CITY OF ALBUQUERQUE

May 18, 2015

J. Arthur Blessen, P.E.
J. Arthur Blessen Engineering
2429 Zena Lona NE
Albuquerque, NM 87112

RE: **Array Technologies Paving**
3901 Midway PL NE
Grading and Drainage Plan
Engineers Stamp Date 4/22/2015 (E17D034C)

Dear Mr. Blessen,

Based upon the information provided in your submittal received 4/22/2015, the above referenced Grading and Drainage Plan is approved for Grading Permit and Paving Permit.

Please attach a copy of this approved plan, dated 3-10-15, to the construction sets in the permitting process prior to sign-off by Hydrology.

When completed please provide a copy of the as-build for our records.

If you have any questions please contact me at 924-3999 or Rudy Rael at 924-3977.

Sincerely,

Shahab Biazar, P.E.
City Engineer
City of Albuquerque

RR/SB
C: File

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 01/06 – KDM)

PROJECT TITLE: Array Technologies Paving ZONE MAP: E17/D034C
DRB#: 13DRB-70553 EPC#: 1001360 WORK ORDER#: _____

LEGAL DESCRIPTION: Lot B1B1A1, Albuquerque Industrial Park
CITY ADDRESS: 3901 Midway Place, N.E.

ENGINEERING FIRM: J. Arthur Blessen Engineering CONTACT: Art Blessen
ADDRESS: 2429 Zena Lona PHONE: (505) 293-1477
CITY, STATE: Albuquerque, NM ZIP CODE: 87112

OWNER: Array Technologies CONTACT: David Mead
ADDRESS: 3901 Midway Place, N.E. PHONE: (505) 881-7567
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYING FIRM: LICENSED SURVEYOR:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

PROFESSIONAL LICENSED SURVEYOR SIGNATURE LICENSE NO. DATE

CONTRACTOR: Klinger Constructors, LLC CONTACT: Joel Loes
ADDRESS: 8701 Washington , N.E. PHONE: (505) 856-9990
CITY, STATE: Albuquerque, N.M. ZIP CODE: 87113

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN 1st SUBMITTAL
__X__ DRAINAGE PLAN RESUBMITTAL
_____ CONCEPTUAL G & D PLAN
__X__ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERT (HYDROLOGY)
_____ CLOMR/LOMR
_____ TRAFFIC CIRCULATION LAYOUT
_____ ENGINEER'S CERT (TCL)
_____ ENGINEER'S CERT (DRB SITE PLAN)
_____ OTHER-

CHECK TYPE OF APPROVAL SOUGHT:

_____ SIA/FINANCIAL GUARANTEE RELEASE
_____ PRELIMINARY PLAT APPROVAL
_____ S. DEV. PLAN FOR SUB'D APPROVAL
_____ S. DEV. FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_____ CERTIFICATE OF OCCUPANCY
__X__ GRADING PERMIT APPROVAL
__X__ PAVING PERMIT APPROVAL
_____ WORK ORDER APPROVAL
_____ OTHER (SPECIFY)

AO varified

WAS A PRE-DESIGN CONFERENCE ATTENDED:

_____ YES
__X__ NO
_____ COPY PROVIDED

DATE SUBMITTED: 4/22/15 BY: J Arthur Blessen

RECEIVED
APR 22 2015
LAND DEVELOPMENT SECTION

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to 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 (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 01/06 – KDM)

PROJECT TITLE: Array Technologies Paving ZONE MAP: E17/D034C
DRB#: 13DRB-70553 EPC#: 1001360 WORK ORDER#: _____

LEGAL DESCRIPTION: Lot B1B1A1, Albuquerque Industrial Park
CITY ADDRESS: 3901 Midway Place, N.E.

ENGINEERING FIRM: J. Arthur Blessen Engineering CONTACT: Art Blessen – Archite
ADDRESS: 2429 Zena Lona PHONE: (505) ~~293-1477~~ 401-4142
CITY, STATE: Albuquerque, NM ZIP CODE: 87112

OWNER: Array Technologies CONTACT: David Mead
ADDRESS: 3901 Midway Place, N.E. PHONE: (505) 881-7567
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYING FIRM: _____ LICENSED SURVEYOR: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

_____
PROFESSIONAL LICENSED SURVEYOR SIGNATURE **LICENSE NO.** **DATE**

CONTRACTOR: Klinger Constructors, LLC CONTACT: Joel Loes
ADDRESS: 8701 Washington , N.E. PHONE: (505) 856-9990
CITY, STATE: Albuquerque, N.M. ZIP CODE: 87113

TYPE OF SUBMITTAL:
_____ DRAINAGE REPORT
_____ DRAINAGE PLAN 1st SUBMITTAL
_____ DRAINAGE PLAN RESUBMITTAL
_____ CONCEPTUAL G & D PLAN
__X__ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERT (HYDROLOGY)
_____ CLOMR/LOMR
_____ TRAFFIC CIRCULATION LAYOUT
_____ ENGINEER'S CERT (TCL)
_____ ENGINEER'S CERT (DRB SITE PLAN)
_____ OTHER-

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

RECEIVED
FEB 25 2015
LAND DEVELOPMENT SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:
_____ YES
__X__ NO
_____ COPY PROVIDED
DATE SUBMITTED: 2/23/15 BY: J Arthur Blessen

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to 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 (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

Revised Drainage Report

for

Array Tech Paving

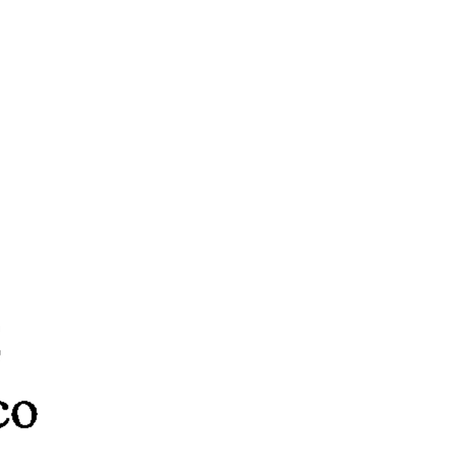
3901 Midway Place NE
Albuquerque, New Mexico

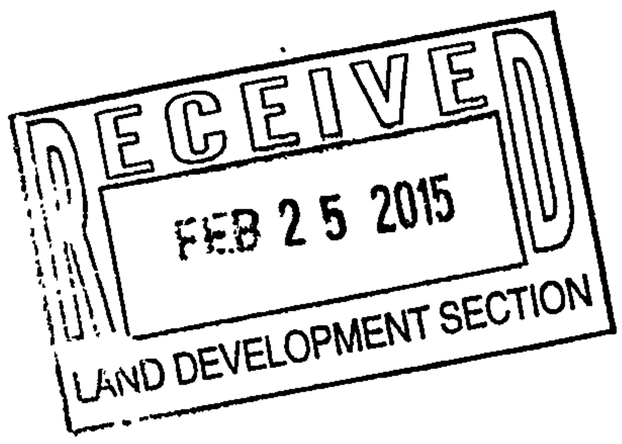
February 23, 2015

File: E17/D034C

by

J Arthur Blessen Engineering





Location:
Tract B-1-B-1A-1A-1 Albuquerque Industrial Park, Bernalillo County New Mexico
3901 Midway Place NE.

Zone map E-17-Z
Located east of Office Blvd. at the east end of Midway Place, south of the Bear Arroyo North Diversion Channel.

Site Area: 6.16 Acres

Precipitation Zone 2

Flood Zone:
The subject site does not lie within a flood hazard zone (Map 35001C0138H panel 138 of 825). The site slopes from east to west. The Bear Arroyo is located to the north of the site. The lands to the west and south are lower than the site. The existing drainage channel along the east property line block flow from that direction. Therefore offsite flows are considered negligible.

Proposed Improvements:
The proposed development includes the paving of the existing gravel storage yard in Basin B-3 and a portion of Basin C-1.

Existing Conditions:
The existing 6.16 acre site is developed. The previous developments included the a warehouse, and asphalt parking lots and access road, landscaping, and detention ponds. The previously approved drainage plan (COA File #E17/D034C) directs the runoff from the site to two existing detention ponds, and to Midway Place.

The existing master drainage plan "Overall Drainage Plan" for the Nabisco Inc Warehouse (1990) established a discharge rate from the site of 2.1 cfs /acre (2.1cfs/acre x 6.16 acre = 12.9 cfs). The previously approved drainage plan for the site was prepared by Bohannan-Houston Inc (1-6-95) and divided the site into six sub-basins:

Basin A-1
A 0.582 ac portion of the site located at the southwest corner of the site. Runoff from the basin discharges to existing detention pond B. The previously approved drainage plan established the a discharged rate from pond B of 0.3 csf. The volume of the pond is 1077 cf at an elevation of 5128.6 ft. The proposed development will not effect basin A-1.

Basin A-2
A 0.446 ac portion of the site located north of basin A-1. Runoff from the basin discharges to Midway Place. The previously approved drainage plan established free discharge from the basin at a rate of 1.7 cfs. The proposed development will not effect basin A-2.

Basin B-1
The basin includes the existing warehouse and parking lot located to the west of the facility. Runoff from the basin flows to the existing catch basin located in the parking lot, and is routed to the existing detention pond located at the northwest corner of the site via a 21" dia culvert at a rate of 8 cfs. The proposed development will not effect basin B-1.

Basin B-2
The basin includes the existing service drive and landscaping area located at the southeast corner of the site. Runoff from the basin flows to an existing catch basin located east corner of the existing warehouse, and is routed to the existing detention pond located at the northwest corner of the site via a pipe culvert at a rate of 3.3 cfs. The proposed development will not effect basin B-2.

Basin B-3
The basin includes the gravel storage yard and asphalt service drive located at the northeast corner of the site. Runoff from the basin flows to an existing catch basin located on the east side of the existing loading dock, and is routed to the existing detention pond located at the northwest corner of the site via a 15" dia culvert at a rate of 3.9 cfs. The proposed development includes the paving of the existing gravel storage yard. The proposed new rate of discharge from basin B-3 is 4.6 cf. when combined with basin B-2 the flow through the 15" culvert is 7.9 cfs.

Basin C-1 (previously unnamed)
The basin includes the existing parking lot on the north side of the facility and the north section of the site. Runoff form the site discharges to the existing detention pond (pond A) located within the site. The proposed development includes the paving of a portion on the site, however the additional paving are (2077 sf) does not significantly increase the runoff from the site.

The combined runoff from basins B-1, B-2, B-3, and A is discharged to existing pond A at a rate of 23.5 cfs. The previously approved drainage plan established a discharge rate from the pond at a rate of 10.6 cfs via a 16.9 orifice to the existing asphalt swale within the drainage easement running parallel to the Bear Arroyo. The existing pond volume was established as 16,000 cf at an elevation of 5126.0.

The combined existing discharge from the site is (0.3cfs + 1.7cfs + 10.6cfs = 12.6cfs).

Note: The elevations have been adjusted to correspond to the current bench mark reference.

Developed Conditions:
The proposed development includes the paving of the gravel storage yard and a portion of basin C-1. The proposed additions will be confined to basins B-3 and C-1. The remainder of the site will remain unchanged. The runoff from the proposed addition will be directed to the existing detention pond A.

The combined area of basins B-1, B-2, B-3, and C-1 is 5.132 ac. and produces a combined runoff of 21.5 cfs. The existing orifice in the outlet pipe for pond A limits the discharge to 10.6 cfs. The required pond volume for the combined basis in 12,069 cfs. The existing pond A has a capacity of 12,124 cf at a elevation of 5125.78 ft, therefore no modification to the pond is required.

Summary:
As shown by the attached calculations the existing runoff for the site will be decreased form the existing due to the additional landscaping. The existing detention pond with a controlled discharge will control the addition runoff from the site.

Basin	Historic	Existing	Proposed	
A-1	0.9 cfs	1.5 cfs	no change	to existing pond B discharge 0.3 cfs
A-2	0.7 cfs	1.7 cfs	no change	to Midway Place
B-1	2.5 cfs	7.0 cfs	no change	
B-2	1.1 cfs	3.0 cfs	no change	
B-3	1.6 csf	3.9 cfs	4.6 cfs	
C-1	2.8 cfs	6.9 cfs	6.9 cfs	
Total to pond		20.8 cfs	21.5 cfs	to existing pond A discharge 10.6 cfs

To follow are the calculations analyze the historic and proposed conditions for the 6-HOUR, 100 year event. The analysis is in. accordance with the City of Albuquerque Development Process Manual Volume II.

