

March 4, 1998

Tucker Green, P.E.
Per Se Engineering
9109 La Barranca NE
Albuquerque, NM 87111

**RE: CENTEX IMPROVEMENTS (D17-D76). UPDATED GRADING
AND DRAINAGE PLAN FOR BUILDING PERMIT APPROVAL.
ENGINEER'S STAMP DATED FEBRUARY 20, 1998.**

Dear Mr. Green:

Based on the information provided on your February 19, 1998 submittal, the above referenced project is approved for Building Permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification will be required upon project completion.

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

Sincerely,

Lisa Ann Manwill, P.E.
Hydrology

c: Andrew Garcia
File

Good for You, Albuquerque!





City of Albuquerque
Readers #71216
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 24, 1997

Tucker Green, P.E.
Per Se Engineering
9109 La Barranca NE
Albuquerque, NM 87111

RE: CENTEX IMPROVEMENTS (D17-D76). DRAINAGE REPORT FOR BUILDING AND SO #19 PERMIT APPROVALS. ENGINEER'S STAMP DATED DECEMBER 8, 1997.

Dear Mr. Green:

Based on the information provided on your December 8, 1997 submittal, the above referenced project is approved for Building and SO #19 Permits.

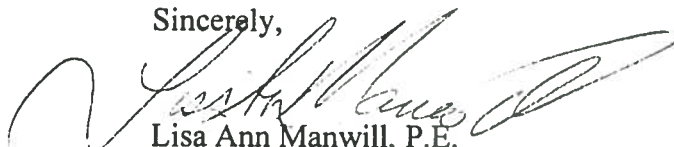
Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit is required for construction within City right-of-way. A copy of this approval letter must be on hand when applying for the excavation permit.

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

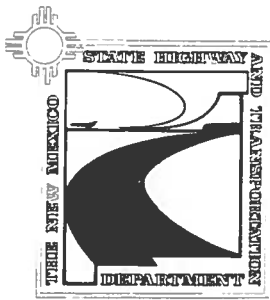
If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,



Lisa Ann Manwill, P.E.
Hydrology

c: Arlene Portillo
Andrew Garcia
File



**NEW MEXICO STATE HIGHWAY
AND TRANSPORTATION DEPARTMENT**
AN EQUAL OPPORTUNITY EMPLOYER

D-17/

GARY E. JOHNSON
GOVERNOR

COMMISSION

Holm Bursum, III
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Sherry Galloway
Member, Farmington

Albert N. Sanchez
Member, Santa Rosa

Sidney G. Strebeck
Member, Portales

DEPARTMENT

Secretary
Pete K. Rahn

General Office
P.O. Box 1149
Santa Fe, NM
87504-1149
505-827-5100

District One Office
P.O. Box 231
Deming, NM
88031-0231
505-546-2603

District Two Office
P.O. Box 1457
Roswell, NM
88202-1457
505-624-3300

District Three Office
P.O. Box 91750
Albuquerque, NM
87199-1750
505-841-2700

District Four Office
P.O. Box 30
Las Vegas, NM
87701-0030
505-454-3600

District Five Office
P.O. Box 4127
Coronado Station
Santa Fe, NM
87502-4127
505-827-9500

District Six Office
P.O. Box 2159
Milan, NM
87021
505-285-3200

December 16, 1997

Mr. Tucker Green
Per Se Engineering
9109 La Barranca NE
Albuquerque, New Mexico 87111

Subject: Centex American Gypsum Site
Paseo Del Norte at Jefferson/Tiburon
Albuquerque, New Mexico

Dear Mr. Tucker:

I received the plan and details of the pond on Centex American Gypsum site located at the southwest section of Paseo Del Norte and Jefferson Street. I do not have any further comments.

This is to confirm the drainage approval on the subject project. Please call me at 827-5323, if I can be of further assistance.

Sincerely,

Raymunda A. Van Hoven
Raymunda A. Van Hoven, PE
Drainage Engineer

XC: George Herrera
Kathy Trujillo



Martin J. Chávez, Mayor

November 25, 1997

Tucker Green
Per Se Engineering
9109 La Barranca NE
Albuquerque, New Mexico 87111

RE: DRAINAGE PLAN FOR CENTEX IMPROVEMENTS (D17-D76) ENGINEER'S PLAN
DATED 10/31/97

Dear Mr. Green:

Based on the information provided on your November 3, 1997 submittal, the above referenced site is approved for Foundation and Grading /Paving Permit.

Please be advised that the final refined submittal will need to be submitted and approved prior to the release of the Building Permit. Also, the concurrence from the State Highway Department must be included with the submittal.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
Tom Fulgham
File

Sincerely

Bernie J. Montoya CE
Associate Engineer



Amendment to
Drainage Report and Calculations
for
Centex Improvements
Drainage File D17-D75

The cover letter to the previously approved drainage plan & report (Engineer's stamp 12-8-97) for the entire 50+ acre site noted the possibility of decreasing the size of the proposed office addition, which affected only a small portion of the site. Now the owners have in fact decided on a somewhat smaller office addition. However, discussion with City staff as to parking layout and setback requirements led to a larger paved area at the office. The result is that the office portion of the site is "the same only different".

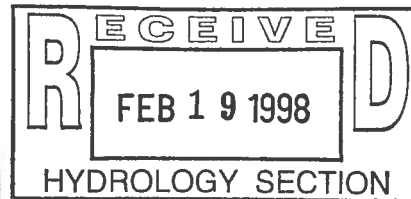
How different, in terms of hydrology? A comparison of proposed impervious areas between the current and previous layouts indicates an increase of approximately 1085 sf, at the expense of what would have been landscaping. According to City of Albuquerque DPM small watershed procedures), for the site's location in Rah Zone 2, the increase in 100-year peak flow rate is $(1085/43560)(4.70-2.28)=0.06$ cfs, a very small change. The general pattern and location of drainage from the office area remains the same.

The office area drains to the uncontrolled-discharge part of the site. However, as noted on page 2 of the approved 12-8-97 report, the controlled-discharge part of the site controls outflow from the entire site to a rate well below that required. The small increase associated with the revised office addition does not warrant re-analysis of the entire site or any change in construction.

Two procedural notes: (1) Only the revised plan sheet is being submitted. (2) The plan sheet retains a signature block for S.O.-19 approval, but the only work in the City right of way is a new driveway entrance. If the signature block is not needed, please ignore it.

END OF REPORT


Tucker Green P.E.



sf93 SW

sf3911 OFFICE

CLSD

sf1156 SW

REUSED' 2-20-98 IMPERVIOUS
AREAS FOR COMPARISON

sf15692

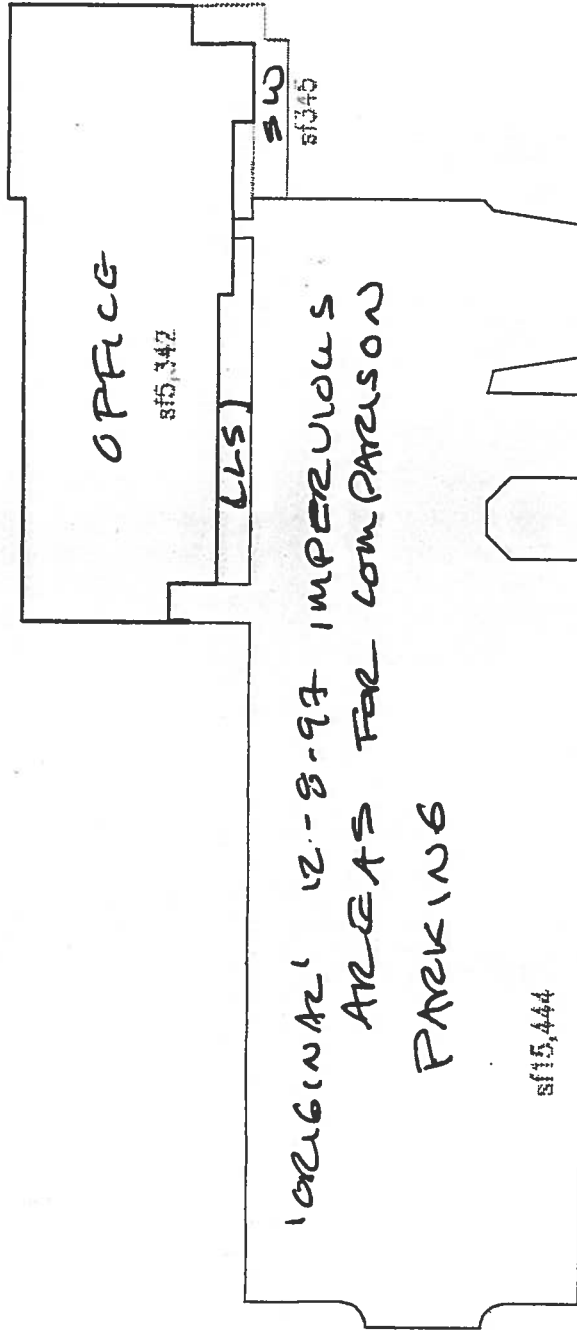
PARKING

sf364

Total SF shown = 22,216



D:\Acad14\Ps\cxofcrv.dwg DATE: 02/19/98 TIME: 19:18 T. GREEN



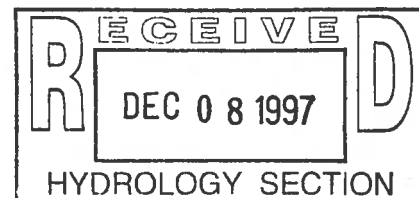
Total SF this page = 21,131

D:\Acad14\tcx3c.dwg DATE: 02/19/98 TIME: 22:49 T, GREEN

Drainage Report and Calculations
for
CENTEX IMPROVEMENTS

Tiburon St. NW and Paseo Del Norte South Frontage Road
Albuquerque, New Mexico
Map D-17

Prepared by Per Se Engineering
December, 1997



12-08-97

PER SE ENGINEERING

9109 La Barranca NE Albuquerque NM 87111 (505) 275-0451/239-7855 mobile

December 8, 1997

Mr. Bernie J. Montoya
City of Albuquerque
Public Works Dept/Hydrology
One Stop Shop/Plaza del Sol
POBox 1293
Albuquerque NM 87103

Re: Drainage Plan for Centex Improvements D17-D75

Dear Mr. Montoya or other reviewer:

This letter accompanies a drainage submittal which addresses work associated with the addition and also with the office addition. The submittal includes a complete plan set and a second copy of Sheet 8 for the use of the SO19 inspector in regard to the office addition.

There has been some discussion about decreasing the size of the office addition and the associated parking. If the change is significant a new submittal may be required for that part. The effect on the overall project would be small, and would tend to reduce both the amount and peak rate of runoff.

