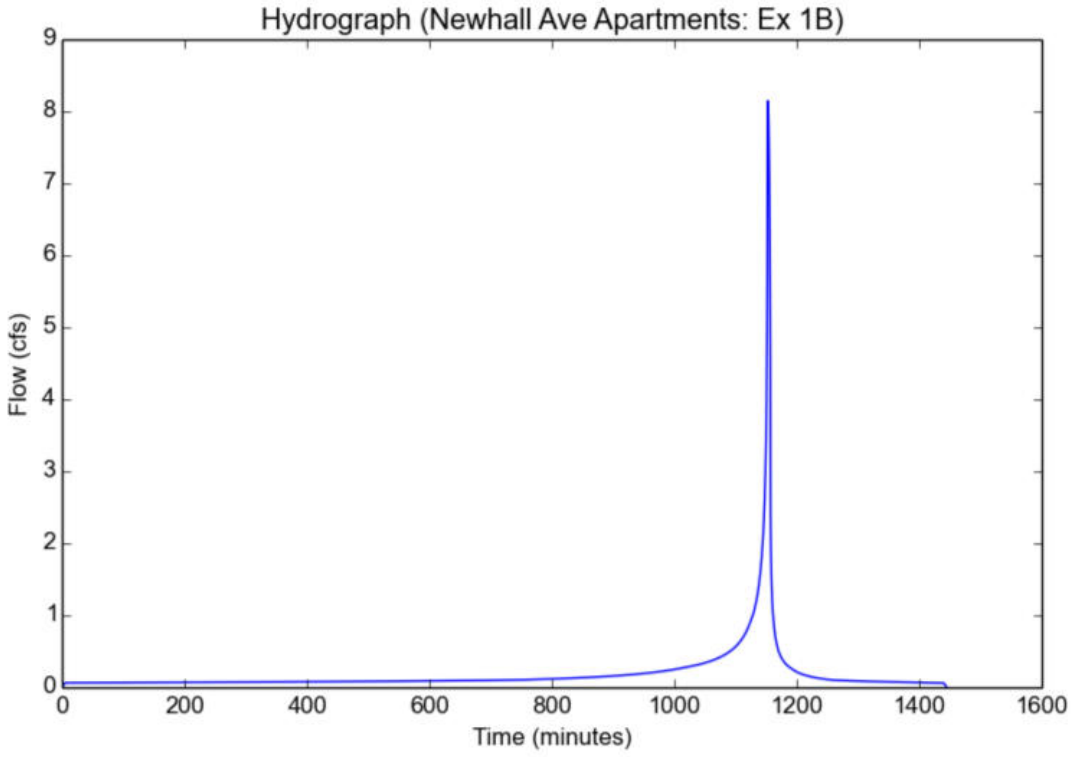
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1B.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Ex 1B
Area (ac)	2.3
Flow Path Length (ft)	660.0
Flow Path Slope (vft/hft)	0.1514
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.1464
Burned Peak Flow Rate (cfs)	8.6356
24-Hr Clear Runoff Volume (ac-ft)	0.3864
24-Hr Clear Runoff Volume (cu-ft)	16831.0493



TIME OF CONCENTRATION

DEVELOPED CONDITION

Q50

BASIN A & BASIN B & BASIN C

Peak Flow Hydrologic Analysis

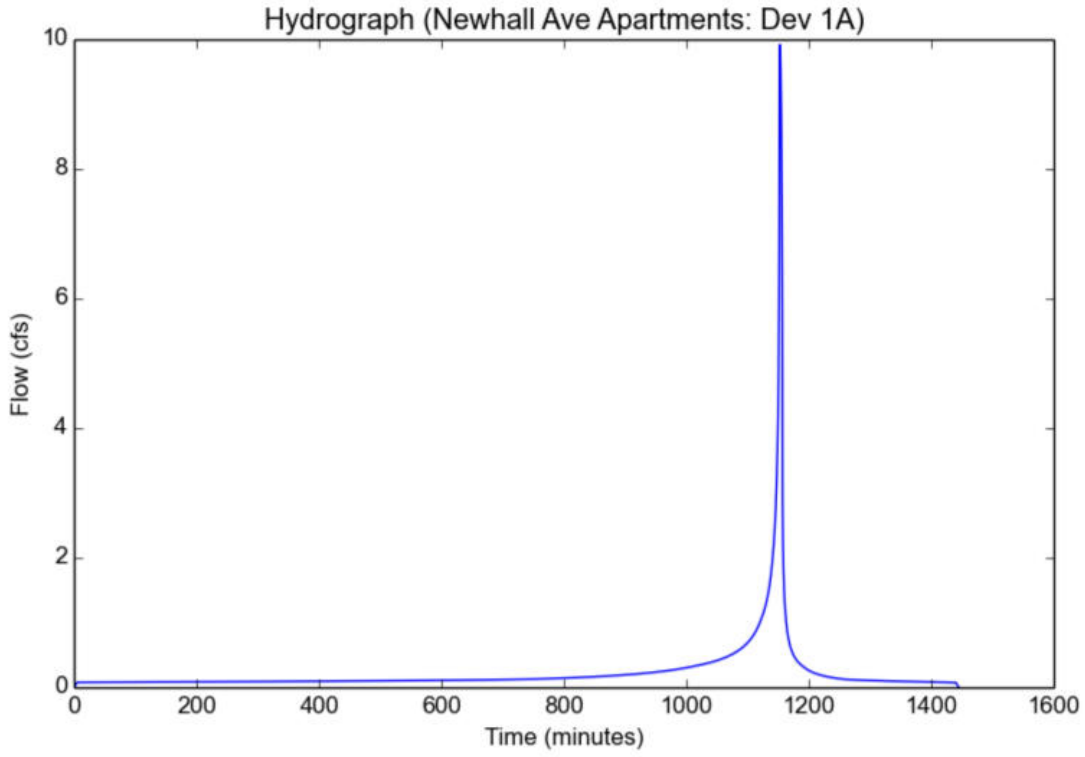
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1A
Area (ac)	2.8
Flow Path Length (ft)	635.0
Flow Path Slope (vft/hft)	0.2504
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.9173
Burned Peak Flow Rate (cfs)	9.9173
24-Hr Clear Runoff Volume (ac-ft)	0.4704
24-Hr Clear Runoff Volume (cu-ft)	20489.9731



Peak Flow Hydrologic Analysis

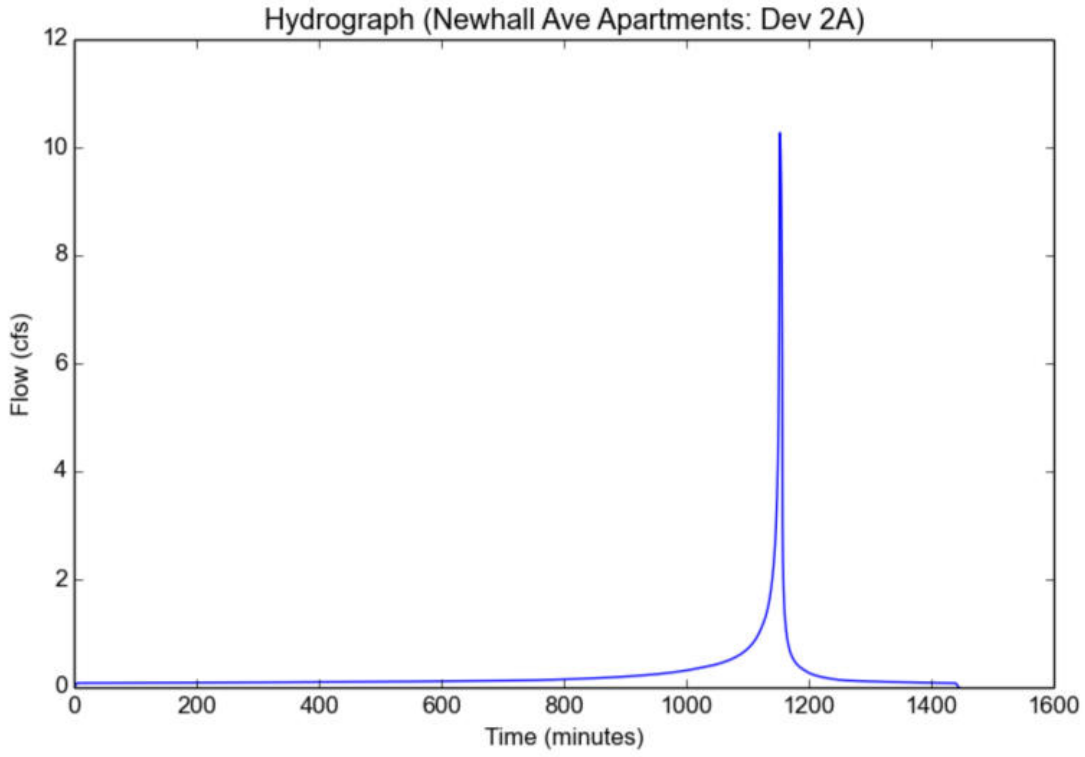
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 2A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 2A
Area (ac)	2.9
Flow Path Length (ft)	615.0
Flow Path Slope (vft/hft)	0.3496
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.2715
Burned Peak Flow Rate (cfs)	10.2715
24-Hr Clear Runoff Volume (ac-ft)	0.4872
24-Hr Clear Runoff Volume (cu-ft)	21221.7578



Peak Flow Hydrologic Analysis

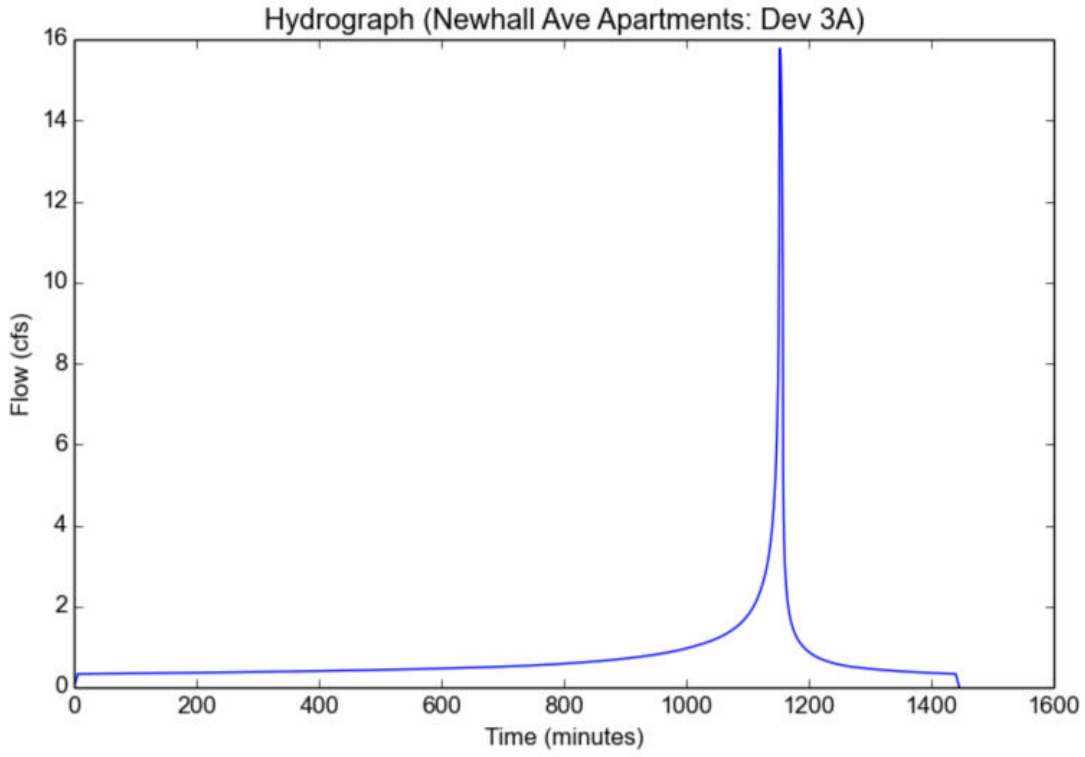
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 3A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 3A
Area (ac)	4.5
Flow Path Length (ft)	785.0
Flow Path Slope (vft/hft)	0.0561
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.37
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	4.6001
Undeveloped Runoff Coefficient (Cu)	0.6812
Developed Runoff Coefficient (Cd)	0.7622
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	15.777
Burned Peak Flow Rate (cfs)	15.777
24-Hr Clear Runoff Volume (ac-ft)	1.4336
24-Hr Clear Runoff Volume (cu-ft)	62447.5182



Peak Flow Hydrologic Analysis

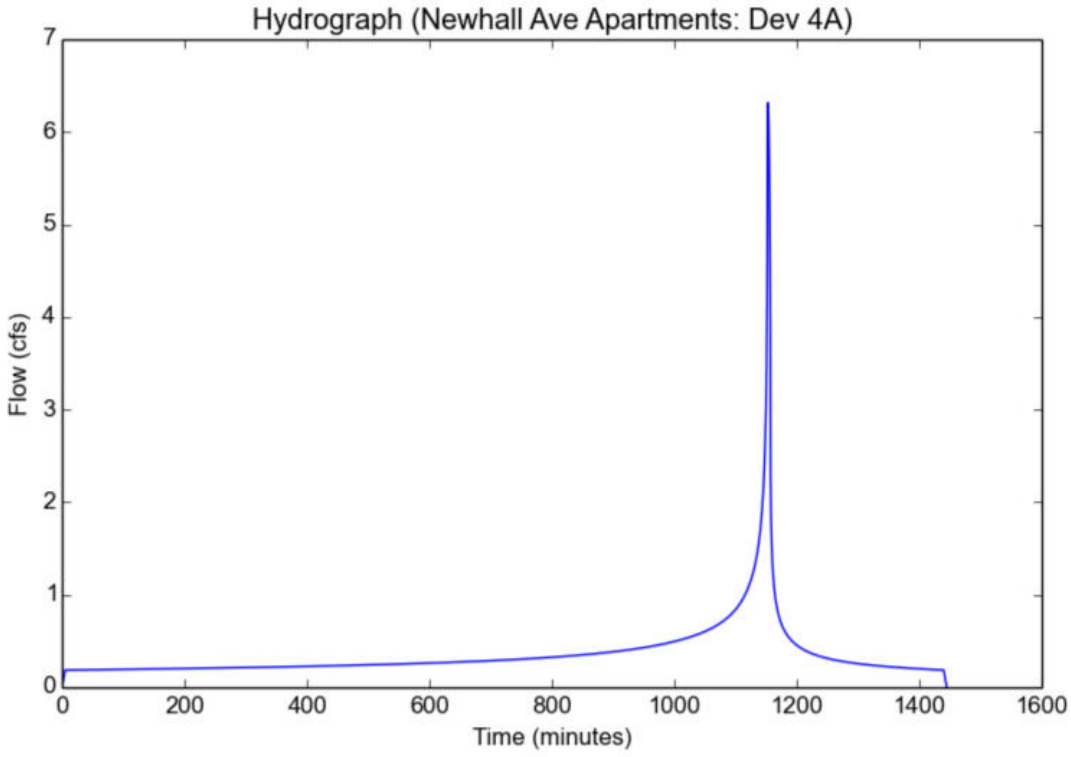
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 4A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 4A
Area (ac)	1.5
Flow Path Length (ft)	400.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.71
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8404
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.3175
Burned Peak Flow Rate (cfs)	6.3175
24-Hr Clear Runoff Volume (ac-ft)	0.7258
24-Hr Clear Runoff Volume (cu-ft)	31615.8213



