CITY OF ALBUQUERQUE

THREE HUNDRED YEARS 1706 • 2006
ALBUQUERQUE
Making History

April 4, 2006

Verlyn A. Miller, PE
Miller Engineering Consultants
95 344 Hwy No, PO Box 520
Edgewood, NM 87015

Re: UNM Press, 1312 Basehart SE-Grading & Drainage Plan
Engineer's Stamp dated 2-21-06 (L15-D31F)

Dear Mr. Miller,

Based upon the information provided in your submittal dated 2-22-06, 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. Additionally, prior to release of the Certificate of Occupancy an Engineer's Certification of the grading plan per the DPM checklist will be required.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department Hydrology section at 768-3654 (Charles Caruso).

If you have any questions, you can contact me at 924-3990.

Sincerely,

Phillip J. Lovato, E.I., C.F.M.
Engineering Associate, Hydrology,
Development and Building Services,
Planning Department

cc: Charles Caruso, DMD
file

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(REV. 1/11/2002)

PROJECT TITLE: UNM PRESS
DRB #: N/A EPC#: N/A
ZONE MAP/DRG. FILE #: L15/D31F
WORK ORDER#: N/A

LEGAL DESCRIPTION: TRACT 1E 2A, SCIENCE AND TECHNOLOGY PARK
CITY ADDRESS: ~~1312 BASE HWY SE~~ ALBUQUERQUE, NM 87106

ENGINEERING FIRM: MILLER ENGINEERING CONSULTANTS
ADDRESS: 95 344 HWY NO, POBOX 520
CITY, STATE: EDGEWOOD, NM
CONTACT: VERLIN MILLER
PHONE: 286.7771
ZIP CODE: 87015

OWNER: SANDIA FOUNDATION UNIVERSITY OF NEW MEXICO
ADDRESS: 6211 SAN MATEO NE STE 100
CITY, STATE: ALBUQUERQUE, NM
CONTACT:
PHONE:
ZIP CODE: 87109

ARCHITECT: NCA ARCHITECTS
ADDRESS: 1306 RIO GRANDE BLVD NW
CITY, STATE: ALBUQUERQUE, NM
CONTACT: DANE PURITZ
PHONE: 255.6400
ZIP CODE: 87104

SURVEYOR: ALBUQUERQUE SURVEY CO
ADDRESS 2119 MENAUL NE
CITY, STATE: ALBUQUERQUE, NM
CONTACT:
PHONE: 884.2036
ZIP CODE: 87107

CONTRACTOR: FLINT CO
ADDRESS: 6020 INDIAN SCHOOL RD NE
CITY, STATE: ALBUQUERQUE, NM
CONTACT:
PHONE: 262.1888
ZIP CODE: 87110

CHECK TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- X DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

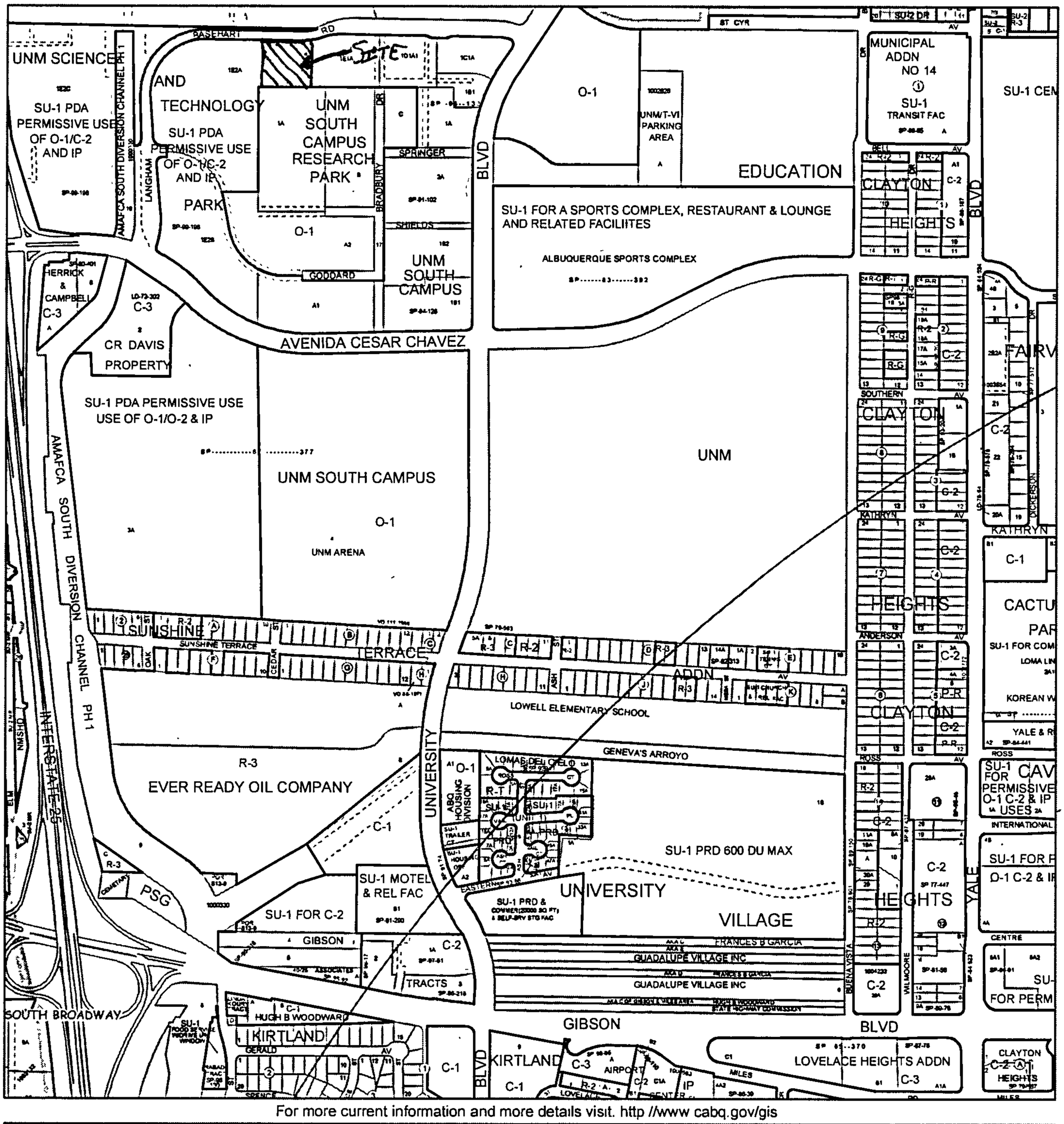
CHECK TYPE OF APPROVAL SOUGHT:
- ___ SIA / FINANCIAL GUARANTEE RELEASE
- ___ PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUB'D. APPROVAL
- ___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- ___ FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- ___ YES
- ___ NO
- ___ COPY PROVIDED

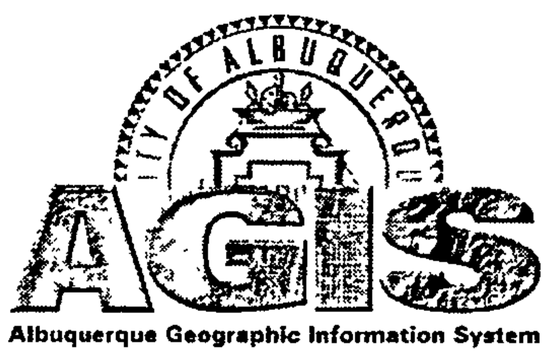
DATE SUBMITTED: 24 Jan 06 BY:

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

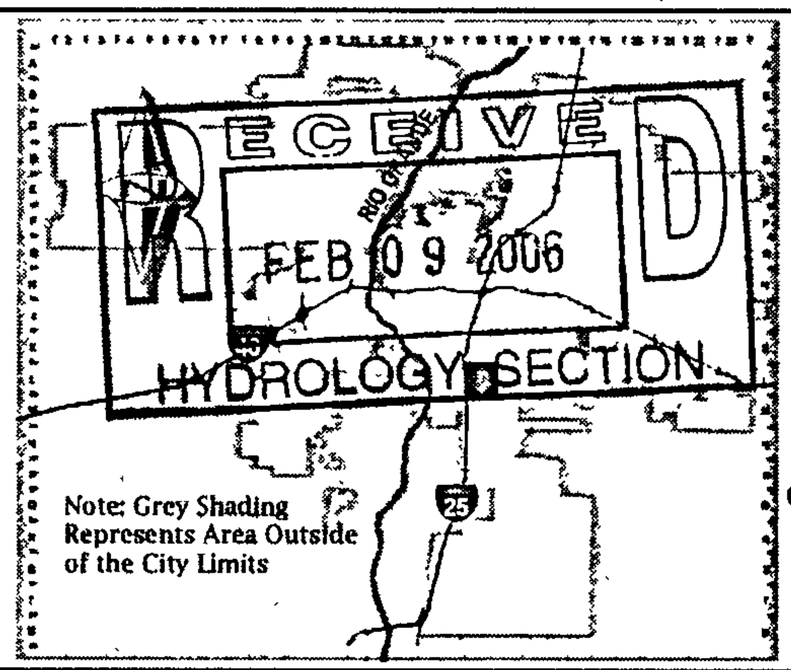
1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report**: Required for subdivisions containing more than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



