CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

October 30, 2015

Jonathan Niski
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM, 87109

RE: **Abraham – Beach Property**
Drainage and Grading Plan
Engineer's Stamp Date 9-14-15 (File: F16D003E1)

Dear Mr. Niski:

Based upon the information provided in your submittal received 9-15-2015, the above referenced Drainage Management Plan cannot be approved until the following comments are addressed:

- Please provide a copy (or at least the applicable section that described the maximum stormwater discharge rate) from the referenced Renaissance Master Drainage Plan.

- Minor labeling and unit corrections:
  - Show units on flows and dimensions mentioned on page 2.
  - It appears that Exhibit B-2 is the "old" layout, not the proposed layout.

- The Basin Map on Sheet C2 references existing drainage that do not appear to match the proposed layout. Correct the Existing Drainage Condition language to reflect the fact that Basins 1 and 3 do not drain to the detention pond.

- The Proposed Drainage Condition language on Sheet C2 does not seem to be associated with this project (e.g., references to the "Frito Lay pond" and mismatched Basin numbers).

- The Northeast corner of the pond is graded in a manner that encroaches into the access aisle of the parking lot of Basin 7.

- Basin 9 quantified in the calculations appears to refer to the Shell/McDonald's/Starbucks development. It should be labeled on the Basin Map.

PO Box 1293
Albuquerque
NM 87103
www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Holy Cross Subdivision Building Permit #: _____ City Drainage #: EPD021

DRB#: 1006844 EPC#: _____ Work Order#: _____

Legal Description: Tract A-1-A Lutheran Church in America

City Address: 6901 Wyoming Blvd., ABQ, NM 87109

Engineering Firm: D. Mark Goodwin & Associates Contact: _____

Address: PO Box 90606, ABQ, NM 87199

Phone#: (505) 828-2200 Fax#: (505) 797-9539 E-mail: hiram@goodwinengineers.com

Owner: Lutheran Church in America - Holy Cross Lutheran Church Contact: Joseph A. Pappe Jr.

Address: 6901 Wyoming Blvd., ABQ, NM 87109

Phone#: (505) 821-4676 Fax#: _____ E-mail: _____

Architect: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

✓ HYDROLOGY/ DRAINAGE
____ TRAFFIC/ TRANSPORTATION
____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

____ ENGINEER/ ARCHITECT CERTIFICATION

____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ DRAINAGE MASTER PLAN
✓ DRAINAGE REPORT
____ CLOMR/LOMR

____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ EROSION & SEDIMENT CONTROL PLAN (ESC)

____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY

✓ PRELIMINARY PLAT APPROVAL
____ SITE PLAN FOR SUB'D APPROVAL
____ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL
____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
____ GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR

____ PRE-DESIGN MEETING
____ OTHER (SPECIFY) _____

$ 260.00

RECEIVED
SEP 25 2015
LAND DEVELOPMENT SECTION

IS THIS A RESUBMITTAL?: ____ Yes ✓ No

DATE SUBMITTED: 9/25/2015 By: Hiram L. Crook

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Abraham-Beach Property I-25/ Montano Building Permit #: _____ City Drainage #: F16D003E1

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: _____

City Address: _____

Engineering Firm: Tierra West, LLC Contact: Jonathan Niski

Address: 5571 Midway Park Place NE Albuquerque NM 87109

Phone#: 505-858-3100 Fax#: 505-858-1118 E-mail: jniski@tierrawestllc.com

Owner: Steve Abraham Contact: _____

Address: 122 Tulane SE Albuquerque NM 87106

Phone#: _____ Fax#: _____ E-mail: _____

Architect: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

x HYDROLOGY/ DRAINAGE
____ TRAFFIC/ TRANSPORTATION
____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

____ ENGINEER/ ARCHITECT CERTIFICATION

____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ DRAINAGE MASTER PLAN
x DRAINAGE REPORT
____ CLOMR/LOMR

____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ EROSION & SEDIMENT CONTROL PLAN (ESC)

____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: ____ Yes ____ No

RECEIVED SEP 15 2015 LAND DEVELOPMENT SECTION

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

X BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY

____ PRELIMINARY PLAT APPROVAL
____ SITE PLAN FOR SUB'D APPROVAL
____ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL
____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
____ GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR

____ PRE-DESIGN MEETING
____ OTHER (SPECIFY) _____

DATE SUBMITTED: 09/15/2015 By: Jonathan Niski

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ✓ CD

MASTER DRAINAGE MANAGEMENT PLAN

for

Parcels B1 & C1
Renaissance Center III
Albuquerque, NM

Prepared by:

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

Prepared for:

Steve Abraham
122 Tulane SE
Albuquerque, NM 87106

September 2015

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.

RONALD R. BOHANNAN
NEW MEXICO
7868
PROFESSIONAL ENGINEER
9/15/15

Ronald R. Bohannan, PE
NO. 7686

RECEIVED
SEP 15 2015
LAND DEVELOPMENT SECTION

Job No. 2015016

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APPENDICES

Drainage Calculations	Appendix "A"

MAP POCKET

Overall Grading and Drainage Plan	Map Pocket

Location

This is a modification to the Montano Pads Drainage Report prepared by Tierra West, LLC (F-16/D3E1) stamped February 19, 2001. This report is being generated to reevaluate land uses on what is formerly known as the Beach Waterpark which was demolished and is currently vacant land. The property is located northeast of Montano Road and southwest of the 1-25 frontage road. The site is identified as Parcels B1 & C1 of Renaissance III. The site is shown on Zone Atlas Map F-16, on page 2, and contains approximately 23.77 ACRES The purpose of this report is to provide an overall drainage analysis and management plan for the proposed redevelopment of the Beach Waterpark. Each future development within these parcels will be required to submit a site specific grading and drainage plan for building permit approval.

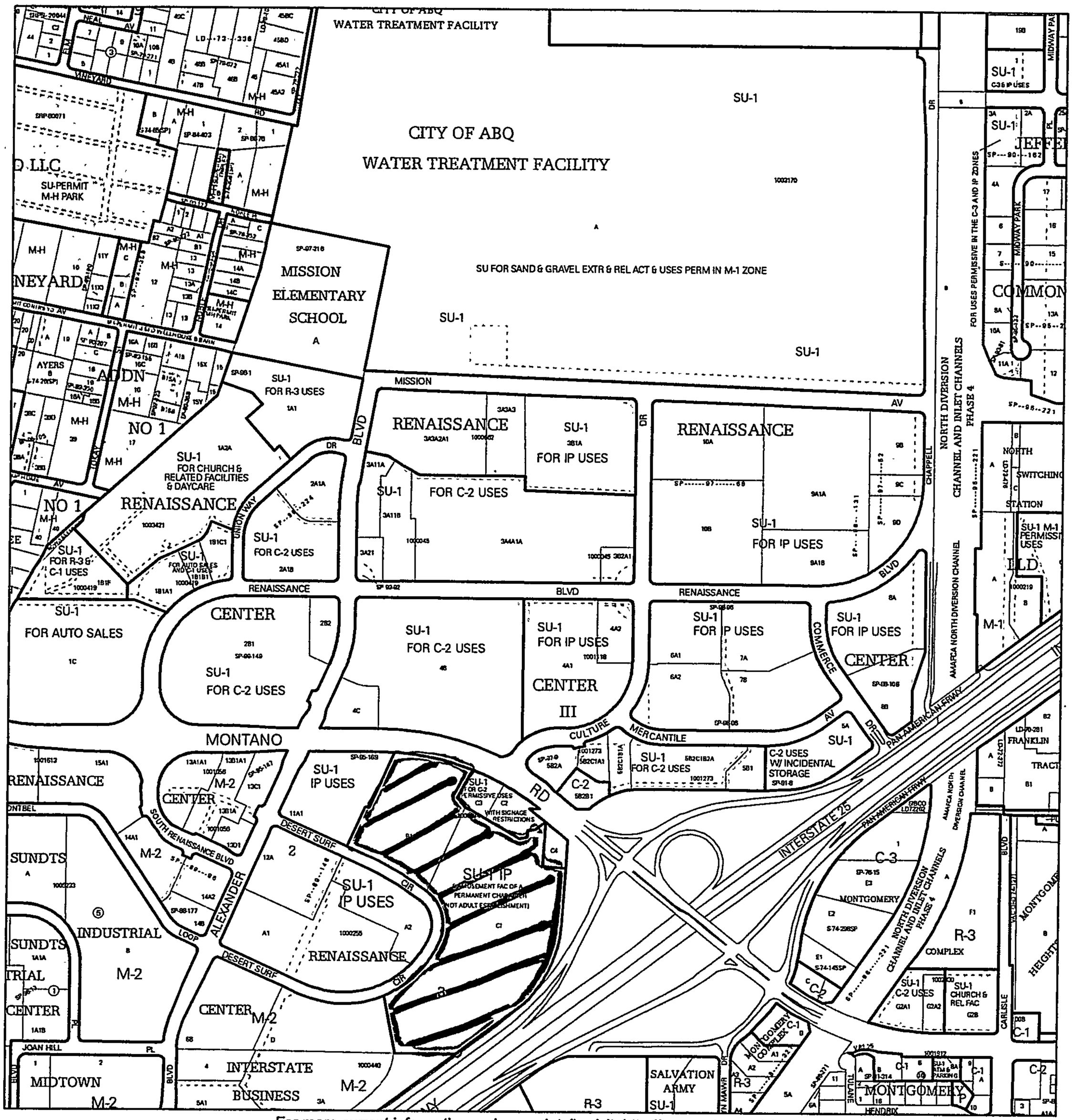
Existing Drainage Conditions

Currently, the proposed site is undeveloped and offsite flows enter the site from the east and flow to an existing detention pond in the northeast corner of the property. There are three previous drainage reports for this site, two by Tierra West, LLC (F-16/D3EI) that refers to Wilson & Company's (F-16/D3EI) drainage plan stamped April 3, 1987. The reports define all basins and provide information of the trench drains and drop inlets for each basin. Shown on page 3 is the Basin Layout Map used in the previous reports. A portion of the property drains 28.19 cfs to Desert Surf Circle which is captured by an existing storm sewer system. The rest of the property drains to the existing detention pond mentioned previously in this report. The outfall from the pond has a 6" orifice plate and discharges the flows into an existing 36" RCP and is carried into the Renaissance Center pond located north of Montano Boulevard and west of Bob Turner Ford's car lot. The 6" orifice plate currently limits the discharge from the pond to 1.86 cfs to stay within the guidelines outlined by the Renaissance Master Drainage Plan, which limits the site to 0.10 cfs per acre. Andrews, Asbury, and Robert, Inc. provided this information, in their Renaissance Center drainage report, revised February 22, 1985, section III page 9.

BASIN MAP SHOWS 2.66 cfs

FEMA Map and Soil Conditions

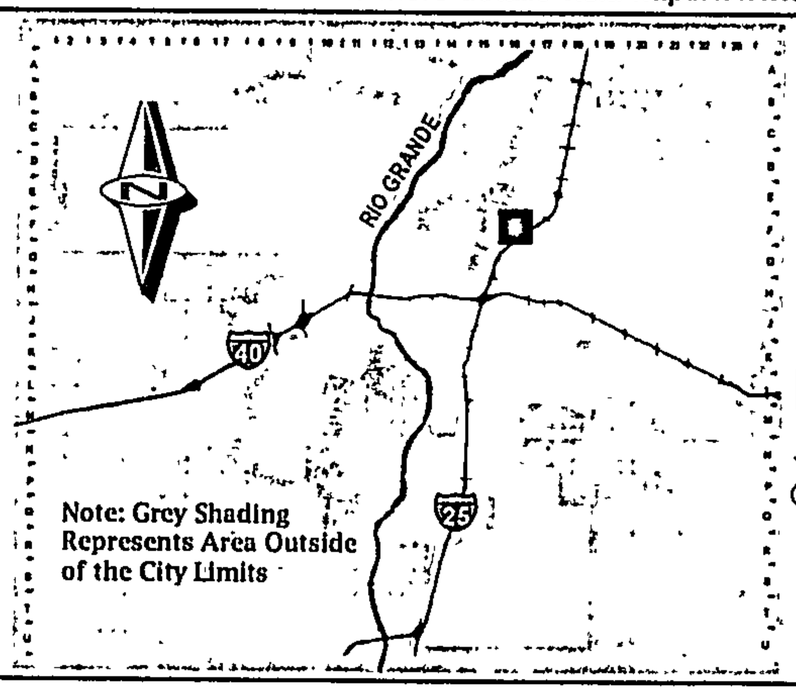
The site is located on FIRM Map 350001C138H, as shown on the attached extract on page 4. The map shows that the site does not lie within any 100-year flood plain.



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

Albuquerque Geographic Information System

Map amended through: 1/24/2011



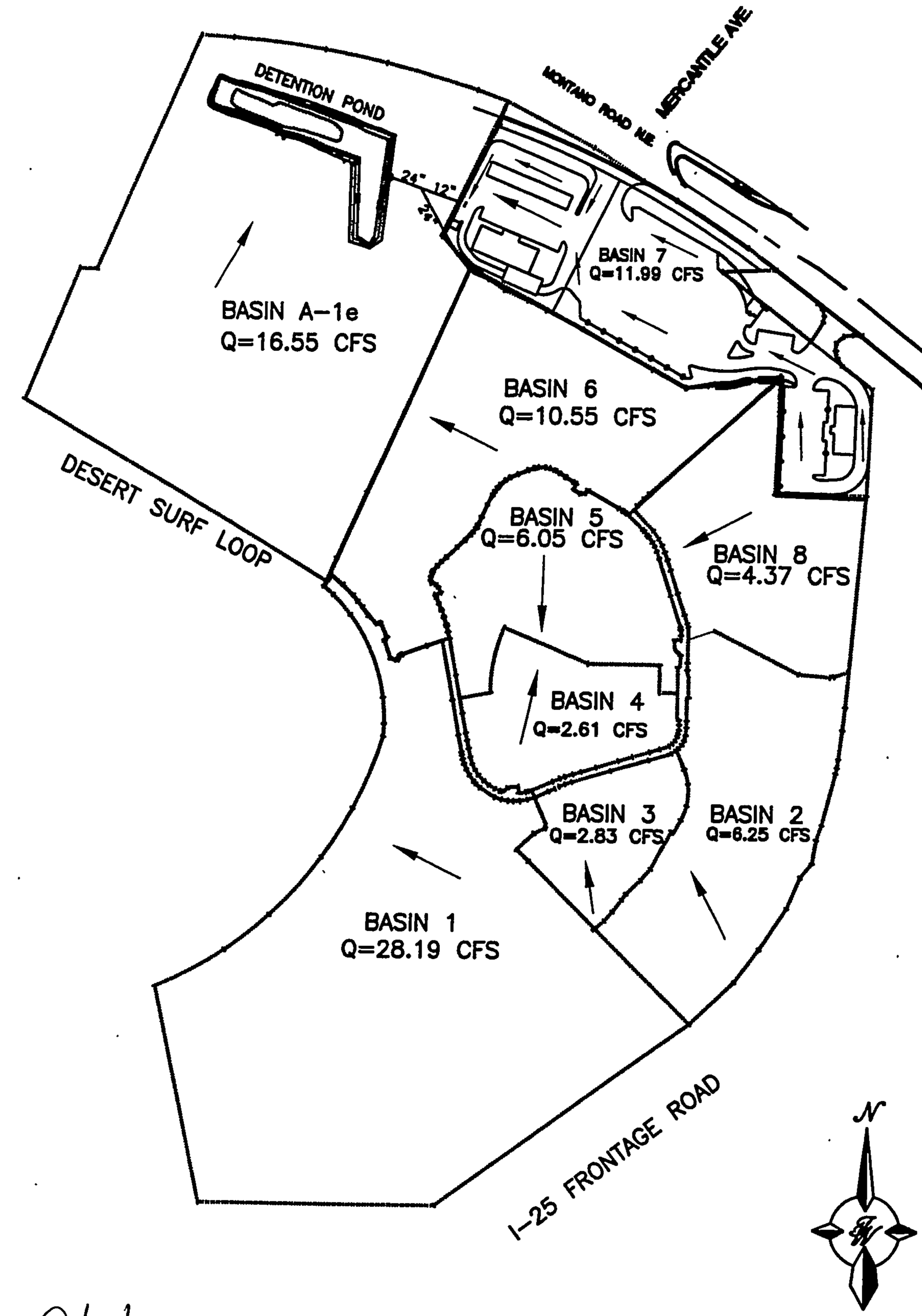
Zone Atlas Page:

F-16-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

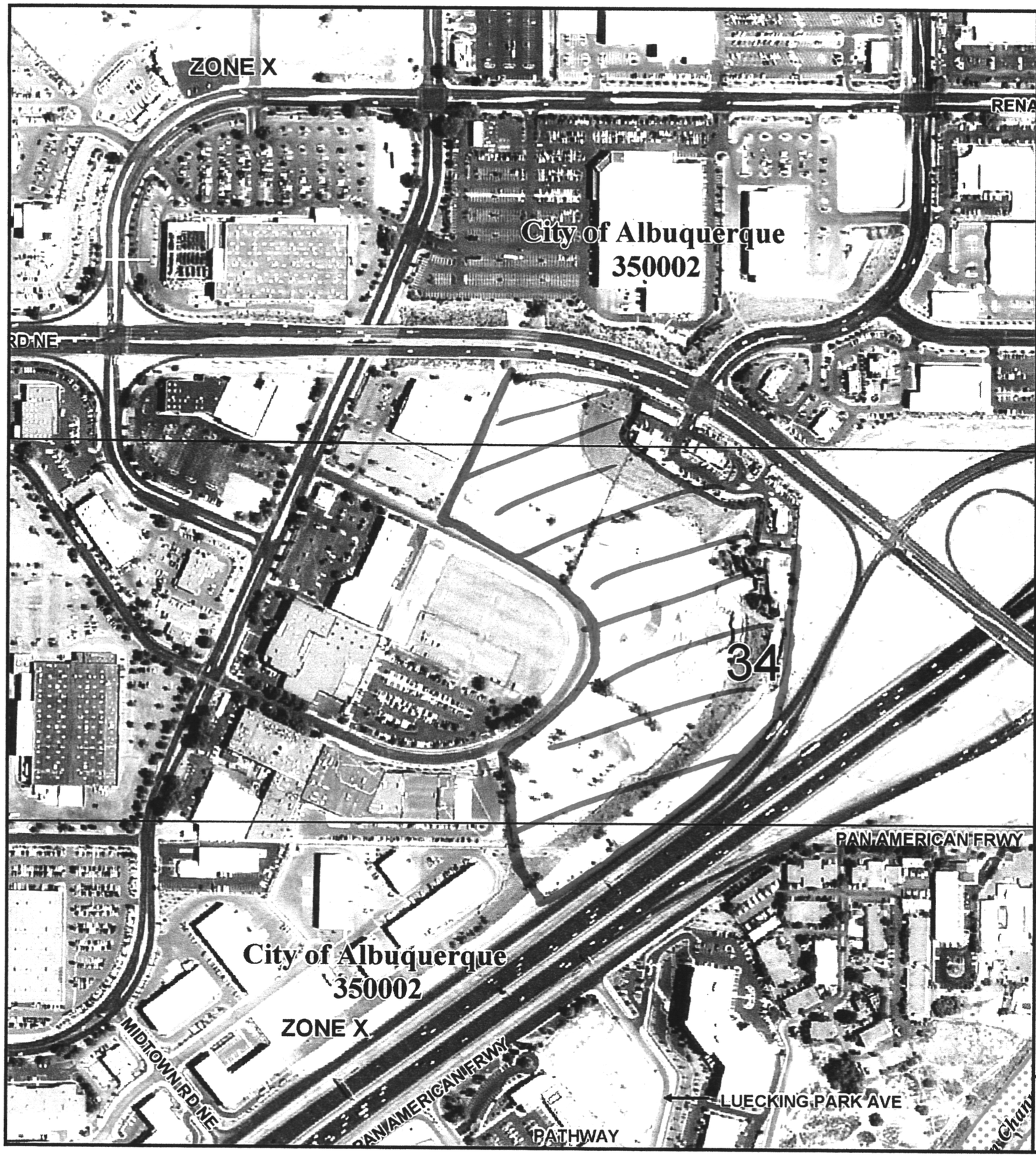
0 750 1,500 Feet



Old
~~New~~ Basin Layout Map

EXHIBIT B-2

PAGE



MAP SCALE 1" = 500'

0 500 1000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0138H

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO

AND INCORPORATED AREAS

PANEL 138 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0138	H
BERNALILLO COUNTY UNINCORPORATED AREAS	350001	0138	H

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
35001C0138H

MAP REVISED
AUGUST 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

On-Site Drainage Management Plan

Basically, everything will remain the same in the system designed by Tierra West, LLC (F-161D3E1) with some modifications to the existing detention pond, due to the new developed flows from the redevelopment of the site. As shown on the Proposed Basin Map located on the next page, Basins 1, 2 and 3 will sheet flow to Desert Surf Circle discharging a total of 28.17 cfs which is slightly less than the 28.19 cfs that was previously being discharged to the street. Basins 4-7 (63.56 cfs) will sheet flow to the northwest and flow directly into the retention pond which will be regraded to accommodate the increased volume from the anticipated redevelopment of those basins. There is an existing 24-inch storm sewer located in Basin 7 that may be used in the future to direct flows to the retention pond. Basin 8 consists of the retention pond area and Basin 9 will remain as it is and was identified as Basin 7 in the Montano Pads Drainage Report.