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin A1

Precipitation Zone 2

Basin Area = 0.582 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	25338 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	22709 sf	90%
Area of C =	0 sf	0%	Area of C =	0 sf	0%
Area of D =	0 sf	0%	Area of D =	2629 sf	10%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.90	x	0.78 =	0.70
C	0.00	x	1.13 =	0.00	C	0.00	x	1.13 =	0.00
D	0.00	x	2.12 =	0.00	D	0.10	x	2.12 =	0.22
			E =	0.53				E =	0.92

Volume V = E A / 12

Ve =	0.530	x	0.5817 /	12 =	0.026	acre ft	1119 cf
Vi =	0.919	x	0.5817 /	12 =	0.045	acre ft	1941 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.90	x	2.28 =	2.04
C	0.00	x	3.14 =	0.00	C	0.00	x	3.14 =	0.00
D	0.00	x	4.7 =	0.00	D	0.10	x	4.7 =	0.49
			q =	1.56				q =	2.53

Peak Rate Qp = q A

Qp(e) =	1.56	x	0.5817 =	0.91	cfs
Qp(i) =	2.53	x	0.5817 =	1.47	cfs

Excess Volume = 0.019 acre ft

Excess Rate = 0.56 cfs

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =	0.739	hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12) =	0.265	hr

Discharge Rate 0.30 cfs 0.52 cfs/ac

Volume	2027	cf
Discharged -	720	cf
Pond Voulme	**1308**	cf

Basin A1-Pond

	elevation	depth ft	area sf	volume cf
top of pond	66.75	0.75	7034	4737
	66	1	5598	4691
	65	0.5	3784	1243
bottom	64.5		1188	
				10671

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin A2

Precipitation Zone 2
Basin Area = 0.422 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	18384 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	3384 sf	18%
Area of C =	0 sf	0%	Area of C =	0 sf	0%
Area of D =	0 sf	0%	Area of D =	15000 sf	82%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.18	x	0.78 =	0.14
C	0.00	x	1.13 =	0.00	C	0.00	x	1.13 =	0.00
D	0.00	x	2.12 =	0.00	D	0.82	x	2.12 =	1.73
			E =	0.53				E =	1.87

Volume V = E A / 12

Ve =	0.530	x	0.422 /	12 =	0.019	acre ft	812	cf	
Vi =	1.873	x	0.422 /	12 =	0.066	acre ft	2870	cf	

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.18	x	2.28 =	0.42
C	0.00	x	3.14 =	0.00	C	0.00	x	3.14 =	0.00
D	0.00	x	4.7 =	0.00	D	0.82	x	4.7 =	3.83
			q =	1.56				q =	4.25

Peak Rate Qp = q A

Qp(e) =	1.56	x	0.422 =	0.66	cfs
Qp(i) =	4.25	x	0.422 =	1.80	cfs

Excess Volume = 0.047 acre ft
Excess Rate = 1.14 cfs

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =	0.724	hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12) =	0.205	hr

Discharge Rate 1.70 cfs 4.03 cfs/ac

Volume 2999 cf
Discharged - 2924 cf

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B1

Precipitation Zone 2

Basin Area = 1.570 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	68379 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	6822 sf	10%
Area of C =	0 sf	0%	Area of C =	0 sf	0%
Area of D =	0 sf	0%	Area of D =	61557 sf	90%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.10	x	0.78 =	0.08
C	0.00	x	1.13 =	0.00	C	0.00	x	1.13 =	0.00
D	0.00	x	2.12 =	0.00	D	0.90	x	2.12 =	1.91
			E =	0.53				E =	1.99

Volume V = E A / 12

Ve =	0.530	x	1.5698 /	12 =	0.069	acre ft	3020 cf
Vi =	1.986	x	1.5698 /	12 =	0.260	acre ft	11319 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.10	x	2.28 =	0.23
C	0.00	x	3.14 =	0.00	C	0.00	x	3.14 =	0.00
D	0.00	x	4.7 =	0.00	D	0.90	x	4.7 =	4.23
			q =	1.56				q =	4.46

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.5698 =	2.45	cfs
Qp(i) =	4.46	x	1.5698 =	7.00	cfs

Excess Volume = 0.191 acre ft

Excess Rate = 4.55 cfs

tc = 0.2 hr

tb = (2.107 *E*At/Qp)-(0.25*Ad/At) = 0.714 hr

tp = (0.7*tc)+((1.6-(Ad/At))/12) = 0.198 hr

Discharge Rate 7.00 cfs 4.46 cfs/ac

Volume 11825 cf

Discharged - 11825 cf

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B2

Precipitation Zone 2
Basin Area = 0.723 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	31500 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	3652 sf	12%
Area of C =	0 sf	0%	Area of C =	6924 sf	22%
Area of D =	0 sf	0%	Area of D =	20924 sf	66%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.12	x	0.78 =	0.09
C	0.00	x	1.13 =	0.00	C	0.22	x	1.13 =	0.25
D	0.00	x	2.12 =	0.00	D	0.66	x	2.12 =	1.41
			E =	0.53				E =	1.75

Volume V = E A / 12

Ve =	0.530	x	0.7231	/	12 =	0.032	acre ft	1391	cf
Vi =	1.747	x	0.7231	/	12 =	0.105	acre ft	4586	cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.12	x	2.28 =	0.26
C	0.00	x	3.14 =	0.00	C	0.22	x	3.14 =	0.69
D	0.00	x	4.7 =	0.00	D	0.66	x	4.7 =	3.12
			q =	1.56				q =	4.08

Peak Rate Qp = q A

Qp(e) =	1.56	x	0.7231 =	1.13	cfs
Qp(i) =	4.08	x	0.7231 =	2.95	cfs

Excess Volume = 0.073 acre ft
Excess Rate = 1.82 cfs

tc = 0.2 hr
tb = (2.107 *E*At/Qp)-(0.25*Ad/At) = 0.737 hr
tp = (0.7*tc)+((1.6-(Ad/At))/12) = 0.218 hr

Discharge Rate	2.95 cfs	4.08 cfs/ac
Volume	4791 cf	
Discharged -	4791 cf	

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B3

Precipitation Zone 2

Basin Area = 1.040 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	45296 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	sf	0%
Area of C =	0 sf	0%	Area of C =	8266 sf	18%
Area of D =	0 sf	0%	Area of D =	37030 sf	82%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.00	x	0.78 =	0.00
C	0.00	x	1.13 =	0.00	C	0.18	x	1.13 =	0.21
D	0.00	x	2.12 =	0.00	D	0.82	x	2.12 =	1.73
			E =	0.53				E =	1.94

Volume V = E A / 12

Ve =	0.530	x	1.0399 /	12 =	0.046	acre ft	2001 cf
Vi =	1.939	x	1.0399 /	12 =	0.168	acre ft	7320 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.00	x	2.28 =	0.00
C	0.00	x	3.14 =	0.00	C	0.18	x	3.14 =	0.57
D	0.00	x	4.7 =	0.00	D	0.82	x	4.7 =	3.84
			q =	1.56				q =	4.42

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.0399 =	1.62	cfs
Qp(i) =	4.42	x	1.0399 =	4.59	cfs

Excess Volume =	0.122	acre ft	5319.8 CF
Excess Rate =	2.97	cfs	

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =		0.721 hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12)	=	0.205 hr

Discharge Rate	4.59 cfs	4.42 cfs/ac

Volume	7648	cf
Discharged -	7648	cf

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin C1

Precipitation Zone 2

Basin Area = 1.798 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	78336 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	24113 sf	31%
Area of C =	0 sf	0%	Area of C =	4935 sf	6%
Area of D =	0 sf	0%	Area of D =	49288 sf	63%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.31	x	0.78 =	0.24
C	0.00	x	1.13 =	0.00	C	0.06	x	1.13 =	0.07
D	0.00	x	2.12 =	0.00	D	0.63	x	2.12 =	1.33
			E =	0.53				E =	1.65

Volume V = E A / 12

Ve =	0.530	x	1.7983 /	12 =	0.079	acre ft	3460 cf
Vi =	1.645	x	1.7983 /	12 =	0.247	acre ft	10740 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.31	x	2.28 =	0.70
C	0.00	x	3.14 =	0.00	C	0.06	x	3.14 =	0.20
D	0.00	x	4.7 =	0.00	D	0.63	x	4.7 =	2.96
			q =	1.56				q =	3.86

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.7983 =	2.81	cfs
Qp(i) =	3.86	x	1.7983 =	6.94	cfs

Excess Volume = 0.167 acre ft

Excess Rate = 4.13 cfs

tc = 0.2 hr

tb = (2.107 *E*At/Qp)-(0.25*Ad/At) = 0.741 hr

tp = (0.7*tc)+((1.6-(Ad/At))/12) = 0.221 hr

Discharge Rate 6.94 cfs 3.86 cfs/ac

Volume 11221 cf

Discharged - 11221 cf

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basins B-1, B-2, B-3 and C-1 (to pond A)

Precipitation Zone 2

Basin Area = 5.132 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	223563 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	39587 sf	18%
Area of C =	0 sf	0%	Area of C =	22125 sf	10%
Area of D =	0 sf	0%	Area of D =	161851 sf	72%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.18	x	0.78 =	0.14
C	0.00	x	1.13 =	0.00	C	0.10	x	1.13 =	0.11
D	0.00	x	2.12 =	0.00	D	0.72	x	2.12 =	1.53
			E =	0.53				E =	1.78

Volume V = E A / 12

Ve =	0.530	x	5.1323 /	12 =	0.227	acre ft	9874	cf
Vi =	1.785	x	5.1323 /	12 =	0.763	acre ft	33250	cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.18	x	2.28 =	0.40
C	0.00	x	3.14 =	0.00	C	0.10	x	3.14 =	0.31
D	0.00	x	4.7 =	0.00	D	0.72	x	4.7 =	3.40
			q =	1.56				q =	4.12

Peak Rate Qp = q A

Qp(e) =	1.56	x	5.1323 =	8.01	cfs
Qp(i) =	4.12	x	5.1323 =	21.13	cfs

Excess Volume = 0.537 acre ft

Excess Rate = 13.12 cfs

tc =	0.2 hr		
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =		0.732 hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12)	=	0.213 hr

Discharge Rate 10.60 cfs 2.07 cfs/ac

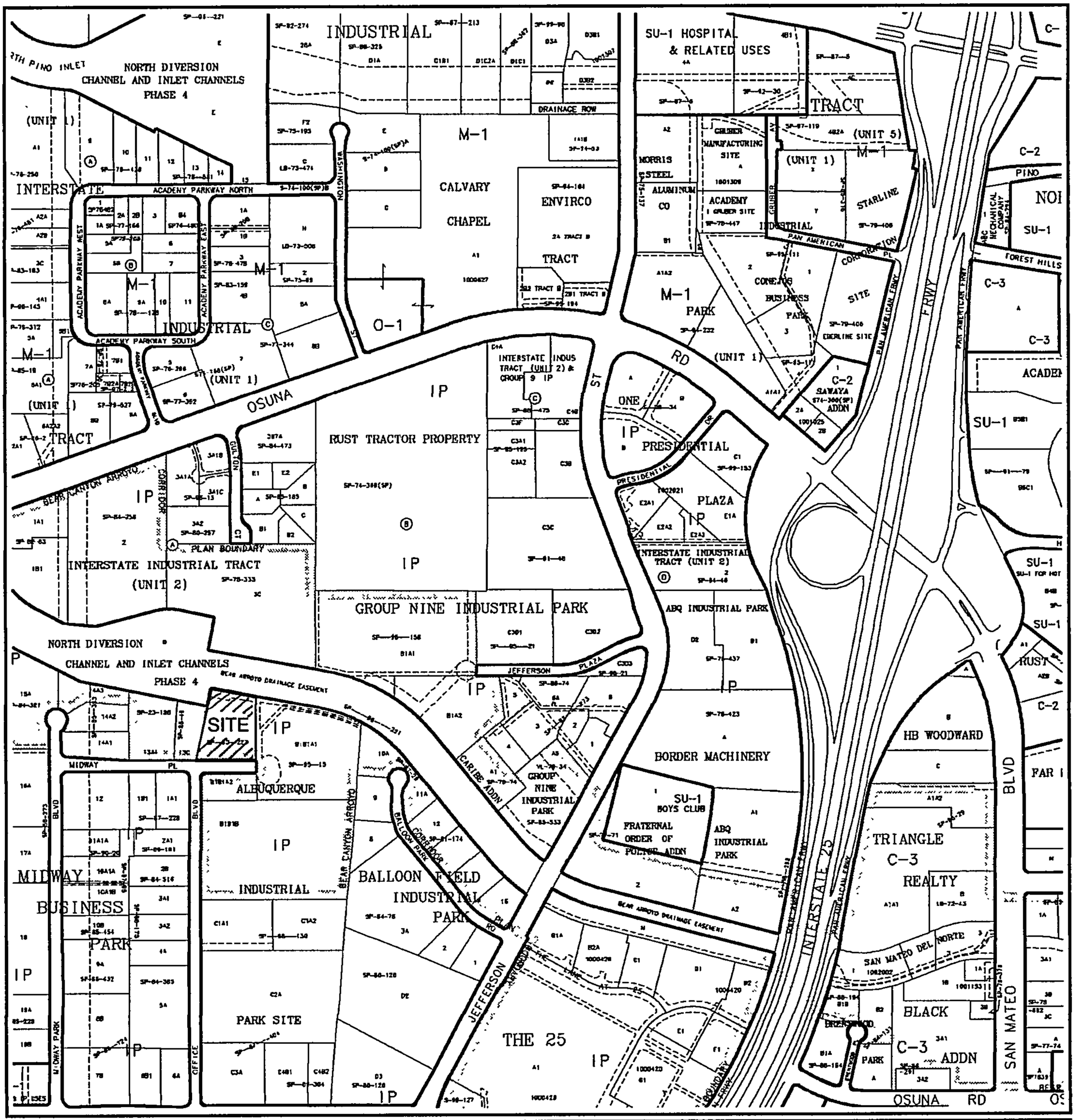
Volume 34740 cf

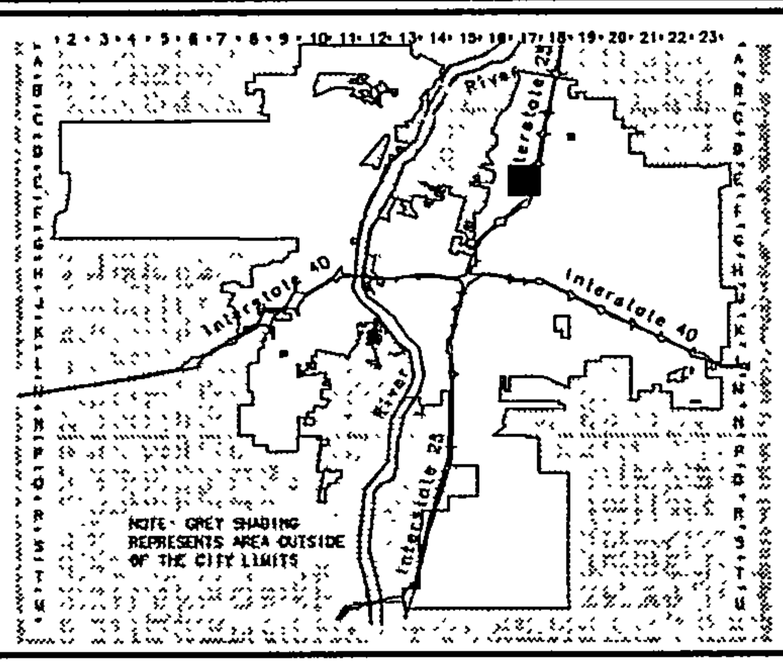
Discharged - 22670 cf

Pond Voulme **12069** cf

Basins B-1, B-2, B-3 and C-1 Pond

	elevation	depth ft	area sf	volume cf	
top of pond	25.78	0.78	6305	4635.93	6809
	25	1	5582	4936	
	24	1.19	4290	2552.55	
bottom	22.81		0		
				12124.48	





