City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 2, 2001

Ron Bohannan, PE
Tierra West LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Parking @ 25 Drainage Report
Engineer's Stamp dated 2-14-01 (F17/D46B)

Dear Mr. Bohannan,

Based upon the information provided in your submittal dated 2-15-01, the above referenced plan is approved for Building Permit, Grading Permit and Paving Permit. In order to achieve the required runoff restrictions, all the end islands will have to be landscaped with a 'B' type land treatment. Please include type of landscaping on your certified as-builts for our files.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

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

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *Parking @25* **ZONE ATLAS/DRNG. FILE #:** F-17 / 046B

DRB #: _____ **EPC #:** _____ **WORK ORDER #:** _____

LEGAL DESCRIPTION: *TRACTS E, C, B2, THE 25 DEVELOPMENT*

CITY ADDRESS: *JEFFERSON AT SINGER*

ENGINEERING FIRM: *TIERRA WEST, LLC* **CONTACT:** *DAVID SOULE*

ADDRESS: *8509 jEFFERSON* **PHONE:** *858-3100*

OWNER: *BRIAN PARKS* **CONTACT:** *KEN GILES*

ADDRESS: *6801 JeffersonBlvd. Suite 100* **PHONE:** *761-9700*

ARCHITECT: *Dekker/Perich/Sabatini* **CONTACT:** *KEN GILES*

ADDRESS: *6801 JeffersonBlvd. Suite 100* **PHONE:** *761-9700*

SURVEYOR: *PRECISION* **CONTACT:** *LARRY MEDRANO*

ADDRESS: *8418-D JEFFERSON* **PHONE:** *856-5700*

CONTRACTOR: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

TYPE OF SUBMITTAL:

- X DRAINAGE REPORT
- X DRAINAGE PLAN
- _____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- _____ EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- _____ OTHER

PRE-DESIGN MEETING:

- _____ YES
- X NO
- _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- _____ SKETCH PLAN APPROVAL
- _____ PRELIMINARY PLAT APPROVAL
- _____ S. DEV. PLAN FOR SUB'D. APPROVAL
- _____ S. DEV. PLAN FOR BLDG. PERMIT APPROV
- _____ SECTOR PLAN APPROVAL
- _____ FINAL PLAT APPROVAL
- _____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- _____ CERTIFICATE OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- X PAVING PERMIT APPROVAL
- _____ S. A. D. DRAINAGE REPORT
- _____ DRAINAGE REQUIREMENTS
- _____ OTHER