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



Map amended through: 11/2/2005



Zone Atlas Page:

L-15-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

MILLER ENGINEERING CONSULTANTS
Engineers • Planners

LETTER OF TRANSMITTAL

TO COA HYDROLOGY DEPT
PLAZA DEL SOL
STE. 201

DATE 02.22.06	JOB NO. E.05.087
ATTENTION ARLENE PORTELCO	
RE:	
UNM PRESS	
G&D	

GENTLEMEN:
WE ARE SENDING YOU ATTACHED THE FOLLOWING ITEMS:

COPIES	DATE	NO.	DESCRIPTION
2	02.21.06	3	REVISED G&D W/ NEW ENGR'S STAMP
1	01.24.06	1	ORIGINAL D&T INFO SHEET

THESE ARE TRANSMITTED as checked below:

For Approval For Your Use As Requested For Review & Comment

Other FOR GRADING PERMIT

REMARKS

COPY TO FILE
NCA. DAVE PURITZ

SIGNED:

P.O. Box 520 • 95 Hwy 344 N. • Edgewood, New Mexico 87015 • Phone 505-286-7771 • Fax 505-286-9026

UNM PRESS WAREHOUSE BUILDING

AT THE SCIENCE & TECHNOLOGY PARK
UNIVERSITY OF NEW MEXICO CAMPUS
ALBUQUERQUE, NEW MEXICO

Drainage Report

January, 2006

JERRY A. MILLER II
NEW MEXICO
14507
1/13/06
REGISTERED PROFESSIONAL ENGINEER

RECEIVED
JAN 24 2006
HYDROLOGY SECTION

Prepared For: NCA Architects & UNM Real Estate Office

Prepared By:

MILLER ENGINEERING CONSULTANTS
Engineers • Planners

95 HWY 344 N., Suite 2
P.O. Box 520
Edgewood, New Mexico 87015
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1.0 Purpose

The purpose of this report is to quantify the storm water runoff from the site prior to and after development of the site, address any offsite flows that may impact the site and to substantiate the proposed drainage improvements outlined on the grading and drainage plan for this project.

2.0 Approach & Methodology

The approach taken in performing the drainage analysis for this project was to comply with the recommendations outlined in drainage report for the Science & Technology Park prepared by Bohannon-Huston, Inc. (BHI), dated April, 1997. This report provides recommendations for addressing drainage from development in the Science and Technology Park, including providing allowable land treatments percentages and peak discharge rates for the free release of storm water to the Basehart Road Storm Sewer System.

The methodology utilized in conducting the hydrologic analysis for this project is Section 22.2 of the City of Albuquerque's Development Process Manual (DPM). The AHYMO_97 hydrologic computer model was utilized in developed the pre and post developed hydrology for this project and for the reservoir routing for the proposed Social Security Detention Pond. The Flow Master Computer Program was utilized to size the proposed storm sewer system and for the hydraulic analyses of the hydraulic structures proposed on the grading and drainage plan.

3.0 Existing On-site Conditions

The project site, which consists of approximately 2.6 acres, is currently undeveloped, but has been mostly disturbed by human activity and is sparsely covered by native grasses and vegetation. In past years, it appears that the dumping of construction debris has occurred at the site as well as substantial surface grading on a vast majority of the site.

The pre-developed land treatments percentages are categorized as 10% A and 90% C as per Section 22.2 of the DPM.

The site is bound on the north by Basehart Road, a parking structure on the east, the Social Security Parking Lot on the south and vacant land owned by UNM to the west. The site generally slopes to the north and west with terrain that is mildly to steeply sloping.

4.0 Proposed On-Site Conditions

The proposed project will consist of a new two-story building with 35,200 square foot at the first level, asphalt paved parking areas, concrete sidewalks and landscaped areas. The land treatment percentages for the site after development are categorized as 0.5% B, 40.5% C and 60% D as per Section 22.2 of the DPM. These land treatment values do not exceed the allowable developed land treatment percentages outlined in the BHI Drainage Report. This report has accounted for the "free release" of storm water from the site to Basehart Road provided that the allowable developed land treatment percentages are not exceeded.

5.0 Offsite Flows:

There is one offsite drainage basin that impacts the site, the old Social Security Building and parking lot. The Social Security Site located south of the project site consists of 10.91 acres and discharges flows into an existing retention pond located south of the proposed UNM Press Warehouse Building. A small portion of this off-site area, 0.89 acres more or less, is collected by a drop inlet and diverted north along the eastern boundary of the site through a storm sewer to the Basehart Road Storm Sewer System. The BHI drainage report has called for an allowable release rate from the Social Security Site to the Basehart Road Storm Sewer System of 24.877 cfs.

6.0 Storm Water Routing

The post developed flows from the site will free discharge north to the Basehart Road Storm Sewer System via surface drainage and through a proposed on-site storm sewer system. The storm sewer system will collect runoff from onsite Basins A & B and will collect runoff from a proposed outlet pipe in the existing Social Security Retention Pond. All storm water flows collected in the proposed storm sewer system will connect to the existing storm sewer stub-out provided for the site as outlined in the BHI report. Basins C & D will free discharge to the Basehart Road roadway section via surface flow and will be intercepted by the drainage inlets on Basehart Road.

7.0 Conclusion

When this site is developed as indicated on the proposed grading and drainage plan, the runoff from this site will not exceed the prescribed discharge rates provided in the BHI Drainage Report.

The Social Security Retention Pond will be upgraded to a detention facility with a 24-inch primary outflow device, which will control the release of storm water from the Social Security Site to approximately 22.66 cfs during the 100-year event, compared to a prescribed rate of 24.877 cfs outlined in the BHI report.

To improve the safety of the detention pond facility, minor grading and compaction of the existing embankment areas will be accomplished and an emergency spillway will be added. In the event that storm waters reach the emergency spillway elevation, storm waters will be routed west toward currently undeveloped land owned by UNM. Future development of areas west of the detention pond will be required to accommodate and safely route potential flows from the detention pond's emergency spillway to areas downstream.

APPENDIX A
Drainage Basin Characteristics

MILLER ENGINEERING CONSULTANTS

UNION PRESS WAREHOUSE — BASIN HYDROLOGY

ONSITE "EXISTING" BASINS

Total Site = 2.60 AC = 0.004 MI²

LAND TREATMENT

A = 0.26 AC 10.0%
B = 0.00 AC
C = 2.34 AC = 90.0%
D = 0.00 AC

BASIN A = 0.60 AC = 0.0009 MI²

LAND TREATMENT

A = 0.16 AC = 26.7%
B = 0.00 AC = 0.00%
C = 0.44 AC = 73.3%
D = 0.00 AC = 0.00%

BASIN B = 2.00 AC =

LAND TREATMENT = 0.0031 MI²

A = 0.10 AC = 5%
B = 0.00 AC = 0.00%
C = 1.90 AC = 95%
D = 0.00 AC = 0.00%

MILLER ENGINEERING

UNM PRESS WAREHOUSE CONSULTANTS BASIN HYDROLOGY

ONSITE "PROPOSED" BASIN

Total Site = 2.60 Ac = 0.004 MI²

LAND TREATMENT

A = 0.00 Ac
B = 0.0129 Ac 0.50%
C = 1.0584 Ac 40.25%
D = 1.5704 Ac 60%

BASIN A = .9012 Ac = 0.0014 MI²

LAND TREATMENT

A = 0.00 Ac = 0%
B = 0.00 Ac = 0%
C = 0.5902 Ac = 65.50%
D = 0.3109 Ac = 34.50%

BASIN B = 0.2204 Ac = 0.0003 MI²

LAND TREATMENT

A 0.00 Ac = 0%
B 0.00 Ac = 0%
C 0.00 Ac = 0%
D = 0.2204 Ac = 100%

BASIN C = 0.5433 Ac = 0.0008 MI²

LAND TREATMENT

A = 0.00 Ac = 0%
B = 0.0129 Ac = 2.40%
C = 0.00 Ac = 0%
D = 0.5304 Ac = 97.60%

BASIN D = .9269 Ac = 0.0015 MI²

LAND TREATMENT

A = 0.00 Ac = 0%
B = 0.00 Ac = 0%
C = 0.4682 Ac = 50.50%
D = 0.4587 Ac = 49.50%

UNM PRESS WAREHOUSE — MILLER ENGINEERING CONSULTANTS — BASIN HYDROLOGY

OFFSITE BASIN → SOCIAL SECURITY SITE

BASIN S.S = 10.9110 AC (Total)

Land Treatment

A=0.00 AC
B=0.53 AC = 4.87%
C=0.00 AC
D=10.38 AC = 95.13%

BASIN SS-1 = 0.89 AC

Land Treatment

A= 0.00 AC
B= 0.04 AC - 0.50%
C= 0.00 AC
D= 0.85 AC - 95.50%

BASIN SS-2 = 4.17 AC

Land Treatment

A= 0.00 AC
B= 0.20 AC - 0.20%
C= 0.00 AC
D= 3.87 AC - 92.80%

BASIN SS-3 = 5.85 AC

Land Treatment

A= 0.00 AC
B= 0.29 AC - 4.96%
C= 0.00 AC
D= 5.56 AC - 95.04%

APPENDIX B
Detention Pond Stage-Storage-Discharge Relationship

Miller Engineering Consultants

Pond Hydrology

Unm Press Warehouse

Offsite Pond → Stage Storage Table

Elevation	Area	Avg Area	Cumm Vol. (Cubic Feet)
5080 Inv.	6419		Ø C.F @ 5080
		7273	
5081	8127		7273 C.F. @ 5081
		8627	
5082	9127		15,900 C.F. @ 5082
		9627	
5083	10,128		25,527 C.F. @ 5083
		10,651	
5084	11,174		36,178 C.F. @ 5084
		11,682	
5085 Tp	12,190		47,860 C.F. @ 5085