Peak Flow Hydrologic Analysis

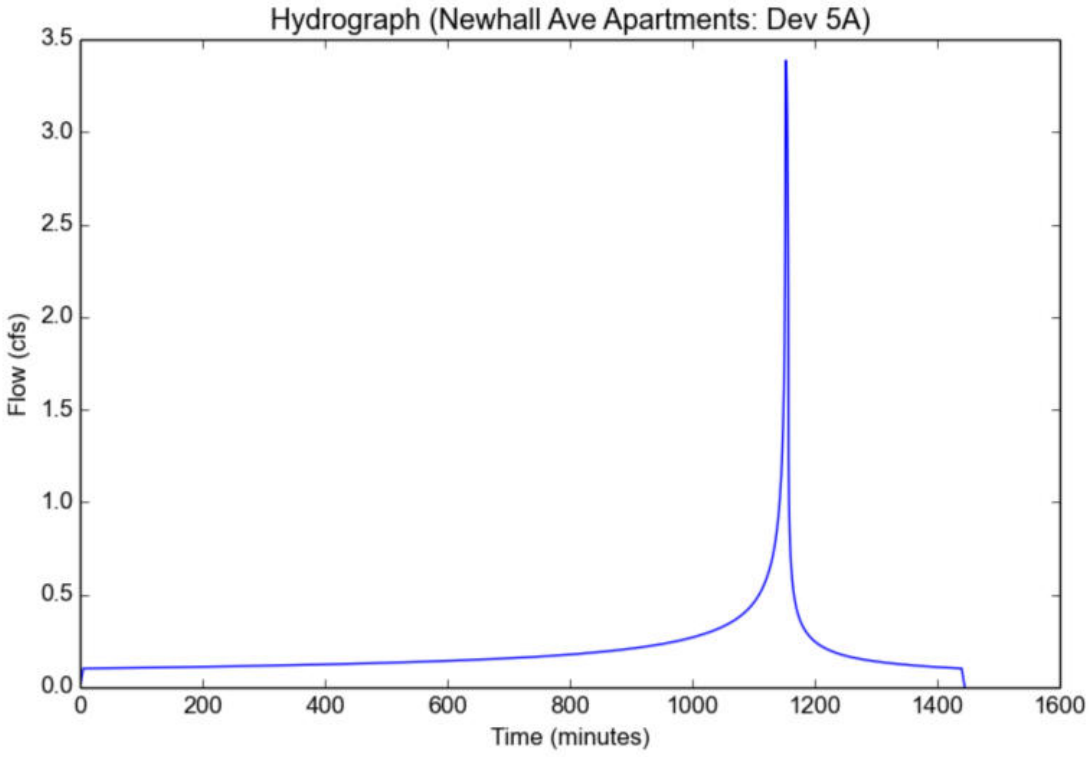
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 5A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 5A
Area (ac)	0.8
Flow Path Length (ft)	350.0
Flow Path Slope (vft/hft)	0.1571
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.73
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8445
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.3858
Burned Peak Flow Rate (cfs)	3.3858
24-Hr Clear Runoff Volume (ac-ft)	0.3949
24-Hr Clear Runoff Volume (cu-ft)	17200.4634



Peak Flow Hydrologic Analysis

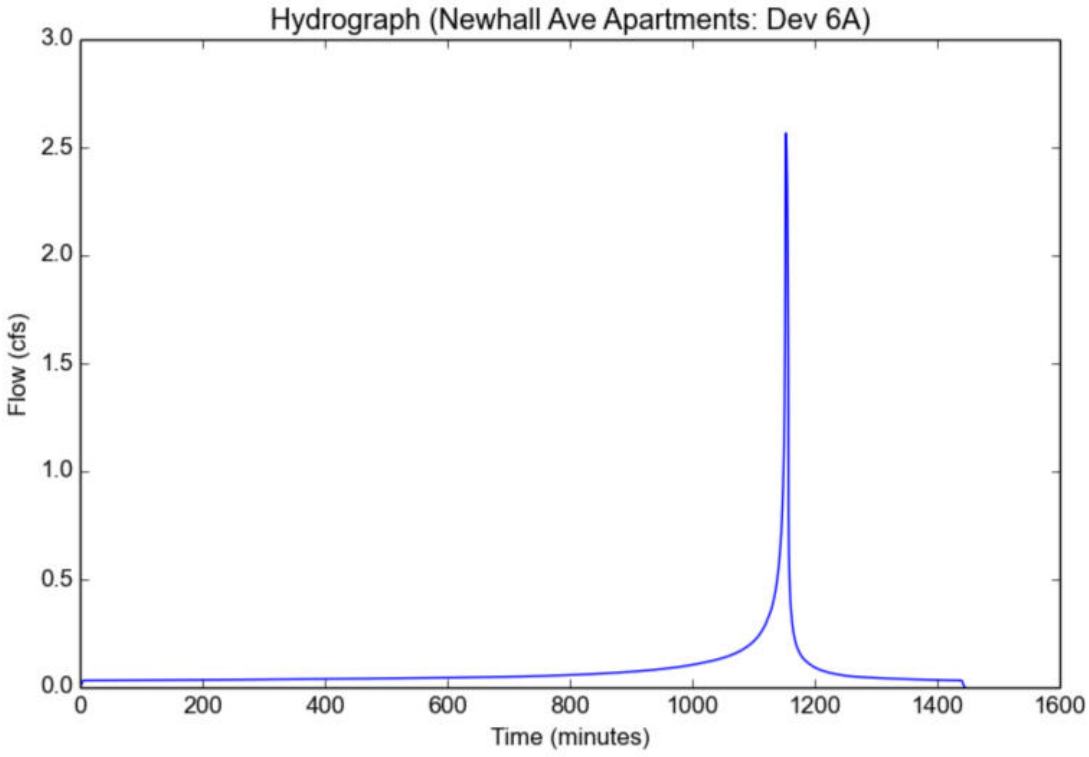
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 9A.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 6A
Area (ac)	0.7
Flow Path Length (ft)	570.0
Flow Path Slope (vft/hft)	0.1456
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.18
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7314
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5659
Burned Peak Flow Rate (cfs)	2.5659
24-Hr Clear Runoff Volume (ac-ft)	0.1584
24-Hr Clear Runoff Volume (cu-ft)	6900.6268



Peak Flow Hydrologic Analysis

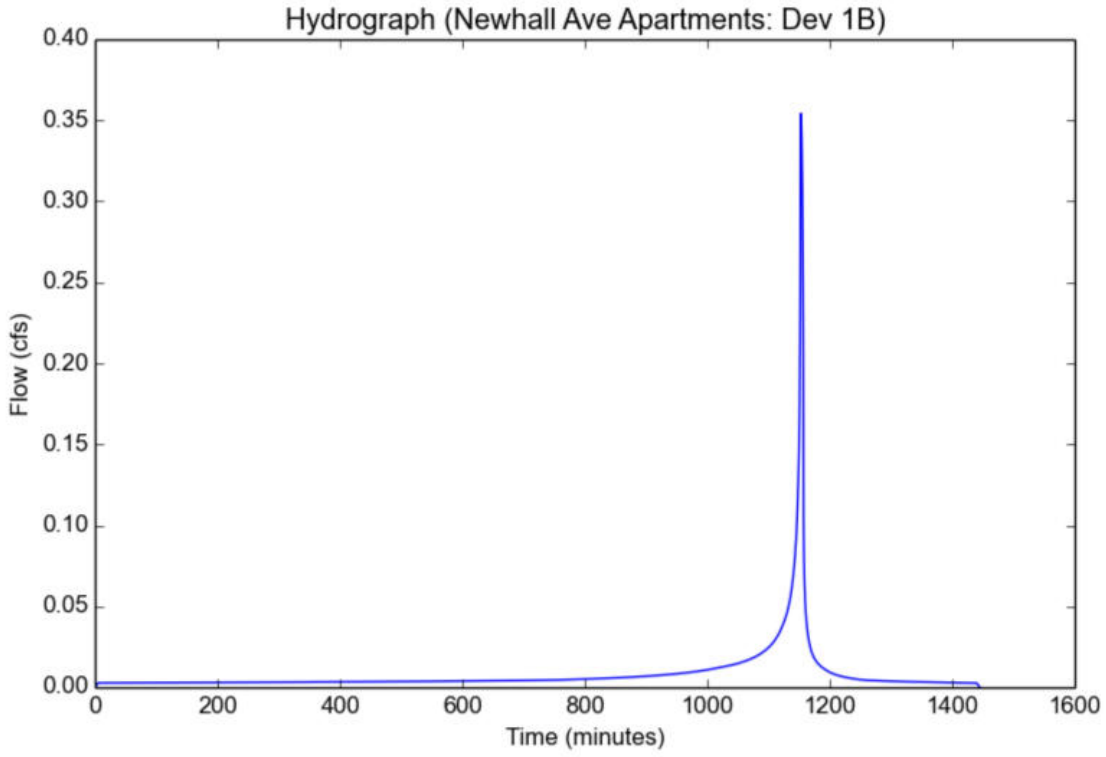
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1B.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1B
Area (ac)	0.1
Flow Path Length (ft)	225.0
Flow Path Slope (vft/hft)	0.0222
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.06
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.7067
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3542
Burned Peak Flow Rate (cfs)	0.3542
24-Hr Clear Runoff Volume (ac-ft)	0.0168
24-Hr Clear Runoff Volume (cu-ft)	731.7848



Peak Flow Hydrologic Analysis

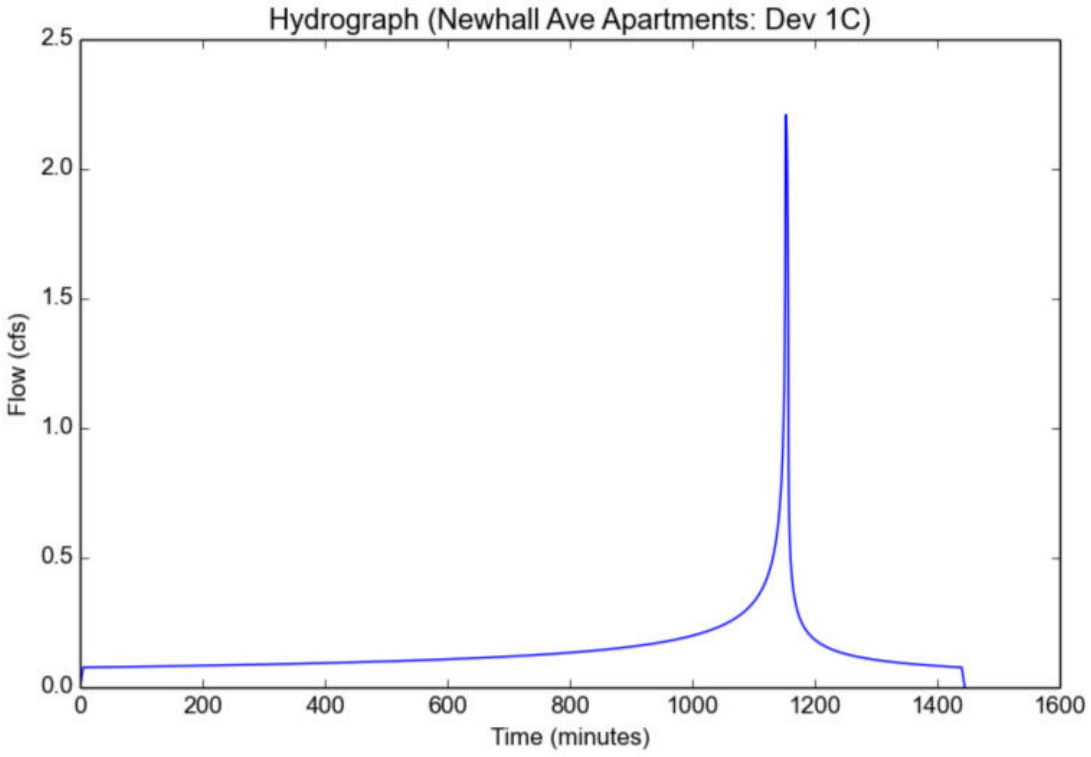
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/DEV/Dev 1C.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Newhall Ave Apartments
Subarea ID	Dev 1C
Area (ac)	0.5
Flow Path Length (ft)	425.0
Flow Path Slope (vft/hft)	0.0094
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8815
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2089
Burned Peak Flow Rate (cfs)	2.2089
24-Hr Clear Runoff Volume (ac-ft)	0.2905
24-Hr Clear Runoff Volume (cu-ft)	12655.4327



APPENDIX C

LAR04 MODELS

25-YEAR

EXISTING CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN A - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	3.0	9.15	3.0	9.15	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2A	3.0	9.15	6.0	18.26	1	601.	.07290	.00	.00	0.	20	5	A42	.06
1944	3A	4.8	12.96	10.8	24.67	1	1.	.01000	.00	.00	0.	20	6	A42	.06

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN A - 25YR
HYDROGRAPH AT 1944 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.12	200	.12	300	.13	400	.14
500	.15	600	.16	700	.36	800	.43	900	.49
1000	.75	1050	1.08	1100	1.70	1110	2.28	1120	2.82
1130	3.55	1131	3.63	1132	3.71	1133	3.86	1134	4.01
1135	4.16	1136	4.30	1137	4.52	1138	4.77	1139	4.94
1140	5.14	1141	5.47	1142	5.82	1143	6.06	1144	6.34
1145	6.91	1146	7.48	1147	7.94	1148	8.47	1149	10.57
1150	12.79	1151	15.04	1152	18.09	1153	21.76	1154	24.16
1155	24.67	1156	23.79	1157	21.36	1158	17.94	1159	14.18
1160	11.75	1161	9.58	1162	7.85	1163	6.58	1164	5.64
1165	4.93	1166	4.38	1167	3.93	1168	3.58	1169	3.28
1170	3.02	1171	2.84	1172	2.65	1173	2.46	1174	2.34
1175	2.21	1176	2.10	1177	1.99	1178	1.90	1179	1.82
1180	1.72	1181	1.67	1182	1.59	1183	1.53	1184	1.46
1185	1.43	1186	1.38	1187	1.33	1188	1.29	1189	1.25
1190	1.22	1191	1.18	1192	1.16	1193	1.12	1194	1.10
1195	1.07	1196	1.05	1197	1.02	1198	.99	1199	.98
1200	.95	1201	.94	1202	.91	1203	.90	1204	.89
1205	.86	1206	.85	1207	.84	1208	.82	1209	.81
1210	.80	1211	.77	1212	.76	1213	.74	1214	.73
1215	.73	1216	.70	1217	.70	1218	.67	1219	.68
1220	.68	1221	.65	1222	.65	1223	.64	1224	.63
1225	.61	1226	.61	1227	.58	1228	.58	1229	.58
1230	.57	1231	.55	1232	.55	1233	.56	1234	.53
1235	.53	1236	.52	1237	.52	1238	.51	1239	.50
1240	.50	1241	.50	1242	.49	1243	.48	1244	.48
1245	.48	1246	.47	1247	.46	1248	.47	1249	.47
1250	.46	1251	.46	1252	.46	1253	.45	1254	.45
1255	.44	1256	.44	1257	.44	1258	.44	1259	.44
1260	.44	1261	.43	1262	.43	1263	.43	1264	.42
1265	.42	1266	.42	1267	.42	1268	.42	1269	.41
1270	.42	1271	.42	1272	.41	1273	.41	1274	.41
1275	.41	1276	.41	1277	.40	1278	.40	1279	.40
1280	.40	1281	.40	1282	.39	1283	.40	1284	.39
1285	.39	1286	.39	1287	.38	1288	.39	1289	.38
1290	.39	1291	.38	1292	.38	1293	.38	1294	.38
1295	.38	1296	.37	1297	.37	1298	.37	1299	.37
1300	.37	1310	.33	1320	.32	1330	.29	1340	.25
1350	.24	1360	.24	1370	.23	1380	.23	1390	.23
1400	.22	1420	.12	1440	.12	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = 1.30(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN B - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	2.3	7.02	2.3	7.02	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	2.3	6.98	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN B - 25YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.11
1000	.16	1050	.24	1100	.38	1110	.56	1120	.65
1130	.82	1131	.84	1132	.86	1133	.92	1134	.98
1135	1.05	1136	1.06	1137	1.14	1138	1.19	1139	1.22
1140	1.27	1141	1.39	1142	1.47	1143	1.52	1144	1.61
1145	1.81	1146	1.97	1147	2.10	1148	2.25	1149	3.23
1150	4.17	1151	5.06	1152	6.04	1153	6.98	1154	6.12
1155	4.96	1156	3.85	1157	2.61	1158	1.53	1159	1.14
1160	1.01	1161	.83	1162	.80	1163	.69	1164	.68
1165	.59	1166	.58	1167	.52	1168	.51	1169	.45
1170	.46	1171	.42	1172	.42	1173	.37	1174	.38
1175	.35	1176	.34	1177	.31	1178	.32	1179	.29
1180	.28	1181	.28	1182	.27	1183	.26	1184	.25
1185	.25	1186	.24	1187	.23	1188	.23	1189	.22
1190	.22	1191	.21	1192	.21	1193	.20	1194	.21
1195	.20	1196	.20	1197	.19	1198	.18	1199	.18
1200	.18	1201	.17	1202	.17	1203	.17	1204	.16
1205	.16	1206	.16	1207	.16	1208	.15	1209	.15
1210	.15	1211	.14	1212	.14	1213	.14	1214	.13
1215	.13	1216	.13	1217	.13	1218	.12	1219	.13
1220	.13	1221	.12	1222	.13	1223	.12	1224	.12
1225	.11	1226	.12	1227	.11	1228	.11	1229	.11
1230	.11	1231	.10	1232	.11	1233	.11	1234	.10
1235	.10	1236	.10	1237	.10	1238	.00	1239	.10
1240	.10	1241	.10	1242	.10	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .21(Ac.Ft)