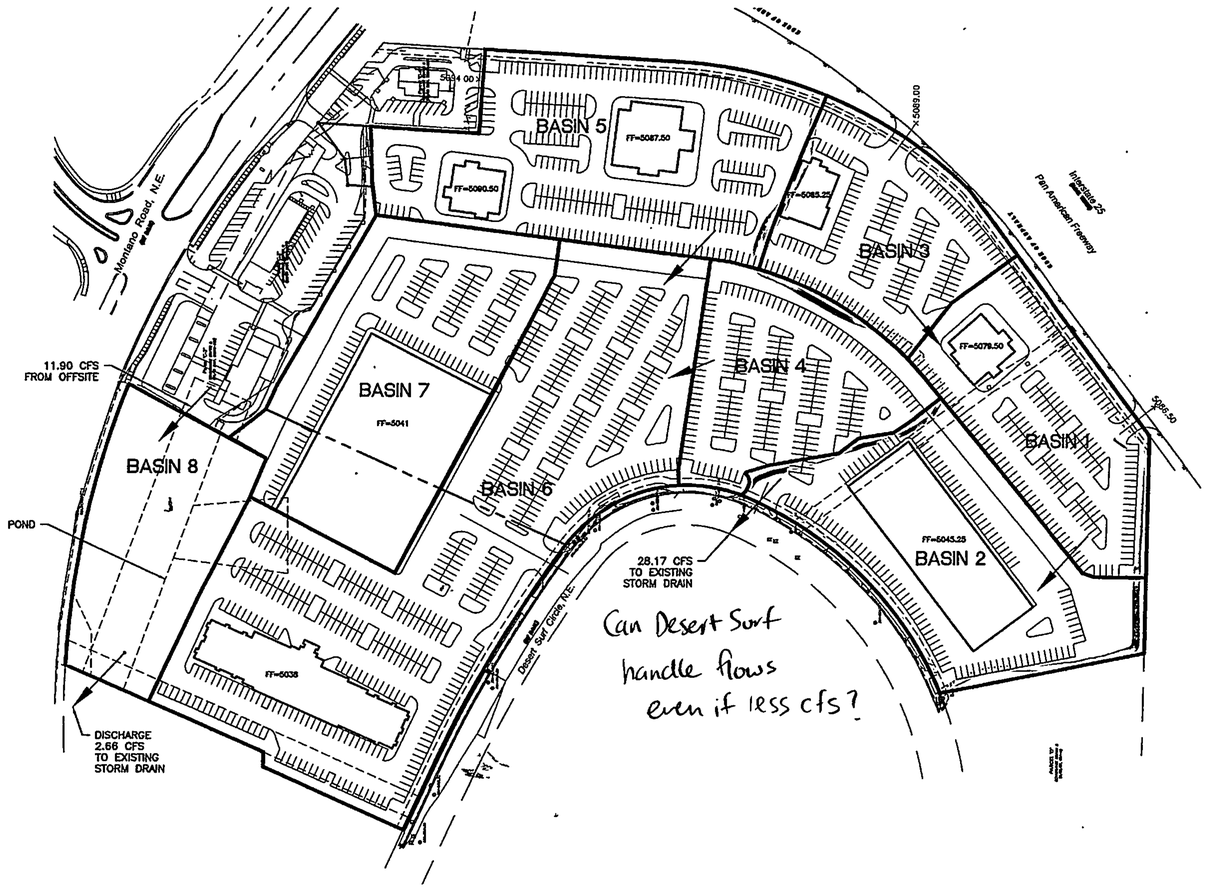
Doesn't exist in Montano Pads Report

As a result of the increased flows and volume the existing detention pond will be modified to hold the required volume of 2.59 acre-feet while discharging a peak flow of 2.66 cfs through the orifice plate. The orifice plate will be increased from 6 inches to 6.5 inches to allow for the increased discharge with is still consistent with the Renaissance Center Master Drainage Plan of no more than 0.10 cfs discharge per acre of land. The total amount of land being drained through the pond is 26.6 acres. A copy of the AHYMO summary, input and output printouts are found in Appendix "A". As this pond has been in place for a number of years with no settlement, the pond bottom will be lowered two feet below outfall to meet the first flush requirement.

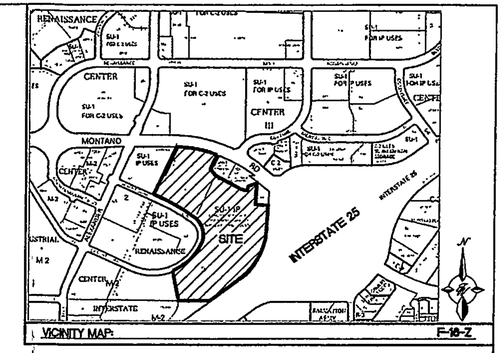
show first flush volume retained.

Criteria

The site was analyzed using the procedures outlined in the Development Process Manual Volume 2, Chapter 22. The AHYMO computer program was used to analyze all basins and the ponds for a 100-year, 24-hour rainfall event.



Can Desert Surf handle flows even if less cfs?



VICINITY MAP: F-16-Z

EXISTING DRAINAGE CONDITIONS

THIS SITE IS LOCATED IN THE RENAISSANCE CENTER MASTER PLAN AREA AND IS LOCATED NEAR THE INTERSECTION OF INTERSTATE 25 AND MONTANO RD. IT IS BOUNDED ON THE SOUTH BY AN INDUSTRIAL PARK, ON THE WEST BY DESERT SURF CIRCLE, ON THE NORTH BY MONTANO ROAD AND ON THE EAST BY INTERSTATE 25 AND CONTAINS APPROXIMATELY 23.7 ACRES.

THE SITE CURRENTLY DRAINS TO A DETENTION POND IN THE NORTHWEST CORNER OF THE PROPERTY. THIS SITE WAS ORIGINALLY THE BEACH WATER PARK WHICH HAS SINCE BEEN DEMOLISHED AND WAS SUBJECT TO AN APPROVED MASTER DRAINAGE PLAN COMPLETED BY WILSON & COMPANY (F16/D3E1). THIS PLAN WILL FOLLOW THAT DRAINAGE SCHEME.

THE SITE DOES ACCEPT OFF-SITE FLOWS (11.99 CFS) FROM THE MONTANO PADS (F16/D3E1) WHICH IS CONVEYED TO THE DETENTION POND VIA A 24-INCH STORM SEWER THE DAYLIGHTS INTO THE POND ON THE EAST SIDE. AS SHOWN ON THE FIRM MAP THERE ARE NO FLOOD PLAINS ON THIS PROPERTY.

PROPOSED DRAINAGE CONDITIONS

THIS SITE WILL CONTAIN SEVEN BASINS WITH FIVE OF THE BASINS DRAINING TO AN EXISTING STORM SEWER STUB THAT IS CONNECTED TO FRITO LAY POND #5. THE EXISTING STORM SEWER PIPE FROM THE OFFICE COMPLEX WILL BE INTERCEPTED WITH A NEW STORM SEWER AND ROUTED AROUND THE PERIMETER OF THE SITE AN CONNECT TO THE EXISTING STUB MENTIONED ABOVE.

BASINS 1, 2 AND 4 WILL DRAIN TO AREA INLETS THAT ARE CONNECTED TO THE STORM SEWER. BASIN 3 WILL DRAIN THE TRUCK DOCK AREA THROUGH A STORM DRAIN OPENING ON THE NORTH SIDE OF THE DOCK.

BASINS 5 AND 6 WILL DRAIN TO THE STREET GENERATING 1.00 CFS. THE ORIGINAL FRITO LAY DRAINAGE PLAN ALLOWED FOR 0.66 CFS TO BE DISCHARGED TO THE STREET. THE ADDITIONAL 0.34 CFS BEING DISCHARGED WILL BE COMPENSATED BY REMOVING THAT FLOW FROM THE OVERALL SYSTEM WITH THE REQUIREMENT OF THE FIRST FLUSH POND FOUND IN BASIN 7. THE MINIMAL FLOW GOING TO THE STREET WILL NOT IMPACT PROPERTIES DOWN STREAM SINCE ALL OF THE PROPERTIES DRAIN A SMALL AMOUNT TO THE WIDE STREET.

BASIN 7 WILL REMAINED UNDEVELOPED AT THIS TIME AND WILL DRAIN TO A FIRST FLUSH POND DESIGNED TO HOLD 4,008 CUBIC FEET OR WATER WHICH IS GREATER THAN THE 3,801 CUBIC FEET REQUIRED. THE POND WILL OVERFLOW TO THE AREA INLET LOCATED IN BASIN 1 NEAR THE TRUCK DOCK AND BE CONVEYED TO FRITO LAY DETENTION POND #5.

THIS SITE WILL DISCHARGE A TOTAL OF 24.89 CFS TO FRITO LAY POND #5 WHICH IS LESS THAN THE 24.97 ALLOWED IN THE APPROVED DRAINAGE PLAN. THAT TOTAL INCLUDES THE 10.52 CFS BEING PASSED THROUGH FROM THE ADJACENT OFFICE COMPLEX.

ENGINEER'S SEAL RONALD R. BOHANNAN NEW MEXICO 7868 PROFESSIONAL ENGINEER	ABRAHAM - BEACH PROPERTY INTERSTATE 25 AND MONTANO	DRAWN BY BJF
		DATE 09/10/15
	BASIN MAP	2015016_GRB
	TIERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	SHEET # C2
RONALD R. BOHANNAN P.E. #7868		JOB # 2015016

Z:\2015\2015016 Abraham - Beach Property\dwg\DRB\2015016_GRB.dwg, 9/11/2015 6:47:15 AM

Summary

The purpose of this report is to provide an overall drainage analysis and management plan for the proposed redevelopment of the Beach Waterpark. Each future development within these parcels will be required to submit a site specific grading and drainage plan for building permit approval. The property will continue to drain as it does in its current state with 28.19 cfs being discharged to the street and the rest of the storm water being directed to an existing detention pond. The pond will be modified to increase the volume needed for the proposed developed flows and will discharge 2.66 cfs to the storm sewer in concurrence with the Renaissance Center Master Drainage Plan.

Reference how Desert Surf currently is approved to handle the 28.19 cfs

Appendix "A"
Drainage Calculations

Weighted E Method

On-Site Basins

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)	100-Year 10 hr. Weighted E (ac-ft)	100-Year Volume (ac-ft)	100-Year Flow cfs	10-Year Weighted E (ac-ft)	10-Year Volume (ac-ft)	10-Year Flow cfs
1	91,371	2.10	0%	0	22%	0.46	0%	0.00	78%	1.64	1.825	0.319	8.74	1.107	0.193	5.58
2	126,373	2.90	0%	0	26%	0.75	0%	0.00	74%	2.15	1.772	0.428	11.81	1.064	0.257	7.46
3	79,690	1.83	0%	0	22%	0.40	0%	0.00	78%	1.43	1.825	0.278	7.62	1.107	0.169	4.86
4	81,846	1.88	0%	0	20%	0.38	0%	0.00	80%	1.50	1.852	0.290	7.92	1.128	0.177	5.08
5	151,431	3.48	0%	0	20%	0.70	0%	0.00	80%	2.78	1.852	0.537	14.66	1.128	0.327	9.39
6	282,820	6.49	0%	0	20%	1.30	0%	0.00	80%	5.19	1.852	1.002	27.37	1.128	0.610	17.54
7	142,726	3.28	0%	0	20%	0.66	0%	0.00	80%	2.62	1.852	0.506	13.81	1.128	0.308	8.85
8	78,858	1.81	0%	0	100%	1.81	0%	0.00	0%	0.00	0.780	0.118	4.13	0.280	0.042	1.72
9	122,944	2.82	0%	0	20%	0.56	0%	0.00	80%	2.26	1.852	0.436	11.90	1.128	0.265	7.63
		26.59								19.57		**3.477**	**96.07**			

Offsite Basin (Montano Pads)

?

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 2	100-Year	10 - Year
E_a	0.53	0.13
E_b	0.78	0.28
E_c	1.13	0.52
E_d	2.12	1.34

Peak Discharge (cfs/acre)		
Zone 2	100-Year	10 - Year
Q_a	1.56	0.38
Q_b	2.28	0.95
Q_c	3.14	1.71
Q_d	4.70	3.14

28.18 cfs to street
67.89 cfs to detention pond
2.45 ac-ft of volume

VOLUME CALCULATIONS
POND

Ab - Bottom Of The Pond Surface Area
At - Top Of The Pond Surface Area
D - Water Depth
Dt - Total Pond Depth
C - Change In Surface Area / Water Depth

Volume = $Ab * D + 0.5 * C * D^2$
C = (At - Ab) / Dt

Ab = 15,554.00
At = 30,660.00
Dt = 6.00
C = 2517.67

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
5029.00	0.00	0.00	0.0000
5030.00	1.00	0.3571	0.9501
5031.00	2.00	0.7141	1.4634
5032.00	3.00	1.1001	1.8385
5033.00	4.00	1.5439	2.1491
5034.00	5.00	2.0454	2.4202
5035.00	6.00	2.6048	2.6639

<u>Orifice Equation</u>
Q = CA SQRT(2gH)

C = 0.6
Diameter (in) 6.51
Area (ft^2)= 0.231
g = 32.2
H (Ft) = Depth of water above center of orifice
Q (CFS)= Flow

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =08/28/2015
INPUT FILE = erty\Filing - PDF's Only\Grading & Drainage\2015016 24hour input 8-26-15.txt USER NO.=
AHYMO_Temp_User:20122010

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START TIME=	0.00	RAINFALL	TYPE= 2 NOAA 14		RAIN24=	2.750				
COMPUTE NM HYD	101.00	-	1	0.00328	9.24	0.378	2.16182	1.510	4.404	PER IMP= 78.00
COMPUTE NM HYD	102.00	-	2	0.00453	12.50	0.507	2.09990	1.510	4.313	PER IMP= 74.00
COMPUTE NM HYD	103.00	-	3	0.00286	8.06	0.330	2.16182	1.510	4.405	PER IMP= 78.00
COMPUTE NM HYD	104.00	-	4	0.00294	8.37	0.344	2.19278	1.510	4.448	PER IMP= 80.00
COMPUTE NM HYD	105.00	-	5	0.00543	15.44	0.635	2.19277	1.510	4.444	PER IMP= 80.00
COMPUTE NM HYD	106.00	-	6	0.01014	28.82	1.186	2.19278	1.510	4.441	PER IMP= 80.00
COMPUTE NM HYD	107.00	-	7	0.00512	14.56	0.599	2.19277	1.510	4.444	PER IMP= 80.00
COMPUTE NM HYD	108.00	-	8	0.00283	3.76	0.113	0.75005	1.532	2.078	PER IMP= 0.00
COMPUTE NM HYD	109.00	-	9	0.00441	12.55	0.516	2.19278	1.510	4.445	PER IMP= 80.00
ADD HYD	201.00	4& 5	10	0.00837	23.81	0.979	2.19271	1.510	4.445	
ADD HYD	202.00	10& 6	11	0.01851	52.63	2.165	2.19273	1.510	4.443	
ADD HYD	203.00	11& 7	12	0.02363	67.20	2.763	2.19273	1.510	4.443	
ADD HYD	204.00	12& 8	13	0.02646	70.87	2.877	2.03842	1.532	4.185	
ADD HYD	205.00	13& 9	14	0.03087	83.40	3.392	2.06046	1.532	4.221	
ROUTE RES.	301.00	14	15	0.03087	2.66	3.392	2.06046	2.433	0.135	

AC-FT= 2.591
FINISH

```
*****************************************************************
*                                                               *
*              THE BEACH WATERPARK AND MONTANO PADS             *
*                          (2015016)                            *
*           PROPOSED CONDITIONS (100-YEAR, 24-HR STORM)         *
*                                                               *
*****************************************************************
*
START                   TIME=0.0 HR
RAINFALL                TYPE=2 RAIN QUARTER=0.0 IN
                        RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                        RAIN DAY=2.75 IN DT=0.02253 HR
*
*BASIN 1
*
COMPUTE NM HYD          ID=1 HYD NO=101 AREA=0.00328 SQ MI
                        PER A=0 PER B=22.00 PER C=0.00 PER D=78.00
                        TP=0 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1

*
*BASIN 2
*
COMPUTE NM HYD          ID=2 HYD NO=102 AREA=0.00453 SQ MI
                        PER A=0 PER B=26.00 PER C=0.00 PER D=74.00
                        TP=0 HR MASS RAINFALL=-1
PRINT HYD               ID=2 CODE=1

*
*BASIN 3
*
COMPUTE NM HYD          ID=3 HYD NO=103 AREA=0.00286 SQ MI
                        PER A=0 PER B=22.00 PER C=0.00 PER D=78.00
                        TP=0 HR MASS RAINFALL=-1
PRINT HYD               ID=3 CODE=1

*
*BASIN 4
*
COMPUTE NM HYD          ID=4 HYD NO=104 AREA=0.00294 SQ MI
                        PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                        TP=0 HR MASS RAINFALL=-1
PRINT HYD               ID=4 CODE=1

*
*BASIN 5
*
COMPUTE NM HYD          ID=5 HYD NO=105 AREA=0.00543 SQ MI
```

```
                    PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                    TP=0 HR MASS RAINFALL=-1
PRINT HYD           ID=5 CODE=1

*
*BASIN 6
*
COMPUTE NM HYD      ID=6 HYD NO=106 AREA=0.01014 SQ MI
                    PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                    TP=0 HR MASS RAINFALL=-1
PRINT HYD           ID=6 CODE=1

*
*BASIN 7
*
COMPUTE NM HYD      ID=7 HYD NO=107 AREA=0.00512 SQ MI
                    PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                    TP=0 HR MASS RAINFALL=-1
PRINT HYD           ID=7 CODE=1

*
*BASIN 8
*
COMPUTE NM HYD      ID=8 HYD NO=108 AREA=0.00283 SQ MI
                    PER A=100.00 PER B=0 PER C=0.00 PER D=0
                    TP=0 HR MASS RAINFALL=-1
PRINT HYD           ID=8 CODE=1

*
*BASIN 9
*
COMPUTE NM HYD      ID=9 HYD NO=109 AREA=0.00441 SQ MI
                    PER A=0.00 PER B=20.00 PER C=0.00 PER D=80.00
                    TP=0 HR MASS RAINFALL=-1
PRINT HYD           ID=9 CODE=1

*
*ADD BASINS 4-9; BASINS 1-3 DRAIN TO STREET AND DON'T ENTER POND
*
ADD HYD             ID=10 HYD NO=201.00 ID=4  ID=5
ADD HYD             ID=11 HYD NO=202.00 ID=10 ID=6
ADD HYD             ID=12 HYD NO=203.00 ID=11 ID=7
ADD HYD             ID=13 HYD NO=204.00 ID=12 ID=8
ADD HYD             ID=14 HYD NO=205.00 ID=13 ID=9

*
PRINT HYD           ID=14 CODE=1
```

```
*
*POND
*
ROUTE RESERVOIR     ID=15 HYD NO=301.00 INFLOW ID=14 CODE=24
                    OUTFLOW(CFS)      STORAGE(AC-FT)  ELEVATION(FT)
                        0.0000            0.0000          5029.00
                        0.9501            0.3571          5030.00
                        1.4634            0.7141          5031.00
                        1.8385            1.1001          5032.00
                        2.1491            1.5439          5033.00
                        2.4202            2.0454          5034.00
                        2.6639            2.6048          5035.00

PRINT HYD           ID=15 CODE=1
*
FINISH
```

```
        AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.01a - Rel: 01a
             RUN DATE (MON/DAY/YR) = 08/28/2015
             START TIME (HR:MIN:SEC) = 10:31:48     USER NO.=
AHYMO_Temp_User:20122010
             INPUT FILE = Property\Filing - PDF's Only\Grading & Drainage\2015016
24hour input 8-26-15.txt

**********************************************************************
*                                                                    *
*                THE BEACH WATERPARK AND MONTANO PADS                *
*                                (2015016)                           *

*              PROPOSED CONDITIONS (100-YEAR, 24-HR STORM)           *
*                                                                    *
**********************************************************************
*
START                  TIME=0.0 HR
RAINFALL               TYPE=2 RAIN QUARTER=0.0 IN
                       RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                       RAIN DAY=2.75 IN DT=0.02253 HR

                 24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE
AREAS (NM & AZ) - D1
                 DT =   0.022530 HOURS        END TIME =    23.994452 HOURS
                   0.0000  0.0010  0.0020  0.0031  0.0041  0.0053  0.0064
                   0.0075  0.0087  0.0100  0.0113  0.0126  0.0140  0.0154
                   0.0169  0.0187  0.0218  0.0249  0.0280  0.0313  0.0347
                   0.0382  0.0417  0.0455  0.0493  0.0531  0.0570  0.0610
                   0.0650  0.0690  0.0731  0.0773  0.0815  0.0857  0.0903
                   0.0950  0.0998  0.1045  0.1099  0.1153  0.1207  0.1285
                   0.1416  0.1546  0.1677  0.1836  0.2011  0.2187  0.2362
                   0.2602  0.2848  0.3093  0.3366  0.3734  0.4103  0.4472
                   0.4979  0.5616  0.6252  0.6889  0.8393  1.0089  1.1785
                   1.3389  1.4329  1.5269  1.6209  1.6952  1.7424  1.7896
                   1.8369  1.8714  1.9012  1.9309  1.9605  1.9811  2.0017
                   2.0223  2.0412  2.0563  2.0713  2.0864  2.0992  2.1107
                   2.1221  2.1335  2.1390  2.1441  2.1491  2.1540  2.1585
                   2.1629  2.1674  2.1714  2.1751  2.1787  2.1823  2.1857
                   2.1891  2.1924  2.1958  2.1990  2.2022  2.2054  2.2079
                   2.2095  2.2110  2.2126  2.2141  2.2156  2.2171  2.2186
                   2.2200  2.2214  2.2228  2.2242  2.2256  2.2269  2.2283
                   2.2296  2.2309  2.2322  2.2335  2.2348  2.2360  2.2372
                   2.2385  2.2397  2.2409  2.2421  2.2432  2.2444  2.2456
                   2.2467  2.2478  2.2489  2.2501  2.2511  2.2522  2.2533
                   2.2544  2.2554  2.2565  2.2575  2.2586  2.2596  2.2606
                   2.2616  2.2626  2.2636  2.2645  2.2655  2.2665  2.2674
                   2.2684  2.2693  2.2703  2.2712  2.2721  2.2731  2.2740
```

2.2749	2.2758	2.2767	2.2776	2.2785	2.2794	2.2803
2.2812	2.2820	2.2829	2.2838	2.2846	2.2855	2.2863
2.2872	2.2880	2.2889	2.2897	2.2905	2.2913	2.2922
2.2930	2.2938	2.2946	2.2954	2.2962	2.2970	2.2978
2.2986	2.2993	2.3001	2.3009	2.3017	2.3024	2.3032
2.3040	2.3047	2.3055	2.3062	2.3070	2.3077	2.3085
2.3092	2.3099	2.3107	2.3114	2.3121	2.3128	2.3135
2.3142	2.3150	2.3157	2.3164	2.3171	2.3178	2.3185
2.3191	2.3198	2.3205	2.3212	2.3219	2.3226	2.3232
2.3239	2.3246	2.3252	2.3259	2.3266	2.3272	2.3279
2.3285	2.3292	2.3298	2.3305	2.3311	2.3317	2.3324
2.3330	2.3336	2.3343	2.3349	2.3355	2.3361	2.3368
2.3374	2.3380	2.3386	2.3392	2.3398	2.3404	2.3410
2.3416	2.3422	2.3428	2.3434	2.3440	2.3446	2.3452
2.3458	2.3464	2.3469	2.3475	2.3481	2.3487	2.3492
2.3498	2.3504	2.3510	2.3515	2.3521	2.3527	2.3533
2.3538	2.3544	2.3550	2.3555	2.3561	2.3567	2.3573
2.3578	2.3584	2.3590	2.3595	2.3601	2.3607	2.3612
2.3618	2.3624	2.3630	2.3635	2.3641	2.3647	2.3652
2.3658	2.3664	2.3669	2.3675	2.3681	2.3686	2.3692
2.3698	2.3703	2.3709	2.3715	2.3720	2.3726	2.3732
2.3737	2.3743	2.3749	2.3754	2.3760	2.3766	2.3771
2.3777	2.3783	2.3788	2.3794	2.3800	2.3805	2.3811
2.3816	2.3822	2.3828	2.3833	2.3839	2.3845	2.3850
2.3856	2.3861	2.3867	2.3873	2.3878	2.3884	2.3890
2.3895	2.3901	2.3906	2.3912	2.3918	2.3923	2.3929
2.3934	2.3940	2.3946	2.3951	2.3957	2.3962	2.3968
2.3973	2.3979	2.3985	2.3990	2.3996	2.4001	2.4007
2.4013	2.4018	2.4024	2.4029	2.4035	2.4040	2.4046
2.4051	2.4057	2.4063	2.4068	2.4074	2.4079	2.4085
2.4090	2.4096	2.4101	2.4107	2.4112	2.4118	2.4124
2.4129	2.4135	2.4140	2.4146	2.4151	2.4157	2.4162
2.4168	2.4173	2.4179	2.4184	2.4190	2.4195	2.4201
2.4206	2.4212	2.4217	2.4223	2.4228	2.4234	2.4239
2.4245	2.4250	2.4256	2.4261	2.4267	2.4272	2.4278
2.4283	2.4289	2.4294	2.4300	2.4305	2.4311	2.4316
2.4322	2.4327	2.4333	2.4338	2.4344	2.4349	2.4354
2.4360	2.4365	2.4371	2.4376	2.4382	2.4387	2.4393
2.4398	2.4403	2.4409	2.4414	2.4420	2.4425	2.4431
2.4436	2.4442	2.4447	2.4452	2.4458	2.4463	2.4469
2.4474	2.4480	2.4485	2.4490	2.4496	2.4501	2.4507
2.4512	2.4517	2.4523	2.4528	2.4534	2.4539	2.4544
2.4550	2.4555	2.4561	2.4566	2.4571	2.4577	2.4582
2.4587	2.4593	2.4598	2.4604	2.4609	2.4614	2.4620
2.4625	2.4630	2.4636	2.4641	2.4647	2.4652	2.4657
2.4663	2.4668	2.4673	2.4679	2.4684	2.4689	2.4695
2.4700	2.4705	2.4711	2.4716	2.4721	2.4727	2.4732
2.4737	2.4743	2.4748	2.4753	2.4759	2.4764	2.4769

