



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 16, 2004

Shahab Biazar PE
Advanced Engineering and Consulting
10205 Snowflake Ct NW
Albuquerque, NM 87114

**Re: West Bluff Mobile Home Park Grading Certification
Engineer's Stamp dated 10-11-03 (K9/D24)**

Dear Mr. Biazar,

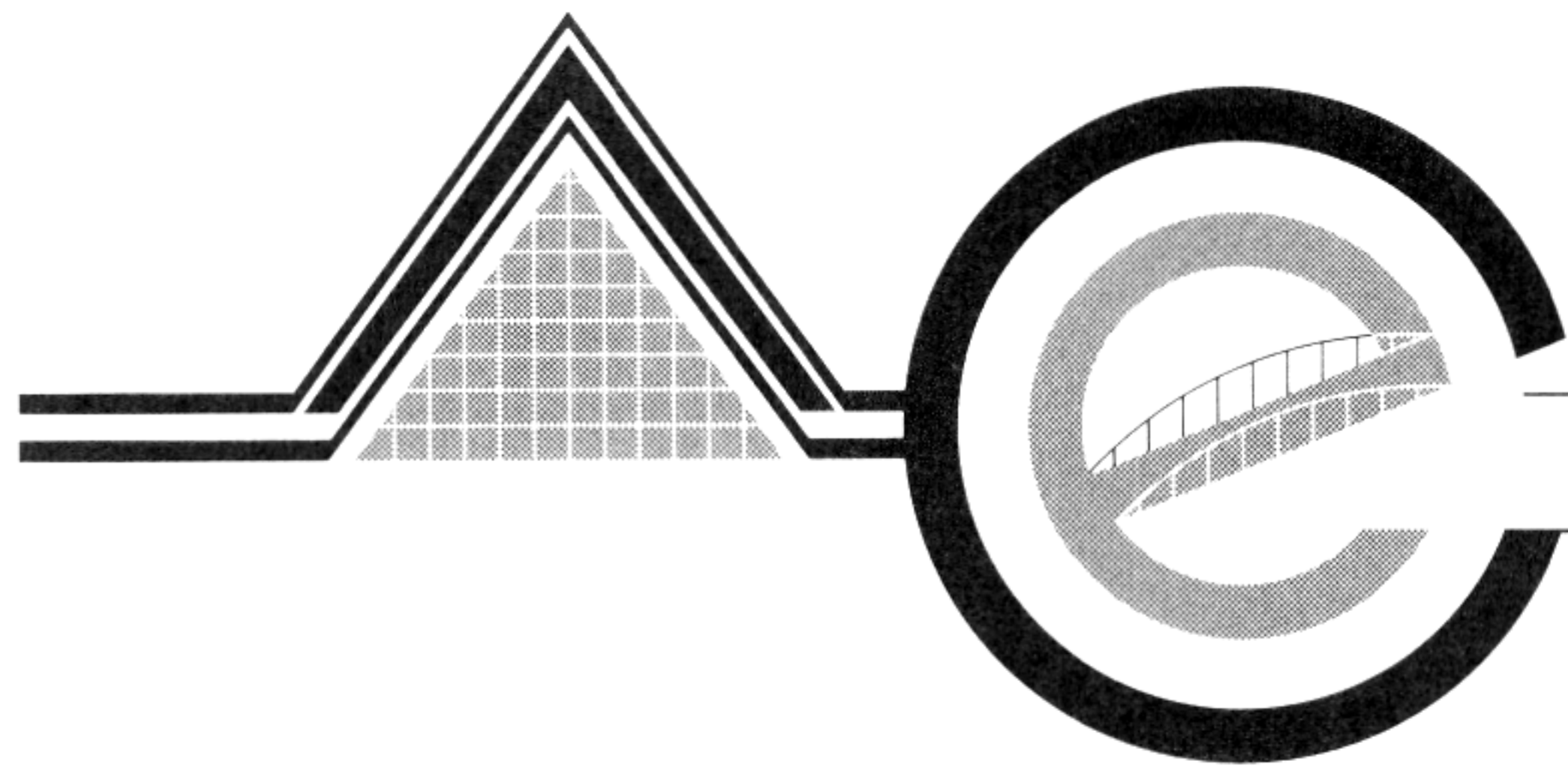
Based upon the information provided in your submittal dated 1-15-03, the above referenced certification is approved for Release of Financial Guarantee.

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

Sincerely,

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

C: Arlene Portillo, CPN 707881
file



ADVANCED ENGINEERING and CONSULTING, LLC

*Consulting
Design
Development
Management
Inspection*

January 12, 2004

Mr. Bradley L. Bingham, P.E.
Sr. Engineer, Planning Dept.
Development and Building Services
600 Second Street NW
Albuquerque, New Mexico 87102

RE: GRADING AND PAD CERTIFICATION AND FINANCIAL GUARANTEE
RELEASE, WEST PLATEAU MOBILE HOME SUBDIVISION (K9 / D24), CITY
PROJECT # 707881

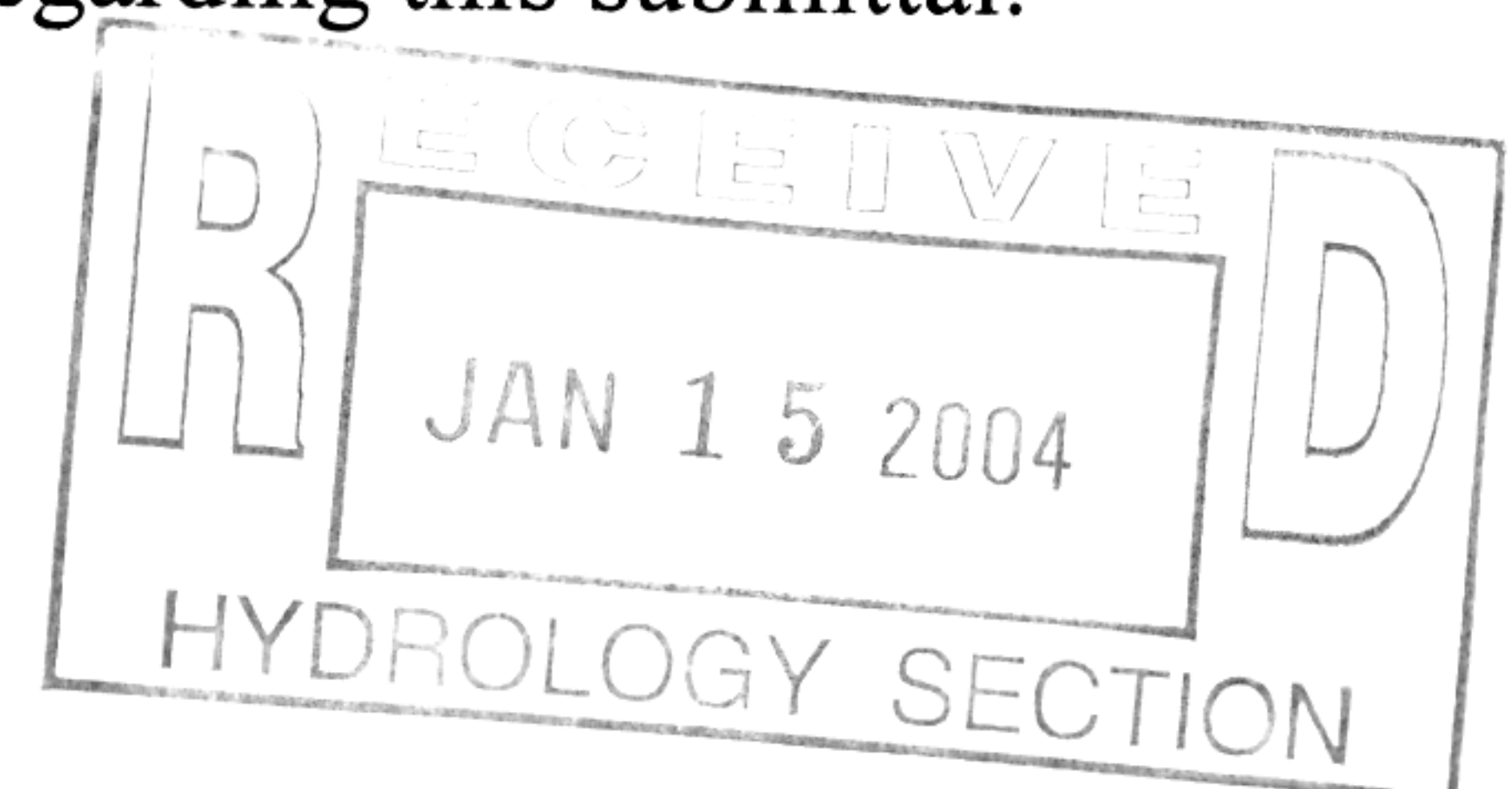
Dear Mr. Bingham:

This submittal is for grading plan/pad certification. All the improvements for the above-mentioned project has been completed last year. The storm sewer piping and pavements have been inspected and approved by the City last year as well. Attached please find the as-built grades on the grading plan and as-built plans for the storm sewer pipe construction. We are asking for the Financial Guarantee Release and Grading/Pad Certification Approval.

Please contact me if there are any questions or concerns regarding this submittal.

Sincerely yours,

Shahab Biazar, P.E.





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 30, 2003

Shahab Biazar PE
Advanced Engineering and Consulting
10205 Snowflake Ct NW
Albuquerque, NM 87114

Re: West Bluff Mobile Home Park Grading and Drainage Plan
Engineer's Stamp dated 3-28-03 (K9/D24)

Dear Mr. Biazar,

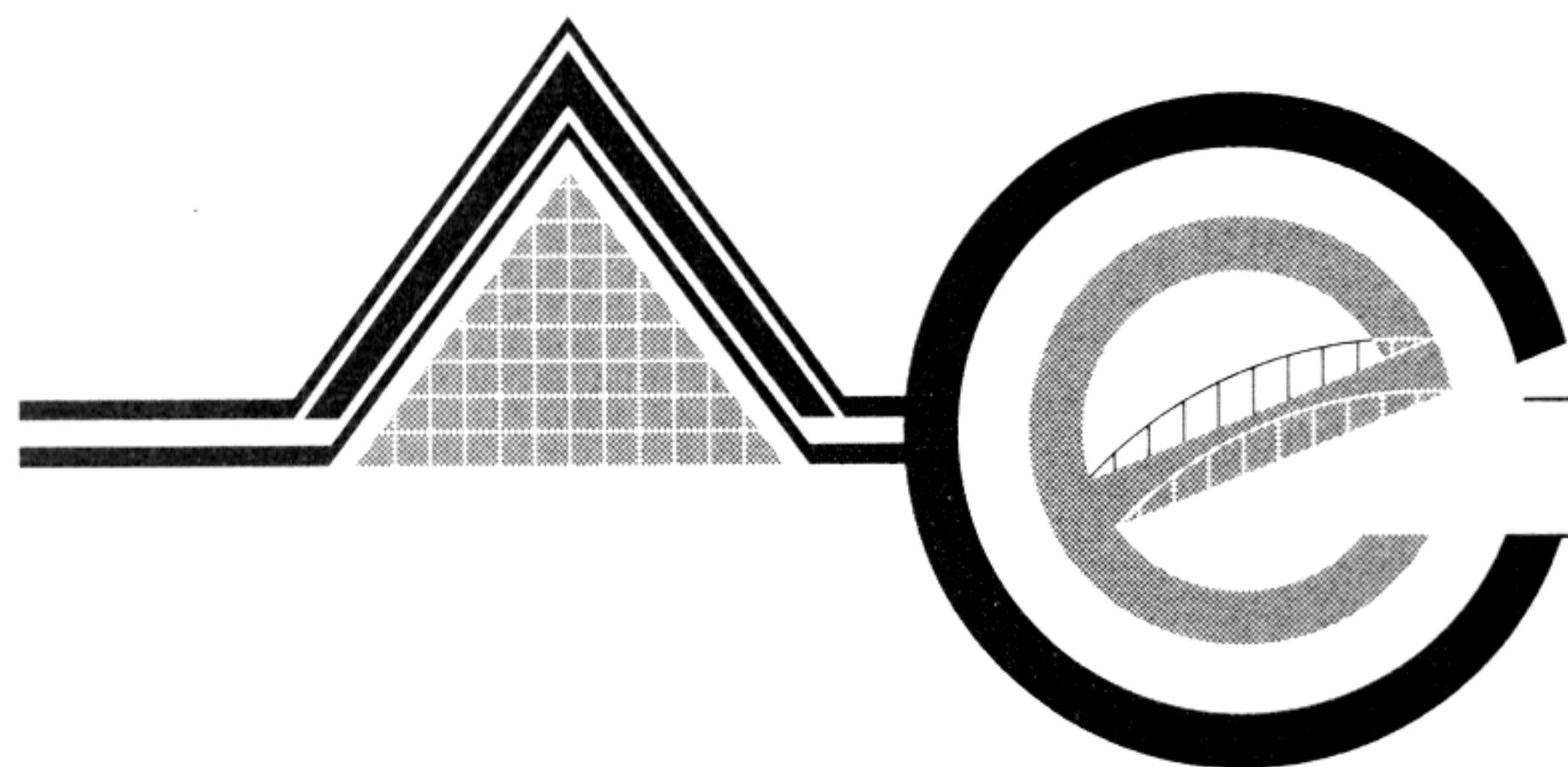
Based upon the information provided in your submittal dated 3-28-03, the above referenced plan is approved as amended. This is now the plan that must be certified for release of financial guarantee.

