CITY OF ALBUQUERQUE

May 11, 2011

Ronald Bohannan, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM 87109

Re: The Boulders Phase 1 Subdivision Drainage Report and Grading and Drainage Plan

Engineer's Stamp date 5-6-11 (B11/D001B)

Dear Mr. Bohannan,

Based upon the information provided in your submittal received 5-6-11, the above referenced report and plan are approved for Preliminary Plat action by the DRB.

Since the DRB approved the grading plan on 5-11-11, the above referenced plan is approved for Grading Permit.

An Agreement and Covenant is required for the Temporary Retention Pond west of Unser Blvd as a condition for Work Order approval.

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

Sincerely,

Curtis A. Cherne, P.E.
Principal Engineer, Planning Dept.
Development and Building Services

Copy: file

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION SHEET

(REV. 1/28/2003rd)

B11/D001 B

PROJECT TITLE: The Boulders
DRB #: 1002632 EPC #:
ZONE MAP/DRG. FILE #: ~~B-10 & B-11~~
WORK ORDER #:

LEGAL DESCRIPTION: Tracts 2, 3 & 7, Sundance Estates
CITY ADDRESS: n/a

ENGINEERING FIRM:	Tierra West, LLC	CONTACT:	Vince Carrica, P.E.
ADDRESS:	5571 Midway Park Place NE	PHONE:	(505) 858-3100
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87109
OWNER:	AmGo Properties LLC	CONTACT:	Pierre Amestoy
ADDRESS:	4461 Irving Blvd. NW	PHONE:	505-822-0044
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87114
ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
CITY, STATE:		ZIP CODE:	
SURVEYOR:		CONTACT:	
ADDRESS:		PHONE:	
CITY, STATE:		ZIP CODE:	
CONTRACTOR:		CONTACT:	
ADDRESS:		PHONE:	
CITY, STATE:		ZIP CODE:	

CHECK TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- ___ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
- ___ DRAINAGE PLAN RESUBMITTAL
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- ___ GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SIA / FINANACIAL GUARANTEE RELEASE
- ___ PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUB'D. APPROVAL
- X S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- ___ FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- ___ GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ___ YES
- ___ NO
- ___ COPY PROVIDED

DATE SUBMITTED: Revised 5/5/11 3/11/2011 BY: Vincent Carrica, P.E.

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of sumbittal may be required based on the following:

1. **Conceptual Grading and Drainage Plans**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

DRAINAGE REPORT

For

THE BOULDERS PHASE I SUBDIVISION
ALBUQUERQUE, NEW MEXICO

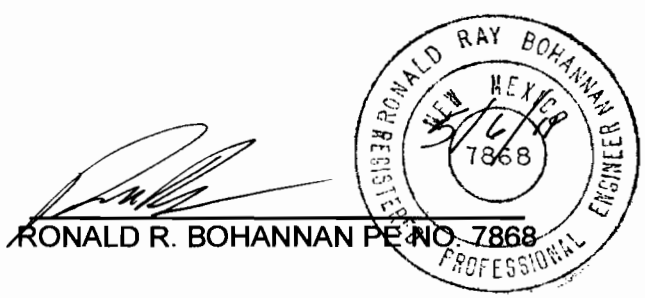
Prepared by

Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

Prepared for

Flash Resouces
6340 Coors Boulevard
Albuquerque, New Mexico 87120

May 05, 2011



RONALD R. BOHANNAN PE NO. 7868

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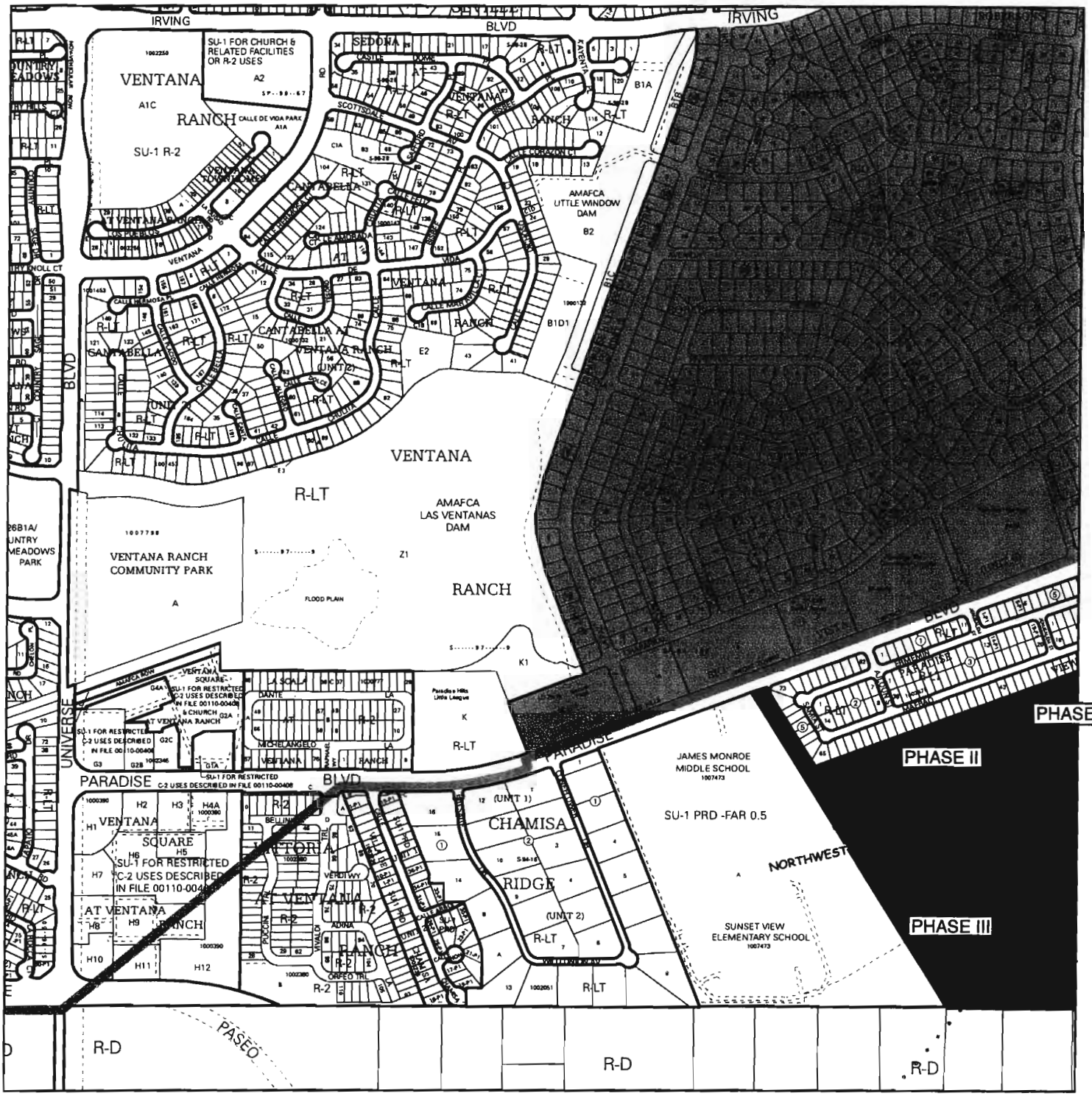
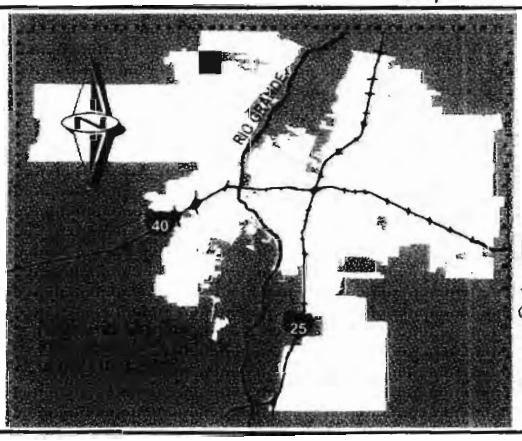