50-YEAR

EXISTING CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN A - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	3.0	10.73	3.0	10.73	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2A	3.0	10.73	6.0	21.41	1	601.	.07290	.00	.00	0.	20	5	A42	.06
1944	3A	4.8	15.25	10.8	29.54	1	1.	.01000	.00	.00	0.	20	6	A42	.06

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN A - 50YR
HYDROGRAPH AT 1944 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.13	200	.14	300	.15	400	.16
500	.35	600	.41	700	.43	800	.50	900	.66
1000	.96	1050	1.37	1100	2.15	1110	2.83	1120	3.45
1130	4.38	1131	4.49	1132	4.60	1133	4.77	1134	4.96
1135	5.14	1136	5.32	1137	5.59	1138	5.89	1139	6.09
1140	6.33	1141	6.71	1142	7.14	1143	7.43	1144	7.77
1145	8.46	1146	9.12	1147	9.68	1148	10.33	1149	12.82
1150	15.38	1151	18.12	1152	21.82	1153	26.20	1154	29.09
1155	29.54	1156	28.29	1157	25.19	1158	21.05	1159	16.47
1160	13.56	1161	11.06	1162	9.03	1163	7.58	1164	6.52
1165	5.73	1166	5.11	1167	4.60	1168	4.21	1169	3.87
1170	3.58	1171	3.37	1172	3.17	1173	2.95	1174	2.82
1175	2.67	1176	2.56	1177	2.43	1178	2.33	1179	2.24
1180	2.13	1181	2.07	1182	1.99	1183	1.92	1184	1.83
1185	1.79	1186	1.73	1187	1.67	1188	1.61	1189	1.55
1190	1.52	1191	1.47	1192	1.44	1193	1.39	1194	1.36
1195	1.32	1196	1.30	1197	1.26	1198	1.23	1199	1.21
1200	1.18	1201	1.17	1202	1.14	1203	1.12	1204	1.11
1205	1.07	1206	1.06	1207	1.05	1208	1.02	1209	1.01
1210	1.00	1211	.97	1212	.96	1213	.94	1214	.93
1215	.92	1216	.89	1217	.89	1218	.86	1219	.87
1220	.86	1221	.84	1222	.83	1223	.82	1224	.81
1225	.79	1226	.78	1227	.76	1228	.75	1229	.75
1230	.74	1231	.72	1232	.71	1233	.73	1234	.70
1235	.69	1236	.67	1237	.68	1238	.66	1239	.65
1240	.65	1241	.65	1242	.64	1243	.62	1244	.63
1245	.61	1246	.61	1247	.58	1248	.60	1249	.60
1250	.57	1251	.57	1252	.57	1253	.56	1254	.54
1255	.54	1256	.53	1257	.53	1258	.53	1259	.52
1260	.52	1261	.51	1262	.51	1263	.50	1264	.49
1265	.49	1266	.49	1267	.49	1268	.48	1269	.47
1270	.48	1271	.48	1272	.47	1273	.47	1274	.47
1275	.46	1276	.46	1277	.45	1278	.46	1279	.46
1280	.45	1281	.46	1282	.45	1283	.45	1284	.45
1285	.44	1286	.44	1287	.44	1288	.44	1289	.43
1290	.44	1291	.43	1292	.43	1293	.44	1294	.43
1295	.43	1296	.42	1297	.43	1298	.42	1299	.42
1300	.42	1310	.41	1320	.40	1330	.39	1340	.37
1350	.36	1360	.35	1370	.30	1380	.26	1390	.25
1400	.24	1420	.14	1440	.13	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = 1.63(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - EXISTING BASIN B - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	2.3	8.22	2.3	8.22	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	2.3	8.19	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - EXISTING BASIN B - 50YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.11	900	.14
1000	.21	1050	.30	1100	.48	1110	.68	1120	.79
1130	1.01	1131	1.04	1132	1.07	1133	1.14	1134	1.21
1135	1.28	1136	1.30	1137	1.39	1138	1.45	1139	1.48
1140	1.54	1141	1.69	1142	1.78	1143	1.85	1144	1.96
1145	2.19	1146	2.37	1147	2.52	1148	2.71	1149	3.84
1150	4.95	1151	5.97	1152	7.11	1153	8.19	1154	7.19
1155	5.84	1156	4.56	1157	3.13	1158	1.85	1159	1.39
1160	1.24	1161	1.04	1162	.97	1163	.83	1164	.82
1165	.71	1166	.70	1167	.63	1168	.63	1169	.56
1170	.57	1171	.52	1172	.52	1173	.47	1174	.48
1175	.44	1176	.43	1177	.40	1178	.41	1179	.37
1180	.37	1181	.36	1182	.35	1183	.33	1184	.33
1185	.32	1186	.30	1187	.29	1188	.28	1189	.27
1190	.27	1191	.26	1192	.26	1193	.25	1194	.26
1195	.24	1196	.25	1197	.23	1198	.23	1199	.22
1200	.23	1201	.21	1202	.22	1203	.21	1204	.21
1205	.20	1206	.21	1207	.20	1208	.20	1209	.19
1210	.20	1211	.18	1212	.18	1213	.18	1214	.17
1215	.17	1216	.17	1217	.16	1218	.16	1219	.17
1220	.17	1221	.16	1222	.16	1223	.16	1224	.15
1225	.15	1226	.15	1227	.14	1228	.14	1229	.14
1230	.14	1231	.13	1232	.14	1233	.14	1234	.13
1235	.13	1236	.13	1237	.13	1238	.12	1239	.13
1240	.12	1241	.13	1242	.13	1243	.12	1244	.12
1245	.12	1246	.11	1247	.11	1248	.12	1249	.11
1250	.11	1251	.11	1252	.11	1253	.10	1254	.10
1255	.10	1256	.10	1257	.10	1258	.10	1259	.10
1260	.10	1261	.10	1262	.10	1263	.10	1264	.10
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .28(Ac.Ft)

25-YEAR

DEVELOPED CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1A	2.8	8.54	2.8	8.54	1	80.	.07500	.00	.00	0.	20	5	A42	.06
1944	2A	2.9	8.85	5.7	16.70	1	470.	.03190	.00	.00	0.	20	5	A42	.06
1944	3A	4.5	13.48	10.2	22.27	1	1.	.01000	.00	.00	0.	20	6	A42	.37
1944	4A	1.5	5.52	11.7	26.62	1	1.	.01000	.00	.00	0.	20	5	A42	.71
1944	5A	.8	2.96	12.5	29.23	1	125.	.04000	.00	.00	0.	20	5	A42	.73
1944	6A	.7	2.22	13.2	30.43	1	1.	.01000	.00	.00	0.	20	5	A42	.18

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 25YR
HYDROGRAPH AT 1944 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.58	200	.61	300	.64	400	.68
500	.72	600	.77	700	.94	800	1.13	900	1.34
1000	1.74	1050	2.29	1100	3.21	1110	3.99	1120	4.80
1130	5.77	1131	5.91	1132	6.04	1133	6.19	1134	6.39
1135	6.63	1136	6.85	1137	7.08	1138	7.34	1139	7.62
1140	7.87	1141	8.19	1142	8.59	1143	9.04	1144	9.44
1145	9.93	1146	10.61	1147	11.37	1148	12.07	1149	13.58
1150	16.37	1151	19.85	1152	23.35	1153	27.19	1154	29.88
1155	30.43	1156	29.52	1157	27.56	1158	24.60	1159	21.20
1160	18.11	1161	15.72	1162	13.71	1163	11.94	1164	10.44
1165	9.19	1166	8.17	1167	7.35	1168	6.69	1169	6.14
1170	5.69	1171	5.31	1172	4.99	1173	4.71	1174	4.46
1175	4.23	1176	4.04	1177	3.86	1178	3.71	1179	3.56
1180	3.43	1181	3.31	1182	3.20	1183	3.11	1184	3.02
1185	2.93	1186	2.84	1187	2.76	1188	2.69	1189	2.62
1190	2.55	1191	2.50	1192	2.45	1193	2.40	1194	2.36
1195	2.32	1196	2.28	1197	2.24	1198	2.20	1199	2.15
1200	2.10	1201	2.07	1202	2.04	1203	2.01	1204	1.98
1205	1.95	1206	1.93	1207	1.90	1208	1.88	1209	1.86
1210	1.83	1211	1.81	1212	1.79	1213	1.76	1214	1.73
1215	1.71	1216	1.69	1217	1.67	1218	1.64	1219	1.62
1220	1.61	1221	1.60	1222	1.59	1223	1.57	1224	1.56
1225	1.54	1226	1.52	1227	1.50	1228	1.48	1229	1.45
1230	1.44	1231	1.43	1232	1.42	1233	1.40	1234	1.40
1235	1.39	1236	1.38	1237	1.36	1238	1.35	1239	1.34
1240	1.33	1241	1.32	1242	1.31	1243	1.31	1244	1.29
1245	1.29	1246	1.28	1247	1.27	1248	1.25	1249	1.24
1250	1.24	1251	1.24	1252	1.23	1253	1.22	1254	1.21
1255	1.20	1256	1.19	1257	1.18	1258	1.17	1259	1.17
1260	1.17	1261	1.17	1262	1.17	1263	1.17	1264	1.16
1265	1.15	1266	1.14	1267	1.13	1268	1.13	1269	1.12
1270	1.12	1271	1.11	1272	1.11	1273	1.11	1274	1.10
1275	1.09	1276	1.09	1277	1.09	1278	1.08	1279	1.07
1280	1.07	1281	1.07	1282	1.07	1283	1.07	1284	1.06
1285	1.06	1286	1.05	1287	1.05	1288	1.04	1289	1.03
1290	1.03	1291	1.03	1292	1.02	1293	1.02	1294	1.02
1295	1.02	1296	1.01	1297	1.00	1298	1.00	1299	1.00
1300	.99	1310	.94	1320	.89	1330	.84	1340	.81
1350	.79	1360	.78	1370	.76	1380	.74	1390	.75
1400	.72	1420	.70	1440	.61	1460	.55	1500	.55

TOTAL VOLUME THIS HYDROGRAPH = 2.89(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 25YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1944	1B	.1	.31	.1	.31	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	.1	.30	2	1.	.01000	.00	.00	0.	20	99	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 25YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.00
1000	.00	1050	.00	1100	.00	1110	.00	1120	.00
1130	.00	1131	.00	1132	.00	1133	.00	1134	.00
1135	.00	1136	.00	1137	.00	1138	.00	1139	.00
1140	.00	1141	.00	1142	.00	1143	.00	1144	.00
1145	.00	1146	.00	1147	.00	1148	.00	1149	.14
1150	.18	1151	.22	1152	.26	1153	.30	1154	.27
1155	.22	1156	.17	1157	.12	1158	.10	1159	.00
1160	.00	1161	.00	1162	.00	1163	.00	1164	.00
1165	.00	1166	.00	1167	.00	1168	.00	1169	.00
1170	.00	1171	.00	1172	.00	1173	.00	1174	.00
1175	.00	1176	.00	1177	.00	1178	.00	1179	.00
1180	.00	1181	.00	1182	.00	1183	.00	1184	.00
1185	.00	1186	.00	1187	.00	1188	.00	1189	.00
1190	.00	1191	.00	1192	.00	1193	.00	1194	.00
1195	.00	1196	.00	1197	.00	1198	.00	1199	.00
1200	.00	1201	.00	1202	.00	1203	.00	1204	.00
1205	.00	1206	.00	1207	.00	1208	.00	1209	.00
1210	.00	1211	.00	1212	.00	1213	.00	1214	.00
1215	.00	1216	.00	1217	.00	1218	.00	1219	.00
1220	.00	1221	.00	1222	.00	1223	.00	1224	.00
1225	.00	1226	.00	1227	.00	1228	.00	1229	.00
1230	.00	1231	.00	1232	.00	1233	.00	1234	.00
1235	.00	1236	.00	1237	.00	1238	.00	1239	.00
1240	.00	1241	.00	1242	.00	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .00(Ac.Ft)

50-YEAR

DEVELOPED CONDITION

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 50YR STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1944	1A	2.8	10.01	2.8	10.01	1	80.	.07500	.00	.00	0.	20	5	A42	.06
1944	2A	2.9	10.37	5.7	19.63	1	470.	.03190	.00	.00	0.	20	5	A42	.06
1944	3A	4.5	15.66	10.2	26.74	1	1.	.01000	.00	.00	0.	20	6	A42	.37
1944	4A	1.5	6.34	11.7	31.72	1	1.	.01000	.00	.00	0.	20	5	A42	.71
1944	5A	.8	3.40	12.5	34.72	1	125.	.04000	.00	.00	0.	20	5	A42	.73
1944	6A	.7	2.59	13.2	36.13	1	1.	.01000	.00	.00	0.	20	5	A42	.18