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

Sincerely,

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

C: file



ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection
Surveying

March 28, 2003

Mr. Bradley L. Bingham, P.E.
Sr. Engineer, PWD
Development and Building Services
600 Second Street NW
Albuquerque, New Mexico 87102

RE: GRADING PLAN MODIFICATION FOR WEST PLATEAU MOBILE HOME
SUBDIVISION (K9 / D24)

(BLUFF)

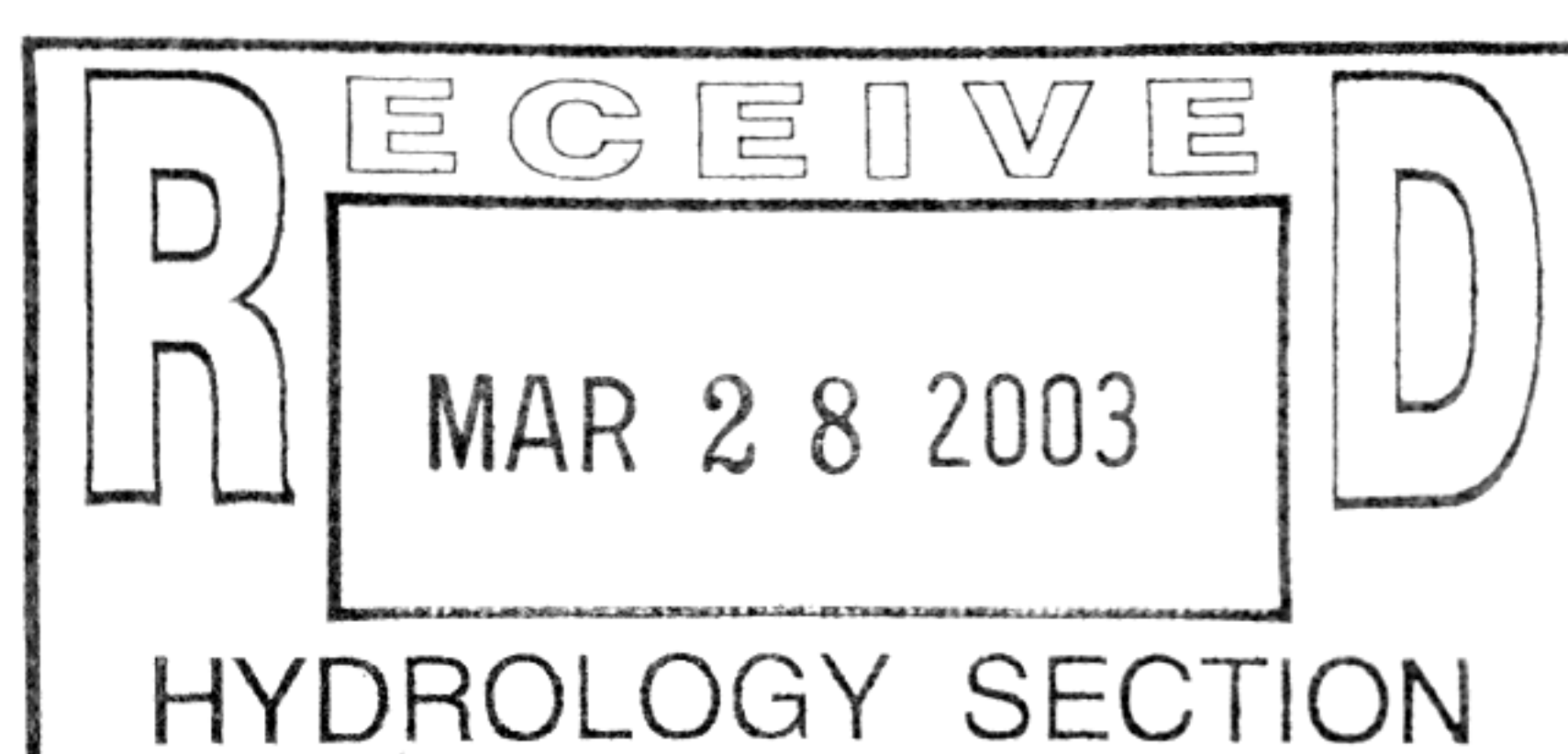
Dear Mr. Bingham:

This letter is to request the approval on the revised grading plan. The grading plan has previously been approved. The grades were changed to reduce some of the retaining walls. Lots 1 through 15 will slope to the back of the lot (15' from the rear of the lot) in order to eliminate and reduce some of the retaining wall along 90th Street. Only 15' rear portion of the lot will drain to the back and the remaining portion of the lot will continue to drain to the front of the lot. The ponding requirement for the back drainage is only 35 cfs and ponding capacity (up to 18" water depth) is 135 CF. See attached calculation for ponding requirement. Some of the grades on the north side of the project were also modified to eliminate some of the retaining walls. See the revised grading plan for changes.

Please contact me if there are any questions or concerns regarding this submittal.

Sincerely yours,

Shahab Biazar, P.E.



VOLUME CALCULATIONS FOR 10-DAY STORM

REAR LOT PONDING VOLUME REQUIREMENT

(UNDER PROPOSED CONDITIONS)

DRAINAGE BASINS

SUB-BASIN	AREA (SF)	AREA (AC-FT)	AREA (MI ²)
BASIN	600.00	0.01377	0.000022

$$E = \frac{EA(AA) + EB(AB) + EC(AC) + ED(AD)}{AA + AB + AC + AD}$$

$$V-360 = E (AA + AB + AC + AD)$$

$$V-10 \text{ Day} = V-360 + AD (P-10 \text{ Day} - P-360) / 12 \text{ in/ft}$$

$$EA = 0.44$$

$$EB = 0.67$$

$$EC = 0.99$$

$$ED = 1.97$$

$$AA = 0.00\%$$

$$AB = 100.00\%$$

$$AC = 0.00\%$$

$$AD = 0.00\%$$

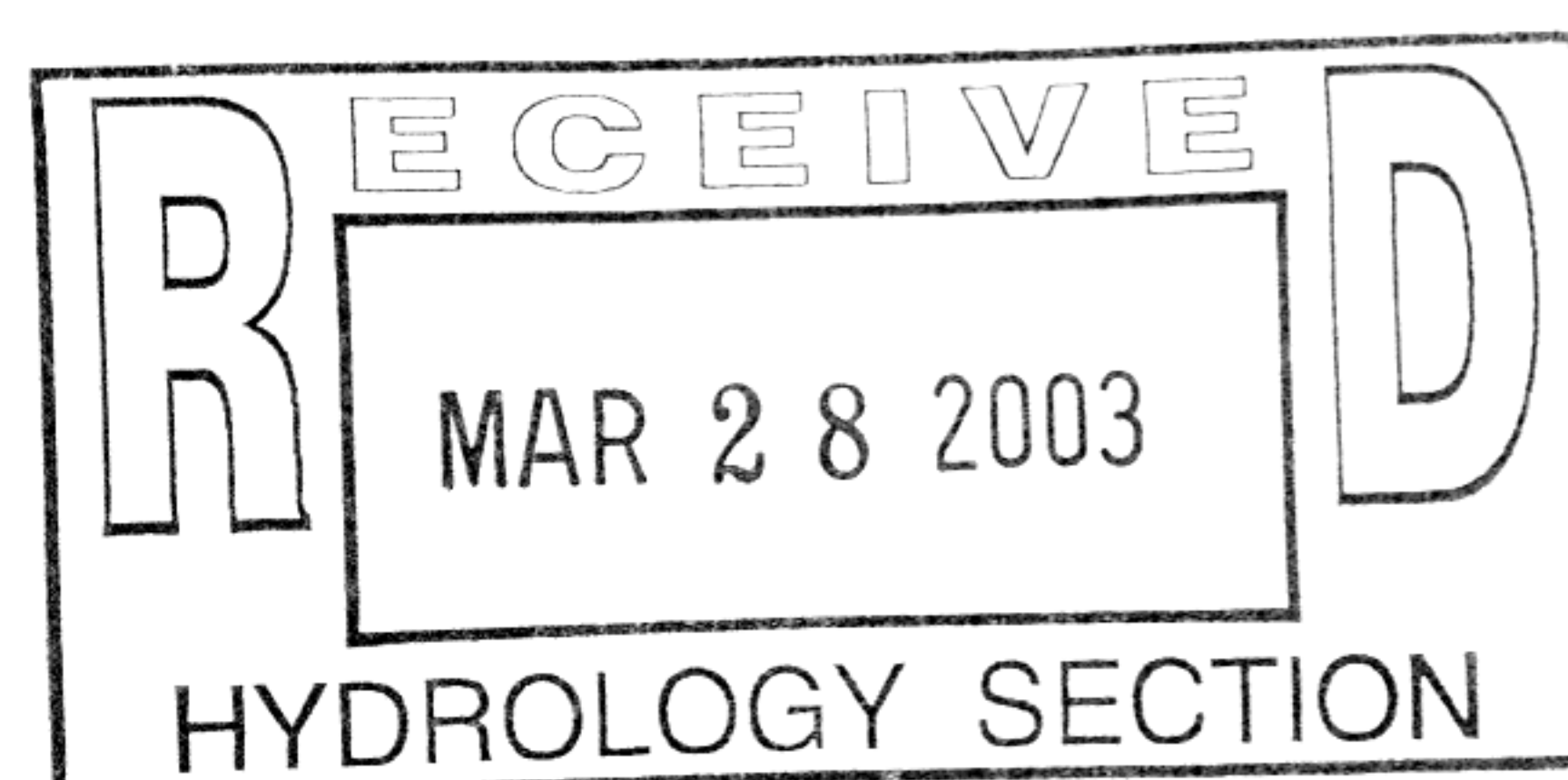
$$P-60 = 1.87$$

$$P-360 = 2.20$$

$$P-1440 = 2.66$$

$$P-10 \text{ Day} = 3.67$$

E =	0.6700	IN
V-360 =	0.0008	AC-FT
AD =	0.0000	AC
V-10 Day =	0.0008	AC-FT
V-10 DAY =	33.50	CF





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 14, 2003

Shahab Biazar PE
Advanced Engineering and Consulting
10205 Snowflake Ct NW
Albuquerque, NM 87114

Re: West Bluff Mobile Home Park Drainage Report
Engineer's Stamp dated 10-9-02 and letter of acceptance (K9/D24)

Dear Mr. Biazar,

Based upon the information provided in your submittal dated 2-20-03, the above referenced report is approved for Site Development Plan for Building Permit and Preliminary Plat action by the DRB.

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

Sincerely,

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

C: file

2010

City of Albuquerque

Planning Department



Certificate of Work Order Completion

October 22, 2002

City Engineer
600 Second St.
Plaza Del Sol
Albuquerque, NM 87102

Re: Los Volcanos Mobile Home Park, Project No. 6608.81

Dear Sir:

This is to certify that Project No. 6608.81 has been completed according to approved plans and construction specifications. Please be advised this Certificate of Work-Order Completion does not constitute acceptance of the city infrastructure until all requirements of the subdivision improvements agreement have been satisfied and a Certificate of Completion and Acceptance is issued by the City Engineer.

