CITY OF ALBUQUERQUE

May 1, 2006

Mr. Shahab Biazar, PE
ADVANCED ENGINEERING AND CONSULTING, LLC
4416 Anaheim Avenue NE
Albuquerque, NM 87113

RE: CIELO LINDO SUBDIVISION (M-11/D5)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 12/06/2004
Engineers Certification dated 04/27/2006

Dear Shahab:

Based upon the information provided in your Engineer's Certification Submittal dated 04/27/2006, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, you can contact me at 924-3982

Sincerely,

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 594085
File

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Cielo Lindo Subdivision ZONE ATLAS/DRG. FILE #: M11 / D5

DRB #: _____ EPC #: _____ WORK ORDER #: 594085

LEGAL DESCRIPTION: TRACT C, LAND OF POLO CHAVEZ, AND TRACTS A-1, A-2, SAN JOSE TRACT

CITY ADDRESS: _____

ENGINEERING FIRM: *Advanced Engineering and Consulting, LLC* CONTACT: Shahab Biazar

ADDRESS: 4416 Anaheim Ave., NE PHONE: (505) 899-5570

CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87113

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

____	DRAINAGE REPORT
____	DRAINAGE PLAN 1ST SUBMITTAL, REQUIRES TCL OR EQUAL
____	CONCEPTUAL GRADING & DRAINAGE PLAN
____	GRADING PLAN
____	EROSION CONTROL PLAN
X	ENGINEER'S CERTIFICATION (HYDROLOGY)
____	CLOMR / LOMR
____	TRAFFIC CIRCULATION LAYOUT (TCL)
____	ENGINEER'S CERTIFICATION (TCL)
____	ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
____	OTHER

CHECK TYPE OF APPROVAL SOUGHT:

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

WAS A PRE-DESIGN CONFERENCE ATTENDED:

____ YES

X NO

____ COPY PROVIDED

RECEIVED
APR 27 2006
HYDROLOGY SECTION

DATE SUBMITTED: 4 / 27 / 2006 BY: Shahab Biazar, P.E.

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

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

ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection
Surveying

April 27, 2006

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

RE: FINAL CERTIFICATION OF GRADING AND DRAINAGE FOR CEILO LINDO SUBDIVISION (M11/D5)

Dear Mr. Bingham:

This letter is in request of approval of Final Certification of Grading and Drainage for Cielo Lindo Subdivision. I Shahab Biazar, NMPE, of the Advanced Engineering, LLC hereby certify that project has been graded and will drain in substantial compliance with and design intent of the approved plan dated 12/06/2004. All the storm drain infrastructure are built. The retaining walls have been constructed. All the pavement and curb and gutter are in place. The pads are graded. Attached please find a copy of the as-built grades.

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

Sincerely yours,

Shahab Biazar, P.E.

RECEIVED
APR 27 2006
HYDROLOGY SECTION

4416 Anaheim Ave., N.E., Albuquerque, NM 87113 PH (505) 899-5570 FAX (505) 897-4996 EMAIL AECLLC@aol.com

CITY OF ALBUQUERQUE

December 17, 2004

Shahab Biazar PE
Advanced Engineering and Consulting
4416 Anaheim Ave NE
Albuquerque, NM 87113

Re: Cielo Lindo Subdivision Drainage Report
Engineer's Stamp dated 12-6-04 (M11/D5)

Dear Mr. Biazar,

Based upon the information provided in your submittal dated 12-6-04, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

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

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

Sincerely,

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

C: Chuck Caruso, DMD
file

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

New Mexico
Department of Transportation

INTRA-DEPARTMENTAL CORRESPONDENCE

SUBJECT: Cielo Lindo Subdivision
In Albuquerque

DATE: October 13, 2004

TO: Tony Abbo
Traffic Engineer, District 3

FILE REFERENCE:

File M11/05

FROM: Reza Afaghpour R.A.
Drainage Development Engineer

I have reviewed the drainage report for the subject project and the following are my comments. Advanced Engineering and Consulting, LLC is the design consultant for the project. They have proposed to move the existing detention pond that serves the Puno De Tierra Subdivision and relocate it to the east end of Ceilo Lindo Subdivision. The pond will then discharge to a drop inlet on Coors Boulevard at a discharge rate of 0.73 cfs. Currently, the discharge to Coors Boulevard is approximately 14 CFS, so the proposal will improve the drainage condition on Coors. This design is acceptable.

If you have any further questions, please contact me at 827-5329.

xc: Max Valerio
Rae Van Hoven
Brad Bingham, City of Albuquerque Hydrology
Shahab Biazar, Advanced Engineering and Consulting, LLC
File

DRAINAGE INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Cielo Lindo Subdivision ZONE ATLAS/DRG. FILE #: M11 / D5

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: TRACT C, LAND OF POLO CHAVEZ, AND TRACTS A-1, A-2, SAN JOSE TRACT

CITY ADDRESS: 5010 JEFFERSON BLVD NE

ENGINEERING FIRM: *Advanced Engineering and Consulting, LLC* CONTACT: Shahab Biazar

ADDRESS: 4416 Anaheim Ave., NE PHONE: (505) 899-5570

CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87113

OWNER: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

ARCHITECT: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

____	DRAINAGE REPORT
____	DRAINAGE PLAN 1ST SUBMITTAL, REQUIRES TCL OR EQUAL
____	CONCEPTUAL GRADING & DRAINAGE PLAN
X	GRADING PLAN
____	EROSION CONTROL PLAN
____	ENGINEER'S CERTIFICATION (HYDROLOGY)
____	CLOMR / LOMR
____	TRAFFIC CIRCULATION LAYOUT (TCL)
____	ENGINEER'S CERTIFICATION (TCL)
____	ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
____	OTHER

CHECK TYPE OF APPROVAL SOUGHT:

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

WAS A PRE-DESIGN CONFERENCE ATTENDED:

____	YES
X	NO
____	COPY PROVIDED

RECEIVED
DEC 06 2004
HYDROLOGY SECTION

DATE SUBMITTED: 12 / 06 / 2004 BY: Shahab Biazar, P.E.

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

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2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or containing five (5) acres or more

ADVANCED ENGINEERING and CONSULTING, LLC

Consulting
Design
Development
Management
Inspection
Surveying

December 6, 2004

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

RE: GRADING AND DRAINAGE PLAN FOR CEILO LINDO SUBDIVISION (M11/D5)

Dear Mr. Bingham:

This letter is in regards to your comments received dated November 29, 2004. The following are the responses to your comments.