CITY OF ALBUQUERQUE · NEW MEXICO · 1706

Albuquerque Geographic Information System
PLANNING DEPARTMENT

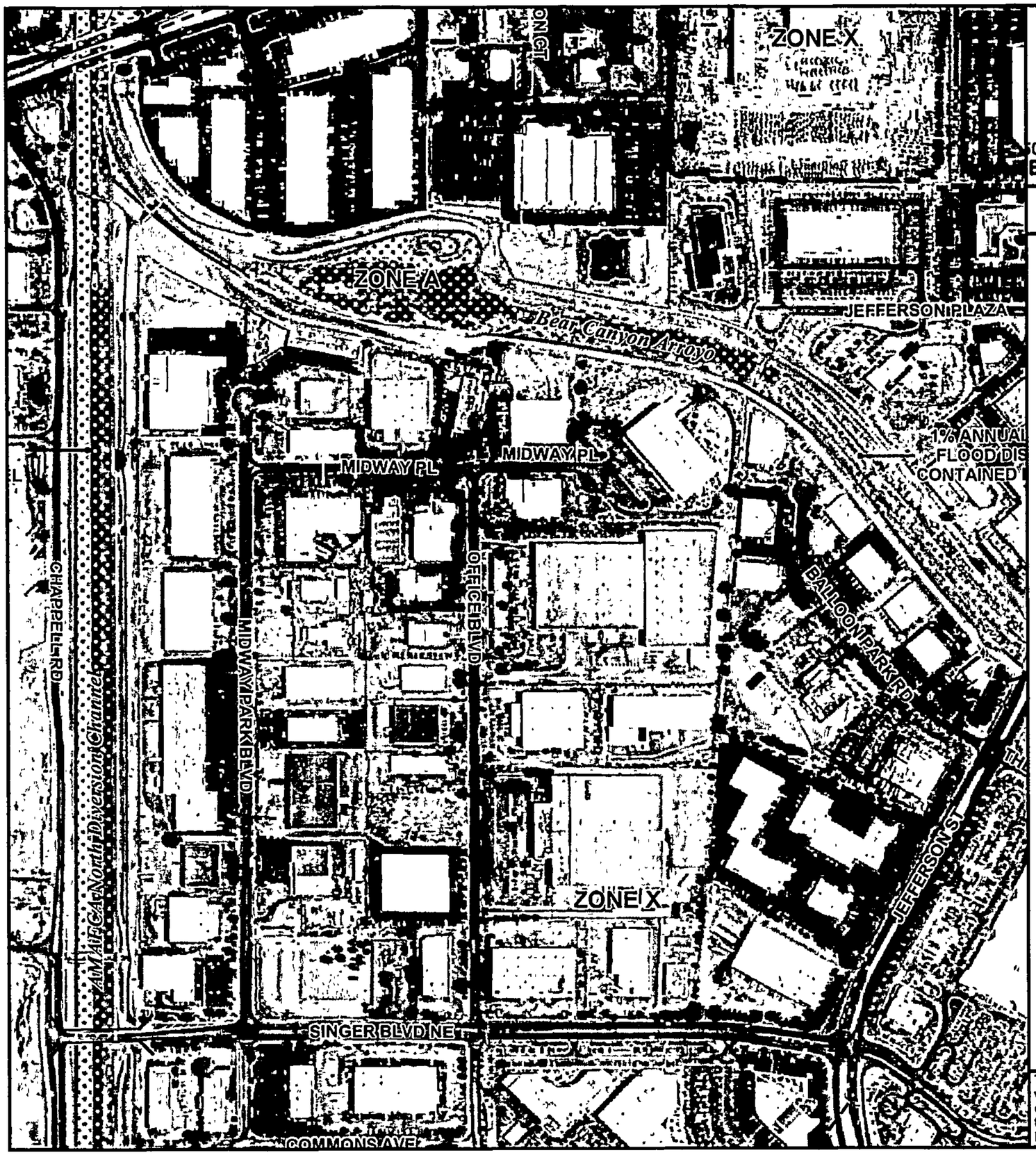
GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

E-17-Z

Map Amended through February 01, 2005



MAP SCALE 1" = 500'

0 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

CITY OF ALBUQUERQUE

June 25, 2015

J. Arthur Blessen, P.E.
J. Arthur Blessen Engineering
2429 Zena Lona NE
Albuquerque, NM 87112

Re: Array Technologies Paving
3901 Midway PL NE
Request Permanent CO - Accepted
Engineers Stamp Date 4/22/2015 (E17D034C)
Certification dated: 8-12-14

Dear Mr. Blessen,

Based on the Certification received 6/22/2015, the above named business is acceptable for release of Certificate of Occupancy by Hydrology.

If you have any questions, you can contact me at 924-3695 or Rudy Rael at 924-3977.

Sincerely,

Rita Harmon, P.E.
Principal Engineer, Hydrology
Planning Department

RR/RH
C: email

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 01/06 – KDM)

PROJECT TITLE: Array Technologies Paving ZONE MAP: E17/D034C
DRB#: 13DRB-70553 EPC#: 1001360 WORK ORDER#: _____

LEGAL DESCRIPTION: Lot B1B1A1, Albuquerque Industrial Park
CITY ADDRESS: 3901 Midway Place, N.E.

ENGINEERING FIRM: J. Arthur Blessen Engineering CONTACT: Art Blessen
ADDRESS: 2429 Zena Lona PHONE: (505) 401-4142
CITY, STATE: Albuquerque, NM ZIP CODE: 87112

OWNER: Array Technologies CONTACT: David Mead
ADDRESS: 3901 Midway Place, N.E. PHONE: (505) 881-7567
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYING FIRM: _____ LICENSED SURVEYOR: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

_____
PROFESSIONAL LICENSED SURVEYOR SIGNATURE **LICENSE NO.** **DATE**

CONTRACTOR: Klinger Constructors, LLC CONTACT: Joel Loes
ADDRESS: 8701 Washington , N.E. PHONE: (505) 856-9990
CITY, STATE: Albuquerque, N.M. ZIP CODE: 87113

TYPE OF SUBMITTAL:
_____ DRAINAGE REPORT
_____ DRAINAGE PLAN 1st SUBMITTAL
_____ DRAINAGE PLAN RESUBMITTAL
_____ CONCEPTUAL G & D PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
__X__ ENGINEER'S CERT (HYDROLOGY)
_____ CLOMR/LOMR
_____ TRAFFIC CIRCULATION LAYOUT
_____ ENGINEER'S CERT (TCL)
_____ ENGINEER'S CERT (DRB SITE PLAN)
_____ OTHER-

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

WAS A PRE-DESIGN CONFERENCE ATTENDED:
_____ YES
__X__ NO
_____ COPY PROVIDED
DATE SUBMITTED: 6/4/15 BY: J Arthur Blessen

RECEIVED
JUN 22 2015
LAND DEVELOPMENT SECTION

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to 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 (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE

March 11, 2015

J. Arthur Blessen, P.E.
J. Arthur Blessen Engineering
2429 Zena Lona NE
Albuquerque, NM 87112

RE: **Array Technologies Paving**
3901 Midway PL NE
Grading and Drainage Plan
Engineers Stamp Date 2/23/2015 (E17D034C)

Dear Mr. Blessen,

Based upon the information provided in your submittal received 2/25/2015, the above referenced Grading and Drainage Plan cannot be approved for Grading Permit or Paving Permit until the following comments are addressed.

- Mention of the first flush per EPA standards is required and placed on the plans. The amount required for detention is .34" times the new impervious area. Depress the landscape islands/areas as part of the first flush requirements.

If you have any questions please contact me at 924-3986 or Rudy Rael at 924-3977.

Sincerely,

Curtis Cherne, P.E.
Principal Engineer, Hydrology
Planning Department

RR/CC
C: File

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

CITY OF ALBUQUERQUE

Planning Department
Transportation Development Services Section

February 27, 2014

Claudio Vigil, R.A.
Claudio Vigil Architects
1801 Rio Grande Blvd. NW
Albuquerque, NM 87104

Re: Array Technologies, 3901 Midway Place NE
Certificate of Occupancy – Transportation Development
Architect's Stamp dated 2-21-14 (E17-D034)

Dear Mr. Vigil,

Based upon the information provided in your submittal received 02-26-14, Transportation Development has no objection to the issuance of a Permanent Certificate of Occupancy. This letter serves as a "green tag" from Transportation Development for a Permanent Certificate of Occupancy to be issued by the Building and Safety Division.

If you have any questions, please contact me at (505)924-3630.

Sincerely,

Racquel M. Michel, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

c: File
CO Clerk

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 01/06 – KDM)

E17D043C

PROJECT TITLE: Array Technologies ZONE MAP: E-17-Z

DRB#: 13DRB-70553 EPC#: 1001360 WORK ORDER#: _____

LEGAL DESCRIPTION: Lot B1B1A1, Albuquerque Industrial Park

CITY ADDRESS: 3901 Midway Place, N.E.

ENGINEERING FIRM: J. Arthur Blessen Engineering CONTACT: Art Blessen

ADDRESS: 2625 Pennsylvania Boulevard, N.E., Suite 600 PHONE: (505) 293-1477

CITY, STATE: Albuquerque, NM ZIP CODE: 87110

OWNER: Array Technologies CONTACT: David Mead

ADDRESS: 3901 Midway Place, N.E. PHONE: (505) 881-7567

CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: Claudio Vigil Architects CONTACT: Sandra M. Fairchild

ADDRESS: 1801 Rio Grande Boulevard, N.W. PHONE: (505) 842-1113

CITY, STATE: Albuquerque, N M ZIP CODE: 87104

SURVEYING FIRM: _____ LICENSED SURVEYOR: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

_____

PROFESSIONAL LICENSED SURVEYOR SIGNATURE **LICENSE NO.** **DATE**

CONTRACTOR: Klinger Constructors, LLC CONTACT: Alan White

ADDRESS: 8701 Washington , N.E. PHONE: (505) 856-9990

CITY, STATE: Albuquerque, N.M. ZIP CODE: 87113

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN 1st SUBMITTAL
_____ DRAINAGE PLAN RESUBMITTAL
_____ CONCEPTUAL G & D PLAN
_____ GRADING PLAN
_____ EROSION CONTROL PLAN
_____ ENGINEER'S CERT (HYDROLOGY)
_____ CLOMR/LOMR
__X__ TRAFFIC CIRCULATION LAYOUT
_____ ENGINEER'S CERT (TCL)
__X__ ENGINEER'S CERT (DRB SITE PLAN)
_____ OTHER-

CHECK TYPE OF APPROVAL SOUGHT:

_____ SIA/FINANCIAL GUARANTEE RELEASE
_____ PRELIMINARY PLAT APPROVAL
_____ S. DEV. PLAN FOR SUB'D APPROVAL
_____ S. DEV. FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
__X__ CERTIFICATE OF OCCUPANCY
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ WORK ORDER APPROVAL
_____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

_____ YES
__X__ NO
_____ COPY PROVIDED

DATE SUBMITTED: February 26, 2014 BY: Sandra M. Fairchild

RECEIVED
FEB 26 2014
LAND DEVELOPMENT SECTION

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to 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 (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more

HYDROLOGY (TCL) HAS FILE. JS 2-26-14

CLAUDIO VIGIL ARCHITECTS

February 21, 2014

Traffic Engineer
Development and Building Services
600 Second St. N.W
Albuquerque, New Mexico

RE: TRAFFIC CERTIFICATION - Submittal
Array Technologies
3901 Midway Place, N.E.

To whom it may concern:

I, Claudio Vigil, NM Registered Architect 1236, of the firm Claudio Vigil Architects, hereby certify that this project is in substantial compliance with and in accordance with the design intent of the site development plan approved through administrative amendment and permit set. The record information documented and edited onto the approved TCL Site Plan has been obtained by Sandra Fairchild of the firm Claudio Vigil Architects. I further certify that I have personally visited the project site on February 21, 2014 and have determined by visual inspection that the survey data provided is representative of actual site conditions and is true and correct to the best of my knowledge and belief and as shown on the attached site plans. This certification is submitted in support of a request for Certificate of Occupancy.

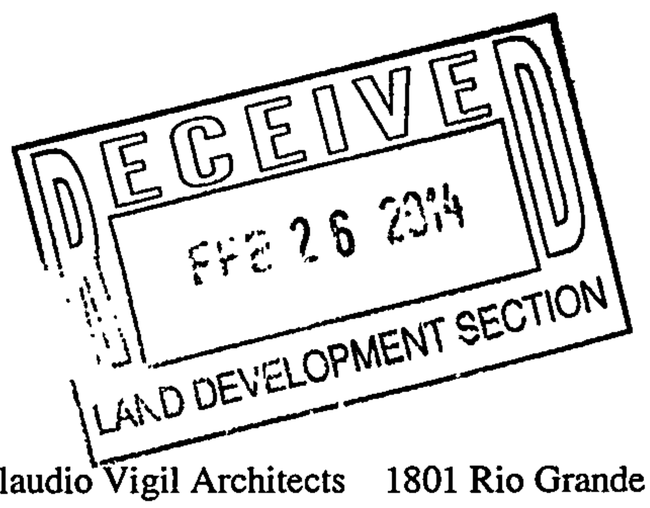
All work necessary to support the facility has been completed, and is in substantial compliance with the approved site development plan.

The record information presented hereon is not necessarily complete and intended only to verify substantial compliance of the traffic aspects of this project. Those relying on the record document are advised to obtain independent verification of its accuracy before using it for any other purpose.

Claudio Vigil
Signature of Architect

2/21/14
Date

ARCHITECT'S STAMP



CITY OF ALBUQUERQUE

February 27, 2014

John Arthur Blessen, P.E.
J. Arthur Blessen Engineering
2429 Zena Lona NE
Albuquerque, NM 87112

Re: Array Technologies 3901 MIDWAY Pl NE
Request for Permanent C.O. - Accepted
Engineer's Stamp dated: 07-08-13 (E17/D034C)
Certification dated: 2-26-14

Dear Mr. Blessen,

Based on the Certification received 2/26/2014, the site is acceptable for release of Permanent Certificate of Occupancy by the Hydrology.