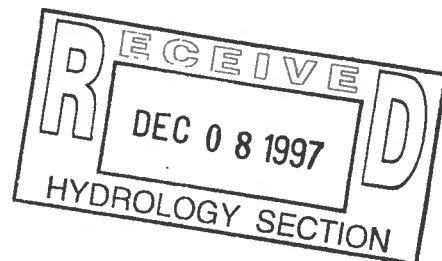
As you probably recall, entrance to the manufacturing plan is from the Paseo del Norte Frontage Rd, which is State of New Mexico right of way. Part of the drainage plan involves reconstructing the entrance to provide the water block required by City standards. Attached to this letter is a fax from the New Mexico State Highway Department indicating their concurrence with the drainage concepts on which this project is based. Per their request, I am submitting details of the pond to them. I will send you a copy of any further approvals from them.

Feel free to call if you have any questions regarding this submittal.

Sincerely,



Tucker Green, P.E.



DRAINAGE PLAN & REPORT for IMPROVEMENTS & ADDITIONS

at

CENTEX AMERICAN GYPSUM, ALBUQUERQUE NM

LEGAL DESCRIPTION: (Lands of) American Gypsum Company

LOCATION: Tiburon St. NW and Paseo Del Norte south frontage Rd. NW, approximately at the northwest corner of Jefferson St. and Paseo Del Norte. Albuquerque Map D-17.

FLOOD ZONE: The site is not in a 100-year flood zone (FEMA maps 136,137).

SITE DESCRIPTION: The eastern portion of the roughly 54-acre site is developed as a wallboard manufacturing plant with associated sales and office facilities. The site is served by a railroad spur, part of which separates it from a largely undeveloped PNM site to the west. Generally, the site slopes down toward the west but with a northward tendency. The result is that, in large storms, runoff tends to butt up against the railroad tracks on the west and then slide north to the frontage road. From the exit point flow is either in the road or, at least partly, in a storm drain associated with Paseo Del Norte, which is a New Mexico State Highway. In either case, runoff quickly reaches AMAFCA's North Diversion Channel, located about 1/2 mile west. With a trivial exception as noted below (water block at frontage road entrance) there is no offsite flow, the main barriers being a railroad spur on the south, existing roads with curb, gutter, and storm sewer on the east, and Paseo Del Norte improvements and grades on the north.

A portion of site - near the northeast corner of the wall board plant - is currently drained by an existing storm drain that consists of 3 inlets and a pipe that discharges to a brushy area between the current plant entrance and the perimeter fence around the manufacturing area. It is this flow that the proposed culvert will convey. There will be less flow to this system under proposed conditions than under current ones.

SPECIAL SITE HISTORY: My understanding is that, when the site was annexed to the City, there were special provisions exempting the site from some site development criteria, provided that any increment of development was less than a specified percentage. My further understanding is that the currently proposed development is well below that percentage. I have not seen the actual document.

PROPOSED DEVELOPMENT: The 4 major pieces of the project are: (1) a long (+/- 900 ft), narrow (30 ft) manufacturing addition along the east side of the wallboard plant. Most of the addition will be built over existing paved areas, but the addition does extend some 185' south of the existing building; (2) a private access road around the west side of the plant. This is for slow (10 mph) one-way truck traffic; (3) additional employee parking near this access route; and (4) an additional office building and parking revisions along Tiburon St.

A small part of the proposed development involves reconstructing the entrance from the frontage road to provide a water block per normal City requirements. There is essentially zero water block now, but then there is essentially zero offsite flow to block; the only offsite runoff comes from approximately 400 ft of frontage road pavement west of Jefferson St.

DRAINAGE CONCEPTS: Review of the Construction Plans for Paseo Del Norte, obtained from the State Highway Dept., indicates that there probably is not available capacity for a significant increase in flows, if any. Hence the decision to maintain the peak discharge from the site at or below existing conditions level.

This will be accomplished by considering the flow in two parts. Most of the site will continue to discharge freely as it does now, down toward the railroad tracks then north to the frontage road. Flow from the northeast portion of the site will be controlled in a detention pond so that the overall outflow rate from the entire site is less than or equal conditions. Although outflow from the pond will eventually reach the Frontage Road (the historical location) the initial direction of flow is away from the Frontage Road and the 'path' is overland.

To maintain peak outflow from the entire site at or below historical conditions, the allowable outflow rate from the pond is (Existing, entire site) - (Proposed, south part), or $131.14 - 104.40 = 27.64$ cfs. Peak inflow to the pond for the basin analyzed is 36.54 cfs per AHYMO, or slightly higher at 37.05 cfs per City "DPM" methods for small areas. Per AHYMO, the peak outflow from the pond is 8.48 cfs for an 18-inch CMP (corrugated metal pipe) outlet, or 11.61 cfs for the optional 24-inch CMP. Both of these are much less than the 27.64 allowed. Outflow is down to 0.1 cfs approximately 3 hours after the first flow reaches the pond.

The basin analyzed is about 0.6 acres larger than the area that contributes to the pond as finally designed. This amount of open field has a peak runoff of roughly 1 cfs in the 100-year, 6-hour design storm. So the actual reduction in peak flow is actually about 1 cfs less than the calculations indicate.

It is clear that the present design controls site outflow to a lower level than required. Part of the reason for providing the excess reduction was to allow for future additional development of the site without construction of additional facilities. Supporting calculations would be provided.

A word about the proposed onsite road. The road is designed with a uniform cross-slope - rather than a crown - with drainage being on the surface across the road, primarily at dip sections. The crossing at the on-site railroad spur will use treated timbers according to final details to be supplied by a contractor to Centex.

END OF REPORT

ALBUQUERQUE, NM (1/93) CRITERIA - SIMPLE PROCEDURE FOR <= 40 ACRES

PX100-6 = PRECIPITATION EXCESS FROM 100-YEAR 6-HOUR STORM

VOL10D = VOLUME OF RUNOFF FROM 100-YEAR 10-DAY STORM

TRTMT CLASS A=UNDISTURBED, B=LAWNS, C=UNPAVED ROADS, D=ROOFS, PAVEMENT: SEE DPM 22.2 P A-5

***** PROJECT INFO *****

CenteX plant at SW corner of Paseo Del Norte, Jefferson, Tiburon

Total site apx 54.30 ac, Developed (east) portion apx 35.72 ac, west apx 18.58 ac

RAIN ZONE 2 SEE DPM P 22.2-2

100-YEAR PRECIPITATION (P) DEPTHS, INCHES

1 HR	6 HR	24 HR	4 DAY	10 DAY
2.01	2.35	2.75	3.30	3.95

08/08/97 10:53 AM EXISTING CONDITIONS - EAST PART OF SITE

SF TOT 1556050

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	691557.00	15.8760	0.53	1.56	24.767	0.701	0.701	0.701	0.701	44.44
B	40006.00	0.9184	0.78	2.28	2.094	0.060	0.060	0.060	0.060	2.57
C	431921.00	9.9155	1.13	3.14	31.135	0.934	0.934	0.934	0.934	27.76
D	392566.00	9.0121	2.12	4.70	42.357	1.592	1.893	2.306	2.794	25.23
TOTAL 1556050.00 35.7220			AVG Q/AC=	2.809	100.352	3.287	3.587	4.000	4.488	100.00
					CU FT	143170	156256	174248	195512	

08/08/97 10:53 AM WEST PART

SF TOT 809246

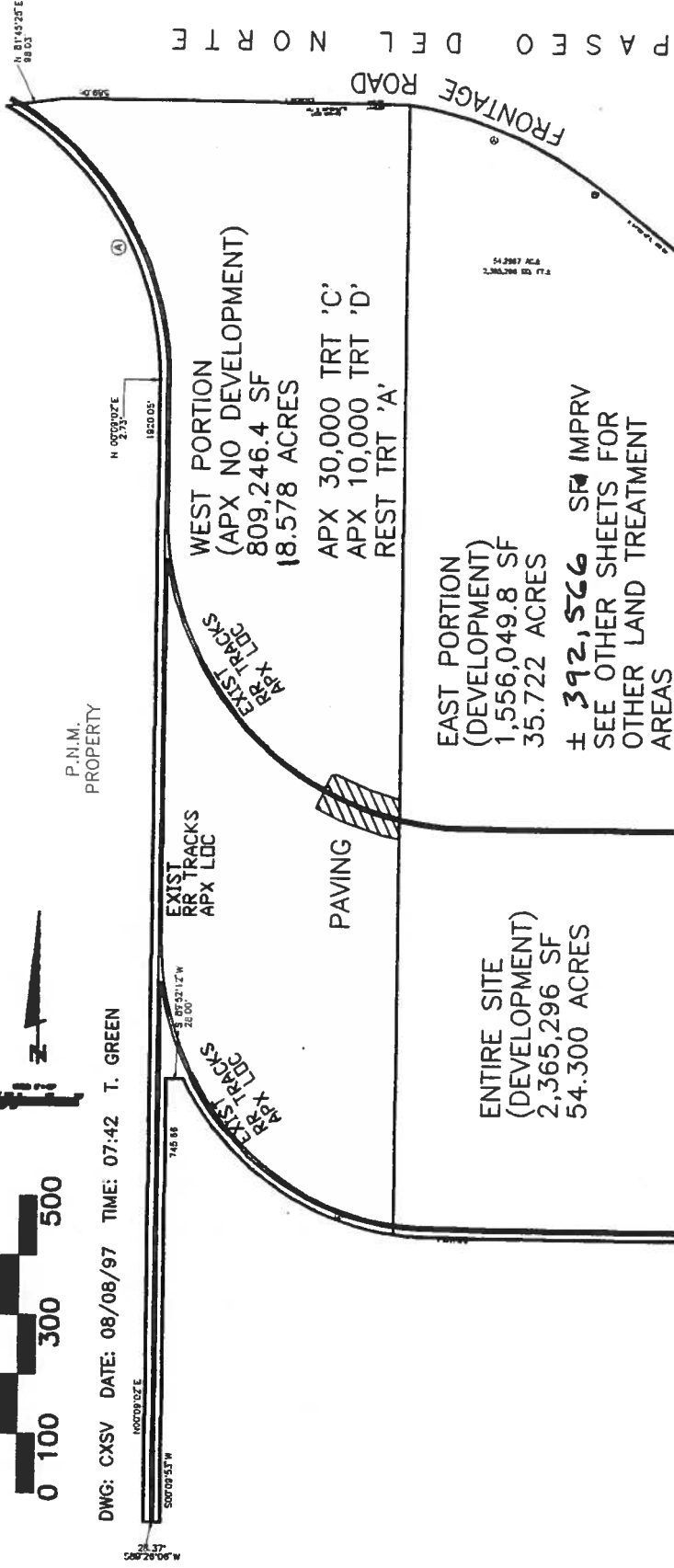
TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	769246.00	17.6595	0.53	1.56	27.549	0.780	0.780	0.780	0.780	95.06
B	0.00	0.0000	0.78	2.28	0.000	0.000	0.000	0.000	0.000	0.00
C	30000.00	0.6887	1.13	3.14	2.163	0.065	0.065	0.065	0.065	3.71
D	10000.00	0.2296	2.12	4.70	1.079	0.041	0.048	0.059	0.071	1.24
TOTAL 809246.00 18.5777			AVG Q/AC=	1.657	30.790	0.885	0.893	0.904	0.916	100.00
					CU FT	38567	38900	39358	39900	