RECEIVED
FEB 15 2001
HYDROLOGY SECTION

DATE SUBMITTED: *02/15/01*

BY: *DAVID SOULE*

DRAINAGE REPORT

for

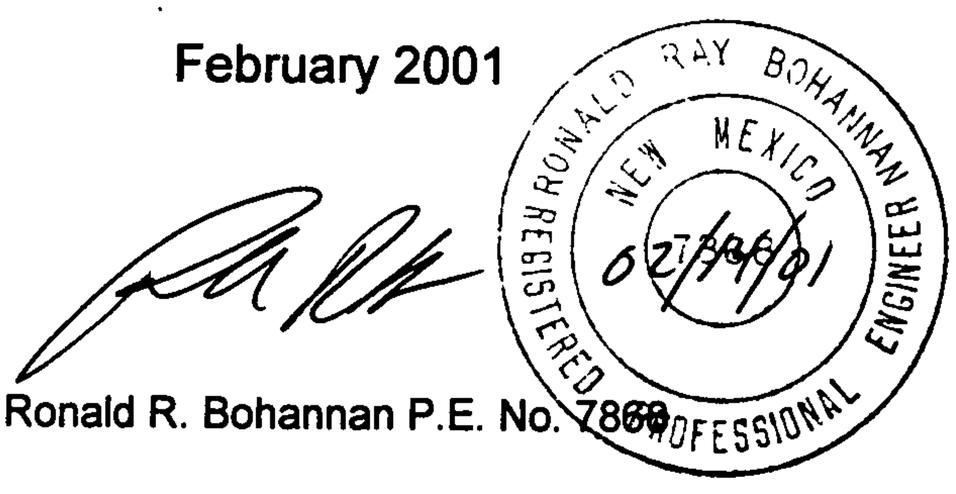
Parking @ 25
Albuquerque, New Mexico

Prepared by

Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Prepared for
Brian Parks
Provident Realty Advisors
17440 North Dallas Pkwy, Suite 230
Dallas Texas 75287