PAVING:

48' FF arterial paving, curb and gutter and 6' sidewalk (on the both sides of the street) for 90th Street from Volcano, NW (south property line) to NE corner of Tract 6.

30' FE arterial paving (24' permanent and 6' of temporary), curb and gutter and 6' sidewalk (on the east side of the street only) for Volcano from east property line to 90th Street (north property line)

30' FE arterial paving (24' permanent and 6' of temporary), curb and gutter and 6' sidewalk (on the north side of the street only) for 90th Street from NE corner of Tract 6 to east property line.

WATER:

8", waterline for Volcano, NW from east property line to 90th Street (west property line)

SANITARY SEWER:

8" sewer line for 90th Street from Volcano NW (south property line) to NE corner of Tract 6

8" sewer line for Volcano NW from east property line to 90th Street (west property line)

STORM SEWER:

54" storm sewer RCP for 90th Street from NE corner of Tract 6 to North property line (existing RCP)

54" storm sewer RCP for 90th Street from NE corner of Tract 6 to Volcano NW (south property line)

54" storm sewer RCP for Volcano NW from 90th Street (manhole) to existing stub (to the west of 90th Street ± 50')

60" storm sewer RCP for Volcano NW from East property line to 90 Street (east property line)

PRIVATE ROAD IMPROVEMENTS

28' FF residential paving, curb and gutter and 4' sidewalk (on both sides of the street) for Merida Street from East property line to 90th Street (west property line)

28' FF residential paving, curb and gutter and 4' sidewalk (on both sides of the street) for Monterrer Ct from Mazatlan Street to West property line (90th Street)

28' FF residential paving, curb and gutter and 4' sidewalk (on both sides of the street) for Matamoros Ct. from Mazatlan Street to West property line (90th Street)

28' FF residential paving, curb and gutter and 4' sidewalk (on both sides of the street) for Manzanillo Ct from Mazatlan Street to West property line (90th Street)

28' FF residential paving, curb and gutter and 4' sidewalk (on both sides of the street) for Mazatlan Street from Volcano NW to Merida Street.

PRIVATE UTILITY IMPROVEMENTS

Water

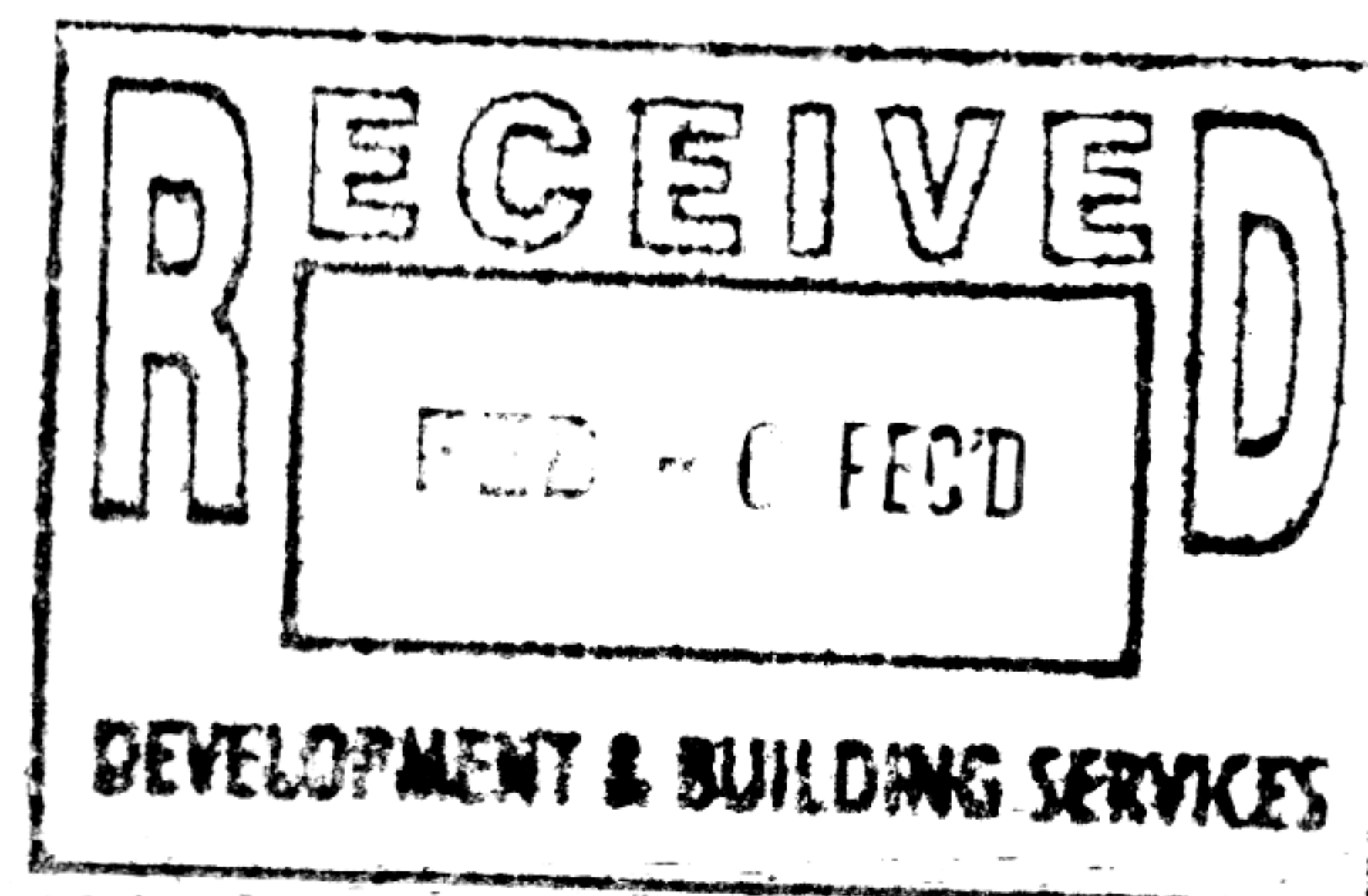
6" waterline for Merida Street from East property line to 90th Street (West Property line)

6" waterline for Monterrer Ct from Mazatlan St to West property line (90th Street)

6" waterline for Matamoros Ct from Mazatlan St. to West property line (90th Street)

6" waterline for Manzanillo Ct from Mazatlan St. to West property line (90th Street)

8" waterline for Mazatlan St from Volcano NW to Merida Street.

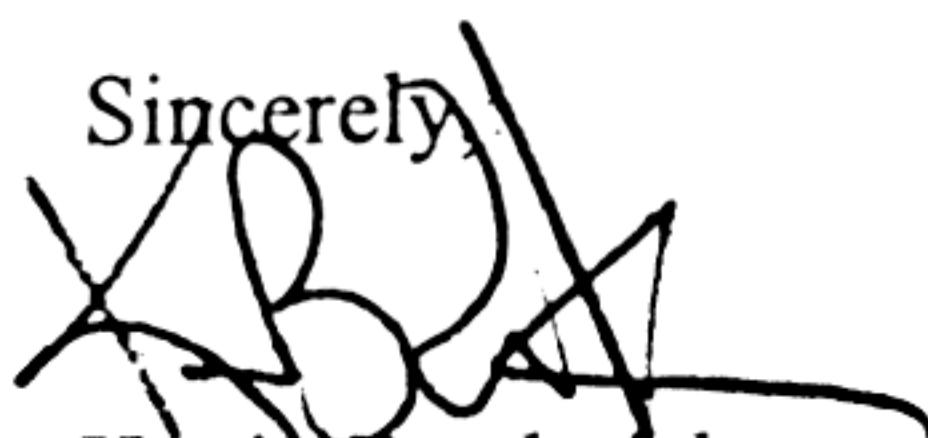


Sanitary Sewer

8" sewer line for Merida Street from East property line to 90th Street (West property line)
8" sewer line for Monterrer Ct from Mazatlan Street to West property line (90th Street)
8" sewer line for Matamoros Ct from Mazatlan St. to West property line (90th Street)
8" sewer line for Manzanillo Ct from Mazatlan St. to West property line (90th Street)
8" sewer line for Mazatlan St from Volcano NW to Merida Street.

The contractor's correction period will begin October 22, 2002 and is effective for a period of one (1) year.

Sincerely,



Kevin Broderick
Development & Bldg Services
Planning Department

c: Advanced Engineering
Albuquerque Excavators
Master Scheduler
Project Administrator
Martin Barker, Materials Testing Lab
Orvis Bartow, Water Systems
Dave Harmon, Traffic Engineering, PWD
Josie Jaramillo, New Meter Sales, PWD
George King, Maps & Records, PWD
Project No. 6608.81
Warranty:Contract



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 7, 2002

Shahab Biazar PE
Advanced Engineering and Consulting
10205 Snowflake Ct NW
Albuquerque, NM 87114

Re: West Bluff Home Park Drainage Report
Engineer's Stamp dated 10-9-02 (K9/D24)

Dear Mr. Biazar,

Based upon the information provided in your submittal dated 10-9-02, the above referenced report cannot be approved for Site Development Plan for Building Permit, Preliminary Plat or Building Permit until the following comments are addressed.

- Please provide all as-built drawings to ascertain that the storm drain in 90th is active. That is, I need to see the drawings, or the Letter of Acceptance of the section of storm drain in 90th between Volcano and Central.

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

Sincerely,

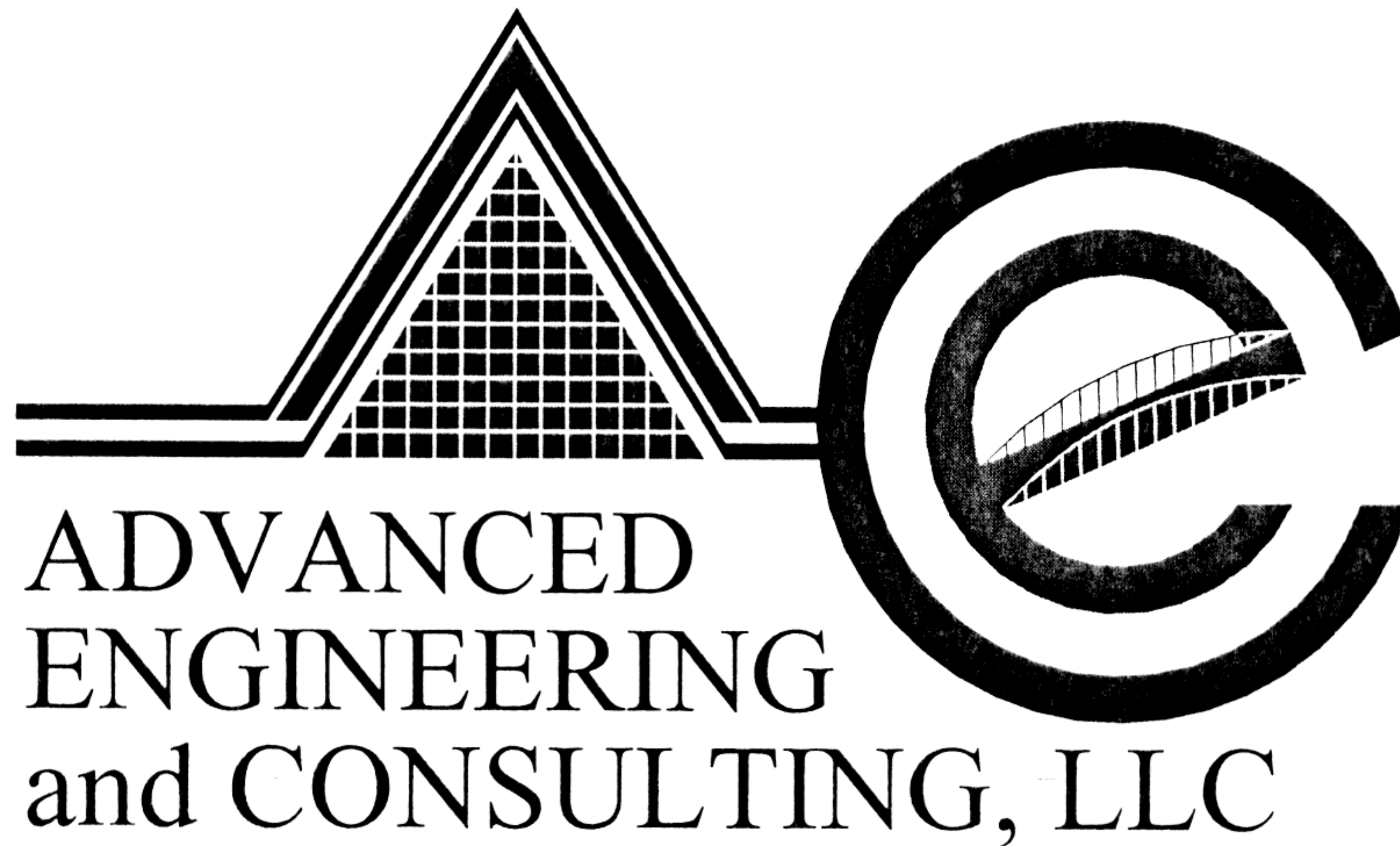
Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building