SITE-ALL 2365296.00 54.300

4.47	131.14	4.17	4.48	4.90	5.40	200.00
		181737	195156	213607	235412	



DWG: CXSV DATE: 08/08/97 TIME: 07:42 T. GREEN



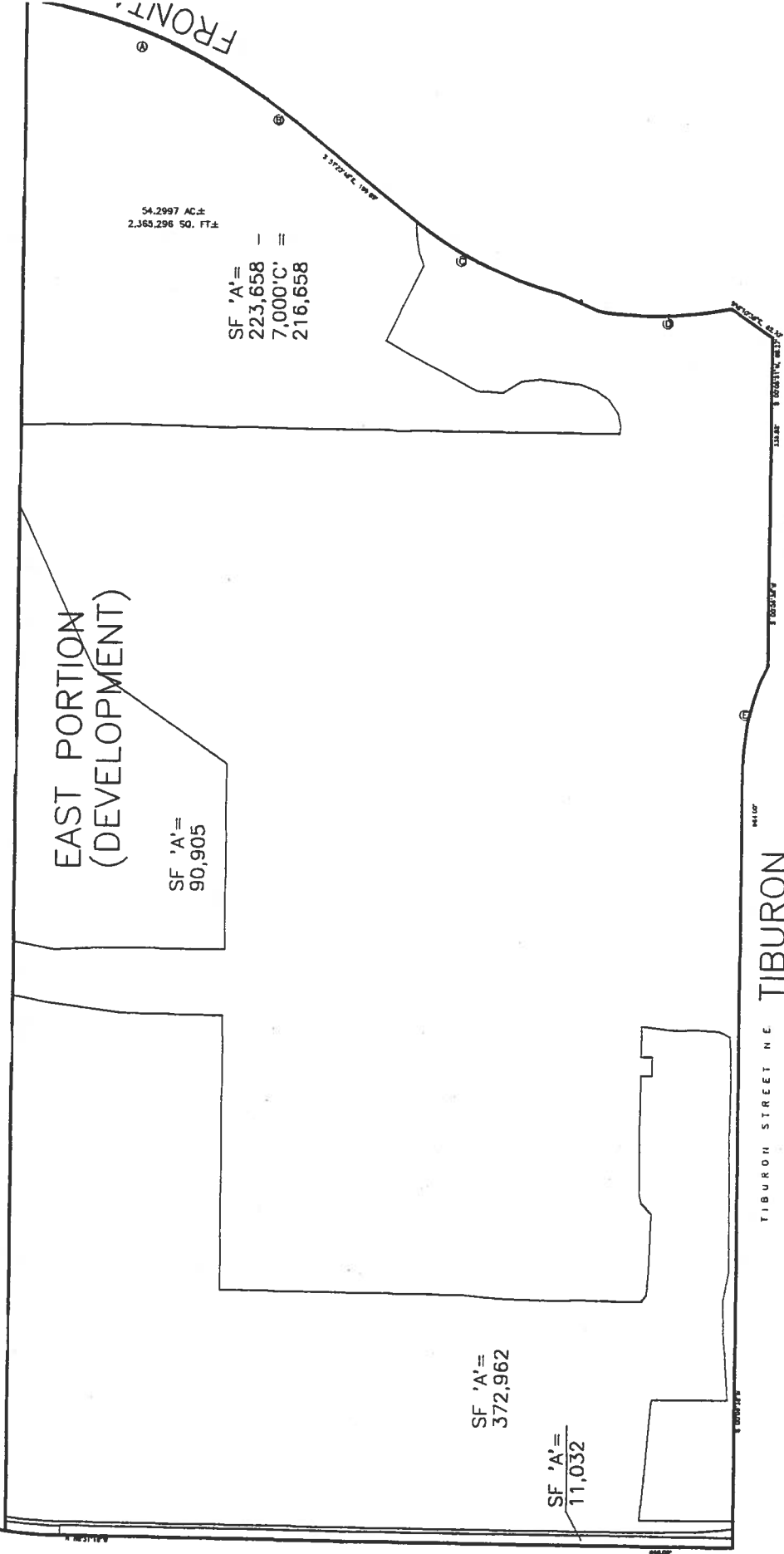
EXISTING CONDITIONS

745.66 S 89°52'12"W
28.00'

WEST PORTION
(APX NO DEVELOPMENT)

0 100 300 500

DWG: CXSV DATE: 08/08/97 TIME: 09:39 T. GREEN



EXISTING CONDITIONS - EAST PART OF SITE
LAND TRTMT 'A' - NATURAL/NATIVE
LAND TRTMT 'A' - APX 691,557 SF

745.66
S 89°52'12"W
28.00'

WEST PORTION
(APX NO DEVELOPMENT)

0 100 300 500

DWG: CXSV DATE: 08/08/97 TIME: 10:35 T. GREEN



EAST PORTION
(DEVELOPMENT)

54.2997 AC±
2,365,296 SQ. FT±

FRONTAGE

SF 'B' =
1,340

SF 'B' =
1,836

SF 'B' =
1,588

SF 'B' =
8,041

SF 'B' =
4,105

SF 'B' =
9,342

SF 'B' =
13,754

TIBURON STREET NE TIBURON

EXISTING CONDITIONS - EAST PART OF SITE
LAND TRMT 'B' - LANDSCAPING
LAND TRMT 'B' - APX 40,006 SF

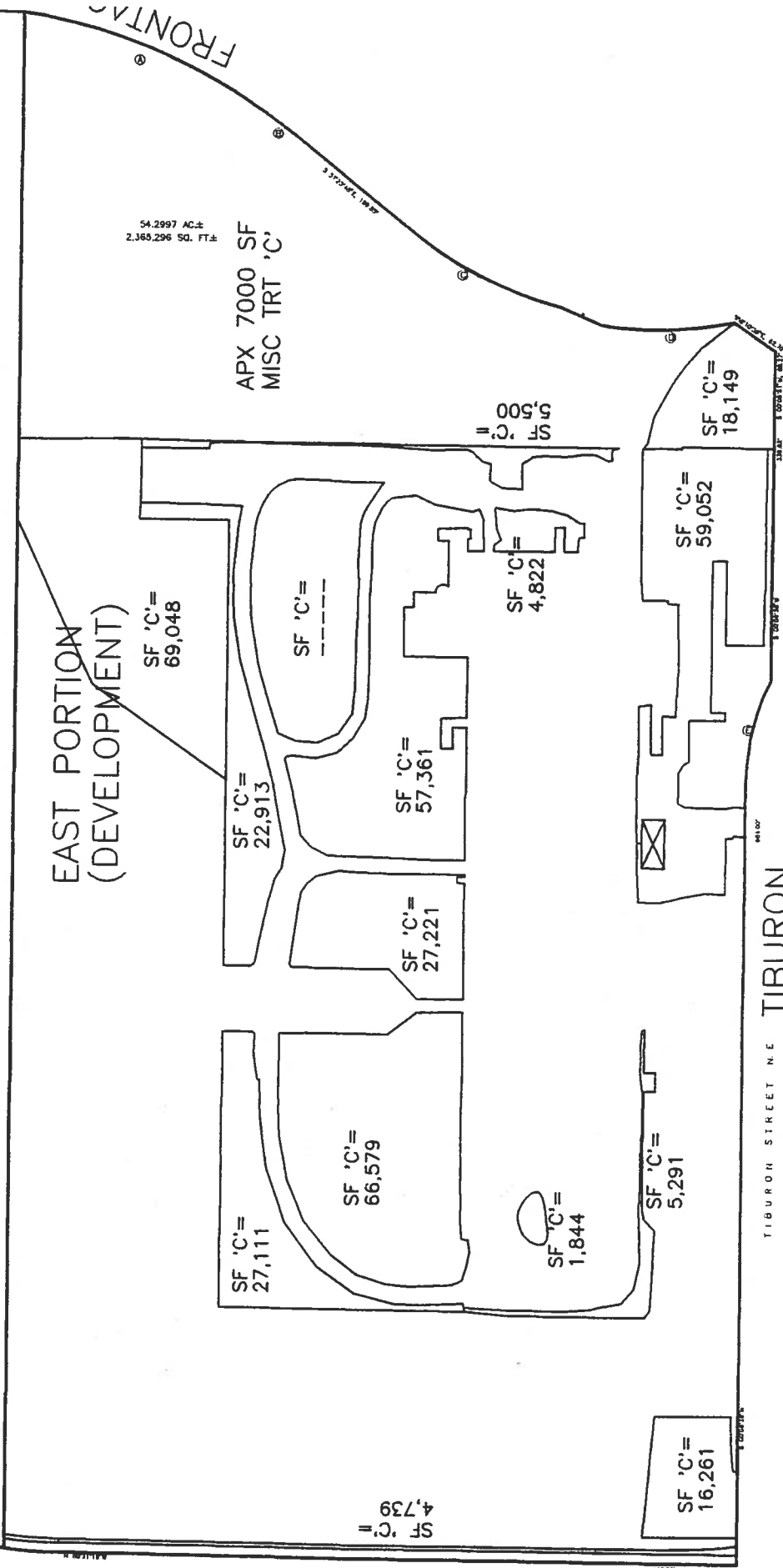
745.66
S 89°52'12"W
28.00'