2.4775	2.4780	2.4785	2.4791	2.4796	2.4801	2.4807
2.4812	2.4817	2.4822	2.4828	2.4833	2.4838	2.4844
2.4849	2.4854	2.4860	2.4865	2.4870	2.4875	2.4881
2.4886	2.4891	2.4897	2.4902	2.4907	2.4912	2.4918
2.4923	2.4928	2.4933	2.4939	2.4944	2.4949	2.4954
2.4960	2.4965	2.4970	2.4975	2.4981	2.4986	2.4991
2.4996	2.5002	2.5007	2.5012	2.5017	2.5023	2.5028
2.5033	2.5038	2.5044	2.5049	2.5054	2.5059	2.5064
2.5070	2.5075	2.5080	2.5085	2.5090	2.5096	2.5101
2.5106	2.5111	2.5116	2.5122	2.5127	2.5132	2.5137
2.5142	2.5148	2.5153	2.5158	2.5163	2.5168	2.5174
2.5179	2.5184	2.5189	2.5194	2.5199	2.5205	2.5210
2.5215	2.5220	2.5225	2.5230	2.5236	2.5241	2.5246
2.5251	2.5256	2.5261	2.5266	2.5272	2.5277	2.5282
2.5287	2.5292	2.5297	2.5302	2.5308	2.5313	2.5318
2.5323	2.5328	2.5333	2.5338	2.5343	2.5349	2.5354
2.5359	2.5364	2.5369	2.5374	2.5379	2.5384	2.5389
2.5395	2.5400	2.5405	2.5410	2.5415	2.5420	2.5425
2.5430	2.5435	2.5440	2.5445	2.5451	2.5456	2.5461
2.5466	2.5471	2.5476	2.5481	2.5486	2.5491	2.5496
2.5501	2.5506	2.5511	2.5516	2.5521	2.5527	2.5532
2.5537	2.5542	2.5547	2.5552	2.5557	2.5562	2.5567
2.5572	2.5577	2.5582	2.5587	2.5592	2.5597	2.5602
2.5607	2.5612	2.5617	2.5622	2.5627	2.5632	2.5637
2.5642	2.5647	2.5652	2.5657	2.5662	2.5667	2.5672
2.5677	2.5682	2.5687	2.5692	2.5697	2.5702	2.5707
2.5712	2.5717	2.5722	2.5727	2.5732	2.5737	2.5742
2.5747	2.5752	2.5757	2.5762	2.5767	2.5772	2.5777
2.5782	2.5787	2.5792	2.5797	2.5802	2.5807	2.5812
2.5816	2.5821	2.5826	2.5831	2.5836	2.5841	2.5846
2.5851	2.5856	2.5861	2.5866	2.5871	2.5876	2.5881
2.5886	2.5890	2.5895	2.5900	2.5905	2.5910	2.5915
2.5920	2.5925	2.5930	2.5935	2.5940	2.5944	2.5949
2.5954	2.5959	2.5964	2.5969	2.5974	2.5979	2.5984
2.5988	2.5993	2.5998	2.6003	2.6008	2.6013	2.6018
2.6023	2.6027	2.6032	2.6037	2.6042	2.6047	2.6052
2.6057	2.6061	2.6066	2.6071	2.6076	2.6081	2.6086
2.6091	2.6095	2.6100	2.6105	2.6110	2.6115	2.6120
2.6124	2.6129	2.6134	2.6139	2.6144	2.6149	2.6153
2.6158	2.6163	2.6168	2.6173	2.6177	2.6182	2.6187
2.6192	2.6197	2.6201	2.6206	2.6211	2.6216	2.6221
2.6225	2.6230	2.6235	2.6240	2.6245	2.6249	2.6254
2.6259	2.6264	2.6268	2.6273	2.6278	2.6283	2.6288
2.6292	2.6297	2.6302	2.6307	2.6311	2.6316	2.6321
2.6326	2.6330	2.6335	2.6340	2.6345	2.6349	2.6354
2.6359	2.6364	2.6368	2.6373	2.6378	2.6383	2.6387
2.6392	2.6397	2.6401	2.6406	2.6411	2.6416	2.6420
2.6425	2.6430	2.6434	2.6439	2.6444	2.6449	2.6453

2.6458	2.6463	2.6467	2.6472	2.6477	2.6481	2.6486
2.6491	2.6496	2.6500	2.6505	2.6510	2.6514	2.6519
2.6524	2.6528	2.6533	2.6538	2.6542	2.6547	2.6552
2.6556	2.6561	2.6566	2.6570	2.6575	2.6580	2.6584
2.6589	2.6594	2.6598	2.6603	2.6608	2.6612	2.6617
2.6621	2.6626	2.6631	2.6635	2.6640	2.6645	2.6649
2.6654	2.6658	2.6663	2.6668	2.6672	2.6677	2.6682
2.6686	2.6691	2.6695	2.6700	2.6705	2.6709	2.6714
2.6718	2.6723	2.6728	2.6732	2.6737	2.6741	2.6746
2.6751	2.6755	2.6760	2.6764	2.6769	2.6773	2.6778
2.6783	2.6787	2.6792	2.6796	2.6801	2.6805	2.6810
2.6815	2.6819	2.6824	2.6828	2.6833	2.6837	2.6842
2.6846	2.6851	2.6855	2.6860	2.6865	2.6869	2.6874
2.6878	2.6883	2.6887	2.6892	2.6896	2.6901	2.6905
2.6910	2.6914	2.6919	2.6923	2.6928	2.6932	2.6937
2.6941	2.6946	2.6950	2.6955	2.6959	2.6964	2.6968
2.6973	2.6977	2.6982	2.6986	2.6991	2.6995	2.7000
2.7004	2.7009	2.7013	2.7018	2.7022	2.7027	2.7031
2.7036	2.7040	2.7045	2.7049	2.7054	2.7058	2.7062
2.7067	2.7071	2.7076	2.7080	2.7085	2.7089	2.7094
2.7098	2.7103	2.7107	2.7111	2.7116	2.7120	2.7125
2.7129	2.7134	2.7138	2.7142	2.7147	2.7151	2.7156
2.7160	2.7165	2.7169	2.7173	2.7178	2.7182	2.7187
2.7191	2.7195	2.7200	2.7204	2.7209	2.7213	2.7217
2.7222	2.7226	2.7231	2.7235	2.7239	2.7244	2.7248
2.7252	2.7257	2.7261	2.7266	2.7270	2.7274	2.7279
2.7283	2.7287	2.7292	2.7296	2.7300	2.7305	2.7309
2.7314	2.7318	2.7322	2.7327	2.7331	2.7335	2.7340
2.7344	2.7348	2.7353	2.7357	2.7361	2.7366	2.7370
2.7374	2.7379	2.7383	2.7387	2.7392	2.7396	2.7400
2.7405	2.7409	2.7413	2.7417	2.7422	2.7426	2.7430
2.7435	2.7439	2.7443	2.7448	2.7452	2.7456	2.7460
2.7465	2.7469	2.7473	2.7478	2.7482	2.7486	2.7490
2.7495	2.7500					

```
*
*BASIN 1
*
COMPUTE NM HYD      ID=1 HYD NO=101 AREA=0.00328 SQ MI
                    PER A=0 PER B=22.00 PER C=0.00 PER D=78.00
                    TP=0 HR MASS RAINFALL=-1
        *****Warning*****A value for the Time to Peak was not previously computed;
use Tp=0.133333 hrs.

        TIME TO PEAK (hrs)=  0.1333

        K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
```

```
        UNIT PEAK =   10.098    CFS   UNIT VOLUME =   0.9989       B =   526.28
 P60 = 2.0100
        AREA =     0.002558 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

        K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
        UNIT PEAK =   1.7584    CFS   UNIT VOLUME =   0.9919       B =   324.90
 P60 = 2.0100
        AREA =     0.000722 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   101.00

        RUNOFF VOLUME =     2.16182 INCHES     =       0.3782 ACRE-FEET
        PEAK DISCHARGE RATE =       9.24 CFS  AT   1.510 HOURS   BASIN AREA =
0.0033 SQ. MI.

    *
    *BASIN 2
    *
    COMPUTE NM HYD      ID=2 HYD NO=102 AREA=0.00453 SQ MI
                        PER A=0 PER B=26.00 PER C=0.00 PER D=74.00
                        TP=0 HR MASS RAINFALL=-1
        TIME TO PEAK (hrs)=  0.1333
        *****Warning*****This Tp value was used for a previously computed
hydrograph.
                          A new Tp value should be computed.

        K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
        UNIT PEAK =   13.231    CFS   UNIT VOLUME =   0.9992       B =   526.28
 P60 = 2.0100
        AREA =     0.003352 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

        K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
        UNIT PEAK =   2.8700    CFS   UNIT VOLUME =   0.9952       B =   324.90
 P60 = 2.0100
```

```
        AREA =     0.001178 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   102.00

        RUNOFF VOLUME =     2.09990 INCHES     =       0.5073 ACRE-FEET
        PEAK DISCHARGE RATE =      12.50 CFS  AT   1.510 HOURS   BASIN AREA =
0.0045 SQ. MI.

    *
    *BASIN 3
    *
    COMPUTE NM HYD      ID=3 HYD NO=103 AREA=0.00286 SQ MI
                        PER A=0 PER B=22.00 PER C=0.00 PER D=78.00
                        TP=0 HR MASS RAINFALL=-1
         TIME TO PEAK (hrs)=  0.1333
         *****Warning*****This Tp value was used for a previously computed
hydrograph.
                          A new Tp value should be computed.

         K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
         UNIT PEAK =   8.8051    CFS   UNIT VOLUME =   0.9988       B =   526.28
 P60 = 2.0100
         AREA =     0.002231 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

         K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
         UNIT PEAK =   1.5332    CFS   UNIT VOLUME =   0.9909       B =   324.90
 P60 = 2.0100
         AREA =     0.000629 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=3 CODE=1

                                        PARTIAL HYDROGRAPH   103.00

        RUNOFF VOLUME =     2.16182 INCHES     =       0.3297 ACRE-FEET
        PEAK DISCHARGE RATE =       8.06 CFS  AT   1.510 HOURS   BASIN AREA =
```

```
0.0029 SQ. MI.

    *
    *BASIN 4
    *
    COMPUTE NM HYD       ID=4 HYD NO=104 AREA=0.00294 SQ MI
                         PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                         TP=0 HR MASS RAINFALL=-1
         TIME TO PEAK (hrs)=  0.1333
         *****Warning*****This Tp value was used for a previously computed
hydrograph.
                              A new Tp value should be computed.

         K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
         UNIT PEAK =   9.2835    CFS   UNIT VOLUME =   0.9988       B =   526.28
 P60 = 2.0100
         AREA =     0.002352 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

         K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
         UNIT PEAK =   1.4328    CFS   UNIT VOLUME =   0.9904       B =   324.90
 P60 = 2.0100
         AREA =     0.000588 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD            ID=4 CODE=1

                                        PARTIAL HYDROGRAPH   104.00

        RUNOFF VOLUME =     2.19278 INCHES     =       0.3438 ACRE-FEET
        PEAK DISCHARGE RATE =       8.37 CFS  AT   1.510 HOURS   BASIN AREA =
0.0029 SQ. MI.

    *
    *BASIN 5
    *
    COMPUTE NM HYD       ID=5 HYD NO=105 AREA=0.00543 SQ MI
                         PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                         TP=0 HR MASS RAINFALL=-1
         TIME TO PEAK (hrs)=  0.1333
         *****Warning*****This Tp value was used for a previously computed
hydrograph.
```

```
A new Tp value should be computed.

        K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
        UNIT PEAK =   17.146    CFS   UNIT VOLUME =   0.9994       B =   526.28
 P60 = 2.0100
        AREA =     0.004344 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

        K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
        UNIT PEAK =   2.6463    CFS   UNIT VOLUME =   0.9949       B =   324.90
 P60 = 2.0100
        AREA =     0.001086 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=5 CODE=1

                                        PARTIAL HYDROGRAPH   105.00

        RUNOFF VOLUME =     2.19277 INCHES     =       0.6350 ACRE-FEET
        PEAK DISCHARGE RATE =      15.44 CFS  AT   1.510 HOURS   BASIN AREA =
0.0054 SQ. MI.

    *
    *BASIN 6
    *
    COMPUTE NM HYD      ID=6 HYD NO=106 AREA=0.01014 SQ MI
                        PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                        TP=0 HR MASS RAINFALL=-1
        TIME TO PEAK (hrs)=  0.1333
        *****Warning*****This Tp value was used for a previously computed
hydrograph.
                          A new Tp value should be computed.

        K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
        UNIT PEAK =   32.019    CFS   UNIT VOLUME =   0.9997       B =   526.28
 P60 = 2.0100
        AREA =     0.008112 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530
```

```
        K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
        UNIT PEAK =   4.9418    CFS   UNIT VOLUME =   0.9972       B =   324.90
 P60 = 2.0100
        AREA =     0.002028 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=6 CODE=1

                                        PARTIAL HYDROGRAPH   106.00

        RUNOFF VOLUME =     2.19278 INCHES     =       1.1858 ACRE-FEET
        PEAK DISCHARGE RATE =      28.82 CFS  AT   1.510 HOURS   BASIN AREA =
0.0101 SQ. MI.

    *
    *BASIN 7
    *
    COMPUTE NM HYD      ID=7 HYD NO=107 AREA=0.00512 SQ MI
                        PER A=0 PER B=20.00 PER C=0.00 PER D=80.00
                        TP=0 HR MASS RAINFALL=-1
        TIME TO PEAK (hrs)=  0.1333
        *****Warning*****This Tp value was used for a previously computed
hydrograph.
                            A new Tp value should be computed.

        K =  0.072666HR    TP =  0.133333HR    K/TP RATIO =  0.545000     SHAPE
CONSTANT, N =  7.106428
        UNIT PEAK =   16.167    CFS   UNIT VOLUME =   0.9994       B =   526.28
 P60 = 2.0100
        AREA =     0.004096 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

        K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
        UNIT PEAK =   2.4953    CFS   UNIT VOLUME =   0.9943       B =   324.90
 P60 = 2.0100
        AREA =     0.001024 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD           ID=7 CODE=1
```

PARTIAL HYDROGRAPH 107.00

RUNOFF VOLUME = 2.19277 INCHES = 0.5988 ACRE-FEET
PEAK DISCHARGE RATE = 14.56 CFS AT 1.510 HOURS BASIN AREA = 0.0051 SQ. MI.

*
*BASIN 8
*
COMPUTE NM HYD ID=8 HYD NO=108 AREA=0.00283 SQ MI
PER A=100.00 PER B=0 PER C=0.00 PER D=0
TP=0 HR MASS RAINFALL=-1
TIME TO PEAK (hrs)= 0.1333
*****Warning*****This Tp value was used for a previously computed hydrograph.
A new Tp value should be computed.

K = 0.160194HR TP = 0.133333HR K/TP RATIO = 1.201459 SHAPE CONSTANT, N = 2.957769
UNIT PEAK = 5.9084 CFS UNIT VOLUME = 0.9975 B = 278.37 P60 = 2.0100
AREA = 0.002830 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.022530

PRINT HYD ID=8 CODE=1

PARTIAL HYDROGRAPH 108.00

RUNOFF VOLUME = 0.75005 INCHES = 0.1132 ACRE-FEET
PEAK DISCHARGE RATE = 3.76 CFS AT 1.532 HOURS BASIN AREA = 0.0028 SQ. MI.

*
*BASIN 9
*
COMPUTE NM HYD ID=9 HYD NO=109 AREA=0.00441 SQ MI
PER A=0.00 PER B=20.00 PER C=0.00 PER D=80.00
TP=0 HR MASS RAINFALL=-1
TIME TO PEAK (hrs)= 0.1333
*****Warning*****This Tp value was used for a previously computed hydrograph.
A new Tp value should be computed.

K = 0.072666HR TP = 0.133333HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 13.925 CFS UNIT VOLUME = 0.9992 B = 526.28

```
 P60 = 2.0100
         AREA =     0.003528 SQ MI    IA =   0.10000 INCHES    INF =   0.04000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

         K =  0.132120HR    TP =  0.133333HR    K/TP RATIO =  0.990905     SHAPE
CONSTANT, N =  3.562974
         UNIT PEAK =   2.1492    CFS   UNIT VOLUME =   0.9936       B =   324.90
 P60 = 2.0100
         AREA =     0.000882 SQ MI    IA =   0.50000 INCHES    INF =   1.25000
INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
0.022530

    PRINT HYD            ID=9 CODE=1

                                          PARTIAL HYDROGRAPH   109.00

        RUNOFF VOLUME =     2.19278 INCHES     =       0.5157 ACRE-FEET
        PEAK DISCHARGE RATE =      12.55 CFS  AT   1.510 HOURS   BASIN AREA =
0.0044 SQ. MI.

    *
    *ADD BASINS 4-9; BASINS 1-3 DRAIN TO STREET AND DON'T ENTER POND
    *

    ADD HYD                          ID=10 HYD NO=201.00 ID=4  ID=5

    ADD HYD                          ID=11 HYD NO=202.00 ID=10 ID=6

    ADD HYD                          ID=12 HYD NO=203.00 ID=11 ID=7

    ADD HYD                          ID=13 HYD NO=204.00 ID=12 ID=8

    ADD HYD                          ID=14 HYD NO=205.00 ID=13 ID=9


    *
    PRINT HYD                ID=14 CODE=1

                                          PARTIAL HYDROGRAPH   205.00

        RUNOFF VOLUME =     2.06046 INCHES     =       3.3923 ACRE-FEET
        PEAK DISCHARGE RATE =      83.40 CFS  AT   1.532 HOURS   BASIN AREA =
0.0309 SQ. MI.

    *
```

```
*POND
*
ROUTE RESERVOIR     ID=15 HYD NO=301.00 INFLOW ID=14 CODE=24
                    OUTFLOW(CFS)      STORAGE(AC-FT)  ELEVATION(FT)
                        0.0000            0.0000          5029.00
                        0.9501            0.3571          5030.00
                        1.4634            0.7141          5031.00
                        1.8385            1.1001          5032.00
                                  2.1491            1.5439          5033.00

                        2.4202            2.0454          5034.00
                                  2.6639            2.6048          5035.00


* * * * * * * * * * * * * * * * *

  TIME      INFLOW    ELEV      VOLUME    OUTFLOW
  (HRS)     (CFS)     (FEET)    (AC-FT)   (CFS)

   0.00       0.00   5029.00     0.000      0.00
   0.54       0.00   5029.00     0.000      0.00
   1.08       5.53   5029.10     0.037      0.10
   1.62      61.95   5033.24     1.665      2.21
   2.16       5.95   5034.92     2.560      2.64
   2.70       0.92   5034.93     2.566      2.65
   3.24       0.21   5034.76     2.469      2.60
   3.79       0.14   5034.56     2.361      2.56
   4.33       0.16   5034.37     2.255      2.51
   4.87       0.21   5034.19     2.152      2.47
   5.41       0.27   5034.01     2.053      2.42
   5.95       0.34   5033.83     1.959      2.37
   6.49       0.36   5033.65     1.870      2.33
   7.03       0.36   5033.48     1.784      2.28
   7.57       0.36   5033.31     1.699      2.23
   8.11       0.36   5033.14     1.616      2.19
   8.65       0.36   5032.98     1.535      2.14
   9.19       0.35   5032.80     1.457      2.09
   9.73       0.35   5032.63     1.380      2.03
  10.27       0.35   5032.46     1.306      1.98
  10.81       0.34   5032.30     1.234      1.93
  11.36       0.34   5032.14     1.164      1.88
  11.90       0.34   5031.99     1.096      1.83
  12.44       0.34   5031.82     1.031      1.77
  12.98       0.33   5031.66     0.968      1.71
  13.52       0.33   5031.50     0.908      1.65
  14.06       0.33   5031.35     0.850      1.60
  14.60       0.33   5031.21     0.794      1.54
```

15.14	0.32	5031.07	0.741	1.49
15.68	0.32	5030.93	0.690	1.43
16.22	0.31	5030.80	0.642	1.36
16.76	0.32	5030.67	0.597	1.29
17.30	0.31	5030.55	0.554	1.23
17.84	0.31	5030.44	0.514	1.18
18.38	0.30	5030.33	0.476	1.12
18.93	0.30	5030.23	0.441	1.07
19.47	0.30	5030.14	0.408	1.02
20.01	0.30	5030.05	0.376	0.98
20.55	0.29	5029.97	0.347	0.92
21.09	0.29	5029.90	0.320	0.85
21.63	0.29	5029.83	0.296	0.79
22.17	0.29	5029.77	0.275	0.73
22.71	0.28	5029.72	0.256	0.68
23.25	0.28	5029.67	0.239	0.64
23.79	0.28	5029.63	0.224	0.60
24.33	0.03	5029.58	0.207	0.55
24.87	0.00	5029.52	0.184	0.49
25.41	0.00	5029.46	0.164	0.44
25.95	0.00	5029.41	0.145	0.39
26.50	0.00	5029.36	0.129	0.34
27.04	0.00	5029.32	0.115	0.30
27.58	0.00	5029.28	0.102	0.27
28.12	0.00	5029.25	0.090	0.24
28.66	0.00	5029.22	0.080	0.21
29.20	0.00	5029.20	0.071	0.19
29.74	0.00	5029.18	0.063	0.17

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
30.28	0.00	5029.16	0.056	0.15
30.82	0.00	5029.14	0.050	0.13
31.36	0.00	5029.12	0.044	0.12
31.90	0.00	5029.11	0.039	0.10
32.44	0.00	5029.10	0.035	0.09
32.98	0.00	5029.09	0.031	0.08
33.52	0.00	5029.08	0.028	0.07
34.07	0.00	5029.07	0.024	0.06
34.61	0.00	5029.06	0.022	0.06
35.15	0.00	5029.05	0.019	0.05
35.69	0.00	5029.05	0.017	0.05
36.23	0.00	5029.04	0.015	0.04
36.77	0.00	5029.04	0.013	0.04
37.31	0.00	5029.03	0.012	0.03
37.85	0.00	5029.03	0.011	0.03
38.39	0.00	5029.03	0.009	0.03

```
   38.93        0.00   5029.02      0.008      0.02
   39.47        0.00   5029.02      0.007      0.02
   40.01        0.00   5029.02      0.007      0.02
   40.55        0.00   5029.02      0.006      0.02
   41.09        0.00   5029.01      0.005      0.01
   41.64        0.00   5029.01      0.005      0.01
   42.18        0.00   5029.01      0.004      0.01
   42.72        0.00   5029.01      0.004      0.01
   43.26        0.00   5029.01      0.003      0.01
   43.80        0.00   5029.01      0.003      0.01
   44.34        0.00   5029.01      0.003      0.01
   44.88        0.00   5029.01      0.002      0.01
   45.42        0.00   5029.01      0.002      0.01
   45.96        0.00   5029.00      0.002      0.00
 PEAK DISCHARGE =        2.658 CFS - PEAK OCCURS AT HOUR    2.43
 MAXIMUM WATER SURFACE ELEVATION =     5034.975
 MAXIMUM STORAGE =        2.5905 AC-FT      INCREMENTAL TIME=    0.022530HRS

PRINT HYD           ID=15 CODE=1

                                                HYDROGRAPH FROM AREA   301.00

        RUNOFF VOLUME =     2.06046 INCHES     =       3.3923 ACRE-FEET
        PEAK DISCHARGE RATE =       2.66 CFS  AT   2.433 HOURS   BASIN AREA =
0.0309 SQ. MI.

    *
    FINISH

        NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 10:31:48
```

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 25, 2003

Ronald R. Bohannan, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

RE: MONTANO PADS- (STARBUCKS & KIVA JUICE) (F-16/D3E1)
(1450A Montano and 1450B Montano NW)
ENGINEERS CERTIFICATION FOR CERTIFICATE OF OCCUPANCY
ENGINEERS STAMP DATED 10/8/2002
ENGINEERS CERTIFICATION DATED 3/20/2003

Dear Mr. Bohannan:

Based upon the information in your Engineers Certification submittal dated 3/21/2003, the above referenced site is approved for Permanent Certificate of Occupancy.

