CITY OF ALBUQUERQUE

February 6, 2007

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

Re: Sage Park Subdivision Grading and Drainage Plan
Engineer's Stamp dated 2-6-07 (L10/D030)

Dear Mr. Lavy,

Based upon the information provided in your submittal received 2-6-07, the above referenced plan is approved for Preliminary Plat action by the DRB. Once that board approves the Grading Plan, please submit a mylar copy for signature in order to obtain a Rough Grading Permit.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, E.I.
Engineering Associate, Planning Dept.
Development and Building Services

C: file
Brad Bingham
Sarah Kanber

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE AND TRANSPORTATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Sage Park Subdivision
ZONE MAP/DRG. FILE #: L10 / D030
DRB #: 1004526 EPC #:
WORK ORDER #:

LEGAL DESCRIPTION: Lots 22 thru 26, Block 9, Original Townsite of Westland
CITY ADDRESS: 100 98th Street SW

ENGINEERING FIRM:	Tierra West, LLC	CONTACT:	Ron Bohannan
ADDRESS:	5571 Midway Park Place	PHONE:	(505) 858-3100
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87109
OWNER:	Stillbrooke Homes	CONTACT:	AJ Yarbrough
ADDRESS:	8801 Jefferson NE, Bldg. A	PHONE:	505-923-4606
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87113
ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
CITY, STATE:		ZIP CODE:	
SURVEYOR:	Precision Surveys	CONTACT:	Larry Medrano
ADDRESS:	8500-A Jefferson Street NE	PHONE:	505-856-5700
CITY, STATE:	Albuquerque, NM	ZIP CODE:	87109
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
- X 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
- X PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUB'D. APPROVAL
- ___ 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.)
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ SO19

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ___ YES
- x NO
- ___ COPY PROVIDED

RECEIVED FEB 06 2007 HYDROLOGY SECTION

RECEIVED JAN 05 2007 HYDROLOGY SECTION

DATE SUBMITTED: 1/5/2007 BY: Sarah Abeyta

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.

TIERRA WEST, LLC

5571 Midway Park Place NE
Albuquerque, NM 87109

(505) 858-3100
fax (505) 858-1118

twllc@tierrawestllc.com
1-800-245-3102

February 6, 2007

Mr. Curtis Cherne
Planning Department
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

RECEIVED
FEB 06 2007
HYDROLOGY SECTION

RE: **Sage Park Subdivision Grading and Drainage Plan Revisions**
Response to Comments
Zone Atlas Page L10/D030

Dear Mr. Cherne:

Per your correspondence dated January 30, 2007, regarding the above referenced property, please find the following responses addressing the comments listed in your letter.

1. Provide a detail of the weir/overflow from the pond and the conveyance to the street.
A detail of the overflow from the pond has been provided on the detail sheet. There is currently no curb and gutter on Sage Road. With the project the sidewalk, and standard curb and gutter will be built adjacent to the south property line on Sage Road. The water will overflow from the pond thru the wrought iron fence, then surface drain over the sidewalk to Sage Road.

2. Your weir equation uses H=2ft. Please show how this works with the weir/overflow and the top of the pond.
A detail of the overflow is shown on the detail sheet. The overflow elevation has been labeled, which is .5' above the water surface elevation.

3. Provide pond volume calculation and a pond bottom elevation.
The pond volume calculations are shown on the attached. The bottom of pond elevation has been added to the revised grading and drainage plan.

If you have any questions or need additional information regarding this matter, please do not hesitate to contact me.

Sincerely,

Sarah Abeyta

Sarah Abeyta

Enclosure/s

JN: 25059
SA/cla

2005: 25059 Curtis Cherne Drain Response Ltr 020607

DRAINAGE AND TRANSPORTATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Sage Park Subdivision
ZONE MAP/DRG. FILE #: L10 / D030
DRB #: 1004526
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ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
CITY, STATE:		ZIP CODE:	
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- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ___ YES
- x NO
- ___ COPY PROVIDED

RECEIVED
JAN 05 2007
HYDROLOGY SECTION

DATE SUBMITTED: 1/5/2007
BY: Sarah Abeyta

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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.

CITY OF ALBUQUERQUE

January 30, 2007

Sara Lavy, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM 87109

Re: Sage Park Subdivision Grading and Drainage Plan
Engineer's Stamp dated 1-5-07 (L10/D030)

Dear Mr. Lavy,

Based upon the information provided in your submittal received 1-5-07, the above referenced plan cannot be approved for Preliminary Plat action by the DRB until the following comments are addressed.

- Provide a detail of the weir/overflow from the pond and the conveyance to the street.
- Your weir equation uses H=2 ft. Please show how this works with the weir/overflow and the top of the pond.
- Provide pond volume calculations and a pond bottom elevation.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, E.I.
Engineering Associate, Planning Dept.
Development and Building Services

C: file
Brad Bingham

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

ONE STOP SHOP
CITY OF ALBUQUERQUE PLANNING DEPARTMENT
Development & Building Services

PAID RECEIPT

APPLICANT NAME Clearbrook Investments

AGENT Tierra West LLC

ADDRESS 5571 Midway Park Place NE

PROJECT & APP # 1004526

PROJECT NAME Sage Park Subdivision

$ _____ 441032/3424000 **Conflict Management Fee**

$ _____ 441006/4983000 **DRB Actions**

$ _____ 441006/4971000 **EPC/AA/LUCC Actions & All Appeals**

$ _____ 441018/4971000 **Public Notification**

$ 570.00 441006/4983000 DRAINAGE PLAN REVIEW OR TRAFFIC IMPACT STUDY***
( )Major/Minor Subdivision ( )Site Development Plan (X)Bldg Permit
( ) Letter of Map Revision ( )Conditional Letter of Map Revision
( ) Traffic Impact Study

$ 570.00 **TOTAL AMOUNT DUE**

****NOTE:** *If a subsequent submittal is required, bring a copy of this paid receipt with you to avoid an* **additional charge.**

CLEARBROOK INVESTMENTS INC.
8801 JEFFERSON NE, BLDG. A
ALBUQUERQUE, NM 87113
(505) 858-1800

BANK OF ALBUQUERQUE, NA
ALBUQUERQUE, NM 87105
95-660/1070

4173

12/19/2006

PAY TO THE ORDER OF City of Albuquerque CATE*** $ **570.00
City Of Albuquerque
Five Hundred Seventy and 00/100********** DOLLARS

© 2005 INTUIT INC. # 642. 1-800-433-8810.