For more current information and more details visit: http://www.cabq.gov/gis

AGIS
Albuquerque Geographic Information System

Map amended through: 2/4/2010



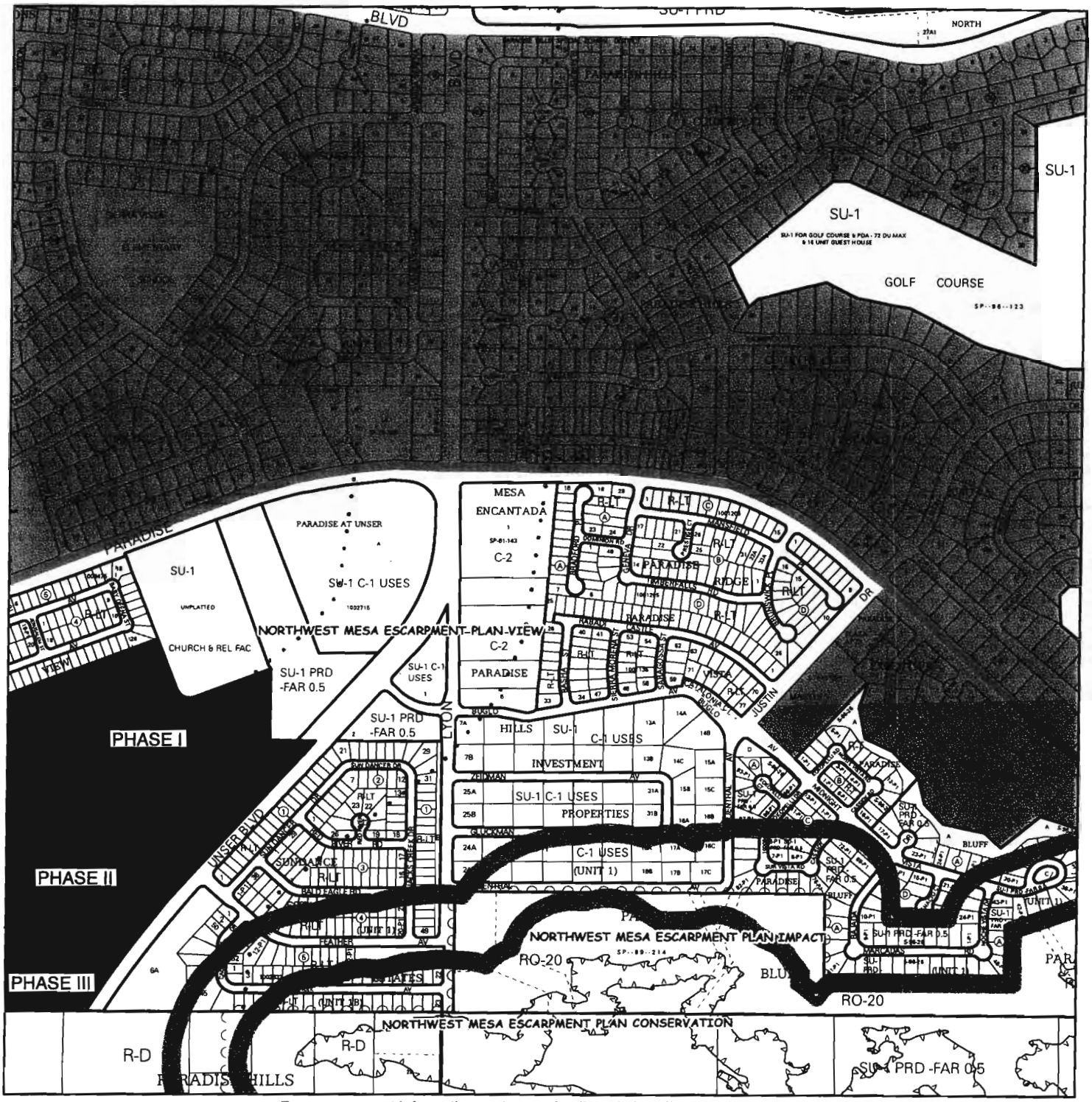
Zone Atlas Page:

B-10-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet



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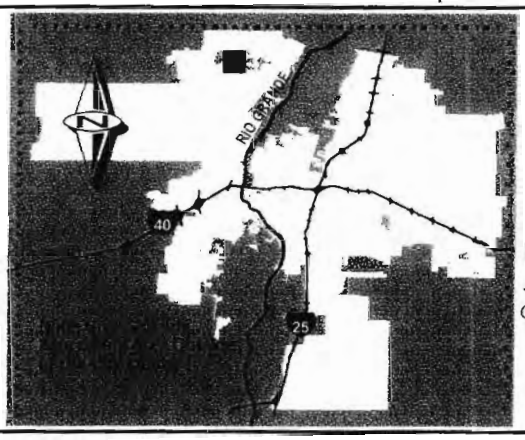


Zone Atlas Page:

B-11-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet

LOCATION

The proposed residential subdivision, The Boulders Phase I, is comprised of approximately 26 acres zoned RLT and is located in the City of Albuquerque, in Bernalillo County. The site is bordered by Unser Boulevard to the east, Paradise View Subdivision to the north, private undeveloped property to the south and Albuquerque Public Schools property to the west. The property is currently undeveloped.

This report represents a drainage management and grading plan for approval by the City of Albuquerque, for grading and Preliminary Plat submittal.