If I can be of further assistance, please contact me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Development & Building Services Division

C: Certificate of Occupancy Clerk, COA
drainage file
approval file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 8, 2002

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

Re: Montano Pads @ The Beach Revised Grading Plan (for Starbucks)
Engineer's Stamp dated 10-8-02 (F16/D3E1)

Dear Mr. Bohannan,

Based upon the information provided in your submittal dated 10-15-02, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

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

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: file

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 28, 2001

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

Re: Montano Pads @ The Beach Water Park Drainage Report
Engineer's Stamp dated 7-17-01 (F16/D3E1)

Dear Mr. Bohannan,

Based upon the information provided in your resubmittal dated 8-28-01, the above referenced plan is approved for Building Permit.

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

Also, prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

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

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 7, 2001

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

Re: Montano Pads @ The Beach Water Park Drainage Report
Engineer's Stamp dated 2-19-01 (F16/D3E1)

Dear Mr. Bohannan,

Based upon the information provided in your resubmittal dated 2-21-00, the above referenced plan is approved for Site Plan for Subdivision and Site Plan for Building Permit action by the DRB. Prior to Building Permit, there are a few spot elevations that need correcting. In addition, it appears there some spots that are receiving up to eight feet of fill without showing how the slope is affected. Also, to avoid over silting the pond, seeding will be required on the sloped areas.

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

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE REPORT

For

Montano Pads

Prepared by

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

Prepared for

Union Pension Transaction Trust

RECEIVED
MAR 08 2001
HYDROLOGY SECTION

March 7, 2001

RONALD RAY BOHANNAN
NEW MEXICO
03/07/01
REGISTERED PROFESSIONAL ENGINEER

Ronald R. Bohannan P.E. No. 7868

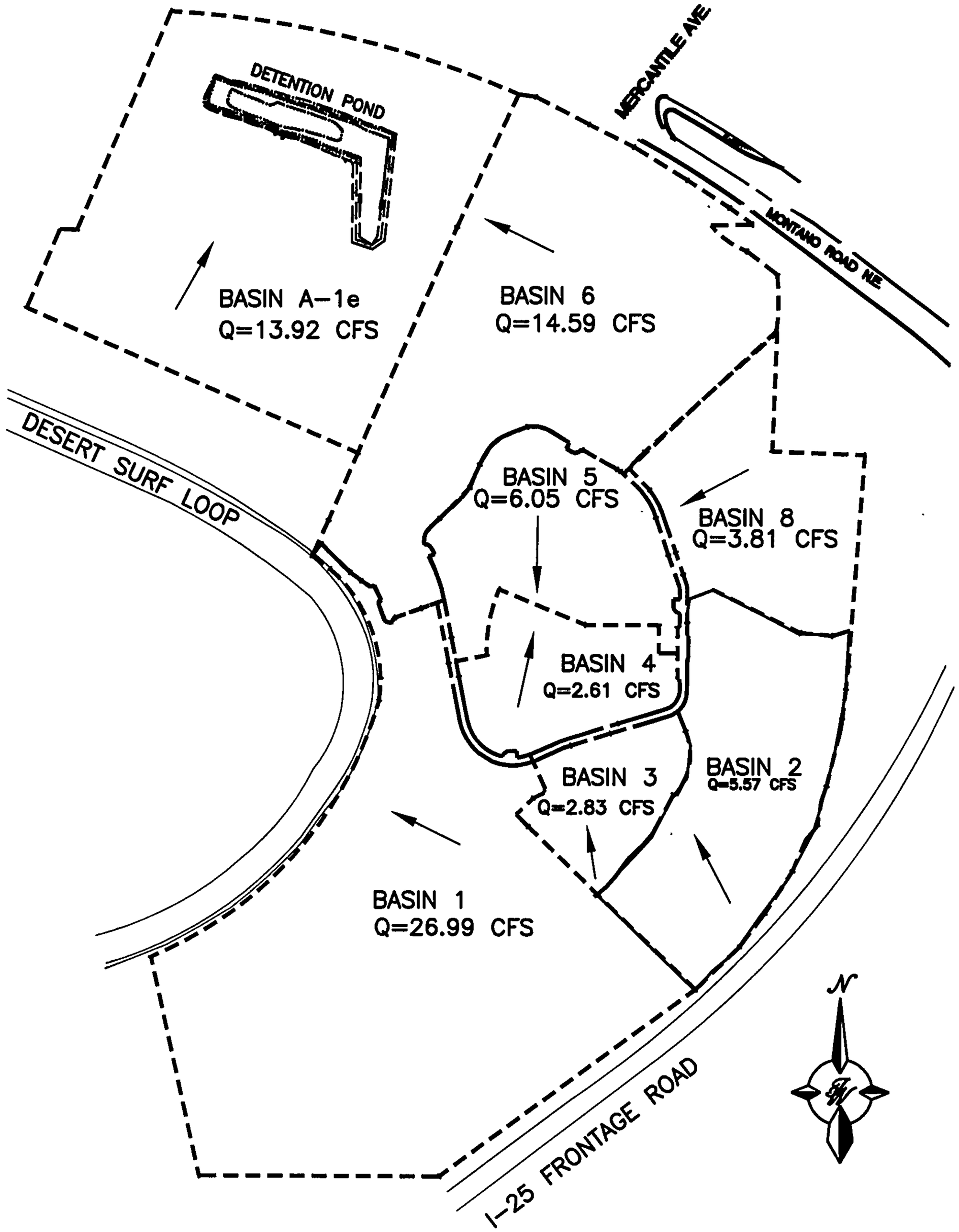
Location

This is a modification to The Beach Drainage Report prepared by Tierra West, LLC (F-16/D3E1) stamped July 30, 1999. This report requests an expansion of a service station, fast food facility, and coffee shop on the site. The Beach is an existing recreational water park developed in 1987. It is located northeast of Montaño Road and southwest of the I-25 frontage road. The site is identified as Tract C-3, C-2, and Tract A of Renaissance III. The site is shown on the attached Zone Atlas Map F-16, on page 1, and contains approximately 2.82 acres with a 100-year, 24-hour developed flow of 11.99 cfs. The purpose of this report is to provide the drainage analysis and management plan for the proposed expansion of the Park.

Existing Drainage Conditions

Currently, the proposed site is partially developed and no offsite flows enter the site. There are two previous drainage reports for the site, one by Tierra West, LLC (F-16/D3E1) that refers to Wilson & Company's (F-16/D3E1) drainage plan stamped April 3, 1987. The reports define all basins and provide information of the trench drains and drop inlets for each basin. Shown on page 3 is the Original Basin Layout Map used in the two previous reports that does not have a Basin 7 and used the incorrect land treatments for several basins. The New Basin Layout Map, located on page 4, shows the modified basins and located in map pocket A is the Overall Grading and Drainage Plan that illustrates the existing storm drain infrastructure and the land treatments of the new basins. Due to the 20 percent or greater slopes located in Basins 2, 6, 8, and A-1e, the land treatments were modified to land treatment C and range from 10 to 45 percent, refer to appendix B for percentages of the land treatments for each basin and runoff summary tables.

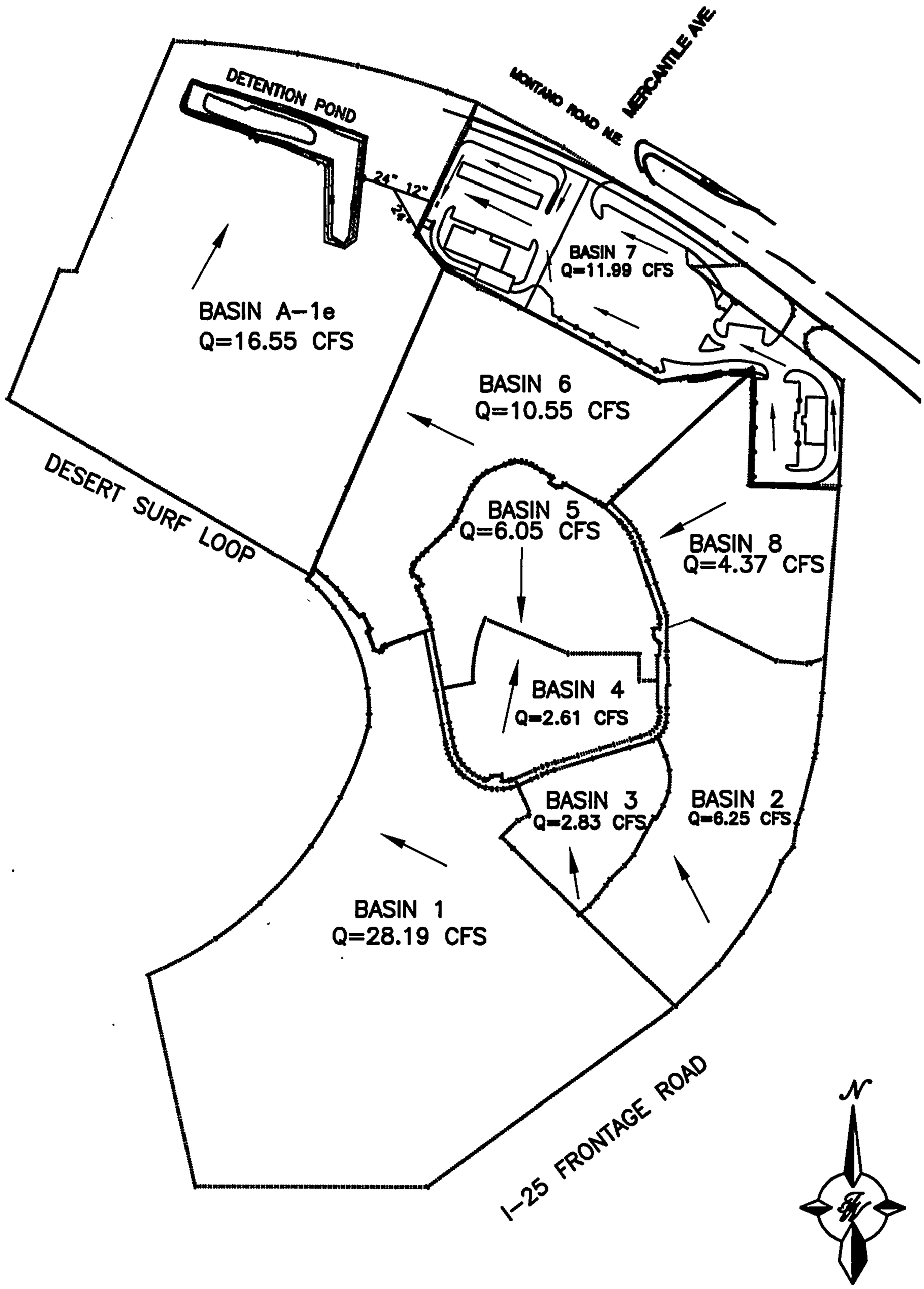
A summary of all the basin's flows and the location of their discharge is as follows: Basin 1, which consists of the parking area, free discharges 28.19 cfs through a series of sidewalk culverts into



ORIGINAL BASIN LAYOUT

EXHIBIT B-1

NOTE: BASIN 7 DOES NOT EXIST



New Basin Layout Map

EXHIBIT B-2

Desert Surf Circle and from there into an existing storm sewer system. Basins 2 through 8 and A-1e drain to the existing detention pond. Basin 2 discharges 6.25 cfs to a catch basin located in the service drive. Basin 3 discharges 2.83 cfs into a trench drain at the north end of the basin. Basin 4 discharges 2.61 cfs, while Basin 5 discharges 6.05 cfs, both basins are captured in a series of trench drains adjacent to the wave pool. Basin 6 routes 10.55 cfs into the detention pond. Basin 7, the proposed site, currently drains its undeveloped flows to the existing detention pond through a trench drain located on the south slope. Basin 8 discharges 4.37 cfs to trench drains located at the west end of the basin and Basin A-1e sheet flows 16.55 cfs into the detention pond. The outfall from the pond has a 6" orifice plate and discharges the flows into an existing 36" RCP and is carried into the Renaissance Center pond located north of Montano Boulevard and west of Bob Turner Ford's car lot. The total area that drains into the pond is 18.12 acres. A total runoff of 32.66 cfs is routed from Basins; 2, 3, 4, 5, 6, and 8 to a 24" RCP that ties into an existing manhole located east of the detention pond. The flows are then carried through another 24" RCP and out to the pond, refer to the Overall Grading and Drainage Plan in map pocket A. The 6" orifice plate limits the discharge from the pond to 1.86 cfs to stay within the guidelines outlined by the Renaissance Master Drainage Plan, which limits the site to 0.10 cfs per acre. Andrews, Asbury, and Robert, Inc. provided this information, in their Renaissance Center drainage report, revised February 22, 1985, section III page 9.

FEMA Map and Soil Conditions

The site is located on FEMA Map Section 350001C Panel 138D, as shown on the attached extract. The map shows that the site does not lie within any 100-year flood plains.

The site contains one soil group according to the Soil Conservation Service Survey of Bernalillo County. The soil is a Wink-Embudo complex with a moderate hazard of water erosion and medium runoff.

On-Site Drainage Management Plan

After investigation with the Water Park Management it's been indicated that the system is functioning without any problems no flooding is occurring in the park. Basically, everything will remain the same in the system designed by Tierra West, LLC (F-16/D3E1) with some minor modifications to the existing detention pond, due to the new developed flows from the proposed site in Basin 7. The runoff from the site will sheet flow west into a proposed type single "C" drop inlet shown on the Grading and Drainage Plan in map pocket B. Flows will discharge through a 12" pipe, which will convey the 11.99 cfs runoff to the existing detention pond. A total flow rate of 32.66 cfs from Basins 2, 3, 4, 5, 6, and 8 enter an existing manhole, east of the pond, and discharges into the pond through a 24" RCP. This storm drain system is under pressure during a 100-year, 24-hour storm and the existing pipes do have the carrying capacity. A HydroFlow computer program was used to determine that this system does work, refer to appendix E for calculations and profiles, which show the hydraulic grade lines. The emergency overflow, based on an additional 100-year storm, will discharge from the site through a four-foot screen wall downstream onto Basin A-1e and into the detention pond. A weir will be located at the Westside of the detention pond to release the flows under the Montano Bridge and into Alexander Boulevard, refer to Appendix F for calculations and Exhibits for clarification of the emergency overflows.

As a result from amount of fill for the proposed developed site, the sloped area occupied part of the detention pond. It was relocated from the previous drainage plan. However, from the new development flows of the proposed site the existing detention pond must be resized. The new pond is shown on the Pond Sheet in map pocket C. Its new maximum storage capacity is 1.7765 acre-feet and the maximum water surface elevation is 5035.14 feet, while the top of pond elevation is 5036.00 feet and bottom of pond is 5031.00 feet. The 6" orifice plate will remain at the outfall of the pond to control the discharge into the existing 36" RCP and will continue to flow into the Renaissance Center pond. The total area that drains into the pond is 18.12 acres. The 6" orifice plate limits the discharge

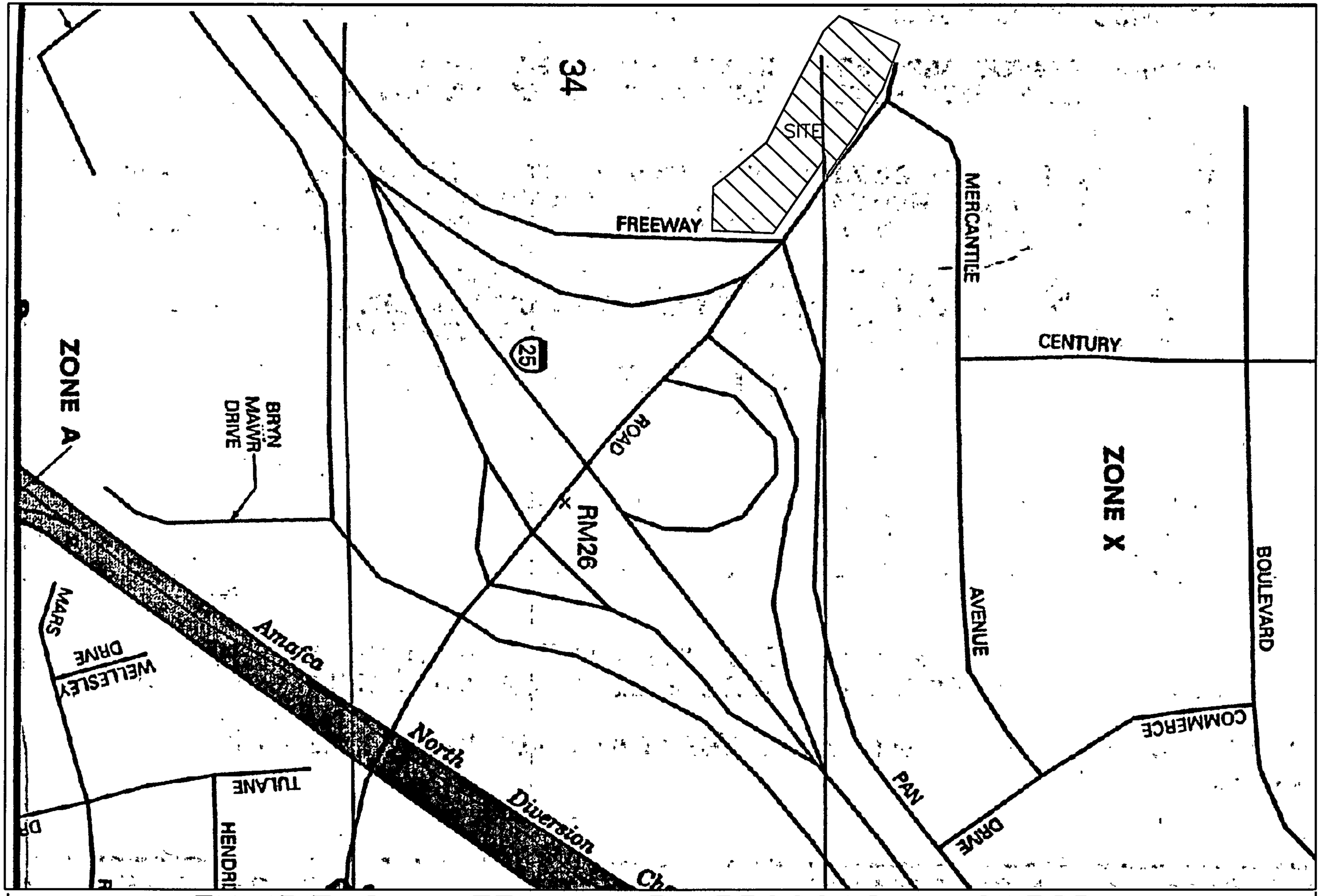


EXHIBIT C – FEMA MAP: 350001C – 0138D

from the pond to 1.86 cfs to stay within the guidelines outlined by the Renaissance Master Drainage Plan that limits the site to 0.10 cfs per acre.

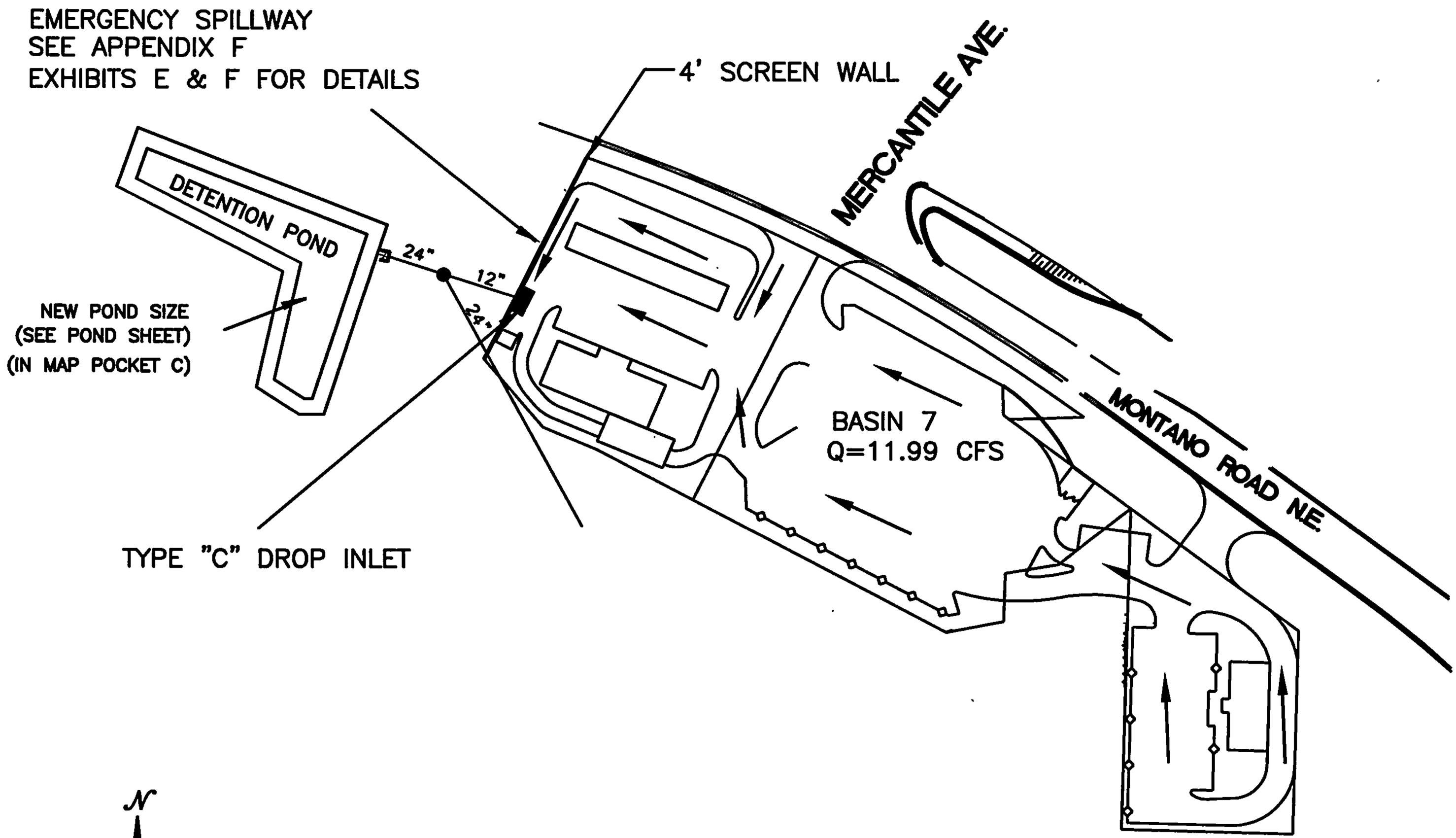
Criteria

The site was analyzed using the procedures outlined in the Development Process Manual Volume 2, Chapter 22. The AHYMO computer program was used to analyze all basins and the ponds. The existing and proposed conditions for all basins were analyzed for a 100-year, 24-hour rainfall event.