February 2001



Ronald R. Bohannan P.E. No. 7868

Appendices

Map Pockets

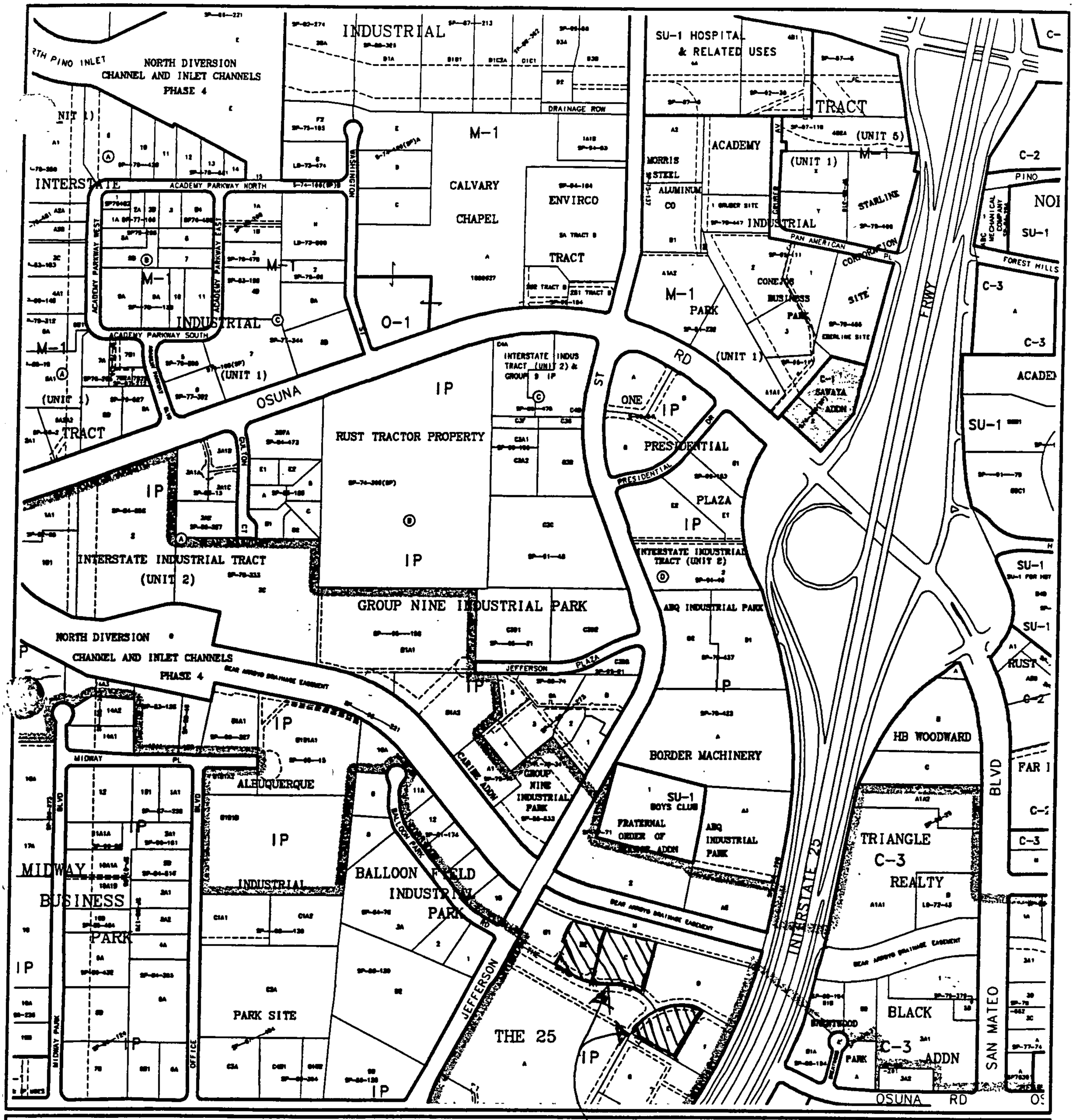
PURPOSE

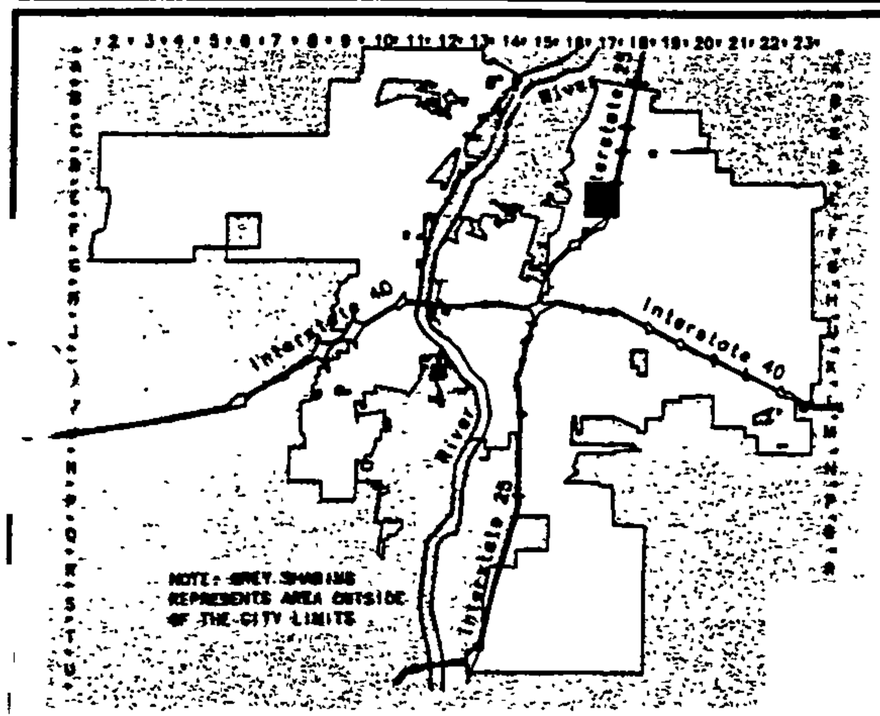
The purpose of this report is to provide the drainage management for Tracts B-2, C, and E of 'The 25 Development', located at the northeast corner of Jefferson and Singer. The project contains 4.15 acres. The proposed development will consist of several parking fields and the associated landscaping. This report will demonstrate that the proposed improvements are in accordance with the DPM Chapter 22, and do not adversely effect the surrounding properties nor the upstream or downstream facilities.

INTRODUCTION

As shown on the Exhibit A vicinity map, the project is a combination of three separate tracts encompassing approximately 4.15 acres. All of the tracts of land are located on the northeast corner of Jefferson and I-25. The site is located on Zone Atlas page F-17. The site currently exists as a rough lots within 'The 25 Development'. The legal descriptions of the properties are Tract B2, Tract C, and Tract E of 'The 25 Development'. As shown on Exhibit B, FIRM maps 35001C0139D and 35001C0139D, the site lies within flood zone X.