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN A - 50YR
HYDROGRAPH AT 1944 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.66	200	.69	300	.73	400	.77
500	.91	600	1.07	700	1.19	800	1.32	900	1.61
1000	2.08	1050	2.73	1100	3.85	1110	4.76	1120	5.70
1130	6.87	1131	7.05	1132	7.21	1133	7.40	1134	7.64
1135	7.92	1136	8.18	1137	8.46	1138	8.77	1139	9.11
1140	9.41	1141	9.78	1142	10.27	1143	10.80	1144	11.27
1145	11.87	1146	12.67	1147	13.56	1148	14.37	1149	16.21
1150	19.54	1151	23.60	1152	27.71	1153	32.30	1154	35.52
1155	36.13	1156	35.03	1157	32.61	1158	28.89	1159	24.69
1160	20.95	1161	18.08	1162	15.67	1163	13.57	1164	11.83
1165	10.41	1166	9.28	1167	8.38	1168	7.64	1169	7.04
1170	6.53	1171	6.11	1172	5.75	1173	5.45	1174	5.16
1175	4.92	1176	4.70	1177	4.51	1178	4.33	1179	4.18
1180	4.03	1181	3.89	1182	3.78	1183	3.68	1184	3.57
1185	3.46	1186	3.36	1187	3.27	1188	3.18	1189	3.10
1190	3.02	1191	2.96	1192	2.90	1193	2.84	1194	2.79
1195	2.74	1196	2.70	1197	2.64	1198	2.59	1199	2.53
1200	2.48	1201	2.44	1202	2.41	1203	2.37	1204	2.34
1205	2.31	1206	2.28	1207	2.25	1208	2.23	1209	2.20
1210	2.16	1211	2.14	1212	2.11	1213	2.08	1214	2.05
1215	2.03	1216	2.00	1217	1.98	1218	1.95	1219	1.93
1220	1.91	1221	1.91	1222	1.89	1223	1.87	1224	1.86
1225	1.84	1226	1.82	1227	1.79	1228	1.77	1229	1.74
1230	1.72	1231	1.71	1232	1.70	1233	1.68	1234	1.68
1235	1.67	1236	1.65	1237	1.63	1238	1.61	1239	1.60
1240	1.58	1241	1.58	1242	1.57	1243	1.56	1244	1.54
1245	1.53	1246	1.52	1247	1.50	1248	1.48	1249	1.47
1250	1.47	1251	1.46	1252	1.45	1253	1.43	1254	1.42
1255	1.41	1256	1.39	1257	1.38	1258	1.37	1259	1.37
1260	1.36	1261	1.36	1262	1.35	1263	1.35	1264	1.35
1265	1.33	1266	1.31	1267	1.30	1268	1.30	1269	1.29
1270	1.28	1271	1.28	1272	1.28	1273	1.27	1274	1.25
1275	1.25	1276	1.25	1277	1.24	1278	1.23	1279	1.22
1280	1.22	1281	1.22	1282	1.22	1283	1.22	1284	1.21
1285	1.21	1286	1.20	1287	1.19	1288	1.18	1289	1.17
1290	1.17	1291	1.17	1292	1.17	1293	1.16	1294	1.16
1295	1.16	1296	1.15	1297	1.14	1298	1.13	1299	1.13
1300	1.13	1310	1.09	1320	1.08	1330	1.04	1340	1.01
1350	.98	1360	.95	1370	.88	1380	.84	1390	.84
1400	.81	1420	.78	1440	.77	1460	.63	1500	.63

TOTAL VOLUME THIS HYDROGRAPH = 3.44(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 50YR

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1944	1B	.1	.36	.1	.36	1	1.	.01000	.00	.00	0.	20	5	A42	.06
1944	2B	.0	.00	.1	.35	2	1.	.01000	.00	.00	0.	20	99	A29	.00

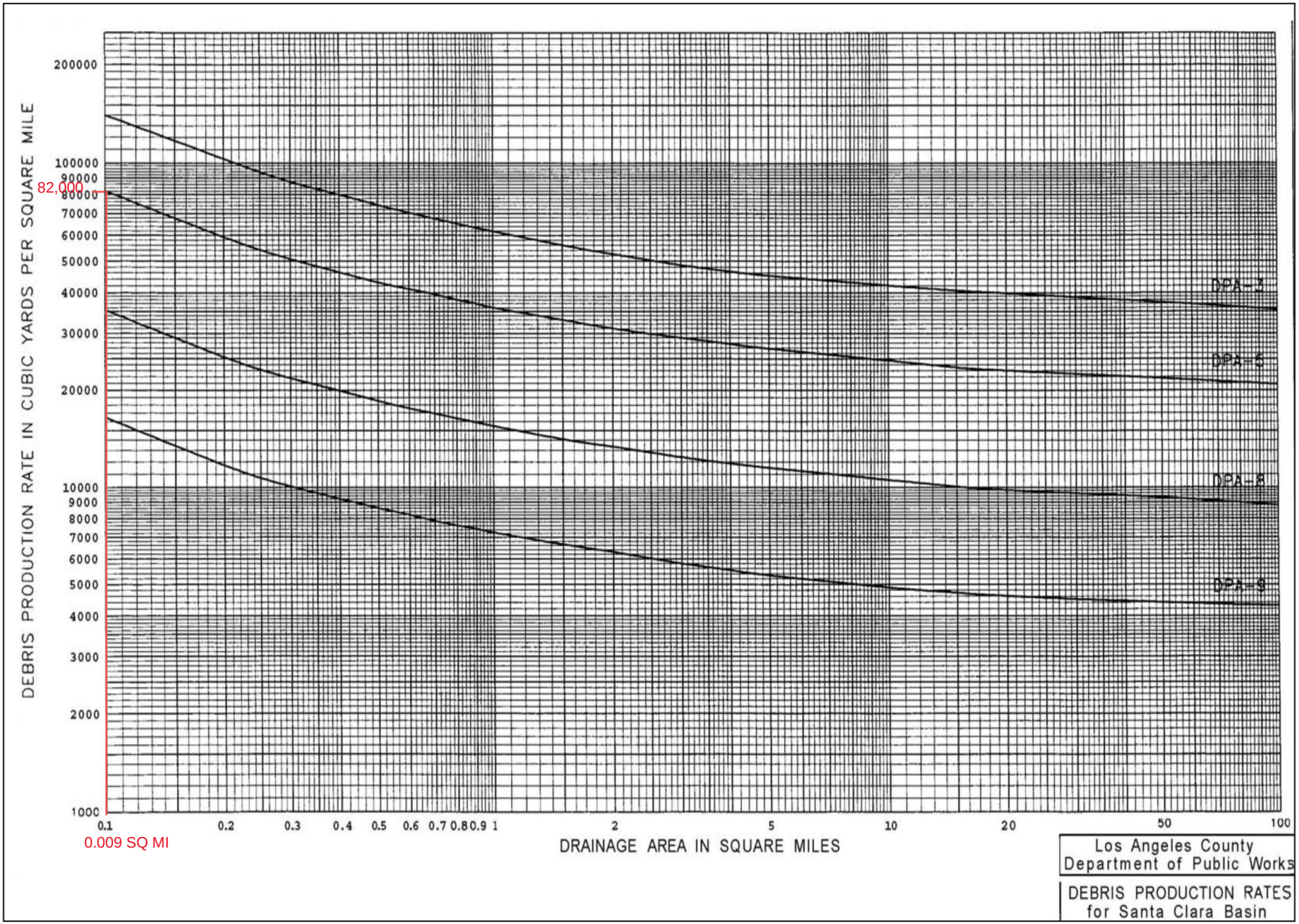
Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
NEWHALL AVE APARTMENTS - DEVELOPED BASIN B - 50YR
HYDROGRAPH AT 1944 2B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.00	200	.00	300	.00	400	.00
500	.00	600	.00	700	.00	800	.00	900	.00
1000	.00	1050	.00	1100	.00	1110	.00	1120	.00
1130	.00	1131	.00	1132	.00	1133	.00	1134	.00
1135	.00	1136	.00	1137	.00	1138	.00	1139	.00
1140	.00	1141	.00	1142	.00	1143	.00	1144	.00
1145	.00	1146	.10	1147	.11	1148	.12	1149	.16
1150	.21	1151	.26	1152	.31	1153	.35	1154	.32
1155	.26	1156	.20	1157	.14	1158	.10	1159	.00
1160	.00	1161	.00	1162	.00	1163	.00	1164	.00
1165	.00	1166	.00	1167	.00	1168	.00	1169	.00
1170	.00	1171	.00	1172	.00	1173	.00	1174	.00
1175	.00	1176	.00	1177	.00	1178	.00	1179	.00
1180	.00	1181	.00	1182	.00	1183	.00	1184	.00
1185	.00	1186	.00	1187	.00	1188	.00	1189	.00
1190	.00	1191	.00	1192	.00	1193	.00	1194	.00
1195	.00	1196	.00	1197	.00	1198	.00	1199	.00
1200	.00	1201	.00	1202	.00	1203	.00	1204	.00
1205	.00	1206	.00	1207	.00	1208	.00	1209	.00
1210	.00	1211	.00	1212	.00	1213	.00	1214	.00
1215	.00	1216	.00	1217	.00	1218	.00	1219	.00
1220	.00	1221	.00	1222	.00	1223	.00	1224	.00
1225	.00	1226	.00	1227	.00	1228	.00	1229	.00
1230	.00	1231	.00	1232	.00	1233	.00	1234	.00
1235	.00	1236	.00	1237	.00	1238	.00	1239	.00
1240	.00	1241	.00	1242	.00	1243	.00	1244	.00
1245	.00	1246	.00	1247	.00	1248	.00	1249	.00
1250	.00	1251	.00	1252	.00	1253	.00	1254	.00
1255	.00	1256	.00	1257	.00	1258	.00	1259	.00
1260	.00	1261	.00	1262	.00	1263	.00	1264	.00
1265	.00	1266	.00	1267	.00	1268	.00	1269	.00
1270	.00	1271	.00	1272	.00	1273	.00	1274	.00
1275	.00	1276	.00	1277	.00	1278	.00	1279	.00
1280	.00	1281	.00	1282	.00	1283	.00	1284	.00
1285	.00	1286	.00	1287	.00	1288	.00	1289	.00
1290	.00	1291	.00	1292	.00	1293	.00	1294	.00
1295	.00	1296	.00	1297	.00	1298	.00	1299	.00
1300	.00	1310	.00	1320	.00	1330	.00	1340	.00
1350	.00	1360	.00	1370	.00	1380	.00	1390	.00
1400	.00	1420	.00	1440	.00	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = .00(Ac.Ft)

APPENDIX D

Debris Calculations


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
82,000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
DFA-3
DFA-6
DFA-8
DFA-9
0.1
0.009 SQ MI
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Santa Clara Basin

DEBRIS VOLUME REQUIRED

DEBRIS PRODUCING SUBAREAS	TOTAL AREA	DEBRIS PRODUCING AREA		DEBRIS PRODUCTION RATE	DEBRIS PRODUCED (VOL_REQ)
	ac	ac	sq mi	cy / sq mi	cy
DEV SUBAREA 1A	2.8	2.8	0.004	82000	359
DEV SUBAREA 2A*	2.9	2.9	0.005	82000	372
LA COUNTY METHOD			0.009		731
50% REDUCTION **					366

*Debris producing area is less then the total area because part of the total area is engineered slope from the Needham Ranch Project

** Debris producing area contains well established vegetaion and no historical record of large debris flows

DEBRIS VOLUME PROVIDED

DEBRIS BASIN	depth	TOP(CONE LIMIT)	BOTTOM	AVERAGE	VOL_PROV		VOL_REQ
	ft	sf	sf	sf	cf	cy	cy
BASIN A	4.25	2934.412	1886.524	2410	10244.489	380	366

APPENDIX E

Existing 14’ Catch Basin in Newhall Ave

Hydrology and Hydraulic Analysis

Peak Flow Hydrologic Analysis

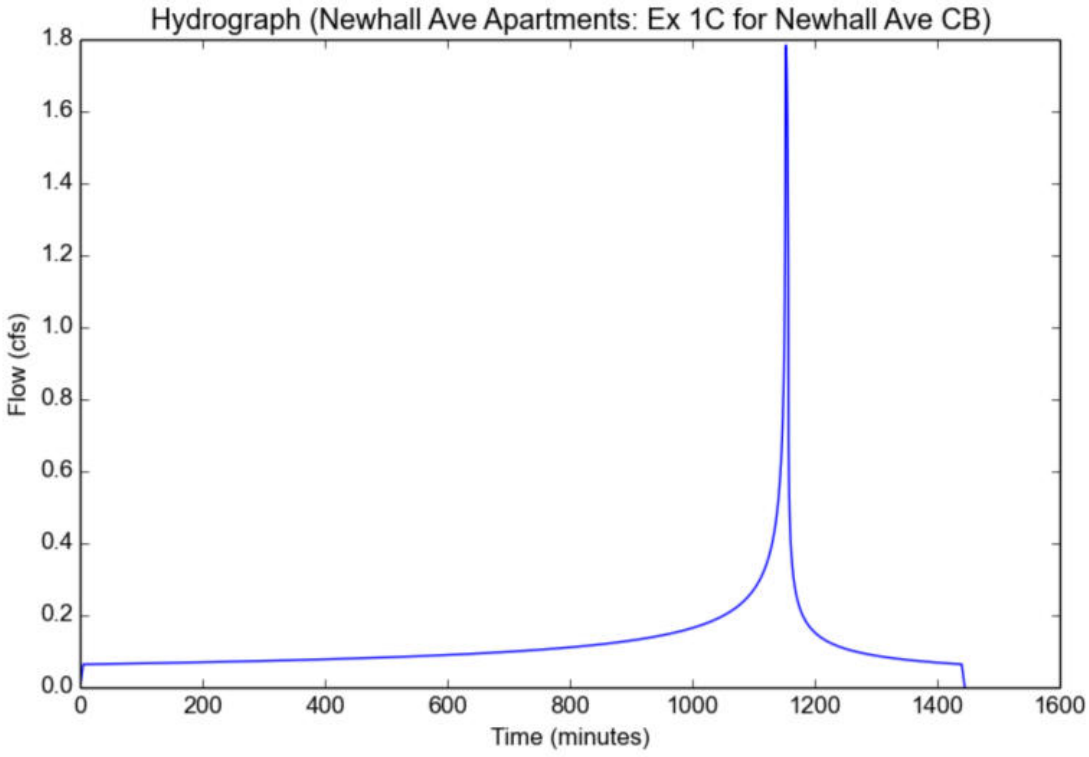
File location: I:/Project Files/1944 - NEWHALL AVENUE/HYDROLOGY/TC/EX/Ex 1C for Offsite CB.pdf
Version: HydroCalc 1.0.3

Input Parameters

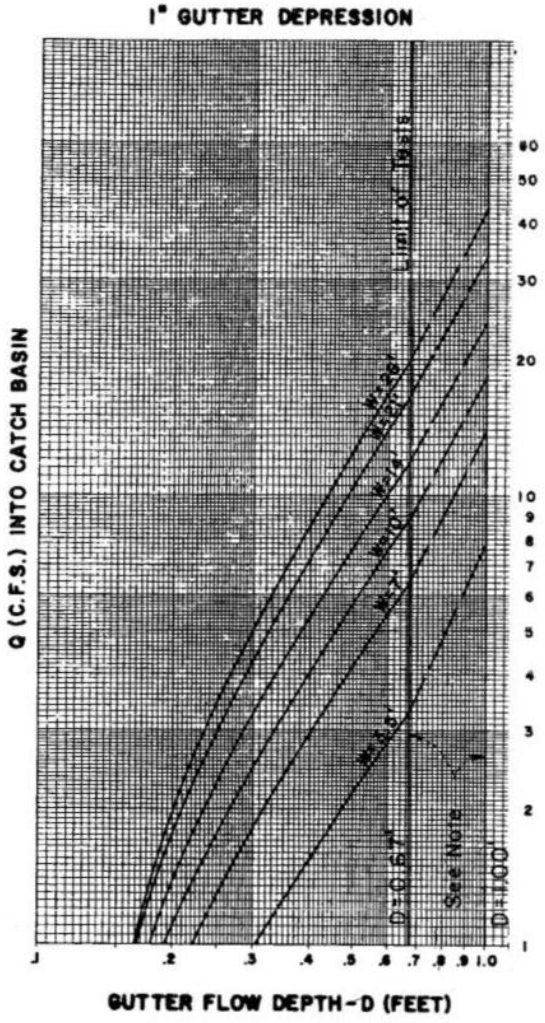
Project Name	Newhall Ave Apartments
Subarea ID	Ex 1C for Newhall Ave CB
Area (ac)	0.4
Flow Path Length (ft)	405.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	8.4
Percent Impervious	0.95
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