1) The concrete channel in the cul-de-sac did not have to be revised for the developed runoff, but the drainage opening at the wall was increased to handle the developed runoff of 5.53 cfs. See the revised grading plan for the changes. Also see attached AHYMO runoff results for the developed conditions using the following treatments: B=33%, C=17%, & D=50%.

2) We modify our inlet calculation using a 10" maximum water depth at the inlets. See attached calculations.

3) We talked with Glen Jurgensen regarding the access for the pond and he said there should not be any problem with the way we have shown the access for the maintenance of the pond.

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

Sincerely yours,

Shahab Biazar, P.E.

RECEIVED
DEC 06 2004
HYDROLOGY SECTION

4416 Anaheim Ave., N.E., Albuquerque, NM 87113 PH (505) 899-5570 FAX (505) 897-4996 EMAIL AECLLC@aol.com

STORM DROP INLET DRAINAGE CAPACITY

Double 'A' (in ponding conditions)

Area at the grate:

L = 88 ¾" - 2(6"$_{ends}$) - 6"$_{center\ piece}$ - 14(½ $_{middle\ bars}$)
= 63 ¾"
= 5.3125'

W = 25 ½" - 13(½"$_{middle\ bars}$)
= 19"
= 1.5833'

Area = 5.3125' x 1.5833'
= 8.41 ft^2

Effective Area = 8.41- 8.41 (0.5 $_{clogging\ factor}$)
= 4.21 ft^2 at the grate

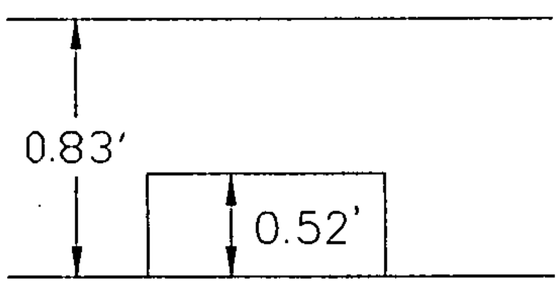
Area at the throat:

L = 10.95'

H = 10 ¾" - 4 ½"
= 6 ¼"
= 0.5208'

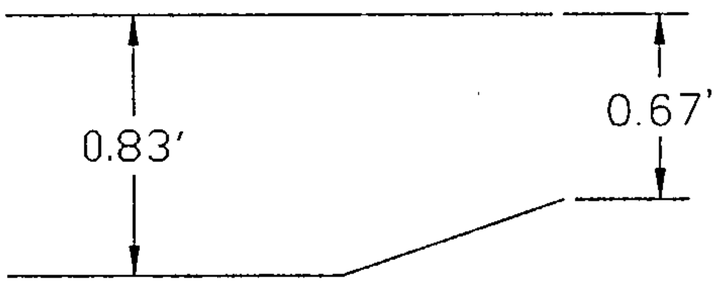
Area = 10.95' x 0.5208'
= 5.70 ft^2 at the throat

THROAT



$H=0.83$
$Q=CA\sqrt{2gH}$
$Q=0.60(5.70)\sqrt{2(32.2)(0.83)}$
$Q=25.00$ CFS

GRATE



$H=(0.83+.67)/2=0.75$
$Q=CA\sqrt{2gH}$
$Q=0.60(4.21)\sqrt{2(32.2)(0.75)}$
$Q=17.56$ CFS

TOTAL

$Q=25.00+17.56=42.56$ CFS

Number Of Inlets Provided:

One Single "A" and One Double "A" Total Q = 42.56 +24.98 = 67.54 cfs

The maximum flow intercepted by the inlets (required) 56.35 cfs (28.18 cfs each)

STORM DROP INLET DRAINAGE CAPACITY

Single 'A' (in ponding conditions)

Area at the grate:

L = 44 3/8" - 2(6"$_{ends}$) - 7(½ $_{middle\ bars}$)
= 28 7/8"
= 2.41'

W = 25 ½" - 13(½"$_{middle\ bars}$)
= 19"
= 1.58'

Area = 2.41' x 1.58'
= 3.81 ft^2

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

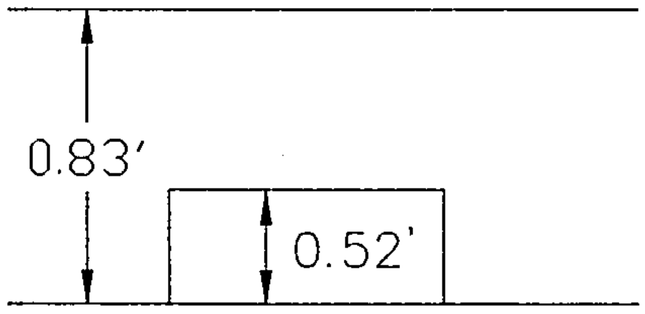
Area at the throat:

L = 7.45'

H = 10 ¾" - 4 ½"
= 6 ¼"
= 0.5208'

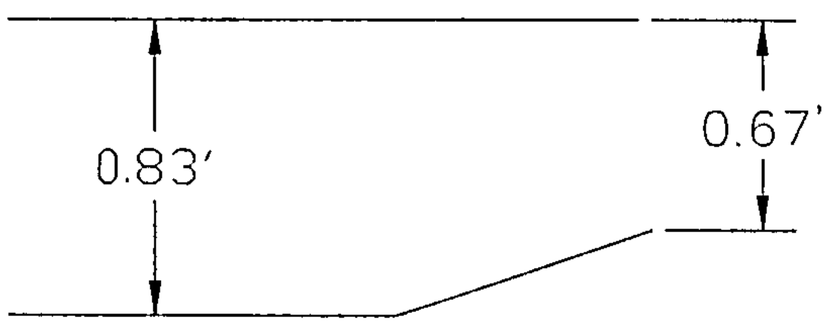
Area = 7.45' x 0.5208'
= 3.88 ft^2 at the throat