Summary

The purpose of this drainage plan is to request the expansion of a new service station, fast food facility, and coffee shop. The site has a developed peak discharge of 11.99 cfs. A 100-year, 24-hour storm would generate 0.473 acre-feet of runoff. A new basin layout with slight modifications to the previous drainage report by Tierra West, LLC (F-16/D3E1) were made for proper drainage. Basin 1, which consists of the parking area, free discharges 28.19 cfs through a series of sidewalk culverts into Desert Surf Circle and from there into an existing storm sewer system that eventually enters the 36" RCP at the outfall of the pond. From the new developed Basin 7, 11.99 cfs runoff and the rest of the basins will discharge a total of 44.65 cfs into the resized detention pond. The pond will capture 100 percent of the flows generated within the developed site. The detention pond will be drained at a controlled release rate into an existing 36" RCP and carried into the Renaissance Center pond located north of Montano Boulevard and west of Bob Turner Ford's car lot. The release rate from the detention pond will be limited to 1.86 cfs in order to comply with Renaissance Master Plan of 0.10 cfs per acre. This is consistent with the policies and practices of the City of Albuquerque.

This drainage plan was designed to intercept and detain 100 percent of the flows generated by a 100-year, 24-hour event. The presence of deep, excessively drained soils with high permeability rates will aid in the efforts to empty the detention pond. The pond was designed with steep slopes in order to comply with the required area and the capacity needed to store the developed flows. A new 6-foot fence will surround the entire pond to prevent any possible hazards to the costumers of the Beach Water Park.



SITE DRAINAGE LAYOUT

EXHIBIT D

DATA FOR HYDROLOGY CALCULATIONS

RUNOFF CALCULATIONS

THE SITE IS @ ZONE 2

LAND TREATMENT

VARIES (SEE ATTACHMENT)

DEPTH (INCHES) @ 100-YEAR STORM

P60 =	2.01	INCHES
P360 =	2.35	INCHES
P1440 =	2.75	INCHES

DEPTH (INCHES) @ 10-YEAR STORM (FACTOR 0.667)

P60 =	1.34	INCHES
P360 =	1.57	INCHES
P1440 =	1.83	INCHES

*** SEE THE SUMMARY OUTPUT FROM AHYMO CALCULATIONS**

*** ALSO SEE THE FOLLOWING SUMMARY TABLES**

LAND TREATMENT

BASIN	A	B	C	D
1	0	15	10	75
2	0	22	45	33
3	0	37	0	63
4	0	0	0	100
5	0	0	0	100
6	0	22	28	50
7	0	20	0	80
8	0	37	43	20
A-1e	0	82	18	0

DRAINAGE BASINS

Developed

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	291852.00	6.7000	0.01047
2	77872.12	1.7877	0.00279
3	32012.37	0.7349	0.00115
4	23950.69	0.5498	0.00086
5	55645.32	1.2774	0.00200
6	122296.00	2.8075	0.00439
7	122852.00	2.8203	0.00441
8	60257.34	1.3833	0.00216
A-1e	294371.00	6.7578	0.01056

TOTAL:	24.8188

RUNOFF CALCULATION RESULTS

Developed

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	28.19	17.75	1.097	0.665
2	6.25	3.57	0.214	0.114
3	2.83	1.71	0.107	0.063
4	2.61	1.73	0.106	0.067
5	6.05	4.00	0.247	0.156
6	10.55	6.28	0.383	0.218
7	11.99	7.59	0.473	0.290
8	4.37	2.34	0.141	0.070
A-1e	16.55	7.24	0.469	0.177

Note:

Basin areas do not include area covered by pools.
Basins 2-8 & A-1e all drain into detention pond.
Basin 1 drains into Desert Surf Circle and from there into a existing storm sewer system

VOLUME CALCULATIONS

NEW POND

Ab - Bottom Of The Pond Surface Area
At - Top Of The Pond Surface Area
D - Water Depth
Dt - Total Pond Depth
C - Change In Surface Area / Water Depth

Volume = Ab * D + 0.5 * C * D^2
C = (At - Ab) / Dt

Ab =	14,439.97
At =	32,123.52
Dt =	5.00
C =	3536.71
B Elev. =	31.00

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
31.00	0	0	0.000
32.00	1.00	0.3315	0.819
33.00	2.00	0.7036	1.251
34.00	3.00	1.1569	1.568
35.00	4.00	1.6913	1.831
36.00	5.00	2.3070	2.060

<u>Orifice Equation</u>
Q = CA SQRT(2gH)

C =	0.6
Diameter (in	6
Area (ft^2)=	0.19634954
g =	32.2
H (Ft) =	Depth of water above center of orifice
Q (CFS)=	Flow

DROP INLET CALCULATIONS

POND	TYPE OF INLET	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	Single 'C'	4.36	11.99	0.3262	0.8

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

STORM DROP INLET-EFFECTIVE AREA

Single 'C'

Area at the grate:

L = 38.375" - 7(½" middle bars)
= 34.875"
= 2.906'

W = 25.5" - 13(½" middle bars)
= 19"
= 1.583'

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

Effective Area = 4.601- 4.601 (0.5 clogging factor)
= 2.30 ft^2 at the grate

Area at the throat:

L = 47.375"
= 3.95'

H = 10¾" - 4½"
= 6¼"
= 0.5208'

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

Total Area:

Area = $2.30_{grate} + 2.06_{throat}$
= 4.36 ft^2

PIPE CAPACITY

(SEE PLAN VIEW NEXT PAGE)

Line #	D (in)	Slope (%)	Area (ft^2)	R	Q Provided (cfs)	Q Required (cfs)	Velocity (ft/s)
1	**24**	**0.667**	**3.14**	**0.5**	**18.53**	**44.70**	**5.90**
2	**12**	**68**	**0.79**	**0.25**	**29.46**	**11.99**	**37.51**
3	**24**	**0.707**	**3.14**	**0.5**	**19.07**	**32.70**	**6.07**
4	**36**	**1**	**7.07**	**0.75**	**66.88**	**30.09**	**9.46**

Manning's Formula:

Q=1.48 / n* AR^2/3s^1/2

V=Q*A

A= d^2*(3.14)/4 = 0.79

R=A/wp=d/4 = 0.25

s=36

d=12

Q= 29.46 cfs

V= 37.51 f/s

Q= discharge in cfs

V= velocity f/s

s= friction slope

A= area of conduit

R= hydraulic radius of conduit

n= 0.013

wp= wetted perimeter

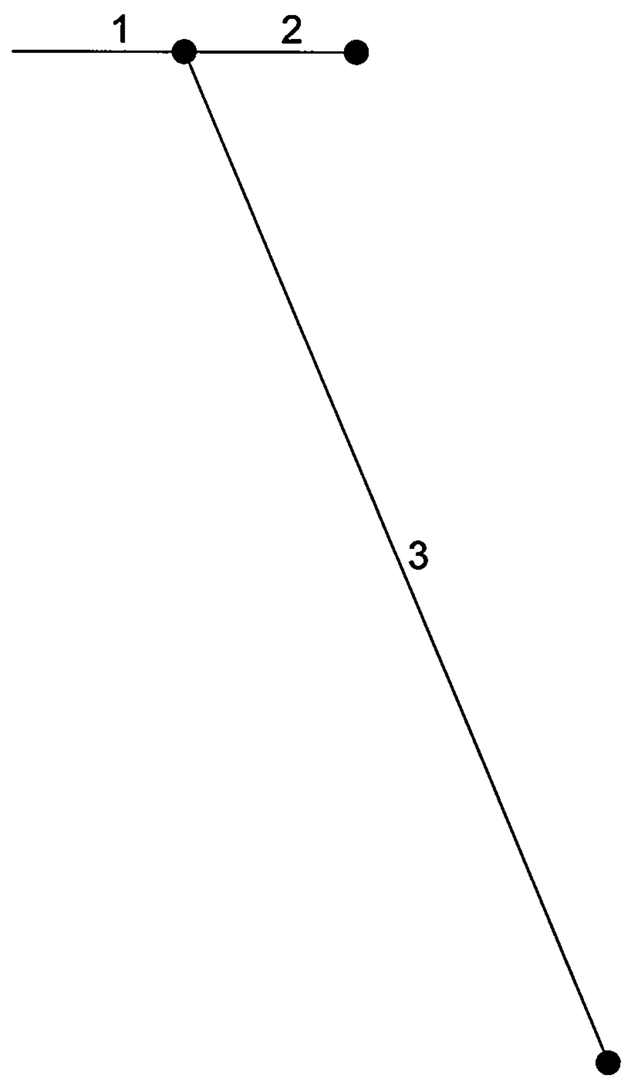
d= diameter of pipe

NOTE:

1 **USING MANNING'S FORMULA THE TWO 24" PIPES DO NOT HAVE THE CAPACITY. HOWEVER THE SYSTEM IS UNDER PRESSURE AND THE PROGRAM HYDOFLOW WAS USED. REFER TO FOLLOWING PAGES FOR SUMMARY AND PROFILES.**

2 **LINE 4 - 36" RCP - IS LOCATED AT THE OUTFALL OF THE POND. (1.90 CFS PLUS BASIN 1 - 28.19 CFS)**

Plan View



Proj. file: STORMY.STM	IDF file: SAMPLE.IDF	No. Lines: 3	02-14-2001

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	1	44.65	24 c	60.0	31.30	31.70	0.667	33.30*	35.64*	3.14	End
2	2	11.99	12 c	60.0	31.70	72.61	68.183	38.78	73.61	3.62	1
3	3	32.66	24 c	300.0	31.70	33.82	0.707	38.78*	45.03*	1.68	1

PROJECT FILE: STORMY.STM | I-D-F FILE: SAMPLE.IDF | TOTAL NO. LINES: 3 | RUN DATE: 02-14-2001

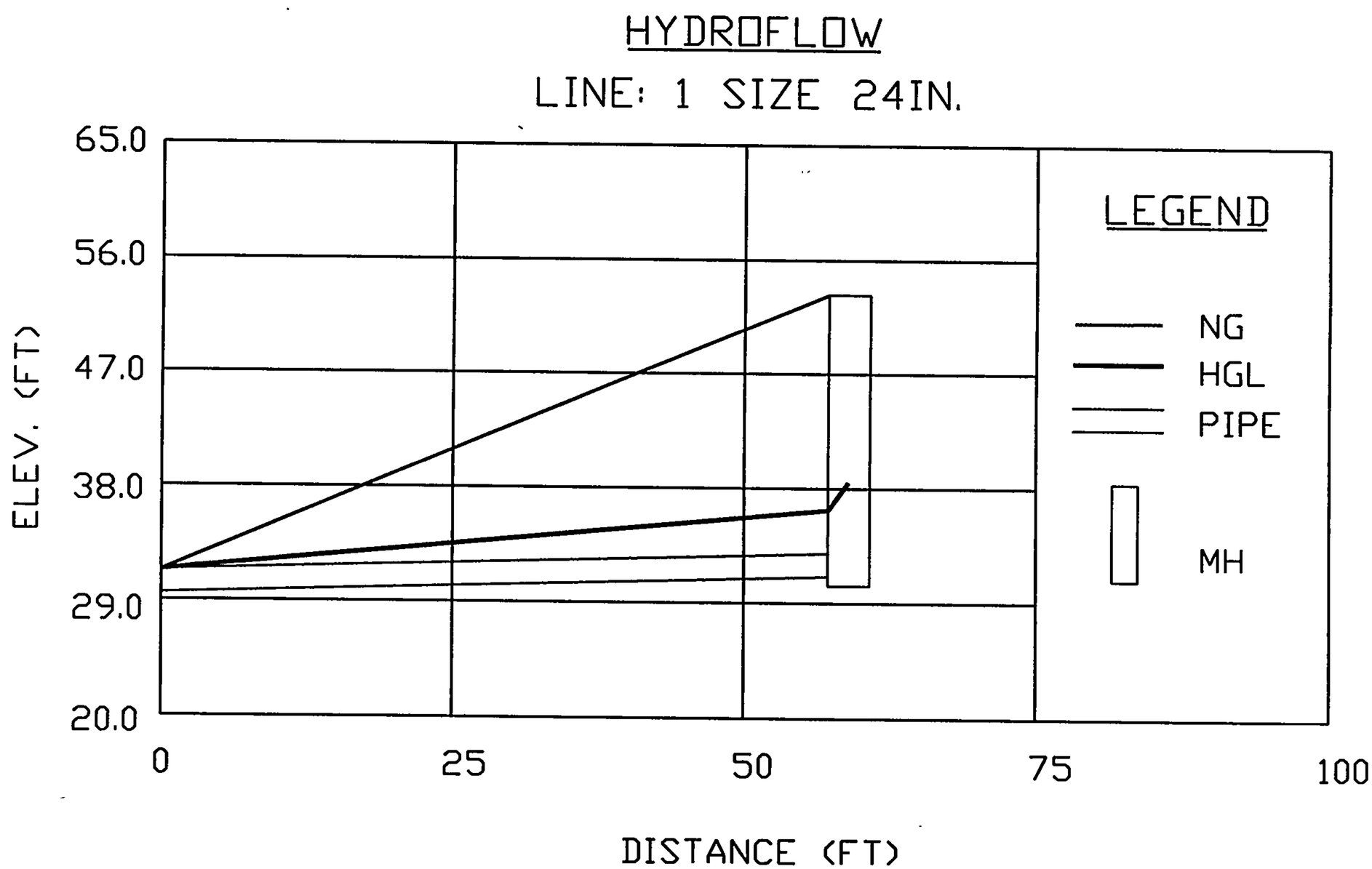
NOTES: c = circular; e = elliptical; b = box; Return period = 5 Yrs.; * Indicates surcharge condition.

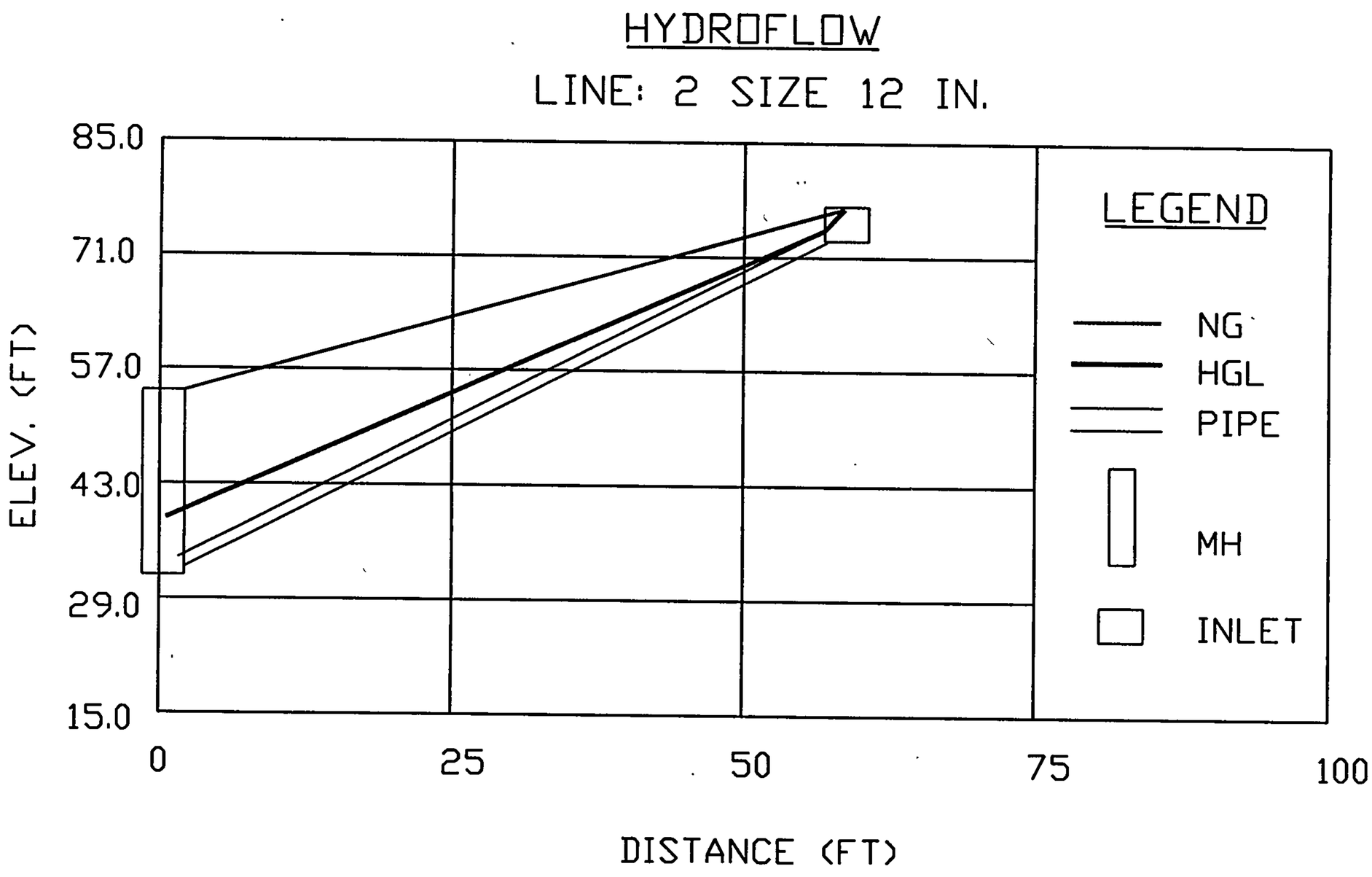
Storm Sewer Inventory Report

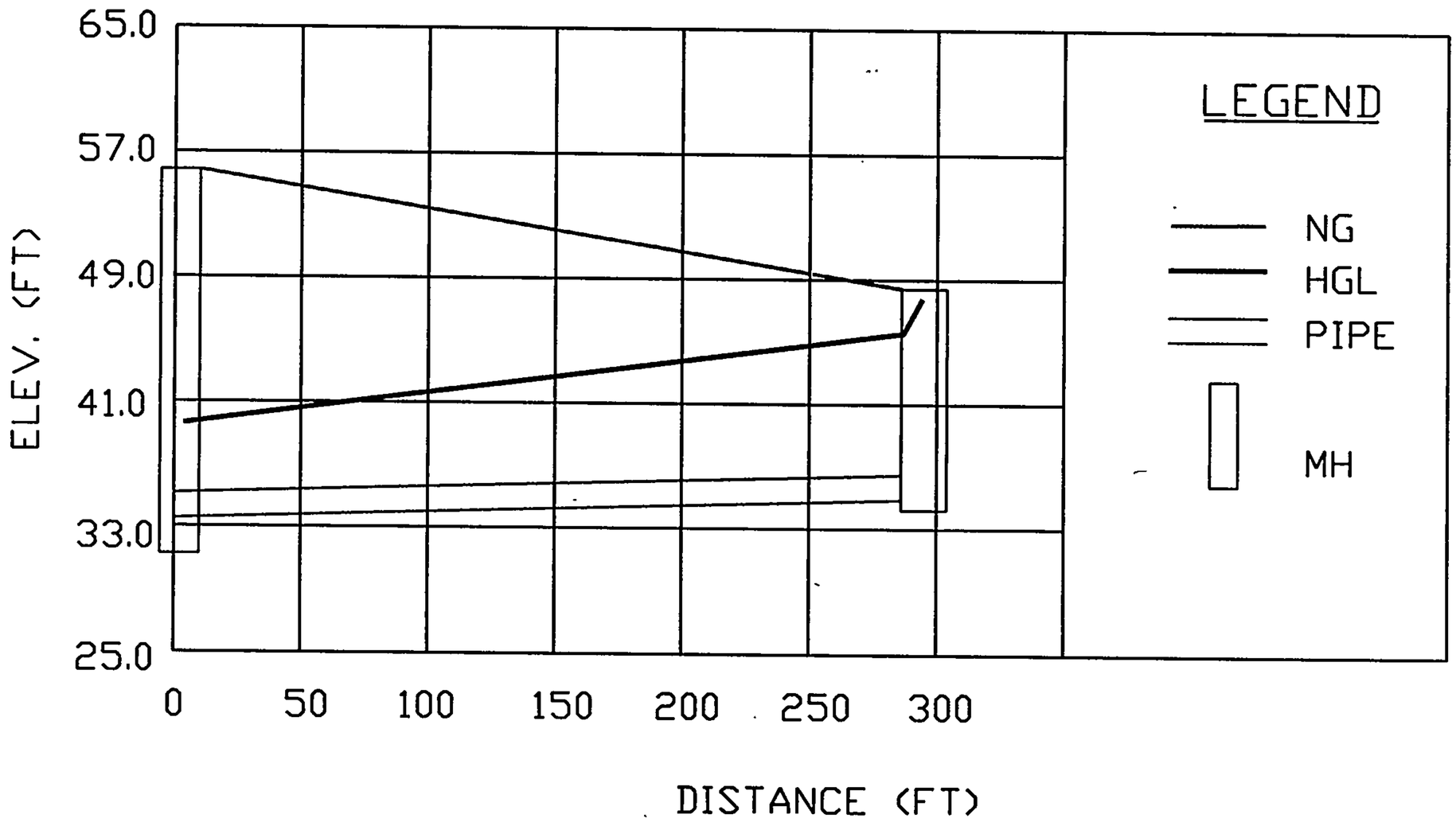
Line #	Line ID	DnStr line #	Defl angle (deg)	Line length (ft)	Line size (in)	Line type	Line slope (%)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Known Q (cfs)	Invert El dn (ft)	Invert El up (ft)	N value	Junction type	J-Loss coeff (JLC)	Natural grnd (ft)	Dns line #
1	1	0	0	60	24	Circular	0.67	0.00	.00	0	0.0	31.30	31.70	.013	MH	1.0	55.00	Off
2	2	1	0	60	12	Circular	68.18	0.00	.00	0	12.0	31.70	72.61	.013	MH	1.0	77.71	1
3	3	1	60	300	24	Circular	0.71	0.00	.00	0	32.7	31.70	33.82	.013	MH	1.0	46.68	1