Hydrology is asking for an electronic copy, in .pdf format, of this certification for our records once the permanent CO is accepted. This certification can be e-mailed to: rrael@cabq.gov.

If you have any questions, you can contact me at 924-3986 or Rudy Rael at 924-3977.

Sincerely,

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

RR/CC
C: CO Clerk—Katrina Sigala
email

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 01/06 – KDM)

E17D034C

PROJECT TITLE: Array Technologies ZONE MAP: ~~E17/D034C~~

DRB#: 13DRB-70553 EPC#: 1001360 WORK ORDER#:

LEGAL DESCRIPTION: Lot B1B1A1, Albuquerque Industrial Park

CITY ADDRESS: 3901 Midway Place, N.E.

ENGINEERING FIRM: J. Arthur Blessen Engineering CONTACT: Art Blessen

ADDRESS: 2429 Zena Lona PHONE: (505) 293-1477

CITY, STATE: Albuquerque, NM ZIP CODE: 87112

OWNER: Array Technologies CONTACT: David Mead

ADDRESS: 3901 Midway Place, N.E. PHONE: (505) 881-7567

CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: Claudio Vigil Architects CONTACT: Sandra M. Fairchild

ADDRESS: 1801 Rio Grande Boulevard, N.W. PHONE: (505) 841-1113

CITY, STATE: Albuquerque, N M ZIP CODE: 87104

SURVEYING FIRM: LICENSED SURVEYOR:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

PROFESSIONAL LICENSED SURVEYOR SIGNATURE **LICENSE NO.** **DATE**

CONTRACTOR: Klinger Constructors, LLC CONTACT: Alan White

ADDRESS: 8701 Washington , N.E. PHONE: (505) 856-9990

CITY, STATE: Albuquerque, N.M. ZIP CODE: 87113

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT
_____ DRAINAGE PLAN 1st SUBMITTAL
_____ DRAINAGE PLAN RESUBMITTAL
_____ CONCEPTUAL G & D PLAN
_X_ GRADING PLAN
_____ EROSION CONTROL PLAN
_X_ ENGINEER'S CERT (HYDROLOGY)
_____ CLOMR/LOMR
_____ TRAFFIC CIRCULATION LAYOUT
_____ ENGINEER'S CERT (TCL)
_____ ENGINEER'S CERT (DRB SITE PLAN)
_____ OTHER-

CHECK TYPE OF APPROVAL SOUGHT:

_____ SIA/FINANCIAL GUARANTEE RELEASE
_____ PRELIMINARY PLAT APPROVAL
_____ S. DEV. PLAN FOR SUB'D APPROVAL
_____ S. DEV. FOR BLDG. PERMIT APPROVAL
_____ SECTOR PLAN APPROVAL
_____ FINAL PLAT APPROVAL
_____ FOUNDATION PERMIT APPROVAL
_____ BUILDING PERMIT APPROVAL
_X_ CERTIFICATE OF OCCUPANCY
_____ GRADING PERMIT APPROVAL
_____ PAVING PERMIT APPROVAL
_____ WORK ORDER APPROVAL
_____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

_____ YES
_X_ NO
_____ COPY PROVIDED

DATE SUBMITTED: 2/26/14 BY: J Arthur Blessen

RECEIVED
FEB 26 2014
LAND DEVELOPMENT SECTION

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to 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 (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development & Building Services

July 25, 2013

FASTrax

Richard J. Berry, Mayor

John Arthur Blessen, P.E.
J Arthur Blessen Engineering
2429 Zena Lona NE
Albuquerque, NM 87112

RE: **Array Tech Addition** – 3901 Midway Place NE
Drainage Report and Plan for Building Permit

File **E17-D034C**
Stamp: 7/8/13

Dear Mr. Blessen,

Based upon the information provided in your submittal received July 10, 2013, the above referenced Drainage Report and Grading Plan is approved for Building Permit. As discussed by telephone, please correct the "Existing Spillway" elevation, at the upper left from 5129.0 to **5126.0**, and initial the correction.

Attach a copy of this approved plan to the Building Permit, construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy release, an Engineer's Certification of the As-Built grading and drainage, per the DPM checklist will be required. The Certification for C.O. must include Certification of the volume and elevations on the Existing Detention Pond A, at the NW corner of the site.

If you have questions, please contact me by email at grolson@cabq.gov, or telephone 505-924-3994.

Sincerely,

7/25/13

Gregory R. Olson, P.E.
Senior Engineer

Orig: Drainage file E17-D034C
c.pdf Addressee via Email: JAB-Enginering@hotmail.com

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

FOUND REBAR WITH
ILLEGIBLE CAP
ELEVATION 5124.58'

EXISTING DRAINAGE EASEMENT

Q_{100} = 10.6 CFS

EXISTING CULVERT WITH
CONTROLLED DISCHARGE
16.9" ORIFICE

EXISTING SPILLWAY AT 5129.0'

EXISTING DETENTION
POND A
MAX VOL 16,000 CF AT 5126.0
VOL 10,579 CF AT 5125.52

20' WATERLINE ESMT.
PER PLAT

20' WATERLINE ESMT. PER PLAT

BASIN C-1

How does water get from Pond A to Pond A?

INV=21.99'

INV=22.81'

INV=23.94'

TC=28.82'
FL=28.34'

TC=30.13'
FL=29.65'

TC=29.38'
INV=24.33'

TC=30.26'
FL=29.59'

TC=29.88'
FL=29.44'

33.6 TS
30.2 GND

32.0 TS
31.0 GND

21"DIA

21"DIA

FFE=33.70

ASPHALT ROAD

ASPHALT RO

SIGN

5123 5124 5125 5126 5127 5128 5129 5130

D

C

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: Array Tech Addition Building Permit #: _____ City Drainage #: E17/D034C

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

Legal Description: Tract B-1-B-1A-1A-1 Albuquerque Industrial Park

City Address: 3901 Midway Place NE

Engineering Firm: J Arthur Blessen Engineering Contact: Arthur Blessen

Address: 2429 Zena Lona Albuquerque, NM *7112

Phone#: 505-293-1477 Fax#: 505-237-8314 E-mail: jab-engineering@hotmail.com

Owner: _____ Contact: _____

Address: _____

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

Architect: Claudiao Vigil Architects Contact: _____

Address: _____

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

Surveyor: _____ Contact: _____

Address: _____

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

Contractor: _____ Contact: _____

Address: _____

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

TYPE OF SUBMITTAL:

x DRAINAGE REPORT
x DRAINAGE PLAN 1st SUBMITTAL
___ DRAINAGE PLAN RESUBMITTAL
___ CONCEPTUAL G & D PLAN
x GRADING PLAN
___ EROSION & SEDIMENT CONTROL PLAN (ESC)
___ ENGINEER'S CERT (HYDROLOGY)
___ CLOMR/LOMR
___ TRAFFIC CIRCULATION LAYOUT (TCL)
___ ENGINEER'S CERT (TCL)
___ ENGINEER'S CERT (DRB SITE PLAN)
___ ENGINEER'S CERT (ESC)
___ SO-19
___ OTHER (SPECIFY)

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

___ SIA/FINANCIAL GUARANTEE RELEASE
___ PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D APPROVAL
___ S. DEV. FOR BLDG. PERMIT APPROVAL $ 50.00
___ SECTOR PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ CERTIFICATE OF OCCUPANCY (PERM)
___ CERTIFICATE OF OCCUPANCY (TCL TEMP)
___ FOUNDATION PERMIT APPROVAL
X BUILDING PERMIT APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ WORK ORDER APPROVAL
___ GRADING CERTIFICATION

___ SO-19 APPROVAL
___ ESC PERMIT APPROVAL
___ ESC CERT. ACCEPTANCE
___ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED: ___ Yes x No ___ Copy Provided

DATE SUBMITTED: 7.10.13 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 to the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the followin

1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development

RECEIVED
JUL 10 2013
LAND DEVELOPMENT SECTION

Revised Drainage Report

for

Array Tech Addition

3901 Midway Place NE
Albuquerque, New Mexico

July 8, 2013

File: E17/D034C

by

J Arthur Blessen Engineering

Location:
Tract B-1-B-1A-1A-1 Albuquerque Industrial Park, Bernalillo County New Mexico
3901 Midway Place NE.

Zone map E-17-Z
Located east of Office Blvd. at the east end of Midway Place, south of the Bear Arroyo North Diversion Channel.

Site Area: 6.16 Acres

Precipitation Zone 2

Flood Zone:
The proposed building locations on the site does not lie within a flood hazard zone (Map 35001C0138H panel 138 of 825). The site slopes from east to west. The Bear Arroyo is located to the north of the site. The lands to the west and south are lower than the site. The existing drainage channel along the east property line block flow from that direction. Therefore offsite flows are considered negligible.

Existing Conditions:
The existing 6.16 acre site is developed. The previous developments included the a warehouse, and asphalt parking lots and access road, landscaping, and detention ponds. The previously approved drainage plan (COA File #E17/D034C) directs the runoff from the site to two existing detention ponds, and to Midway Place.

The existing master drainage plan "Overall Drainage Plan" for the Nabisco Inc Warehouse (1990) established a discharge rate from the site of 2.1 cfs /acre (2.1cfs/acre x 6.16 acre = 12.9 cfs). The previously approved drainage plan for the site was prepared by Bohannan-Houston Inc (1-6-95) and divided the site into six sub-basins:

Basin A-1
A 0.582 ac portion of the site located at the southwest corner of the site. Runoff from the basin discharges to existing detention pond B. The previously approved drainage plan established the a discharged rate from pond B of 0.3 csf. The volume of the pond is 1077 cf at an elevation of 5128.6 ft. The proposed development will not effect basin A-1.

Basin A-2
$\frac{.314}{.446} = 70^{\circ}$ D
A 0.446 Ac portion of the site located north of basin A-1. Runoff from the basin discharges to Midway Place. The previously approved drainage plan established free discharge from the basin at a rate of 1.7 cfs. The proposed development will not effect basin A-2.

Basin B-1
The basin includes the existing warehouse and parking lot located to the west of the facility. Runoff from the basin flows to the existing catch basin located in the parking lot, and is routed to the existing detention pond located at the northwest corner of the site via a 21" dia culvert at a rate of 8 cfs. The proposed development will continue to use the existing drainage route. The proposed

development will increase the size of the basin to include a portion of the proposed warehouse.

G&O Plan Not found in file 10/10

Basin B-2
The basin includes the existing service drive and landscaping area located at the southeast corner of the site. Runoff from the basin flows to an existing catch basin located east corner of the existing warehouse, and is routed to the existing detention pond located at the northwest corner of the site vis a 15" dia culvert at a rate of 3.3 cfs. The proposed development includes a small parking area which will increase the discharge rate to the basin.

Basin B-3
The basin includes the gravel storage yard and asphalt service drive located at the northeast corner of the site. Runoff from the basin flows to an existing catch basin located on the east side of the existing loading dock, and is routed to the existing detention pond located at the northwest corner of the site via a 15" dia culvert at a rate of 2.8 cfs, when combined with basin B-2 the flow through the 15" culvert is 6.1 cfs. The proposed development will not effect basin B-3.

Basin C-1 (previously unnamed)
The basin includes the existing parking lot on the north side of the facility and the north section of the site. Runoff form the site discharges to the existing detention pond (pond A) located within the site. The proposed development will increase the rate of runoff to the basin.

The combined runoff from basins B-1, B-2, B-3, and A is discharged to existing pond A at a rate of 23.5 cfs. The previously approved drainage plan established a discharge rate from the pond at a rate of 10.6 cfs via a 16.9" orifice to the existing asphalt swale within the drainage easement running parallel to the Bear Arroyo. The existing pond volume was established as 16,000 cf at an elevation of 5126.0.

The combined existing discharge from the site is (0.3cfs + 1.7cfs + 10.6cfs = 12.6cfs).

Note: The elevations have been adjusted to correspond to the current bench mark reference.

Developed Conditions:
The proposed development include a 20,595 sf office / warehouse addition, small parking lot, and associated landscaping. The proposed additions will be confined to basins B-1, B-2 and C-1. The remainder of the site will remain unchanged. The runoff from the proposed addition will be directed to the existing detention pond A.

The combined area of basins B-1, B-2, B-3, and C-1 is 5.132 ac. and produces a combined runoff of 20.4 cfs. The existing orifice in the outlet pipe for pond A limits the discharge to 10.6 cfs. The required pond volume for the combined basis in 10,528 cfs. The existing pond A has a capacity of 10,578 cf at a elevation of 5125.52 ft, therefore no modification to the pond is required.

Proposed adds 1/2 Ac. of bldg & calcs at reduction in flow Verify!

Summary:
As shown by the attached calculations the existing runoff for the site will be decreased form the existing due to the additional landscaping. The existing detention pond with a controlled discharge will control the addition runoff from the site.

Basin	Historic	Existing	Proposed	
A-1	0.9 cfs	1.5 cfs	no change	to existing pond B discharge 0.3 cfs
A-2	0.7 cfs	1.7 cfs	no change	
B-1	2.5 cfs	8.0 cfs	7.0 cfs	
B-2	1.1 cfs	3.3 cfs	3.0 cfs	
B-3	1.6 csf	2.8 cfs	3.9 cfs	
C-1	2.8 cfs	9.4 cfs	6.9 cfs	
Total to pond		23.5 cfs	20.8 cfs	to existing pond A discharge 10.6 cfs

To follow are the calculations analyze the historic and proposed conditions for the 6-HOUR, 100 year event. The analysis is in. accordance with the City of Albuquerque Development Process Manual Volume II.