This site was analyzed within the Master Drainage Report and Grading Plan for The 25 Development (F17-D46D) previously submitted by Tierra West, LLC, with the stamp date of 5/5/99. The City of Albuquerque Hydrology Section approved the Drainage Management Plan on 5/13/99. Based upon the approved Drainage Management Plan, this site is located entirely within Basin A of the approved plan. The approved Master Drainage Plan indicates this parcel is allowed free discharge if the land treatments are equal to, or less than 85% D, and 15% B. Since our improvements are consistent with developed condition assumptions within The 25 Development Drainage Plan the site should be allowed free discharge.





CITY OF Albuquerque

A Albuquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

GRAPHIC SCALE IN FEET

250 0 750 1000

EXHIBIT A

Zone Atlas Page

E-17-Z

Map Amended through August 15, 2000

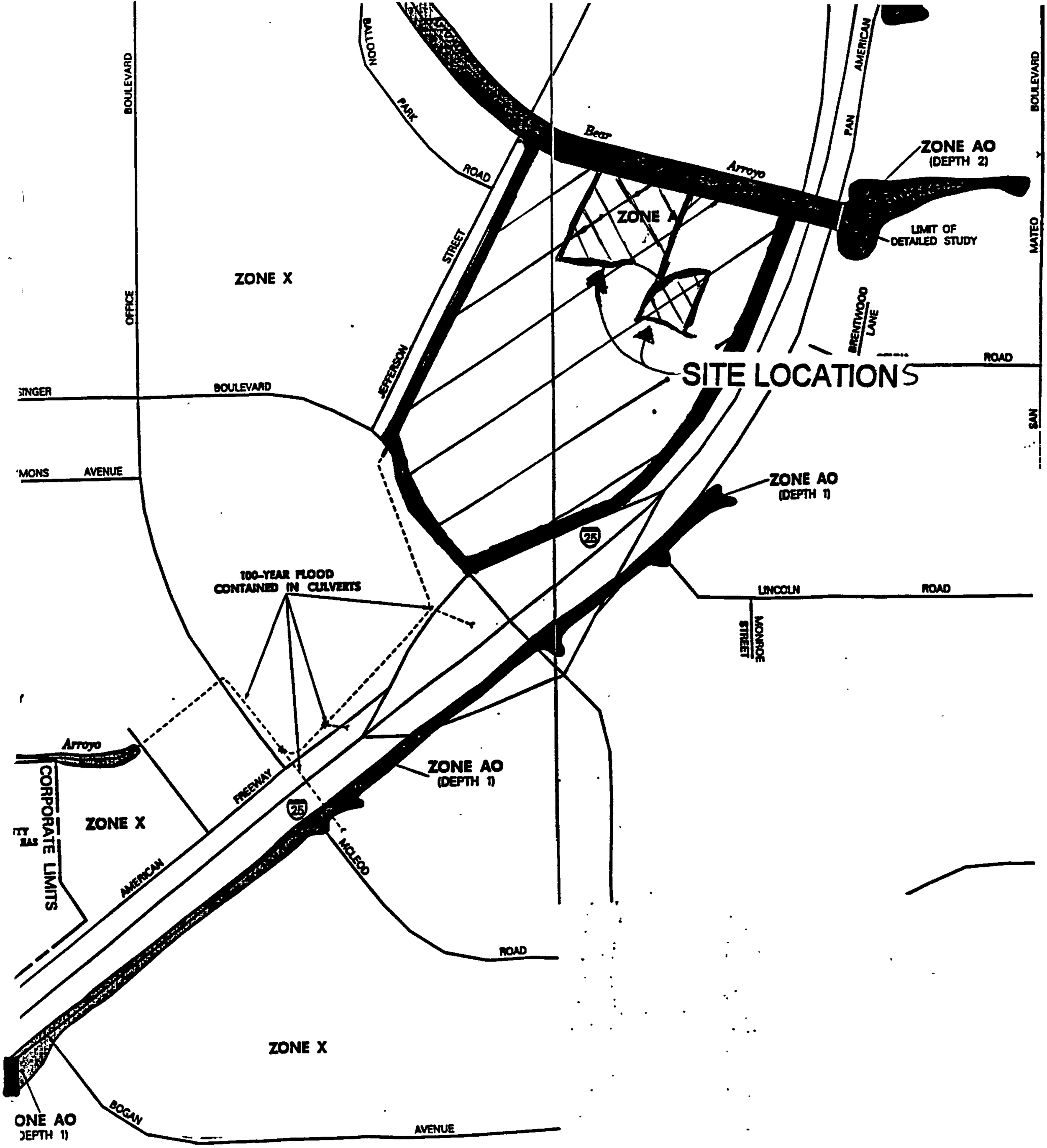


EXHIBIT B

Flood Insurance Rate Maps

EXISTING CONDITIONS

The site slopes from northeast to southwest, with general grades between 3-4%. This site currently accepts offsite flows from the undeveloped Tract D. The site was rough graded with the construction of the initial phases of The 25 Development. The approved Grading Plan for The 25 Development is included in Map Pocket A. This site was analyzed within the Drainage Study for the entire 25 Development. This site is located entirely within Basin A, as described within the Master Drainage Study, and shown in Exhibit C. As discussed within The 25 Development's drainage report, Basin A flows from the northeast to the west, where the flows are partially captured by two existing Double C inlets with the remaining flow leaving the site via the driveway into the Jefferson Right-of-Way. The double C inlets discharge directly into the Bear Canyon Arroyo. The flows entering Jefferson are conveyed to the south were they are captured by multiple inlets and discharged into the Vineyard Channel.

PROPOSED CONDITIONS

The proposed improvements consist of two parking fields to be utilized by the existing buildings. As shown in Exhibit C, the entire site lies within Basin A, as described within The 25 Developments' Master Drainage Study. As shown in Appendix A, the proposed land treatments are consistent with the developed condition assumptions for this site within The 25 Developments' Drainage Management Plan. The offsite flows that currently enter the site from the Tract D to the east will continue to be accepted and passed through the site. A berm and desiltation pond will be constructed on Tract D along its western property line. This will divert the partially developed upstream flow to the existing private loop road. Once the upstream Tract D develops the flows from this tract will continue to discharge directly to the loop road. As shown in Appendix B the loop road has a capacity of 27.74 CFS. As described within the master drainage report and shown on the plat of The 25 Development, all lots provide for cross-lot drainage. The