THROAT



H=0.83
$Q=CA\sqrt{2gH}$
$Q=0.60(3.88)\sqrt{2(32.2)(0.83)}$
Q=17.02 CFS

GRATE



H=(0.83+0.67)/2
$Q=CA\sqrt{2gH}$
$Q=0.60(1.91)\sqrt{2(32.2)(0.75)}$
Q=7.96 CFS

TOTAL

Q=17.02+7.96=24.98 CFS

AHYMO INPUT FILE

```
*
* ZONE 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
* BASIN OFFSITE
COMPUTE NM HYD          ID=40 HYD NO=213.011 AREA=0.003782 SQ MI
                        PER A=100.00 PER B=33.00 PER C=17.00 PER D=50.00
                        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
* BASIN OFFSITE
COMPUTE NM HYD          ID=40 HYD NO=213.111 AREA=0.003782 SQ MI
                        PER A=100.00 PER B=33.00 PER C=17.00 PER D=50.00
                        TP=0.1333 HR MASS RAINFALL=-1
*
FINISH
```

SUMMARY OUTPUT FILE

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02d RUN DATE (MON/DAY/YR) =12/06/2004
INPUT FILE = 200419of USER NO.= AHYMO-I-9702c01000R31-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	213.01	-	40	.00378	5.53	.180	.89095	1.500	2.284	PER IMP= 25.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.470
COMPUTE NM HYD	213.11	-	40	.00378	2.53	.084	.41415	1.500	1.043	PER IMP= 25.00
FINISH										

Wall Opening Calculations (at the cul-de-sac)
(@ SE Corner of Lot 27)

Orifice Equation: $Q=CA\sqrt{(2gh)}$

Q = 5.53 cfs (maximum runoff)

C = 0.6

g = 32.20

h = 0.75'w

Wall Opening = 2.00'

A= 2.00 x 0.75 = 1.50 sf

$Q = 0.60 \times 1.50\sqrt{(2 \times 32.2 \times 0.75)}$

Q = 6.25 cfs > 5.53 cfs

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name:

Comment: CHANNEL CAPACITY CALCULATIONS

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Manning's n.....	0.012
Channel Slope....	0.0137 ft/ft
Discharge.....	5.53 cfs

Computed Results:

Depth.....	0.43 ft
Velocity.....	6.48 fps
Flow Area.....	0.85 sf
Flow Top Width...	2.00 ft
Wetted Perimeter.	2.85 ft
Critical Depth...	0.62 ft
Critical Slope...	0.0047 ft/ft
Froude Number....	1.75 (flow is Supercritical)

Open Channel Flow Module, Version 3.12 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

CITY OF ALBUQUERQUE

November 29, 2004

Shahab Biazar PE
Advanced Engineering and Consulting
4416 Anaheim Ave NE
Albuquerque, NM 87113

Re: Cielo Lindo Subdivision Drainage Report
Engineer's Stamp dated 10-1-04 (M11/D5)

Dear Mr. Biazar,

Based upon the information provided in your submittal dated 10-6-04, the above referenced report cannot be approved for Preliminary Plat until the following comments are addressed

- The concrete channel in the cul-de-sac should be sized for developed runoff. Please revise your calculation accordingly.

- I'm not sure how you analyze the capacity of your inlet. The head (H) available at a type "C" or "A" inlet is at best 10 inches, not 1.25 feet as you have shown. Please revise or show a detail how this is possible.

- The pond is proposed for public maintenance. Please coordinate with Storm Drain Maintenance for any comments on the configuration of this pond.

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

Sincerely,

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

C: file

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Fx 897-4496

DRAINAGE INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: Cielo Lindo Subdivision ZONE ATLAS/DRG. FILE #: M11/D005

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: TRACT C, LAND OF POLO CHAVES, AND TRACTS A-1, A-2, SAN JOSE TRACT

CITY ADDRESS: _____

ENGINEERING FIRM: *Advanced Engineering and Consulting, LLC* CONTACT: Shahab Biazar

ADDRESS: 4416 Anaheim Ave., NE PHONE: (505) 899-5570

CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87113

OWNER: CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

ARCHITECT: CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: CONTACT: _____

ADDRESS: _____ PHONE: _____

CITY, STATE: _____ ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

X	DRAINAGE REPORT
	DRAINAGE PLAN 1ST SUBMITTAL, REQUIRES TCL OR EQUAL
	CONCEPTUAL GRADING & DRAINAGE PLAN
X	GRADING PLAN
	EROSION CONTROL PLAN
	ENGINEER'S CERTIFICATION (HYDROLOGY)
	CLOMR / LOMR
	TRAFFIC CIRCULATION LAYOUT (TCL)
	ENGINEER'S CERTIFICATION (TCL)
	ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
	OTHER

CHECK TYPE OF APPROVAL SOUGHT:

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

WAS A PRE-DESIGN CONFERENCE ATTENDED:

	YES
X	NO
	COPY PROVIDED

DATE SUBMITTED: 10 / 01 / 2004 BY: Shahab Biazar, P.E.

RECEIVED
OCT 6 2004
HYDROLOGY 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 of the proposed development defines the degree of drainage detail. One or more of the following levels of submittals may be required based on the following:

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3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or containing five (5) acres or more

DRAINAGE REPORT
FOR

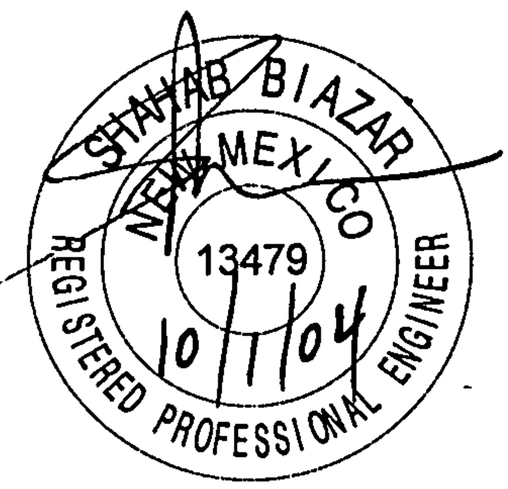
CIELO LINDO SUBDIVISION

Prepared by:

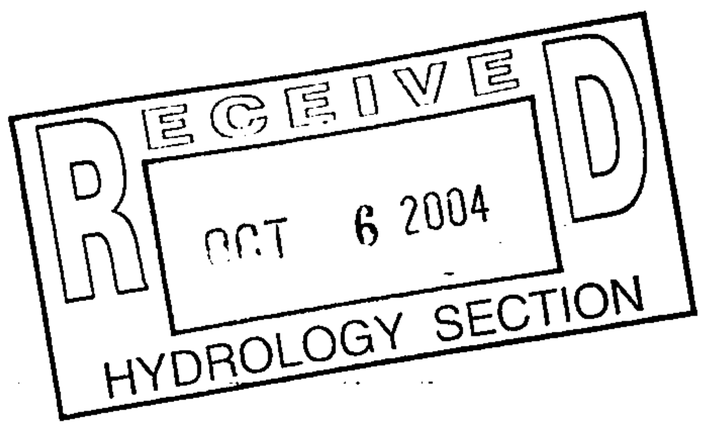
ADVANCED ENGINEERING and CONSULTING, LLC