1/5/07 City of Albuquerque LOC: ANNX
RECEIPT# 00073952 USR# 007 TRANS# 0013
Account 441006 Fund 0110
Activity 4983000 TRSARG
Trans Amt $570.00
MEMO Drainage Report Submittal; Sage Park
CK $570.00
CHANGE

INT9A FONT 7K RAM BUFFER
USA CHARACTER SET
8 BIT - PARALLEL INTERFACE
PIN 13 = FORM IN
AUTO LF WITH CR = OFF
CHARACTERS / LINE = 4
JOURNAL LPT=A
DEFAULT CLAMP = OPEN
RIGHT MARGIN CLOCKS = 0207
DIP SWITCH 1 SETTING = CCCOOOCO
DIP SWITCH 2 SETTING = OCOOOOCO

⑈004173⑈ ⑆107006606⑆ 7827208678⑈

Thank You

DRAINAGE REPORT
FOR

Sage Park Subdivision

Prepared by:

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

Prepared for:
Stillbrooke Homes
8801 Jefferson NE, Bldg. A
Albuquerque, NM 87113

January 2007

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the State of New Mexico in good standing.

Sara Lavy
PE NO. 15092

RECEIVED
JAN 05 2007
HYDROLOGY SECTION

Job No 25059

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MAP POCKET
Grading and Drainage Plan

Section I

Report

Purpose

This report is being prepared at the request of Stillbrooke Homes. The purpose of this drainage report is to prepare a grading and drainage solution for the proposed subdivision. The site is +/-9.96 acres, more or less, which will be developed into a 52 lot single family subdivision, entitled Sage Park. We are requesting preliminary plat, SIA infrastructure, and grading permit approval at this time.

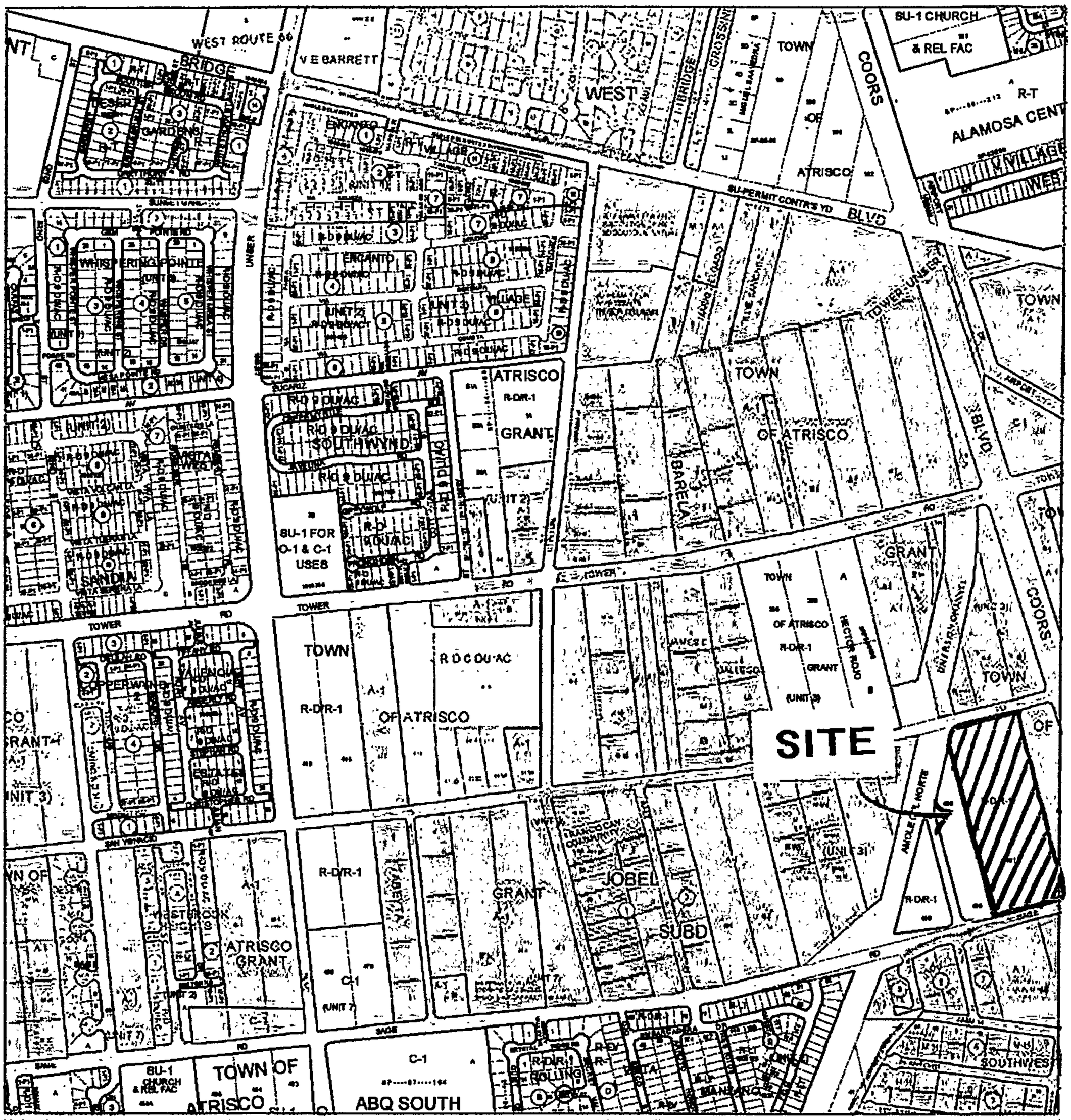
Location

The site is located on the west side of Albuquerque, more specifically north of Sage Road SW and East of 75th Street. The site is highlighted and shown on the enclosed Zone Atlas page number L-10-Z. The site will be built in one phase and contains 9.96 acres, more or less.