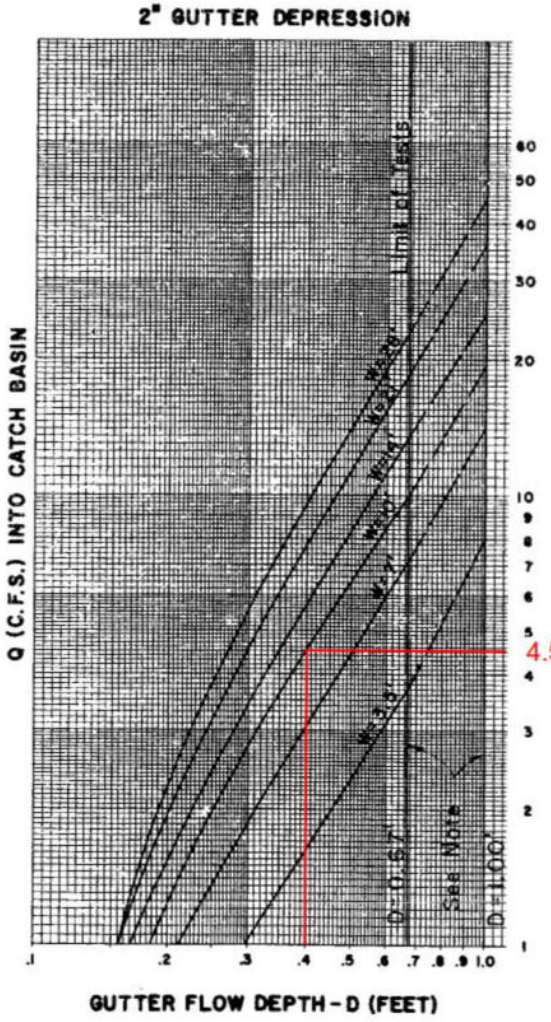
Output Results

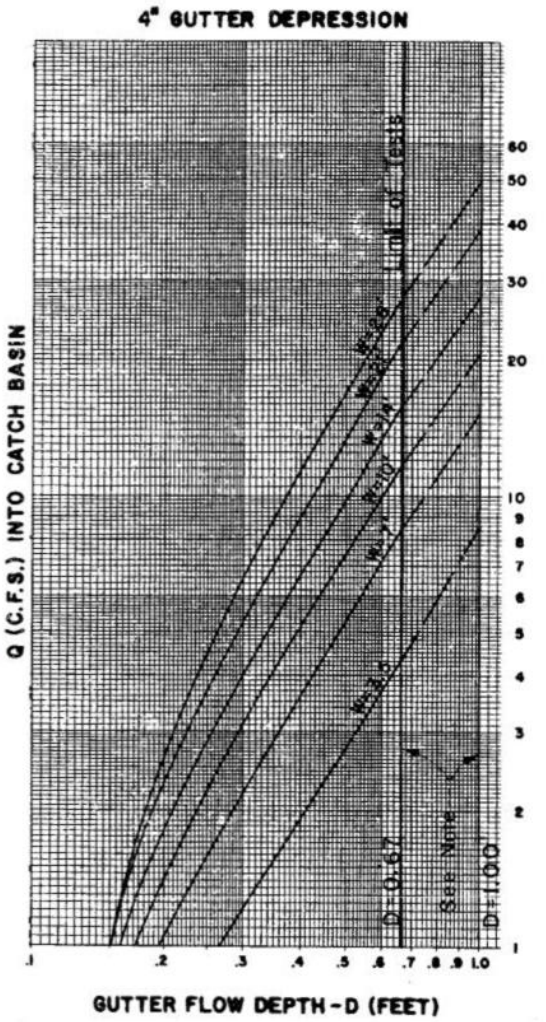
Modeled (50-yr) Rainfall Depth (in)	8.4
Peak Intensity (in/hr)	5.0117
Undeveloped Runoff Coefficient (Cu)	0.6944
Developed Runoff Coefficient (Cd)	0.8897
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7836
Burned Peak Flow Rate (cfs)	1.7836
24-Hr Clear Runoff Volume (ac-ft)	0.2402
24-Hr Clear Runoff Volume (cu-ft)	10463.0383



NEWHALL AVE APARTMENTS
8/15/22







NOTE: Curves between D=0.67' and 1.0' are not from model test data and will be revised in the future when additional model test data are available.

Los Angeles County Flood Control District

CURB OPENING CATCH BASIN CAPACITIES

STREET SLOPE = .005
Rev. 6-12-84

D-10A

EX 14' CB IN NEWHALL AVE
ASSUME 5" DEPTH OF FULL IN GUTTER
CAPACITY = 4.5 CFS
SUM Q = 2.14 CFS

APPENDIX F

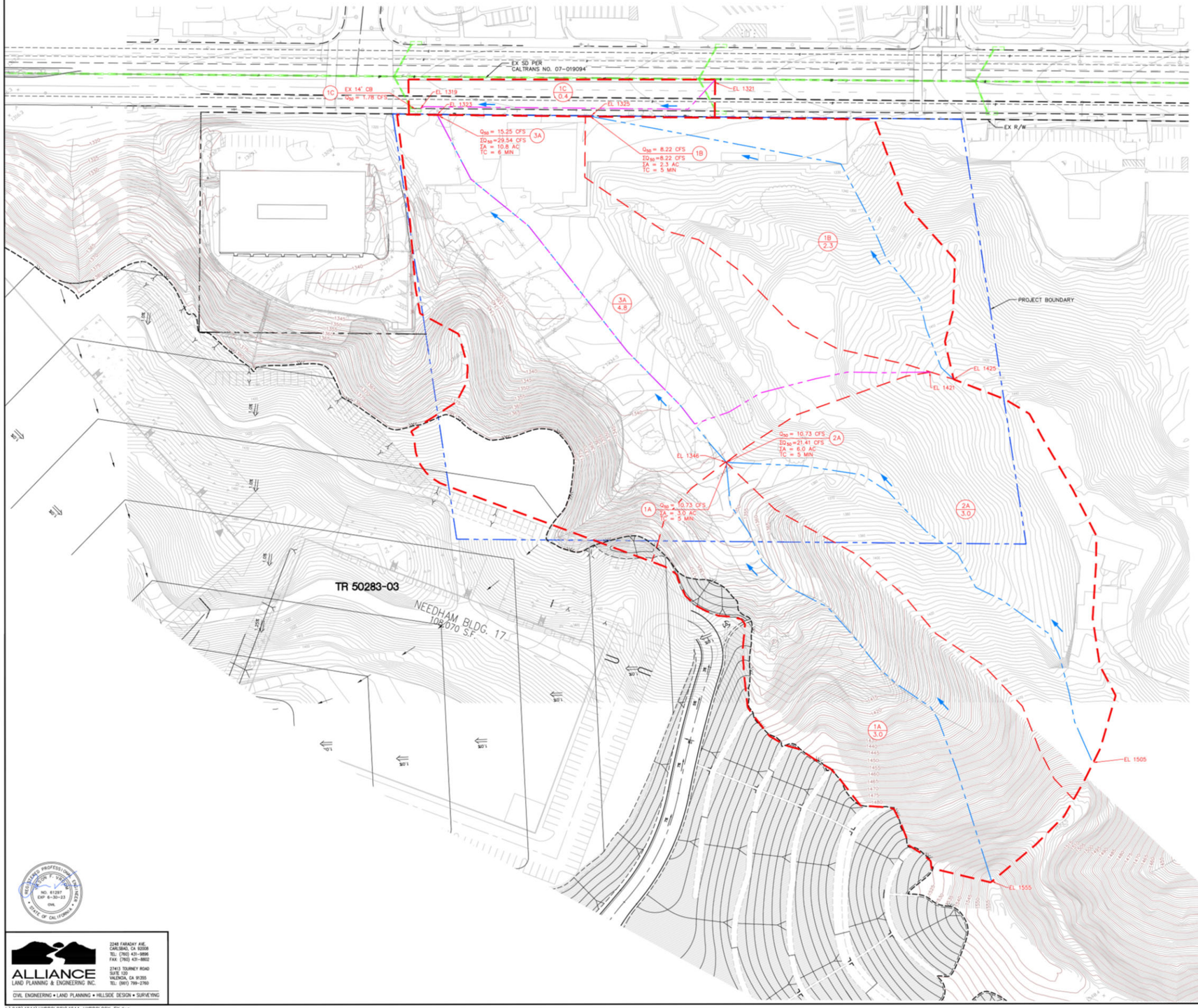
Existing and Developed Condition

Hydrology Exhibits

NEWHALL AVENUE APARTMENTS
EXISTING CONDITION HYDROLOGY
8/15/22

Σ ONSITE EXISTING CONDITION:
ΣQ_{50} = 37.76 CFS
ΣA = 13.1 AC

Σ AT EXISTING 14" CB:
ΣQ_{50} = 1.78 CFS



EXISTING CONDITION MODEL PARAMETERS

Subarea	Area	Overland	Slope	Flowpath	Slope	50-Yr Rain	Imp	Soil Type	Tc
#	ac	ft	ft/ft	ft	ft/ft	in	%		min
1A	3.0	684	0.3058	1		8.4	6	20	5
2A	3.0	687	0.2314	601	0.0383	8.4	6	20	5
3A	4.8	860	0.1128	1		8.4	6	20	6
1B	2.3	660	0.1515	1		8.4	6	20	5
ONSITE TTL	13.1								
1C	0.4	405	0.0049	1		8.4	95	20	5

LEGEND

- PROJECT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-BASIN LIMITS
- OVERLAND PATH (TC)
- FLOW PATH
- TC — TIME OF CONCENTRATION (MIN.)
- ΣA — CUMULATIVE TRIBUTARY AREA (AC)
- Q_{50} — 50 YR. CLEAR FLOWRATE (CFS)
- Q_{50B} — 50 YR. BURNED FLOWRATE (CFS)
- ΣQ — CUMULATIVE FLOWRATE (CFS)
- DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
- EXISTING STORM DRAIN LINE
- DIRECTION OF FLOW

DESIGN CRITERIA:

STORM EVENT	50 YR – SUMP LOCATIONS 25 YR – NON-SUMP LOCATIONS
50-YR RAINFALL ISOHYET	8.4"
SOIL TYPE	D20
DEBRIS PRODUCTION AREA	DPA 5/DPA 9

REGISTERED PROFESSIONAL ENGINEER — JASON T. VREELAND — NO. 61287 EXP 6-30-23 CIVIL — STATE OF CALIFORNIA

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-9802
27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

SCALE: 1"=30'

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NEWHALL AVENUE APARTMENTS
DEVELOPED CONDITION HYDROLOGY
12/9/22

CARL CT

VALLE DEL ORO

EX SD PER CALTRANS NO. 07-019094

PROPOSED SD LATERAL

NEWHALL AVENUE

BASIN A AND BASIN B:

Σ EXISTING CONDITION:	Σ DEVELOPED CONDITION:
ΣQ_{50} = 37.76 AC	ΣQ_{50} = 36.49 AC
ΣA = 13.1 AC	ΣA = 13.3 AC

BASIN B

BASIN A

EXISTING 14' CB
Q_{D50}=1.78 CFS
ΣQ_{50}=2.14 CFS
14' CB CAPAX =4.5 CFS

1C
1C
0.4

Q_{50} =2.59 CFS
ΣQ_{50}=36.13 CFS
ΣA = 13.2 AC
TC = 5 MIN
6A

EL 1321

EX R/W

8'

PROP. R/W

1B
1B
0.1

Q_{50}=0.36 CFS
ΣQ_{50}=0.36 CFS
ΣA = 0.1 AC
TC = 5 MIN

5' RET WALL

4A
4A
1.5

Q_{50} = 6.34 CFS
ΣA = 11.7 AC
TC = 5 MIN

RET WALL

RETENTION UNIT

Q_{50}=34.72 CFS
5A

Q_{50} = 3.40 CFS
ΣA = 12.5 AC
TC = 5 MIN
5A

5A
0.8

1325.67
1325.0 FS

1324.0 FS/HP

1325.1 FS/LP

1324.6 FS

1324.5 FS/HP

1323.8 FS/HP

1326.2 FS/GB

6A
0.7

EL 1360

EL 1403

PROJECT BOUNDARY

FIRE DEPARTMENT TURNAROUND

Q_{50} =15.66 CFS
ΣQ_{50} =26.74 CFS
ΣA = 10.2 AC
TC = 6 MIN
3A

3A
4.5

EL 1369

EL 1340

6' RET WALL

11' RET WALL

Q_{50} = 10.01 CFS
ΣA = 2.8 AC
TC = 5 MIN
DPV = 359 CY
1A

1A
2.8

Q_{50} = 10.37 CFS
ΣQ_{50} =19.63 CFS
ΣA = 5.7 AC
TC = 5 MIN
DEBRIS VOL PROV. = 380 CY
DEBRIS VOL REQ = .364 AC
2A

2A
2.9

* DEBRIS VOLUME HAS BEEN REDUCED BY 50% DUE TO EXISTING SITE CONDITIONS OF DEBRIS PRODUCING AREA

SEE EXISTING CONDITION HYDROLOGY FOR UPSTREAM HALF OF SUBAREA 1A AND SUBAREA 2A

TR 50283-03

NEEDHAM BLDG. 17
108,070 S.F.

LEGEND

- PROJECT BOUNDARY
- PRIMARY BASIN LIMITS
- SUB-BASIN LIMITS
- OVERLAND PATH (TC)
- FLOW PATH
- TC — TIME OF CONCENTRATION (MIN.)
- ΣA — CUMULATIVE TRIBUTARY AREA (AC)
- Q_{50} — 50 YR. CLEAR FLOWRATE (CFS)
- Q_{50B} — 50 YR. BURNED FLOWRATE (CFS)
- ΣQ — CUMULATIVE FLOWRATE (CFS)
- DRAINAGE AREA DESIGNATION / DRAINAGE AREA IN ACRES
- EXISTING STORM DRAIN LINE
- EXISTING STORM DRAIN LINE
- EXISTING STORM DRAIN LINE
- DIRECTION OF FLOW

DESIGN CRITERIA:

STORM EVENT	50 YR
50-YR RAINFALL ISOHYET	8.4"
SOIL TYPE	D20
DEBRIS PRODUCTION AREA	DPA 5/DPA 9

DEVELOPED CONDITION MODEL PARAMETERS

Subarea #	Area ac	Overland ft	Slope ft/ft	Flowpath ft	Slope ft/ft	50-Yr Rain in	Imp %	Soil Type	Tc min
1A	2.8	635	0.3501	80	0.0750	8.4	6	20	5
2A	2.9	615	0.3496	470	0.0319	8.4	6	20	5
3A	4.5	785	0.0561	1		8.4	37	20	6
4A	1.5	400	0.1100	1		8.4	71	20	5
5A	0.8	350	0.1571	125	0.0400	8.4	73	20	5
6A	0.7	570	0.1456	1		8.4	18	20	5
1B	0.1	225	0.0222	1		8.4	6	20	5
ONSITE TTL	13.3								
1C	0.5	425	0.0094	1		8.4	91	20	5

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CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

SCALE: 1"=30'

I:\CAD\1944\HYDROLOGY\1944-HYDROLOGY-DEV.dwg

Attachment 2

Urban Stormwater Management Plan U.S.M.P.

URBAN STORMWATER MANAGEMENT PLAN
U.S.M.P.

City of Santa Clarita

NEWHALL AVENUE APARTMENTS

APN 2827-003-016

Prepared For:
Chandler Partners
4116 West Magnolia Blvd, Ste 203
Burbank, CA 91505

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

December 2022
JN 1944

Table Of Contents

Appendices

Project Description

The Newhall Avenue Apartment project is located in the City of Santa Clarita on Newhall Avenue approximately 0.4 miles east of Pine Street. The project boundary is approximately 9.7 ac in size of which only 6.7 ac is being developed.