- Reduced Runoff
- Pav't when

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B1

Precipitation Zone 2
Basin Area = 1.570 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	68379 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	6822 sf	10% ✓
Area of C =	0 sf	0%	Area of C =	0 sf	0%
Area of D =	0 sf	0%	Area of D =	61557 sf	90% ✓

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.10	x	0.78 =	0.08
C	0.00	x	1.13 =	0.00	C	0.00	x	1.13 =	0.00
D	0.00	x	2.12 =	0.00	D	0.90	x	2.12 =	1.91
			E =	0.53				E =	1.99

Volume V = E A / 12

Ve =	0.530	x	1.5698 /	12 =	0.069	acre ft	3020	cf
Vi =	1.986	x	1.5698 /	12 =	0.260	acre ft	11319	cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.10	x	2.28 =	0.23
C	0.00	x	3.14 =	0.00	C	0.00	x	3.14 =	0.00
D	0.00	x	4.7 =	0.00	D	0.90	x	4.7 =	4.23
			q =	1.56				q =	4.46

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.5698 =	2.45	cfs
Qp(i) =	4.46	x	1.5698 =	7.00	cfs

Excess Volume = 0.191 acre ft
Excess Rate = 4.55 cfs

tc = 0.2 hr
tb = (2.107 *E*At/Qp)-(0.25*Ad/At) = 0.714 hr
tp = (0.7*tc)+((1.6-(Ad/At))/12) = 0.198 hr

Discharge Rate 7.00 cfs 4.46 cfs/ac

Volume 11825 cf
Discharged - 11825 cf

Pond Voulme **0** cf

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B2

Precipitation Zone 2
Basin Area = 0.723 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	31500 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	3652 sf	12%
Area of C =	0 sf	0%	Area of C =	6924 sf	22%
Area of D =	0 sf	0%	Area of D =	20924 sf	66%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.12	x	0.78 =	0.09
C	0.00	x	1.13 =	0.00	C	0.22	x	1.13 =	0.25
D	0.00	x	2.12 =	0.00	D	0.66	x	2.12 =	1.41
			E =	0.53				E =	1.75

Volume V = E A / 12

Ve =	0.530	x	0.7231 /	12 =	0.032	acre ft	1391	cf
Vi =	1.747	x	0.7231 /	12 =	0.105	acre ft	4586	cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.12	x	2.28 =	0.26
C	0.00	x	3.14 =	0.00	C	0.22	x	3.14 =	0.69
D	0.00	x	4.7 =	0.00	D	0.66	x	4.7 =	3.12
			q =	1.56				q =	4.08

Peak Rate Qp = q A

Qp(e) =	1.56	x	0.7231 =	1.13	cfs
Qp(i) =	4.08	x	0.7231 =	2.95	cfs

Excess Volume = 0.073 acre ft
Excess Rate = 1.82 cfs

tc = 0.2 hr
tb = (2.107 *E*At/Qp)-(0.25*Ad/At) = 0.737 hr
tp = (0.7*tc)+((1.6-(Ad/At))/12) = 0.218 hr

Discharge Rate	2.95 cfs	4.08 cfs/ac
Volume	4791 cf	
Discharged -	4791 cf	
Pond Voulme	**0** cf	

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin B3

Precipitation Zone 2
Basin Area = 1.040 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	45296 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	sf	0%
Area of C =	0 sf	0%	Area of C =	28362 sf	63%
Area of D =	0 sf	0%	Area of D =	16934 sf	37%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area				Improved Conditions Treatment	% of Area			
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.00	x	0.78 =	0.00
C	0.00	x	1.13 =	0.00	C	0.63	x	1.13 =	0.71
D	0.00	x	2.12 =	0.00	D	0.37	x	2.12 =	0.79
			E =	0.53				E =	1.50

Volume V = E A / 12

Ve =	0.530	x	1.0399 /	12 =	0.046	acre ft	2001 cf
Vi =	1.500	x	1.0399 /	12 =	0.130	acre ft	5662 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area				Treatment	% of Area			
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.00	x	2.28 =	0.00
C	0.00	x	3.14 =	0.00	C	0.63	x	3.14 =	1.97
D	0.00	x	4.7 =	0.00	D	0.37	x	4.7 =	1.76
			q =	1.56				q =	3.72

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.0399 =	1.62	cfs
Qp(i) =	3.72	x	1.0399 =	3.87	cfs

Excess Volume = 0.084 acre ft
Excess Rate = 2.25 cfs

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =	0.755	hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12) =	0.242	hr

Discharge Rate	3.87 cfs	3.72 cfs/ac
Volume	5916 cf	
Discharged -	5916 cf	
Pond Voulme	**0** cf	

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basin C1

Precipitation Zone 2
Basin Area = 1.798 acres

Historic Treatment			Improved Conditions Treatment		
Area of A =	78336 sf	100%	Area of A =	sf	0%
Area of B =	0 sf	0%	Area of B =	24113 sf	31% ? Pond A
Area of C =	0 sf	0%	Area of C =	7012 sf	9%
Area of D =	0 sf	0%	Area of D =	47211 sf	60% ✓

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area			En	Improved Conditions Treatment	% of Area			En
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.31	x	0.78 =	0.24
C	0.00	x	1.13 =	0.00	C	0.09	x	1.13 =	0.10
D	0.00	x	2.12 =	0.00	D	0.60	x	2.12 =	1.28
			E =	0.53				E =	1.62

Volume V = E A / 12

Ve =	0.530	x	1.7983 /	12 =	0.079	acre ft	3460 cf
Vi =	1.619	x	1.7983 /	12 =	0.243	acre ft	10568 cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area			Q	Treatment	% of Area			Q
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.31	x	2.28 =	0.70
C	0.00	x	3.14 =	0.00	C	0.09	x	3.14 =	0.28
D	0.00	x	4.7 =	0.00	D	0.60	x	4.7 =	2.83
			q =	1.56				q =	3.82

Peak Rate Qp = q A

Qp(e) =	1.56	x	1.7983 =	2.81	cfs
Qp(i) =	3.82	x	1.7983 =	6.86	cfs

Excess Volume = 0.163 acre ft
Excess Rate = 4.06 cfs

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =		0.743 hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12)	=	0.223 hr

Discharge Rate	6.86 cfs	3.82 cfs/ac
Volume	11042 cf	
Discharged -	11042 cf	
Pond Voulme	**0** cf	

Drainage Calculation

City of Albuquerque DPM 1997 edition

Basins B-1, B-2, B-3 and C-1 (to pond A)

Precipitation Zone 2
Basin Area = 5.132 acres

Historic Treatment				Improved Conditions Treatment			
Area of A =	223563	sf	100%	Area of A =		sf	0%
Area of B =	0	sf	0%	Area of B =	39587	sf	18%
Area of C =	0	sf	0%	Area of C =	42298	sf	19%
Area of D =	0	sf	0%	Area of D =	141678	sf	63%

Excess Precipitation, E (inches) 6 hr - 100 yr storm table A-8

Existing Conditions Treatment	% of Area				Improved Conditions Treatment	% of Area			
A	1.00	x	0.53 =	0.53	A	0.00	x	0.53 =	0.00
B	0.00	x	0.78 =	0.00	B	0.18	x	0.78 =	0.14
C	0.00	x	1.13 =	0.00	C	0.19	x	1.13 =	0.21
D	0.00	x	2.12 =	0.00	D	0.63	x	2.12 =	1.34
			E =	0.53				E =	1.70

Volume V = E A / 12

Ve =	0.530	x	5.1323 /	12 =	0.227	acre ft	9874	cf
Vi =	1.695	x	5.1323 /	12 =	0.725	acre ft	31586	cf

Discharge Rate, Q (cfs / acre) 100 yr storm table A-9

Treatment	% of Area				Treatment	% of Area			
A	1.00	x	1.56 =	1.56	A	0.00	x	1.56 =	0.00
B	0.00	x	2.28 =	0.00	B	0.18	x	2.28 =	0.40
C	0.00	x	3.14 =	0.00	C	0.19	x	3.14 =	0.59
D	0.00	x	4.7 =	0.00	D	0.63	x	4.7 =	2.98
			q =	1.56				q =	3.98

Peak Rate Qp = q A

Qp(e) =	1.56	x	5.1323 =	8.01	cfs
Qp(i) =	3.98	x	5.1323 =	20.41	cfs

Excess Volume = 0.498 acre ft
Excess Rate = 12.40 cfs

tc =	0.2	hr	
tb =	(2.107 *E*At/Qp)-(0.25*Ad/At) =	0.740	hr
tp =	(0.7*tc)+((1.6-(Ad/At))/12) =	0.221	hr

Discharge Rate	10.60	cfs	2.07 cfs/ac
Volume	33001	cf	
Discharged -	22473	cf	
Pond Voulme	**10528**	cf	

	elevation	depth ft	area sf	volume cf
top of pond	25.52	0.52	6304	3090.36
	25	1	5582	4936
	24	1.19	4290	2552.55
bottom	22.81		0	
				10578.91

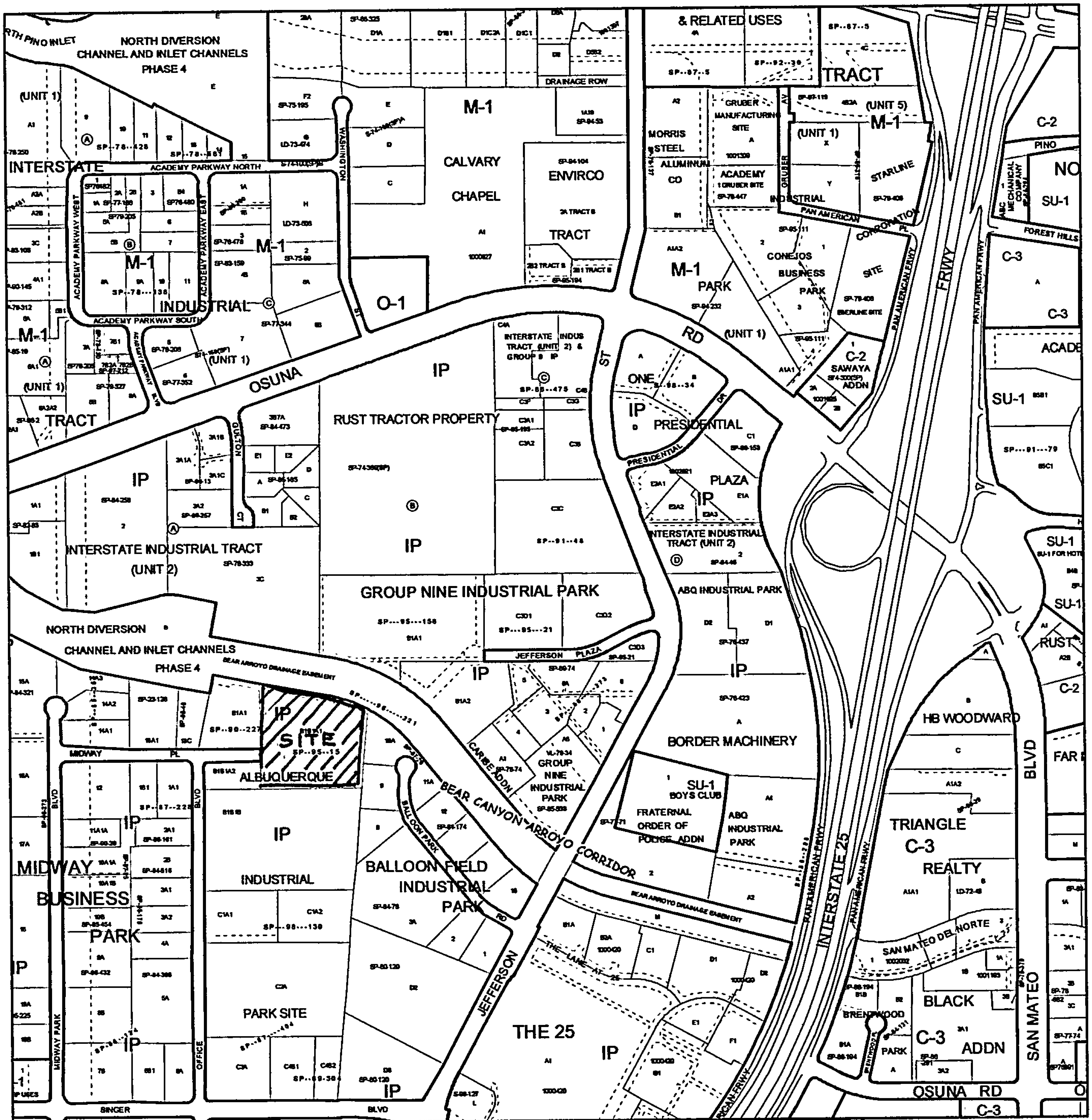
Orifice

pond depth = 2.71 ft

pipe dia = 16.9 in Area = 1.56 sf

H = pond depth - 0.5*dia = 2.01 ft

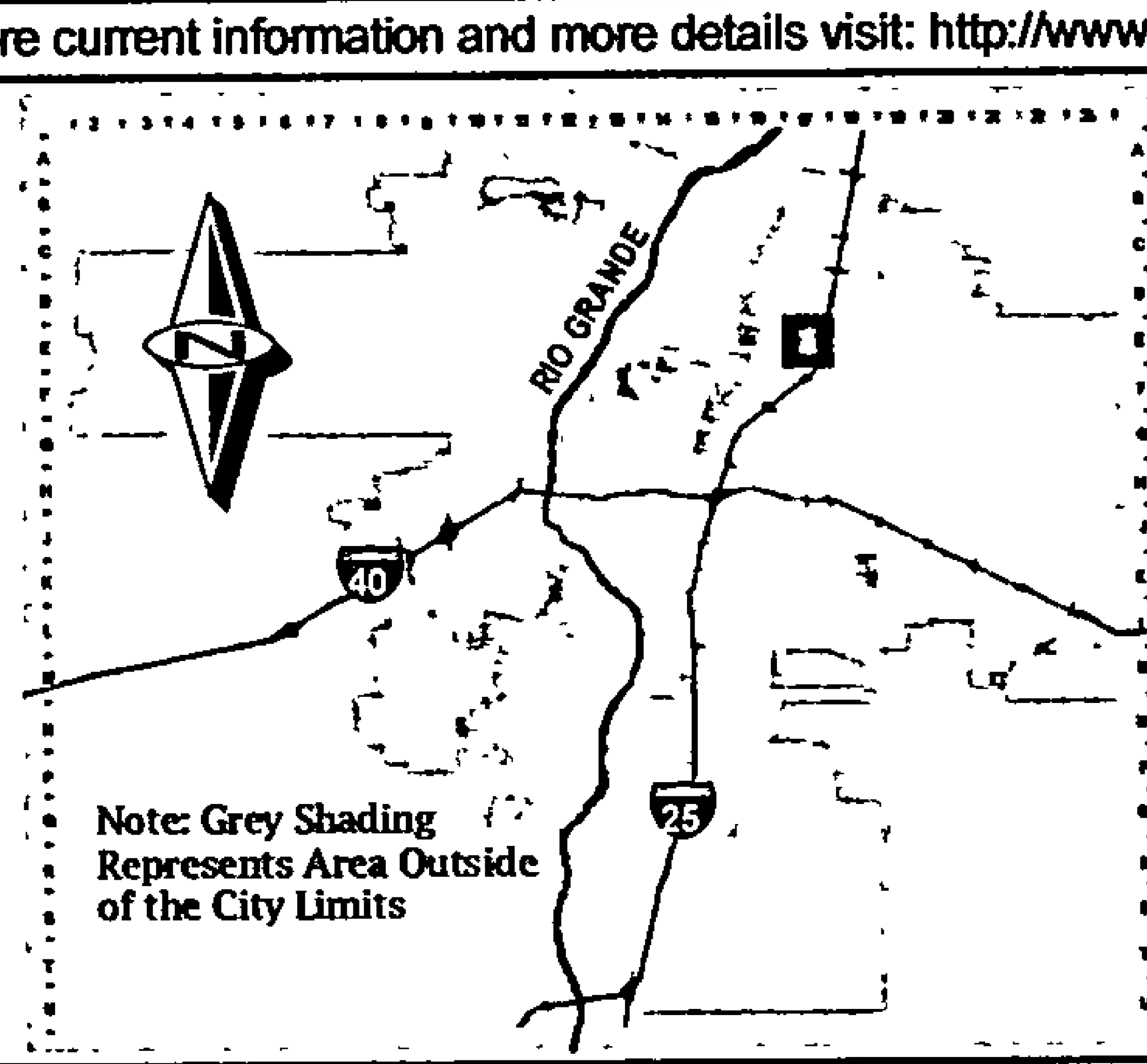
Qpipe = 0.6 A (2 * 32.2 * H)^.5 = 10.6 cfs