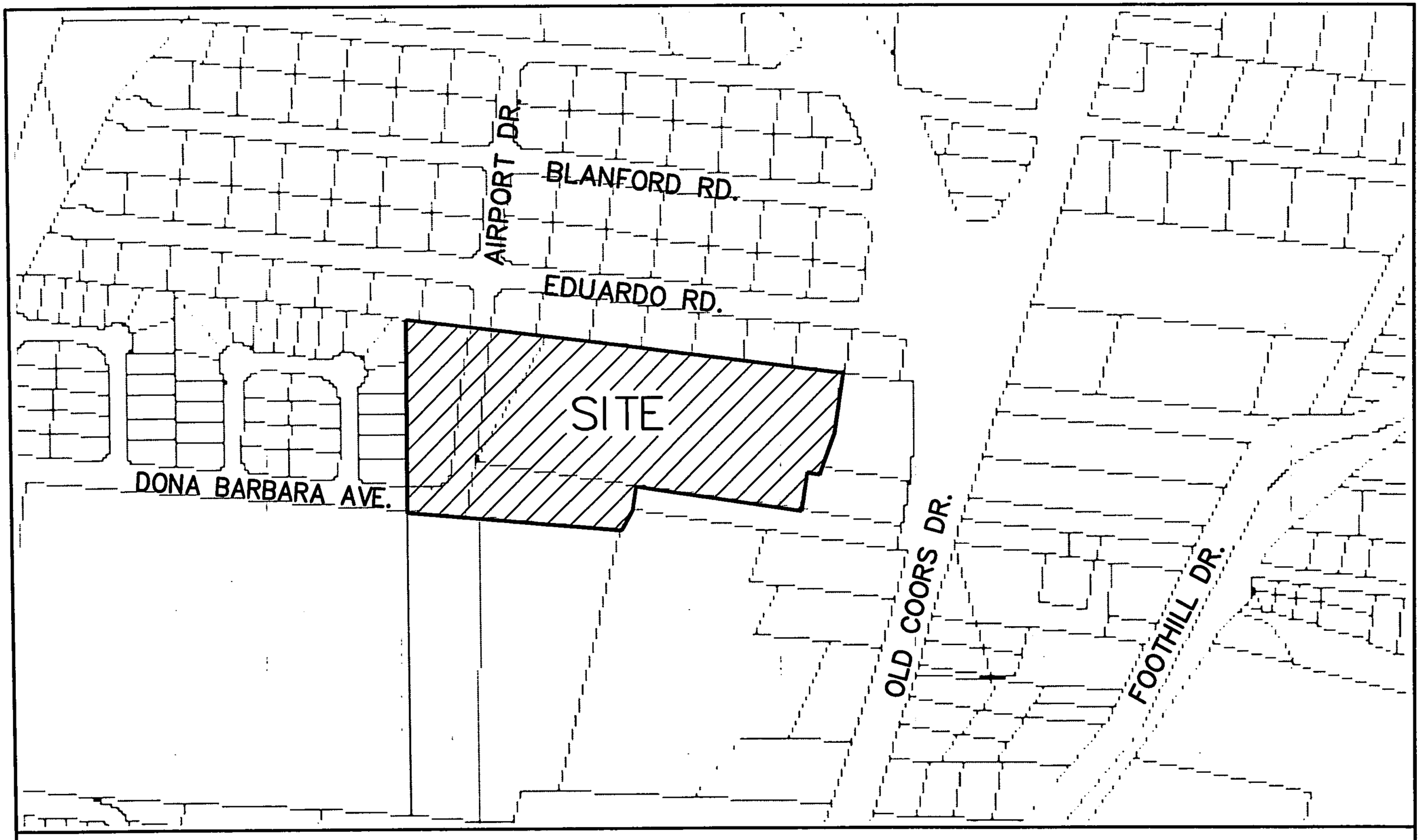
4416 Anaheim Ave., NE
Albuquerque, New Mexico 87113

October, 2004



Shahab Biazar
PE NO. 13479





VICINITY MAP:

M-11-Z

Location

Cielo Lindo is a 42 lot subdivision which is located on Airport Drive ±100' south side Eduardo Road. See attached Zone Atlas page number M-11 for exact location.

Purpose

The purpose of this drainage report is to present a grading and drainage solution for the proposed subdivision. The site is being annexed into the City of Albuquerque. We are requesting rough grading approval, site development plan for subdivision purposes, site development plan for building permit, preliminary and final Plat approval and building permit.

Existing Drainage Conditions

Western portion of the site falls within sub-basin I of the Puño De Tierra Subdivision drainage plan (prepared by Mark Goodwin and Associates). Basin I along with the upper basins F, G, H, and offsite basin 211 (basins from Mark Goodwin and Associates drainage report for Puño De Tierra Subdivision) are designed to drain to a detention pond on the west side of Airport Drive and then re-routed at a flow rate of less than 1.00 cfs via storm sewer pipe East on Eduardo Road to an inlet on Coors Boulevard. Copies of the Grading and Drainage plans as well as the basin map for Puño De Tierra Subdivision are located in the map pocket. At existing conditions this site along with the offsite

runoff from the south (San Jose Tracts) drain to the east to the carwash site and then to existing storm sewer inlets on Coors Boulevard. The site does not fall within a 100-year floodplain.

Proposed Conditions and On-Site Drainage Management Plan

Under the proposed conditions the detention pond on the west side of Airport Drive will be eliminated and the runoff from upper basins F, G, H, and offsite basin 211 and our On-site Basin A (Basin I modified) will drain to a series inlets on Dona Barbara Ave., and to two inlets (in swamp condition) on Airport Drive. From there the runoff will drain east on Calle Lindo to a detention pond via a 36" RCP pipe. On-site basin B along with the offsite runoff from the east (San Jose Tracts) will drain east via surface on Calle Lindo to an inlet then to the proposed detention pond located on the east end of the project. From there the runoff will be detained and then discharged at a flow rate of 0.73 cfs to an existing inlet on Coors Boulevard via (18" RCP) through the carwash. The runoff from the detention pond is being detained using an orifice opening with a diameter of 3-1/12".