C: file

DRAINAGE REPORT
FOR

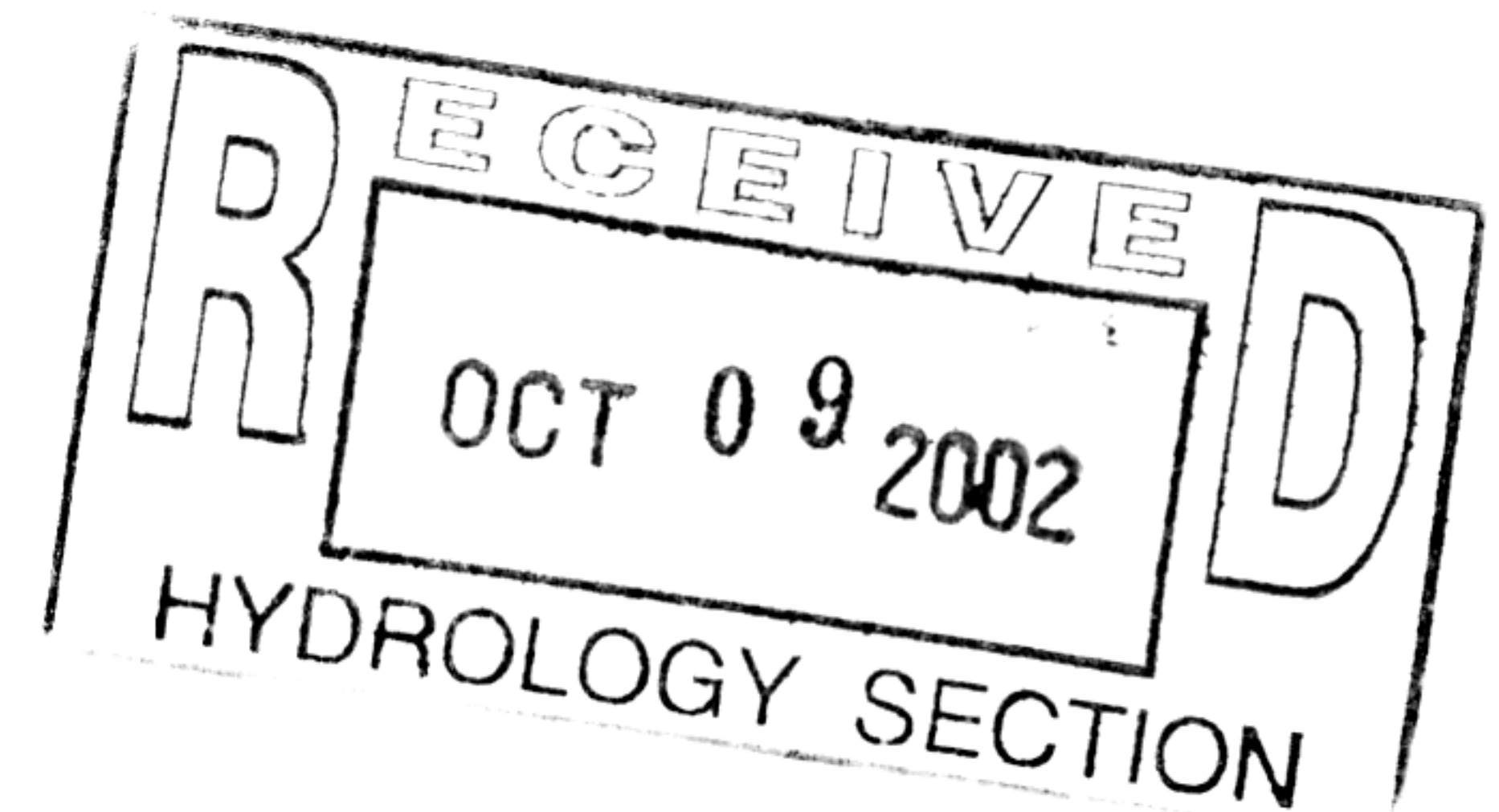
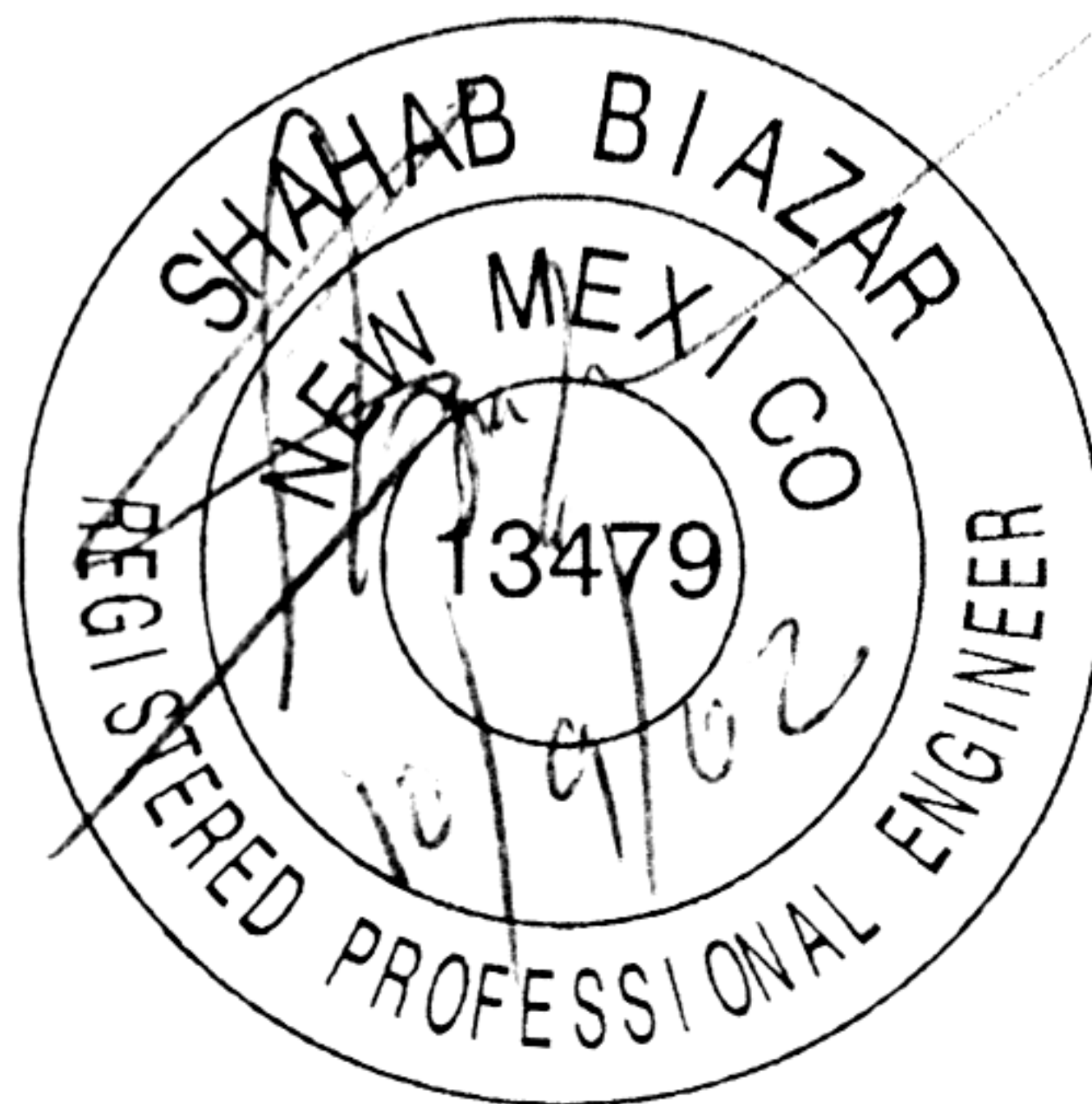
WEST BLUFF
Mobile Home Subdivision

Prepared by:



10205 Snowflake Ct. NW
Albuquerque, New Mexico 87114

October, 2002



Shahab Biazar
PE NO. 13479

Location

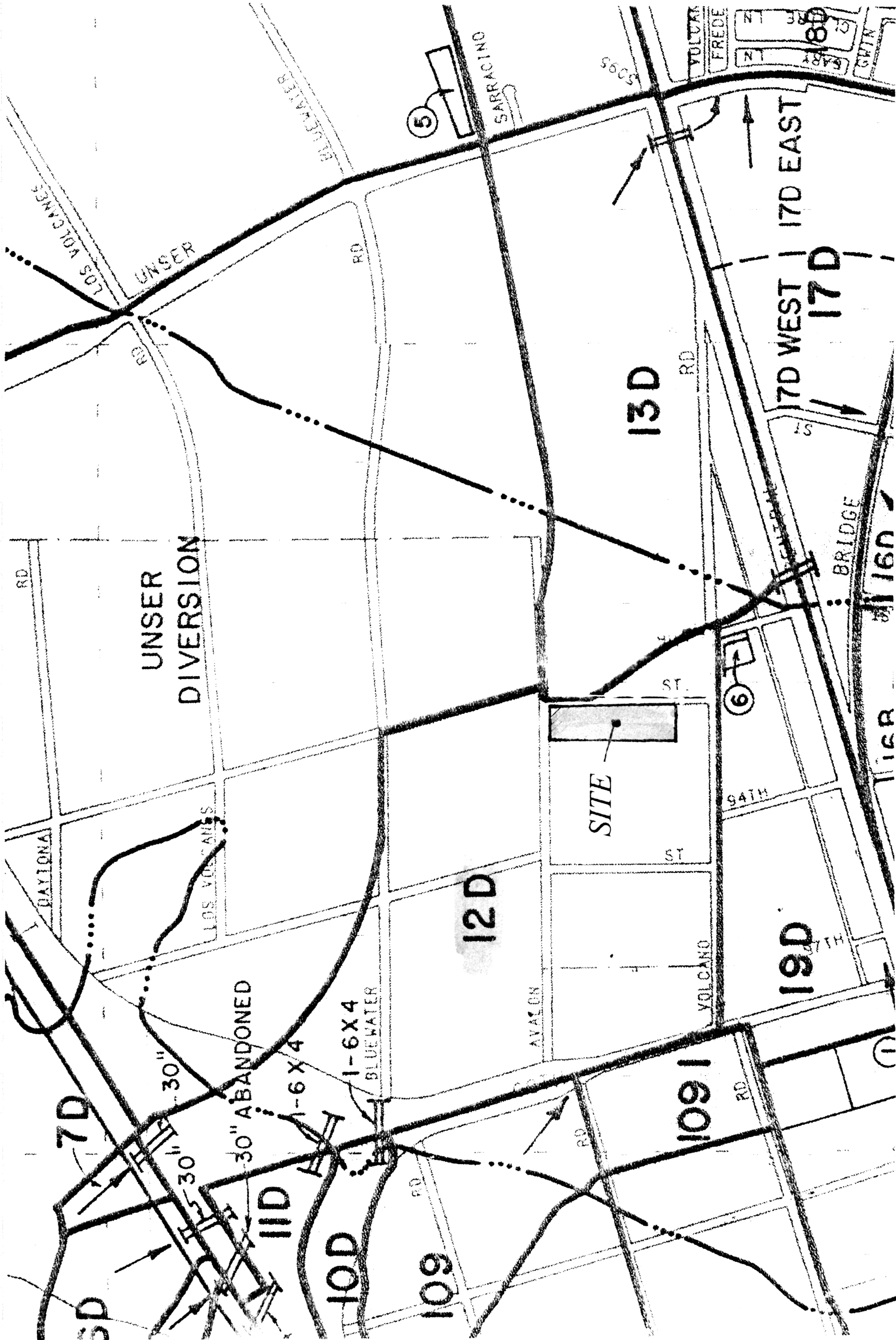
West Bluff Mobile Home Subdivision Tract 6, Lands of C.H. Hall, is located on 90th Street North of Volcano Rd. The site contains ± 4.00 acres. See attached vicinity map for location.