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

Albuquerque Geographic Information System

Map amended through: 1/12/2006



Note: Grey Shading Represents Area Outside of the City Limits

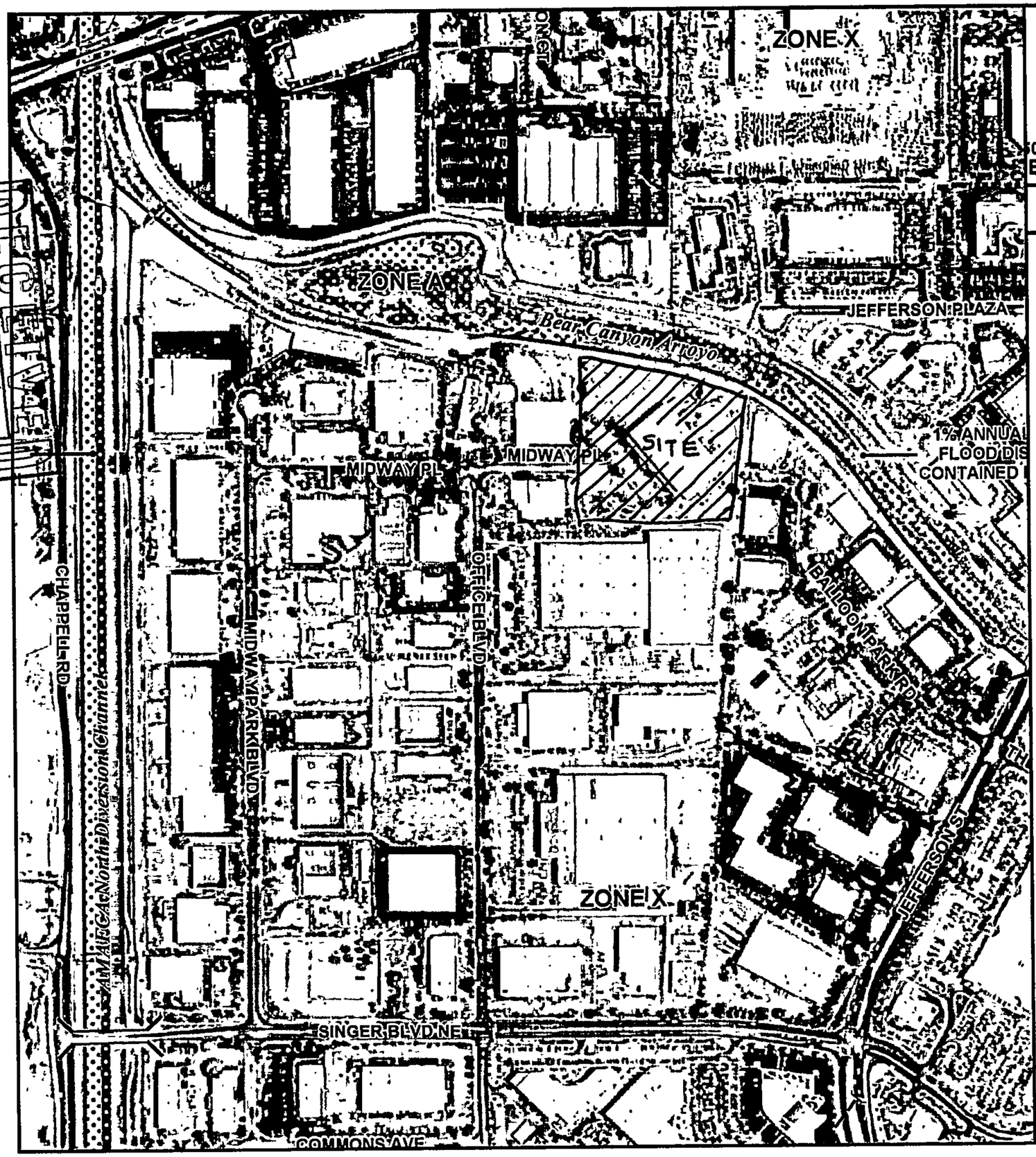
Zone Atlas Page:

E-17-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



MAP SCALE 1" = 500'

0 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

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 14, 2001

James R. Topmiller, P.E.
Bohannan-Huston, Inc.
Courtyard 1
7500 Jefferson NE
Albuquerque, NM 87109-4335

RE: FLOWSERVE BUILDING ADDITION (Formerly BWIP International, Inc.) (E17-D34C). Revised DRAINAGE PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED MAY 31, 2001.

Dear Mr.Topmiller:

Based on the information provided on your June 1, 2001 submittal, the above referenced project is approved for Building Permit.

Thank you for the early notification of this modification to the G&D Plan. As often as not, such (limited) modifications are recorded during the Certification Process.

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

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: Terri Martin
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 9, 1994

James R. Topmiller
Bohannan-Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

RE: BW/IP INTERNATIONAL LCF BUILDING (E17-D34C) ENGINEER'S CERTIFICATION FOR CERTIFICATE OF OCCUPANCY APPROVAL. ENGINEER'S CERTIFICATION DATED 8-4--95.

Dear Mr. Topmiller:

Based on the information provided on your August 4, 1995 submittal, a Certificate of Occupancy is approved for BW/IP International LCF Building.

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~~

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 17, 1995

James Topmiller, P.E.
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, N.M. 87109

RE: DRAINAGE REPORT FOR BW/IP INTERNATIONAL LCF BUILDING (E-17/D34C)
RECEIVED FEBRUARY 2, 1995 FOR BUILDING PERMIT APPROVAL
ENGINEER'S STAMP DATED 1-24-95

Dear Mr. Topmiller:

Based on the information included in the submittal referenced above, City Hydrology approves this project for Building Permit.

Include a copy of the approved Grading & Drainage Plan, dated 1-24-95, in the set of construction documents that will be submitted to Code Administration for the Building Permit.

Engineer's Certification of grading & drainage, per DPM checklist, must be approved before any Certificate of Occupancy will be released.

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,

John P. Curtin

John P. Curtin, P.E.
Civil Engineer/Hydrology

c: Andrew Garcia
Ken Ishihara; BW/IP International; 2300 East Vernon Ave; Vernon, CA 90058

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 16, 1994

James Topmiller, P.E.
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, N.M. 87109

RE: CON GRADING & DRAINAGE PLAN FOR BW/IP LCF BUILDING (E-17/D34C)
RECEIVED NOVEMBER 28, 1994 FOR S DEV PLAN & FINAL PLAT APPROVAL
ENGINEER'S STAMP DATED 11-23-94

Dear Mr. Topmiller:

Based on the information included in the submittal referenced above, City Hydrology accepts the concept for this project and approves the Site Development Plan and Final Plat.

The following comments must be addressed prior to Rough Grading approval:

1. Add the proposed retaining walls to the Legend. If the retaining walls are constructed on the property line, permission to work on the adjacent property must be obtained in writing from the property owner.

2. Indicate the extent of the ponding on the Plan. It appears that the pond in Basin B will extend on to the dirt road & the parking lot.

3. Expound on the Erosion Control Plan. Indicate where the erosion control berm is located. Explain what the purpose of the berm is. Remind the Contractor that he must obtain a "Topsoil Disturbance Permit".

4. Indicate roof drain locations. The water blocks indicate that significant areas are draining to the loading docks. It appears that some type of drain is required at the loading docks.

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,

John P. Curtin

John P. Curtin, P.E.
Civil Engineer/Hydrology

Foundation Permit OK JPC 1-9-95

c: Andrew Garcia
Fred Aguirre, DRB 94-559

Drainage Report
for
BW/IP International Inc.

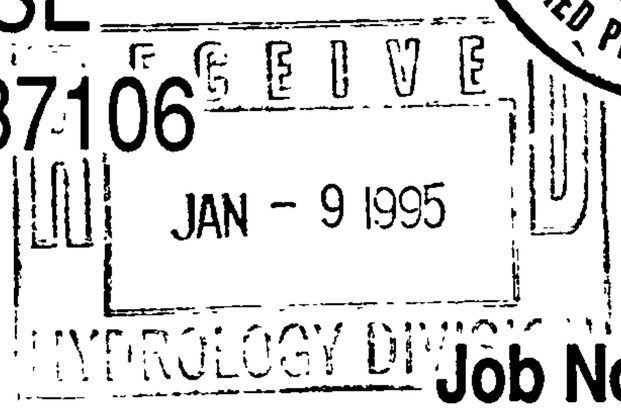
January 1994

Prepared for:

BW/IP INTERNATIONAL INC.
2300 East Vernon Avenue
Vernon, CA 90058

SMPC ARCHITECT
115 Amherst Drive SE
Albuquerque, NM 87106

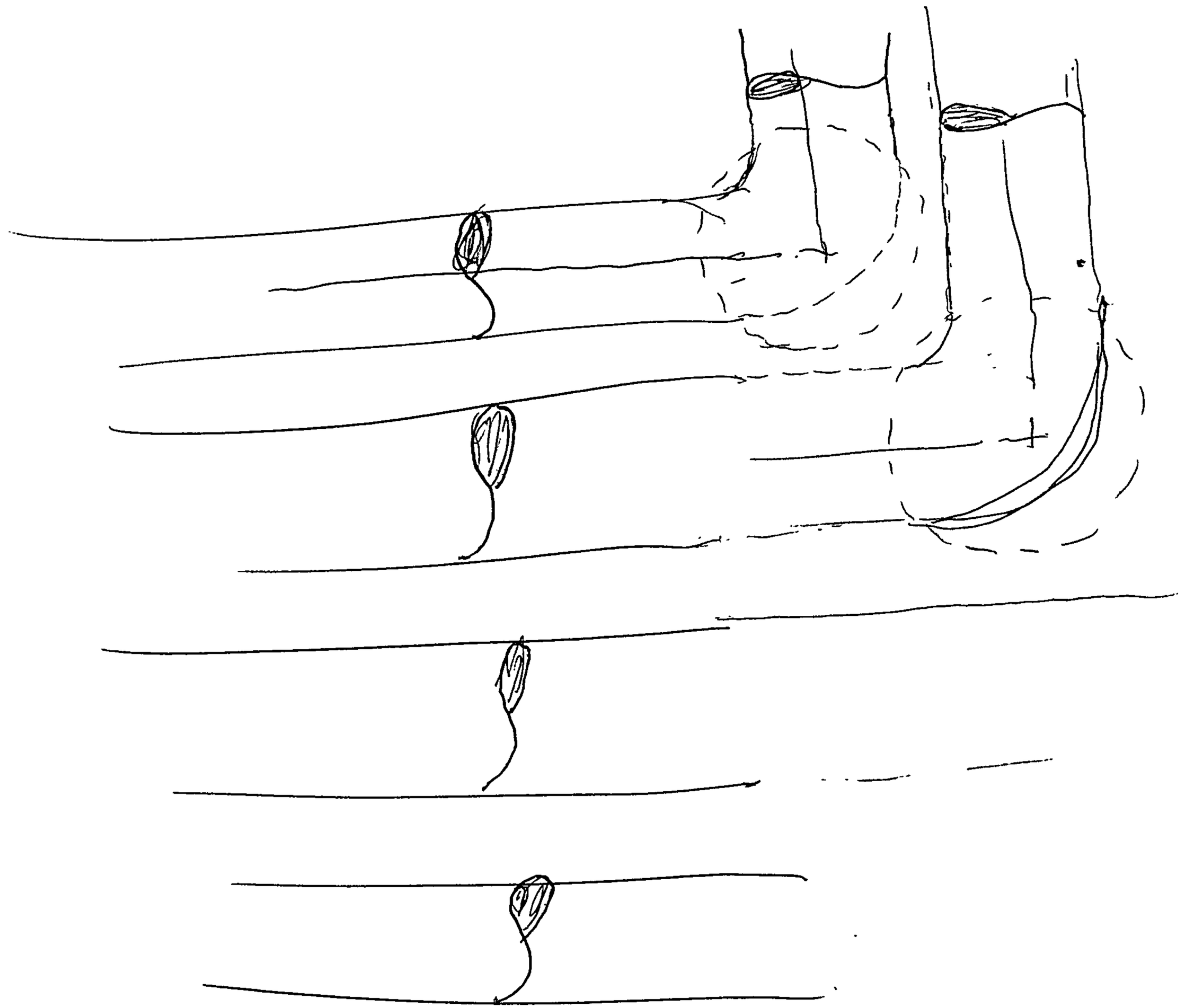
1.6.95



Prepared by:

Job No. 94288.42

BOHANNAN-HUSTON INC.
ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS
COURTYARD I, 7500 JEFFERSON NE ALBUQUERQUE, NM 87109 TEL (505) 823-1000 FAX (505) 821-0892



FINAL GRADING/DRAINAGE PLAN (E17/d34c)

PURPOSE

The purpose of this Final Grading/Drainage Plan is to present existing and proposed hydrological conditions and grading for the proposed development. This plan is prepared and submitted to support rough grading and building permit approval.