Calculations

City of Albuquerque, Development Process Manuel, Section 22.2, Hydrology Section was used for runoff calculations. See also this report for Summary Table for runoff results, AHYMO input and output files for runoff and ponding calculations.

Runoff Calculations &
AHYMO Input and Output Files

RUNOFF CALCULATIONS

(INPUT DATA FOR AHYMO CALCULATIONS)

The site is @ Zone 1

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 1.87 inches

P_{360} = 2.20 inches

P_{1440} = 2.66 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 1.87 x 0.667
= 1.25 inches

P_{360} = 1.47

P_{1440} = 1.77

See the summary output from AHYMO calculations.

Also see the following summary tables.

LAND TREATMENT

On-Site Runoff:

Based on the historical/existing conditions: A=100.00%

Based on the developed conditions:

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

$N = 42 / 8.6888 = 4.83$

$D = 7\sqrt{(4.83^2 + 5*4.83)} = 48.23$ Use D = 50.00%

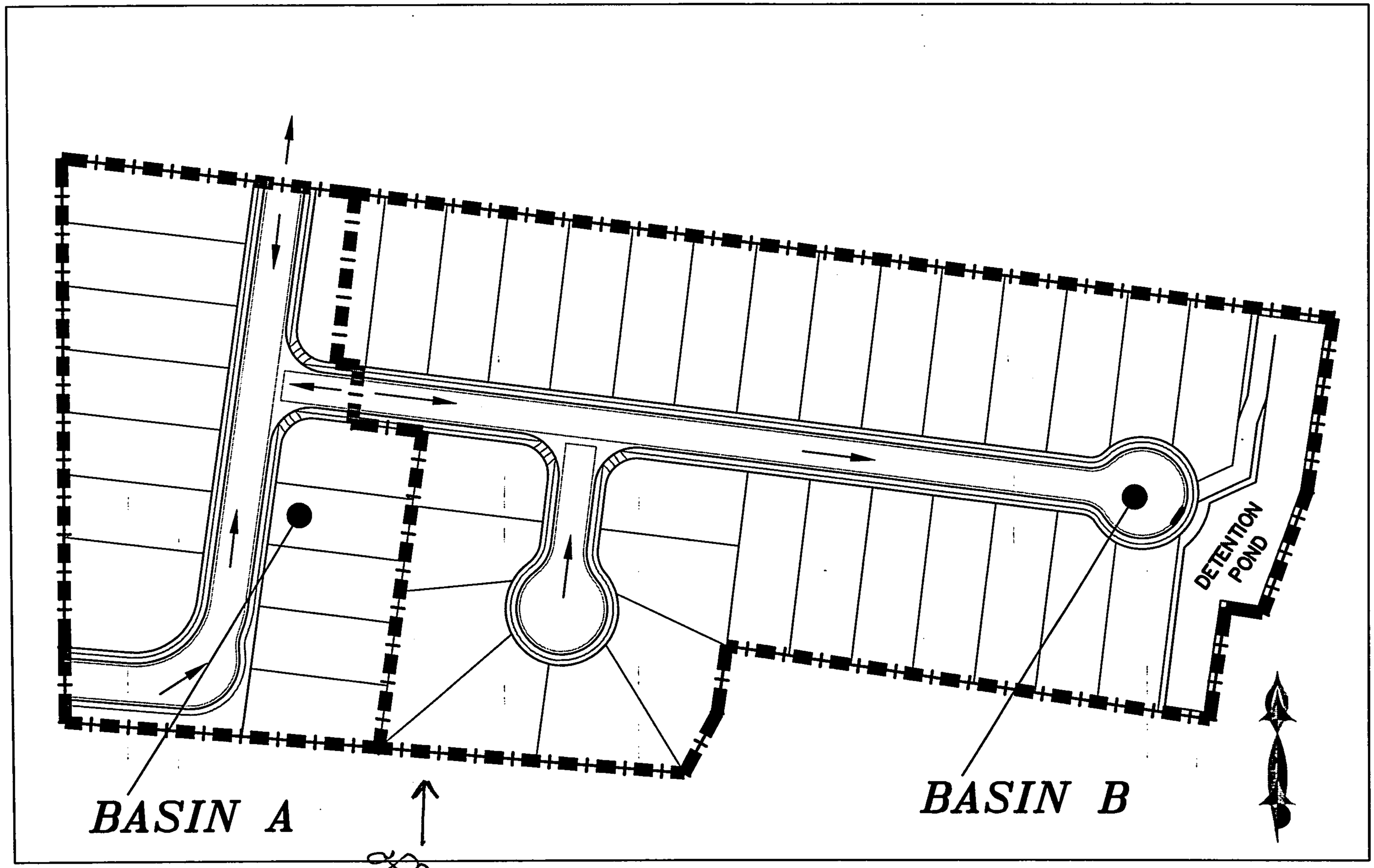
Assume C = 25% and B = 25%

See the summary output from AHYMO calculations.

Also see the following runoff tables for a summary of the results.