Existing Drainage Conditions

The site is currently undeveloped and drains from the west to the southeast corner where the undeveloped flows drain into an existing pond. There is a tract of land, which is approximately 5.14 acres, to the west of the site which also drains to the existing drainage pond. There is a natural berm which separates the Sage Park development from the 5.14 acre tract. The runoff from this property currently flows to the berm adjacent to the Sage Park west property line. The drainage flows against the berm and is conveyed south to Sage Road, where it is conveyed to the existing pond. After the Sage Park Subdivision is constructed the discharge generated by the 5.14 acre parcel of land will continue to be conveyed to Sage Road. The flows will drain from west to east to the new

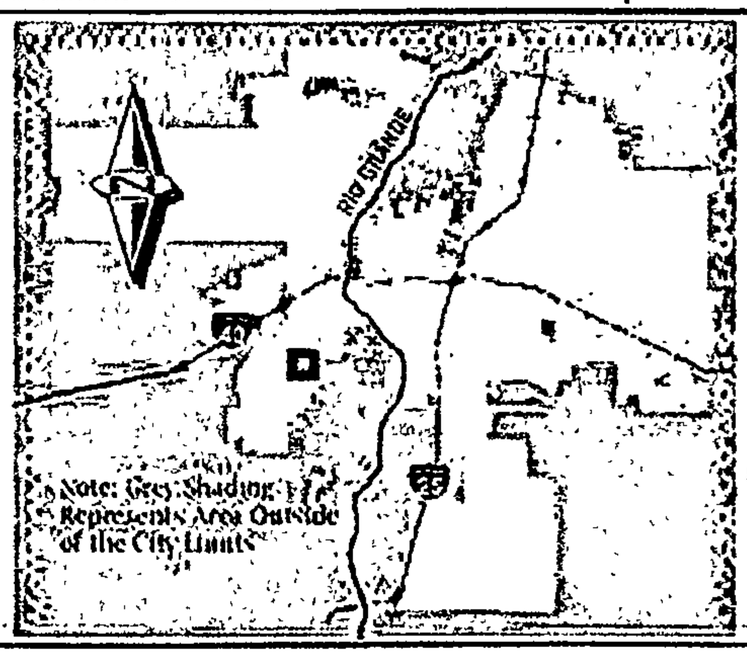
? to pond



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

Albuquerque Geographic Information System

Map amended through: 5/1/2006



Zone Atlas Page:

L-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

screen wall which will be built with the subdivision. The discharge will drain against the screen wall and be conveyed south to Sage Road. The drainage from San Ygnacio currently drains to Coors Boulevard and will continue to do so after development.

Flood Plain

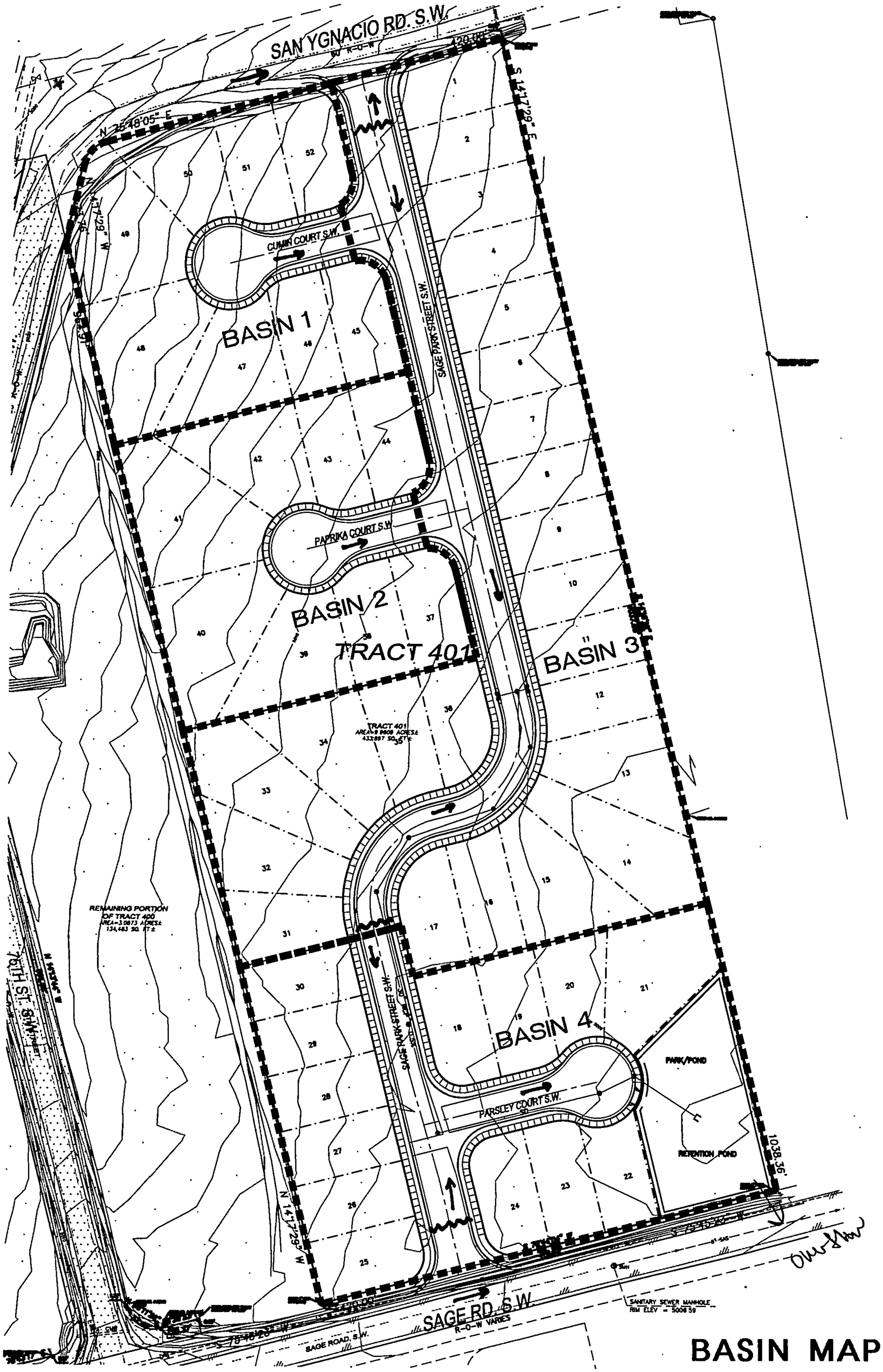
The site is located on Firm Map 35001C0337E, as shown on the attached excerpt. The map indicates that portions of the site lie within a 100-year flood plain. The floodplain portion of the floodplain that is on the site will be collected in a new storm sewer which will drain to a new retention pond located on the southeast corner of the site. A LOMR will be requested after development of the project.