EXISTING CONDITIONS

The site is currently a vacant piece of ground sloping downstream in a westerly direction at a slope of approximately 2% to 4%. This approximately 6.1 acre site generates 11cfs in a uncontrolled sheetflow fashion during a 100-year storm event. The site accepts essentially no offsite drainage flows from its perimeter properties.

Except for the property immediately to the west of the proposed site and immediately south of the Midway Place, all adjacent properties are developed. To the north lies the Bear Arroyo Diversion Channel, an AMAFCA facility.

The area of this proposed site is governed by an existing Master Drainage Plan. The plan is called "Overall Drainage Plan" and was first prepared under drainage plans provided for a "Warehouse for Nabisco, Inc." in 1990. This Master Plan identifies that the site has two drainage outfalls. The southern-most portion of the site will drain directly to Midway Place or Office Boulevard. The larger north portion of the site will drain into an existing drainage swale provided with the 1990 Nabisco project. The Drainage Management Plan further requires that developed flows be controlled to a 2.1 cfs per acre rate.

No FEMA flood plains exist on the site. The nearest floodplain is located within the Bear Arroyo Diversion Channel to the north and does not impact the site in any way.

PROPOSED CONDITIONS

All flow references are 100-yr storm events.

Under developed conditions, the site will drain in a manner to maintain the basins identified on the Overall Drainage Plan (the Master Plan). Accordingly, the southwestern-most corner of the property will discharge directly to Midway Place while the remainder of the site discharges northwesterly to the existing swale on the Lot B-1-B-1. A 20-foot private drainage easement currently exists on this adjacent tract expressly for the purposes of collecting these flows.

The flows generated in Basin A-1 are approximately 1.4 cfs and calculations for it are shown in the Appendix. Using a small detention pond in this basin to detain a portion of the flows allows this basin to restrict flows to 0.3 cfs and helps to comply with the 2.1 cfs per acre maximum discharge requirement of the Overall Drainage Plan. By raising the west berm to an elevation (Elev. 26.4) that is 0.5' higher than the berm elevation (Elev. 25.9) adjacent to the paved cul-de-sac, a spillway is created. Accordingly, any spillage from the pond (in a storm exceeding 100-yr event) will be discharged almost directly (northerly) into the cul-de-sac. Via the landscape plan,

the "spillway" will be graveled. This should be sufficient for the very low flows (1.4 cfs) of this basin and the "spread-out" (very low depth) nature of any spillage over the berm.

Basin A-2 provides no detention and free discharges 1.7 cfs to Midway Place. 2.0 Accordingly, the actual discharge to Midway Place from both Basins is only ~~2.1~~ cfs. Since the two Basins comprise 1 acre, the discharge rate is ~~2.1~~ cfs per acre, approximately equal to the ~~2.0~~ cfs allowed by the Overall Drainage Plan. 2.0 2.1

Basins B-1, B-2, B-3 and the unnamed basin (in the northwest) comprise the remainder of the site at approximately 5.1 acres and generate 23.5 cfs in the 100-year storm event. For this area, the Overall Drainage Plan requires a controlled discharge of only 10.6 cfs. Accordingly, the detention pond in the northwest corner of the site will control discharge to the allowable 10.6cfs rate. Calculations in the Appendix show that a pond of 16,000 cubic feet with a 16.9-inch orifice outlet as shown on the plan will control discharge from these basins to 10.6 cfs. A asphalt-lined emergency spillway is provided from this pond to the downstream drainage swale. The Appendix calculations size the spillway by weir equation for 23.5 cfs (the max. 100-yr storm flow to the pond). At a depth of 1', the spillway weir must be 8' wide. Additional details are provided on the plan.

The three named basins, B-1, B-2 and B-3 are analyzed in order to determine pipe sizing for the storm drain. Basin B-1, 8 cfs, drains to the inlet at the west end of the parking. The Appendix calculations show that a single type "d" inlet collects the flow with only 0.5' headwater above the grate. The inlet then discharges to the pond by 21" pipe.

Basin B-2 discharges 3.3 cfs to a 15" pipe located in the south dock area. At a 0.8% slope, the 15" pipe can carry the 3.3 cfs.

Basin B-3 discharges 6.1 cfs to the east loading dock (which contains a 15" pipe outlet) and the grated-lid manhole, whereupon these then discharge to the 24" storm drain. Appendix calculations show that the 15" pipe outlet alone could carry/discharge the basin's flows should the grated-lid manhole plug. Accordingly, no further calculations are provided for the manhole lid's collection capacity. The 24" storm drain can carry the 11 cfs of Basins B-2 and B-3 at a slope of 0.8%. This 24" storm drain then discharges to the previously discussed detention pond.

Conclusion

We believe this plan complies in all respects with the Development Process Manual. We respectfully request building permit approval.

E:\CDP\9428841\DRAINPLN.RPT-1/5/95

BASINS B-1, B-2, B-3 and the unnamed basin in the northwest corner of the site

Existing undeveloped

Area = 5.1 ac

Land treatments: 73% treatment "D"
27% treatment "B"

Zone 2

$Q_{100} = 0.73 (5.1 \text{ ac.}) 4.7 \text{ cfs/ac.} + 0.27 (5.1) 2.28 = 23.5 \text{ cfs}$

Allowable per Overall Drainage Plan = 10.6 cfs

Detention Ponding Required to Restrict Discharge to 10.6 cfs.

BOHANNAN-HUSTON INC.

PROJECT NAME BW/IP site SHEET 1 OF

PROJECT NO. 94288-42 BY JonTe DATE 1/5/95

SUBJECT CH'D DATE

POND SIZING (Basins B-1, B-2, B-3 and unnamed remaining basin in NW corner of site)

$Q_p = 23.5$ cfs

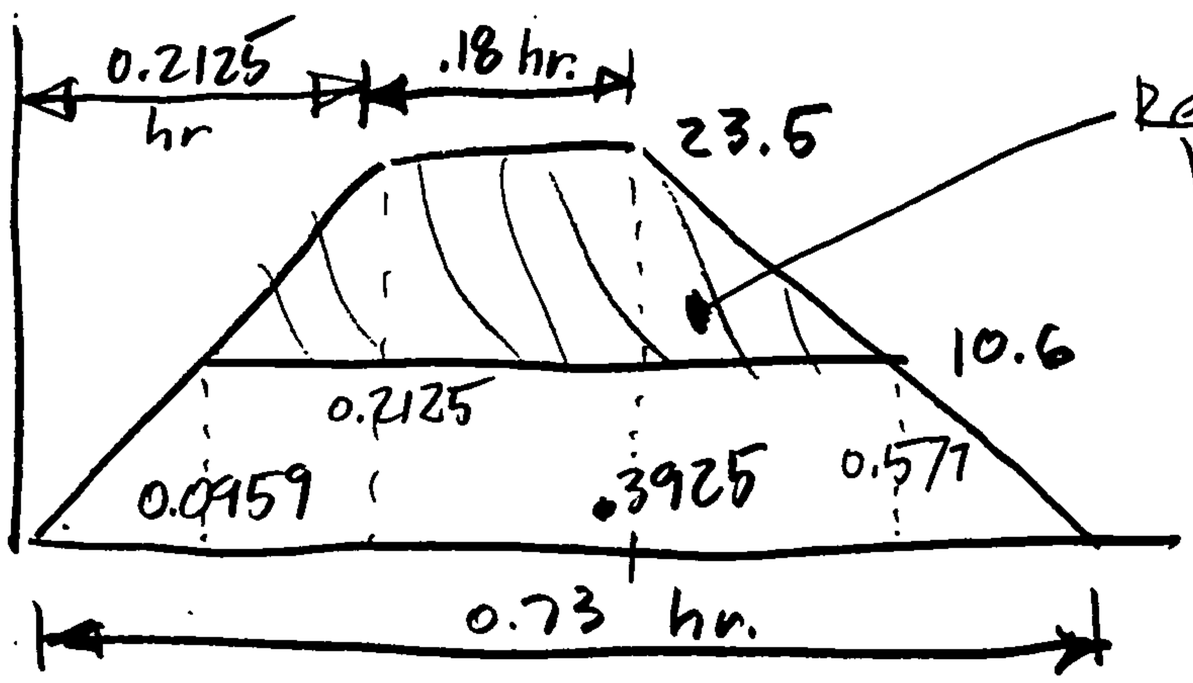
$t_c = 0.2$ hours

$t_p = 0.7(0.2) + \frac{(1.6 - 0.73)}{.12} = 0.2125$ hours

top bar $= 0.25(0.73) = 0.18$ hours

$$E = \frac{0.73(5.1)^{2.12} + 0.27(5.1)^{0.78}}{5.1} = \frac{10.2}{5.8} = 1.75''$$

$$t_b = \frac{2.107(1.75)5.1}{23.5} - 0.18 = 0.73 \text{ hour}$$



Required detention Volume = 4.43 cfs·hr

$= 4.43\left(60 \frac{\text{sec}}{\text{min}}\right) 60 \frac{\text{min}}{\text{hr}}$

$= 16000$ cf

$V = 12.9 \text{cfs}\left(.18\text{hr} + \frac{.481}{2}\text{hr}\right)3600$

$= 15,351$ cf

@ 1.5' depth, 103'x103'

@ 3.0', 5300#, 73'x73'

$A_{23.3} = (160+60)\,80/2 = 8800$

$A_{20.3} = (115+50)\,50/2 = 4125$

sht. 2

$V = (8800+4125)\,3/2 = 19,388$ cf

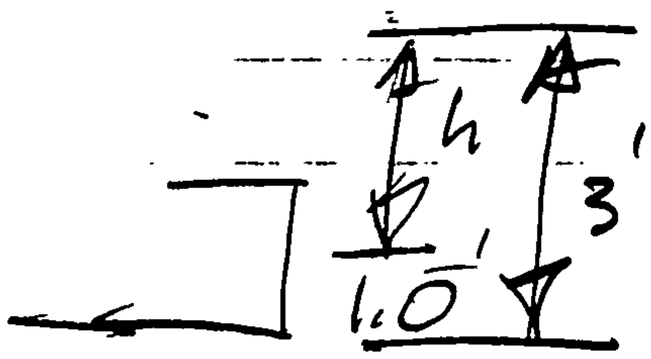
pond Outlet

Q = 10.6 cfs (max. allowable)
18" pipe culvert
using orifice....

$Q = ca\sqrt{2gh} = 10.6 = 0.6(1.8)\sqrt{2(32.2)h} = 8.7\sqrt{h}$ (1.77)

or $\left(\frac{10.6}{8.7}\right)^2 = h = 1.5'$ $\quad h = 2.25 \quad Q = 19.1$ cfs

find orifice size, when $h = 2.0'$, $Q_{100} = 10.6$ cfs
then we have...



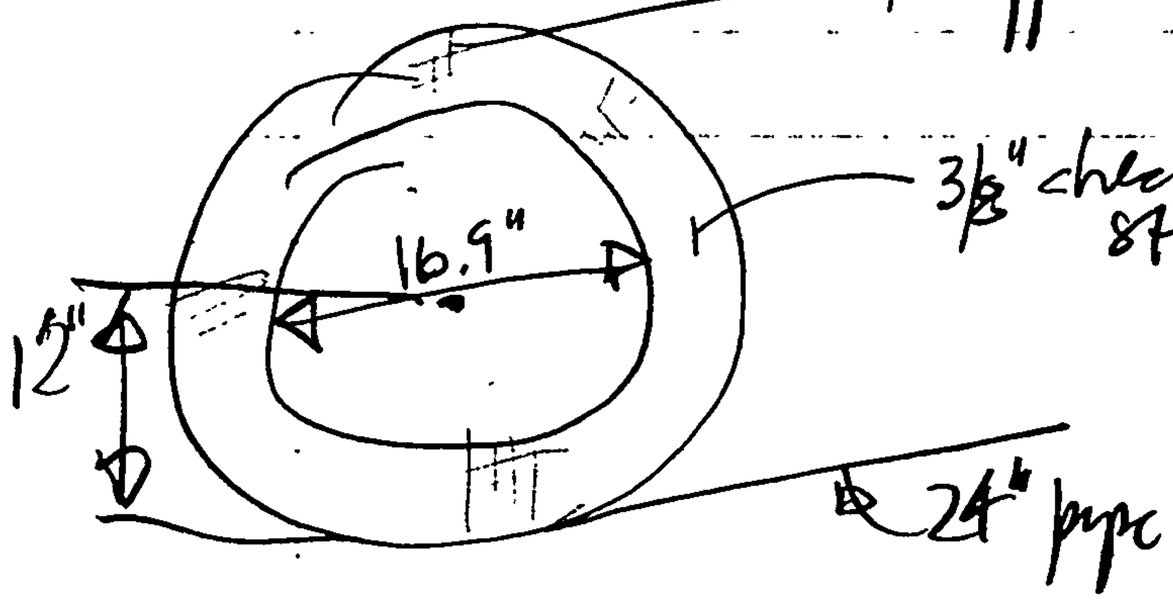
$$\frac{Q}{c\sqrt{2gh}} = a = \frac{10.6 \text{ cfs}}{0.6\sqrt{64.4(2.0)}}$$

area of orifice $= 1.55$ ☐'

circle area $= \pi d^2 = 1.55$ ☐'

$$\frac{}{4}$$

$$d = \sqrt{\frac{1.55(4)}{\pi}} = 1.40 = 16.9" \text{ inch dia.}$$



Sht 3

BASIN B-1

Zone 2, DPM

A. Area = 1.7 acres
Q_{100} = 1.7 ac. (4.7 cfs/ac.) = 8 cfs (assumed 100% impervious)

B. Single Inlet = 4.56 sq. Ft., depth = 0.5', Length = $\frac{35" + 18(2)}{12}$ = 8.8'
Type "D"

analyze as weir ... $Q = CLH^{3/2}$
$= 3.0\ (8.8')\ 0.5^{3/2}$
$= 9.3$ cfs $>$ 8 cfs, OK
8.4

analyze as orifice .... $Q = CA\sqrt{2gh}$
$= 0.6\ (4.56)\ \sqrt{2(32.2)\ 0.5}$
$= 15.5$ cfs $>$ 8 cfs, OK