PROJECT FILE: STORMY.STM | I-D-F FILE: SAMPLE.IDF | TOTAL NUMBER OF LINES: 3 | RUN DATE: 02-14-2001

DESIGN CODES: Min. Pipe Size = 12 in; Max. Pipe Size = 120 in; Min. Slope = .2 %; Min. Cover = 4 ft; Inlet N-Values = .016 ; Average Inlet Throat Height = 6 in


HYDROFLOW
LINE: 1 SIZE 24IN.
65.0
56.0
47.0
38.0
29.0
20.0
ELEV. (FT)
0
25
50
75
100
DISTANCE (FT)
LEGEND
NG
HGL
PIPE
MH


HYDROFLOW
LINE: 2 SIZE 12 IN.
85.0
71.0
57.0
43.0
29.0
15.0
ELEV. (FT)
0
25
50
75
100
DISTANCE (FT)
LEGEND
NG
HGL
PIPE
MH
INLET


HYDROFLOW
LINE: 3 SIZE 24IN.
65.0
57.0
49.0
41.0
33.0
25.0
ELEV. (FT)
0
50
100
150
200
250
300
DISTANCE (FT)
LEGEND
NG
HGL
PIPE
MH

EMERGENCY OVERFLOW

Broad - Crested Weirs

AT OUTFALL OF POND

Weir Equation

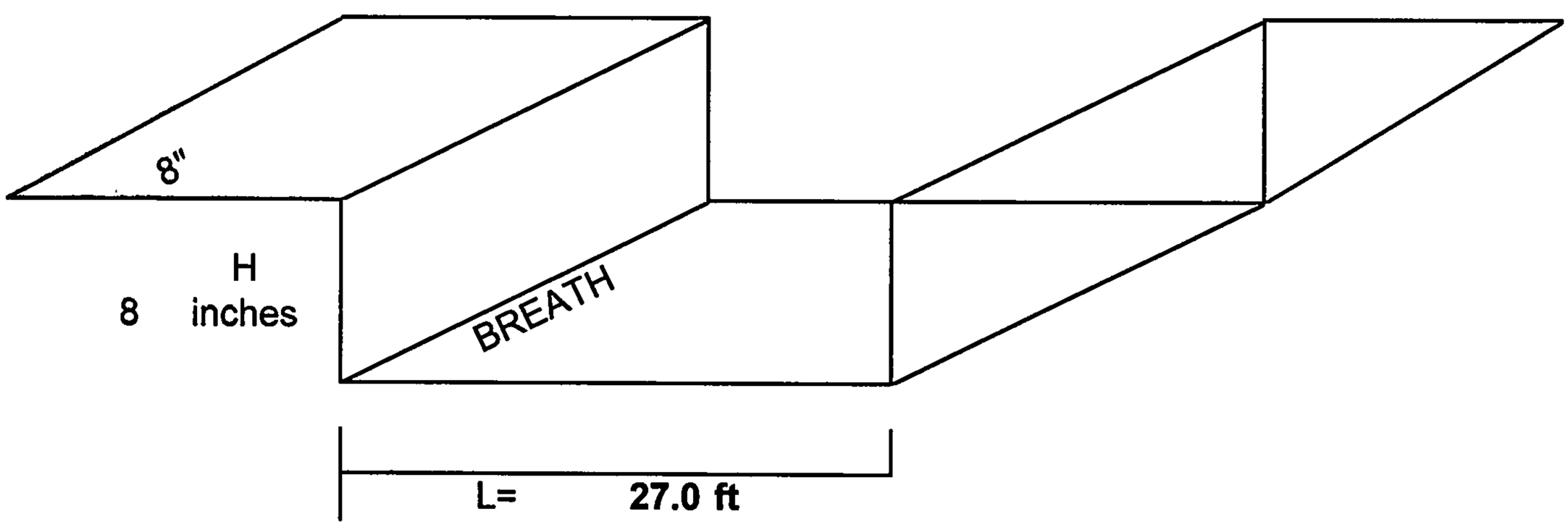
Q = CLH^(3/2)

Variables:

C = a constant value based on breast of crest of weir and head
L = length of weir
H = Height of water measured from center of orifice
Q = flow

Solve for L:

Q =	44.65	cfs
H =	8	inches
C =	3.08	constant
Lreq =	**26.6**	**ft**



TOP OF POND ELEVATION IS 5036.00 FEET AND MAXIMUM WATER SURFACE ELEVATION IS 5035.35.
A WEIR 27 FT LONG, 8 IN. WIDE, AND 8 IN. DEEP IS REQUIRED TO CARRY 44.65 CFS.

EMERGENCY OVERFLOW

Broad - Crested Weirs

Weir Equation

Q = CLH^(3/2)

Variables:

C = a constant value based on breast of crest of weir and head
L = length of weir
H = Height of water measured from center of orifice
Q = flow

Solve for L:

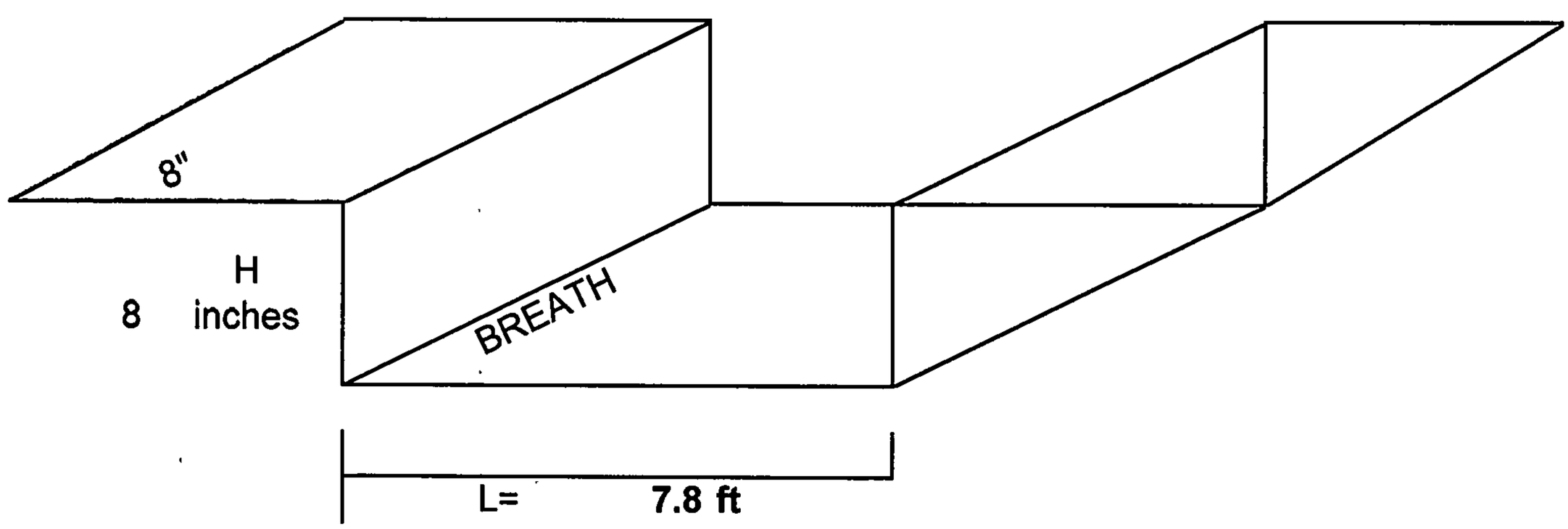
Q =	11.99	cfs
H =	8	inches
C =	3.08	constant
L =	**7.2**	**ft**

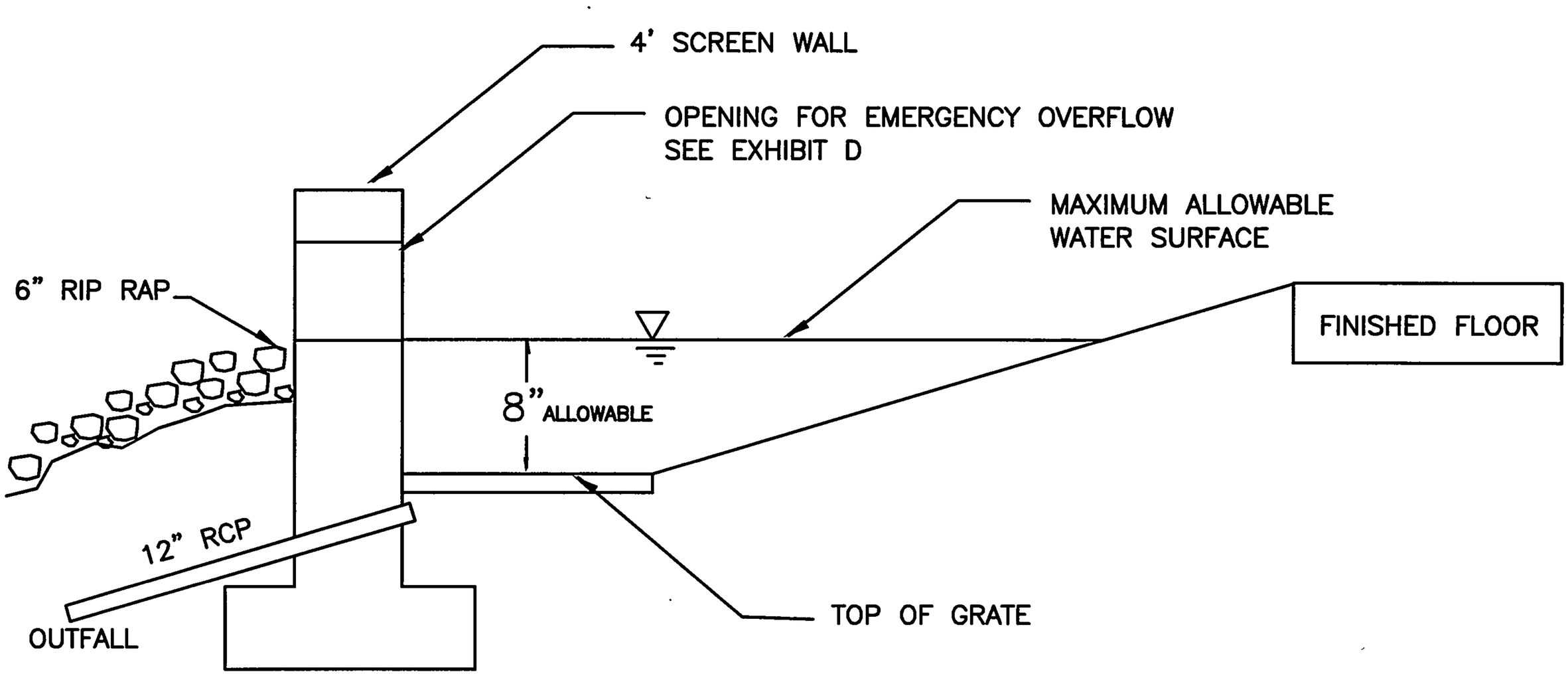
CEMENT BLOCKS

DIMENSIONS PER 8"X8"x16"

NEED TO REMOVE 6 BLOCKS FROM WALL

16" X 6 = 7.8 ft





EMERGENCY OVERFLOW

EXHIBIT E

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02a RUN DATE (MON/DAY/YR) =02/11/2001
INPUT FILE = C:\MY FILES\990097\AHYMO\BASINS2.TXT USER NO.= AHYMO-I-9702a0100011K-SH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	1	.01047	28.19	1.097	1.96404	1.510	4.207	PER IMP= 75.00
COMPUTE NM HYD	100.20	-	1	.00279	6.25	.214	1.43409	1.510	3.494	PER IMP= 33.00
COMPUTE NM HYD	100.30	-	1	.00115	2.83	.107	1.74841	1.510	3.855	PER IMP= 63.00
COMPUTE NM HYD	100.40	-	1	.00086	2.61	.106	2.31773	1.510	4.746	PER IMP= 100.00
COMPUTE NM HYD	100.50	-	1	.00200	6.05	.247	2.31768	1.510	4.736	PER IMP= 100.00
COMPUTE NM HYD	100.60	-	1	.00439	10.55	.383	1.63808	1.510	3.756	PER IMP= 50.00
COMPUTE NM HYD	100.70	-	1	.00441	11.99	.473	2.00993	1.510	4.250	PER IMP= 80.00
COMPUTE NM HYD	100.80	-	1	.00216	4.37	.141	1.22394	1.510	3.160	PER IMP= 20.00
COMPUTE NM HYD	100.A	-	1	.01056	16.55	.469	.83266	1.510	2.449	PER IMP= .00
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 1.830
COMPUTE NM HYD	100.10	-	1	.01047	17.75	.665	1.19146	1.510	2.649	PER IMP= 75.00
COMPUTE NM HYD	100.20	-	1	.00279	3.57	.114	.76760	1.510	2.000	PER IMP= 33.00
COMPUTE NM HYD	100.30	-	1	.00115	1.71	.063	1.02883	1.510	2.325	PER IMP= 63.00
COMPUTE NM HYD	100.40	-	1	.00086	1.73	.067	1.46909	1.510	3.138	PER IMP= 100.00
COMPUTE NM HYD	100.50	-	1	.00200	4.00	.156	1.46906	1.510	3.131	PER IMP= 100.00
COMPUTE NM HYD	100.60	-	1	.00439	6.28	.218	.93202	1.510	2.237	PER IMP= 50.00
COMPUTE NM HYD	100.70	-	1	.00441	7.59	.290	1.23108	1.510	2.689	PER IMP= 80.00
COMPUTE NM HYD	100.80	-	1	.00216	2.34	.070	.60553	1.510	1.690	PER IMP= 20.00
COMPUTE NM HYD	100.A	-	1	.01056	7.24	.177	.31352	1.532	1.071	PER IMP= .00
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02a RUN DATE (MON/DAY/YR) =03/07/2001
INPUT FILE = c:\my files\990097\ahymo\pond4.txt USER NO.= AHYMO-I-9702a0100011K-SH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	10	.01047	28.19	1.097	1.96404	1.510	4.207	PER IMP= 75.00
COMPUTE NM HYD	100.20	-	2	.00279	6.25	.214	1.43409	1.510	3.494	PER IMP= 33.00
COMPUTE NM HYD	100.30	-	3	.00115	2.83	.107	1.74841	1.510	3.855	PER IMP= 63.00
COMPUTE NM HYD	100.40	-	4	.00086	2.61	.106	2.31773	1.510	4.746	PER IMP= 100.00
COMPUTE NM HYD	100.50	-	5	.00200	6.05	.247	2.31768	1.510	4.736	PER IMP= 100.00
COMPUTE NM HYD	100.60	-	6	.00439	10.55	.383	1.63808	1.510	3.756	PER IMP= 50.00
COMPUTE NM HYD	100.70	-	7	.00441	11.99	.473	2.00993	1.510	4.250	PER IMP= 80.00
COMPUTE NM HYD	100.80	-	8	.00216	4.41	.144	1.24539	1.510	3.190	PER IMP= 21.57
COMPUTE NM HYD	100.90	-	9	.01056	16.55	.469	.83266	1.510	2.449	PER IMP= .00
ADD HYD	102.30	2& 3	1	.00394	9.08	.321	1.52565	1.510	3.599	
ADD HYD	103.40	1& 4	1	.00480	11.69	.427	1.66740	1.510	3.805	
ADD HYD	104.50	1& 5	1	.00680	17.74	.674	1.85839	1.510	4.078	
ADD HYD	105.60	1& 6	1	.01118	28.28	1.057	1.77197	1.510	3.952	
ADD HYD	106.70	1& 7	1	.01559	40.28	1.530	1.83927	1.510	4.036	
ADD HYD	107.80	1& 8	1	.01775	44.69	1.673	1.76698	1.510	3.933	
ADD HYD	108.90	1& 9	1	.02831	61.24	2.142	1.41851	1.510	3.380	
ROUTE RESERVOIR	501.10	1	2	.02831	1.86	1.543	1.02210	2.478	.103	AC-FT= 1.777
ADD HYD	101.10	10& 2	3	.03878	29.28	2.640	1.27636	1.510	1.180	
FINISH										

BOX CULVERT

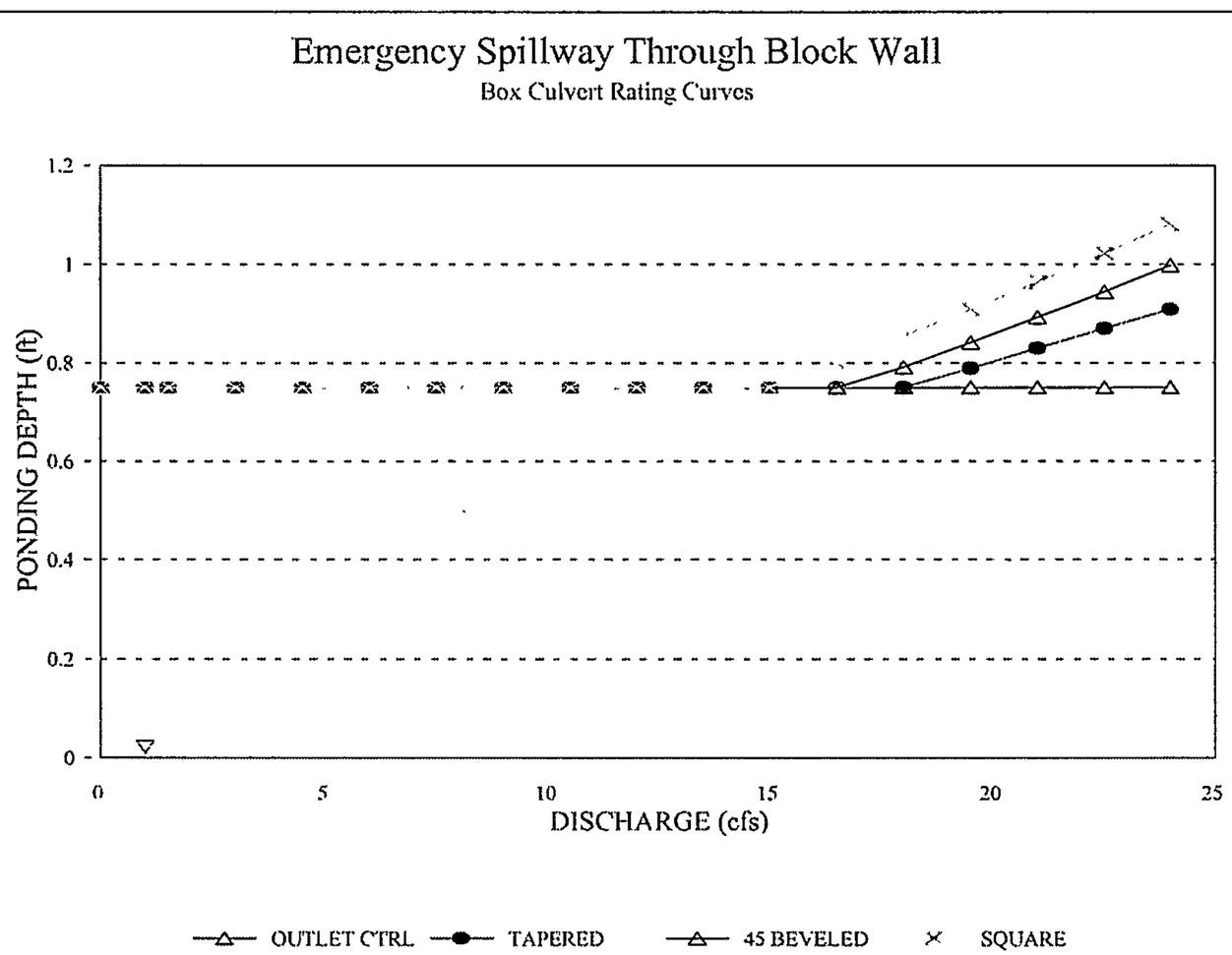
Inlet control and outlet control parameters

Emergency Spillway Through Block Wall

Box height	0.75	ft	***INLET CTRL HWo:***		
Box width	1.5	ft	tapered throat	0.57	ft
Number of boxes	6		45 degree bevels	0.59	ft
Slope	0.02000	ft/ft	sq edge headwall	0.64	ft
Manning's n	0.015		***OUTLET CTRL HWo***	0.61	ft
Culvert length	0.75	ft	Velocity	1.8	fps
Discharge	12	cfs	Critical depth	0.38	ft

Note: 1. Full flowing box assumed.
2. Critical depth cannot exceed the height of box culvert.

BURAK



CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

June 6, 1997

Robert E. Gurulé, Director

Shahab Biazar
Tierra West Development Management Services
4421 McCleod Road NE Suite D
Albuquerque, New Mexico 87109

RE: Engineer's Certification for The Beach Water Park (F16-D3E1) Received May 16, 1997

Dear Mr. Biazar:

The above reference Engineer's Certification dated June 1, 1997 is approved.

If you have any questions please call me at 924-3984.

Sincerely,

Carlos A. Montoya
Project Manager

c: Andrew Garcia
File

JN 960042
cc: Jim Trup
PRB

CITY OF
Albuquerque
January 2, 1997

Martin J. Chávez, Mayor

Ronald Bohannan
Tierra West Dev.
4421 McCleod Rd. NE
Suite D
Albuquerque, NM 87109

RE: THE BEACH WATER PARK (F16-D3E1). DRAINAGE REPORT FOR SITE DEVELOPMENT PLAN FOR BUILDING PERMIT AND BUILDING PERMIT. ENGINEER'S STAMP DATED 12-24-96.

Dear Mr. Bohannan:

Based on the information provided on your December 26, 1996 submittal, the above referenced plan is approved for Site Development Plan for Building Permit and Building Permit.

Prior to Certificate of Occupancy, an Engineer's Certification will be required.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

RECEIVED
MAY 16 1997
HYDROLOGY SECTION

DRAINAGE REPORT

for

Modification to the The Beach Water Park

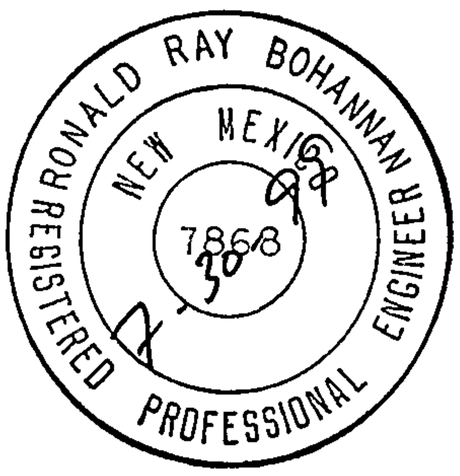
Prepared by

Tierra West, LLC
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

Prepared for

Union Pension Transaction Trust

July 1999



Ronald R. Bohannan P.E. No. 7868

Location

This is a modification to The Beach Drainage Report to expand a service station and fast food facility on the site. The Beach is an existing recreational water park developed in 1987. It is located northeast of Montaño Road and southwest of the I-25 frontage road. The site is identified as Parcels B and C of Renaissance III. The site is shown on the attached Zone Atlas Map F-16 and contains approximately 18.98 acres. The purpose of this report is to provide an update on the drainage analysis and management plan for the site and for the proposed expansion of the Park. Three new slides, a bandstand area, additional picnic areas and a caretakers unit with storage were added in 1996. This report intends to expand the request to add a new fast food restaurant and service station.