DETENTION POND DISCHARGE
-VS- STAGE

Rating Table Report
Worksheet-1

Range Data:

	Minimum	Maximum	Increment	
Allowable HW E	5,080.00	5,085.00	1.00	ft

HW Elev. (ft)	Discharge (cfs)
5,080.00	0.00
5,081.00	3.92
5,082.00	13.27
5,083.00	22.60
5,084.00	28.67
5,085.00	33.66

© Haestad Methods, Inc.
Miller Engineering Consultants
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

APPENDIX C
AHYMO Output Model

AHYMO PROGRAM (AHYMO_97) - - Version: 1997.02b
RUN DATE (MON/DAY/YR) = 01/09/2006
START TIME (HR:MIN:SEC) = 11:11:19 USER NO.= AHYMO-I-9702aD2000N25-AH
INPUT FILE = UNMP100.DAT

********** MILLER ENGINERING CONSULTANTS **********
********** DECEMBER 2005 **********
********** UNM PRESS PROJECT, ALBUQUERQUE, NM **********
********** 100 YEAR, 24-HOUR STORM (ZONE 2) **********
**********PROJECT HYDROLOGY **********
****

START 0.00
****

RAINFALL TYPE=2 RAIN QUARTER=0.0 RAIN ONE=2.01
RAIN SIX=2.35 RAIN DAY=2.75 DT=0.05

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT = .050000 HOURS END TIME = 24.000000 HOURS

.0000	.0024	.0049	.0075	.0102	.0130	.0158
.0188	.0219	.0252	.0286	.0321	.0358	.0397
.0439	.0482	.0529	.0578	.0631	.0689	.0751
.0836	.0930	.1201	.1842	.2944	.4649	.7103
1.0460	1.3107	1.4303	1.5302	1.6176	1.6959	1.7667
1.8313	1.8906	1.9452	1.9955	2.0421	2.0851	2.0946
2.1034	2.1115	2.1191	2.1262	2.1330	2.1394	2.1455
2.1513	2.1569	2.1622	2.1673	2.1723	2.1771	2.1817
2.1862	2.1905	2.1948	2.1989	2.2028	2.2067	2.2105
2.2142	2.2178	2.2213	2.2248	2.2282	2.2315	2.2347
2.2379	2.2410	2.2440	2.2470	2.2500	2.2529	2.2557
2.2585	2.2613	2.2640	2.2666	2.2693	2.2719	2.2744
2.2769	2.2794	2.2818	2.2842	2.2866	2.2889	2.2913
2.2935	2.2958	2.2980	2.3002	2.3024	2.3046	2.3067
2.3088	2.3109	2.3129	2.3150	2.3170	2.3190	2.3209
2.3229	2.3248	2.3267	2.3286	2.3305	2.3323	2.3342
2.3360	2.3378	2.3396	2.3414	2.3431	2.3449	2.3466
2.3483	2.3500	2.3517	2.3534	2.3551	2.3569	2.3586
2.3602	2.3619	2.3636	2.3653	2.3669	2.3686	2.3703
2.3719	2.3736	2.3752	2.3768	2.3785	2.3801	2.3817
2.3833	2.3849	2.3865	2.3881	2.3897	2.3913	2.3929
2.3944	2.3960	2.3976	2.3991	2.4007	2.4022	2.4038
2.4053	2.4068	2.4084	2.4099	2.4114	2.4129	2.4144
2.4159	2.4174	2.4189	2.4204	2.4219	2.4234	2.4248
2.4263	2.4278	2.4292	2.4307	2.4322	2.4336	2.4350
2.4365	2.4379	2.4394	2.4408	2.4422	2.4436	2.4450
2.4464	2.4478	2.4493	2.4506	2.4520	2.4534	2.4548
2.4562	2.4576	2.4589	2.4603	2.4617	2.4630	2.4644
2.4658	2.4671	2.4685	2.4698	2.4711	2.4725	2.4738
2.4751	2.4765	2.4778	2.4791	2.4804	2.4817	2.4830
2.4843	2.4856	2.4869	2.4882	2.4895	2.4908	2.4921
2.4934	2.4946	2.4959	2.4972	2.4984	2.4997	2.5010
2.5022	2.5035	2.5047	2.5060	2.5072	2.5085	2.5097
2.5109	2.5122	2.5134	2.5146	2.5158	2.5170	2.5183
2.5195	2.5207	2.5219	2.5231	2.5243	2.5255	2.5267
2.5279	2.5291	2.5303	2.5314	2.5326	2.5338	2.5350

2.5361	2.5373	2.5385	2.5396	2.5408	2.5420	2.5431
2.5443	2.5454	2.5466	2.5477	2.5488	2.5500	2.5511
2.5523	2.5534	2.5545	2.5556	2.5568	2.5579	2.5590
2.5601	2.5612	2.5623	2.5635	2.5646	2.5657	2.5668
2.5679	2.5690	2.5701	2.5711	2.5722	2.5733	2.5744
2.5755	2.5766	2.5776	2.5787	2.5798	2.5809	2.5819
2.5830	2.5841	2.5851	2.5862	2.5872	2.5883	2.5893
2.5904	2.5914	2.5925	2.5935	2.5946	2.5956	2.5966
2.5977	2.5987	2.5997	2.6008	2.6018	2.6028	2.6038
2.6049	2.6059	2.6069	2.6079	2.6089	2.6099	2.6109
2.6119	2.6129	2.6139	2.6149	2.6159	2.6169	2.6179
2.6189	2.6199	2.6209	2.6219	2.6229	2.6238	2.6248
2.6258	2.6268	2.6278	2.6287	2.6297	2.6307	2.6316
2.6326	2.6336	2.6345	2.6355	2.6364	2.6374	2.6384
2.6393	2.6403	2.6412	2.6421	2.6431	2.6440	2.6450
2.6459	2.6469	2.6478	2.6487	2.6497	2.6506	2.6515
2.6524	2.6534	2.6543	2.6552	2.6561	2.6571	2.6580
2.6589	2.6598	2.6607	2.6616	2.6625	2.6634	2.6644
2.6653	2.6662	2.6671	2.6680	2.6689	2.6698	2.6707
2.6715	2.6724	2.6733	2.6742	2.6751	2.6760	2.6769
2.6778	2.6786	2.6795	2.6804	2.6813	2.6821	2.6830
2.6839	2.6848	2.6856	2.6865	2.6874	2.6882	2.6891
2.6900	2.6908	2.6917	2.6925	2.6934	2.6942	2.6951
2.6959	2.6968	2.6976	2.6985	2.6993	2.7002	2.7010
2.7019	2.7027	2.7035	2.7044	2.7052	2.7061	2.7069
2.7077	2.7085	2.7094	2.7102	2.7110	2.7119	2.7127
2.7135	2.7143	2.7151	2.7160	2.7168	2.7176	2.7184
2.7192	2.7200	2.7209	2.7217	2.7225	2.7233	2.7241
2.7249	2.7257	2.7265	2.7273	2.7281	2.7289	2.7297
2.7305	2.7313	2.7321	2.7329	2.7337	2.7344	2.7352
2.7360	2.7368	2.7376	2.7384	2.7392	2.7399	2.7407
2.7415	2.7423	2.7431	2.7438	2.7446	2.7454	2.7462
2.7469	2.7477	2.7485	2.7492	2.7500		

```
*S*********************************************************************
*S****SOCIAL SECURITY(SS) SITE OFFSITE BASIN*****************************
*S*********************************************************************
*S* BASIN SS-1 ***
COMPUTE NM HYD      ID=2 HYD NO=201    DA=0.0014 SQ MI
            PER A=0   PER B=5   PER C=0   PER D=95
            TP= -.1333   RAIN=-1

      K =  .072649HR   TP =  .133300HR   K/TP RATIO =  .545000    SHAPE CONSTANT, N =
7.106420
      UNIT PEAK =  5.2509   CFS  UNIT VOLUME =   .9971      B =  526.28     P60 = 2.0100
      AREA =     .001330 SQ MI   IA =   .10000 INCHES   INF =   .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
.050000


      K =  .132088HR   TP =  .133300HR   K/TP RATIO =  .990905    SHAPE CONSTANT, N =
3.563124
      UNIT PEAK =  .17062   CFS  UNIT VOLUME =   .9246      B =  324.91     P60 = 2.0100
      AREA =     .000070 SQ MI   IA =   .50000 INCHES   INF =  1.25000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
.050000
```

PRINT HYD ID=2 CODE=10

PARTIAL HYDROGRAPH 201.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	4.1	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	1.0	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.1	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 2.43019 INCHES = .1815 ACRE-FEET
PEAK DISCHARGE RATE = 4.05 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