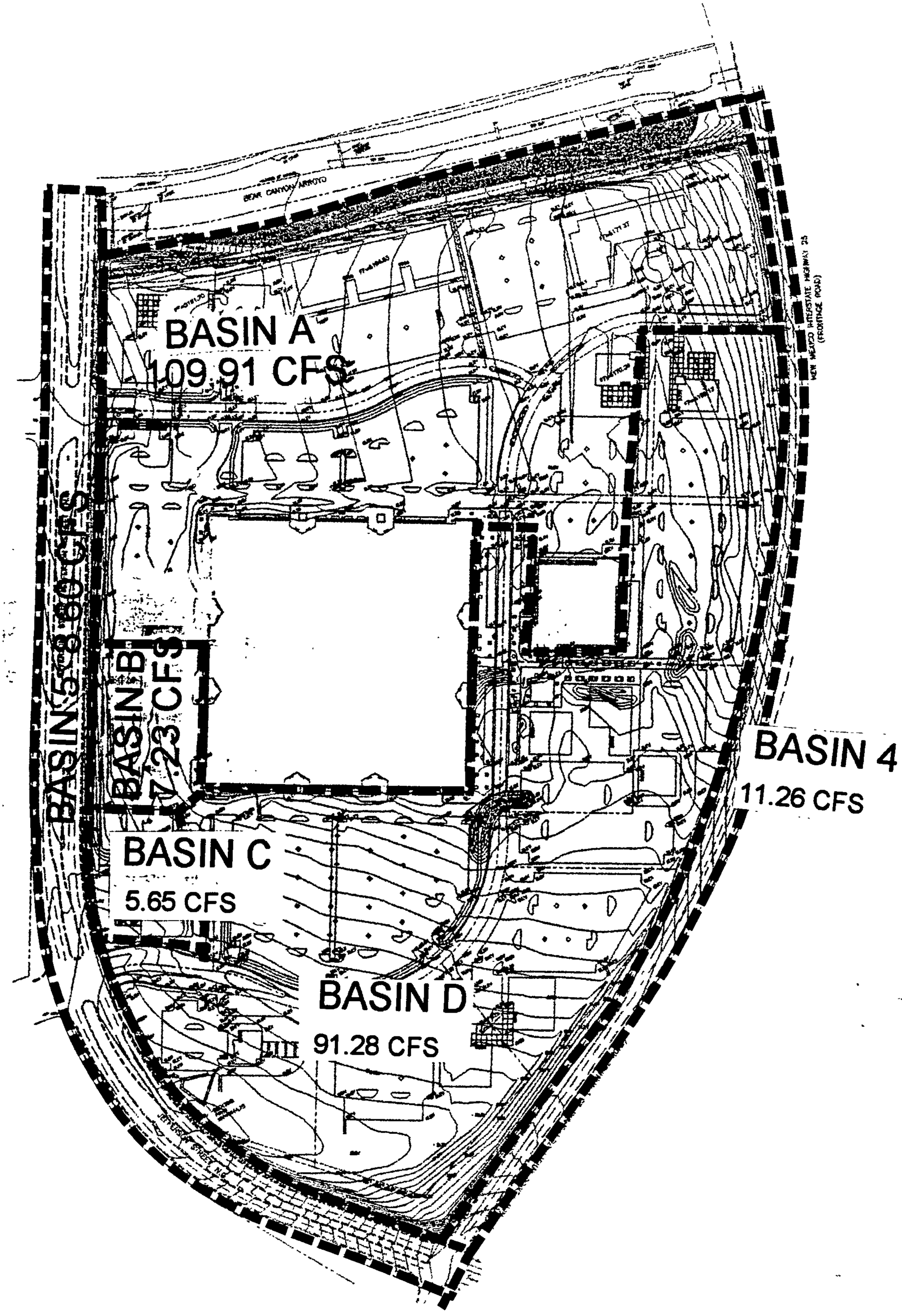


EXHIBIT C

@25 BASIN MAP
PROPOSED CONDITIONS

onsite flows, generated from the pavement areas in Tracts C and B2, are conveyed via surface flows from northeast to southwest where they enter a private loop road through a 15' wide asphalt rundown. The flows generated from tract E are conveyed via surface flows from east to west were they enter the private loop road through 2-24" sidewalk culverts. As shown in Appendix B both the rundown and the sidewalk culverts have capacity to pass the entire 100-year peak discharge. Once the flows enter the private loop road, this roadway conveys the flow to the west where the flows are partially captured by a pair of C inlets. The flow passing over these inlets exit the site through the driveway where the flows are conveyed to the south within Jefferson Boulevard. As described within the Master Drainage Report these inlets and onsite storm drain divert 32.91 CFS directly to the Bear Arroyo. The predicted 100-year peak runoff generated from the three tracts is 19.25 CFS. According to the 25 Developments master drainage study this site is allowed to discharge 19.32 CFS.