Existing Drainage Conditions

The site is currently partially developed. There is a previous drainage report for the site by Wilson & Co. (F-16/D3E1). The report defines basins and provided for trench drains and drop inlets to drain each basin. Enclosed is a small 8½ x 11 exhibit showing the drainage from each basin. The basins have been designated the same as the original Wilson & Co. report. The runoff from Basins 2 through 8 and A-1e is transported through an underground storm sewer system to a detention pond located to the north of the site. Basin 1, which consists of the parking area, drains west through a series of sidewalk culverts into Desert Surf Circle and from there into the existing storm sewer system. The original report utilized the rational method for analysis of the runoff. This report will begin the initial phase development of a proposed seven year expansion of the park. In order to bring the analysis up to date, new aerial topography was flown and the basins analyzed using AHYMO.

The location of the new facility is the extension of Mercantile Avenue and Montaño Boulevard. The site is currently at the side of the slide area which runs parallel to Montaño Boulevard. This site sheet flows to an existing pond location at the base of the slope.

FEMA Map and Soil Conditions

The site is located on FEMA Map section 350002 panel 16 as shown on the attached excerpt. The map shows that the site does not lie within any 100 year flood plains.

The site contains one soil group according to the Soil Conservation Service Survey of Bernalillo County. The soil is a Wink-Embudo complex with a moderate hazard of water erosion and medium runoff.

On-Site Drainage Management Plan

The proposed drainage management plan is to continue using the existing drainage system designed by Wilson & Co. with some minor modifications. The system has been functioning without any problems or changes to the inlets. Investigation with the management indicates that no flooding is occurring in the park.

The basin layout and land treatments have been modified slightly from the Wilson & Co. drainage report as identified previously. The previous Wilson Report analyzed the system using the rational method. This report re-analyzes the system using the current method of the AHYMO computer program. This caused slight increases in the developed flows from the site and a more accurate pond volume capacity calculation that was compensated for in the last update.

A summary of the existing discharge for each basin is as follows:

Basin 1 is free discharging 26.99 cfs into Desert Surf Loop. No changes will be made to this existing drainage pattern. Basins 2 through 8 and A-1e drain to an existing detention pond through the existing underground storm drainage system. Basin 2 will discharge 5.57 cfs to a

catch basin located in the service drive. Basin 3 will discharge 2.83 cfs into a trench drain at the north end of the basin. Basin 4 will discharge 2.61 cfs while Basin 5 discharges 6.05 cfs. The runoff from both basins will be captured in a series of trench drains adjacent to the wave pool. Basin 6 will increase the discharge from 14.59 cfs to 17.63 cfs which will be routed into the detention pond. The grading plan enclosed in the map pocket shows the proposed grades. The flows will be collected on the west edge of the parking lot and collect those flows in an 8" pipe. The pipe will convey the flows to the existing pond. Basin 8 will discharge 3.81 cfs to trench drains located at the west end of the basin. Basin A-1e will sheet flow 13.92 cfs into the pond. The existing detention pond is currently discharging 11.23 cfs (F16-D3E1) to the existing storm drain system. The outfall from the pond will be changed from a 12" pipe to a 6" orifice plate. This will limit the discharge from the pond to 1.79 cfs which is within the guidelines outlined by the Master Plan. The pond has a storage capacity of 1.6628 ac-ft. The increased volume generated by the partial development of basin 6 can be stored in the existing pond. The pond has capacity for the increase in the volume of water being detained in the pond. The maximum water surface elevation is 5034.32, while the top of pond elevation is 5035.00. The total discharge from the site will decrease from 35.92 cfs (F16-D3E1) to 28.78 cfs.

Summary

There will be no changes to the existing drainage patterns for the remaining basin. The runoff flows from here increased slightly with the AHYMO method of analysis over the original Wilson Report. This did not affect the overall drainage system. Basin 1 will discharge 26.99 cfs into Desert Surf Loop. The rest of the basins will discharge a total of 49.38 cfs into the existing detention pond.

The next phase of development will expand to develop a fast food restaurant and service station on site. The development will increase the runoff on Basin 6 to 17.63 cfs. The volume will also increase to 0.646 acre feet which can be handled in the existing pond volume. There will be no changes.

The outfall from the detention pond has been limited to 1.79 cfs in order to comply with Renaissance Master Plan.

RUNOFF CALCULATIONS

The site is @ Zone 2

LAND TREATMENT

Varies

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 2.01 inches

P_{360} = 2.35 inches

P_{1440} = 2.75 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 2.01 x 0.667
= 1.34 inches

P_{360} = 1.57

P_{1440} = 1.83

See the summary output from AHYMO calculations.

Also see the following summary tables.

LAND TREATMENT

BASIN	A	B	C	D
1	0	29	0	71
2	0	67	0	33
3	0	37	0	63
4	0	0	0	100
5	0	0	0	100
6	0	50	0	50
8	0	82	0	18
A-1e	0	100	0	0

DRAINAGE BASINS

Developed

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	291852.00	6.7000	0.010469
2	77872.12	1.7877	0.002793
3	32012.37	0.7349	0.001148
4	23950.69	0.5498	0.000859
5	55645.32	1.2774	0.001996
6	218235.60	5.0100	0.007828
8	60257.34	1.3833	0.002161
A-1e	263102.40	6.0400	0.009438

RUNOFF CALCULATION RESULTS

Developed

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	26.99	16.68	1.045	0.680
2	5.57	2.96	0.192	0.100
3	2.83	1.29	0.107	0.044
4	2.61	1.73	0.106	0.067
5	5.75	4.00	0.230	0.156
6	17.63	7.40	0.646	0.241
8	3.81	1.84	0.122	0.057
A-1e	13.92	5.71	0.392	0.141

Note: Basin areas do not include area covered by pools.

VOLUME CALCULATIONS

DETENTION POND

Ab - Bottom Of The Pond Surface Area
At - Top Of The Pond Surface Area
D - Water Depth
Dt - Total Pond Depth
C - Change In Surface Area / Water Depth

$$\text{Volume} = Ab * D + 0.5 * C * D^2$$

$$C = (At - Ab) / Dt$$

Ab =	25,178.00	(@ Elevation 5032.00)
At =	29,075.00	(@ Elevation 5035.00)
Dt =	3.00	
C =	1,299.00	

Ab =	17,799.00	(@ Elevation 5031.00)
At =	25,178.00	(@ Elevation 5032.00)
Dt =	1.00	
C =	7,379.00	

Ab =	0.00	(@ Elevation 5030.50)
At =	17,799.00	(@ Elevation 5031.00)
Dt =	0.50	
C =	35,598.00	

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
30.5	0	0	0.0000
31.00	0.5	0.1022	0.4727
31.50	1	0.4933	0.8188
32.00	1.5	0.8035	1.0570
32.50	2	1.1560	1.2507
33.00	2.5	1.4487	1.4181
33.50	3	1.7489	1.5678
34.00	3.5	2.0566	1.7044
34.50	4	2.3717	1.8308
35.00	4.5	2.6942	1.9490

<u>Orifice Equation</u>
Q = CA SQRT(2gH)

C =	0.6
Diameter (in)	6
Area (ft^2)=	0.19635
g =	32.2
H (ft) =	Depth of water above center of orifice
Q (cfs)=	Flow

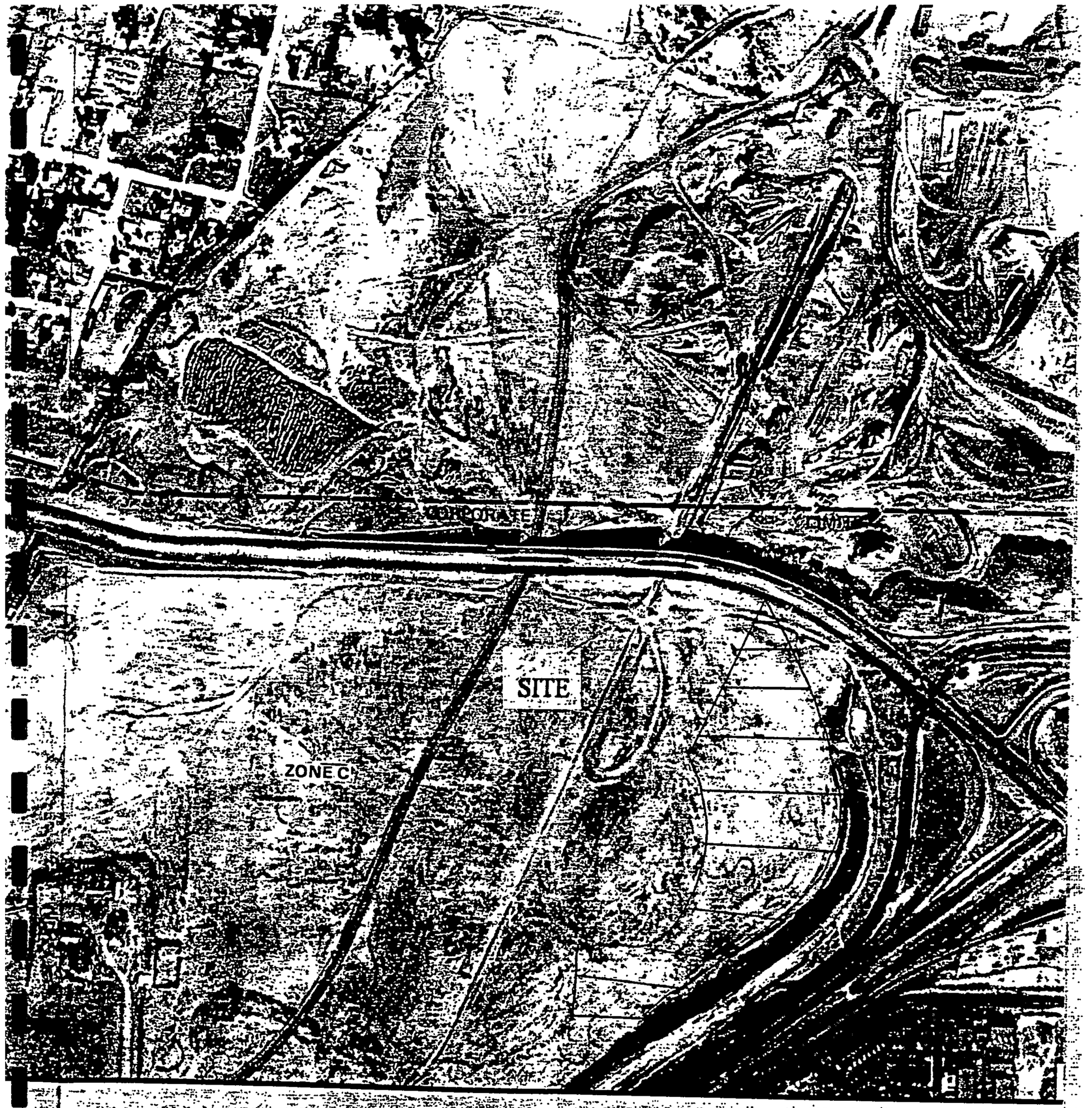
AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/06/1999

INPUT FILE = A:BEACH.DAT USER NO.= R_BOHANN.I01

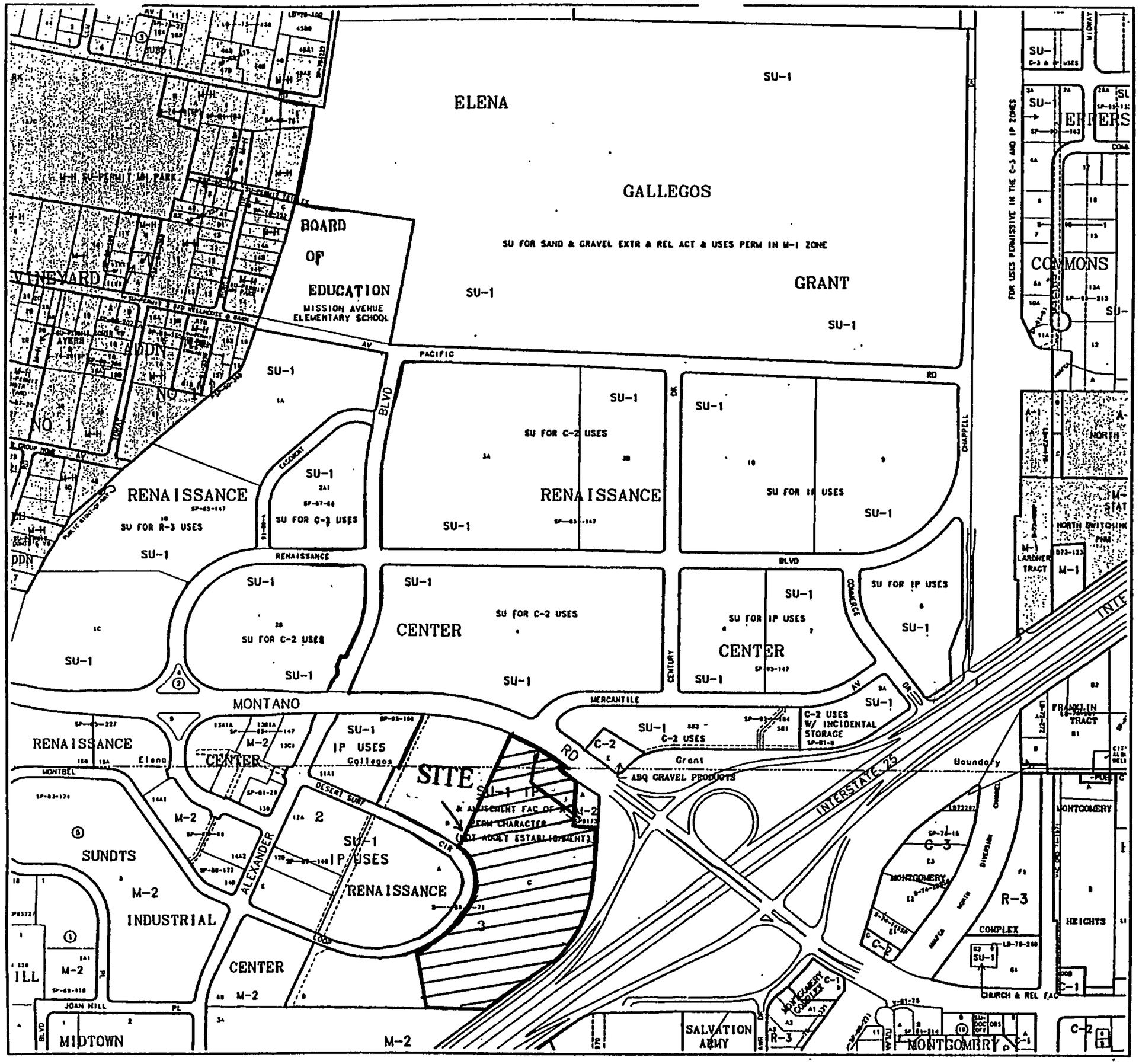
COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	1	.01047	26.99	1.045	1.87145	1.510	4.028	PER IMP= 71.00
COMPUTE NM HYD	100.20	-	1	.00279	5.57	.192	1.28678	1.510	3.114	PER IMP= 33.00
COMPUTE NM HYD	100.30	-	1	.00115	2.83	.107	1.74841	1.510	3.855	PER IMP= 63.00
COMPUTE NM HYD	100.40	-	1	.00086	2.61	.106	2.31773	1.510	4.746	PER IMP= 100.00
COMPUTE NM HYD	100.50	-	1	.00200	5.75	.230	2.16382	1.510	4.500	PER IMP= 90.00
COMPUTE NM HYD	100.60	-	1	.00783	17.63	.646	1.54833	1.510	3.519	PER IMP= 50.00
COMPUTE NM HYD	100.80	-	1	.00216	3.81	.122	1.05599	1.510	2.752	PER IMP= 18.00
COMPUTE NM HYD	100.A	-	1	.00944	13.92	.392	.77901	1.532	2.305	PER IMP= .00
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	110.10	-	1	.01047	16.68	.797	1.42673	1.510	2.489	PER IMP= 71.00
COMPUTE NM HYD	110.20	-	1	.00279	2.96	.121	.81261	1.510	1.657	PER IMP= 33.00
COMPUTE NM HYD	110.30	-	1	.00115	1.71	.079	1.29759	1.510	2.325	PER IMP= 63.00
COMPUTE NM HYD	110.40	-	1	.00086	1.73	.087	1.89568	1.510	3.138	PER IMP= 100.00
COMPUTE NM HYD	110.50	-	1	.00200	3.72	.185	1.73391	1.510	2.914	PER IMP= 90.00
COMPUTE NM HYD	110.60	-	1	.00783	10.16	.454	1.08732	1.510	2.028	PER IMP= 50.00
COMPUTE NM HYD	110.80	-	1	.00216	1.84	.066	.57018	1.510	1.328	PER IMP= 18.00
COMPUTE NM HYD	110.A	-	1	.00944	5.71	.141	.27917	1.532	.945	PER IMP= .00
FINISH										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/05/1999
INPUT FILE = a:pond.dat USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	10	.01047	26.99	1.045	1.87145	1.510	4.028	PER IMP= 71.00
COMPUTE NM HYD	100.20	-	2	.00279	5.57	.192	1.28678	1.510	3.114	PER IMP= 33.00
COMPUTE NM HYD	100.30	-	3	.00115	2.83	.107	1.74841	1.510	3.855	PER IMP= 63.00
COMPUTE NM HYD	100.40	-	4	.00086	2.61	.106	2.31773	1.510	4.746	PER IMP= 100.00
COMPUTE NM HYD	100.50	-	5	.00200	5.75	.230	2.16382	1.510	4.500	PER IMP= 90.00
COMPUTE NM HYD	100.60	-	6	.00783	17.63	.646	1.54833	1.510	3.519	PER IMP= 50.00
COMPUTE NM HYD	100.80	-	8	.00216	3.81	.122	1.05599	1.510	2.752	PER IMP= 18.00
COMPUTE NM HYD	100.A	-	9	.00944	13.92	.392	.77901	1.532	2.305	PER IMP= .00
ADD HYD	102.30	2& 3	1	.00394	8.40	.299	1.42125	1.510	3.330	
ADD HYD	103.40	1& 4	1	.00480	11.01	.405	1.58169	1.510	3.583	
ADD HYD	104.50	1& 5	1	.00680	16.76	.635	1.75266	1.510	3.852	
ADD HYD	105.60	1& 6	1	.01462	34.39	1.282	1.64329	1.510	3.674	
ADD HYD	106.80	1& 8	1	.01679	38.19	1.403	1.56768	1.510	3.555	
ADD HYD	108.90	1& 9	1	.02622	52.11	1.795	1.28382	1.510	3.105	
ROUTE RESERVOIR	501.10	1	2	.02622	1.44	1.188	.84952	2.501	.086	AC-FT= 1.502
FINISH										



FEMA MAP 350002-0016



GRAPHIC SCALE IN FEET

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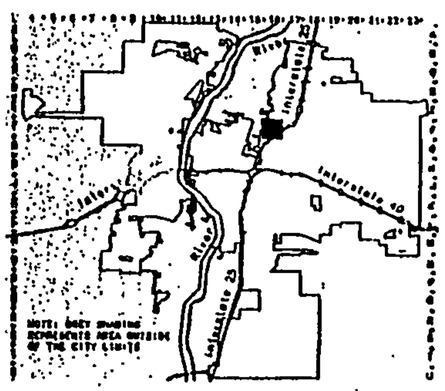

City of Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

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Map Amended through November 06, 1995

LEGAL DESCRIPTION

T11N

R3E

SEC 34

UNIFORM PROPERTY CODE

1-018-081

F-16-Z

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO PUBLIC SERVICES
DAN WEAKS

July 29, 1988

Bob Sykes
Wilson & Company
Post Office Box 3548
Albuquerque, New Mexico 87190

RE: CERTIFICATE OF OCCUPANCY FOR THE BEACH WATER PARK
(F-16/D3E1)

Dear Mr. Sykes:

The above referenced plan dated June 16, 1988 is approved for sign-off by Hydrology for Certificate of Occupancy.

Should you have further questions, please call me at 768-2650.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

xc: John Andrews

CAM/bsj

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO PUBLIC SERVICES
DAN WEAKS

July 19, 1988

Bob Sykes
Wilson & Company
Post Office Box 3548
Albuquerque, New Mexico 87190

RE: CERTIFICATE OF OCCUPANCY FOR THE BEACH WATER PARK
(F-16/D3E1) RECEIVED JUNE 17, 1988

Dear Mr. Sykes:

I have reviewed the referenced plan submitted June 16, 1988, and find it acceptable. However, due to the length of time this project has been active, I reviewed the letters which were sent to your office. Attached is a letter dated April 9, 1987, which was addressed to Mr. Boothby. Item 3 was of concern to me and I was unable to find any documentation of these items being complied with. Have these three items been completed?

Should you have any questions, please call me at 768-2650.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

Enclosure

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO PUBLIC SERVICES
FRANK MARTINEZ

DEPUTY CAO PLANNING/DEVELOPMENT
BILL MUELLER

May 18, 1988

Charles M. Easterling, P.E.
Easterling & Associates, Inc.
5643 Paradise Boulevard, NW
Albuquerque, New Mexico 87114

RE: DRAINAGE PLAN FOR THE BEACH WATER PARK
(F-16/D3E1)

Dear Mr. Easterling:

I have made a site visit to The Beach Water Park. It is obvious that the slopes are being stabilized and new improvements are being constructed in the pool areas. We have two areas of concern, which need to be addressed. First, we need a revised drainage plan to be submitted and approved. Second, we allowed a temporary Certificate of Occupancy to be released with a commitment from Wilson & Company to certify the project. We still need the certification by the owner's engineer. In order to obtain a permanent Certificate of Occupancy, we need the above items finalized.

Please address these concerns so that we can review plans, and certification within a reasonable time period. Should you have any questions, call me at 768-2650.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

xc: Thomas Boothby, Wilson & Company
Richard L. Duran, Drainage Inspector

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Mayor
Ken Schultz

RECEIVED
JUL 27 1988
HYDROLOGY SECTION

November 16, 1987

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Montbel, Inc.
c/o John Andrews
Andrews, Asbury & Robert, Inc.
149 Jackson St., N.E.
Albuquerque, NM 87108

RE: PROJECT NO. 3134, RENAISSANCE III, (MAP NO. F-16)

Gentlemen:

This is to certify that the City of Albuquerque accepts Project No. 3134 as being completed according to approved plans and construction specifications and accepts for continuous maintenance all public infrastructure improvements constructed as part of Project No. 3134.