Proposed Drainage Management Plan

The entire site will be graded and all of the surface improvements will be built out in their entirety. The enclosed grading plan (in the map pocket) shows the grades for the entire project.

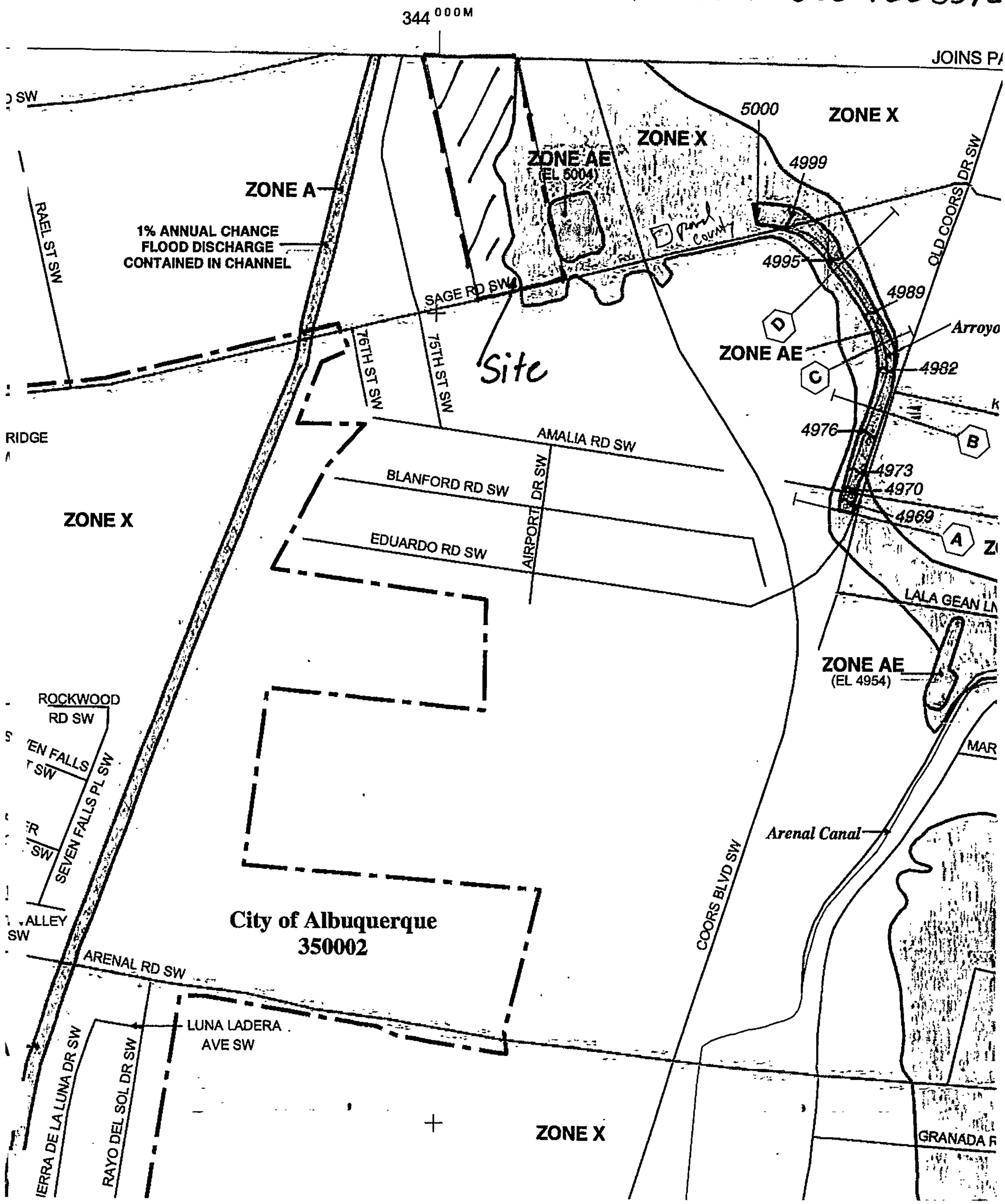
There is an existing pond located on the northwest corner of Sage Road and Coors Boulevard that the site appears to currently drain to. An attempt has been made to obtain as-builts from the City of Albuquerque, Bernalillo County and the New Mexico Department of Transportation but we have been unable to obtain information on the existing pond and existing storm drain in the vicinity. According to AGIS the property, which the pond is on, is owned by the County. We will continue to research the pond and will modify the Grading and Drainage plan once all the information has been obtained.

The site was divided into 4 developed basins as shown on the following page.