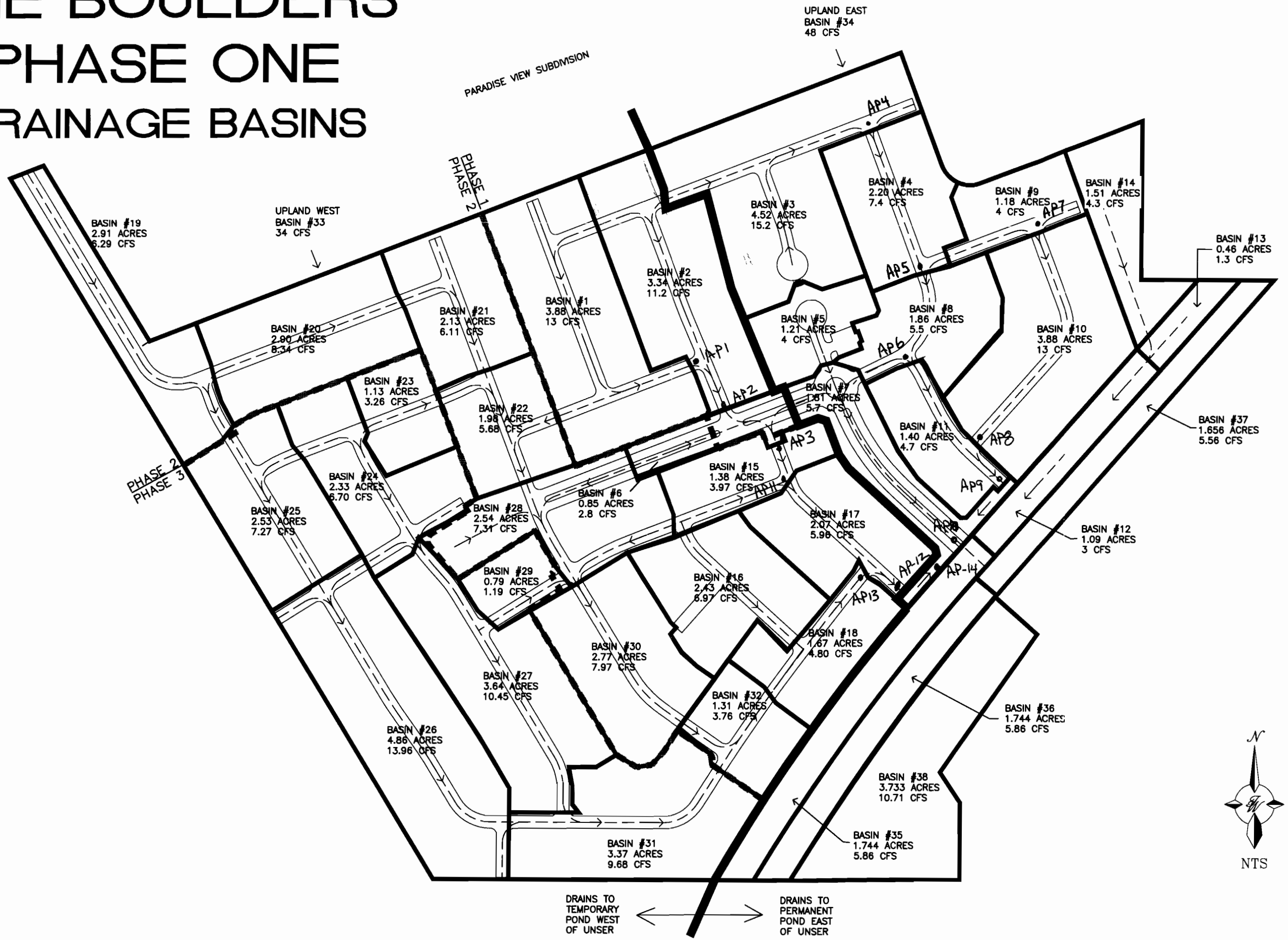
DRAINAGE BASIN DESIGNATION

The drainage basins for proposed conditions are as indicated on the BASIN MAP included in this report. Under existing conditions the entire site drains across the site from northwest to southeast and into the Piedras Marcadas Arroyo. Developed flows from the subdivision to the north, Paradise View, are detained in existing detention ponds on site. Under proposed conditions, all proposed residential lots will flow to the fronting residential streets and no cross lot drainage is anticipated. Also under proposed conditions, the temporary ponds and associated cmp's required for Paradise View will be removed. Tract 6A will contain a proposed permanent pond that will be retention in the interim and detention ultimately, when the Chamisa Storm Drain is constructed to Paradise Blvd. There is an upstream basin consisting of a portion of a residential subdivision (Paradise View Subdivision) that drains its runoff through the Boulders Subdivision Phase I as shown on the basin map.

EXISTING DRAINGE CONDITIONS

The majority of the site historically drains from northwest to southeast to the Petroglyph National Monument located south and east of the proposed subdivision. Runoff under undeveloped conditions surface flows off the site, through the monument and eventually into the Piedras Marcadas Dam. Originally, the undeveloped flows from onsite, as well as developed and undeveloped flows from offsite basins are partially

THE BOULDERS
PHASE ONE
DRAINAGE BASINS



detained in a natural playa that exists at the southeast corner of the proposed subdivision, at the end of Lyons Boulevard. Previously, the playa discharged into the Monument at a number of locations. An earthen and rock berm was temporarily constructed to convey the flows to a single point of discharge to control erosion in the Monument.

The existing subdivision located east of Unser across from the proposed Boulders Phase I, Sundance Estates I & IB were constructed to drains to a permanent detention pond at the corner of Blue Feather and Lyon. The flows are detained in the pond and released at a controlled rate into the Monument via an existing storm drain.

Developed flows from the exist portion of Unser drain to an existing temporary retention pond at the southeast corner of Blue Feather and Unser Blvd.

FIRM MAP AND SOIL CONDITIONS

Phase I of the Boulders Subdivision is not located in a designated Flood Hazard Zone per FEMA – (Firm Map 35001C0104 – See Attached Map). Aside for minor use of unplatted and undeveloped dirt roads/trails and minor dumping of rock and dirt spoils, there has not been any grading or changes to the site from its historic state. Per the USDA Soil Conservation Services (SCS), the soils type for this site is Alameda sandy loam and consists largely of undulating soil on old basalt flows. Numerous basalt rock outcrops are present. Runoff is medium, the hazard of soil blowing is moderate and the hazard of water erosion is slight.

DESIGN-CRITERIA

The drainage plan presented in this report was prepared in accordance with the City of Albuquerque Drainage Ordinances and Chapter 22 of the Development Process Manual DPM. The hydrological analysis is based on the 100-year frequency, 6-hour duration storm, as Represented in Section 22, Part A, Hydrology, of the Development Process Manual. Storage detention ponds are sized for the 100-year, 24-hour storm and ultimately will drain in less than 24 hours. Storage retention ponds are sized for the

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0104G

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 104 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0104	G
BERNALILLO COUNTY UNINCORPORATED AREAS	350001	0104	G
RIO RANCHO, CITY OF	350146	0104	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35001C0104G

MAP REVISED
SEPTEMBER 26, 2008

Federal Emergency Management Agency

100-year, 10-day storm. In addition, it is the intent to demonstrate existing conditions will be improved by decreasing erosion in the Monument by reducing flows that enter the Monument, by redirecting the majority of the developed runoff to the proposed Paradise Boulevard and Lyons Boulevard storm drain that are programmed to convey flows north to the Calabacillas Arroyo.

Rainfall intensities per this report are as follows:

FREQ	ZONE	P60	P360	P1440
100YR	1	1.87	2.20	2.66

Land Treatments:

Proposed Subdivision:

The proposed subdivision land use values were calculated as follows:

Residential DPM-Eqn a-4, pg 22-n)

n=Residential Units/Acre = 5.0 DU / Acre

A = 0 (Under fully developed conditions, no undisturbed naturally vegetated areas will remain.)

B = 25 % Approx. assuming ½ remaining lot will be grass lawns

C = 25 % Approx. since ½ of lot will be gravel and Xeriscaping

D= 7 * SQ RT [(n)(n) + 5(n)] = 7* SQ RT [(5) (5) + 5(5]

= 49.5 ---- use 50%

DEVELOPED-DRAINAGE CONDITIONS

The Boulders Subdivision is proposed to be developed in approximately three equal phases. The first of these phases will consist of approximately 26 acres in Phase I with 23.4 acres in the Phase II and 18.7 acres in Phase III. All three phases will flow via the proposed streets and storm drains to a permanent detention pond located to the east and adjacent to Unser Blvd, under ultimate conditions. The pond outfall will ultimately be to the north via the Chamisa Storm Drain connection to the Lyon Storm Drain which conveys the flows to the Calabacillas Arroyo. In the interim, the Unser pond will act as a retention pond for the flows from Phase I, including the flows from the eastern half of Paradise View Subdivision which is an upland basin to the north. The pond, which will be completed with Phase I will have a total retention capacity of 8.244 Acre-Feet with a 2 foot free board. A temporary pond will be constructed in the southeast corner of the site, on the west side of Unser to handle flows under interim conditions as a supplement to the permanent pond located in Tract 6A on the east side of Unser. The total runoff (design storm equal to 100-year, 10-day) for Phase I developed and Phases II & III rough graded that will be channeled to the two ponds is less than the capacity amount of the ponds.

The detention pond adjacent to Unser is a regional pond that is part of the proposed Chamisa master storm drain. The Chamisa drain is proposed to divert approximately 671 cfs from approximately 240 acres to the Calabacillas Arroyo. This area historically drained through the Petroglyph Monument to the Piedras Marcadas Arroyo and eventually to the Piedras Marcadas Dam. The proposed diversion involves a cooperative agreement between several local developers, AMAFCA, the City of Albuquerque and Albuquerque Public Schools in an attempt to reduce the impact of flows channeled through the Monument as well as a method of maintaining the integrity and capacity capabilities of the Piedras Marcadas Dam.