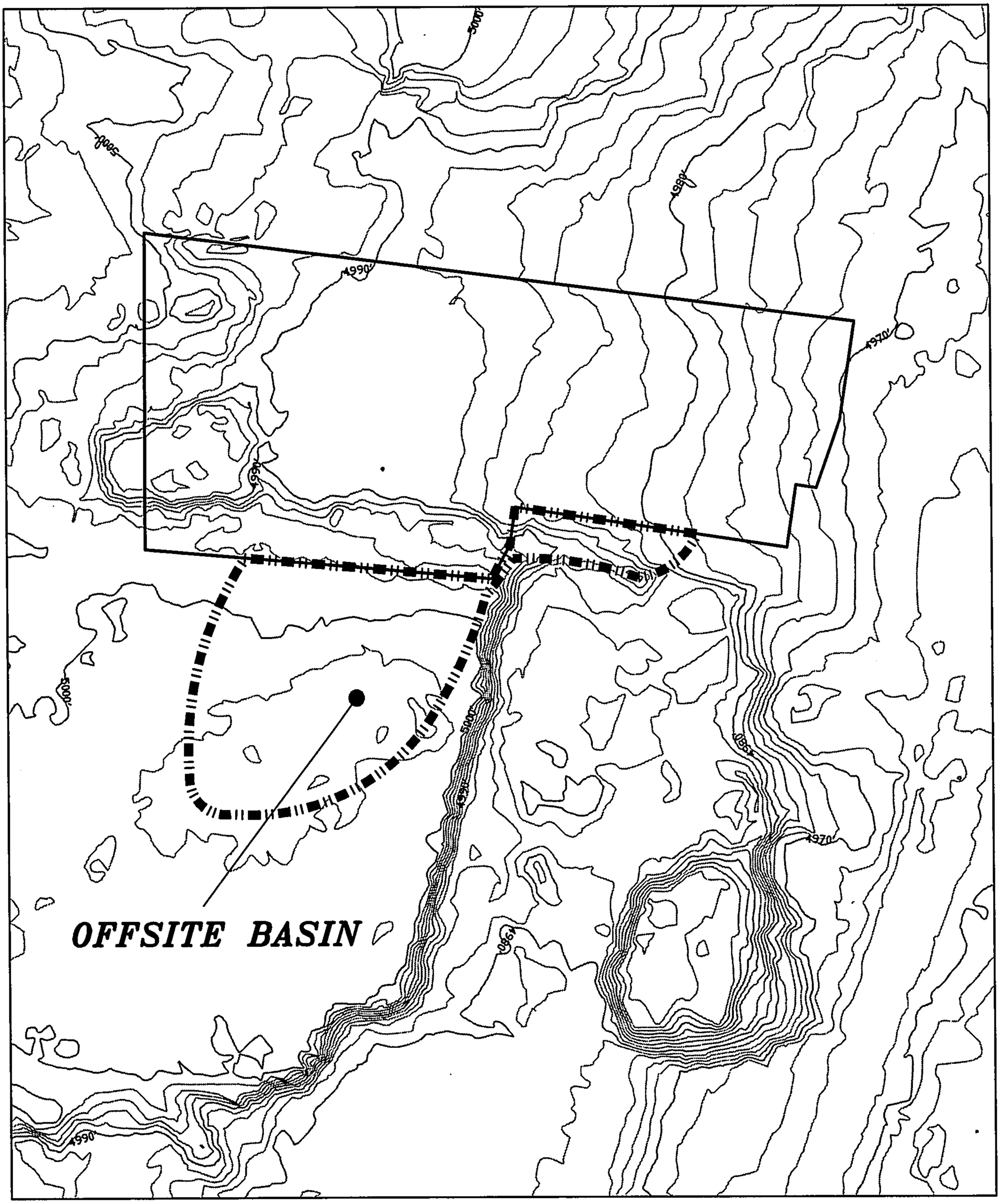
Offsite Runoff:

Based on the historical/existing conditions: A=100.00%



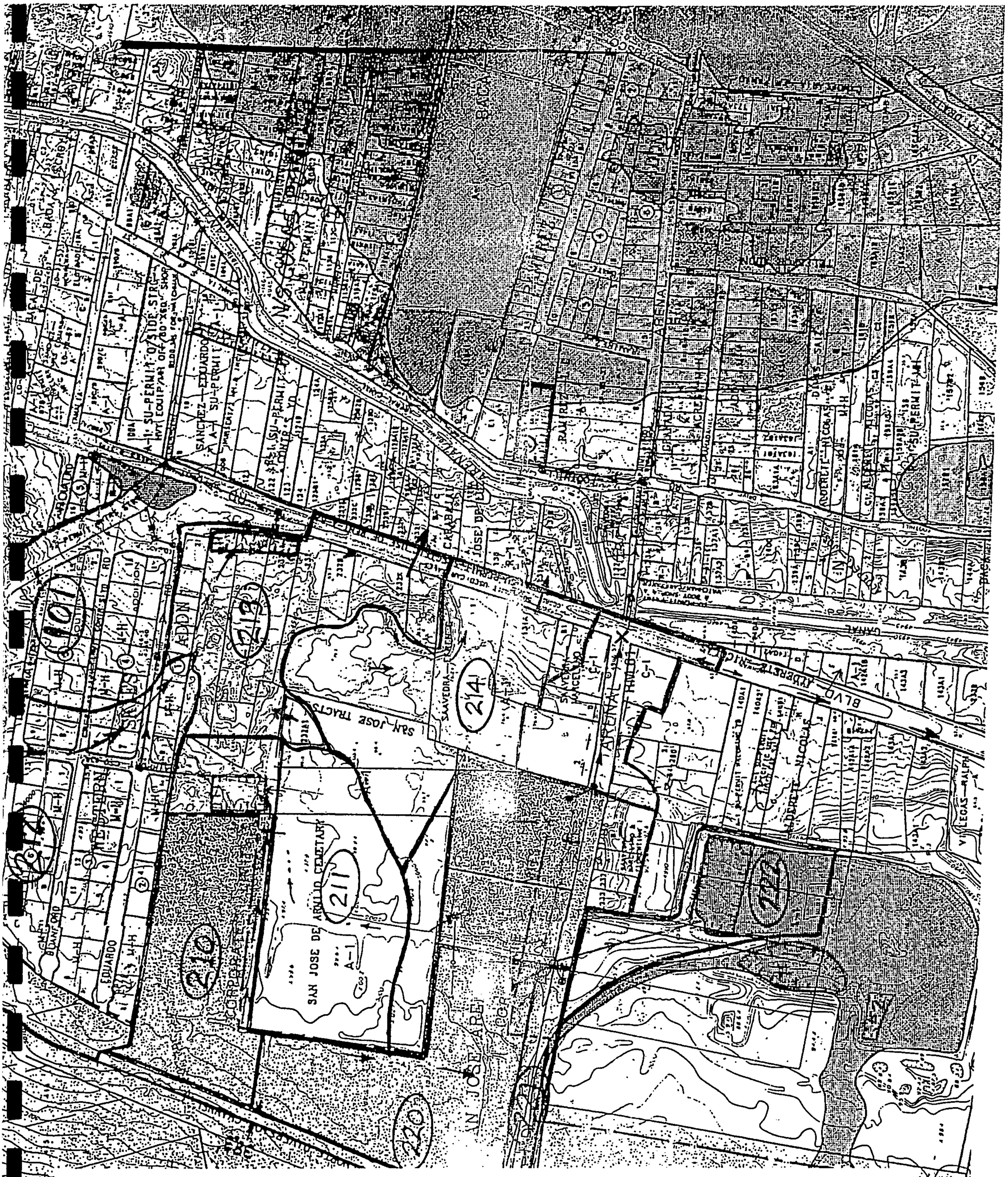
ON-SITE BASIN LAYOUT

NTS



OFFSITE BASIN LAYOUT

NTS



Portion of The Basin Map From Drainage Report For Puño De Tierra Subdivision

(Prepared by Mark Goodwin and Associates)