SAN YGNACIO RD. S.W.
60' R-O-W
N 25°48'05" E
S 14°17'29" E
N 14°17'29" W
CUMIN COURT S.W.
SAGE PARK STREET S.W.
BASIN 1
PAPRIKA COURT S.W.
BASIN 2
TRACT 401
BASIN 3
TRACT 401
AREA=9.9608 ACRES±
433,897 SQ. FT±
REMAINING PORTION
OF TRACT 400
AREA=3.0873 ACRES±
134,483 SQ. FT±
76TH ST. S.W.
BASIN 4
PARK/POND
PARSLEY COURT S.W.
RETENTION POND
1038.36'
SAGE RD. S.W.
R-O-W VARIES
SAGE ROAD, S.W.
SANITARY SEWER MANHOLE
RIM ELEV = 5006.59

BASIN MAP

FIRM
MAP NUMBER 350001C0337E



Using land treatment types 20% type B, 20% type C and 60% type D, the runoff generated by the developed residential property is 35.89 cfs. The discharge from Basin 1(5.48 cfs), and Basin 2 (5.70 cfs) will surface drain to Sage Park Street, SW via a 4" mountable curb and gutter. From Sage Park Road the discharge from Basins 1, 2, and 3 (26.30 cfs) will be conveyed via an 8" standard curb to two Type C drop inlets. From the drop inlets, the 26.30 cfs from Basins 1, 2, and 3, will drain via a 30" RCP to a new retention pond, which will be built on the southeast corner of the subdivision. The retention pond will function as a park/ponding area. There will be two levels of the pond. There will be a park/pond area which will function as a park for the Sage Park Subdivision. There will be a 12' deep pond area adjacent to the park, which will retain all of the drainage from the subdivision.

The discharge from basin 4 (9.59 cfs) will surface drain via a 4" mountable curb and gutter to the east end of Parsley Court, SW to a Type C inlet. From the inlet the discharge will be conveyed to the retention pond via a storm drain.

The retention pond was sized to contain the developed discharge from the subdivision, which is approximately 2.0 acre-feet. The discharge from the subdivision will be conveyed to the pond via a storm drain. An emergency overflow will be provided on the south side of the pond in the form of a wrought iron fence for approximately 6', the rest of the wall will be screen wall.

Calculations

The weighted E method from the "City of Albuquerque Development Process Manual Volume 11 – Design Criteria, 1997 Revision" was used to calculate the runoff and volume for the site.

Summary

The site was divided into 4 developed basins. The runoff generated by the developed residential property is 35.89 cfs. The discharge from Basin 1 and Basin 2 will surface drain to Sage Park Street, SW via a 4" mountable curb and gutter. From Sage Park Street SW the discharge from Basins 1, 2, and 3 will be conveyed via an 8" standard curb to two drop inlets. From the drop inlets, the drainage from Basins 1, 2, and 3, will drain via a 30" RCP to a new retention pond which will be built on the southeast corner of the subdivision. The retention pond will function as a park/ponding area. There will be two levels of the pond as shown on the grading and drainage plan. The discharge from Basin 4 (9.59 cfs) will surface drain via a 4" mountable curb and gutter to the east end of Parsley Court SW to a Type C inlet. From the inlet the discharge will be conveyed to the retention pond via a storm drain.

The retention pond was sized to contain the developed discharge from the subdivision, which is approximately 2.0 acre-feet. The discharge from the subdivision will be conveyed to the pond via a storm drain. An emergency overflow will be provided on the south side of the pond in the form of a wrought iron fence for a width of approximately 6', the rest of pond will be screened by a CMU wall.

Section II

Runoff Calculations

Weighted E Method

Developed Basins

											100-Year			10-Year		
Basin	Area (sf)	Area (acres)	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
1	66305	1.52	0%	0	20%	0.30	20%	0.30	60%	0.91	1.514	0.192	5.48	0.876	0.111	3.32
2	68901	1.58	0%	0	20%	0.32	20%	0.32	60%	0.95	1.514	0.200	5.70	0.876	0.115	3.45
3	182822	4.20	0%	0	20%	0.84	20%	0.84	60%	2.52	1.514	0.530	15.12	0.876	0.306	9.17
4	116021	2.66	0%	0	20%	0.53	20%	0.53	60%	1.60	1.514	0.336	9.59	0.876	0.194	5.82
TOTAL	434,049	9.96										1.257	35.89		0.111	21.76

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

Excess Precipitation, E (inches)		
Zone 1	100-Year	10 - Year
E_a	0.44	0.08
E_b	0.67	0.22
E_c	0.99	0.44
E_d	1.97	1.24

Peak Discharge (cfs/acre)		
Zone 1	100-Year	10 - Year
Q_a	1.29	0.24
Q_b	2.03	0.76
Q_c	2.87	1.49
Q_d	4.37	2.89