SUMMARY

Phase I of the proposed Boulders Subdivision is a 26-acre residential project with a planned Unser alignment and a detention pond. The single family detached homes will be constructed in lots that meet the RLT zoning ordinances. No adverse impact will result due to developed conditions from the proposed Phase I of the Boulders Subdivision. Flows exiting the subdivision will be retained by two ponds in an interim condition. Under ultimate conditions the flows will be detained by the pond in Tract 6A, east of Unser. Onsite developed flows will be routed via surface flow in the streets and supplemented by a storm sewer to the proposed retention ponds for the interim, which will become one detention pond in the ultimate condition. Emergency overflow structures will be provided in the ponds. The overflow will be directed toward the northeast and will not impact the lots within the proposed or existing subdivision.

THE BOULDERS

Weighted E Method

Zone #1 PHASE ONE DEVELOPED AND PHASES TWO & THREE ROUGH GRADED

Developed Basins

												100-Year			10-Year			2-Year		
Basin	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
Upland East-34	578790.00	13.287	0.02076	0%	0	17%	2.259	18%	2.391694	65%	8.637	1.573	1.741	49.19	0.923	1.022	30.24	0.491	0.544	15.79
3	197187.00	4.527	0.00707	0%	0	24%	1.095	25%	1.131698	49%	2.227	1.379	0.520	15.20	0.773	0.292	8.96	0.387	0.146	4.33
4	96049.00	2.205	0.00345	0%	0	24%	0.534	25%	0.551245	49%	1.085	1.379	0.253	7.41	0.773	0.142	4.36	0.387	0.071	2.11
5	52992.00	1.217	0.00190	0%	0	24%	0.294	25%	0.304132	49%	0.599	1.379	0.140	4.09	0.773	0.078	2.41	0.387	0.039	1.16
7	78936.00	1.812	0.00283	0%	0	52%	0.942	0%	0	48%	0.870	1.294	0.195	5.71	0.710	0.107	3.23	0.351	0.053	1.50
8	81003.00	1.860	0.00291	0%	0	50%	0.930	15%	0.278936	35%	0.651	1.173	0.182	5.53	0.610	0.095	3.00	0.275	0.043	1.26
9	51672.00	1.186	0.00185	0%	0	24%	0.287	25%	0.296556	49%	0.584	1.379	0.136	3.98	0.773	0.076	2.35	0.387	0.038	1.13
10	169241.00	3.885	0.00607	0%	0	24%	0.940	25%	0.97131	49%	1.912	1.379	0.446	13.05	0.773	0.250	7.69	0.387	0.125	3.72
11	61236.00	1.406	0.00220	0%	0	24%	0.340	25%	0.351446	49%	0.692	1.379	0.162	4.72	0.773	0.091	2.78	0.387	0.045	1.34
12	47531.00	1.091	0.00170	0%	0	50%	0.546	0%	0	40%	0.436	1.123	0.102	3.01	0.606	0.055	1.68	0.293	0.027	0.75
13	20308.00	0.466	0.00073	0%	0	0%	0.000	100%	0.466208	0%	0.000	0.990	0.038	1.34	0.440	0.017	0.69	0.120	0.005	0.22
14	65898.00	1.513	0.00236	0%	0	0%	0.000	100%	1.51281	0%	0.000	0.990	0.125	4.34	0.440	0.055	2.25	0.120	0.015	0.71
35	75972.00	1.744	0.00273	0%	0	24%	0.422	25%	0.436019	49%	0.858	1.379	0.200	5.86	0.773	0.112	3.45	0.387	0.056	1.67
36	75972.00	1.744	0.00273	0%	0	24%	0.422	25%	0.436019	49%	0.858	1.379	0.200	5.86	0.773	0.112	3.45	0.387	0.056	1.67
37	72150.00	1.656	0.00259	0%	0	24%	0.401	25%	0.414084	49%	0.815	1.379	0.190	5.56	0.773	0.107	3.28	0.387	0.053	1.58
38	162616.00	3.733	0.00583	0%	0	0%	0.000	100%	3.73315	0%	0.000	0.990	0.308	10.71	0.440	0.137	5.56	0.120	0.037	1.75
Subtotals	1887553.00	43.33	0.07				Tract 6A Permanent Pond:				SUBTOTAL: 100-year, 6-Hour		4.941	Acre-feet						
											100-year, 10-Day		8.241	Acre-feet						
1	169318.00	3.887	0.00607	0%	0	24%	0.941	25%	0.971752	49%	1.912	1.379	0.447	13.06	0.773	0.250	7.69	0.387	0.125	3.72
2	145603.00	3.343	0.00522	0%	0	24%	0.809	25%	0.835646	49%	1.645	1.379	0.384	11.23	0.773	0.215	6.61	0.387	0.108	3.20
6	37337.00	0.857	0.00134	0%	0	24%	0.207	25%	0.214285	49%	0.422	1.379	0.098	2.88	0.773	0.055	1.70	0.387	0.028	0.82
Upland West-33	399950.00	9.182	0.01435	0%	0	17%	1.561	18%	1.652686	65%	5.968	1.573	1.203	33.99	0.923	0.706	20.90	0.491	0.376	10.91
15	60326.00	1.385	0.00216	0%	0	0%	0.000	100%	1.384894	0%	0.000	0.990	0.114	3.97	0.440	0.051	2.06	0.120	0.014	0.65
16	105842.00	2.430	0.00380	0%	0	0%	0.000	100%	2.429798	0%	0.000	0.990	0.200	6.97	0.440	0.089	3.62	0.120	0.024	1.14
17	90468.00	2.077	0.00325	0%	0	0%	0.000	100%	2.07686	0%	0.000	0.990	0.171	5.96	0.440	0.076	3.09	0.120	0.021	0.98
18	72866.00	1.673	0.00261	0%	0	0%	0.000	100%	1.672773	0%	0.000	0.990	0.138	4.80	0.440	0.061	2.49	0.120	0.017	0.79
19	95406.00	2.190	0.00342	0%	0	0%	0.000	100%	2.19022	0%	0.000	0.990	0.181	6.29	0.440	0.080	3.26	0.120	0.022	1.03
20	126567.00	2.906	0.00454	0%	0	0%	0.000	100%	2.905579	0%	0.000	0.990	0.240	8.34	0.440	0.107	4.33	0.120	0.029	1.37
21	92773.00	2.130	0.00333	0%	0	0%	0.000	100%	2.129775	0%	0.000	0.990	0.176	6.11	0.440	0.078	3.17	0.120	0.021	1.00
22	86236.00	1.980	0.00309	0%	0	0%	0.000	100%	1.979706	0%	0.000	0.990	0.163	5.68	0.440	0.073	2.95	0.120	0.020	0.93
28	110947.00	2.547	0.00398	0%	0	0%	0.000	100%	2.546993	0%	0.000	0.990	0.210	7.31	0.440	0.093	3.80	0.120	0.025	1.20
30	121026.00	2.778	0.00434	0%	0	0%	0.000	100%	2.778375	0%	0.000	0.990	0.229	7.97	0.440	0.102	4.14	0.120	0.028	1.31
32	57122.00	1.311	0.00205	0%	0	0%	0.000	100%	1.311341	0%	0.000	0.990	0.108	3.76	0.440	0.048	1.95	0.120	0.013	0.62
23	49551.00	1.138	0.00178	0%	0	0%	0.000	100%	1.137534	0%	0.000	0.990	0.094	3.26	0.440	0.042	1.69	0.120	0.011	0.53
24	101726.00	2.335	0.00365	0%	0	0%	0.000	100%	2.335308	0%	0.000	0.990	0.193	6.70	0.440	0.086	3.48	0.120	0.023	1.10
25	110273.00	2.532	0.00396	0%	0	0%	0.000	100%	2.53152	0%	0.000	0.990	0.209	7.27	0.440	0.093	3.77	0.120	0.025	1.19
26	211882.00	4.864	0.00760	0%	0	0%	0.000	100%	4.864141	0%	0.000	0.990	0.401	13.96	0.440	0.178	7.25	0.120	0.049	2.29
27	158638.00	3.642	0.00569	0%	0	0%	0.000	100%	3.641827	0%	0.000	0.990	0.300	10.45	0.440	0.134	5.43	0.120	0.036	1.71
29	34747.00	0.798	0.00125	0%	0	0%	0.000	100%	0.797681	0%	0.000	0.990	0.066	2.29	0.440	0.029	1.19	0.120	0.008	0.37
31	146976.00	3.374	0.00527	0%	0	0%	0.000	100%	3.374105	0%	0.000	0.990	0.278	9.68	0.440	0.124	5.03	0.120	0.034	1.59
Subtotals	2585580.00	59.36	0.09				Temporary Pond West of Unser:				Total: 100-year, 6-hour		5.60	Acre-feet		5.52	184.98		2.41	79.12
											Total: 100-year, 10-day		9.349	Acre-feet						