SUMMARY AND RECOMMENDATIONS

This project consists of three separate tracts within The 25 Development. All three tracts have been rough graded with the construction of the first phases of The 25 Development. The City of Albuquerque Hydrology Section approved the Drainage Management Plan for the entire center. The 25 Development's Master Drainage Plan assumed fully developed conditions for our site. All three parcels are located in drainage basin A, as described within the Master Drainage Study. The proposed improvements are consistent with the land treatment types used for the developed condition for this site within The 25 Development's Drainage Plan. The proposed grading will direct the developed flows a private loop road adjacent to each site. The proposed drainage patterns are consistent with the overall drainage of the site as shown in The 25 Developments Master Drainage Study. Since no work is to be performed within the Public Right-of-Way, an infrastructure list is not required. The development of this site is consistent with the

DPM, Chapter 22, Hydrology section. Since this site encompasses less than 5 acres, a NPDES permit is not required prior to any construction activity. It is recommended this development be approved for rough grading, and Site Plan for Building Permit.

APPENDIX A

SITE HYDROLOGY

RUNOFF RATE COMPARISON

Use Equation A-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

DEVELOPED RATE OF RUNOFF (CFS)

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Total CFS
Tract B2	1.87	0.00	2.60	0.17	3.45	0.15	5.02	1.41	8.03
Tract C	1.87	0.00	2.60	0.13	3.45	0.11	5.02	1.03	5.89
Tract E	1.87	0.00	2.60	0.12	3.45	0.10	5.02	0.93	5.33
ONSITE TOTAL	1.87	0.00	2.60	0.42	3.45	0.36	5.02	3.37	19.25
Site as proposed in The 25 master plan*	1.87	0.00	2.60	0.41	3.45	0.33	5.02	3.41	19.32
Tract D(existing)	1.87	1.90	2.60	2.0	3.45	0.00	5.02	0.00	8.75
Tract F(existing)	1.87	0.70	2.60	0.80	3.45	0.00	5.02	0.00	3.39

* based upon treatment percentages used for basin A

APPENDIX B

HYDRAULIC CALCULATIONS

SIDEWALK CULVERT

Orifice Equation:

$$Q = CA\,(2Gh)^{1/2}$$

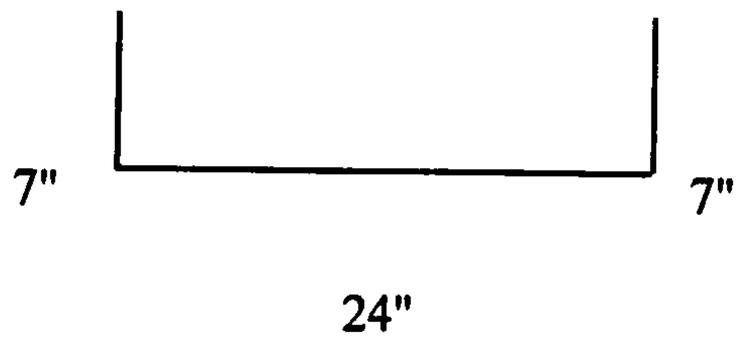
Solve for Q
C = 0.6
A = 0.5833*2 = 1.167 ft^2
g = 32.2
H = Height of water measured from center of orifice

$$Q = .6(1.167)\,[2*32.2*(.5833/2]^{1/2}$$

Q=3.035 cfs

Basin A discharges 5.33 cfs

Use 2-24" sidewalk culverts
6.07 cfs > 5.33 cfs



Rundown leaving tract B-2

Weir Equation:

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

Q= flow (cfs)
C = 2.75
H = Curb Height (ft)
L = width of opening

OPENING ON WEST SIDE OF TRACT B2

$$Q_{max} = 2.75(15)(.5)^{3/2} = 14.58 \text{ CFS}$$

Q_{req}= 13.92 CFS

OPENING ON SOUTH SIDE OF TRACT D (TEMPORARY)

$$Q_{max} = 2.75(10)(.5)^{3/2} = 9.72 \text{ CFS}$$

Q_{req}= 8.75 CFS

OPENING ON SOUTH SIDE OF TRACT F (TEMPORARY)