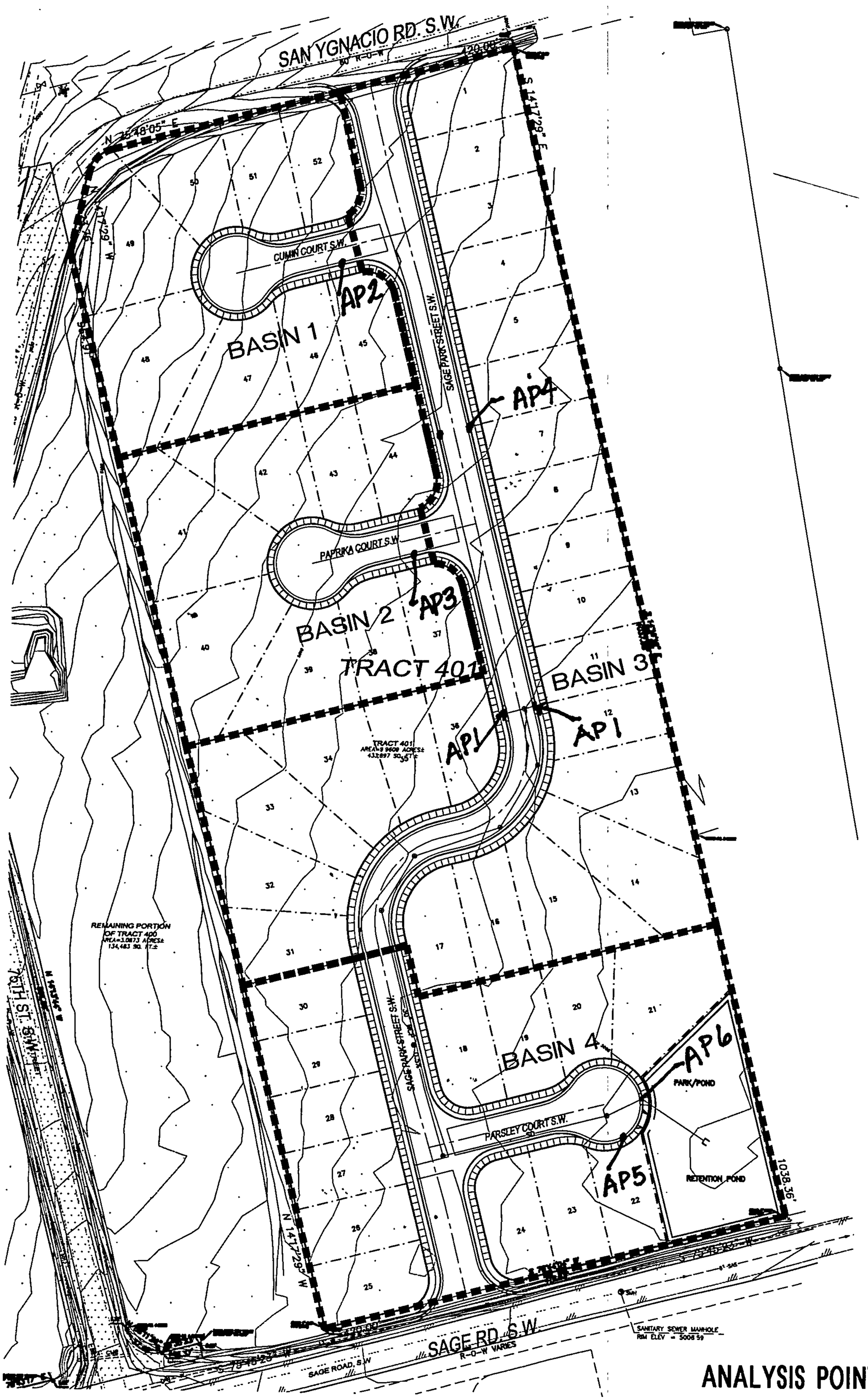
Weighted E Method

Developed On-Site Basins

											100-Year, 6-Hr			10-Year, 6-Hr			2-Year, 6-Hr			100-Year, 10-Day		
Basin	Area (sf)	Area (acres)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
1	66,305	1.52	0%	0	20%	0.30	20%	0.3044307	60%	0.91	1.514	0.192	5.48	0.876	0.111	3.32	0.458	0.058	1.70	1.514	0.304	5.48
2	68,901	1.58	0%	0	20%	0.32	20%	0.3163499	60%	0.95	1.514	0.200	5.70	0.876	0.115	3.45	0.458	0.060	1.76	1.514	0.316	5.70
3	182,822	4.20	0%	0	20%	0.84	20%	0.8394031	60%	2.52	1.514	0.530	15.12	0.876	0.306	9.17	0.458	0.160	4.68	1.514	0.838	15.12
4	116,021	2.66	0%	0	20%	0.53	20%	0.5326951	60%	1.60	1.514	0.336	9.59	0.876	0.194	5.82	0.458	0.102	2.97	1.514	0.532	9.59
Total		10										1.257	35.89			21.76					1.990	35.89

Undeveloped Off-Site Basins

											100-Year			10-Year			2-Year			100-Year		
Basin	Area (sf)	Area (acres)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
OS-1	223,727	5.14	100%	5.136065		0.00	0%	0	0%	0.00	0.440	0.188	6.63	0.080	0.034	1.23	0.000	0.000	0.00	0.440	0.188	6.63



ANALYSIS POINT MAP

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
Inlet - Pond	30	0.5	4.91	0.625	29.08	26.30	5.36
Type C inlet to MH	18	1.6	1.77	0.375	13.32	13.15	7.44

<u>Manning's Equation:</u>

Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area
R = D/4
S = Slope
n = 0.013

Single 'C' Drop Inlet

EFFECTIVE AREA

EFFECTIVE AREA ASSUMING A 50% CLOGGING FACTOR

Area at the grate:

L = 38.375" - 7(2@ $_{\text{middle bars}}$)
= 34.875"
= 2.906'

W = 25.5" - 13(2@ $_{\text{middle bars}}$)
= 19"
= 1.583'

Area = 1.583' x 2.906'
= 4.601 ft^2

Effective Area: = 4.601- 4.601 (0.5 $_{\text{clogging factor}}$)
= 2.30 ft^2 at the grate

Orifice Equation
Q = CA sqrt(2gH)
Q = 0.6*2.30*sqrt(2*32.2*0.67)
Q = 9.06 cfs

Area at the throat:

L = 47.375@
= 3.95'

H = 10:@ - 42@
= 63@
= 0.5208'

Area = 3.95' x 0.5208'
= 2.06 ft^2 at the throat

Weir Equation
Q = CLH^(3/2)
Q = 2.95 * 3.95 * 0.67^(3/2)
Q = 6.39 cfs

Total Capacity

Q = 9.06 grate + 6.39 throat
Q = 15.45 cfs

AP# 1
Flow required = 13.15 cfs 15.45 cfs
Single C inlet at both east and west sides of Sage Park Street will have capacity

AP# 6 at bwd
Flow required = 8.13 cfs 15.45 cfs
Single C inlet has capacity

Street Capacity Calculations

Sage Park Street, SW

28' F-F Street Section with 8" curb

Slope= 0.01

AP #1 Q = 26.30 cfs

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

4" curb

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
0.4556	3.31	14.46	0.23	10.84	21.69	3.27	1.49	0.85	0.3680379
0.489	**3.78**	**14.50**	**0.26**	**13.49**	**26.99**	**3.57**	**1.75**	**0.90**	**0.4237503**
0.5	3.94	14.51	0.27	14.41	28.83	3.66	1.83	0.91	0.4422273
0.54	4.50	14.55	0.31	17.96	35.92	4.00	2.16	0.96	0.5099349
0.5584	4.75	14.56	0.33	19.69	39.38	4.14	2.31	0.98	0.5413445
0.63	5.76	14.64	0.39	27.00	54.00	4.69	2.96	1.04	0.6650489
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