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

THE BOULDERS PHASE I

Street Capacity Summary

Analysis Point	Street Slope (%)	Street Width (ft)	Curb Height (inches)	Basins Contributing to Street	Flow (cfs)	Street Capacity (cfs)
1	0.80	28	8	B1	13.09	55.68
2	0.80	28	8	B1, B2	24.34	55.67
3	1.00	28	8	B1, B2, B6	27.24	54.22
4	1.10	28	8	B3, B34	63.24	51.73
5	1.00	28	8	B3, B4, B34	71.18	55.67
6	4.30	28	8	B3, B4, B8, B34	76.66	25.25
7	1.00	28	8	B9	4.00	54.22
8	1.00	28	8	B9, B10	65.58	54.22
* 9	1.00	28	8	B3, B4, B8, B9, B10, B11, B34	98.50	54.22
10	3.50	28	8	B5, B7	9.75	28.22
11	2.90	28	8	B1, B2, B6, B15	31.91	31.35
* 12	1.00	28	8	B1, B2, B6, B15, B16, B17, B18	101.25	54.22
13	1.00	28	8	B16, B18	13.83	54.22
14	UNSER CROSSING			B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B15, B16, B17, B18, B34	209.38	N/A

Pipe Capacity Summary

Pipe Diam. (in)	Pipe Slope (%)	Area (ft^2)	R	Pipe Capacity (cfs)	Velocity (ft/s)	
30	1.5	4.91	0.625	50.37	10.26	**
30	1.5	4.91	0.625	50.37	10.26	**
30	2.4	4.91	0.625	63.71	12.98	**
24	1.3	3.14	0.5	25.86	8.23	**
36	1.3	7.07	0.75	76.25	10.79	**
24	3	3.14	0.5	39.29	12.51	
30	2.8	4.91	0.625	68.82	14.02	**
48	2.1	12.57	1	212.73	16.61	**

Combined Capacity Summary

Total Flow (cfs)	Street Capacity (cfs)	Storm Drain Capacity (cfs)	Total Combined Capaci (cfs)
13.09	55.68		**55.68**
24.34	55.67		**55.67**
27.24	54.22		**54.22**
63.24	51.73	50.37	**102.10**
71.18	55.67	50.37	**106.04**
76.66	25.25	63.71	**88.96**
4.00	54.22		**54.22**
65.58	54.22	25.86	**80.08**
98.50	54.22	76.25	**130.47**
9.75	28.22		**28.22**
31.91	31.35	39.29	**70.64**
101.25	54.22	68.82	**123.04**
13.83	54.22		**54.22**
209.38	N/A	212.73	**212.72**

* Note: Sump location --Storm sewer to be constructed to carry flows to detention pond.
Superelevated cross-section.

** Note: Total Flow includes 48.49 cfs from 'Upland Basin East' routed into storm drain at top of property

Street Capacity Calculations

AP1 - 13.09 cfs

28' F-F Street Section with 8" curb

Slope= 0.008

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.22	0.00	0.39	0.0024072
0.02	0.00	0.34	0.01	0.00	0.00	0.35	0.01	0.43	0.0058279
0.04	0.01	0.68	0.02	0.01	0.01	0.55	0.02	0.49	0.014038
0.06	0.03	1.02	0.03	0.02	0.04	0.72	0.04	0.52	0.0234211
0.08	0.05	1.36	0.04	0.04	0.09	0.88	0.07	0.55	0.0336411
0.1	0.08	1.70	0.05	0.08	0.16	1.02	0.10	0.57	0.0445236
0.12	0.12	2.04	0.06	0.13	0.26	1.15	0.14	0.58	0.0559594
0.125	0.13	2.13	0.06	0.15	0.30	1.18	0.15	0.59	0.0588955

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.16	0.31	1.16	0.15	0.57	0.0575744
0.16	0.23	3.91	0.06	0.26	0.53	1.17	0.19	0.51	0.0611601
0.2	0.42	5.95	0.07	0.55	1.10	1.33	0.27	0.52	0.0783872
0.24	0.69	8.00	0.09	1.04	2.08	1.52	0.36	0.55	0.1010406
0.2846	1.08	10.27	0.11	1.88	3.77	1.74	0.50	0.58	0.1296365
0.32	1.47	12.08	0.12	2.81	5.62	1.92	0.61	0.60	0.1540165
0.3551	1.91	13.87	0.14	3.98	7.96	2.08	0.74	0.62	0.1793173
0.365	2.05	14.37	0.14	4.36	8.72	2.13	0.78	0.62	0.186629

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	4.61	9.22	2.18	0.81	0.63	0.1935824
0.405	**2.61**	**14.41**	**0.18**	**6.51**	**13.02**	**2.50**	**1.01**	**0.69**	**0.2426544**
0.447	3.19	14.45	0.22	9.12	18.25	2.86	1.28	0.75	0.302429
0.491	3.81	14.50	0.26	12.22	24.43	3.21	1.57	0.81	0.3660326
0.522	4.24	14.53	0.29	14.60	29.20	3.44	1.80	0.84	0.4114131
0.59	5.20	14.60	0.36	20.40	40.80	3.93	2.32	0.90	0.5124788
0.632	5.78	14.64	0.40	24.34	48.69	4.21	2.66	0.93	0.5758637
0.667	**6.27**	**14.67**	**0.43**	**27.83**	**55.67**	**4.44**	**2.96**	**0.96**	**0.6291989**

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	29.38	58.76	4.34	3.04	0.92	0.621199
0.72	7.09	17.32	0.41	30.52	61.04	4.31	3.10	0.89	0.6195311
0.74	7.43	18.32	0.41	31.81	63.62	4.28	3.17	0.88	0.6198598
0.76	7.79	19.32	0.40	33.24	66.49	4.27	3.24	0.86	0.6219247
0.78	8.17	20.32	0.40	34.82	69.64	4.26	3.32	0.85	0.6255112
0.8	8.58	21.32	0.40	36.54	73.08	4.26	3.41	0.84	0.6304408
0.847	9.60	23.68	0.41	41.14	82.28	4.28	3.63	0.82	0.6465003

Street Capacity Calculations

AP2 - 24.34 cfs

28' F-F Street Section with 8" curb

Slope= 0.008

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.22	0.00	0.39	0.0024072
0.02	0.00	0.34	0.01	0.00	0.00	0.35	0.01	0.43	0.0058279
0.04	0.01	0.68	0.02	0.01	0.01	0.55	0.02	0.49	0.014038
0.06	0.03	1.02	0.03	0.02	0.04	0.72	0.04	0.52	0.0234211
0.08	0.05	1.36	0.04	0.04	0.09	0.88	0.07	0.55	0.0336411
0.1	0.08	1.70	0.05	0.08	0.16	1.02	0.10	0.57	0.0445236
0.12	0.12	2.04	0.06	0.13	0.26	1.15	0.14	0.58	0.0559594
0.125	0.13	2.13	0.06	0.15	0.30	1.18	0.15	0.59	0.0588955