$$Q_{max} = 2.75(4)(.5)^{3/2} = 3.89 \text{ CFS}$$

Q_{req}= 3.39 CFS

Street Capacity Calculations

@25 Way

32' F-F Street Section with 6" curb

Slope= 0.0091

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)	rea (ft^2	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0002	0.0004	0.2339	0.0023	0.4122	0.0027
0.02	0.0032	0.3406	0.0094	0.0012	0.0024	0.3713	0.0074	0.4626	0.0065
0.04	0.0128	0.6812	0.0188	0.0075	0.0151	0.5893	0.0236	0.5193	0.0155
0.06	0.0288	1.0219	0.0282	0.0222	0.0445	0.7722	0.0463	0.5556	0.0259
0.08	0.0512	1.3625	0.0376	0.0479	0.0958	0.9355	0.0748	0.5829	0.0371
0.1	0.0800	1.7031	0.0470	0.0868	0.1737	1.0856	0.1086	0.6050	0.0491
0.12	0.1152	2.0437	0.0564	0.1412	0.2824	1.2259	0.1471	0.6236	0.0617
0.125	0.1250	2.1289	0.0587	0.1575	0.3149	1.2597	0.1575	0.6279	0.0649

For water depths greater than 0.125 ft but less than 0.405 ft

Y1=	Y-0.125
A2=	A1 + 2*Y1 + 25*Y1^2
P2=	P1 + SQRT(2501*Y1^2)

Depth (ft)	rea (ft^2	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.1673	0.3346	1.2334	0.1603	0.6029	0.0635
0.16	0.2256	3.9143	0.0576	0.2807	0.5615	1.2443	0.1991	0.5482	0.0676
0.2	0.4156	5.9547	0.0698	0.5875	1.1750	1.4136	0.2827	0.5570	0.0866
0.24	0.6856	7.9951	0.0858	1.1118	2.2236	1.6216	0.3892	0.5833	0.1115
0.28	1.0356	10.0355	0.1032	1.8999	3.7999	1.8346	0.5137	0.6110	0.1395
0.32	1.4656	12.0759	0.1214	2.9958	5.9917	2.0441	0.6541	0.6368	0.1696
0.3464	1.7932	13.4225	0.1336	3.9078	7.8157	2.1792	0.7549	0.6525	0.1904
0.39	2.4106	15.6466	0.1541	5.7769	11.5538	2.3964	0.9346	0.6762	0.2259
0.405	2.6450	16.4117	0.1612	6.5318	13.0635	2.4695	1.0001	0.6838	0.2384

For water depths greater than 0.405 ft but less than 050 ft

Y2=	Y - 0.405
A3=	A2 + Y2*16
P3=	P2 + Y2

Depth (ft)	rea (ft^2	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7250	16.4167	0.1660	6.8629	13.7259	2.5185	1.0326	0.6931	0.2462
0.44	3.2050	16.4467	0.1949	8.9829	17.9659	2.8028	1.2332	0.7446	0.2929
0.47	3.6850	16.4767	0.2236	11.3216	22.6431	3.0723	1.4440	0.7898	0.3401
0.5	4.1650	16.5067	0.2523	13.8678	27.7357	3.3296	1.6648	0.8298	0.3878

MAP POCKET A

THE 25 DEVELOPMENT GRADING PLAN

MAP POCKET B

PARKING @ 25 GRADING PLAN

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 16, 2001

Ron Bohannan, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, NM 87113

RE: Grading Plan for Tracts B-2, C, and E
Plan dated March 15, 2001 Sheet C-1
Drainage File #F17/D46B
Request for Rough Grading Approval

Dear Mr. Bohannan:

The attached plan dated 3/15/01 is approved for rough grading. Please advise your contractor of the Top Soil Permit and erosion control requirements listed on the plan.

If I can be of further assistance, please feel free to contact me at 924-3999.

Sincerely,

Fred J. Aguirre, P.E.
City Engineer

Attachment

c: Terri Martin
David Soule
File

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