S BASIN SS-2 ***
COMPUTE NM HYD ID=3 HYD NO=202 DA=0.0065 SQ MI
PER A=0 PER B=5 PER C=0 PER D=95
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 24.379 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 2.0100
AREA = .006175 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .132088HR TP = .133300HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .79216 CFS UNIT VOLUME = .9843 B = 324.91 P60 = 2.0100
AREA = .000325 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=3 CODE=10

PARTIAL HYDROGRAPH 202.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.1	10.000	.1	15.000	.1	20.000	.1
.500	.0	5.500	.1	10.500	.1	15.500	.1	20.500	.1
1.000	.0	6.000	.1	11.000	.1	16.000	.1	21.000	.1
1.500	18.8	6.500	.1	11.500	.1	16.500	.1	21.500	.1
2.000	4.6	7.000	.1	12.000	.1	17.000	.1	22.000	.1

2.500	.6	7.500	.1	12.500	.1	17.500	.1	22.500	.1
3.000	.2	8.000	.1	13.000	.1	18.000	.1	23.000	.1
3.500	.1	8.500	.1	13.500	.1	18.500	.1	23.500	.1
4.000	.1	9.000	.1	14.000	.1	19.000	.1	24.000	.1
4.500	.1	9.500	.1	14.500	.1	19.500	.1	24.500	.0

RUNOFF VOLUME = 2.43019 INCHES = .8425 ACRE-FEET
PEAK DISCHARGE RATE = 18.75 CFS AT 1.500 HOURS BASIN AREA = .0065 SQ. MI.

S BASIN SS-3 ***
COMPUTE NM HYD ID=4 HYD NO=203 DA=0.009 SQ MI
PER A=0 PER B=5 PER C=0 PER D=95
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 33.756 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 2.0100
AREA = .008550 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .132088HR TP = .133300HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = 1.0968 CFS UNIT VOLUME = .9896 B = 324.91 P60 = 2.0100
AREA = .000450 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=4 CODE=10

PARTIAL HYDROGRAPH 203.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.2	10.000	.1	15.000	.1	20.000	.1
.500	.0	5.500	.2	10.500	.1	15.500	.1	20.500	.1
1.000	.0	6.000	.2	11.000	.1	16.000	.1	21.000	.1
1.500	26.0	6.500	.2	11.500	.1	16.500	.1	21.500	.1
2.000	6.4	7.000	.2	12.000	.1	17.000	.1	22.000	.1
2.500	.8	7.500	.2	12.500	.1	17.500	.1	22.500	.1
3.000	.3	8.000	.2	13.000	.1	18.000	.1	23.000	.1
3.500	.2	8.500	.2	13.500	.1	18.500	.1	23.500	.1
4.000	.2	9.000	.2	14.000	.1	19.000	.1	24.000	.1
4.500	.1	9.500	.2	14.500	.1	19.500	.1	24.500	.0

RUNOFF VOLUME = 2.43018 INCHES = 1.1665 ACRE-FEET
PEAK DISCHARGE RATE = 25.96 CFS AT 1.500 HOURS BASIN AREA = .0090 SQ. MI.

*S**ADD BASINS SS-2 & SS-3 FOR TOTAL INTO POND**********
ADD HYD ID=5 HYD=203.2 ID I=3 II=4

PRINT HYD ID=5 CODE=10

PARTIAL HYDROGRAPH 203.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.3	10.000	.3	15.000	.2	20.000	.2
.500	.0	5.500	.3	10.500	.2	15.500	.2	20.500	.2
1.000	.0	6.000	.3	11.000	.2	16.000	.2	21.000	.2
1.500	44.7	6.500	.3	11.500	.2	16.500	.2	21.500	.2
2.000	11.0	7.000	.3	12.000	.2	17.000	.2	22.000	.2
2.500	1.4	7.500	.3	12.500	.2	17.500	.2	22.500	.2
3.000	.5	8.000	.3	13.000	.2	18.000	.2	23.000	.2
3.500	.3	8.500	.3	13.500	.2	18.500	.2	23.500	.1
4.000	.3	9.000	.3	14.000	.2	19.000	.2	24.000	.1
4.500	.3	9.500	.3	14.500	.2	19.500	.2	24.500	.0

RUNOFF VOLUME = 2.43014 INCHES = 2.0089 ACRE-FEET
PEAK DISCHARGE RATE = 44.71 CFS AT 1.500 HOURS BASIN AREA = .0155 SQ. MI.

*S*ROUTE THROGUH POND WITH 24" RCP OUTLET**********
ROUTE RESERVOIR ID=6 HYD=503 INFLOW ID=5 CODE=20

OUTFLOW	STORAGE	DEPTH
0	0	5080
3.92	0.167	5081
13.27	0.365	5082
22.60	0.586	5083
28.67	0.831	5084
33.66	1.10	5085

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5080.00	.000	.00
1.00	.00	5080.00	.000	.00
2.00	10.99	5082.41	.455	17.06
3.00	.51	5080.56	.093	2.18
4.00	.27	5080.15	.025	.58
5.00	.27	5080.08	.013	.31
6.00	.32	5080.08	.013	.30
7.00	.31	5080.08	.013	.31
8.00	.29	5080.08	.013	.30
9.00	.27	5080.07	.012	.28
10.00	.26	5080.07	.011	.26
11.00	.24	5080.06	.011	.25
12.00	.23	5080.06	.010	.24
13.00	.22	5080.06	.010	.23
14.00	.21	5080.06	.009	.22
15.00	.20	5080.05	.009	.21
16.00	.19	5080.05	.008	.20
17.00	.18	5080.05	.008	.19

18.00	.18	5080.05	.008	.18
19.00	.17	5080.04	.007	.18
20.00	.17	5080.04	.007	.17
21.00	.16	5080.04	.007	.16
22.00	.16	5080.04	.007	.16
23.00	.15	5080.04	.007	.15
24.00	.15	5080.04	.006	.15
25.00	.00	5080.01	.001	.03
26.00	.00	5080.00	.000	.00

PEAK DISCHARGE = 22.661 CFS - PEAK OCCURS AT HOUR 1.65
MAXIMUM WATER SURFACE ELEVATION = 5083.010
MAXIMUM STORAGE = .5885 AC-FT INCREMENTAL TIME= .050000HRS

PRINT HYD ID=6 CODE=10

OUTFLOW HYDROGRAPH RESERVOIR 503.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.500	.3	11.000	.3	16.500	.2	22.000	.2
.500	.0	6.000	.3	11.500	.2	17.000	.2	22.500	.2
1.000	.0	6.500	.3	12.000	.2	17.500	.2	23.000	.2
1.500	15.1	7.000	.3	12.500	.2	18.000	.2	23.500	.2
2.000	17.1	7.500	.3	13.000	.2	18.500	.2	24.000	.1
2.500	5.2	8.000	.3	13.500	.2	19.000	.2	24.500	.1
3.000	2.2	8.500	.3	14.000	.2	19.500	.2	25.000	.0
3.500	1.1	9.000	.3	14.500	.2	20.000	.2	25.500	.0
4.000	.6	9.500	.3	15.000	.2	20.500	.2	26.000	.0
4.500	.4	10.000	.3	15.500	.2	21.000	.2	26.500	.0
5.000	.3	10.500	.3	16.000	.2	21.500	.2		

RUNOFF VOLUME = 2.43014 INCHES = 2.0089 ACRE-FEET
FROM 1990 ★ PEAK DISCHARGE RATE = 22.66 CFS AT 1.650 HOURS BASIN AREA = .0155 SQ. MI.

*S**ONSITE BSINS**********
S BASIN A ***
COMPUTE NM HYD ID=7 HYD NO=301 DA=0.0014 SQ MI
PER A=0 PER B=0 PER C=65 PER D=35
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.9345 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 2.0100
AREA = .000490 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .107446HR TP = .133300HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = 2.6184 CFS UNIT VOLUME = .9975 B = 383.55 P60 = 2.0100
AREA = .000910 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=7 CODE=10

HYDROGRAPH FROM AREA 301.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	3.3	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	.6	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.1	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 1.61299 INCHES = .1204 ACRE-FEET
PEAK DISCHARGE RATE = 3.28 CFS AT 1.500 HOURS BASIN AREA = .0014 SQ. MI.

S BASIN B ***
COMPUTE NM HYD ID=8 HYD NO=302 DA=0.0003 SQ MI
PER A=0 PER B=0 PER C=0 PER D=100
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.1844 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 2.0100
AREA = .000300 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=8 CODE=10

HYDROGRAPH FROM AREA 302.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	.9	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	.2	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.0	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 2.51715 INCHES = .0403 ACRE-FEET
PEAK DISCHARGE RATE = .89 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

*S**ADD BASINS A & B **********
ADD HYD ID=9 HYD=303.1 ID I=7 II=8
PRINT HYD ID=9 CODE=10

HYDROGRAPH FROM AREA 303.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	4.2	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	.8	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.1	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 1.77228 INCHES = .1607 ACRE-FEET
PEAK DISCHARGE RATE = 4.17 CFS AT 1.500 HOURS BASIN AREA = .0017 SQ. MI.