C. 21" pipe @ 1% = 8 cfs capacity = 8 cfs flow to inlet, OK

BASIN B-2

A. Area = 0.7 ac., conservatively, assume 100% treatment "D"
Q_{100} = 0.7 ac. (4.7 cfs/ac) = 3.3 cfs, use 15" S.D. @ S = 0.008

B. ~~check~~ 15" inlet @ dock, using FHA Culverts Chart
@ 3.3 cfs, $\frac{HW}{D}$ = 0.9, then HW = 0.9 (15") = 13", OK

C. 15" pipe @ S = 0.8%, cap = 3.2 cfs $\approx$ 3.3 cfs, OK

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 4 OF _____
PROJECT NO. _____ BY Jmt DATE 12/11/94
SUBJECT _____ CH'D _____ DATE _____

BASIN B-3

A. Area = 1.3 acres, conservatively, assume 100% Land Treatment "D"

Q_{100} = 1.3 (4.7 cfs/ac.) = 6.1 cfs

B. assume all flow goes to the 12" pipe (which could happen if the grated MH plugged),

check using FHA culvert chart, 15" culvert,

@ 6.1 cfs, $\frac{HW}{D}$ = 1.7, HW = 1.7 (15") = 25" < dock height, OK of 4'

Note: This is worst case. Generally, the grated manhole will pick up ½ of B-3 flows ±

C. Size pipe, Q_{100} = 6.1 (Basin B-3) + 3.3 (Basin B-2)

= 9.4 cfs

use 24" @ min S = 0.008 (manning's equation for gravity flow)

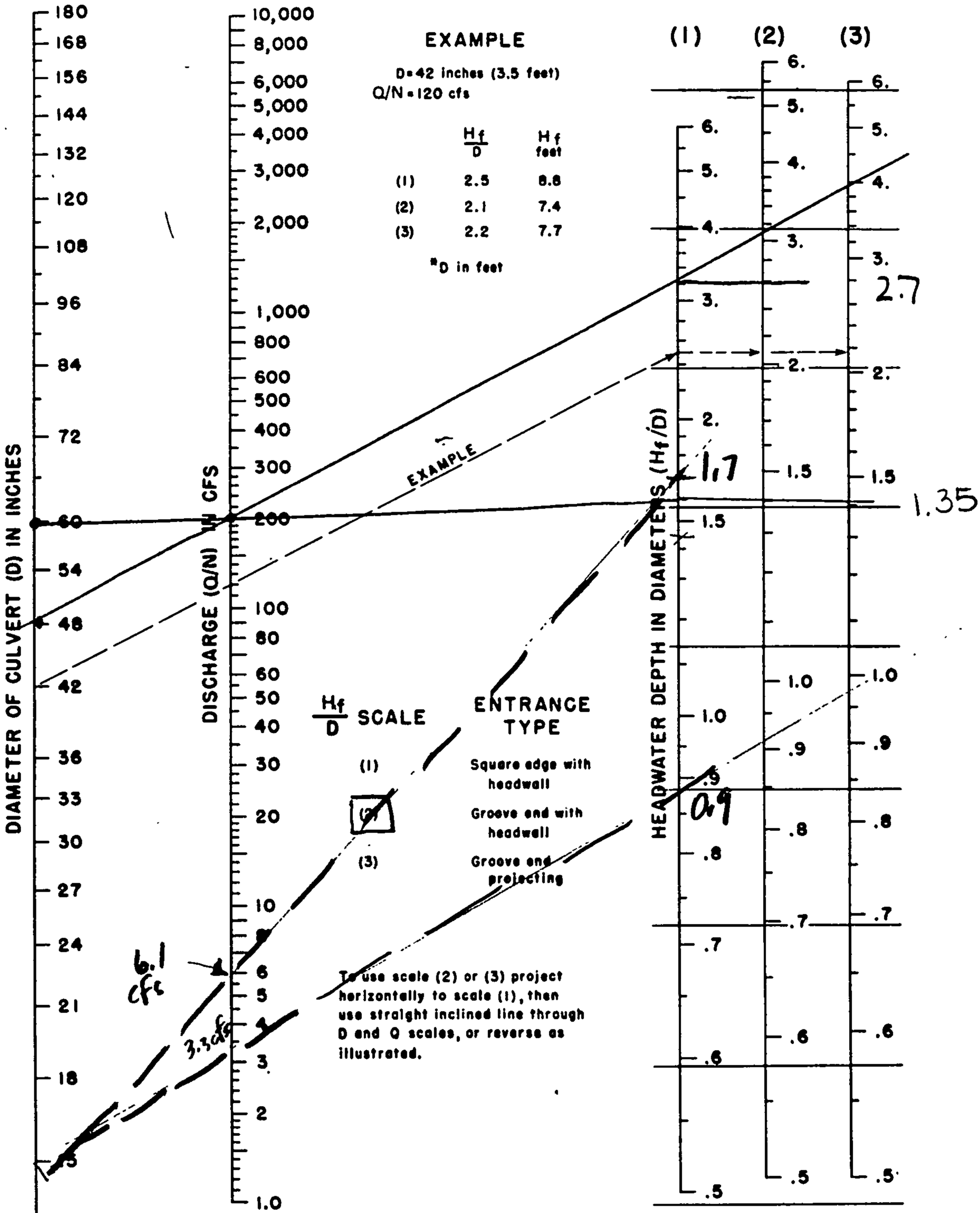
BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 5 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Chart 11



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

Hyt. 5A

A. BASIN "A-1"

Area = 0.55 acre, 15% impervious, 85% treat "B"

$Q_{100} = 0.55(4.7)0.15 + (2.28)0.85(0.55)$

$= 1.40$ cfs

B. BASIN "A-2"

Area = 0.45 ac.
Impervious % = 60%
treatment "B" = 40%

$Q_{100} = 0.60(0.45)4.7 + 0.40(0.45)2.28 = 1.7$ cfs

Discharge Freely

C. Total Discharge to Midway = 1.4 + 1.7 = 3.1 cfs

Place

Allowable Discharge = 1 ac. (2.1 cfs/ac) = 2.1 cfs

Detention Required!

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 6 OF _____

PROJECT NO. _____ BY Jan T. DATE 12/12/94

SUBJECT _____ CH'D _____ DATE _____

D. Calculate Detention Pond in Basin A-1.

Reduce 1.45 cfs flow to 0.3 cfs.

Determine excess precipitation in Basin A-1.

$E = 0.55\,ac(0.15)2.12'' + 0.55(0.85)0.78''$

$= 0.53''$

convert to cubic feet...

$CF = 0.53'' \left(\frac{ft}{12''}\right) 0.55\,(43560) = Volume$

$= 1077$ cubic feet

E. Pond Outlet.

Size for 0.4 cfs

Use 4" Pipe, by Orifice.

$h = 25.9 - 24.4 - .17 = 1.33$

$Q = .48$ cfs

$Q = CA\sqrt{2gh}$, $C = 0.6$, $A = 0.087$ sq.ft.

$h = 1.5$

$Q = 0.5$ cfs ≈ 0.4 cfs OK

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 7 OF _____

PROJECT NO. _____ BY JMT DATE 12/12/94

SUBJECT _____ CH'D _____ DATE _____

EMERGENCY SPILLWAY DESIGN

I. Main Pond @ NW Corner of Site

A. 100-year Storm Flow = 23.5 cfs

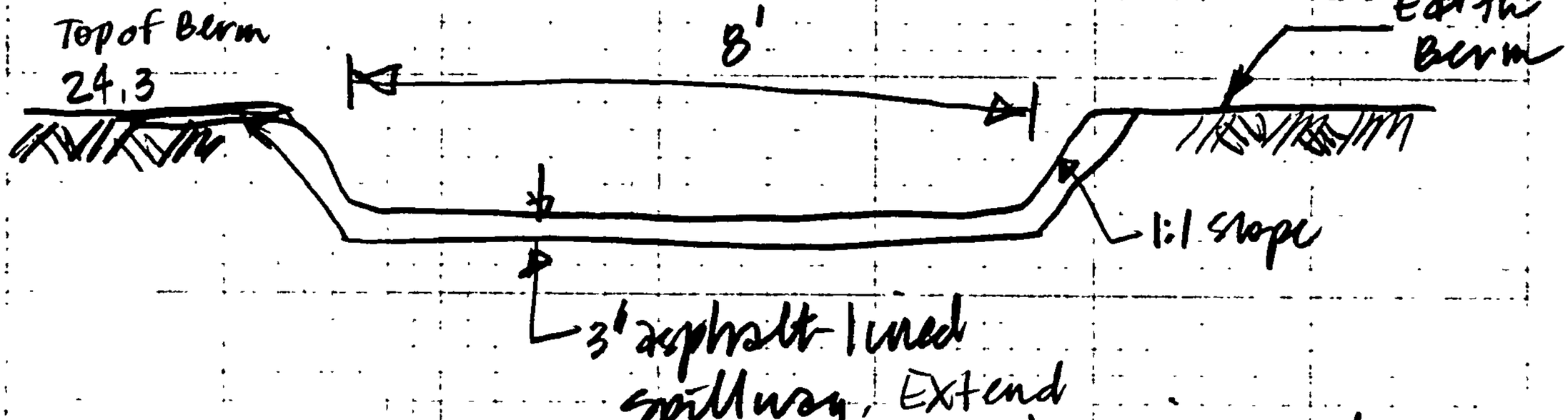
B. use weir equation to size spillway over berm,

$$Q = C L H^{3/2}$$

or $L = \frac{Q}{C H^{3/2}}$, where $H = 1.0'$, $C = 3.0$

$L = 8'$

C.



Section C-C N.T.S.

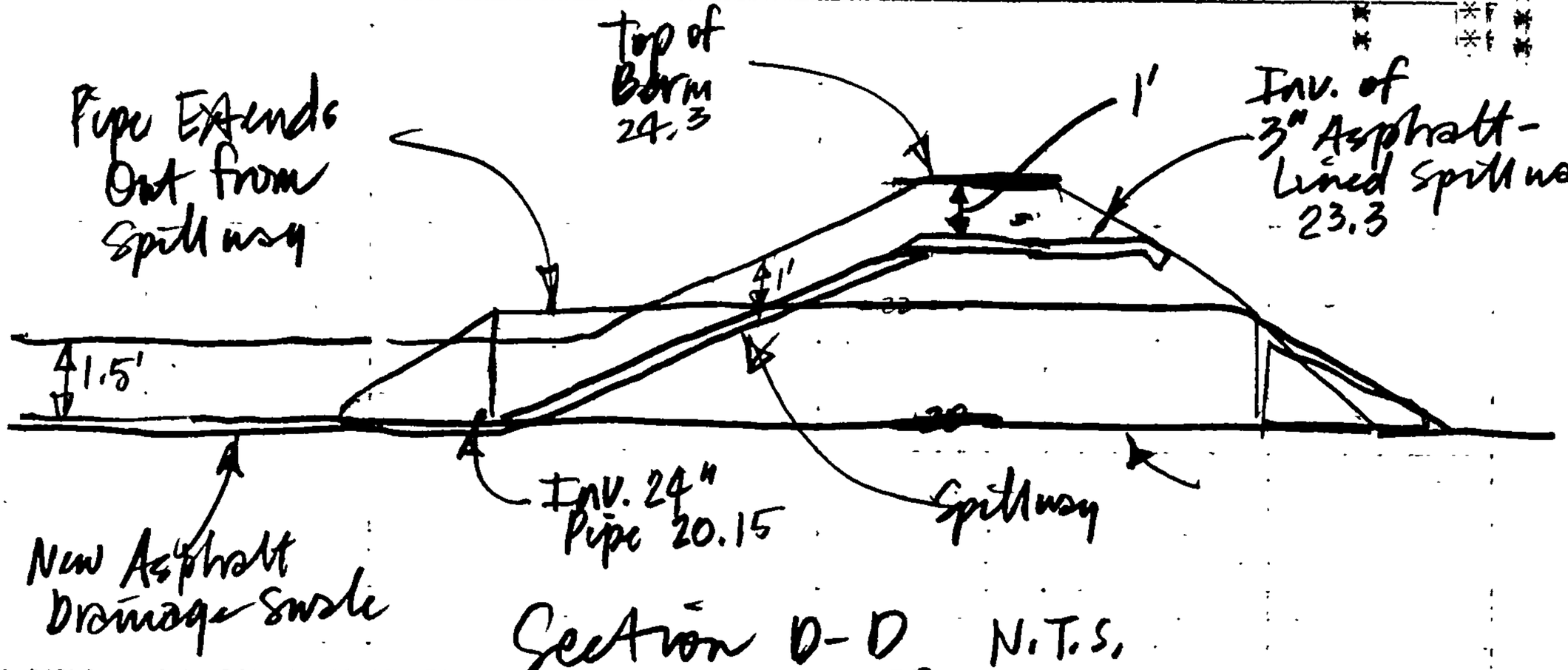
Emergency Spillway

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 8 OF _____

PROJECT NO. _____ BY Jan T DATE 1/5/95

SUBJECT _____ CH'D _____ DATE _____



Section D-D N.T.S.

Emergency Spillway

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 9 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

II. Small Pond @ SW Corner of Property

A. 100-year storm Flows = 1.4 cfs

B. use weir equation

$$L = \frac{Q}{C H^{3/2}}, \quad H = 0.5' \quad C = 3.0$$

$$L = 1.3'$$

SMALL!

C. DECISION:

Only graveled spillway is provided, because:

1. the max. 100-yr storm flow is very low, only 1.4 cfs
2. the pond is located essentially adjacent to the curb of the cul-de-sac, and the west top of berm elev. is raised 0.5' above the berm adjacent to the curb, so that spilled flows are directed immediately to the curb.
3. landscape plan provides gravel in this area, which will provide erosion protection.

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 10 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____