The project is described as follows:

- Installed water, sewer and storm drain lines, sidewalks, wheel chair ramps, curbs, valley gutter and paving on Desert Surf Circle in Renaissance III Subdivision.

- The warranty period will be in effect for a period of three (3) years.

Sincerely,

Russell B. Givler, P.E.
Chief Construction Engineer
Construction Mgmt. Division
Engineering Group
Public Works Department

RBG:jla

ENGINEER'S DRAINAGE REPORT

THE BEACH WATER PARK
RENAISSANCE III
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
HYDROLOGY SECTION
FILE: F16/D3E-1

WILSON & COMPANY
ENGINEERS & ARCHITECTS
6611 GULTON COURT N.E.
ALBUQUERQUE, NEW MEXICO 87109

RECEIVED
APR 03 1987
HYDROLOGY SECTION

REVISED MARCH 1987
JANUARY 1987
(86-528)

WILSON & COMPANY
ENGINEERS
ARCHITECTS

ENGINEER'S DRAINAGE REPORT
THE BEACH WATER PARK
CITY OF ALBUQUERQUE HYDROLOGY SECTION
FILE: F16/D3E-1

DESCRIPTION

Parcels B and C of Renaissance III replat of Lots 3 and 4, Block 4 and Tract 6-A of Sundt's Industrial Center (Zone Map F-16).

PURPOSE AND SCOPE

The Beach Company is planning to develop the 18.98 acre Parcel C as a recreational water park. The development will include water rides and pools, support facility buildings and paved parking. No development is planned for Parcel B at present. However, a detention pond required by the Renaissance III Drainage Report (F16-D3E) will be located within Parcel B.

SITE LOCATION AND TOPOGRAPHY

The site is bounded by Montano Road to the northeast, the I-25 west frontage road to the southeast and the proposed Desert Surf Circle to the west. The site has a narrow, relatively flat area at the eastern boundary along I-25 and Montano Road. The site then slopes sharply (1:1) with about a 30' vertical drop, then slopes gently to Desert Surf Circle along the western boundary.

SOIL PROFILE

The soil for the subject property is shown in the USCS Soil Survey to be of type Wink-Embudo, Hydrologic Soil Group B.

DESIGN CRITERIA

In order to be consistent with the drainage report for the entire Renaissance III tract (F16/D3E) and the approved master plan for drainage of this area (G15/D7), the Rational Method is used to compute design flows using criteria set forth in Volume 2, City of Albuquerque Development Process Manual. The runoff coefficient is based on the land use shown on the site plan. The undeveloped and developed 10- and 100-year runoff computations are attached to this report.

OFF-SITE DRAINAGE

A 41.04 acre area and a 15.18 acre area within the I-25 right-of-way drain onto the upper portion of the site adjacent to I-25. These areas are designated I-1 and I-3 in the Renaissance III Drainage Report (F16/D3E). The off-site flows are now collected in detention ponds located on the subject site. As a part of Renaissance III infrastructure improvements, these off-site flows will be routed directly into a new underground storm drainage system. As a result, an additional volume of stormwater will be released

into the storm drainage system. At present, there is not sufficient downstream capacity to detain this additional volume. So, it is proposed to detain a compensating 40,000 cubic foot volume of water on this site. When the downstream improvements are in place, this on-site storage requirement will no longer apply, and the entire volume of storm water will be permitted to be released from the site in a manner consistent with City of Albuquerque regulations and the approved master plan for this area.

ON-SITE DRAINAGE

The attached grading plans show proposed contours and on-site drainage patterns. The peak 100-year discharge for developed conditions for Parcel C is 50.62 cfs.

The peak 100-year discharge for undeveloped conditions is 35.30 cfs. In accordance with the master plan, the differential of 15.32 cfs is to be detained on site and released at a rate of 0.1 cfs per acre, that is 1.90 cfs.

The detention pond required for this development will be located along the west property line of Parcel B, which is under the same ownership as Parcel C. An additional 6.04 acre area of Parcel B, designated as Drainage Area 1e, will drain to this detention pond. The 10-year and 100-year flows from this area are included in the attached run-off and detention pond calculations.

Drainage Area 1 includes all proposed paved parking areas for the current project, as well as for anticipated additional parking areas on the upper part of the site. The 100-year peak flow rate of 24.59 cfs is proposed to be discharged to Desert Surf Circle through a series of sidewalk culverts.

Drainage Area 2, with a 100-year peak flow rate of 5.42 cfs, will drain to a catch basin in the service drive.

Drainage Area 3, with a 100-year peak flow rate of 1.74 cfs, will drain to a trench drain at the north end of the area.

Drainage Area 4, with a 100-year peak flow rate of 2.42 cfs, will drain to a series of trench drains adjacent to the wave pool.

Drainage Area 5, with a 100-year peak flow rate of 5.24 cfs, will drain to a series of trench drains adjacent to the wave pool.

Drainage Area 8, with a 100-year peak flow rate of 1.77 cfs, will drain to a series of trench drains along the west edge of the area.

The combined discharge from Drainage Areas 2, 3, 4, 5, and 8 will be carried by an underground storm drainage system to a detention pond along the west property line of the adjacent Parcel B.

Drainage Area 6, with a 100-year peak flow rate of 9.43 cfs, will discharge across the north property line to the detention pond.

Parcel B is divided into two drainage areas, designated A1-c and A1-e in the Renaissance III Drainage Report (F16/D3E). Drainage Area A1-c, with a peak 100-year peak flow rate of 1.6 cfs, will drain to Desert Surf Circle.

Drainage Area A1-e, with a 100-year peak flow rate of 11.2 cfs, will drain to the proposed detention pond.

During the 100-year event, storm water will discharge into the detention pond from Areas 2 through 8 of Parcel C, and Area 1e of Parcel B at a peak rate of 37.26 cfs. As required by the master plan, storm water may be released from the site at a rate no greater than the existing plus 0.1 cfs per acre, that is, 1.9 cfs. For this development, storm water may be discharged at a maximum rate of 37.10 cfs from Parcel B. As 24.59 cfs is proposed to be discharged to the street from Area 1, the maximum allowable flow rate from the detention pond is 12.51 cfs. A 12" outlet from the detention pond, with a maximum flow rate of 11.23 cfs, is proposed. This outlet will discharge to a new storm drain line which runs along the west property line of the subject property.

Calculations for the on-site storm drainage system and the detention pond are attached to this report.

COMP. T. BOOTHBY
CK.
DATE 23 JAN 1987

WILSON & COMPANY
ENGINEERS ARCHITECTS

LOC. ALBUQ. FILE 86-528
PROJ. WATER PARK SHEET 1
SUBJ. HYDROLOGY OF 5

MASTERPLAN ANALYSIS BASED ON RATIONAL METHOD

$Q = CIA$ $\quad I_{100} = (2.2)(6.84)t_c^{-0.51}$

$I_{10} = 0.657 \times I_{100}$

IN ALL CASES $t_c < 10$ MINUTES → USE 10 MINUTES

$I_{100} = 4.65$

$I_{10} = 3.06$

C = 0.05 FOR BUILDINGS, PAVEMENTS
= 0.25 FOR SODDED & IRRIGATED AREAS
= 0.40 FOR UNDEVELOPED AREAS OR AREAS WITH MODERATE LANDSCAPING (TREES, SHRUBS)
= 0 FOR WATER FEATURES, AS NO RUN-OFF WILL BE DEVELOPED IN THESE AREAS

PRINT-OUT OF RUN-OFF CALCS. APPENDED

DIFFERENTIAL RUN-OFF - DEVELOPED VS. UNDEVELOPED

$Q_{100} = 50.61 - 35.30 = 15.30$ CFS
$Q_{10} = 33.30 - 23.23 = 10.07$ CFS

RUN-OFF RELEASED DIRECTLY FROM SITE (A-1)

$Q_{100} = 24.59$ CFS
$Q_{10} = 16.18$ CFS

RUN-OFF TO DETENTION POND (A-2 THRU A-8)

$Q_{100} = 37.26$ CFS
$Q_{10} = 24.52$ CFS

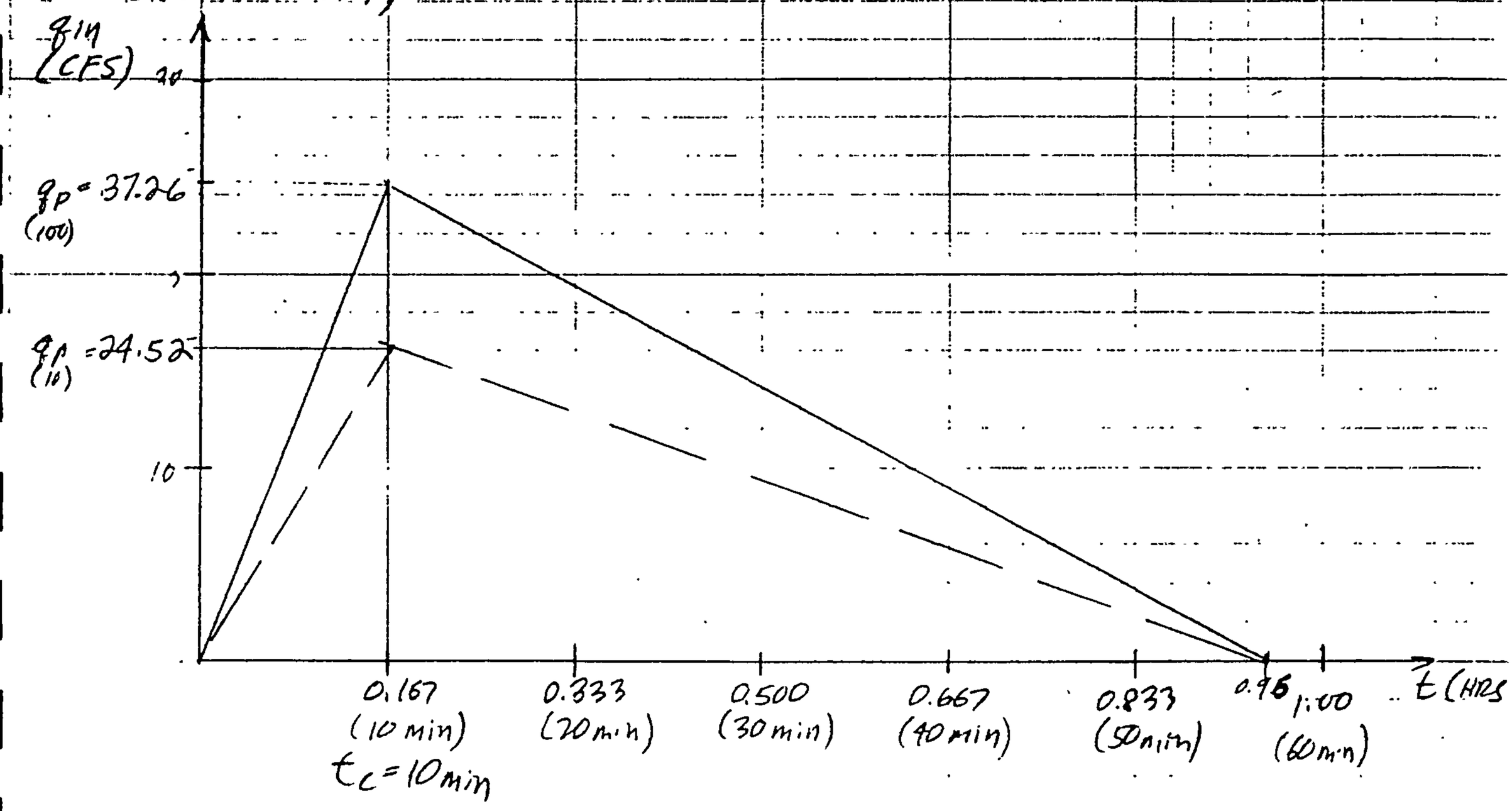
COMP. T. BOOTHBY
CK.
DATE 23 JAN. 1987

WILSON & COMPANY
ENGINEERS ARCHITECTS

LOC. ALBUQ.
PROJ. WATER PARK
SUBJ. HYDROLOGY

FILE 86-528
SHEET 2
OF 5

APPROXIMATE INFLOW HYDROGRAPH OF DETENTION POND
(100 YR EVENT)



$$t_{TOTAL} = \frac{2V}{q_p}$$

$$V = CAV = (0.44)(18.32\,Ac)\left(\frac{2.2''}{12}\right)$$

$$= 1.48 \text{ Ac-FT}$$

$$= 64{,}400 \text{ CF}$$

$$t = \frac{2(64{,}400\,ft^3)}{37.26\,ft^3/s} = 3455 \text{ sec} = 0.96 \text{ HOURS}$$

COMP. T. BOOTHBY | WILSON & COMPANY ENGINEERS & ARCHITECTS | LOC. ALBUQ. | FILE 86-528
CK. | PROJ. WATER PARK | SHEET 3
DATE 23 JAN 1987 | SUBJ. HYDROLOGY | OF 5

ALLOWABLE
RATE OF RELEASE FROM DETENTION POND

= UNDEVELOPED RUN-OFF - DIRECT DISCHARGE + 0.1 CFS/ACRE

Q_{100} = 35.3 - 24.59 + 1.9 = 12.61 CFS

POND INVERT = 30.5

VOL TO	31.0	CONTOUR	= 1/3 (30)(200) = 2,000 CF
31.0 TO	32.0	CONTOUR	≈ 1/2 (36)(400+200) = 5,400 CF
32.0 TO	33.0		≈ (42)(406) = 17,052
33.0 TO	34.0		≈ (48)(412) = 19,776
34.0 TO	35.0		≈ (54)(418) = 22,572

MAXIMUM POND DEPTH = 35.0 (66,500 CF)
H.G. @ DISCHARGE TO PUBLIC STORM DRAIN = 28.0

TRY 18" OUTLET.

$Q = CA\sqrt{2gh}$ $A = 1.76\ FT^2$

$$C = \left(1 + 0.31 d^{1/2} - \frac{0.026L}{d^{1.2}}\right)^{-1/2}$$

CONC. PIPE - SQ - CORNERED ENTRANCE
KING & BRATER p. 4-24

$$= \left(1 + 0.31 (1.5)^{1/2} + \frac{0.026(35)}{(1.5)^{1.2}}\right)^{-1/2}$$

$= 0.72$

$Q = (0.72)(1.76)\sqrt{2(32.2)(7)} = 26.9$ CFS > 12.61 N.G.

TRY 12" OUTLET $A = 0.79\ FT^2$

$$C = \left(1 + 0.31(1) - \frac{0.026(35)}{(1)}\right) = 0.67$$

$Q_{max} = (0.67)(0.79)\sqrt{2(32.2)(7)} = 11.23$ CFS < 12.61 OK

USE 12" ϕ OUTLET

DETENTION POND VOLUME CALCULATIONS FOR 100 YR FLOWS ATTACHED

CONTROL ELEVATION FOR H.G. CALCULATIONS IS GREATER OF

10 YR WATER LEVEL @ DETENTION POND
SOFFIT ELEVATION @ INLET @ DETENTION POND - 34.00

$V_{10} = 0.657\,(64{,}400) = 42{,}300\ ft^3$

$t_{TOTAL} =$ 0.96 hrs

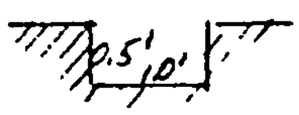
POND WATER SURFACE -10 YEAR 34.00 (V = 44,00 CF)

SOFFIT ELEVATION @ POND INLET = 5034.00'
CONTROL ELEVATION = 5034.15

H.G. CALCULATIONS ATTACHED

LOSSES @ EA. MANHOLE ARE < 0.1' - ASSUMED @ 0.1'

SIDEWALK CULVERTS



SECTION

$A = 0.5\ FT^2$
$W.P. = 2.0'$
$r_H = 0.25'$

SLOPE = 2% MINIMUM

$$Q = \frac{1.486}{n} A r^{2/3} s^{1/2}$$

$$= \frac{1.486}{0.013}(0.5)(0.25)^{2/3}(0.02)^{1/2} = 3.21\ CFS$$

Q_{100} FOR A-1 = 24.59 CFS

0.82 ACRES PAVEMENT DRAIN TO STREET VIA C&G @ NORTH END ENTRANCE DRIVE

$Q_{100} = (0.82)(0.95)(4.65) = 3.62$ CFS

COMP. T. BOOTHBY

CK.

DATE 23 JAN. 1987

WILSON & COMPANY
ENGINEERS & ARCHITECTS

LOC. ALBUQ.

PROJ. WATER PA

SUBJ. HYDROLOGY

NO. OF SIDEWALK CULVERTS REQ'D = 24.59 - 3.62 / 3.21

USE 7 SIDEWALK CULVERTS

SET RIM OF POND OUTLET AT 33.00 (V =

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Planning Department
Transportation Development Services Section

March 19, 2003

David Soule, P.E.
8509 Jefferson NE
Albuquerque, NM 87113

Re: Certification Submittal for Final Building Certificate of Occupancy for Montano Pads(Starbucks), [F-16 / D3E1]
1450A & 1450B Montano Rd NE
Engineer's Stamp Dated 03/19/03

Dear Mr. Soule:

The TCL / Letter of Certification submitted on March 19, 2003 is sufficient for acceptance by this office for final Certificate of Occupancy (C.O.). Notification has been made to the Building and Safety Section.

Sincerely,

Nilo E. Salgado-Fernandez, P.E.
Senior Traffic Engineer
Development and Building Services
Planning Department

c: Engineer
Hydrology file
CO Clerk

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

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

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

March 19, 2003

Ms. Terri Martin
Development and Building Services
Public Works Department
PO Box 1293
Albuquerque, NM 87103

RE: Final Site Plan Certification for Certificate of Occupancy
Tract 6-A Sundts Industrial Center (Starbucks and Kiwi Juice)
1450A and 1450B Montano Blvd. NE

Dear Ms. Martin:

We are requesting Final Site Plan Certification for the Starbucks and Kiwi Juice Restaurants located at Tract 6-A Sundts Industrial Center in South Renaissance Center. Enclosed is the DRB approved Amended Site Plan for Building Permit and Amended Site Plan for Subdivison. Also enclosed is the approved Site Plan for Building Permit, Site Plan for Subdivision and Information Sheet. Jaynes Corporation completed the parking lot striping, paving, curb and gutter and sidewalks. Landscaping is in place. Field verification of the Site Plan was completed by our office and is in substantial compliance with the approved Site Plan. We are, therefore, requesting Final Certification of the Site Plan for Certificate of Occupancy.

If you have any questions regarding this matter, please do not hesitate to call me.

Sincerely,

David Soule, PE

DAVID SOULE
NEW MEXICO
14522
3/19/03
LICENSED PROFESSIONAL ENGINEER

Enclosure/s

cc: James K. Trump, Jr.
John Sedberry

JN: 990097
DS/rw

RECEIVED
MAR 19 2003
HYDROLOGY SECTION

990097 final CO traffic ltr.doc

City of Albuquerque

P.O. BOX 1293 · ALBUQUERQUE, NEW MEXICO 87103

Public Works Department
Transportation Development Services Section

August 14, 2002

David Soule, Registered Architect
Tierra West LLC
8509 Jefferson N.E.
Albuquerque, NM 87113

Re: Certification Submittal for Final Building Certificate of Occupancy for Montano Pads (Conway Oil) [F-16 / D003E1]
1400 Montano Blvd. N.E.
Engineer's Stamp Dated 08/07/02

Dear Mr. Soule:

The TCL / Letter of Certification submitted on August 8, 2002 is sufficient for acceptance by this office for final Certificate of Occupancy (C.O.). Notification has been made to Building and Safety and final C.O. has been logged in by Vicki Chavez in the Building Safety Section downstairs.

Sincerely,

Mike Zamora, Commercial Plan Checker
Development and Building Services
Planning Department

c: Hydrology file
Mike Zamora

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

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

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

August 7, 2002

Mr. Mike Zamora
Development and Building Services
Public Works Department
PO Box 1293
Albuquerque, NM 87103

RE: Final Traffic Certification for Certificate of Occupancy
Tract C-3 Renaissance Center
1400 Montano Blvd. NE

Dear Mr. Zamora:

We are requesting FinalTraffic Certification of the Site Plan for the Conway Oil (Shell) Gas Station located at Tract C-3 Renaissance Center. Enclosed is the Site Plan for Subdivison and the as-built Site Plan for Building Permit. Striping of the parking lot is complete. Jaynes Corporation completed the site curb and gutter, paving and sidewalks. Field verification of the Site Plan was completed by our office and is in substantial compliance with the approved Site Plan. We are, therefore, requesting Final Certification of the Site Plan for Certificate of Occupancy.

If you have any questions regarding this matter, please do not hesitate to call me.

Sincerely,

RONALD R. BOHANNAN REGISTERED PROFESSIONAL ENGINEER NEW MEXICO 8868

Ronald R. Bohannan, PE

Enclosure/s

cc: James K. Trump, Jr.
Phillip Tenorio

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AUG 08 2002
HYDROLOGY SECTION

JN: 990097
RRB/rw
990097 temp CO traffic Conway ltr.doc

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Public Works Department
Transportation Development Services Section

July 15, 2002

David Soule, Registered Architect
8509 Jefferson N.E.
Albuquerque, NM 87113

Re: Certification Submittal for Final Building Certificate of Occupancy for
Montano Pads Tr.C-2 Rennaissance Ctr., [F-16 / D003E1]
1420 Montano Blvd. N.E.
Engineer's Stamp Dated 07/12/02

Dear Mr. Soule:

The TCL / Letter of Certification submitted on July 12, 2002 is sufficient for acceptance by this office for final Certificate of Occupancy (C.O.). Notification has been made to Building and Safety and final C.O. has been logged in by Vicki Chavez in the Building Safety Section downstairs.

Sincerely,

Mike Zamora, Commercial Plan Checker
Development and Building Services
Planning Department

c: Hydrology file
Mike Zamora

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

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

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

July 12, 2002

Mr. Mike Zamora
Development and Building Services
Public Works Department
PO Box 1293
Albuquerque, NM 87103

RE: 30-day Temporary Traffic Certification for Certificate of Occupancy
Tract C-2 Renaissance Center
1420 Montano Blvd. NE

Dear Mr. Zamora:

We are requesting a 30-day Temporary Traffic Certification of the Site Plan for the McDonalds Restaurant located at Tract C-2 Renaissance Center. Enclosed is the Site Plan for Subdivison and the as-built Site Plan for Building Permit. Striping of the parking lot is underway and will be complete before the Restaurant opens July 16. Jaynes Corporation completed the site curb and gutter and paving. Construction of the sidewalks will be complete today. Field verification of the Site Plan was completed by our office and is in substantial compliance with the approved Site Plan. Final Certification will be submitted when the site is 100% complete. We are, therefore, requesting 30-Day Temporary Certification of the Site Plan for Certificate of Occupancy.

If you have any questions regarding this matter, please do not hesitate to call me.

Sincerely,

David Soule, PE

DAVID SOULE
NEW MEXICO
14522
REGISTERED PROFESSIONAL ENGINEER

Enclosure/s

cc: James K. Trump, Jr.

JN: 990097
DS/rw

990097 temp CO traffic ltr.doc

RECEIVED
JUL 12 2002
HYDROLOGY SECTION