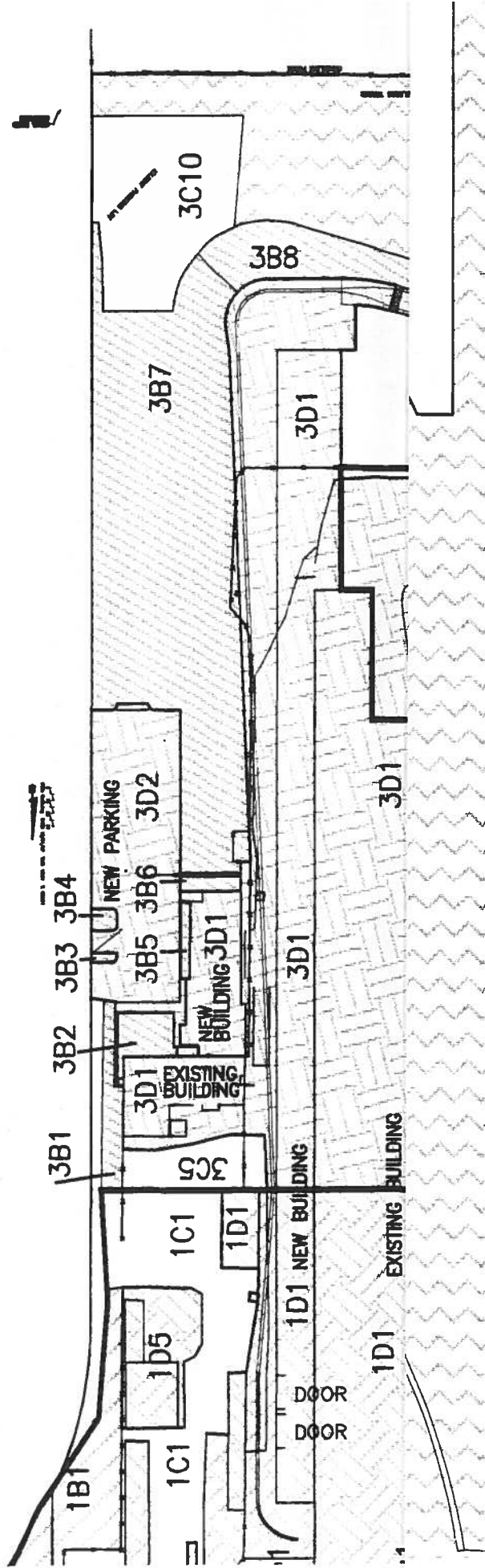
WEST PORTION
(APX NO DEVELOPMENT)

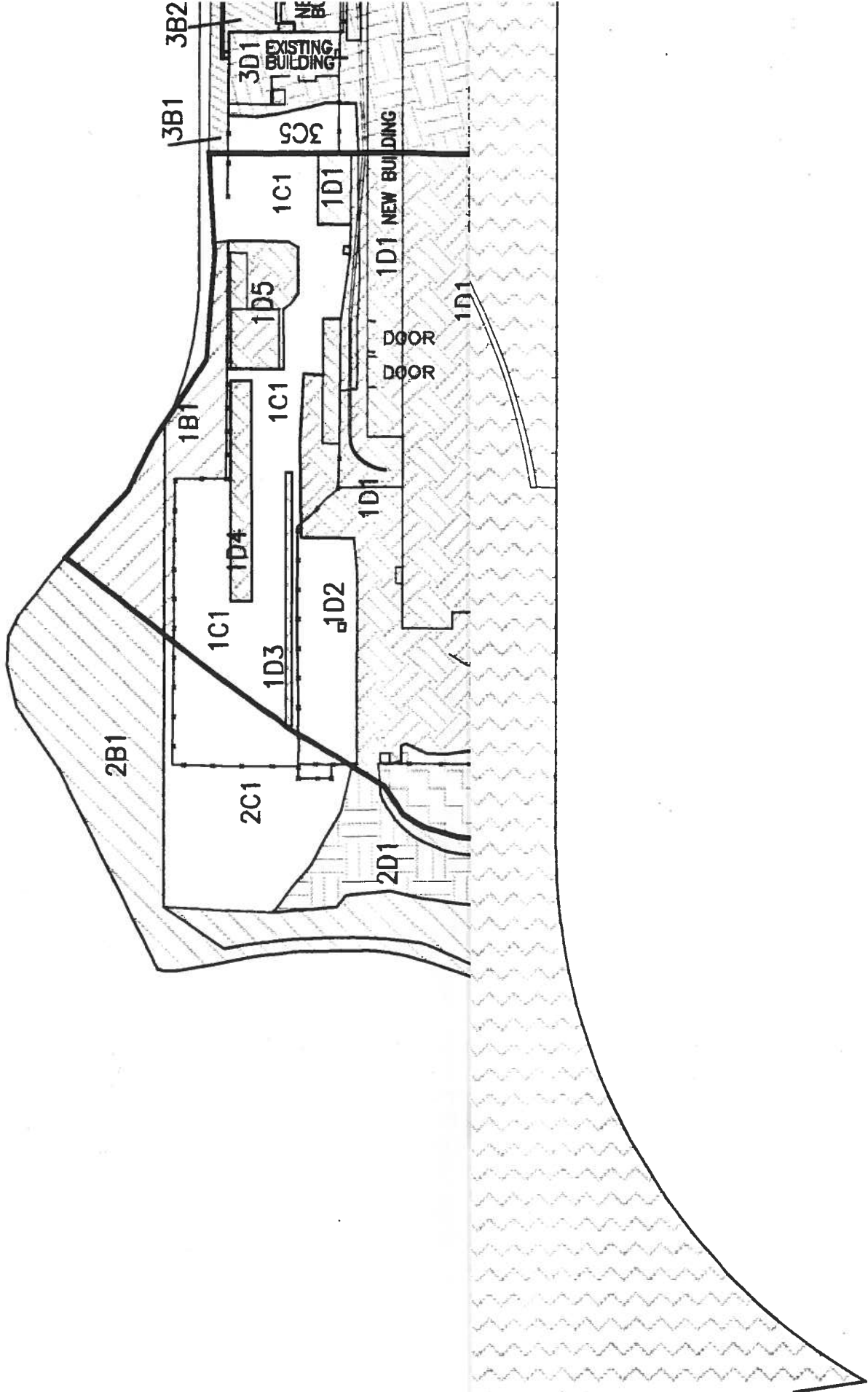
0 100 300 500



DWG: CXSV DATE: 08/08/97 TIME: 09:39 T. GREEN







CENTEX

10-30-91

LABEL "1" AREAS

AREAS TO CULVERT - BY POLYLINE (AUTOCAD)

TOTAL: 170 873 SF = 3.923 AC

A: 14,117

B: 13,997

C: * 170 873 - Σ OTHERS = 170 873 - 129 813
= 41,060

D: 9,050 + 1,329 + 3,423 + 38
+ 5,859 = 101 699

RAIN ZONE 2 OPM TABLE A-9, AREA WEIGHTING

$$Q_p = \frac{(14,117 \times 1.56) + (13,997 \times 2.28) + (41,060 \times 3.14) + (101,699 \times 4.70)}{43560 \text{ SF/AC}}$$

$$= 660 849.38 / 43560$$

$$= 15.17 \text{ UFS}$$

* LATER VERSION OF POLYLINE GIVES

170 854 $\Delta = 19 \text{ SF} \sim 0.11\%$ OK

TOTAL ① 170,873 SF

CENTER 10-31-97

LABEL "2" AREAS, SQUARE FEET

- ALONG WITH LABEL "1" AREAS, TO HAVE FLOW CONTROLLED VIA DETENTION / RETENTION POND
- IN CONTRAST TO LABEL "1" AREAS, THESE FLOWS DO NOT PASS THROUGH THE CULVERT BY THE NEW PARKING AREA (204)

$$A: 1 \quad 131,166 \quad \Sigma = 131,166$$

$$B: 1 \quad 46,759 \quad \Sigma = 54,723$$
$$2 \quad 7,964$$

$$C: 1 \quad 25,049 \quad \Sigma = 38,232$$
$$2 \quad 13,183$$

$$D: 1 \quad 14,116 \quad \Sigma = 107,162$$

$$2 \quad 7,763$$

$$3 \quad 7,579$$

$$4 \quad 17,390$$

$$5 \quad 73,497 - (C2 = 13,183)$$
$$= 60,314$$

$$\text{'TOTAL' } \textcircled{2} = 331,283 \text{ SF}$$

CENTEX

10-30-97

* LABEL "3" AREAS, SF

A:	1	531,941	$\Sigma = 1,197,243$
	2	26,136	
	3	27,405	
	4	551,761	

B:	1	1,988	$\Sigma = 60,039 + 11,810$ $= 71,849$
	2	1577	
	3	127	
	4	329	
	5	407	
	6	541	
	7	42,626	
	8	12,544	
	9	11,810	

C	1	44,291	$\Sigma = 352,049$
	2	21,275	
	3	39,030	
	4	57,361	
	5	4,051	
	6	27,221	
	7	66,579	
	8	19,979	
	9	59,106	
	10	14,266	

* AREA "3" FLOWS TO CONTINUE TO BE
FREE DISCHARGED ONTO (WEST, DOWNHILL)
UNDEVELOPED PART OF SITE

CENTER 10-30-97

LABEL "3" AREAS CONT, SF

D:	1	102,266	$\Sigma = 300,131$
	2	16,093	
	3	107,554	
	4	46,570	
	5	27,643	
	6	<u> </u>	

CONTRIBUTING TO THE PAVED PART OF THE SQUARE
EAST OF & JUST SOUTH OF PLANT BUILDG

3B1 - 3B7 $\Sigma = 71,849 = \Sigma(1-9) - (8 \& 9)$
= 51,495

3C5 & 3C10 $\Sigma = 4051 + 14,266 = 18,317$

3D1 & 3D2 $\Sigma = 102,266 + 16,093 = 118,359$

ADDING TO EARTH SQUARE AT OLD REFERENCE END

3B8 & 3B9 $(12,544 + 11,810) = 24,354$

3C9 58,106

TOTAL (3) = 1,921,272 SF

LENTEX 10-31-97

COMPARE 'TOTAL' LAND TREATMENT AREAS TO
SITE BOUNDARY AREAS

LABEL 1	170,873
2	331,203
3	1,921,272
'LABEL' TOTAL	2,423,428

SITE
BOUNDARY 2,365,296 ~

LABEL - SITE = 2,423,428
- 2,365,296

58,132 SF ~

$\frac{58,132}{2,423,428} \sim .0240 \sim 2.4\%$

MOST OF THIS DIFFERENCE OCCURS NEAR
THE NORTH EAST CORNER OF THE SITE, WHERE
A MINOR AMOUNT OF LANDSCAPED AREA -
APPARENTLY NOT PART OF THE SITE PROPER -
CONTRIBUTES FLOW TO LABEL '2' AREAS.