*S**ADD A & B TO POND OUTFLOW FOR TOTAL IN 24" SD SYSTEM **********
ADD HYD ID=10 HYD=303.2 ID I=6 II=9
PRINT HYD ID=10 CODE=10

HYDROGRAPH FROM AREA 303.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.500	.3	11.000	.3	16.500	.2	22.000	.2
.500	.0	6.000	.3	11.500	.3	17.000	.2	22.500	.2
1.000	.0	6.500	.3	12.000	.2	17.500	.2	23.000	.2
1.500	19.3	7.000	.3	12.500	.2	18.000	.2	23.500	.2
2.000	17.9	7.500	.3	13.000	.2	18.500	.2	24.000	.2
2.500	5.3	8.000	.3	13.500	.2	19.000	.2	24.500	.1
3.000	2.2	8.500	.3	14.000	.2	19.500	.2	25.000	.0
3.500	1.1	9.000	.3	14.500	.2	20.000	.2	25.500	.0
4.000	.6	9.500	.3	15.000	.2	20.500	.2	26.000	.0
4.500	.4	10.000	.3	15.500	.2	21.000	.2	26.500	.0
5.000	.3	10.500	.3	16.000	.2	21.500	.2		

RUNOFF VOLUME = 2.36507 INCHES = 2.1695 ACRE-FEET
PEAK DISCHARGE RATE = 24.96 CFS AT 1.650 HOURS BASIN AREA = .0172 SQ. MI.

S BASIN C ***
COMPUTE NM HYD ID=11 HYD NO=303 DA=0.00085 SQ MI
PER A=0 PER B=2.5 PER C=0 PER D=97.5
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.2719 CFS UNIT VOLUME = .9959 B = 526.28 P60 = 2.0100
AREA = .000829 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .132088HR TP = .133300HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .51795E-01CFS UNIT VOLUME = .8744 B = 324.91 P60 = 2.0100
AREA = .000021 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=11 CODE=10

HYDROGRAPH FROM AREA 303.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	2.5	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	.6	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.1	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 2.47367 INCHES = .1121 ACRE-FEET
PEAK DISCHARGE RATE = 2.49 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

S BASIN D ***
COMPUTE NM HYD ID=12 HYD NO=304 DA=0.00145 SQ MI
PER A=0 PER B=0 PER C=50 PER D=50
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.8623 CFS UNIT VOLUME = .9951 B = 526.28 P60 = 2.0100
AREA = .000725 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .107446HR TP = .133300HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = 2.0861 CFS UNIT VOLUME = .9959 B = 383.55 P60 = 2.0100
AREA = .000725 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=12 CODE=10

HYDROGRAPH FROM AREA 304.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	3.6	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	.7	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.1	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.0	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 1.82164 INCHES = .1409 ACRE-FEET
PEAK DISCHARGE RATE = 3.60 CFS AT 1.500 HOURS BASIN AREA = .0015 SQ. MI.

*S**ADD BASINS C & D FOR TOTAL RELEASE TO STREET SECTION **********
ADD HYD ID=13 HYD=303.3 ID I=11 II=12
PRINT HYD ID=13 CODE=10

HYDROGRAPH FROM AREA 303.30

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.0	10.000	.0	15.000	.0	20.000	.0
.500	.0	5.500	.0	10.500	.0	15.500	.0	20.500	.0
1.000	.0	6.000	.0	11.000	.0	16.000	.0	21.000	.0
1.500	6.1	6.500	.0	11.500	.0	16.500	.0	21.500	.0
2.000	1.4	7.000	.0	12.000	.0	17.000	.0	22.000	.0
2.500	.2	7.500	.0	12.500	.0	17.500	.0	22.500	.0
3.000	.1	8.000	.0	13.000	.0	18.000	.0	23.000	.0
3.500	.0	8.500	.0	13.500	.0	18.500	.0	23.500	.0
4.000	.0	9.000	.0	14.000	.0	19.000	.0	24.000	.0
4.500	.0	9.500	.0	14.500	.0	19.500	.0		

RUNOFF VOLUME = 2.06236 INCHES = .2530 ACRE-FEET
PEAK DISCHARGE RATE = 6.10 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 11:11:19

APPENDIX D
Storm Sewer Hydraulics

STORM DRAIN CAPACITY SPREADSHEET

UNM PRESS PROJECT

1/7/2006

MH	Pipe Size	Pipe Slope (%)	Q100 (cfs)	Q Cap (cfs)
Main Line				
	24			
EX				
	24	5.9%	24.96	54.95
MH 1				
	24	6.1%	24.96	55.87
MH 2				
	24	2.0%	4.17 - 24.96	31.99
MH 3				
	18	0.94%	0.89	10.18
Line from Pond				
Wye				
	24	8.5%	22.66	65.95
MH 4				
	24	2.0%	22.66	31.99
Inlet				
Line from Double D Drop Inlet				
Wye				
	18	7.5%	3.28	28.77
Inlet				

Worksheet for Circular Pipe - 1

Project Description

Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data

Roughness Coefficient:	0.013	
Channel Slope:	0.02000	ft/ft
Normal Depth:	2.00	ft
Diameter:	2.00	ft

Results

Discharge:	31.99	ft^3/s
Flow Area:	3.14	ft^2
Wetted Perimeter:	6.28	ft
Top Width:	0.00	ft
Critical Depth:	1.89	ft
Percent Full:	100.0	%
Critical Slope:	0.01730	ft/ft
Velocity:	10.18	ft/s
Velocity Head:	1.61	ft
Specific Energy:	3.61	ft
Froude Number:	0.00	
Maximum Discharge:	34.41	ft^3/s
Discharge Full:	31.99	ft^3/s
Slope Full:	0.02000	ft/ft
Flow Type:	SubCritical	

GVF Input Data

Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	

GVF Output Data

Upstream Depth:	0 00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0.00	%
Downstream Velocity:	0.00	ft/s

Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	2.00	ft
Critical Depth:	1.89	ft
Channel Slope:	0.02000	ft/ft
Critical Slope:	0 01730	ft/ft

Worksheet for Circular Pipe - 1

Project Description		
Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data		
Roughness Coefficient:	0.013	
Channel Slope:	0.05900	ft/ft
Normal Depth:	2.00	ft
Diameter:	2.00	ft

Results		
Discharge:	54.95	ft^3/s
Flow Area:	3.14	ft^2
Wetted Perimeter:	6.28	ft
Top Width:	0.00	ft
Critical Depth:	1.99	ft
Percent Full:	100.0	%
Critical Slope:	0.05506	ft/ft
Velocity:	17.49	ft/s
Velocity Head:	4.75	ft
Specific Energy:	6.75	ft
Froude Number:	0.00	
Maximum Discharge:	59.11	ft^3/s
Discharge Full:	54.95	ft^3/s
Slope Full:	0.05900	ft/ft
Flow Type:	SubCritical	

GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0 00	ft
Number Of Steps:	0	

GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0.00	%
Downstream Velocity:	0.00	ft/s

Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	2.00	ft
Critical Depth:	1.99	ft
Channel Slope:	0.05900	ft/ft
Critical Slope:	0.05506	ft/ft

Worksheet for Circular Pipe - 1

Project Description

Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data

Roughness Coefficient:	0 013	
Channel Slope:	0.06100	ft/ft
Normal Depth:	2.00	ft
Diameter:	2.00	ft

Results

Discharge:	55.87	ft^3/s
Flow Area:	3.14	ft^2
Wetted Perimeter:	6.28	ft
Top Width:	0.00	ft
Critical Depth:	1.99	ft
Percent Full:	100.0	%
Critical Slope:	0.05705	ft/ft
Velocity:	17.78	ft/s
Velocity Head:	4.92	ft
Specific Energy:	6.92	ft
Froude Number:	0.00	
Maximum Discharge:	60.10	ft^3/s
Discharge Full:	55.87	ft^3/s
Slope Full:	0.06100	ft/ft
Flow Type:	SubCritical	

GVF Input Data

Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	

GVF Output Data

Upstream Depth:	0.00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0.00	%
Downstream Velocity:	0.00	ft/s

Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	2.00	ft
Critical Depth:	1.99	ft
Channel Slope:	0.06100	ft/ft
Critical Slope:	0.05705	ft/ft

Worksheet for Circular Pipe - 1

Project Description		
Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data		
Roughness Coefficient:	0.013	
Channel Slope:	0.08500	ft/ft
Normal Depth:	2.00	ft
Diameter:	2.00	ft

Results		
Discharge:	65.95	ft^3/s
Flow Area:	3.14	ft^2
Wetted Perimeter:	6 28	ft
Top Width:	0 00	ft
Critical Depth:	1.99	ft
Percent Full:	100.0	%
Critical Slope:	0.08096	ft/ft
Velocity:	20.99	ft/s
Velocity Head:	6 85	ft
Specific Energy:	8.85	ft
Froude Number:	0.00	
Maximum Discharge:	70.94	ft^3/s
Discharge Full:	65.95	ft^3/s
Slope Full:	0.08500	ft/ft
Flow Type:	SubCritical	

GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	

GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0.00	%
Downstream Velocity:	0.00	ft/s

Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	2.00	ft
Critical Depth:	1.99	ft
Channel Slope:	0.08500	ft/ft
Critical Slope:	0.08096	ft/ft

Worksheet for Circular Pipe - 1

Project Description		
Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data		
Roughness Coefficient:	0.013	
Channel Slope:	0.07500	ft/ft
Normal Depth:	1.50	ft
Diameter:	1.50	ft