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.16	0.31	1.16	0.15	0.57	0.0575744
0.16	0.23	3.91	0.06	0.26	0.53	1.17	0.19	0.51	0.0611601
0.2	0.42	5.95	0.07	0.55	1.10	1.33	0.27	0.52	0.0783872
0.24	0.69	8.00	0.09	1.04	2.08	1.52	0.36	0.55	0.1010406
0.2846	1.08	10.27	0.11	1.88	3.77	1.74	0.50	0.58	0.1296365
0.32	1.47	12.08	0.12	2.81	5.62	1.92	0.61	0.60	0.1540165
0.3551	1.91	13.87	0.14	3.98	7.96	2.08	0.74	0.62	0.1793173
0.365	2.05	14.37	0.14	4.36	8.72	2.13	0.78	0.62	0.186629

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	4.61	9.22	2.18	0.81	0.63	0.1935824
0.405	2.61	14.41	0.18	6.51	13.02	2.50	1.01	0.69	0.2426544
0.447	3.19	14.45	0.22	9.12	18.25	2.86	1.28	0.75	0.302429
0.491	**3.81**	**14.50**	**0.26**	**12.22**	**24.43**	**3.21**	**1.57**	**0.81**	**0.3660326**
0.522	4.24	14.53	0.29	14.60	29.20	3.44	1.80	0.84	0.4114131
0.59	5.20	14.60	0.36	20.40	40.80	3.93	2.32	0.90	0.5124788
0.632	5.78	14.64	0.40	24.34	48.69	4.21	2.66	0.93	0.5758637
0.667	**6.27**	**14.67**	**0.43**	**27.83**	**55.67**	**4.44**	**2.96**	**0.96**	**0.6291989**

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	29.38	58.76	4.34	3.04	0.92	0.621199
0.72	7.09	17.32	0.41	30.52	61.04	4.31	3.10	0.89	0.6195311
0.74	7.43	18.32	0.41	31.81	63.62	4.28	3.17	0.88	0.6198598
0.76	7.79	19.32	0.40	33.24	66.49	4.27	3.24	0.86	0.6219247
0.78	8.17	20.32	0.40	34.82	69.64	4.26	3.32	0.85	0.6255112
0.8	8.58	21.32	0.40	36.54	73.08	4.26	3.41	0.84	0.6304408
0.847	9.60	23.68	0.41	41.14	82.28	4.28	3.63	0.82	0.6465003

Street Capacity Calculations

AP3 - 27.24 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2846	1.08	10.27	0.11	2.11	4.21	1.95	0.55	0.64	0.1532918
0.32	1.47	12.08	0.12	3.14	6.28	2.14	0.69	0.67	0.1818449
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	5.15	10.30	2.44	0.90	0.71	0.2280369
0.405	2.61	14.41	0.18	7.28	14.56	2.79	1.13	0.77	0.28479
0.447	3.19	14.45	0.22	10.20	20.40	3.19	1.43	0.84	0.3537898
0.491	**3.81**	**14.50**	**0.26**	**13.66**	**27.32**	**3.59**	**1.76**	**0.90**	**0.4271051**
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.59	5.20	14.60	0.36	22.81	45.61	4.39	2.59	1.01	0.5956578
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP4 - 15.24 cfs

28' F-F Street Section with 8" curb

Slope= 0.011

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.26	0.00	0.45	0.0031282
0.02	0.00	0.34	0.01	0.00	0.00	0.41	0.01	0.51	0.0075205
0.04	0.01	0.68	0.02	0.01	0.02	0.65	0.03	0.57	0.0179875
0.06	0.03	1.02	0.03	0.02	0.05	0.85	0.05	0.61	0.0298873
0.08	0.05	1.36	0.04	0.05	0.11	1.03	0.08	0.64	0.0428049
0.1	0.08	1.70	0.05	0.10	0.19	1.19	0.12	0.67	0.0565258
0.12	0.12	2.04	0.06	0.16	0.31	1.35	0.16	0.69	0.0709162
0.125	0.13	2.13	0.06	0.17	0.35	1.38	0.17	0.69	0.074607

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.37	1.36	0.18	0.66	0.0731098
0.16	0.23	3.91	0.06	0.31	0.62	1.37	0.22	0.60	0.0781091
0.2	0.42	5.95	0.07	0.65	1.29	1.55	0.31	0.61	0.1000131
0.24	0.69	8.00	0.09	1.22	2.44	1.78	0.43	0.64	0.128558
0.2846	1.08	10.27	0.11	2.21	4.42	2.04	0.58	0.68	0.1644361
0.32	1.47	12.08	0.12	3.29	6.59	2.25	0.72	0.70	0.1949419
0.3551	1.91	13.87	0.14	4.67	9.33	2.44	0.87	0.72	0.2265424
0.365	2.05	14.37	0.14	5.11	10.22	2.50	0.91	0.73	0.2356656

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	5.40	10.81	2.55	0.95	0.74	0.2442283
0.405	**2.61**	**14.41**	**0.18**	**7.64**	**15.27**	**2.93**	**1.19**	**0.81**	**0.3045464**
0.447	3.19	14.45	0.22	10.70	21.40	3.35	1.50	0.88	0.3778274
0.491	3.81	14.50	0.26	14.32	28.65	3.76	1.85	0.95	0.4556493
0.522	4.24	14.53	0.29	17.12	34.25	4.04	2.11	0.98	0.511105
0.608	**5.45**	**14.61**	**0.37**	**25.86**	**51.73**	**4.75**	**2.89**	**1.07**	**0.667484**
0.631	5.77	14.64	0.39	28.43	56.86	4.93	3.11	1.09	0.7098947
0.667	6.27	14.67	0.43	32.64	65.27	5.20	3.47	1.12	0.7767373

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	34.45	68.90	5.09	3.57	1.07	0.7684813
0.72	7.09	17.32	0.41	35.79	71.58	5.05	3.64	1.05	0.7672474
0.74	7.43	18.32	0.41	37.30	74.60	5.02	3.72	1.03	0.7683841
0.76	7.79	19.32	0.40	38.98	77.97	5.00	3.80	1.01	0.771585
0.78	8.17	20.32	0.40	40.83	81.66	5.00	3.90	1.00	0.7765972
0.8	8.58	21.32	0.40	42.85	85.69	5.00	4.00	0.98	0.7832102
0.847	9.60	23.68	0.41	48.24	96.48	5.02	4.25	0.96	0.8040917

Street Capacity Calculations

AP5 - 22.69 cfs

28' F-F Street Section with 8" curb

Slope= 0.008

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.22	0.00	0.39	0.0024072
0.02	0.00	0.34	0.01	0.00	0.00	0.35	0.01	0.43	0.0058279
0.04	0.01	0.68	0.02	0.01	0.01	0.55	0.02	0.49	0.014038
0.06	0.03	1.02	0.03	0.02	0.04	0.72	0.04	0.52	0.0234211
0.08	0.05	1.36	0.04	0.04	0.09	0.88	0.07	0.55	0.0336411
0.1	0.08	1.70	0.05	0.08	0.16	1.02	0.10	0.57	0.0445236
0.12	0.12	2.04	0.06	0.13	0.26	1.15	0.14	0.58	0.0559594
0.125	0.13	2.13	0.06	0.15	0.30	1.18	0.15	0.59	0.0588955

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.16	0.31	1.16	0.15	0.57	0.0575744
0.16	0.23	3.91	0.06	0.26	0.53	1.17	0.19	0.51	0.0611601
0.2	0.42	5.95	0.07	0.55	1.10	1.33	0.27	0.52	0.0783872
0.24	0.69	8.00	0.09	1.04	2.08	1.52	0.36	0.55	0.1010406
0.2846	1.08	10.27	0.11	1.88	3.77	1.74	0.50	0.58	0.1296365
0.32	1.47	12.08	0.12	2.81	5.62	1.92	0.61	0.60	0.1540165
0.3551	1.91	13.87	0.14	3.98	7.96	2.08	0.74	0.62	0.1793173
0.365	2.05	14.37	0.14	4.36	8.72	2.13	0.78	0.62	0.186629