Purpose

Advanced Engineering and Consulting, LLC on behalf of the owners has prepared this grading and drainage solution for the proposed site. This grading and drainage plan is prepared in order to obtain site plan for subdivision approval, preliminary and final plat approval as well as grading and drainage approval and building permit approval for this site.

Existing Drainage Conditions

This site falls within the Master Drainage Basin for the Amole Del Norte (AND) system Diversion Facility prepared by Greiner. The site is part of Basin 12D of Master Drainage Basin. See attached exhibit for the location of the site in relationship to the Master Plan. The site drains to 90th Street and then to Volcano Road and then it is intercepted by existing inlets and discharged into the storm sewer system on Volcano Road. There are no offsite runoff that enters the site. There is an existing mobile home park to the west and to the south. The runoff from the MH park drains to the existing storm sewer system within the mobile home park itself. The runoff to the north drains east to an existing pond and then discharges to the storm sewer pipe in 90th Street. To the east, 90th Street, intercepts the runoff and no offsite enters the site from the east. According to the revised flood plain map 35001C0328 D dated January 24, 2000 the site does not fall within a 100-year floodplain.



ON-SITE BASIN BOUNDARY

USING GREINER'S MASTER BASIN MAP

CORPORATE LIMITS
VOLCANO ROAD

Proposed Conditions and On-Site/Offsite Drainage Management Plan

Based on the West Ridge Mobile Home Park Drainage Report (City Drainage Number K9/D6) an allowable discharge rate of 2.05 cfs per acre was determined for Basin 12D of the Master Drainage Plan prepared by Greiner. Therefore, the runoff from this site will be detained in the street and then discharge at a flow rate of 7.94 cfs which is less than allowable discharge of $(3.99 \text{ ac} \times 2.05 \text{ cfs/ac})$ 8.18 cfs. The storm sewer system is designed to detail the runoff using a 12" RCP discharge pipe. The runoff on site will be intercepted by 2 Single-A and then discharged into the existing 54" RCP on 90th Street. The runoff will be ponded on site (within the street limits) but not exceeding the top of curb elevation. ~~According to the master drainage plan the runoff has to be retained on-site until the main storm sewer is extended in Broadway. Ultimately the site will be able to free discharge into the storm sewer system. Storm sewer pipes shown on site are for future discharge of the runoff into the main storm sewer pipe within the right-of-way. See grading and drainage plan for storm sewer locations.~~

Calculations

City of Albuquerque, Development Process Manuel, Section 22.2, Hydrology Section, revised January 1993, was used for the runoff calculations. The site falls under Zone 2 based on Figure A-1 of page A-1. The street flow capacity calculation was preformed for West Bluff Street using the flow number from the entire runoff on site for 4" and 8" curb height. The runoff for both cases does not exceed the top of curb elevation. The two storm sewer inlets (Single-A) will have a drainage capacity of 60.90 cfs (under ponding conditions) and the total on site runoff is 14.36 cfs.

RUNOFF CALCULATIONS

The site is @ Zone 1

LAND TREATMENT

Based on the historical conditions:

$$A=100.00\%$$

Based on the developed conditions:

$$D = 7 \sqrt{(N^2 + 5N)}, \quad \text{Where } N=\text{units/acre}, N \leq 6 \quad (\text{From DPM Section 22.2-Hydrology, Page A5, Table A-5})$$

$$N = 29/4.00 = 7.25 > 6, \text{ Therefore use the following treatments}$$

$$A=0.0\%, B=20\%, C=20\%, D=60\%$$

DEPTH (INCHES) @ 100-YEAR STORM

$$P_{60} = 1.87 \text{ inches}$$

$$P_{360} = 2.20 \text{ inches}$$

$$P_{1440} = 2.66 \text{ inches}$$

DEPTH (INCHES) @ 10-YEAR STORM

$$\begin{aligned} P_{60} &= 1.87 \times 0.667 \\ &= 1.25 \text{ inches} \end{aligned}$$

$$P_{360} = 1.47$$

$$P_{1440} = 1.77$$

See the summary output from AHYMO calculations.

Also see the following summary tables.

RUNOFF CALCULATION RESULTS

BASIN	AREA (SF)	AREA (AC)	AREA (MI²)
ON-SITE	173801.20	3.9899	0.006234

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS	TREATMENT A, B, C, D
ON-SITE	14.36	8.66	0%, 20%, 20%, 60%

EXISTING

BASIN	Q-100 CFS	Q-10 CFS	TREATMENT A, B, C, D
ON-SITE	5.18	0.98	100%, 0%, 0%, 0%

INPUT FILE

```
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*****
*          100-YEAR,  6-HR STORM (UNDER EXISTING CONDITIONS)          *
*****
*
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               RAIN ONE=1.87 IN RAIN SIX=2.20 IN
               RAIN DAY=2.66 IN DT=0.03333 HR

* ON-SITE
COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.006234 SQ MI
               PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
               TP=0.1333 HR MASS RAINFALL=-1

*****
*          10-YEAR,  6-HR STORM (UNDER EXISTING CONDITIONS)          *
*****
*
START          TIME=0.0
RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.25 IN RAIN SIX=1.47 IN
               RAIN DAY=1.77 IN DT=0.03333 HR

* ON-STIE
COMPUTE NM HYD ID=1 HYD NO=111.0 AREA=0.006234 SQ MI
               PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
               TP=0.1333 HR MASS RAINFALL=-1

*****
*          100-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
*****
*
START          TIME=0.0
RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.87 IN RAIN SIX=2.20 IN
               RAIN DAY=2.66 IN DT=0.03333 HR

* ON-SITE
COMPUTE NM HYD ID=1 HYD NO=101.1 AREA=0.006234 SQ MI
               PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
               TP=0.1333 HR MASS RAINFALL=-1

*****
*          10-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
*****
*
START          TIME=0.0
RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.25 IN RAIN SIX=1.47 IN
               RAIN DAY=1.77 IN DT=0.03333 HR

* ON-SITE
COMPUTE NM HYD ID=1 HYD NO=111.1 AREA=0.006234 SQ MI
               PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
               TP=0.1333 HR MASS RAINFALL=-1

*
FINISH
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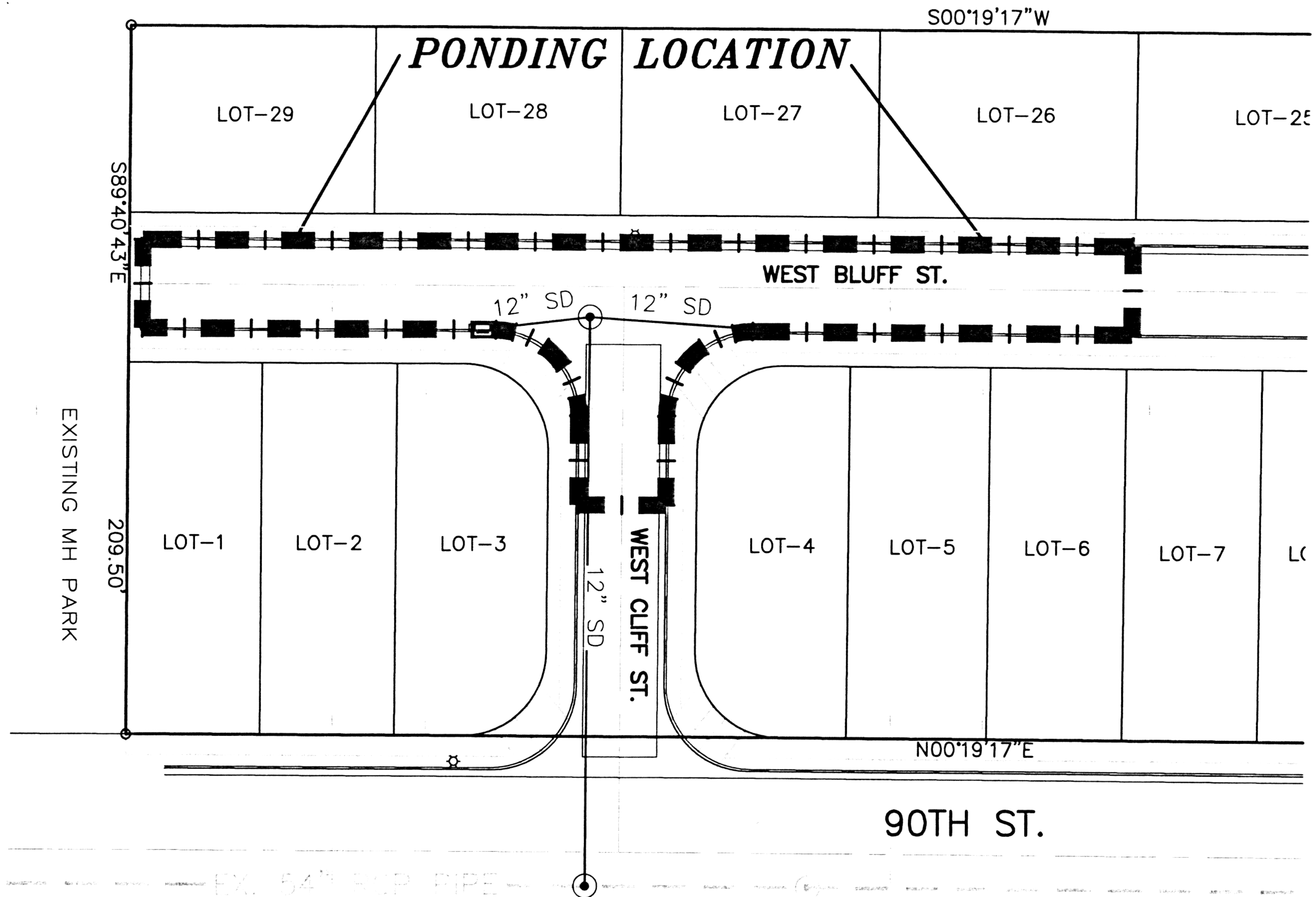

SUMMARY OUTPUT FILE

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = 200226

- VERSION: 1997.02d

RUN DATE (MON/DAY/YR) =07/24/2002
USER NO. = AHYMO-I-9702c01000R31-AH

[illegible]



PONDING LOCATION

NTS

VOLUME CALCULATIONS

DETENTION POND

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

Volume = Ab * D + 0.5 * C * D²

C = (At - Ab) / Dt

Ab = 13.59
At = 8,153.15
Dt = 1.00
C = 8139.56

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
5160.09	0.00	0	0.00
5161.09	1.00	0.0003	2.67
5162.09	2.00	0.0006	4.63
5163.09	3.00	0.0009	5.98
5164.09	4.00	0.0012	7.07
5164.19	4.10	0.0022	7.18
5164.29	4.20	0.0050	7.27
5164.39	4.30	0.0098	7.37
5164.49	4.40	0.0163	7.47
5164.59	4.50	0.0248	7.56
5164.69	4.60	0.0351	7.66
5164.79	4.70	0.0472	7.75
5164.89	4.80	0.0613	7.84
5164.99	4.90	0.0772	7.93
5165.09	5.00	0.0950	8.02

Orifice Equation
Q = CA SQRT(2gH)

C = 0.6
Diameter (in) 12
Area (ft²)= 0.79
g = 32.2
H (Ft) = Depth of water above center of orifice
Q (CFS)= Flow

INPUT FILE

```
*
* PONDING CONDITIONS
*
*****
*          100-YEAR,  6-HR STORM (UNDER PROPOSED CONDITIONS)          *
*****
*
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RAINFALL       TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.87 IN RAIN SIX=2.20 IN
               RAIN DAY=2.66 IN DT=0.03333 HR