Results		
Discharge:	28.77	ft^3/s
Flow Area:	1.77	ft^2
Wetted Perimeter:	4.71	ft
Top Width:	0.00	ft
Critical Depth:	1.49	ft
Percent Full:	100.0	%
Critical Slope:	0.07061	ft/ft
Velocity:	16.28	ft/s
Velocity Head:	4.12	ft
Specific Energy:	5 62	ft
Froude Number:	0.00	
Maximum Discharge:	30.94	ft^3/s
Discharge Full:	28.77	ft^3/s
Slope Full:	0.07500	ft/ft
Flow Type:	SubCritical	

GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	

GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0 00	%
Downstream Velocity:	0.00	ft/s

Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	1.50	ft
Critical Depth:	1.49	ft
Channel Slope:	0.07500	ft/ft
Critical Slope:	0.07061	ft/ft

Worksheet for Circular Pipe - 1

Project Description		
Flow Element:	Circular Pipe	
Friction Method:	Manning Formula	
Solve For:	Discharge	

Input Data		
Roughness Coefficient:	0.013	
Channel Slope:	0.00940	ft/ft
Normal Depth:	1.50	ft
Diameter:	1.50	ft

Results		
Discharge:	10.18	ft^3/s
Flow Area:	1.77	ft^2
Wetted Perimeter:	4.71	ft
Top Width:	0.00	ft
Critical Depth:	1.23	ft
Percent Full:	100.0	%
Critical Slope:	0.00941	ft/ft
Velocity:	5.76	ft/s
Velocity Head:	0.52	ft
Specific Energy:	2.02	ft
Froude Number:	0.00	
Maximum Discharge:	10 95	ft^3/s
Discharge Full:	10.18	ft^3/s
Slope Full:	0.00940	ft/ft
Flow Type:	SubCritical	

GVF Input Data		
Downstream Depth:	0.00	ft
Length:	0.00	ft
Number Of Steps:	0	

GVF Output Data		
Upstream Depth:	0.00	ft
Profile Description:	N/A	
Profile Headloss:	0.00	ft
Average End Depth Over Rise:	0.00	%
Normal Depth Over Rise:	0.00	%
Downstream Velocity:	0.00	ft/s

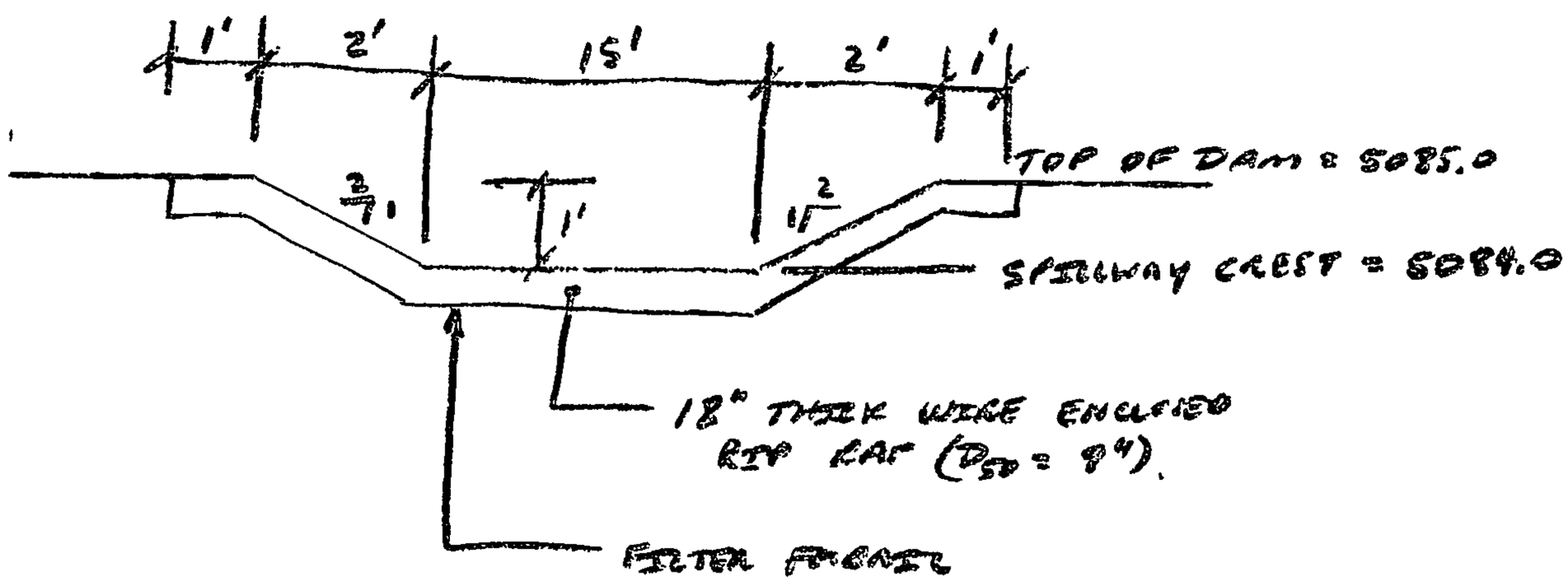
Worksheet for Circular Pipe - 1

Upstream Velocity:	0.00	ft/s
Normal Depth:	1.50	ft
Critical Depth:	1.23	ft
Channel Slope:	0.00940	ft/ft
Critical Slope:	0.00941	ft/ft

APPENDIX E
Detention Pond Hydraulics

Worksheet for Broad Crested Weir - 1

Project Description		
Flow Element:	Broad Crested Weir	
Solve For:	Crest Length	
Input Data		
Discharge:	45.00	ft³/s
Headwater Elevation:	5085.00	ft
Crest Elevation:	5084.00	ft
Tailwater Elevation:	5083.50	ft
Crest Surface Type:	Gravel	
Crest Breadth:	5.00	ft
Results		
Crest Length:	15.00	ft
Headwater Height Above Crest:	1.00	ft
Tailwater Height Above Crest:	-0.50	ft
Weir Coefficient:	3.00	US
Submergence Factor:	1.00	
Adjusted Weir Coefficient:	3.00	US
Flow Area:	15.00	ft²
Velocity:	3.00	ft/s
Wetted Perimeter:	17.00	ft
Top Width:	15.00	ft



TYPICAL SPILLWAY SECTION

PRINT HYD ID=5 CODE=10

PARTIAL HYDROGRAPH 203.20

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.000	.3	10.000	.3	15.000	.2	20.000	.2
.500	.0	5.500	.3	10.500	.2	15.500	.2	20.500	.2
1.000	.0	6.000	.3	11.000	.2	16.000	.2	21.000	.2
1.500	44.7	6.500	.3	11.500	.2	16.500	.2	21.500	.2
2.000	11.0	7.000	.3	12.000	.2	17.000	.2	22.000	.2
2.500	1.4	7.500	.3	12.500	.2	17.500	.2	22.500	.2
3.000	.5	8.000	.3	13.000	.2	18.000	.2	23.000	.2
3.500	.3	8.500	.3	13.500	.2	18.500	.2	23.500	.1
4.000	.3	9.000	.3	14.000	.2	19.000	.2	24.000	.1
4.500	.3	9.500	.3	14.500	.2	19.500	.2	24.500	.0

RUNOFF VOLUME = 2.43014 INCHES = 2.0089 ACRE-FEET
PEAK DISCHARGE RATE = 44.71 CFS AT 1.500 HOURS BASIN AREA = .0155 SQ. MI.

POND RESEVOIR ROUTING

*S*ROUTE THROGUH POND WITH 24" RCP OUTLET**********
ROUTE RESERVOIR ID=6 HYD=503 INFLOW ID=5 CODE=20

OUTFLOW	STORAGE	DEPTH
0	0	5080
3.92	0.167	5081
13.27	0.365	5082
22.60	0.586	5083
28.67	0.831	5084
33.66	1.10	5085

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5080.00	.000	.00
1.00	.00	5080.00	.000	.00
2.00	10.99	5082.41	.455	17.06
3.00	.51	5080.56	.093	2.18
4.00	.27	5080.15	.025	.58
5.00	.27	5080.08	.013	.31
6.00	.32	5080.08	.013	.30
7.00	.31	5080.08	.013	.31
8.00	.29	5080.08	.013	.30
9.00	.27	5080.07	.012	.28
10.00	.26	5080.07	.011	.26
11.00	.24	5080.06	.011	.25
12.00	.23	5080.06	.010	.24
13.00	.22	5080.06	.010	.23
14.00	.21	5080.06	.009	.22
15.00	.20	5080.05	.009	.21
16.00	.19	5080.05	.008	.20
17.00	.18	5080.05	.008	.19

18.00	.18	5080.05	.008	.18
19.00	.17	5080.04	.007	.18
20.00	.17	5080.04	.007	.17
21.00	.16	5080.04	.007	.16
22.00	.16	5080.04	.007	.16
23.00	.15	5080.04	.007	.15
24.00	.15	5080.04	.006	.15
25.00	.00	5080.01	.001	.03
26.00	.00	5080.00	.000	.00

PEAK DISCHARGE = 22.661 CFS - PEAK OCCURS AT HOUR 1.65
MAXIMUM WATER SURFACE ELEVATION = 5083.010
MAXIMUM STORAGE = .5885 AC-FT INCREMENTAL TIME= .050000HRS

PRINT HYD ID=6 CODE=10

OUTFLOW HYDROGRAPH RESERVOIR 503.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	5.500	.3	11.000	.3	16.500	.2	22.000	.2
.500	.0	6.000	.3	11.500	.2	17.000	.2	22.500	.2
1.000	.0	6.500	.3	12.000	.2	17.500	.2	23.000	.2
1.500	15.1	7.000	.3	12.500	.2	18.000	.2	23.500	.2
2.000	17.1	7.500	.3	13.000	.2	18.500	.2	24.000	.1
2.500	5.2	8.000	.3	13.500	.2	19.000	.2	24.500	.1
3.000	2.2	8.500	.3	14.000	.2	19.500	.2	25.000	.0
3.500	1.1	9.000	.3	14.500	.2	20.000	.2	25.500	.0
4.000	.6	9.500	.3	15.000	.2	20.500	.2	26.000	.0
4.500	.4	10.000	.3	15.500	.2	21.000	.2	26.500	.0
5.000	.3	10.500	.3	16.000	.2	21.500	.2		

RUNOFF VOLUME = 2.43014 INCHES = 2.0089 ACRE-FEET
FROM 1010 ★ PEAK DISCHARGE RATE = 22.66 CFS AT 1.650 HOURS BASIN AREA = .0155 SQ. MI.