The proposed project will be a multi-family apartment site, retail building, 36 condominium units with, a recreation center/leasing office and pool, with ac paved drive aisles and parking throughout.

Infiltration will be the method of water quality treatment for this project and is discussed in further detail below.

Methodology

Storm Event	= 85th %
85th % rainfall depth	= 1.00"
Soil Classification Area	= 020

HydroCalc software approved by the City/County was used to calculate the required stormwater quality design volume (SWQDv) and stormwater quality design flowrate (SWQDf) as prescribed per the Low Impact Development (LID) Standards Manual of the County of Los Angeles, Department of Public Works (LACDPW). The 85th percentile design storm of 0.90 inches is determined from the LA County 85th Percentile Analysis Google Earth .KMZ file. The Soil Classification of 020 was acquired from the Mint Canyon 50-yr, 24-hr Isohyetal map. See appendix A for the full HydroCalc output.

A summary of modeling input parameters and output results are provided below:

Area		overland	Slope	85th %	Vreq		Qreq
sf	ac	ft	ft/ft	"	cf	ac-ft	cfs
210,992	4.84	770	0.04675	1.0	13,312	0.31	1.02

Existing Condition

The existing condition site is mostly natural hillside that drains from south to north toward Newhall Ave and consists of an approximate 13.1 ac watershed. The hillsides consist of native vegetation and are primarily scrub and bushes with some trees. The existing site out along Newhall Avenue is currently a quick oil-change garage and semi-vacant used car lot. Once flow leaves the canyons and crosses through the business parking lots, runoff spills down into the gutter and flows to one of two curb opening catch basins in Newhall Ave.

There are currently no known water quality facilities implemented within the existing project site.

Developed Condition

The developed site will consist of a private underground storm drain system that will route water underground and out to the existing public storm drain in Newhall Ave. Runoff from the undeveloped offsite and canyon areas will be routed separately in a dedicated offsite storm drain system so that no comingling with onsite water will occur. Onsite water will be treated in an underground water quality chamber and will not be mixed with offsite flow in order to minimize the required size of any water quality facilities.

Infiltration

The method of treatment for this project is infiltration. Preliminary recommendations by soils engineer estimate a factored perc rate of greater than 0.75 in/hr. In addition, groundwater was not found within 25 ft of the ground surface elevations at the site.

Formal infiltration testing yielded an average percolation rate of 7.87 in/hr, with a 2.5x factor of safety the site infiltration rate is 3.15 in/hr.

Underground Infiltration Chambers

An underground infiltration system consisting of 72" perforated CMP pipes (Contech) is located at the northeast corner of the project. The required water quality component of runoff will be routed to this unit and will then percolate down into the ground below for treatment.

The infiltration unit has been divided into two units that are hydraulically connected via a pipe. This is due to spatial constraints and the nearby covered parking structure (and its post footings) in this area.

The design and performance data for the proposed infiltration chamber are provided in the table below.

WQT Volume Required (SWQDv)	13,312	cf
Underground Chamber Volume Provided	13,483	cf
Required Low Flow (SWQDf)	1.02	cfs

USMP Specific Requirements

The following list discusses additional aspects of the project's SUSMP specific requirements:

Hydromodification

This project is exempt from hydromodification mitigation since all developed condition runoff will discharge to the existing MS4 system located within Newhall Avenue.

However, some runoff mitigation will be provided using the projects underground water quality facility. Approximate 0.3 ac-ft of runoff volume will be treated in the water quality chamber and this will assist in providing mitigation to some degree.

In addition, the summary tables above show the developed condition peak flows are below those of the existing condition peak flows.

Natural Areas

The site consists of natural hillside areas that will be preserved to maximum extent possible. Landscaped medians and parkways are provided and will add to the natural areas.

Stormwater Pollutants of Concern

The primary pollutants of concern anticipated for this project are associated with landscaped areas, fueling station, car wash facility, and commercial buildings. These pollutants have been listed below for regions both onsite and downstream of the proposed development.

Pollutants of concern:

Pathogens; nutrients; pesticides; organic compounds; oxygen demanding substances; trash and debris; oils and grease; sediments; and metals.

Pollutant Removal

The infiltration chambers will remove pathogens, nutrients, pesticides, organic compounds, oxygen demanding substances, trash and debris, oils and grease, sediments, and metals by filtering the runoff though natural earth/soil prior to entering the underground aquifer.

Pollutants shall be removed via the underground infiltration chamber with high effectiveness per CASQA's BMP handbook on New Development and Redevelopment section on infiltration.

Slopes and Channels

Natural slopes to the sides and rear of the project site do exist and will be preserved as discussed above. There are no channels that exist.

Storm Drain System Stenciling and Parking

Multiple Catch Basins are proposed for this Soledad Commercial project. "NO DUMPING. DRAINS TO RIVER" stencils will be painted at the catch basin drain locations per the provided USMP Map.

Outdoor Material Storage Areas

No outdoor material storage areas are proposed for this project.

Properly Design Fueling Areas

No fueling areas are proposed on for this project.

Properly Design Trash Storage Areas

Trash storage areas are proposed for the project and will have three (3) side walls and covered roofs per the City of Santa Clarita guidelines. This is done to prevent contact with stormwater.

Properly Design Vehicle Wash Areas

No vehicle wash areas are proposed for this project.

Landscape Irrigation Practices and Hardscape Runoff

Landscaped areas are designed to minimize/eliminate runoff and the need for fertilizer/pesticides. Where possible, hardscape runoff from the rooftops will be routed through landscaped medians around the main building. All other hardscaped runoff is routed to the underground treatment chamber directly. Landscaped areas are designed to include comprehensive irrigation systems that only water areas as needed to ensure healthy vegetation growth.

Bmp Maintenance (O&M)

An operation and maintenance manual for the proposed underground infiltration chamber is provided in Appendix C of this report.

Conclusion

This report concludes that the Newhall Avenue Apartment project is considered acceptable for development in terms of water quality design. All areas of development will be treated per methods outlined by the City of Santa Clarita and the proposed underground infiltration chamber will treat the project's required water quality runoff volume.

APPENDIX A

HydroCalc for Water Quality

Peak Flow Hydrologic Analysis

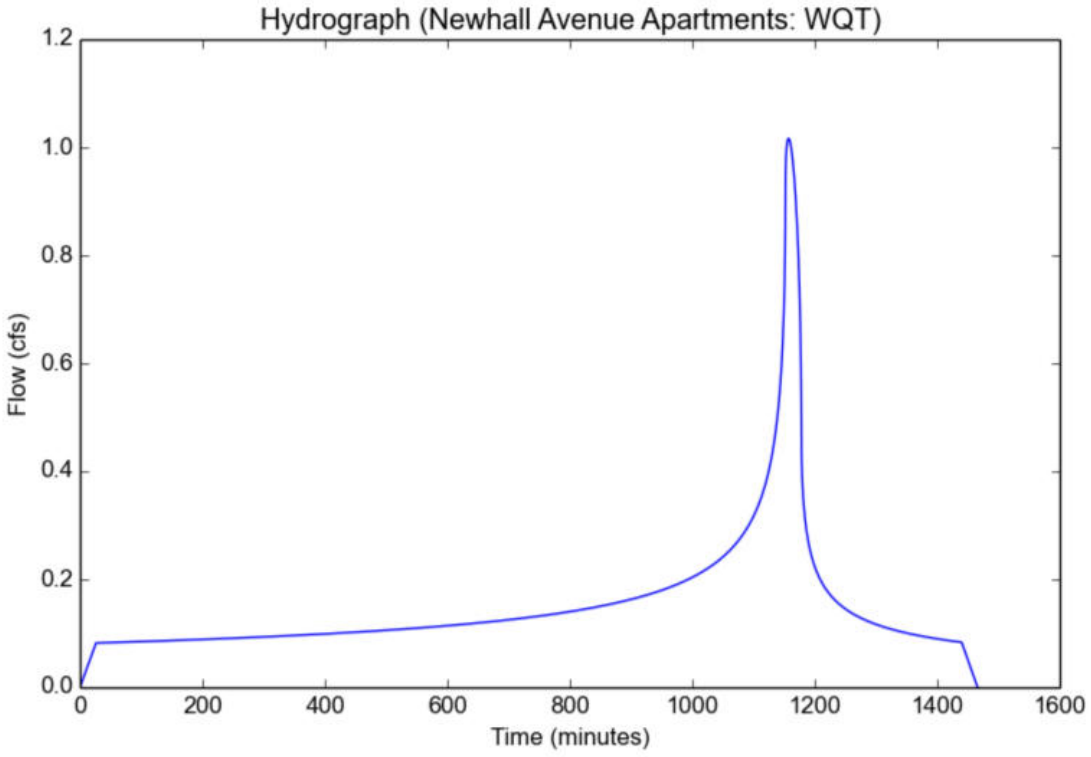
File location: I:/Project Files/1944 - NEWHALL AVENUE/USMP/1944-Wqt HydroCalc_013122.pdf
Version: HydroCalc 1.0.3

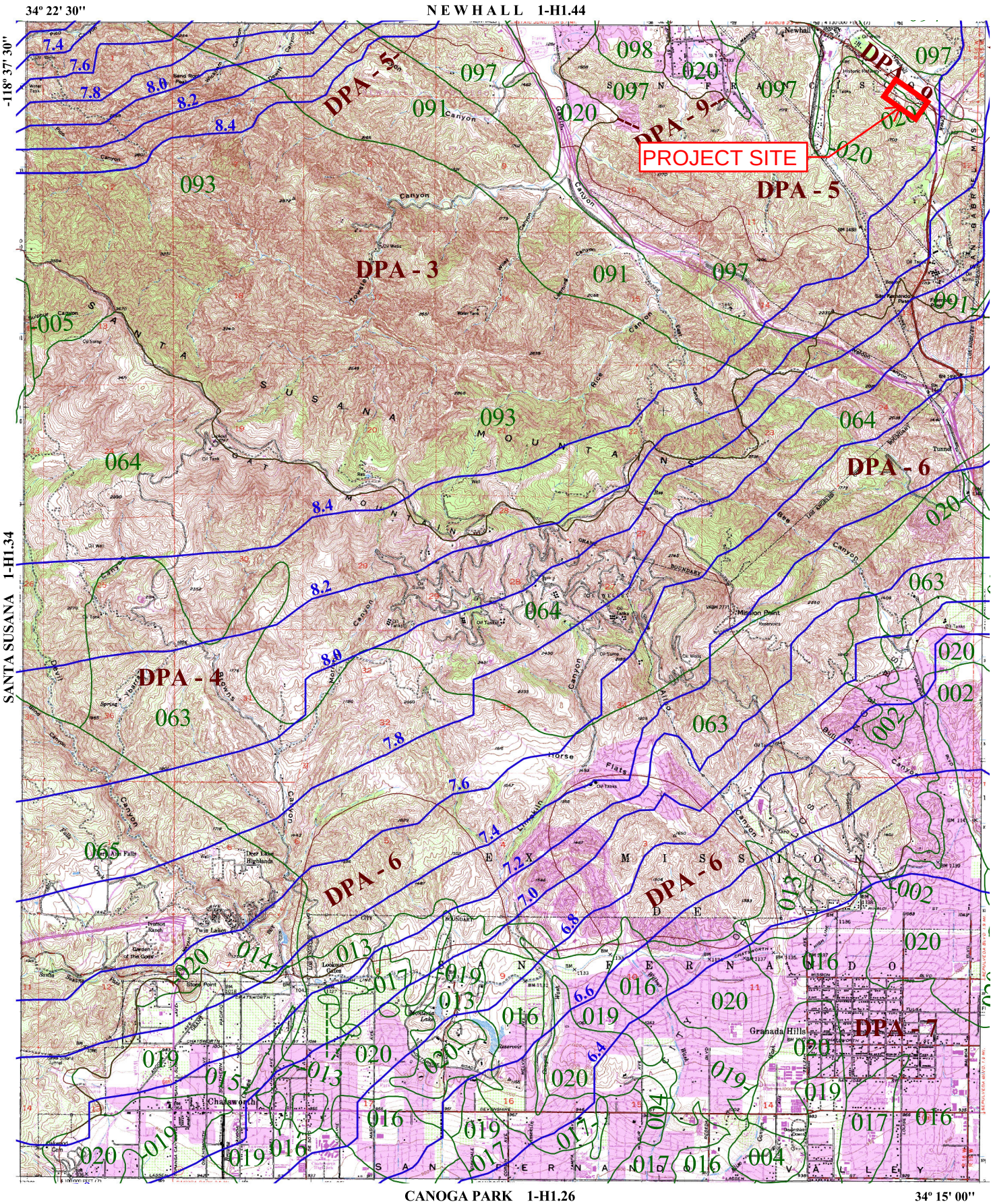
Input Parameters

Project Name	Newhall Avenue Apartments
Subarea ID	WQT
Area (ac)	4.84
Flow Path Length (ft)	770.0
Flow Path Slope (vft/hft)	0.04675
85th Percentile Rainfall Depth (in)	1.0
Percent Impervious	0.83
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.0
Peak Intensity (in/hr)	0.2749
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.764
Time of Concentration (min)	26.0
Clear Peak Flow Rate (cfs)	1.0165
Burned Peak Flow Rate (cfs)	1.0165
24-Hr Clear Runoff Volume (ac-ft)	0.3056
24-Hr Clear Runoff Volume (cu-ft)	13312.0505





016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

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

OAT MOUNTAIN
50-YEAR 24-HOUR ISOHYET

1-H1.35

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

APPENDIX B

INFILTRATION REPORT

INFILTRATION REPORT IN PROCESS

APPENDIX C

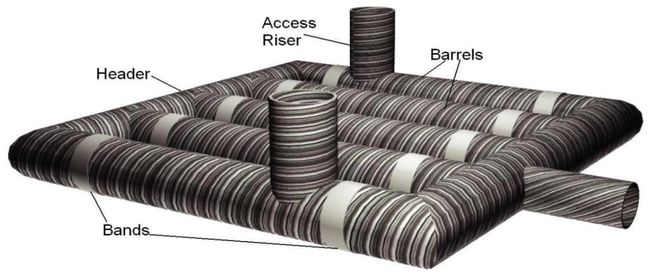
Contech Infiltration Unit Design and O & M

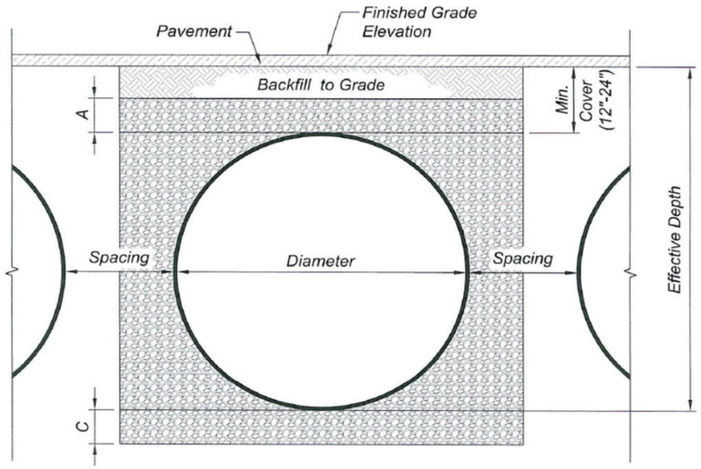
DYODS™
Design Your Own Detention System

CONTECH CMP DETENTION SYSTEMS

CONTECH STORMWATER SOLUTIONS INC.