RUNOFF CALCULATION RESULTS

OVERALL DRAINAGE BASINS

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
**OFFSITE 210*	556261.20	12.7700	0.019953
**OFFSITE 211	659062.80	15.1300	0.023641
OFFSITE	105433.50	2.4204	0.003782
ON-SITE	378482.15	8.6888	0.013576

** FROM MARK GOODWIN DRAINAGE DESIGN CITY DRAINAGE # M10/D

* TOTAL AREA MINUS ON-SITE BASIN I (FROM MARK GOODWIN BASIN MAP)
BASIN I IS REPLACED WITH OUR ON-SITE BASIN A

EXISTING / HITORICAL

BASIN	AREA (SF)	AREA (MI^2)
**OFFSITE 210*	16.57	3.14
**OFFSITE 211	19.63	3.72
OFFSITE	3.14	0.60
ON-SITE	11.27	2.14

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS
**OFFSITE 210*	42.12	24.15
**OFFSITE 211	36.96	16.76
OFFSITE	3.14	0.60
ON-SITE	29.29	17.27

RUNOFF CALCULATION RESULTS

ON-SITE DRAINAGE BASINS

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
ON-SITE	378482.15	8.6888	0.013576

ON-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	112073.46	2.5729	0.004020
B	266408.69	6.1159	0.009556

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS
ON-SITE	29.59	17.27

ON-SITE

BASIN	Q-100* CFS	Q-10* CFS
A	8.76	5.11
B	20.83	12.16

Flows are based on % of the overall on-site runoff

AHYMO INPUT FILE

```
*
* ZONE 1
*
**********************************************************
*  100-YEAR,  6-HR STORM (UNDER EXISTING/HISTORICAL 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
* BASIN 210.00
COMPUTE NM HYD          ID=1 HYD NO=210.000 AREA=0.019953 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

* BASIN 211.00
COMPUTE NM HYD          ID=1 HYD NO=211.000 AREA=0.023641 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
* BASIN OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=213.010 AREA=0.003782 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
* BASIN ON-SITE
COMPUTE NM HYD          ID=1 HYD NO=213.020 AREA=0.013576 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/HISTORICAL 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
* BASIN 210.00
COMPUTE NM HYD          ID=1 HYD NO=210.100 AREA=0.019953 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

* BASIN 211.00
COMPUTE NM HYD          ID=1 HYD NO=211.100 AREA=0.023641 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
* BASIN OFFSITE
COMPUTE NM HYD          ID=1 HYD NO=213.110 AREA=0.003782 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
```

```
* BASIN ON-SITE
COMPUTE NM HYD       ID=1 HYD NO=213.120 AREA=0.013576 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
* BASIN 210.00
COMPUTE NM HYD       ID=10 HYD NO=210.001 AREA=0.019953 SQ MI
                     PER A=0.00 PER B=34.00 PER C=18.00 PER D=48.00
                     TP=0.1333 HR MASS RAINFALL=-1
* BASIN 211.00
COMPUTE NM HYD       ID=20 HYD NO=211.001 AREA=0.023641 SQ MI
                     PER A=0.00 PER B=62.00 PER C=31.00 PER D=7.00
                     TP=0.1333 HR MASS RAINFALL=-1
* BASIN OFFSITE
COMPUTE NM HYD       ID=40 HYD NO=213.011 AREA=0.003782 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
* BASIN ON-SITE
COMPUTE NM HYD       ID=60 HYD NO=213.021 AREA=0.013576 SQ MI
                     PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
                     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
* BASIN 210.00
COMPUTE NM HYD       ID=10 HYD NO=210.101 AREA=0.019953 SQ MI
                     PER A=0.00 PER B=34.00 PER C=18.00 PER D=48.00
                     TP=0.1333 HR MASS RAINFALL=-1
* BASIN 211.00
COMPUTE NM HYD       ID=20 HYD NO=211.101 AREA=0.023640 SQ MI
                     PER A=0.00 PER B=62.00 PER C=31.00 PER D=7.00
                     TP=0.1333 HR MASS RAINFALL=-1
* BASIN OFFSITE
COMPUTE NM HYD       ID=40 HYD NO=213.111 AREA=0.003782 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
* BASIN ON-SITE
COMPUTE NM HYD       ID=60 HYD NO=213.121 AREA=0.013576 SQ MI
                     PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
                     TP=0.1333 HR MASS RAINFALL=-1
*
FINISH
```

NO

NO

SUMMARY OUTPUT FILE

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02d RUN DATE (MON/DAY/YR) =09/27/2004
INPUT FILE = 200419 USER NO.= AHYMO-I-9702c01000R31-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.200
COMPUTE NM HYD	210.00	-	1	.01995	16.57	.467	.43925	1.533	1.297	PER IMP=	.00
COMPUTE NM HYD	211.00	-	1	.02364	19.63	.554	.43925	1.533	1.297	PER IMP=	.00
COMPUTE NM HYD	213.01	-	1	.00378	3.14	.089	.43925	1.533	1.299	PER IMP=	.00
COMPUTE NM HYD	213.02	-	1	.01358	11.27	.318	.43925	1.533	1.298	PER IMP=	.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.470
COMPUTE NM HYD	210.10	-	1	.01995	3.14	.088	.08264	1.533	.246	PER IMP=	.00
COMPUTE NM HYD	211.10	-	1	.02364	3.72	.104	.08264	1.533	.246	PER IMP=	.00
COMPUTE NM HYD	213.11	-	1	.00378	.60	.017	.08264	1.533	.247	PER IMP=	.00
COMPUTE NM HYD	213.12	-	1	.01358	2.14	.060	.08264	1.533	.246	PER IMP=	.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.200
COMPUTE NM HYD	210.00	-	10	.01995	42.12	1.429	1.34253	1.500	3.299	PER IMP=	48.00
COMPUTE NM HYD	211.00	-	20	.02364	36.96	1.069	.84770	1.500	2.443	PER IMP=	7.00
COMPUTE NM HYD	213.01	-	40	.00378	3.14	.089	.43925	1.533	1.299	PER IMP=	.00
COMPUTE NM HYD	213.02	-	60	.01358	29.59	1.007	1.39058	1.500	3.405	PER IMP=	50.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.470
COMPUTE NM HYD	210.10	-	10	.01995	24.15	.791	.74321	1.500	1.891	PER IMP=	48.00
COMPUTE NM HYD	211.10	-	20	.02364	16.76	.442	.35087	1.533	1.108	PER IMP=	7.00
COMPUTE NM HYD	213.11	-	40	.00378	.60	.017	.08264	1.533	.247	PER IMP=	.00
COMPUTE NM HYD	213.12	-	60	.01358	17.27	.563	.77784	1.500	1.987	PER IMP=	50.00
FINISH											