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	4.61	9.22	2.18	0.81	0.63	0.1935824
0.405	2.61	14.41	0.18	6.51	13.02	2.50	1.01	0.69	0.2426544
0.447	3.19	14.45	0.22	9.12	18.25	2.86	1.28	0.75	0.302429
0.479	**3.64**	**14.49**	**0.25**	**11.34**	**22.68**	**3.11**	**1.49**	**0.79**	**0.34859**
0.522	4.24	14.53	0.29	14.60	29.20	3.44	1.80	0.84	0.4114131
0.608	5.45	14.61	0.37	22.06	44.11	4.05	2.46	0.92	0.5395583
0.631	5.77	14.64	0.39	24.25	48.49	4.20	2.65	0.93	0.5743465
0.667	**6.27**	**14.67**	**0.43**	**27.83**	**55.67**	**4.44**	**2.96**	**0.96**	**0.6291989**

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	29.38	58.76	4.34	3.04	0.92	0.621199
0.72	7.09	17.32	0.41	30.52	61.04	4.31	3.10	0.89	0.6195311
0.74	7.43	18.32	0.41	31.81	63.62	4.28	3.17	0.88	0.6198598
0.76	7.79	19.32	0.40	33.24	66.49	4.27	3.24	0.86	0.6219247
0.78	8.17	20.32	0.40	34.82	69.64	4.26	3.32	0.85	0.6255112
0.8	8.58	21.32	0.40	36.54	73.08	4.26	3.41	0.84	0.6304408
0.847	9.60	23.68	0.41	41.14	82.28	4.28	3.63	0.82	0.6465003

Street Capacity Calculations

AP6 - 28.17 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	1.04	10.06	0.10	2.00	4.00	1.93	0.54	0.64	0.1500047
0.303	1.27	11.21	0.11	2.61	5.22	2.05	0.62	0.66	0.1679535
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3999	2.53	14.41	0.18	6.95	13.90	2.74	1.10	0.76	0.276478
0.409	2.66	14.42	0.18	7.54	15.08	2.83	1.16	0.78	0.2913193
0.429	2.94	14.44	0.20	8.90	17.80	3.03	1.30	0.81	0.3240992
0.497	**3.89**	**14.50**	**0.27**	**14.16**	**28.32**	**3.64**	**1.81**	**0.91**	**0.4371819**
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.6244	5.68	14.63	0.39	26.40	52.79	4.65	2.90	1.04	0.6552926
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP7 - 4.00 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	**1.04**	**10.06**	**0.10**	**2.00**	**4.00**	**1.93**	**0.54**	**0.64**	**0.1500047**
0.32	1.47	12.08	0.12	3.14	6.28	2.14	0.69	0.67	0.1818449
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	5.15	10.30	2.44	0.90	0.71	0.2280369
0.386	2.34	14.39	0.16	6.09	12.18	2.60	1.00	0.74	0.2538971
0.447	3.19	14.45	0.22	10.20	20.40	3.19	1.43	0.84	0.3537898
0.479	3.64	14.49	0.25	12.68	25.35	3.48	1.67	0.89	0.4070078
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.608	5.45	14.61	0.37	24.66	49.32	4.53	2.75	1.02	0.6267977
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP8 - 17.09 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	1.04	10.06	0.10	2.00	4.00	1.93	0.54	0.64	0.1500047
0.32	1.47	12.08	0.12	3.14	6.28	2.14	0.69	0.67	0.1818449
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	5.15	10.30	2.44	0.90	0.71	0.2280369
0.386	2.34	14.39	0.16	6.09	12.18	2.60	1.00	0.74	0.2538971
0.424	**2.87**	**14.43**	**0.20**	**8.55**	**17.11**	**2.98**	**1.26**	**0.81**	**0.3158834**
0.479	3.64	14.49	0.25	12.68	25.35	3.48	1.67	0.89	0.4070078
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.608	5.45	14.61	0.37	24.66	49.32	4.53	2.75	1.02	0.6267977
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP9 - 50.01 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	1.04	10.06	0.10	2.00	4.00	1.93	0.54	0.64	0.1500047
0.303	1.27	11.21	0.11	2.61	5.22	2.05	0.62	0.66	0.1679535
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3999	2.53	14.41	0.18	6.95	13.90	2.74	1.10	0.76	0.276478
0.409	2.66	14.42	0.18	7.54	15.08	2.83	1.16	0.78	0.2913193
0.429	2.94	14.44	0.20	8.90	17.80	3.03	1.30	0.81	0.3240992
0.479	3.64	14.49	0.25	12.68	25.35	3.48	1.67	0.89	0.4070078
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.612	**5.50**	**14.62**	**0.38**	**25.08**	**50.16**	**4.56**	**2.79**	**1.03**	**0.633737**
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP10 - 9.75 cfs

28' F-F Street Section with 8" curb

Slope= 0.035

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.46	0.00	0.81	0.0074768
0.02	0.00	0.34	0.01	0.00	0.00	0.73	0.01	0.91	0.0175415
0.04	0.01	0.68	0.02	0.01	0.03	1.16	0.05	1.02	0.040982
0.06	0.03	1.02	0.03	0.04	0.09	1.51	0.09	1.09	0.0672004
0.08	0.05	1.36	0.04	0.09	0.19	1.83	0.15	1.14	0.0953724
0.1	0.08	1.70	0.05	0.17	0.34	2.13	0.21	1.19	0.1250768
0.12	0.12	2.04	0.06	0.28	0.55	2.40	0.29	1.22	0.1560528
0.125	0.13	2.13	0.06	0.31	0.62	2.47	0.31	1.23	0.1639733

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.33	0.66	2.42	0.31	1.18	0.1618762
0.16	0.23	3.91	0.06	0.55	1.10	2.44	0.39	1.08	0.1760801
0.2	0.42	5.95	0.07	1.15	2.30	2.77	0.55	1.09	0.2247633
0.24	0.69	8.00	0.09	2.18	4.36	3.18	0.76	1.14	0.2863963
0.2804	1.04	10.06	0.10	3.74	7.49	3.60	1.01	1.20	0.3554063
0.303	**1.27**	**11.21**	**0.11**	**4.88**	**9.77**	**3.84**	**1.16**	**1.23**	**0.3960366**
0.3551	1.91	13.87	0.14	8.32	16.64	4.36	1.55	1.29	0.4938526
0.365	2.05	14.37	0.14	9.12	18.23	4.46	1.63	1.30	0.5129944

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	9.64	19.28	4.56	1.69	1.32	0.5302173
0.409	**2.66**	**14.42**	**0.18**	**14.11**	**28.22**	**5.30**	**2.17**	**1.46**	**0.6649125**
0.424	2.87	14.43	0.20	16.00	32.00	5.57	2.36	1.51	0.7169527
0.479	3.64	14.49	0.25	23.71	47.43	6.51	3.12	1.66	0.909196
0.522	4.24	14.53	0.29	30.54	61.09	7.20	3.76	1.76	1.0611956
0.608	5.45	14.61	0.37	46.13	92.27	8.47	5.15	1.91	1.36971
0.631	5.77	14.64	0.39	50.71	101.43	8.79	5.55	1.95	1.4531984
0.667	6.27	14.67	0.43	58.22	116.43	9.28	6.19	2.00	1.5846574