* ON-SITE
COMPUTE NM HYD      ID=1 HYD NO=101.1 AREA=0.006234 SQ MI
                   PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
                   TP=0.1333 HR MASS RAINFALL=-1
*****
*          PONDING CONDITION          *
*****
*
ROUTE RESERVOIR    ID=10 HYD NO=501.1 INFLOW ID=1 CODE=24
                   OUTFLOW(CFS)      STORAGE(AC-FT)  ELEVATION(FT)
                   0.00              0.0000         5160.09
                   2.67              0.0003         5161.09
                   4.63              0.0006         5162.09
                   5.98              0.0009         5163.09
                   7.07              0.0012         5164.09
                   7.18              0.0022         5164.19
                   7.27              0.0050         5164.29
                   7.37              0.0098         5164.39
                   7.47              0.0163         5164.49
                   7.56              0.0248         5164.59
                   7.66              0.0351         5164.69
                   7.75              0.0472         5164.79
                   7.84              0.0613         5164.89
                   7.93              0.0772         5164.99
                   8.02              0.0950         5165.09

*
*****
*
FINISH
```


AHYMO OUTPUT FILE

(PONDING @ THE INLET)

AHYMO PROGRAM (AHYMO_97) - - Version: 1997.02d
RUN DATE (MON/DAY/YR) = 09/26/2002
START TIME (HR:MIN:SEC) = 11:18:41 USER NO.= AHYMO-I-9702c01000R31-AH
INPUT FILE = 2226-PD

*
* PONDING CONDITIONS
*

* 100-YEAR, 6-HR STORM (UNDER PROPOSED CONDITIONS) *

*

START TIME=0.0
RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=1.87 IN RAIN SIX=2.20 IN
RAIN DAY=2.66 IN DT=0.03333 HR

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

DT =	.033330 HOURS	END TIME =	5.999400 HOURS
.0000	.0016	.0033	.0050
.0067	.0085	.0103	.0122
.0141	.0160	.0180	.0201
.0222	.0243	.0266	.0289
.0312	.0337	.0362	.0388
.0415	.0443	.0472	.0502
.0534	.0567	.0601	.0637
.0675	.0715	.0758	.0809
.0865	.0924	.1050	.1334
.1771	.2398	.3254	.4379
.5814	.7600	.9780	1.1804
1.2649	1.3363	1.3997	1.4575
1.5106	1.5600	1.6061	1.6493
1.6900	1.7284	1.7646	1.7989
1.8314	1.8623	1.8915	1.9193
1.9456	1.9518	1.9576	1.9630
1.9682	1.9732	1.9780	1.9825
1.9869	1.9912	1.9953	1.9993
2.0031	2.0068	2.0104	2.0140
2.0174	2.0207	2.0240	2.0272
2.0303	2.0333	2.0363	2.0392
2.0420	2.0448	2.0475	2.0502
2.0528	2.0554	2.0580	2.0605
2.0629	2.0653	2.0677	2.0700
2.0723	2.0746	2.0768	2.0790
2.0812	2.0833	2.0855	2.0875
2.0896	2.0916	2.0936	2.0956
2.0976	2.0995	2.1014	2.1033
2.1051	2.1070	2.1088	2.1106
2.1124	2.1141	2.1159	2.1176
2.1193	2.1210	2.1227	2.1244
2.1260	2.1276	2.1292	2.1308
2.1324	2.1340	2.1355	2.1371
2.1386	2.1401	2.1416	2.1431
2.1446	2.1460	2.1475	2.1489
2.1504	2.1518	2.1532	2.1546
2.1560	2.1573	2.1587	2.1600
2.1614	2.1627	2.1640	2.1654
2.1667	2.1680	2.1692	2.1705
2.1718	2.1731	2.1743	2.1756
2.1768	2.1780	2.1792	2.1804
2.1817	2.1829	2.1840	2.1852
2.1864	2.1876	2.1887	2.1899
2.1910	2.1922	2.1933	2.1944
2.1956	2.1967	2.1978	2.1989
2.1999	2.2000		

* ON-SITE
COMPUTE NM HYD ID=1 HYD NO=101.1 AREA=0.006234 SQ MI
PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 14.767 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.8700
AREA = .003740 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N = 3.992480
UNIT PEAK = 6.6347 CFS UNIT VOLUME = .9984 B = 354.67 P60 = 1.8700
AREA = .002494 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

* PONDING CONDITION *

*

ROUTE RESERVOIR	ID=10	HYD NO=501.1	INFLOW ID=1	CODE=24
	OUTFLOW (CFS)	STORAGE (AC-FT)	ELEVATION (FT)	
	0.00	0.0000	5160.09	
	2.67	0.0003	5161.09	
	4.63	0.0006	5162.09	
	5.98	0.0009	5163.09	
	7.07	0.0012	5164.09	
	7.18	0.0022	5164.19	
	7.27	0.0050	5164.29	
	7.37	0.0098	5164.39	
	7.47	0.0163	5164.49	
	7.56	0.0248	5164.59	
	7.66	0.0351	5164.69	
	7.75	0.0472	5164.79	
	7.84	0.0613	5164.89	
	7.93	0.0772	5164.99	
	8.02	0.0950	5165.09	

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5160.09	.000	.00