NOTE THAT THE LARGER 'ADDED AREA' IS
USED FOR CALCS, AND THIS IS CONSERVATIVE

TAG 10-31-97

PX100-6 = PRECIPITATION EXCESS FROM 100-YEAR 6-HOUR STORM
 VOL10D = VOLUME OF RUNOFF FROM 100-YEAR 10-DAY STORM
 TRTMT CLASS A=UNDISTURBED, B=LAWNS, C=UNPAVED ROADS, D=ROOFS, PAVEMENT: SEE DPM 22.2 P A-5

***** PROJECT INFO *****

CenteX plant at SW corner of Paseo Del Norte, Jefferson, Tiburon

RAIN ZONE 2 SEE DPM P 22.2-2
 100-YEAR PRECIPITATION (P) DEPTHS, INCHES
 1 HR 6 HR 24 HR 4 DAY 10 DAY
 2.01 2.35 2.75 3.30 3.95

PROPOSED

10/31/97 01:42 PM PROPOSED CONDITIONS - AREAS '1': TO CULVERT & DETENTION SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	14117.00	0.3241	0.53	1.56	0.506	0.014	0.014	0.014	0.014	8.26
B	13997.00	0.3213	0.78	2.28	0.733	0.021	0.021	0.021	0.021	8.19
C	41060.00	0.9426	1.13	3.14	2.960	0.089	0.089	0.089	0.089	24.03
D	101699.00	2.3347	2.12	4.70	10.973	0.412	0.490	0.597	0.724	59.52
TOTAL	170873.00	3.9227	AVG Q/AC=	3.867	15.171	0.536	0.614	0.721	0.848	100.00
					CU FT	23367	26757	31418	36926	

Qp TOTAL TO DETENTION
 15.17 + 21.88
 = 37.05 cfs

10/31/97 01:42 PM PROPOSED CONDITIONS - AREAS '2': TO DETENTION, NOT TO CULVERT SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	131166.00	3.0112	0.53	1.56	4.697	0.133	0.133	0.133	0.133	39.59
B	54723.00	1.2563	0.78	2.28	2.864	0.082	0.082	0.082	0.082	16.52
C	38232.00	0.8777	1.13	3.14	2.756	0.083	0.083	0.083	0.083	11.54
D	107162.00	2.4601	2.12	4.70	11.562	0.435	0.517	0.629	0.763	32.35
TOTAL	331283.00	7.6052	AVG Q/AC=	2.877	21.880	0.732	0.814	0.927	1.060	100.00
					CU FT	31882	35454	40366	46171	

Qp TOTAL SIF
 37.05 + 104.40
 = 141.45

10/31/97 01:42 PM PROPOSED CONDITIONS - AREAS '3': DISCHARGE TO UNDEVELOPED PART SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	1197243.00	27.4849	0.53	1.56	42.876	1.214	1.214	1.214	1.214	62.32
B	71849.00	1.6494	0.78	2.28	3.761	0.107	0.107	0.107	0.107	3.74
C	352049.00	8.0819	1.13	3.14	25.377	0.761	0.761	0.761	0.761	18.32
D	300131.00	6.8901	2.12	4.70	32.383	1.217	1.447	1.763	2.136	15.62
TOTAL	1921272.00	44.1063	AVG Q/AC=	2.367	104.398	3.299	3.529	3.845	4.218	100.00
					CU FT	143723	153727	167483	183740	

Σ = : Qp 6hr = 141.45 Compare EXIST 131.14
 VOL 6hr 55,249
 24hr 215,938
 10-DAY 266,837
 SIF TO DETENTION 198,972
 62,211
 83097
 EXIST 181,737
 195,156
 234,512

CF Δ VOL, 24 hr: 215,938 - 195,156 (EX) = 20,782 CF
 THIS IS LESS THAN 62,211 TO DETENTION.

20

10/31/97 01:42 PM PROPOSED CONDITIONS - MAX TO PAVED SWALE EAST OF MFG BLDG SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	0.00	0.0000	0.53	1.56	0.000	0.000	0.000	0.000	0.000	0.00
B	51495.00	1.1822	0.78	2.28	2.695	0.077	0.077	0.077	0.077	27.37
C	18317.00	0.4205	1.13	3.14	1.320	0.040	0.040	0.040	0.040	9.73
D	118359.00	2.7171	2.12	4.70	12.771	0.480	0.571	0.695	0.842	62.90
TOTAL	188171.00	4.3198	AVG Q/AC=	3.886	16.786	0.596	0.687	0.812	0.959	100.00
					CU FT	25982	29927	35352	41763	

10/31/97 01:42 PM PROPOSED CONDITIONS - MAX TO EARTH SWALE SOUTH OF MFG BLDG SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	0.00	0.0000	0.53	1.56	0.000	0.000	0.000	0.000	0.000	0.00
B	75849.00	1.7413	0.78	2.28	3.970	0.113	0.113	0.113	0.113	28.03
C	76423.00	1.7544	1.13	3.14	5.509	0.165	0.165	0.165	0.165	28.24
D	118359.00	2.7171	2.12	4.70	12.771	0.480	0.571	0.695	0.842	43.73
TOTAL	270631.00	6.2128	AVG Q/AC=	3.581	22.250	0.758	0.849	0.974	1.121	100.00
					CU FT	33037	36982	42407	48818	

* bottom width (-v for triangles, m-slopeslope n:v (-v for rectangles)
 P=wetted perimeter; R=A/P; Q=flow(cfs); Ev=velocity energy; Fr=Froude no.
 Es=specific energy= $y+v^2/2g$; Ms=specific momentum= $Q^2/gA+A*ybar$
 ** WARNING ** ORIGINAL EQNS IN COLS Y AND Z (+-). DO NOT DELETE OR ERASE **

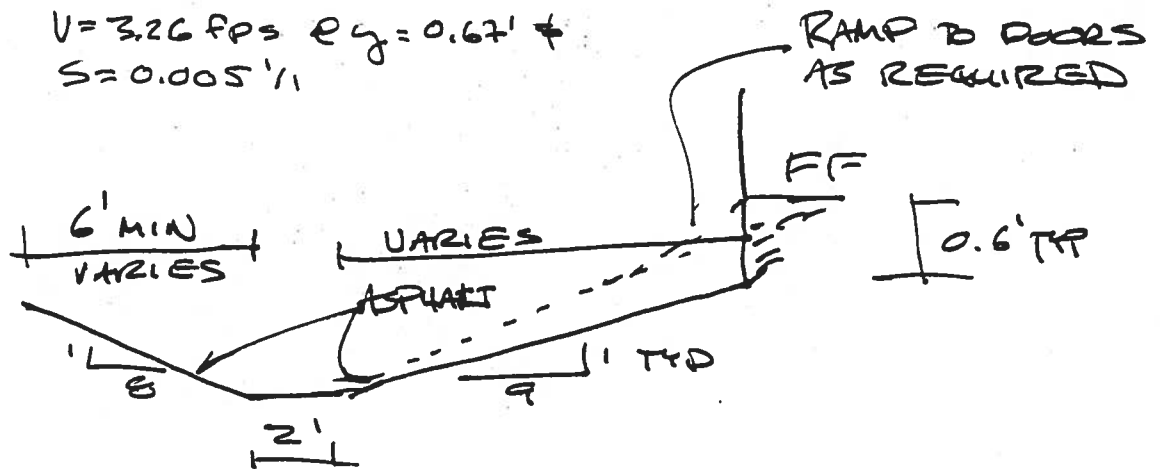
COMMENT: CENTEX AMERICAN GYPSUM WALLBOARD PLANT: ALBUQUERQUE NM

	EARTH CHANNEL SOUTH SIDE OF PLANT		ASPHALT SWALE EAST SIDE OF PLANT		EARTH CHAN
	CAPCITY	DESIGN Q	CAPCITY	DESIGN Q	CULVERT OUT
n	0.0350	0.0350	0.0170	0.0170	0.0350
S	0.00500	0.00500	0.00500	0.00500	0.00900
M1	3.0000	3.0000	8.0000	8.0000	4.0000
M2	3.0000	3.0000	9.0000	9.0000	4.0000
B	14.0000	14.0000	2.0000	2.0000	12.0000
Y	0.7500	0.6638	0.7500	0.6700	0.4820
T	18.5000	17.9830	14.7500	13.3900	15.8558
A	12.1875	10.6156	6.2813	5.1556	6.7130
P	18.7434	18.1984	14.8382	13.4688	15.9745
R	0.6502	0.5833	0.4233	0.3828	0.4202
Q	27.462	22.250	21.888	16.800	15.170
V	2.25	2.10	3.48	3.26	2.26
Ev	0.079	0.068	0.189	0.165	0.079
Es	0.83	0.73	0.94	0.84	0.56
Fr (Y)	0.46	0.45	0.71	0.70	0.57
Fr (A/T)	0.49	0.48	0.94	0.93	0.61
Ms	6.28	4.83	4.13	3.00	2.61

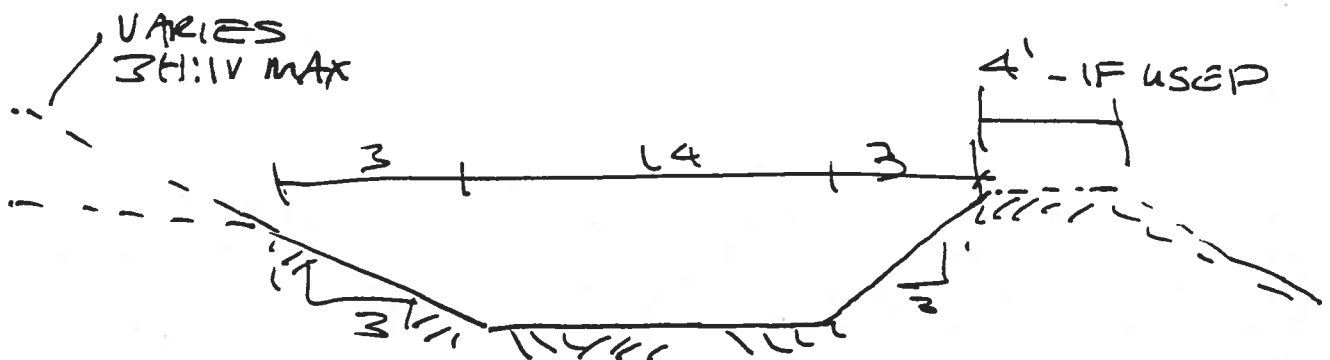
$$n = .017 \quad QP = 16.8$$

$$V = 3.26 \text{ FPS @ } y = 0.67'$$

$$S = 0.005\%$$



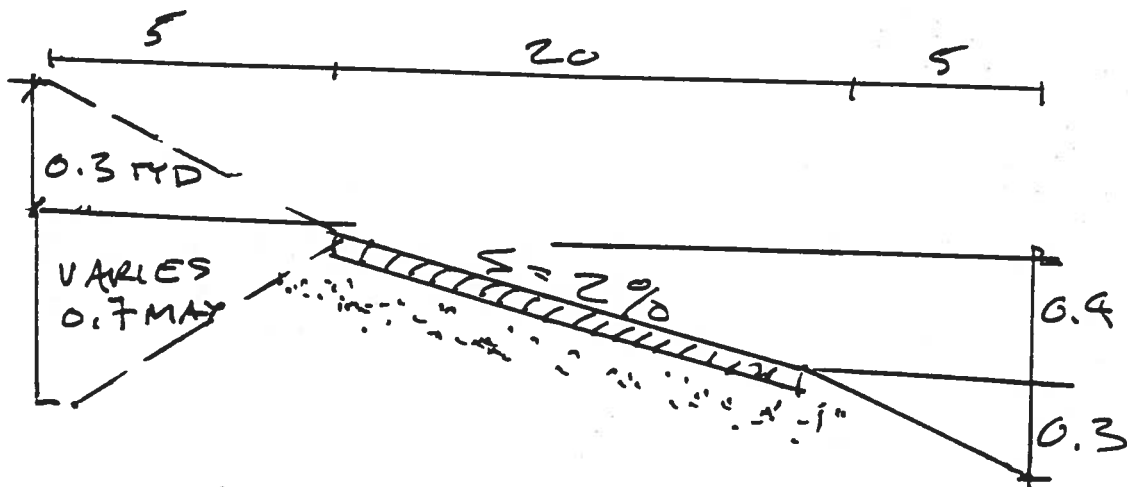
MAIN SWALE EAST OF
MANUFACTURING ADDITION
NO SCALE