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	61.45	122.91	9.09	6.36	1.91	1.5769621
0.72	7.09	17.32	0.41	63.84	127.68	9.01	6.49	1.87	1.5791572
0.74	7.43	18.32	0.41	66.54	133.07	8.96	6.63	1.84	1.5856804
0.76	7.79	19.32	0.40	69.54	139.07	8.92	6.78	1.80	1.5959825
0.78	8.17	20.32	0.40	72.83	145.67	8.91	6.95	1.78	1.6096094
0.8	8.58	21.32	0.40	76.43	152.86	8.91	7.13	1.76	1.6261814
0.847	9.60	23.68	0.41	86.05	172.10	8.96	7.59	1.72	1.674982

Street Capacity Calculations

AP11 - 31.91 cfs

28' F-F Street Section with 8" curb

Slope= 0.029

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.42	0.00	0.74	0.0065442
0.02	0.00	0.34	0.01	0.00	0.00	0.66	0.01	0.83	0.0154095
0.04	0.01	0.68	0.02	0.01	0.03	1.05	0.04	0.93	0.0361236
0.06	0.03	1.02	0.03	0.04	0.08	1.38	0.08	0.99	0.0593452
0.08	0.05	1.36	0.04	0.09	0.17	1.67	0.13	1.04	0.084332
0.1	0.08	1.70	0.05	0.16	0.31	1.94	0.19	1.08	0.1107042
0.12	0.12	2.04	0.06	0.25	0.50	2.19	0.26	1.11	0.1382268
0.125	0.13	2.13	0.06	0.28	0.56	2.25	0.28	1.12	0.1452672

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.30	0.60	2.20	0.29	1.08	0.1432623
0.16	0.23	3.91	0.06	0.50	1.00	2.22	0.36	0.98	0.1554408
0.2	0.42	5.95	0.07	1.05	2.10	2.52	0.50	0.99	0.1985041
0.24	0.69	8.00	0.09	1.98	3.97	2.89	0.69	1.04	0.2532476
0.2804	1.04	10.06	0.10	3.41	6.82	3.28	0.92	1.09	0.3146494
0.303	1.27	11.21	0.11	4.44	8.89	3.49	1.06	1.12	0.3508319
0.3551	1.91	13.87	0.14	7.58	15.15	3.97	1.41	1.17	0.4380057
0.365	2.05	14.37	0.14	8.30	16.59	4.06	1.48	1.18	0.4550735

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	8.77	17.55	4.15	1.53	1.20	0.4705235
0.409	2.66	14.42	0.18	12.84	25.68	4.83	1.97	1.33	0.5914072
0.4333	**3.00**	**14.44**	**0.21**	**15.68**	**31.35**	**5.22**	**2.26**	**1.40**	**0.6671752**
0.479	3.64	14.49	0.25	21.59	43.17	5.93	2.84	1.51	0.8108024
0.522	4.24	14.53	0.29	27.80	55.60	6.55	3.42	1.60	0.9473821
0.608	5.45	14.61	0.37	41.99	83.99	7.71	4.69	1.74	1.2247002
0.631	5.77	14.64	0.39	46.16	92.33	8.00	5.05	1.78	1.2997644
0.667	6.27	14.67	0.43	52.99	105.98	8.45	5.63	1.82	1.4179715

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	55.94	111.88	8.27	5.79	1.74	1.4100106
0.72	7.09	17.32	0.41	58.11	116.22	8.20	5.91	1.70	1.4114174
0.74	7.43	18.32	0.41	60.57	121.13	8.15	6.03	1.67	1.4167551
0.76	7.79	19.32	0.40	63.30	126.59	8.12	6.17	1.64	1.4255241
0.78	8.17	20.32	0.40	66.30	132.60	8.11	6.33	1.62	1.4373111
0.8	8.58	21.32	0.40	69.57	139.14	8.11	6.49	1.60	1.4517708
0.847	9.60	23.68	0.41	78.33	156.66	8.16	6.91	1.56	1.4946932

Street Capacity Calculations

AP12 - 52.76 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	1.04	10.06	0.10	2.00	4.00	1.93	0.54	0.64	0.1500047
0.303	1.27	11.21	0.11	2.61	5.22	2.05	0.62	0.66	0.1679535
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3999	2.53	14.41	0.18	6.95	13.90	2.74	1.10	0.76	0.276478
0.409	2.66	14.42	0.18	7.54	15.08	2.83	1.16	0.78	0.2913193
0.429	2.94	14.44	0.20	8.90	17.80	3.03	1.30	0.81	0.3240992
0.479	3.64	14.49	0.25	12.68	25.35	3.48	1.67	0.89	0.4070078
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.6244	**5.68**	**14.63**	**0.39**	**26.40**	**52.79**	**4.65**	**2.90**	**1.04**	**0.6552926**
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072

Street Capacity Calculations

AP13 - 13.83 cfs

28' F-F Street Section with 8" curb

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.25	0.00	0.43	0.0028952
0.02	0.00	0.34	0.01	0.00	0.00	0.39	0.01	0.48	0.006975
0.04	0.01	0.68	0.02	0.01	0.02	0.62	0.02	0.54	0.0167182
0.06	0.03	1.02	0.03	0.02	0.05	0.81	0.05	0.58	0.0278123
0.08	0.05	1.36	0.04	0.05	0.10	0.98	0.08	0.61	0.0398672
0.1	0.08	1.70	0.05	0.09	0.18	1.14	0.11	0.63	0.052681
0.12	0.12	2.04	0.06	0.15	0.30	1.29	0.15	0.65	0.0661279
0.125	0.13	2.13	0.06	0.17	0.33	1.32	0.17	0.66	0.0695777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.18	0.35	1.29	0.17	0.63	0.0681329
0.16	0.23	3.91	0.06	0.29	0.59	1.30	0.21	0.57	0.0726687
0.2	0.42	5.95	0.07	0.62	1.23	1.48	0.30	0.58	0.0930738
0.24	0.69	8.00	0.09	1.17	2.33	1.70	0.41	0.61	0.1197367
0.2804	1.04	10.06	0.10	2.00	4.00	1.93	0.54	0.64	0.1500047
0.303	1.27	11.21	0.11	2.61	5.22	2.05	0.62	0.66	0.1679535
0.3551	1.91	13.87	0.14	4.45	8.90	2.33	0.83	0.69	0.2114383
0.365	2.05	14.37	0.14	4.87	9.74	2.38	0.87	0.69	0.2199845

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.3999	**2.53**	**14.41**	**0.18**	**6.95**	**13.90**	**2.74**	**1.10**	**0.76**	**0.276478**
0.409	2.66	14.42	0.18	7.54	15.08	2.83	1.16	0.78	0.2913193
0.429	2.94	14.44	0.20	8.90	17.80	3.03	1.30	0.81	0.3240992
0.479	3.64	14.49	0.25	12.68	25.35	3.48	1.67	0.89	0.4070078
0.522	4.24	14.53	0.29	16.33	32.65	3.85	2.01	0.94	0.4793674
0.608	5.45	14.61	0.37	24.66	49.32	4.53	2.75	1.02	0.6267977
0.631	**5.77**	**14.64**	**0.39**	**27.11**	**54.22**	**4.70**	**2.97**	**1.04**	**0.6667925**
0.667	6.27	14.67	0.43	31.12	62.24	4.96	3.31	1.07	0.7298348

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	32.85	65.70	4.86	3.40	1.02	0.7216387
0.72	7.09	17.32	0.41	34.12	68.25	4.82	3.47	1.00	0.7202553
0.74	7.43	18.32	0.41	35.57	71.13	4.79	3.54	0.98	0.7211247
0.76	7.79	19.32	0.40	37.17	74.34	4.77	3.63	0.96	0.7239548
0.78	8.17	20.32	0.40	38.93	77.86	4.76	3.71	0.95	0.7285051
0.8	8.58	21.32	0.40	40.85	81.71	4.76	3.81	0.94	0.734575
0.847	9.60	23.68	0.41	46.00	91.99	4.79	4.06	0.92	0.7539072