.80	.00	5160.09	.000	.00
1.60	10.19	5164.98	.075	7.92
2.40	.56	5160.31	.000	.59
3.20	.10	5160.13	.000	.10
4.00	.06	5160.11	.000	.06
4.80	.06	5160.11	.000	.06
5.60	.07	5160.12	.000	.07
6.40	.01	5160.09	.000	.01
PEAK DISCHARGE = 7.943 CFS - PEAK OCCURS AT HOUR 1.67				
MAXIMUM WATER SURFACE ELEVATION = 5165.004				
MAXIMUM STORAGE = .0797 AC-FT INCREMENTAL TIME= .033330HRS				

*

*

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 11:18:41

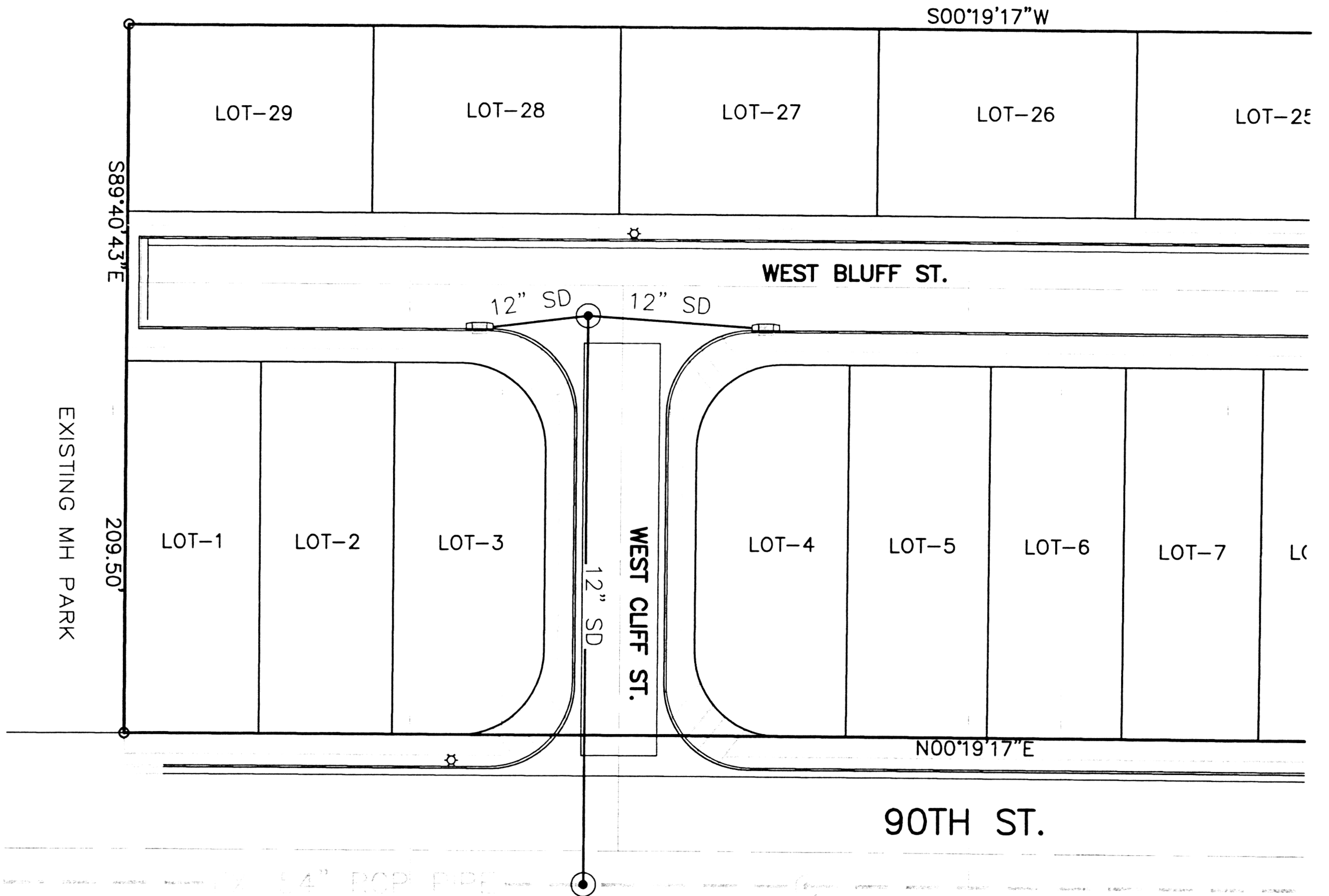
SUMMARY OUTPUT FILE

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = 2226-PD

- VERSION: 1997.02d

RUN DATE (MON/DAY/YR) =09/26/2002
USER NO. = AHYMO-I-9702c01000R31-AH

[illegible]



STORM SEWER LOCATION

NTS

STORM DROP INLET DRAINAGE CAPACITY

Single 'A' (in ponding conditions)

Area at the grate:

$$\begin{aligned} L &= 44 \frac{3}{8}'' - 2(6''_{\text{ends}}) - 7(\frac{1}{2}''_{\text{middle bars}}) \\ &= 28 \frac{7}{8}'' \\ &= 2.41' \end{aligned}$$

$$\begin{aligned} W &= 25 \frac{1}{2}'' - 13(\frac{1}{2}''_{\text{middle bars}}) \\ &= 19'' \\ &= 1.58' \end{aligned}$$

$$\begin{aligned} \text{Area} &= 2.41' \times 1.58' \\ &= 3.81 \text{ ft}^2 \end{aligned}$$

$$\begin{aligned} \text{Effective Area} &= 3.81 - 3.81 (0.5_{\text{clogging factor}}) \\ &= 1.91 \text{ ft}^2 \text{ at the grate} \end{aligned}$$

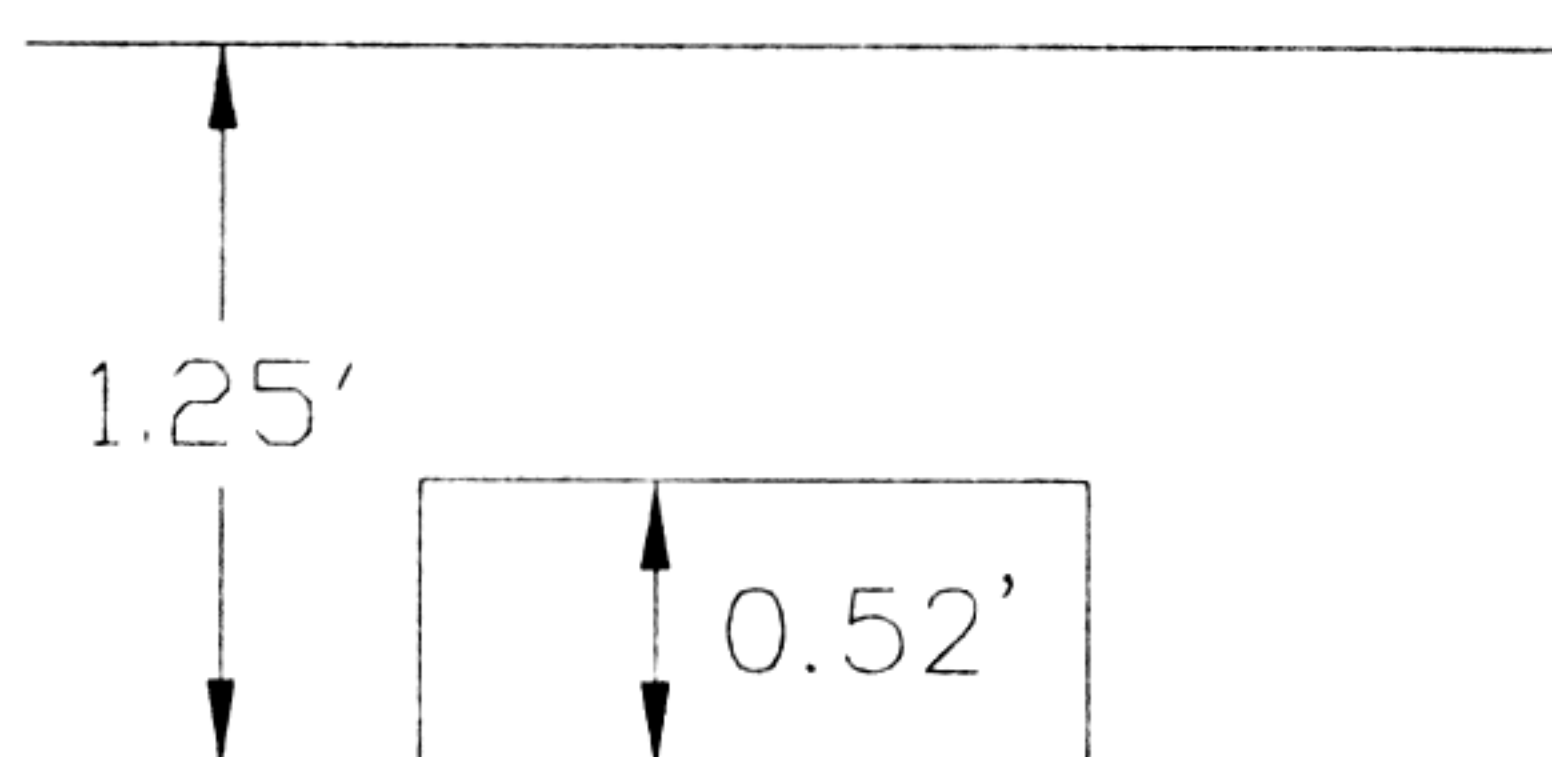
Area at the throat:

$$L = 7.45'$$

$$\begin{aligned} H &= 10 \frac{3}{4}'' - 4 \frac{1}{2}'' \\ &= 6 \frac{1}{4}'' \\ &= 0.5208' \end{aligned}$$

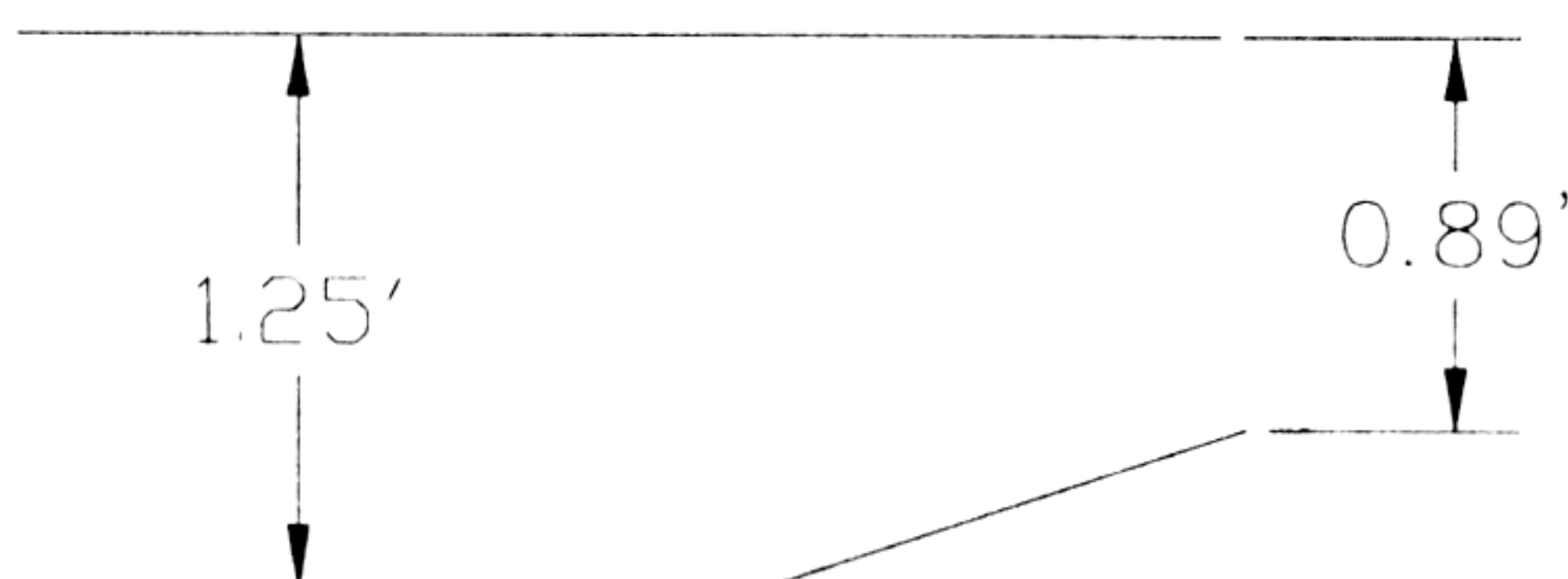
$$\begin{aligned} \text{Area} &= 7.45' \times 0.5208' \\ &= 3.88 \text{ ft}^2 \text{ at the throat} \end{aligned}$$

THROAT



$$\begin{aligned} H &= 1.25 \\ Q &= CA\sqrt{2gH} \\ Q &= 0.60(3.88)\sqrt{2(32.2)(1.25)} \\ Q &= 20.89 \text{ CFS} \end{aligned}$$

GRATE



$$\begin{aligned} H &= (1.25 + 0.89)/2 = 1.08 \\ Q &= CA\sqrt{2gH} \\ Q &= 0.60(1.91)\sqrt{2(32.2)(1.08)} \\ Q &= 9.56 \text{ CFS} \end{aligned}$$

TOTAL

$$Q = 20.89 + 9.56 = 30.45 \text{ CFS}$$

Total on site runoff is only 14.36 cfs and we will have two single A on site.

FINDING STREET CAPACITY - 26 F-F CROSS-SECTION FOR 4" CURB

$$Q = 1.49/n A R^{(2/3)} S^{1/2}$$

$$n = 0.017$$

SLOPE = STREET SLOPE

$$R^{2/3} = (A/P)^{2/3}$$

$$D2 = \text{HYDRAULIC DEPTH AFTER HYDRAULIC JUMP} = D1/2 [\text{SQRT}(1 + 8Fr^2) - 1]$$

HALF STREET CALCULATIONS

$$@ Y < 0.0625$$

$$A1 = \frac{1}{2} Y (Y/0.03125) = 16Y^2$$

$$P1 = \text{SQRT}[Y^2 + (Y/0.03125)^2] + Y = \text{SQRT}(1025 Y^2) + Y$$

$$@ 0.0625 < Y < 0.2825 \quad \& \quad Y1 = Y - 0.0625$$

$$A2 = A1 + \frac{1}{2} Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1^2 + 2Y1$$

$$P2 = P1 + \text{SQRT}[Y1^2 + (Y1/0.02)^2] + Y1 = P1 + \text{SQRT}(2501 Y^2) + Y1$$

$$@ 0.2825 < Y < 0.333 \quad \& \quad Y2 = Y - 0.2825$$

$$A3 = A2 + 13Y2$$

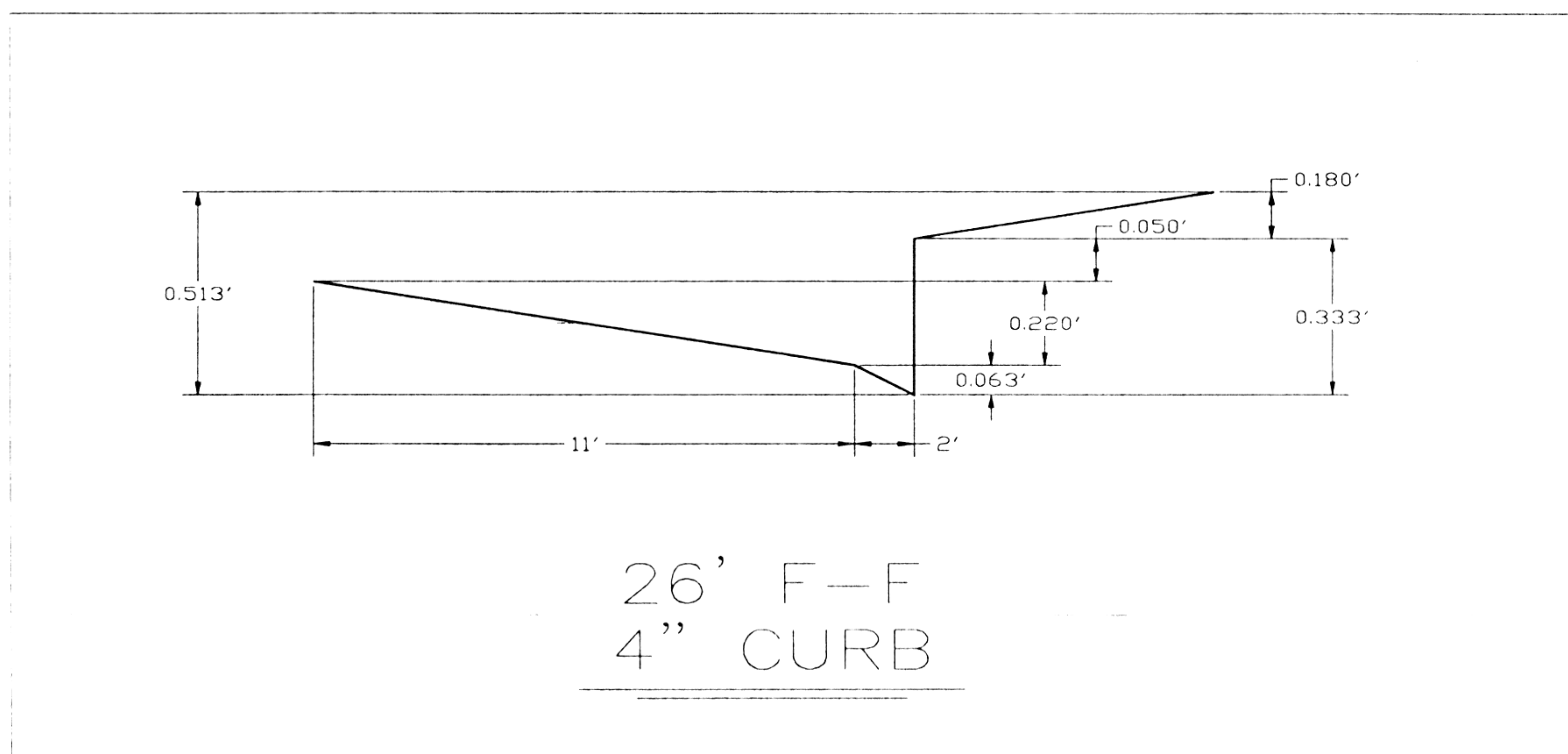
$$P3 = P2 + Y2$$

$$@ 0.333 < Y < 0.513 \quad \& \quad Y3 = Y - 0.333$$

$$A4 = A3 + 13Y3 + \frac{1}{2} Y3 [Y3/(0.02)] = A3 + 13 Y3 + 25 Y3^2$$

$$P4 = P3 + \text{SQRT}(Y3^2 + [Y3/(0.02)]^2) = P3 + \text{SQRT}(2501 Y3^2)$$

SEE THE FOLLOWING SHEET FOR CALCULAITON



26 F-F STREET CROSS-SECTION (4" CURB)

FINDING STREET CAPACITY

$$Q = 1.49 / n A (A/P)^{2/3} S^{1/2}$$

$$n = 0.017$$

$$\text{SLOPE} = 0.01370$$

HALF STREET CALCULATIONS

$$@Y > 0.0625$$

$$A1 = \frac{1}{2} Y (Y/0.03125) = 16Y^2$$

$$P1 = \text{SQRT}[Y^2 + (Y/0.03125)^2] + Y = \text{SQRT}(1025 Y^2) + Y$$

FULL STREET FLOW

Y (FT)	A	P	(A/P) ^{2/3}	Q	2Q	V	Fr	D*V	D2
0.0250	0.0100	0.8254	0.0528	0.01	0.01	0.54	0.60	0.01349	0.01
0.0500	0.0400	1.6508	0.0837	0.03	0.07	0.86	0.68	0.04284	0.03
0.0625	0.0625	2.0635	0.0972	0.06	0.12	0.99	0.03	0.06213	0.00

$$@ 0.0625 < Y < 0.2825 \quad \& \quad Y1 = Y - 0.0625$$

$$A2 = A1 + \frac{1}{2} Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1^2 + 2Y1$$

$$P2 = P1 + \text{SQRT}[Y1^2 + (Y1/0.02)^2] + Y1 = P1 + \text{SQRT}(2501 Y^2) + Y1$$

0.1000	0.1727	3.9764	0.1235	0.22	0.44	1.26	0.70	0.1264	0.06