*S**ONSITE BSINS**********
S BASIN A ***
COMPUTE NM HYD ID=7 HYD NO=301 DA=0.0014 SQ MI
PER A=0 PER B=0 PER C=65 PER D=35
TP= -.1333 RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.9345 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 2.0100
AREA = .000490 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .107446HR TP = .133300HR K/TP RATIO = .806046 SHAPE CONSTANT, N = 4.440701
UNIT PEAK = 2.6184 CFS UNIT VOLUME = .9975 B = 383.55 P60 = 2.0100
AREA = .000910 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR

APPENDIX F
BHI Drainage Study – Relevant Information

VII. PROPOSED DEVELOPED CONDITIONS

The research park was divided into 3 major basins and 7 sub-basins for analysis. Figure 1.5, page 17, shows the outline for the given basins.

Basin A1 drains onto the southern half of Langham in a westerly direction.

Basin A2 is divided into three sub-basins:

A2-A drains onto the southwest half of Goddard,

A2-B drains onto the northeast half of Goddard, and

A2-C drains onto Goddard from the newly constructed Optoelectronics Lab.

Basin A3 is divided into three sub-basins:

A3-A drains westerly onto the east side of Langham,

A3-B drains in a northerly direction onto Basehart, and

A3-C drains northerly onto Basehart.

The eighth basin analyzed was the Social Security site that drains directly into basin A3-C with runoff values consistent with the parcel prior to development. These basins were derived from topographical map and the Research Park's conceptual design; grading plans have not been developed for the parcel, therefore the basin designations are only approximate.

Ultimate buildout was assumed for the analysis and an equal land treatment was applied to all basins, except the Social Security site, for the hydrologic analysis. Using the final grading and drainage plan for the northeast quadrant of the park, the average basin land treatments were found, modified with a factor of safety and applied to the rest of the park. Thus, land treatment for all basins was assumed as follows:

A = 0%, B = 20% , C = 10%, and D = 70% (Figure 1.6, page 18).

The concept for the Science & Technology Park is to create a campus like atmosphere with limited on site parking, and extensive high density parking. This led to a higher percentage of land treatment in category B than usual for this type of

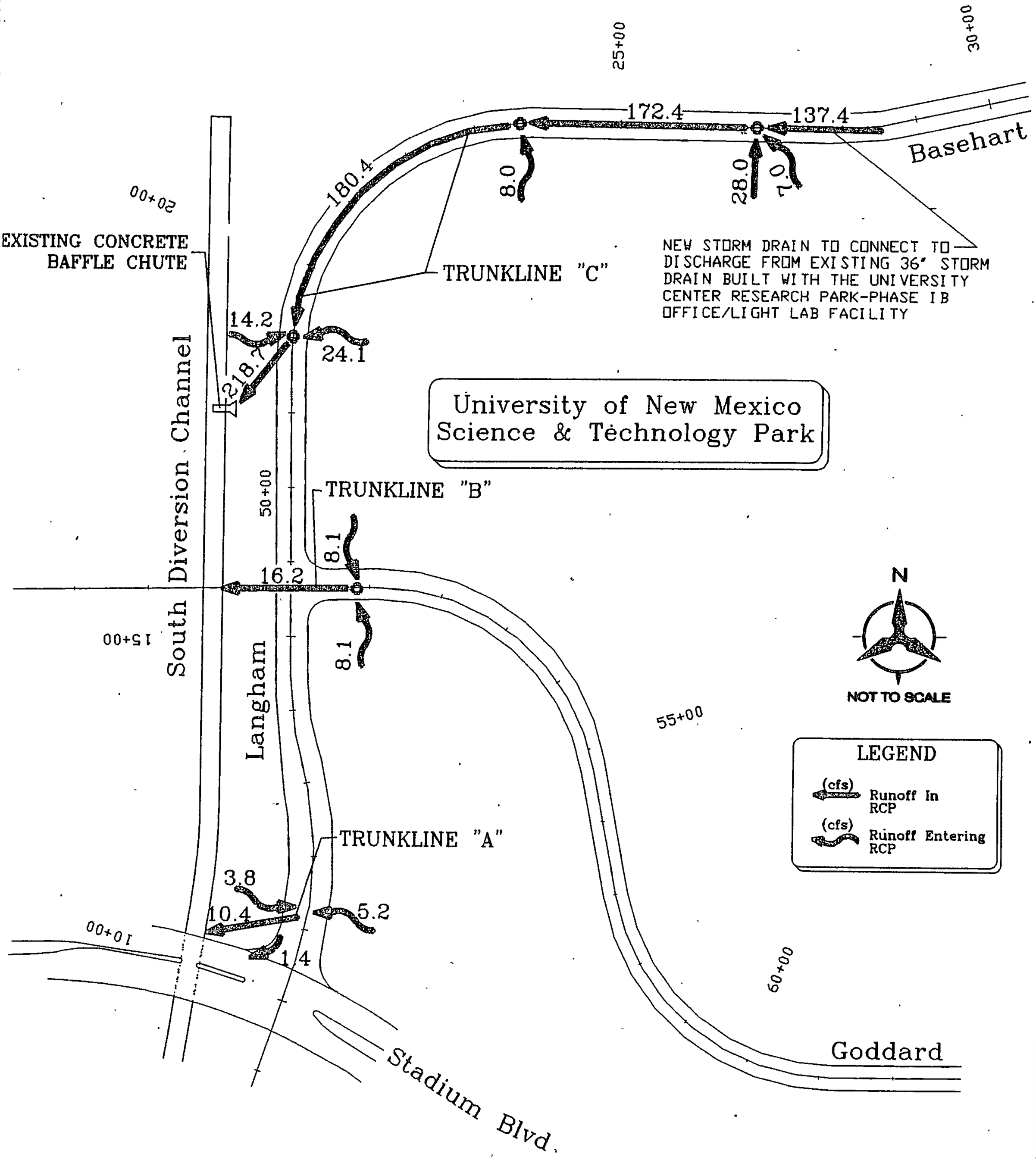
Unversity of New Mexico Science & Technology Park Roadways
Hydrological Data

Basin I.D.	Area (ac)	% Land Treatment A	B	C	D	Peak Discharge Qp(10)	Qp(100)	Volume V(10)	V(100)
A1	3.1881	0	20	10	70	8.158	10.4	12,105	20,287
A2-A	1.3534	0	20	10	70	3.463	5.4	5,139	8,612
A2-B	2.5453	0	20	10	70	6.513	10.3	9,664	16,197
A2-C	2.3900	0	20	10	70	6.116	9.7	9,075	15,209
A2 TOTAL	6.2887	0	20	10	70	16.092	25.4	23,878	40,018
A3-A	6.8516	0	20	10	70	17.533	28.4	26,015	43,599
A3-B	2.5618	0	20	10	70	6.556	10.4	9,727	16,302
A3-C	4.4004	0	20	10	70	11.261	14.7	16,708	28,001
SS	10.9110	0	100	0	0	10.365	28.0	11,090	30,893
A3-C+SS	15.3114	0	20	10	70	21.626	42.7	27,798	58,894
A3	13.8138	0	20	10	70	35.350	53.5	52,450	87,902
A3+SS	24.7248	0	20	10	70	45.715	81.5	63,540	118,795
TOTAL	34.2016	0	20	10	70	69.965	117.300	99,523	179,100

FIGURE 1.6

Zone 2					
PEAK DISCHARGE cfs/ac				Excess Precipitation, E (in) 6 Hour Storm	
	10 Year	100 Year		10 Year	100 Year
A	0.38	1.56	A	0.13	0.53
B	0.952	2.28	B	0.28	0.78
C	1.71	3.14	C	0.52	1.13
D	3.14	4.7	D	1.34	2.12