EARTH CHANNEL SOUTH OF BLOC
RECEIVES FLOW FROM ASPHALT SWALE

$$n = .035 \quad QP = 22.25 \quad S = .005\%$$

$$V = 2.10 \text{ FPS @ } y = 0.66'$$



SLOW SPEED PRIVATE TRUCK
PAVEMENT SECTION

3" ASPHALT OVER 8" COMPACTED
SUBGRADE NTS

Culvert Designer/Analyzer Report

CENTEX - EX-SWALE NEAR FENCE

Peak Discharge Method: User-Specified			
Design Discharge	15.17 cfs	Check Discharge	20.00 cfs
Grades Model: Inverts			
Invert Upstream	13.30 ft	Invert Downstream	11.80 ft
Length	100.00 ft	Slope	0.015000 ft/ft
Drop	1.50 ft		
Headwater Model: Maximum Allowable HW			
Headwater Elevation	17.00 ft		
Tailwater Conditions: Constant Tailwater			
Tailwater Elevation	0.00 ft	SEE NOTE:	

	Name	Desc	Discharge	HW Elev	Velocity	
	Trial-2	1-24 inch Circular	15.17 cfs	15.83 ft	6.44 ft/s	
x	Trial-1	1-24 inch Circular	15.17 cfs	15.65 ft	6.44 ft/s	— USE
	Trial-3	1-24 inch Circular	20.00 cfs	17.19 ft	7.40 ft/s	
	Trial-4	1-24 inch Circular	20.00 cfs	17.44 ft	7.40 ft/s	

TAILWATER NOTE:

SEPARATE CALCS (NOT SHOWN) FOR TAILWATER DEPTHS UP TO 2 FT (2 TO TOP OF PIPE) SHOWED NO EFFECT ON HEADWATER REQUIRED.

ACTUAL TAILWATER DEPTH, AS FLOW EXPANDS INTO THE EARTH CHANNEL, WILL BE CONSIDERABLY LESS THAN 2', ON THE ORDER OF 6 INCHES AT NORMAL DEPTH FOR GRADING SHOWN.

Culvert Designer/Analyzer Report CENTEX - EX SWALE NEAR FENCE

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	17.00 ft	Storm Event	Design
Computed Headwater Elevation	15.65 ft	Discharge	15.17 cfs
Headwater Depth/ Height	1.18	Tailwater Elevation	0.00 ft
Inlet Control HW Elev	15.52 ft	Control Type	Outlet Control
Outlet Control HW Elev	15.65 ft		
Grades			
Upstream Invert	13.30 ft	Downstream Invert	11.80 ft
Length	100.00 ft	Constructed Slope	0.015000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.40 ft
Slope Type	Mild	Normal Depth	1.66 ft
Flow Regime	Subcritical	Critical Depth	1.40 ft
Velocity Downstream	6.44 ft/s	Critical Slope	0.021699 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev	15.65 ft	Upstream Velocity Head	0.46 ft
Ke	0.50	Entrance Loss	0.23 ft
Inlet Control Properties			
Inlet Control HW Elev	15.52 ft	Flow Control	Unsubmerged
Inlet Type	Headwall	Area Full	3.1 ft²
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report

CENTEX - EX SWALE NEAR FENCE

Design: Trial-2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	17.00 ft	Storm Event	Design
Computed Headwater Elevation	15.83 ft	Discharge	15.17 cfs
Headwater Depth/ Height	1.27	Tailwater Elevation	0.00 ft
Inlet Control HW Elev	15.76 ft	Control Type	Outlet Control
Outlet Control HW Elev	15.83 ft		
Grades			
Upstream Invert	13.30 ft	Downstream Invert	11.80 ft
Length	100.00 ft	Constructed Slope	0.015000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.40 ft
Slope Type	Mild	Normal Depth	1.66 ft
Flow Regime	Subcritical	Critical Depth	1.40 ft
Velocity Downstream	6.44 ft/s	Critical Slope	0.021699 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev	15.83 ft	Upstream Velocity Head	0.46 ft
Ke	0.90	Entrance Loss	0.41 ft
Inlet Control Properties			
Inlet Control HW Elev	15.76 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	3.1 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Project Title: CENTEX, ALBUQUERQUE

c:\haestad\cvm\centex1.cvm

11/02/97 08:10:57 PM

Per Se Engineering

© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Project Engineer: Tucker Green

CulvertMaster v1.0

Page 2 of 5

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Culvert Designer/Analyzer Report CENTEX - EX SWALE NEAR FENCE

Design: Trial-3

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	17.00 ft	Storm Event	Check
Computed Headwater Elevation	17.19 ft	Discharge	20.00 cfs
Headwater Depth/ Height	1.94	Tailwater Elevation	0.00 ft
Inlet Control HW Elev	16.20 ft	Control Type	Outlet Control
Outlet Control HW Elev	17.19 ft		
Grades			
Upstream Invert	13.30 ft	Downstream Invert	11.80 ft
Length	100.00 ft	Constructed Slope	0.015000 ft/ft
Hydraulic Profile			
Profile	Composite M2 Pressure	Depth, Downstream	1.61 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.61 ft
Velocity Downstream	7.40 ft/s	Critical Slope	0.027674 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev	17.19 ft	Upstream Velocity Head	0.63 ft
Ke	0.50	Entrance Loss	0.31 ft
Inlet Control Properties			
Inlet Control HW Elev	16.20 ft	Flow Control	Submerged
Inlet Type	Headwall	Area Full	3.1 ft²
K	0.00780	HDS 5 Chart	2
M	2.00000	HDS 5 Scale	1
C	0.03790	Equation Form	1
Y	0.69000		

Culvert Designer/Analyzer Report CENTEX - EX SWALE NEAR FENCE

Design: Trial-4

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	17.00 ft	Storm Event	Check
Computed Headwater Elevation	17.44 ft	Discharge	20.00 cfs
Headwater Depth/ Height	2.07	Tailwater Elevation	0.00 ft
Inlet Control HW Elev	16.61 ft	Control Type	Outlet Control
Outlet Control HW Elev	17.44 ft		
Grades			
Upstream Invert	13.30 ft	Downstream Invert	11.80 ft
Length	100.00 ft	Constructed Slope	0.015000 ft/ft
Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	1.61 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.61 ft
Velocity Downstream	7.40 ft/s	Critical Slope	0.027674 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev	17.44 ft	Upstream Velocity Head	0.63 ft
Ke	0.90	Entrance Loss	0.57 ft
Inlet Control Properties			
Inlet Control HW Elev	16.61 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	3.1 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

PX100-6 = PRECIPITATION EXCESS FROM 100-YEAR 6-HOUR STORM
VOL10D = VOLUME OF RUNOFF FROM 100-YEAR 10-DAY STORM
TRTMT CLASS A=UNDISTURBED, B=LAWNS, C=UNPAVED ROADS, D=ROOFS, PAVEMENT: SEE DPM 22.2 P A-5

***** PROJECT INFO *****

CenteX plant at SW corner of Paseo Del Norte, Jefferson, Tiburon

RAIN ZONE 2 SEE DPM P 22.2-2
100-YEAR PRECIPITATION (P) DEPTHS, INCHES
1 HR 6 HR 24 HR 4 DAY 10 DAY
2.01 2.35 2.75 3.30 3.95

11/24/97 05:39 PM PROPOSED CONDITIONS - AREAS '1': TO CULVERT & DETENTION SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	14117.00	0.3241	0.53	1.56	0.506	0.014	0.014	0.014	0.014	8.26
B	13997.00	0.3213	0.78	2.28	0.733	0.021	0.021	0.021	0.021	8.19
C	41060.00	0.9426	1.13	3.14	2.960	0.089	0.089	0.089	0.089	24.03
D	101699.00	2.3347	2.12	4.70	10.973	0.412	0.490	0.597	0.724	59.52
TOTAL	170873.00	3.9227	AVG Q/AC=	3.867	15.171	0.536	0.614	0.721	0.848	100.00
					CU FT	23367	26757	31418	36926	

11/24/97 05:39 PM PROPOSED CONDITIONS - AREAS '2': TO DETENTION, NOT TO CULVERT SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	131166.00	3.0112	0.53	1.56	4.697	0.133	0.133	0.133	0.133	39.59
B	54723.00	1.2563	0.78	2.28	2.864	0.082	0.082	0.082	0.082	16.52
C	38232.00	0.8777	1.13	3.14	2.756	0.083	0.083	0.083	0.083	11.54
D	107162.00	2.4601	2.12	4.70	11.562	0.435	0.517	0.629	0.763	32.35
TOTAL	331283.00	7.6052	AVG Q/AC=	2.877	21.880	0.732	0.814	0.927	1.060	100.00
					CU FT	31882	35454	40366	46171	

11/24/97 05:39 PM PROPOSED CONDITIONS - TOTAL TO DETENTION SF TOT

TRTMT CLASS	AREA SQUARE FEET	AREA ACRES	PX100-6 IN/AC	QP100-6 CFS/AC	QP100-6 CFS	VOL6HR AC-FT	VOL1D AC-FT	VOL4D AC-FT	VOL10D AC-FT	TRTMT PERCENT
A	145283.00	3.3352	0.53	1.56	5.203	0.147	0.147	0.147	0.147	28.93
B	68720.00	1.5776	0.78	2.28	3.597	0.103	0.103	0.103	0.103	13.68
C	79292.00	1.8203	1.13	3.14	5.716	0.171	0.171	0.171	0.171	15.79
D	208861.00	4.7948	2.12	4.70	22.536	0.847	1.007	1.227	1.486	41.59
TOTAL	502156.00	11.5279	AVG Q/AC=	3.214	37.051	1.268	1.428	1.648	1.908	100.00
					CU FT	55249	62211	71784	83097	