Sage Park Street, SW

28' F-F Street Section with 8" curb

Slope= 0.01

AP #4 Q = 9.44 cfs

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
0.4556	3.31	14.46	0.23	10.84	21.69	3.27	1.49	0.85	0.3680379
0.489	3.78	14.50	0.26	13.49	26.99	3.57	1.75	0.90	0.4237503
0.5	3.94	14.51	0.27	14.41	28.83	3.66	1.83	0.91	0.4422273
0.54	4.50	14.55	0.31	17.96	35.92	4.00	2.16	0.96	0.5099349
0.5584	4.75	14.56	0.33	19.69	39.38	4.14	2.31	0.98	0.5413445
0.63	5.76	14.64	0.39	27.00	54.00	4.69	2.96	1.04	0.6650489
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

Cumin Court, SW

28' F-F Street Section with 4" curb

Slope= 0.01

AP #2 Q = 5.49 cfs

For water depths less than 0.0625 feet

Y= Water depth
Area = 16*Y^2
P= SQRT(1025*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	0.0016	0.33	0.00	0.00	0.00	0.25	0.00	0.44	0.003
0.02	0.0064	0.66	0.01	0.00	0.01	0.40	0.01	0.50	0.00721
0.025	0.01	0.83	0.01	0.00	0.01	0.46	0.01	0.51	0.00955
0.035	0.0196	1.16	0.02	0.01	0.02	0.58	0.02	0.54	0.0146
0.045	0.0324	1.49	0.02	0.02	0.04	0.68	0.03	0.57	0.02001
0.052	0.043264	1.72	0.03	0.03	0.07	0.75	0.04	0.58	0.02399
0.06	0.0576	1.98	0.03	0.05	0.10	0.83	0.05	0.59	0.0287
0.0625	0.0625	2.06	0.03	0.05	0.11	0.85	0.05	0.60	0.03021

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
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)
0.063	0.063506	2.09	0.03	0.05	0.11	0.85	0.05	0.60	0.03038
0.1	0.172656	3.98	0.04	0.19	0.37	1.08	0.11	0.60	0.04871
0.13	0.311406	5.51	0.06	0.40	0.80	1.29	0.17	0.63	0.06773
0.16	0.495156	7.04	0.07	0.74	1.48	1.49	0.24	0.66	0.0887
0.2	0.810156	9.08	0.09	1.41	2.83	1.75	0.35	0.69	0.11876
0.207	0.873506	9.43	0.09	1.56	3.13	1.79	0.37	0.69	0.12423
0.26	**1.432656**	**12.14**	**0.12**	**3.01**	**6.03**	**2.10**	**0.55**	**0.73**	**0.16722**
0.29	1.811406	13.67	0.13	4.12	8.23	2.27	0.66	0.74	0.19267

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
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)
0.303	1.818406	13.67	0.13	4.14	8.28	2.28	0.69	0.73	0.19579
0.304	1.832406	13.67	0.13	4.20	8.39	2.29	0.70	0.73	0.1974
0.3062	1.863206	13.67	0.14	4.31	8.63	2.31	0.71	0.74	0.20095
0.31	1.916406	13.68	0.14	4.52	9.04	2.36	0.73	0.75	0.20709
0.3125	1.951406	13.68	0.14	4.66	9.31	2.39	0.75	0.75	0.21113
0.32	2.056406	13.69	0.15	5.08	10.16	2.47	0.79	0.77	0.2233
0.3317	2.220206	13.70	0.16	5.77	11.54	2.60	0.86	0.80	0.24235
0.333	2.238406	13.70	0.16	5.85	11.70	2.61	0.87	0.80	0.24448

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
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)

0.335	2.266506	13.80	0.16	5.94	11.88	2.62	0.88	0.80	0.24611
0.3601	2.636167	15.05	0.18	7.21	14.43	2.74	0.99	0.80	0.26699
0.38	2.951631	16.05	0.18	8.34	16.69	2.83	1.07	0.81	0.28404
0.4196	3.638295	18.03	0.20	10.94	21.88	3.01	1.26	0.82	0.31908
0.4603	4.425739	20.07	0.22	14.12	28.25	3.19	1.47	0.83	0.35645
0.504	5.363431	22.25	0.24	18.16	36.32	3.39	1.71	0.84	0.39787
0.513	5.568406	22.70	0.25	19.07	38.15	3.43	1.76	0.84	0.40655

Street Capacity Calculations

Paprika Court, SW

28' F-F Street Section with 4" curb

Slope= 0.01

AP #3 Q = 5.70 cfs

For water depths less than 0.0625 feet

Y= Water depth
Area = 16*Y^2
P= SQRT(1025*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	0.0016	0.33	0.00	0.00	0.00	0.25	0.00	0.44	0.003
0.02	0.0064	0.66	0.01	0.00	0.01	0.40	0.01	0.50	0.00721
0.025	0.01	0.83	0.01	0.00	0.01	0.46	0.01	0.51	0.00955
0.035	0.0196	1.16	0.02	0.01	0.02	0.58	0.02	0.54	0.0146
0.045	0.0324	1.49	0.02	0.02	0.04	0.68	0.03	0.57	0.02001
0.052	0.043264	1.72	0.03	0.03	0.07	0.75	0.04	0.58	0.02399
0.06	0.0576	1.98	0.03	0.05	0.10	0.83	0.05	0.59	0.0287
0.0625	0.0625	2.06	0.03	0.05	0.11	0.85	0.05	0.60	0.03021

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
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)
0.063	0.063506	2.09	0.03	0.05	0.11	0.85	0.05	0.60	0.03038
0.1	0.172656	3.98	0.04	0.19	0.37	1.08	0.11	0.60	0.04871
0.13	0.311406	5.51	0.06	0.40	0.80	1.29	0.17	0.63	0.06773
0.16	0.495156	7.04	0.07	0.74	1.48	1.49	0.24	0.66	0.0887
0.2	0.810156	9.08	0.09	1.41	2.83	1.75	0.35	0.69	0.11876
0.207	0.873506	9.43	0.09	1.56	3.13	1.79	0.37	0.69	0.12423
0.26	**1.432656**	**12.14**	**0.12**	**3.01**	**6.03**	**2.10**	**0.55**	**0.73**	**0.16722**
0.29	1.811406	13.67	0.13	4.12	8.23	2.27	0.66	0.74	0.19267