0.1500	0.4289	6.5269	0.1628	0.71	1.43	1.67	0.76	0.2499	0.10
0.2000	0.8102	9.0774	0.1997	1.66	3.31	2.04	0.81	0.4087	0.15
0.2500	1.3164	11.6279	0.2340	3.15	6.30	2.39	0.84	0.5986	0.20
0.2825	1.7125	13.2857	0.2552	4.47	8.94	2.61	0.87	0.7375	0.23

$$@ 0.2825 < Y < 0.333 \quad \& \quad Y2 = Y - 0.2825$$

$$A3 = A2 + 13Y2$$

$$P3 = P2 + Y2$$

0.3000	1.9400	13.3032	0.2771	5.50	11.00	2.83	0.91	0.8504	0.26
0.3100	2.0700	13.3132	0.2892	6.12	12.25	2.96	0.94	0.9171	0.28
0.3260	2.2780	13.3292	0.3080	7.18	14.36	3.15	0.97	1.0272	0.31
0.3333	2.3729	13.3365	0.3163	7.68	15.36	3.24	0.99	1.0788	0.33

$$@ 0.333 < Y < 0.513 \quad \& \quad Y3 = Y - 0.333$$

$$A4 = A3 + 13Y2 + \frac{1}{2} Y2 [Y3/(0.02)] = A3 + 13 Y3 + 25 Y3^2$$

$$P4 = P3 + \text{SQRT}(Y3^2 + [Y3/(0.02)]^2) = P3 + \text{SQRT}(2501 Y3^2)$$

0.4000	3.4179	16.6721	0.3477	12.16	24.32	3.56	0.99	1.4229	0.40
0.4500	4.3472	19.1726	0.3718	16.54	33.08	3.80	1.00	1.7120	0.45
0.5000	5.4014	21.6731	0.3960	21.89	43.77	4.05	1.01	2.0259	0.51
0.5130	5.6960	22.3233	0.4023	23.44	46.89	4.12	1.01	2.1115	0.52

FINDING STREET CAPACITY - 26 F-F CROSS-SECTION FOR 8" CURB

$$Q = 1.49/n A R^{(2/3)} S^{1/2}$$

$$n = 0.017$$

SLOPE = STREET SLOPE

$$R^{2/3} = (A/P)^{2/3}$$

$$D2 = \text{WATER DEPTH AFTER HYDRAULIC JUMP} = D1/2 [\text{SQRT}(1 + 8Fr^2) - 1]$$

HALF STREET CALCULATIONS

$$@ Y < 0.125$$

$$A1 = \frac{1}{2} Y (Y/0.0625) = 8Y^2$$

$$P1 = \text{SQRT}[Y^2 + (Y/0.0625)^2] + Y = \text{SQRT}(257 Y^2) + Y$$

$$@ 0.125 < Y < 0.345 \quad \& \quad Y1 = Y - 0.125$$

$$A2 = A1 + \frac{1}{2} Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1^2 + 2Y1$$

$$P2 = P1 + \text{SQRT}[Y1^2 + (Y1/0.02)^2] + Y1 = P1 + \text{SQRT}(2501 Y1^2) + Y1$$

$$@ 0.345 < Y < 0.667 \quad \& \quad Y2 = Y - 0.345$$

$$A3 = A2 + 13Y2 + \frac{1}{2} Y2 [Y2/(0.02)] = A2 + 13 Y2$$

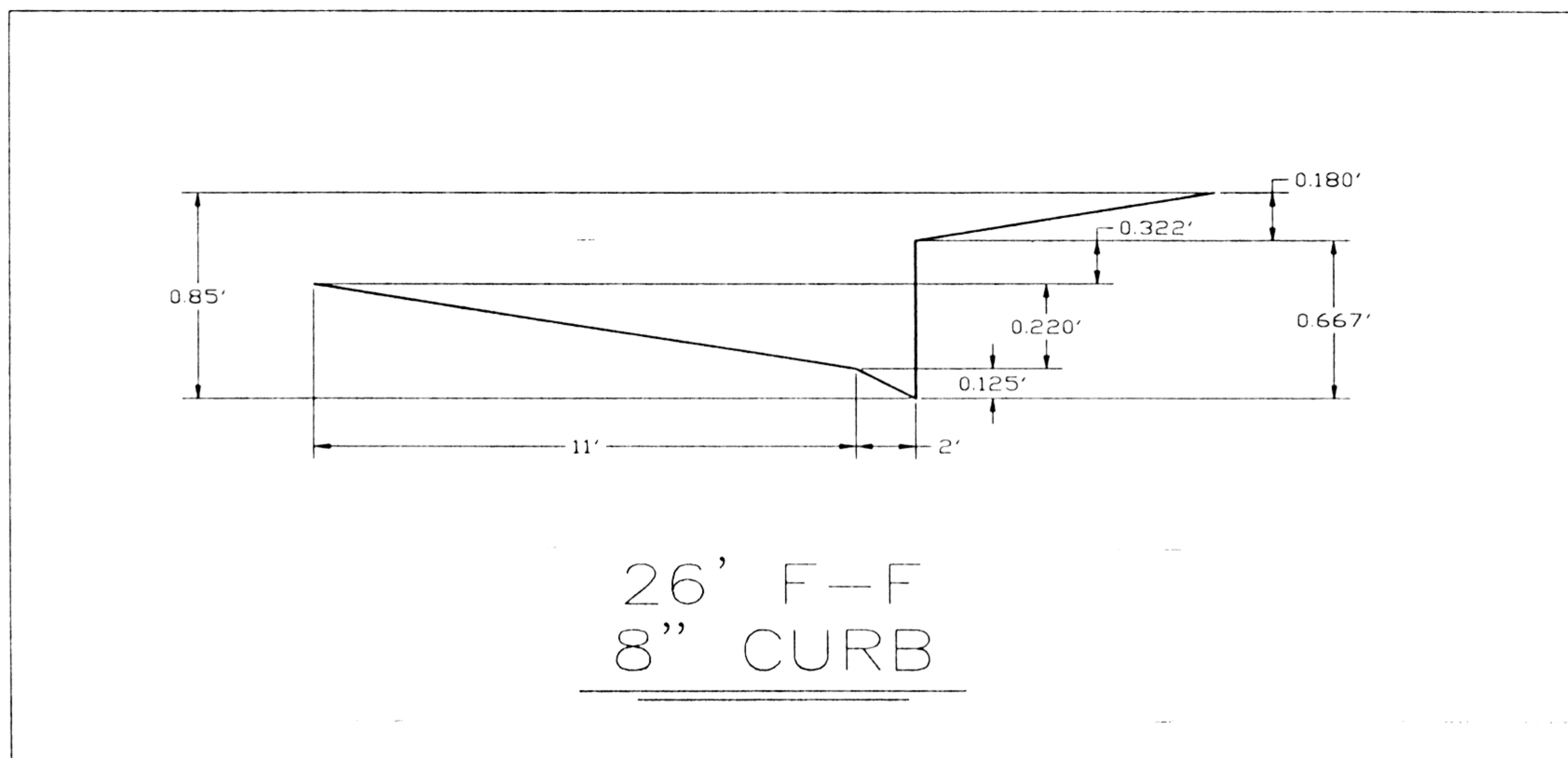
$$P3 = P2 + \text{SQRT}(Y2^2 + [Y2/(0.02)]^2) = P2 + Y2$$

$$@ 0.667 < Y < 0.847 \quad \& \quad Y3 = Y - 0.667$$

$$A4 = A3 + 13Y3 + \frac{1}{2} Y3 [Y3/(0.02)] = A3 + 13 Y3 + 25 Y3^2$$

$$P4 = P3 + \text{SQRT}(Y3^2 + [Y3/(0.02)]^2) = P3 + \text{SQRT}(2501 Y3^2)$$

SEE THE FOLLOWING SHEET FOR CALCULAITON



26 F-F STREET CROSS-SECTION (8" CURB)

FINDING STREET CAPACITY

$$Q = 1.49 / n A (A/P)^{2/3} S^{1/2}$$

$$n = 0.017$$

$$\text{SLOPE} = 0.0137$$

HALF STREET CALCULATION

$$@Y < 0.125$$

$$A1 = \frac{1}{2} Y (Y / 0.0625) = 8 Y^2$$

$$P1 = \text{SQRT}[Y^2 + (Y / 0.0625)^2] + Y = \text{SQRT}(257 Y^2) + Y$$

Y (FT)	A	P	(A/P) ^{2/3}	Q	2Q	V	Fr	D*V	D2
0.0250	0.0050	0.4258	0.0517	0.00	0.01	0.53	0.59	0.013215	0.01
0.0500	0.0200	0.8516	0.0820	0.02	0.03	0.84	0.66	0.041954	0.03
0.1250	0.1250	2.1289	0.1511	0.19	0.39	1.55	0.04	0.193201	0.00

FULL STREET FLOW

$$@ 0.125 < Y < 0.345 \quad \& \quad Y1 = Y - 0.125$$

$$A2 = A1 + \frac{1}{2} Y1(Y1 / 0.02) + 2 Y1 = A1 + 25 Y1^2 + 2 Y1$$

$$P2 = P1 + \text{SQRT}[Y1^2 + (Y1 / 0.01)^2] + Y1 = P1 + \text{SQRT}(2501 Y1^2) + Y1$$

0.2000	0.4156	6.0797	0.1672	0.71	1.42	1.71	0.67	0.342118	0.12
0.2500	0.7656	8.6302	0.1989	1.56	3.12	2.04	0.72	0.508786	0.16
0.3000	1.2406	11.1807	0.2309	2.93	5.86	2.36	0.76	0.708762	0.21
0.3450	1.7750	13.4761	0.2589	4.70	9.40	2.65	0.79	0.913774	0.25

$$@ 0.345 < Y < 0.6667 \quad \& \quad Y2 = Y - 0.385$$

$$A3 = A2 + 16 Y2$$

$$P3 = P2 + Y2$$

0.3500	1.8550	13.4811	0.2665	5.06	10.12	2.73	0.81	0.95443	0.26
0.3773	2.2910	13.5084	0.3064	7.18	14.36	3.13	0.90	1.182609	0.33
0.5000	4.2550	13.6311	0.4602	20.03	40.07	4.71	1.17	2.354033	0.62
0.6667	6.9217	13.7978	0.6313	44.71	89.42	6.46	1.39	4.306368	1.02

$$@ 0.6667 < Y < 0.8467 \quad \& \quad Y3 = Y - 0.6667$$

$$A4 = A3 + 16 Y3 + \frac{1}{2} (Y3) (Y3 / 0.02) = A3 + 16 Y3 + 25 Y3^2$$

$$P4 = P3 + \text{SQRT}(Y3^2 + (Y3 / 0.02)^2) = P3 + \text{SQRT}(2501 Y3^2)$$

0.7000	7.4828	15.4646	0.6163	47.19	94.37	6.31	1.33	4.414119	1.01
0.7500	8.4286	17.9651	0.6038	52.07	104.14	6.18	1.26	4.633137	1.01
0.8000	9.4994	20.4656	0.5995	58.27	116.53	6.13	1.21	4.90684	1.02
0.8467	10.6125	22.8011	0.6006	65.21	130.42	6.14	1.18	5.202761	1.05