For design assistance, drawings,
and pricing send completed worksheet to:
dyods@contech-cpi.com





Project Summary		
Date:	1/31/2022	
Project Name:	Newhall Ave Apartments	
City / County:	Santa Clarita, LA County	
State:	CA	
Designed By:	CVH	
Company:	Alliance Land Planning & Engineering	**Enter Information in Blue Cells**
Telephone:	760-431-9876	

Corrugated Metal Pipe Calculator		
Storage Volume Required (cf):	13,312	
Limiting Width (ft):	28.00	
Invert Depth Below Asphalt (ft):	7.00	
Solid or Perforated Pipe:	Perforated	
Shape Or Diameter (in):	72	28.27 ft^2 Pipe Area
Number Of Headers:	1	
Spacing between Barrels (ft):	3.00	
Stone Width Around Perimeter of System (ft):	1	
Depth A: Porous Stone Above Pipe (in):	6	
Depth C: Porous Stone Below Pipe (in):	6	
Stone Porosity (0 to 40%):	40	

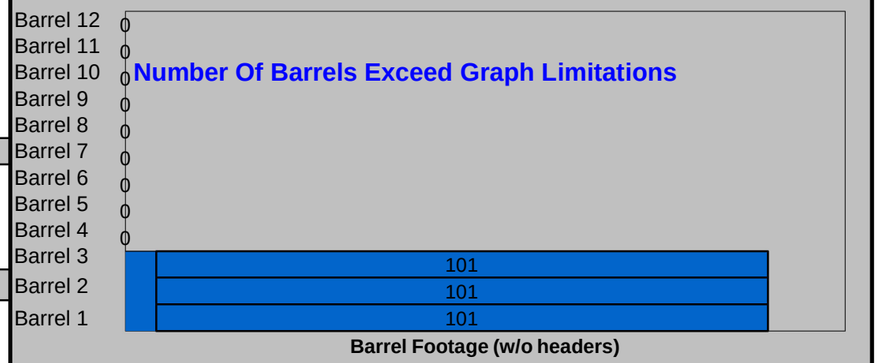
System Sizing			
Pipe Storage:	9,246	cf	
Porous Stone Storage:	4,237	cf	
Total Storage Provided:	13,483	cf	101.3% Of Required Storage
Number of Barrels:	3	barrels	
Length per Barrel:	101.0	ft	
Length Per Header:	24.0	ft	
Rectangular Footprint (W x L):	26. ft x 109. ft		

CONTECH Materials		
Total CMP Footage:	327	ft
Approximate Total Pieces:	16	pcs
Approximate Coupling Bands:	15	bands
Approximate Truckloads:	8	trucks

Construction Quantities**		
Total Excavation:	735	cy
Porous Stone Backfill For Storage:	392	cy stone
Backfill to Grade Excluding Stone:	0	cy fill

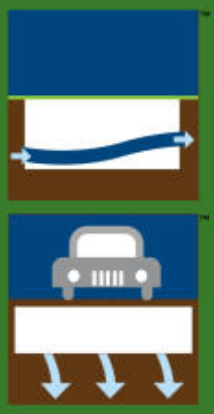
***Construction quantities are approximate and should be verified upon final design*

System Layout



UrbanGreen™

Metal Detention and Infiltration Products



Scan Me!

CONTECH®
ENGINEERED SOLUTIONS

Corrugated Metal Pipe for Stormwater Detention and Infiltration

Selecting the right stormwater solution just got easier...

It's simple to choose the right low impact development (LID) solution to achieve your runoff reduction goals with the Contech UrbanGreen™ Staircase. First, select the runoff reduction practices that are most appropriate for your site, paying particular attention to pretreatment needs. If the entire design storm cannot be retained, select a treatment best management practice (BMP) for the balance. Finally, select a detention system to address any outstanding downstream erosion.

Learn more about our low impact development at:
www.ContechES.com/lid

Meet your stormwater quantity and runoff reduction requirements with ease.

Contech's corrugated metal pipe (CMP) underground detention/infiltration systems can be sized and shaped to meet your site-specific needs. The versatile material provides almost limitless opportunities to match individual site requirements while lowering site development costs.

Durable

- Proven service life – Exceeds 100-years with proper specification that meets all AASHTO and ASTM pipe specifications
- Handles fill heights in excess of 100 feet – steel combines strength with soil
- 100% traceable material – maintains performance even when recycled
- Homogenous material – eliminates failures due to stress cracks, shrinkage cracks and air voids
- Various coatings available with predictable service life
  - Aluminized Steel™ Type 2
  - Galvanized
  - CORLIX®
  - TRENCHCOAT®

Learn more about our available coatings at:
www.ContechES.com/cmp

various coatings available

Versatile

- Wide range of shapes and sizes – round and pipe-arch in diameters from 6 to 144 inches
- Variety of layouts – rectangular, L-shape and staggered cells are frequently used
- Array of fittings – tees, wyes, elbow, saddle branches, manifolds, reducers and custom fabrication available

Sustainable

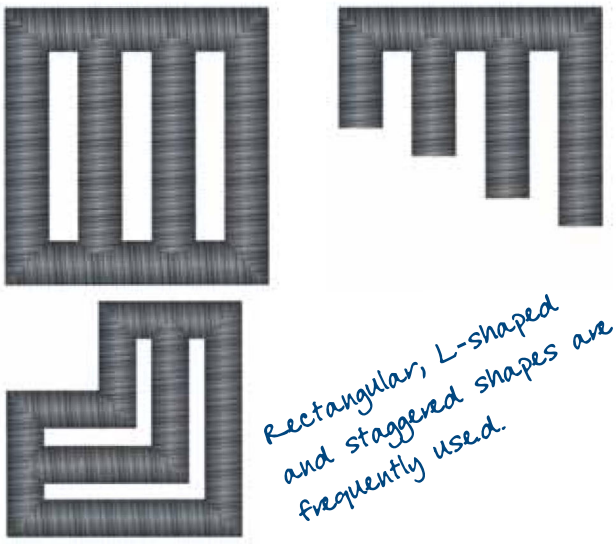
- World's most recycled content – can count towards LEED® credits
- Requires less energy and materials to produce – lowers carbon footprint

Learn how Contech products can help contribute to LEED credits at: www.ContechES.com/LEED

Easy to Install and Maintain

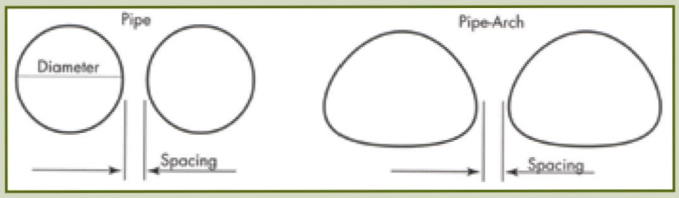
- Flexible and forgiving during installation
- Lightweight for easy handling
- Quick assembly shortens site development time
- Integrated outlet control structure eliminates need for downstream control structure
- Manhole riser sections, complete with ladders facilitate any access and scheduled maintenance

Tees, wyes, elbows, saddle branches, manifolds and reducers are available.



Rectangular, L-shaped and staggered shapes are frequently used.

Typical Spacing for Multiple Barrels



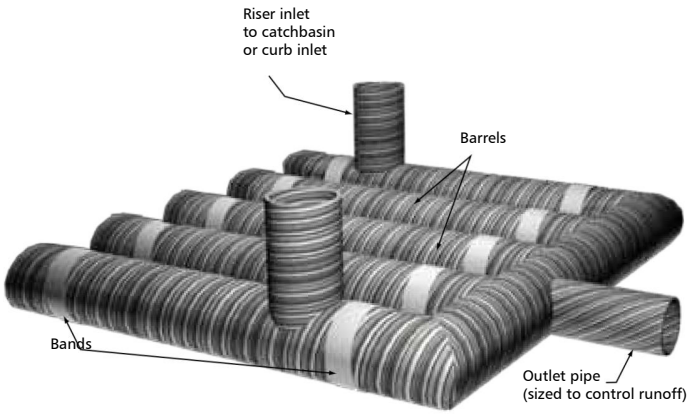
Diameter	Spacing*	Pipe-Arch Span	Spacing*
Up to 24"	12"	Up to 36"	12"
24" to 72"	1/2 Diameter of Pipe	36" to 108"	1/3 Span of Pipe-Arch
72" +	36"	108" to 189"	36"

* Spacing shown provides room for proper backfill to enable the structure to develop adequate side support. Spacing with AASHTO M-145, A-1, A-2, A-3 granular fill. Closer spacing is possible depending on quality of backfill and placing and compaction methods.

Applications

Detention

Contech CMP detention systems store stormwater runoff exceeding a site's allowable discharge rate and release it slowly over time. Installed belowgrade, the systems maximize property usage and meet your specific water quantity requirements. CMP detention systems are available in all AASHTO M-36 Types.



CMP detention system

High Volume Storage

Contech plate systems allow for high volume stormwater storage in small footprint areas. The systems are offered in a wide variety of shapes and sizes in both aluminum and galvanized steel. Full-pipe systems and three-sided structures with open bottoms can be used for infiltration.

Typically, Contech plate systems are used on high vertical rise applications or in areas where the smallest possible footprint is of the greatest concern. The systems are bolted together in the field, which reduces the number of freight loads. Remote sites or projects with challenging accessibility often utilize plate systems.

Plate system for high volume storage

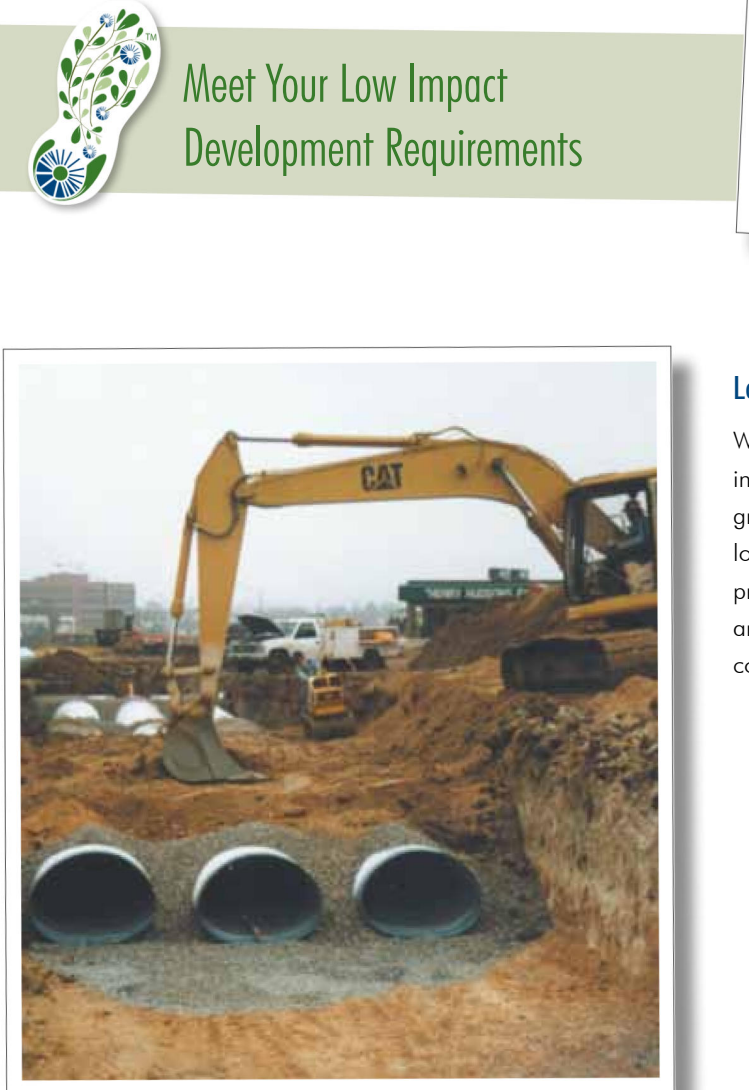
Perforated CMP infiltration system

Infiltration

CMP pipe and pipe-arch is available fully or partially perforated to meet your Low Impact Development (LID) requirements. Subsurface perforated CMP infiltration systems store stormwater runoff in the pipe and surrounding stone during a storm until it can be slowly released into the surrounding native soil.

Stormwater runoff is stored in the pipe and surrounding stone.

Meet Your Low Impact Development Requirements



Pipe-arch for low profile application.

Low Profile

When vertical space must be maximized, the CMP can be utilized in a pipe-arch shape. The low, wide pipe-arch design allows for greater storage in a shallow profile than typical round pipe without losing any structural integrity. Like our round pipe, pipe arch is produced in six wall thicknesses including 18, 16, 14, 12, 10 and 8 gage, which are available with either helical or annular corrugations.

Applications

On-Site Manufacturing

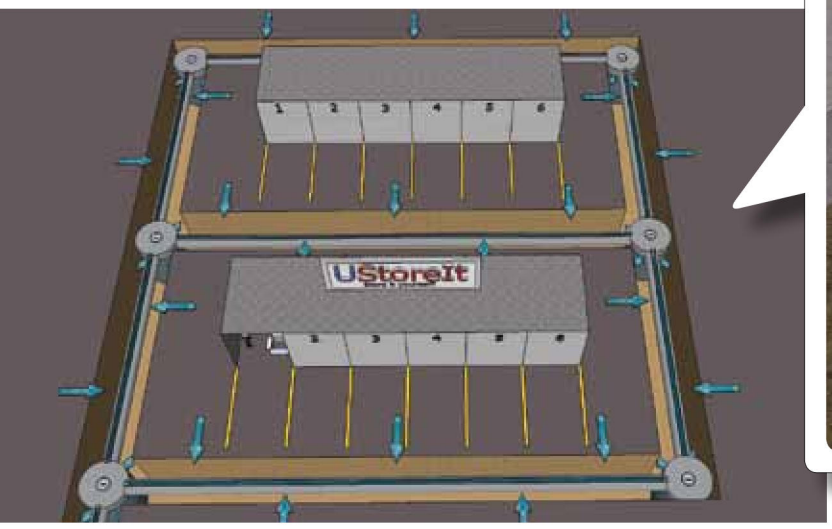
If your job site is remote or you have limited storage space or restricted traffic patterns, take advantage of our Mobile Production Vehicle (MPV) for fast and cost effective on-site steel pipe manufacturing. The PIPE MPV® is designed to be a self-supporting factory that can be quickly deployed and put into production. Once on site, pipe manufacturing progresses quickly enough to allow pipe installation within four hours.

The PIPE MPV can produce corrugated metal pipe in a variety of sizes. Diameters from 36" – 192" and lengths up to 35' can be accommodated. This pipe meets the same levels of quality construction as does all Contech manufactured pipe, with high coil feedrate speeds and the same lock-seem edge process used in conventional pipe manufacturing.

Mobile Production Vehicle

Innovative Solutions for Challenging Sites

The flexibility of CMP allows you to create innovative solutions when dealing with challenging sites. For example, when trying to meet runoff reduction requirements, your site may be mostly impervious or you may have a thin, shallow clay layer just below the surface, limiting the infiltration capacity of surface BMPs. One solution is to utilize CMP infiltration wells. First, collect the site runoff using our Slotted Drain™ around the perimeter of each drive isle. The Slotted Drain then directs water into vertical lengths of perforated CMP. The vertical perforated CMP is long enough to penetrate the clay layer and infiltrate the stormwater into a highly permeable alluvial layer about 12'-14' belowground. This allows the developer to meet the LID requirements and eliminate the need for the extended detention basin.