11.5279 AC = 0.01801 SQ MI

NOTE: TOP 2 CASES THIS PAGE SAME AS THE 10-31-97 RUN INCLUDED IN THE FOUNDATION PERMIT SUBMITAL, & ALSO REPRINTED EARLIER THIS SUBMITAL

GET ALLOWABLE OUTFLOW FOR DETENTION POND

$$= (\text{EXISTING, ENTIRE SITE}) - (\text{PROPOSED, SOUTH PART})$$

$$= (131.14) - (104.40)$$

(CX HYD. WQ1 8-2-97) (CX HYD. WQ1 10-31-97)

$$= 26.74 \text{ CFS}$$

✓ INFLOW TO DETENTION POND (CX HYD. WQ1 10-31-97)

37.05 CFS, peak 100-yr, 6 hr

6 hr	VOLUME	$23367 + 31882 = 55,249 \text{ CF} \sim 1.27 \text{ AF}$
24 hr	"	$26757 + 35454 = 62,211 \text{ CF} \sim 1.43 \text{ AF}$

FILE=CXPOND.WQ1 11/24/97 05:24 PM
 CENTEX DETENTION POND - 4600 PASEO DEL NORTE, ALBUQUERQUE

ELEV FT	AREA	DVOL CONE	VOL FT^3	VOL AC-FT
10	51,926	44,852	95,030	2.1816
9	38,132	29,816	50,178	1.1519
8	22,213	15,436	20,362	0.4674
7	9,539	4,925	4,925	0.1131
6	1,480			

AV END AREA		
DVOL AV AREA	VOL FT^3	VOL AC-FT
45,029	96,587	2.2173
30,173	51,558	1.1836
15,876	21,386	0.4909
5,510	5,510	0.1265

Rating Table Report

Pond 1

POND OUTLET,
CULVERTS

CENTEX

Range Data:

	Minimum	Maximum	Increment
Allowable HW Elev	6.00	10.00	0.50 ft

AC FT

ELEV

HW Elev (ft)	Trial-1 - Discharge (cfs)	Trial-2 - Discharge (cfs)
6.00	0.00	0.00
6.50	0.68	0.79
7.00	2.47	2.91
7.50	5.10	6.15
8.00	7.82	10.31
8.50	9.08	14.88
9.00	10.14	18.30
9.50	11.14	20.23
10.00	12.08	22.10

0	6
0.1265	7
0.4909	8
1.1836	9
2.2173	10

18" CMP 24" CMP

BOTH PIPES : 1.5% SLOPE

: PROJECTING ENTRANCE

: INVERT @ 6.00 NOMINAL

Culvert Design Report

Trial-1

Solve For: Headwater Elevation

CENTEX ROAD - 18" CMP - MAIN DESIGN

Culvert Summary

Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	8.23 ft	Discharge	8.48 cfs
Headwater Depth/ Height	1.49	Tailwater Elevation	N/A ft
Inlet Control HW Elev	8.09 ft	Control Type	Outlet Control
Outlet Control HW Elev	8.23 ft		

Grades

Upstream Invert	6.00 ft	Downstream Invert	5.40 ft
Length	40.00 ft	Constructed Slope	0.015000 ft/ft

Hydraulic Profile

Profile	CompositeM2Pressure	Depth, Downstream	1.13 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.13 ft
Velocity Downstream	5.95 ft/s	Critical Slope	0.026554 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev	8.23 ft	Upstream Velocity Head	0.36 ft
Ke	0.90	Entrance Loss	0.32 ft

Inlet Control Properties

Inlet Control HW Elev	8.09 ft	Flow Control	Transition
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

NOTE: Q design = 8.48 cfs taken from A444MD run, which used a Haestad Methods Culvert Master (this program) rating curve as part of its input. A444MD gave slightly higher required headwater - 8.28 cfs comp to 8.23. Close enough - OK.

Culvert Design Report

Trial-2

Solve For: Headwater Elevation

CENTEX - 24" CMP - OPTIONAL

Culvert Summary

Allowable HW Elevation	N/A ft	Storm Event	Check
Computed Headwater Elevation	8.14 ft	Discharge	11.61 cfs
Headwater Depth/ Height	1.07	Tailwater Elevation	N/A ft
Inlet Control HW Elev	8.01 ft	Control Type	Outlet Control
Outlet Control HW Elev	8.14 ft		

Grades

Upstream Invert	6.00 ft	Downstream Invert	5.40 ft
Length	40.00 ft	Constructed Slope	0.015000 ft/ft

Hydraulic Profile

Profile	M2	Depth, Downstream	1.22 ft
Slope Type	Mild	Normal Depth	1.32 ft
Flow Regime	Subcritical	Critical Depth	1.22 ft
Velocity Downstream	5.77 ft/s	Critical Slope	0.018759 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev	8.14 ft	Upstream Velocity Head	0.43 ft
Ke	0.90	Entrance Loss	0.39 ft

Inlet Control Properties

Inlet Control HW Elev	8.01 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	3.1 ft ²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

NOTE: $Q_{design} = 11.61$ cfs from AFTIMO run based partly on rating curve from this Culvert Master Program. At Q_p , headwater elev AFTIMO was 8.16' comp to 8.14' here. OK
HW elev 8.16' $\Rightarrow$ HW depth = 2.00'

AHYMO PROGRAM (AHYMO194) - ANAFCA Hydrologic Model - January, 1994
 RUN DATE (MON/DAY/YR) = 11/24/1997
 START TIME (HR:MIN:SEC) = 19:14:38 USER NO.= PERSEENG.194
 INPUT FILE = CXPOND.DAT

* CONTROL CODES AT START = 027 038 107 050 083
 * 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 * CONTROL CODES AT END = 0 0 0 0 0
 * 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 * CONTROL CODES ABOVE FOR HP DESKJET 540 INKJET PRINTER, START IN COL 21
 *
 *C PRINT CODES: 0=ALL; 1=TOTALS ONLY; 2=EVERY 2ND + TOTALS; 3,5,10,20 SIMILAR
 *C RATING CURVE ID NEGATIVE => COMPUTE BUT NOT PRINT RATING CURVE
 *C RATING CURVE n NEGATIVE => FLOODPLAIN SLOPE, n POSITIVE => CHANNEL SLOPE
 *S
 *S FILE CXPOND = Centex POND, DETENTION POND AT 4600 PASEO DEL NORTE, ALBQ NM
 *S RAIN ZONE 2 FOR SMALL WATERSHED METHODS - USE HERE
 *S 100-yr 6hr STORM
 *S $\Delta_{REQ} = 10.31 \text{ cfs}$
 *S FOR RESERVOIR ROUTING, NEED Q_{out} AT LEAST 10.31cfs LESS THAN Q_{in}
 *C
 *S FLOW IS **NOT** BULKED FOR SEDIMENT, UNLESS SPECIFICALLY NOTED.
 *C
 *C BASIN & CHANNEL ROUTING PARAMETERS REFLECT THE JUDGMENT OF THE ENGINEER,
 *C AND MAY DIFFER FROM OTHER STUDIES IN THE AREA.
 *C
 *C REVISION NOTES: ORIGINAL FILE CREATED 11-24-97 BY TUCKER GREEN P.E.
 *C

 * RAINFALLS PER ALBUQUERQUE NM DPM - COMMENT OUT THOSE THAT DON'T APPLY
 * TYPE 1 IS 6-HR STORM PER NOAA ATLAS 2 W PEAK INTENSITY @ 1.4 HRS (EQ C1-C5)
 * FOR 6-HR USE DT = 0.033333 HR = 2 MINUTES
 * TYPE 2 IS 24-HR STORM PER NOAA ATLAS 2 W PEAK INTENSITY @ 1.4 HRS (EQ C1-C6)
 * FOR 24-HR USE DT = 0.0500 HR = 5 MINUTES
 * RAIN QUARTER = 0.0 EXCEPT FOR TYPE 3 (6-HR PMP: SEE AHYMO MANUAL)
 *
 *** !!! RAINFALL 100YR-TYPE2 NOT ADJUSTED, BUT NOT USED, EITHER. !!!
 *** !!! RAINFALL 10YR-TYPE1 NOT ADJUSTED, BUT NOT USED, EITHER. !!!
 *

 * RAINFALL AMOUNTS, INCHES
 * RAINFALL HUNDRED TYPE= 2 RAIN QUARTER= 0.0 RAIN ONE= 2.23
 * RAIN SIX= 2.95 RAIN DAY= 3.76 DT= .033333 HR
 RAINFALL HUNDRED TYPE= 1 0.0 2.01 2.35 2.75 0.033333

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT = .033333 HOURS	END TIME = 5.999940 HOURS
.0000 .0016 .0033 .0049 .0066 .0084 .0102	
.0120 .0139 .0158 .0178 .0199 .0219 .0241	
.0263 .0286 .0309 .0333 .0358 .0384 .0411	
.0439 .0467 .0497 .0529 .0561 .0596 .0631	
.0669 .0709 .0751 .0807 .0866 .0930 .1066	
.1372 .1842 .2517 .3438 .4648 .6192 .8114	
1.0459 1.2628 1.3536 1.4303 1.4985 1.5605 1.6176	
1.6706 1.7202 1.7667 1.8104 1.8516 1.8906 1.9274	
1.9624 1.9955 2.0269 2.0568 2.0851 2.0915 2.0976	
2.1034 2.1088 2.1141 2.1191 2.1239 2.1285 2.1330	
2.1373 2.1414 2.1455 2.1494 2.1532 2.1569 2.1604	
2.1639 2.1673 2.1707 2.1739 2.1771 2.1802 2.1832	
2.1862 2.1891 2.1920 2.1948 2.1975 2.2002 2.2028	
2.2054 2.2080 2.2105 2.2130 2.2154 2.2178 2.2202	
2.2225 2.2248 2.2271 2.2293 2.2315 2.2336 2.2358	
2.2379 2.2400 2.2420 2.2440 2.2460 2.2480 2.2500	
2.2519 2.2538 2.2557 2.2576 2.2594 2.2613 2.2631	
2.2649 2.2666 2.2684 2.2701 2.2718 2.2736 2.2752	

* AHYMO GIVES SLIGHTLY
 SMALLER Q_{peaks} THAN
 DPM SMALL WATERSHED
 METHOD, WHICH GAVE
 $\pm 37.05 \text{ CFS}$ FOR SAME
 AREA