TABLE 1.1



University of New Mexico
Science & Technology Park

STORM DRAIN FLOW SCHEMATIC

FIGURE 1.7

BOHANNAN-HUSTON INC.
ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS
ALBUQUERQUE LAS CRUCES SANTA FE

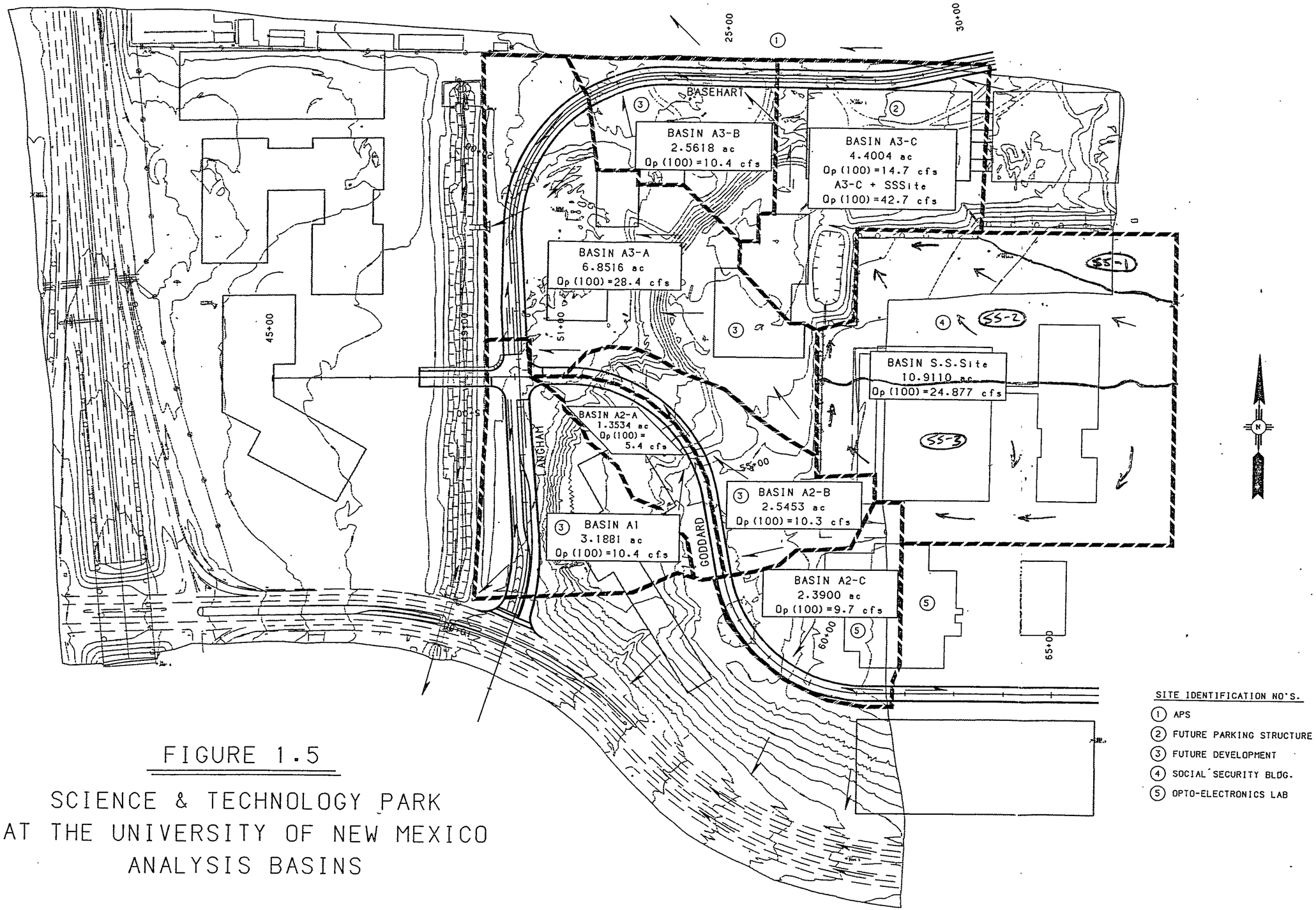
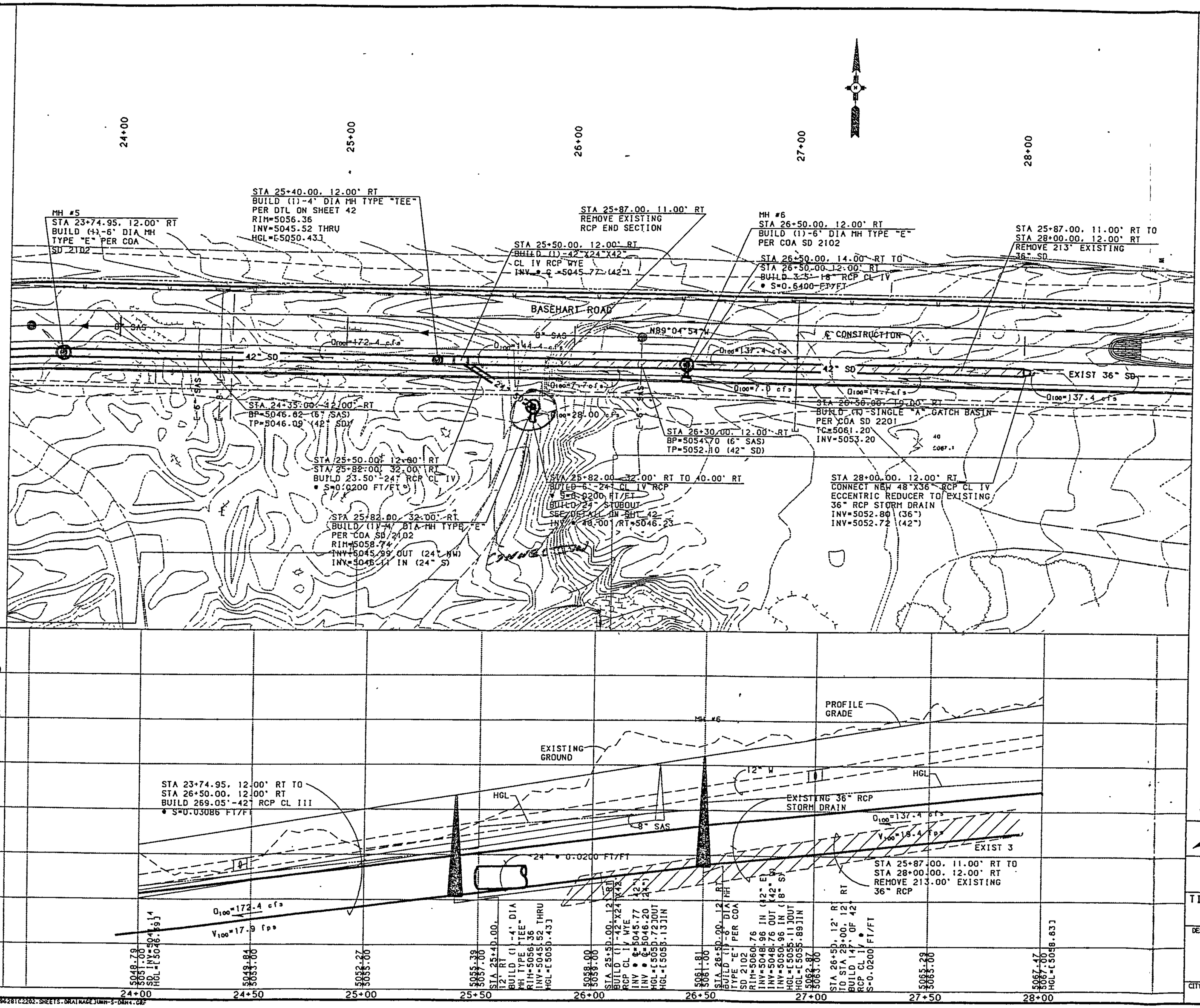


FIGURE 1.5

SCIENCE & TECHNOLOGY PARK
AT THE UNIVERSITY OF NEW MEXICO
ANALYSIS BASINS



PLAN
NOTE BOOK NO.
DATE
BY
REVISED
ALIGNMENT CHECKED
SH. OF NAT SHEETS

PROFILE
NOTE BOOK NO.
DATE
BY
REVISED
PLOTTED
ALIGNMENT CHECKED
S.P.s. NOTED
STRUCTURE NOTATIONS DONE

ENGINEER'S SEAL

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS

NHSHC STATION 1-25-29, ELEVATION = 5031.415, BRASS TABLET SET IN CONCRETE POST FLUSH WITH THE GROUND. LOCATED 1.2 MILES SOUTHEAST OF DOWNTOWN ALBUQUERQUE, AT THE SOUTHEAST CORNER OF THE HWY. I-25 BRIDGE CROSSING OVER STADIUM BLVD.	

AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	
INSPECTOR'S INITIALS	DATE
FIELD VERIFICATION BY	
FIELD REVISIONS BY	DATE
DRAWINGS CORRECTED BY	DATE
MICRO-FILM INFORMATION	
RECORDED BY	DATE
NO.	

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY BHI/ARB DATE 10-96
DRAWN BY BHI/ARB DATE 10-96
CHECKED BY BHI/ARB DATE 10-96

HORIZ SCALE: 1"=20'
VERT SCALE 1"=5'

BOHANNAN-HUSTON INC.
ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS
ALBUQUERQUE LAS CRUCES SANTA FE

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: BASEHART ROAD
STA 24+00 TO STA 28+00
STORM DRAIN LINE PLAN & PROFILE

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
566581	L-15-Z	36	78

23 FIGURE 2.1