Sizing

Round Pipe - CMP and Plate (CMP → 12-in to 144-in; Plate → 60-in to 240-in)

Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height	Diameter (inches)	Volume (ft^3/ft)	Min. Cover Height
12	.78	12″	60	19.6	12″	120	78.5	18″	180	176	24″
15	1.22	12″	66	23.7	12″	126	86.5	18″	186	188	24″
18	1.76	12″	72	28.2	12″	132	95.0	18″	192	201	24″
21	2.40	12″	78	33.1	12″	138	103.8	18″	198	213	30″
24	3.14	12″	84	38.4	12″	144	113.1	18″	204	227	30″
30	4.9	12″	90	44.1	12″	150	122	24″	210	240	30″
36	7.0	12″	96	50.2	12″	156	132	24″	216	254	30″
42	9.6	12″	102	56.7	18″	162	143	24″	222	268	30″
48	12.5	12″	108	63.6	18″	168	153	24″	228	283	30″
54	15.9	12″	114	70.8	18″	174	165	24″	234	298	30″

Pipe-Arch - CMP

1/2″ Deep Corrugations											
Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height
17 x 13	1.1	12″	28 x 20	2.9	12″	49 x 33	8.9	12″	71 x 47	18.1	12″
21 x 15	1.6	12″	35 x 24	4.5	12″	57 x 38	11.6	12″	77 x 52	21.9	12″
24 x 18	2.2	12″	42 x 29	6.5	12″	64 x 43	14.7	12″	83 x 57	26.0	12″
1″ Deep Corrugations											
60 x 46	15.6	15″	81 x 59	27.4	18″	103 x 71	42.4	18″	128 x 83	60.5	24″
66 x 51	19.3	15″	87 x 63	32.1	18″	112 x 75	48.0	21″	137 x 87	67.4	24″
73 x 55	23.2	18″	95 x 67	37.0	18″	117 x 79	54.2	21″	142 x 91	74.5	24″

Pipe-Arch - MULTI-PLATE®

2″ Deep Corrugations												
	Shape (ft-in)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height	Shape (inches)	Volume (ft^3/ft)	Min. Cover Height
18-in Corner Radius (Rc)	6-1 x 4-7	22	12″	8-7 x 5-11	41	18″	8-7 x 5-11	41	18″	14-1 x 8-9	97	24″
	6-4 x 4-9	24	12″	8-10 x 6-1	43	18″	8-10 x 6-1	43	18″	14-3 x 8-11	101	24″
	6-9 x 4-11	26	12″	9-4 x 6-3	46	18″	9-4 x 6-3	46	18″	14-10 x 9-1	105	24″
	7-0 x 5-1	29	12″	9-6 x 6-5	49	18″	9-6 x 6-5	49	18″	15-4 x 9-3	109	24″
	7-3 x 5-3	31	12″	9-9 x 6-7	52	18″	9-9 x 6-7	52	18″	15-6 x 9-5	114	24″
	7-8 x 5-5	33	12″	10-3 x 6-9	55	18″	10-3 x 6-9	55	18″	15-8 x 9-7	118	24″
	7-11 x 5-7	36	12″	10-8 x 6-11	58	18″	10-8 x 6-11	58	18″	15-10 x 9-10	122	24″
	8-2 x 5-9	38	18″	10-11 x 7-1	61	18″	10-11 x 7-1	61	18″	16-5 x 9-11	126	30″
							13-11 x 8-7	93	24″	16-7 x 10-1	131	30″
31-in Corner Radius (Rc)	13-3 x 9-4	98	24″	15-4 x 10-4	124	24″	17-2 x 11-4	153	30″	19-3 x 12-4	185	30″
	13-6 x 9-6	102	24″	15-7 x 10-6	129	24″	17-5 x 11-6	158	30″	19-6 x 12-6	191	30″
	14-0 x 9-8	106	24″	15-10 x 10-8	134	24″	17-11 x 11-8	163	30″	19-8 x 12-8	196	30″
	14-2 x 9-10	111	24″	16-3 x 10-10	138	30″	18-1 x 11-10	168	30″	19-11 x 12-10	202	30″
	14-5 x 10-0	115	24″	16-6 x 11-0	143	30″	18-7 x 12-0	174	30″	20-5 x 13-0	208	30″
	14-11 x 10-2	120	24″	17-0 x 11-2	148	30″	18-9 x 12-2	179	30″	20-7 x 13-2	214	36″

Next Steps

Learn more

Read our white paper, *Economic Optimization of Infiltration Systems*, to learn more. You'll receive free PDH credits for completing a quick quiz.

Available at www.ContechES.com/cmp

Quick Links:

- LEED information – www.ContechES.com/leed
- LID Application Guide – www.ContechES.com/lid
- Articles – www.ContechES.com/pdh

Connect with us

We're here to make your job easier – and that includes being able to get in touch with us when you need to. Search for your local rep at **www.ContechES.com**

While you're there, be sure to check out our upcoming seminar schedule or request an in-house technical presentation.

Links to Stormwater Tools:

To use the Design Your Own Detention System tool, visit: www.ContechES.com/dyods

To use the Land Value Calculator, visit: www.ContechES.com/lvc

(Please scroll to the bottom right to download the Land Value Calculator)

To use the Rain Water Harvesting Runoff Reduction Calculator tool, visit: www.ContechES.com/rwh-calculator

Start a Project

If you are ready to begin a project, contact your local representative to get started. Or you can check out our design toolbox for all our online resources at www.ContechES.com/designtoolbox.

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www.ContechES.com

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ENGINEERED SOLUTIONS

Contech® CMP Detention & Infiltration Maintenance Guide

CONTECH®
CMP DETENTION SYSTEMS

Contech® CMP Detention

Underground stormwater detention/infiltration and retention systems must be properly inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance and is easily performed. Contech recommends ongoing quarterly inspections. The rate at which the system collects pollutants will depend more heavily on site specific activities rather than the size or configuration of the system. Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in various other instances in which higher accumulations of sediment or abrasive / corrosive conditions may exist. Inspection and maintenance records should be maintained for the life of the system.

Maintenance

Systems should be cleaned when inspection reveals that accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

If inspectors observe any salt or other corrosive substance concentrations or accumulations in the system, or if salt or other corrosive substance is used or prevalent near the system, it is recommended to rinse the system above the spring line annually between late spring and early summer as part of the maintenance program. This maintenance is required for infiltration systems. Excessive salting should be avoided and pavement should be sealed to reduce salt infiltration from the surface.

Maintaining an underground detention or retention system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.

Inspection & Maintenance Log Sample Template

_____" Diameter System			Location: Anywhere, USA		
Date	**Depth of Sediment**	**Accumulated Trash**	**Maintenance Performed**	**Maintenance Personnel**	**Comments**
12/01/10	2"	None	Removed Sediment	B. Johnson	Installed
03/01/11	1"	Some	Removed Sediment and Trash	B. Johnson	Swept parking lot
06/01/11	0"	None	None		
09/01/11	0"	Heavy	Removed Trash	S. Riley	
12/01/11	1"	None	Removed Sediment	S. Riley	
04/01/12	0"	None	None	S. Riley	
04/15/01	2	Some	Removed Sediment and Trash	ACE Environmental Services	

CONTECH®
CMP DETENTION SYSTEMS

Support

Drawings and specifications are available at www.ContechES.com.
Site-specific support is available from our engineers.

CONTECH®
ENGINEERED SOLUTIONS
800.338.1122
www.ContechES.com

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products. For information, visit www.ContechES.com or call 800.338.1122.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

APPENDIX D

Maintenance Covenant

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Space above this line for Recorder's use

TITLE(S)

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Recording Fee: _____ Space above this line for Recorder's use

Documentary Transfer Tax:

The property is located in the City of Santa Clarita.

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

Pursuant to Section 17.95.110 of the Santa Clarita Municipal Code and Title 10, Chapter 10.04 of the Santa Clarita Municipal Code relating to the control of pollutants carried by storm water runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

Assessor Parcel No(s): _____

Tract/Parcel Map No.: _____, Lot No.: _____

Address: (insert number and street)
(insert city, state, and zip)

I/We (insert owner(s) name(s)), hereby certify that I/we am/are the legal owner(s) of property described above, and as such owners for the mutual benefit of future purchasers and transferees, their heirs, successors, and assigns (collectively "owner"), do hereby affix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed:

1. That the owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, down-drains, pipes, and water quality devices on the property described above and as shown on plans submitted to the City of Santa Clarita, in a good and functional condition to safeguard the property and adjoining properties from damage and pollution.
2. That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. The annual maintenance inspections shall verify the legibility of all required stencils and signs and the owner shall repaint and label as necessary.
3. That owner(s) shall provide to new owner(s) with any conveyance of the property printed educational materials giving information on which storm water management facilities are present, the type(s) and location(s) of required maintenance signs, and required maintenance instructions.

(type name of company/corporation/partnership/agency - leave blank for all others)

_____ Date:_____
(owner signs and dates above, type name and title here)

_____ Date:_____
(owner signs and dates above, type name and title here)

_____ Date:_____
(owner signs and dates above, type name and title here)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of _____ }

On _____ before me, _____, Notary Public,
Date Name of Notary

personally appeared _____
Name(s) of Signer(s)

_____,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
Signature of Notary Public

Place Notary Seal Above

---------- *OPTIONAL* ----------

Though the information below is not required by law, it may prove valuable to person relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
☐ Individual
☐ Corporate Officer --Title(s): _____
☐ Partner -- ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____

Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
☐ Individual
☐ Corporate Officer -- Title(s): _____
☐ Partner – ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____

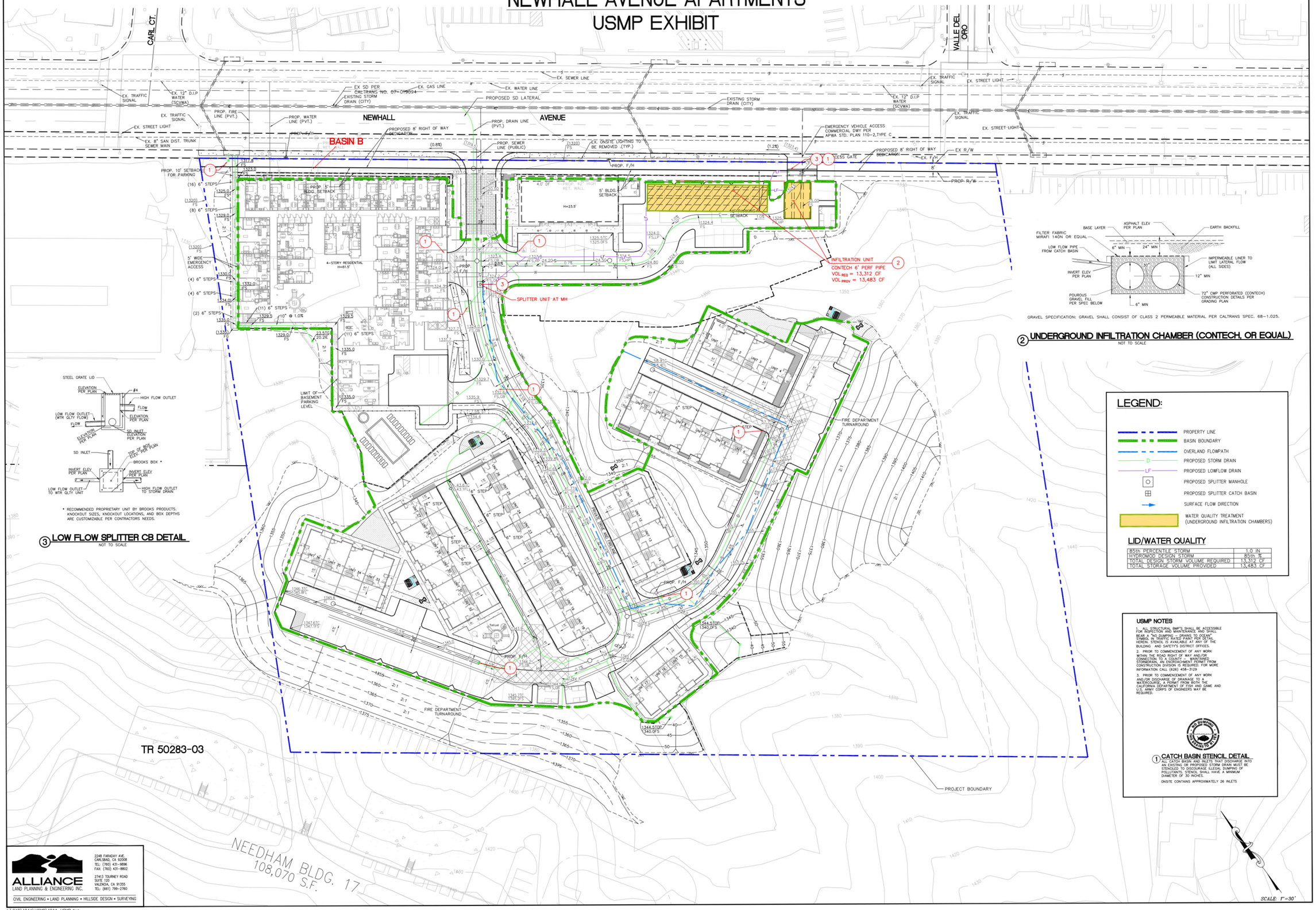
Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

APPENDIX E

DEVELOPED CONDITION USMP EXHIBIT

NEWHALL AVENUE APARTMENTS
USMP EXHIBIT



* RECOMMENDED PROPRIETARY UNIT BY BROOKS PRODUCTS. KNOCKOUT SIZES, KNOCKOUT LOCATIONS, AND BOX DEPTHS ARE CUSTOMIZABLE PER CONTRACTORS NEEDS.

③ LOW FLOW SPLITTER CB DETAIL
NOT TO SCALE

GRAVEL SPECIFICATION: GRAVEL SHALL CONSIST OF CLASS 2 PERMEABLE MATERIAL PER CALTRANS SPEC. 68-1.025.

② UNDERGROUND INFILTRATION CHAMBER (CONTECH, OR EQUAL)
NOT TO SCALE

LEGEND:

- PROPERTY LINE
- BASIN BOUNDARY
- OVERLAND FLOWPATH
- D — PROPOSED STORM DRAIN
- LF — PROPOSED LOWFLOW DRAIN
- PROPOSED SPLITTER MANHOLE
- PROPOSED SPLITTER CATCH BASIN
- SURFACE FLOW DIRECTION
- WATER QUALITY TREATMENT (UNDERGROUND INFILTRATION CHAMBERS)

LID/WATER QUALITY

85th PERCENTILE STORM	1.0 IN
HYDROMOD DESIGN STORM	85th %
TOTAL DESIGN STORM VOLUME REQUIRED	13,312 CF
TOTAL STORAGE VOLUME PROVIDED	13,483 CF

USMP NOTES

1. ALL STRUCTURAL BMP'S SHALL BE ACCESSIBLE FOR INSPECTION AND MAINTENANCE AND SHALL BEAR A "NO DUMPING – DRAINS TO OCEAN" STENCIL OR SIGN PER CITY STD. PLAN 429. AS HEREIN, STENCIL IS AVAILABLE AT ANY OF THE BUILDING AND SAFETY'S DISTRICT OFFICES.
2. PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE ROAD RIGHT OF WAY AND/OR CONNECTION TO A COUNTY MAINTAINED FACILITY, THE PERMITTEE SHALL OBTAIN PERMIT FROM CONSTRUCTION DIVISION IS REQUIRED. FOR MORE INFORMATION CALL (626) 458-3129.
3. PRIOR TO COMMENCEMENT OF ANY WORK AND/OR DISCHARGE OF WATER TO A RIVER, STREAM OR CREEK, PERMITTEE SHALL CONTACT THE CALIFORNIA DEPARTMENT OF FISH AND GAME AND U.S. ARMY CORPS OF ENGINEERS MAY BE REQUIRED.

① CATCH BASIN STENCIL DETAIL
ALL CATCH BASIN AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

ONSITE CONTAINS APPROXIMATELY 26 INLETS

SCALE: 1"=30'

ALLIANCE
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CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING
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CARLSBAD, CA 92008
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FAX: (760) 431-8802
27413 TOURNEY ROAD
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VALENCIA, CA 91355
TEL: (661) 799-2760

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