18"
 * $Q_p \text{ POND IN } 36.54 \text{ cfs}$
 $Q_p \text{ POND OUT } 18 \text{ } 2.48$
 $\Delta = 28.06 \text{ OR}$
 $WS \text{ ELEV @ } 8.28'$
 $(L_y = 2.28')$
 24"
 $Q_p \text{ POND IN } 36.54$
 $Q_p \text{ POND OUT } 24 \text{ } 11.61$
 $\Delta = 24.93 \text{ OR}$
 $WS \text{ ELEV @ } 8.16'$
 $(L_y = 2.16')$

2.2769 2.2786 2.2802 2.2818 2.2834 2.2850 2.2866
 2.2882 2.2897 2.2913 2.2928 2.2943 2.2958 2.2973
 2.2988 2.3002 2.3017 2.3031 2.3046 2.3060 2.3074
 2.3088 2.3102 2.3116 2.3129 2.3143 2.3156 2.3170
 2.3183 2.3196 2.3209 2.3222 2.3235 2.3248 2.3261
 2.3273 2.3286 2.3299 2.3311 2.3323 2.3336 2.3348
 2.3360 2.3372 2.3384 2.3396 2.3408 2.3420 2.3431
 2.3443 2.3454 2.3466 2.3477 2.3489 2.3500

* RAINFALL TENYEAR TYPE= 1 0.0 1.23 1.48 1.78 0.033333
 *

COMPUTE NM HYD ID= 1 HYD= PONDIN DA=0.01801 SQ MI
 PER A= 28.93 B= 13.68 C= 15.79 D= 41.60
 TP= -0.13333 HRS RAIN= -1

K = .072665HR TP = .133330HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 29.573 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 2.0100
 AREA = .007492 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .139360HR TP = .133330HR K/TP RATIO = 1.045227 SHAPE CONSTANT, N = 3.377625
 UNIT PEAK = 24.556 CFS UNIT VOLUME = .9995 B = 311.29 P60 = 2.0100
 AREA = .010518 SQ MI IA = .53375 INCHES INF = 1.34450 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID= 1 CODE= 5

HYDROGRAPH FROM AREA PONDIN

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	36.5	3.000	.4	4.500	.1	6.000	.2
.167	.0	1.667	19.6	3.167	.3	4.667	.1	6.167	.1
.333	.0	1.833	10.4	3.333	.2	4.833	.1	6.333	.0
.500	.0	2.000	7.0	3.500	.2	5.000	.1	6.500	.0
.667	.0	2.167	3.4	3.667	.2	5.167	.1	6.667	.0
.833	.0	2.333	1.8	3.833	.2	5.333	.1	6.833	.0
1.000	.0	2.500	1.1	4.000	.1	5.500	.1		
1.167	.1	2.667	.7	4.167	.1	5.667	.1		
1.333	7.3	2.833	.5	4.333	.1	5.833	.2		

RUNOFF VOLUME = 1.29765 INCHES = 1.2464 ACRE-FEET
 PEAK DISCHARGE RATE = 36.54 CFS AT 1.500 HOURS BASIN AREA = .0180 SQ. MI.

* 18"

*S HYD PONDOUT.18 IS FOR 18" CMP. PROJECTING ENTRANCE, 1.5% SLOPE
 ROUTE RESERVOIR ID=3 HYD=PONDOUT.18 INFLOW ID=1 CODE=5.
 OUTFLOW CFS STORAGE AC-FT ELEVATION FT
 0.00000 0.0000 6
 2.47 0.1265 7
 7.82 0.4909 8
 10.14 1.1836 9
 12.08 2.2173 10

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	6.00	.000	.00
.17	.00	6.00	.000	.00

.33	.00	6.00	.000	.00
.50	.00	6.00	.000	.00
.67	.00	6.00	.000	.00
.83	.00	6.00	.000	.00
1.00	.00	6.00	.000	.00
1.17	.07	6.00	.000	.00
1.33	7.30	6.26	.033	.64
1.50	36.54	7.48	.301	5.04
1.67	19.55	8.16	.600	8.19
1.83	10.42	8.28	.682	8.46
2.00	6.96	8.28	.682	8.46
2.17	3.40	8.22	.640	8.32
2.33	1.75	8.10	.560	8.05
2.50	1.12	7.95	.471	7.53
2.67	.75	7.72	.389	6.32
2.83	.52	7.52	.318	5.27
3.00	.38	7.36	.257	4.39
3.17	.29	7.22	.207	3.65
3.33	.23	7.10	.164	3.03
3.50	.19	7.01	.129	2.51
3.67	.17	6.80	.101	1.97
3.83	.15	6.63	.079	1.54
4.00	.14	6.49	.062	1.22
4.17	.13	6.39	.049	.96
4.33	.13	6.31	.039	.77
4.50	.13	6.25	.031	.61
4.67	.13	6.20	.026	.50
4.83	.13	6.17	.021	.41
5.00	.13	6.14	.018	.35
5.17	.13	6.12	.015	.30
5.33	.14	6.10	.013	.26
5.50	.14	6.09	.012	.23
5.67	.15	6.08	.011	.21
5.83	.15	6.08	.010	.20
6.00	.16	6.08	.010	.19
6.17	.06	6.07	.009	.17
6.33	.02	6.06	.007	.14
6.50	.01	6.04	.006	.11
6.67	.00	6.03	.004	.08
6.83	.00	6.03	.003	.07
7.00	.00	6.02	.003	.05
7.17	.00	6.02	.002	.04
7.33	.00	6.01	.001	.03
7.50	.00	6.01	.001	.02
7.67	.00	6.01	.001	.02
7.83	.00	6.01	.001	.01
8.00	.00	6.00	.001	.01
8.17	.00	6.00	.000	.01
8.33	.00	6.00	.000	.01
8.50	.00	6.00	.000	.00

PEAK DISCHARGE = 8.480 CFS - PEAK OCCURS AT HOUR 1.90
 MAXIMUM WATER SURFACE ELEVATION = 8.284
 MAXIMUM STORAGE = .6878 AC-FT INCREMENTAL TIME= .033333HRS

*

*S

24^h

*S HYD PONDOUT.24 IS FOR 24" CMP. PROJECTING ENTRANCE, 1.5% SLOPE

*S REUSE INFLOW HYD W ID=1 = HYD PONDIN

ROUTE RESERVOIR	ID=3	HYD=PONDOUT.18	INFLOW ID=1	CODE=5.
	OUTFLOW CFS	STORAGE AC-FT	ELEVATION FT	
	0.00000	0.0000	6	
	2.91	0.1265	7	
	10.31	0.4909	8	
	18.30	1.1836	9	
	22.10	2.2173	10	

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	6.00	.000	.00
.17	.00	6.00	.000	.00
.33	.00	6.00	.000	.00
.50	.00	6.00	.000	.00
.67	.00	6.00	.000	.00
.83	.00	6.00	.000	.00
1.00	.00	6.00	.000	.00
1.17	.07	6.00	.000	.00
1.33	7.30	6.26	.033	.75
1.50	36.54	7.46	.294	6.31
1.67	19.55	8.10	.563	11.14
1.83	10.42	8.16	.602	11.59
2.00	6.96	8.10	.561	11.12
2.17	3.40	7.99	.487	10.24
2.33	1.75	7.73	.393	8.31
2.50	1.12	7.50	.309	6.62
2.67	.75	7.31	.241	5.23
2.83	.52	7.16	.185	4.11
3.00	.38	7.04	.141	3.21
3.17	.29	6.84	.107	2.46
3.33	.23	6.64	.081	1.86
3.50	.19	6.49	.061	1.41
3.67	.17	6.37	.047	1.08
3.83	.15	6.28	.036	.83
4.00	.14	6.22	.028	.64
4.17	.13	6.17	.022	.51
4.33	.13	6.14	.018	.40
4.50	.13	6.11	.014	.33
4.67	.13	6.09	.012	.27
4.83	.13	6.08	.010	.23
5.00	.13	6.07	.009	.21
5.17	.13	6.06	.008	.19
5.33	.14	6.06	.007	.17
5.50	.14	6.06	.007	.16
5.67	.15	6.05	.007	.16
5.83	.15	6.05	.007	.16
6.00	.16	6.05	.007	.16
6.17	.06	6.05	.006	.15
6.33	.02	6.04	.005	.12
6.50	.01	6.03	.004	.09
6.67	.00	6.02	.003	.07
6.83	.00	6.02	.002	.05
7.00	.00	6.01	.002	.04
7.17	.00	6.01	.001	.03
7.33	.00	6.01	.001	.02
7.50	.00	6.00	.001	.01
7.67	.00	6.00	.000	.01
7.83	.00	6.00	.000	.01
8.00	.00	6.00	.000	.01
8.17	.00	6.00	.000	.00

PEAK DISCHARGE = 11.606 CFS - PEAK OCCURS AT HOUR 1.80
 MAXIMUM WATER SURFACE ELEVATION = 8.162
 MAXIMUM STORAGE = .6032 AC-FT INCREMENTAL TIME= .033333HRS

*

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 19:14:47

CONIOX

EMERGENCY SPILLWAY AT DETENTION POND

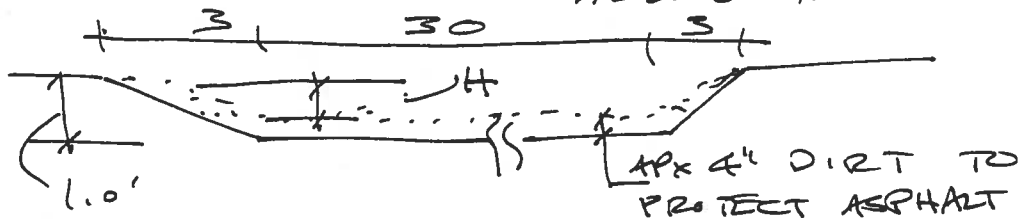
$Q_p = Q_{p100}$ INTO POND (NEGLECT OUTFLOW & STORAGE)

$$= 36.54 \text{ CFS AT 4 M O}$$

$$= 37.05 \text{ CFS DPM SMALL WATER SIZED}$$

USE 37.05

SPILLWAY SECTION ALONG BANK



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

- ASSUME $C = 3$ APX ACCURATE
 $L = 30$ CONSERVATIVE

$$37.05 = 3 \cdot 30 \cdot H^{3/2} \text{ OR}$$

$$\underline{H} = \left(\frac{37.05}{30 \cdot 3} \right)^{2/3} = \underline{0.55'} \text{ (16\% INCH)}$$

H = WATER SURFACE IN POND BACK OF SPILLWAY - depth over crest is 6.55

✓ WATER SURFACE ASSUMING THE 4" DIRT DOESN'T ERODE PRIOR TO ARRIVAL OF Q_{pak} - CONSERVATIVE

$$\text{WATER TO DIRT} = 0.55 \text{ TO } 0.33 = 0.88 < 1.0 \text{ AVAILABLE OF}$$