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
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)
0.303	1.818406	13.67	0.13	4.14	8.28	2.28	0.69	0.73	0.19579
0.304	1.832406	13.67	0.13	4.20	8.39	2.29	0.70	0.73	0.1974
0.3062	1.863206	13.67	0.14	4.31	8.63	2.31	0.71	0.74	0.20095
0.31	1.916406	13.68	0.14	4.52	9.04	2.36	0.73	0.75	0.20709
0.3125	1.951406	13.68	0.14	4.66	9.31	2.39	0.75	0.75	0.21113
0.32	2.056406	13.69	0.15	5.08	10.16	2.47	0.79	0.77	0.2233
0.3317	2.220206	13.70	0.16	5.77	11.54	2.60	0.86	0.80	0.24235
0.333	2.238406	13.70	0.16	5.85	11.70	2.61	0.87	0.80	0.24448

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
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)

0.335	2.266506	13.80	0.16	5.94	11.88	2.62	0.88	0.80	0.24611
0.3601	2.636167	15.05	0.18	7.21	14.43	2.74	0.99	0.80	0.26699
0.38	2.951631	16.05	0.18	8.34	16.69	2.83	1.07	0.81	0.28404
0.4196	3.638295	18.03	0.20	10.94	21.88	3.01	1.26	0.82	0.31908
0.4603	4.425739	20.07	0.22	14.12	28.25	3.19	1.47	0.83	0.35645
0.504	5.363431	22.25	0.24	18.16	36.32	3.39	1.71	0.84	0.39787
0.513	5.568406	22.70	0.25	19.07	38.15	3.43	1.76	0.84	0.40655

Street Capacity Calculations

Parsley Court, SW

28' F-F Street Section with 4" curb

Slope= 0.01

AP #5 Q = 8.13 cfs

For water depths less than 0.0625 feet

Y= Water depth
Area = 16*Y^2
P= SQRT(1025*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	0.0016	0.33	0.00	0.00	0.00	0.25	0.00	0.44	0.003
0.02	0.0064	0.66	0.01	0.00	0.01	0.40	0.01	0.50	0.00721
0.025	0.01	0.83	0.01	0.00	0.01	0.46	0.01	0.51	0.00955
0.035	0.0196	1.16	0.02	0.01	0.02	0.58	0.02	0.54	0.0146
0.045	0.0324	1.49	0.02	0.02	0.04	0.68	0.03	0.57	0.02001
0.052	0.043264	1.72	0.03	0.03	0.07	0.75	0.04	0.58	0.02399
0.06	0.0576	1.98	0.03	0.05	0.10	0.83	0.05	0.59	0.0287
0.0625	0.0625	2.06	0.03	0.05	0.11	0.85	0.05	0.60	0.03021

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
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)
0.063	0.063506	2.09	0.03	0.05	0.11	0.85	0.05	0.60	0.03038
0.1	0.172656	3.98	0.04	0.19	0.37	1.08	0.11	0.60	0.04871
0.13	0.311406	5.51	0.06	0.40	0.80	1.29	0.17	0.63	0.06773
0.16	0.495156	7.04	0.07	0.74	1.48	1.49	0.24	0.66	0.0887
0.2	0.810156	9.08	0.09	1.41	2.83	1.75	0.35	0.69	0.11876
0.207	0.873506	9.43	0.09	1.56	3.13	1.79	0.37	0.69	0.12423
0.26	1.432656	12.14	0.12	3.01	6.03	2.10	0.55	0.73	0.16722
0.29	**1.811406**	**13.67**	**0.13**	**4.12**	**8.23**	**2.27**	**0.66**	**0.74**	**0.19267**

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
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)
0.303	1.818406	13.67	0.13	4.14	8.28	2.28	0.69	0.73	0.19579
0.304	1.832406	13.67	0.13	4.20	8.39	2.29	0.70	0.73	0.1974
0.3062	1.863206	13.67	0.14	4.31	8.63	2.31	0.71	0.74	0.20095
0.31	1.916406	13.68	0.14	4.52	9.04	2.36	0.73	0.75	0.20709
0.3125	1.951406	13.68	0.14	4.66	9.31	2.39	0.75	0.75	0.21113
0.32	2.056406	13.69	0.15	5.08	10.16	2.47	0.79	0.77	0.2233
0.3317	2.220206	13.70	0.16	5.77	11.54	2.60	0.86	0.80	0.24235
0.333	2.238406	13.70	0.16	5.85	11.70	2.61	0.87	0.80	0.24448

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
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)

0.335	2.266506	13.80	0.16	5.94	11.88	2.62	0.88	0.80	0.24611
0.3601	2.636167	15.05	0.18	7.21	14.43	2.74	0.99	0.80	0.26699
0.38	2.951631	16.05	0.18	8.34	16.69	2.83	1.07	0.81	0.28404
0.4196	3.638295	18.03	0.20	10.94	21.88	3.01	1.26	0.82	0.31908
0.4603	4.425739	20.07	0.22	14.12	28.25	3.19	1.47	0.83	0.35645
0.504	5.363431	22.25	0.24	18.16	36.32	3.39	1.71	0.84	0.39787
0.513	5.568406	22.70	0.25	19.07	38.15	3.43	1.76	0.84	0.40655

Emergency Overflow Capacity

Weir Equation:

$$Q = CLH^{3/2}$$

Q= Flow
C = 2.95
L= Length of weir
H = Height of Weir

AP#

L = 5'
H = 2'

Q Provided = 2.95*5*2^3/2 = 41.71cfs

Q Required 35.89 cfs < 41.71 cfs
Use Wrought Iron Fence for a length of 5'