Detention Pond Calculations & AHYMO Input and Output Files For Ponding Conditions

PONDING CONDITIONS

All the runoff on-site and offsite drain to the east end of the project to a detention pond. The runoff from the detention pond will discharged at a flow rate of 0.73 cfs via a 3-1/12" orifice to an 18" RCP. Then from there the runoff drains to an existing inlet on Coors Boulevard through the Carwash/Laundromat. See the following calculations.

VOLUME CALCULATIONS

DETENTION POND

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

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

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

Ab =	14884.39	Elevation 4961
At =	14884.39	Elevation 4966
Ab =	20687.68	Elevation 4966
At =	20687.68	Elevation 4971
Dt =	10.00	
C =	0.00	

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
4961.00	0	0.0000	0.0000
4962.00	1	0.3417	0.2331
4963.00	2	0.6834	0.3416
4964.00	3	1.0251	0.4231
4965.00	4	1.3668	0.4913
4966.00	5	1.7085	0.5511
4967.00	6	2.1834	0.6050
4968.00	7	2.6583	0.6545
4969.00	8	3.1333	0.7005
4970.00	9	3.6082	0.7436
4971.00	10	4.0831	0.7844

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

C =	0.6	
Diameter (in)	3.08333333	(3-1/12")
Area (ft^2)=	0.0519	
g =	32.2	
H (Ft) =	Depth of water above center of orifice	
Q (CFS)=	Flow	

AHYMO INPUT FILE
(PONDING CONDITIONS)

```
*
* 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

* BASIN 210.00
COMPUTE NM HYD          ID=10 HYD NO=210.001 AREA=0.019953 SQ MI
                        PER A=0.00 PER B=34.00 PER C=18.00 PER D=48.00
                        TP=0.1333 HR MASS RAINFALL=-1
* BASIN 211.00
COMPUTE NM HYD          ID=20 HYD NO=211.001 AREA=0.023641 SQ MI
                        PER A=0.00 PER B=62.00 PER C=31.00 PER D=7.00
                        TP=0.1333 HR MASS RAINFALL=-1
*
ADD HYD                 ID=30 HYD NO=210.10 ID=10 ID=20
*
* BASIN OFFSITE
COMPUTE NM HYD          ID=40 HYD NO=213.011 AREA=0.003782 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
*
ADD HYD                 ID=50 HYD NO=213.0111 ID=30 ID=40
*
* BASIN ON-SITE
COMPUTE NM HYD          ID=60 HYD NO=213.021 AREA=0.013576 SQ MI
                        PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
                        TP=0.1333 HR MASS RAINFALL=-1
*
ADD HYD                 ID=70 HYD NO=213.0211 ID=50 ID=60
*
**************************************************************
*                       PONDING CONDITION                     *
**************************************************************
*
ROUTE RESERVOIR         ID=80 HYD NO=500.0 INFLOW ID=70 CODE=24
                      OUTFLOW(CFS)      STORAGE(AC-FT)   ELEVATION(FT)
                           0.0000            0.0000         4961.00
                           0.2331            0.3417         4962.00
                           0.3416            0.6834         4963.00
                           0.4231            1.0251         4964.00
                           0.4913            1.3668         4965.00
                           0.5511            1.7085         4966.00
                           0.6050            2.1834         4967.00
                           0.6545            2.6583         4968.00
                           0.7005            3.1333         4969.00
                           0.7436            3.6082         4970.00
                           0.7844            4.0831         4971.00
*
**************************************************************
*
FINISH
```

SUMMARY OUTPUT FILE
(PONDING CONDITIONS)

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02d RUN DATE (MON/DAY/YR) =10/01/2004
INPUT FILE = 20419pda USER NO.= AHYMO-I-9702c01000R31-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.200
COMPUTE NM HYD	210.00	-	10	.01995	42.12	1.429	1.34253	1.500	3.299	PER IMP=	48.00
COMPUTE NM HYD	211.00	-	20	.02364	36.96	1.069	.84770	1.500	2.443	PER IMP=	7.00
ADD HYD	210.10	10&20	30	.04359	79.08	2.497	1.07417	1.500	2.834		
COMPUTE NM HYD	213.01	-	40	.00378	3.14	.089	.43925	1.533	1.299	PER IMP=	.00
ADD HYD	213.01	30&40	50	.04738	82.16	2.586	1.02349	1.500	2.710		
COMPUTE NM HYD	213.02	-	60	.01358	29.59	1.007	1.39058	1.500	3.405	PER IMP=	50.00
ADD HYD	213.02	50&60	70	.06095	111.75	3.593	1.10525	1.500	2.865		
ROUTE RESERVOIR	500.00	70	80	.06095	.73	1.053	.32391	3.133	.019	AC-FT=	3.407
FINISH											

AHYMO OUTPUT FILE
(PONDING CONDITIONS)

```
    AHYMO PROGRAM (AHYMO_97) -                          - Version:  1997.02d
         RUN DATE (MON/DAY/YR) = 10/01/2004
         START TIME (HR:MIN:SEC) = 08:02:54    USER NO.= AHYMO-I-9702c01000R31-AH
         INPUT FILE = 20419pda

*
* 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  2.2000

* BASIN 210.00
COMPUTE NM HYD         ID=10 HYD NO=210.001 AREA=0.019953 SQ MI
                       PER A=0.00 PER B=34.00 PER C=18.00 PER D=48.00
                       TP=0.1333 HR MASS RAINFALL=-1
```

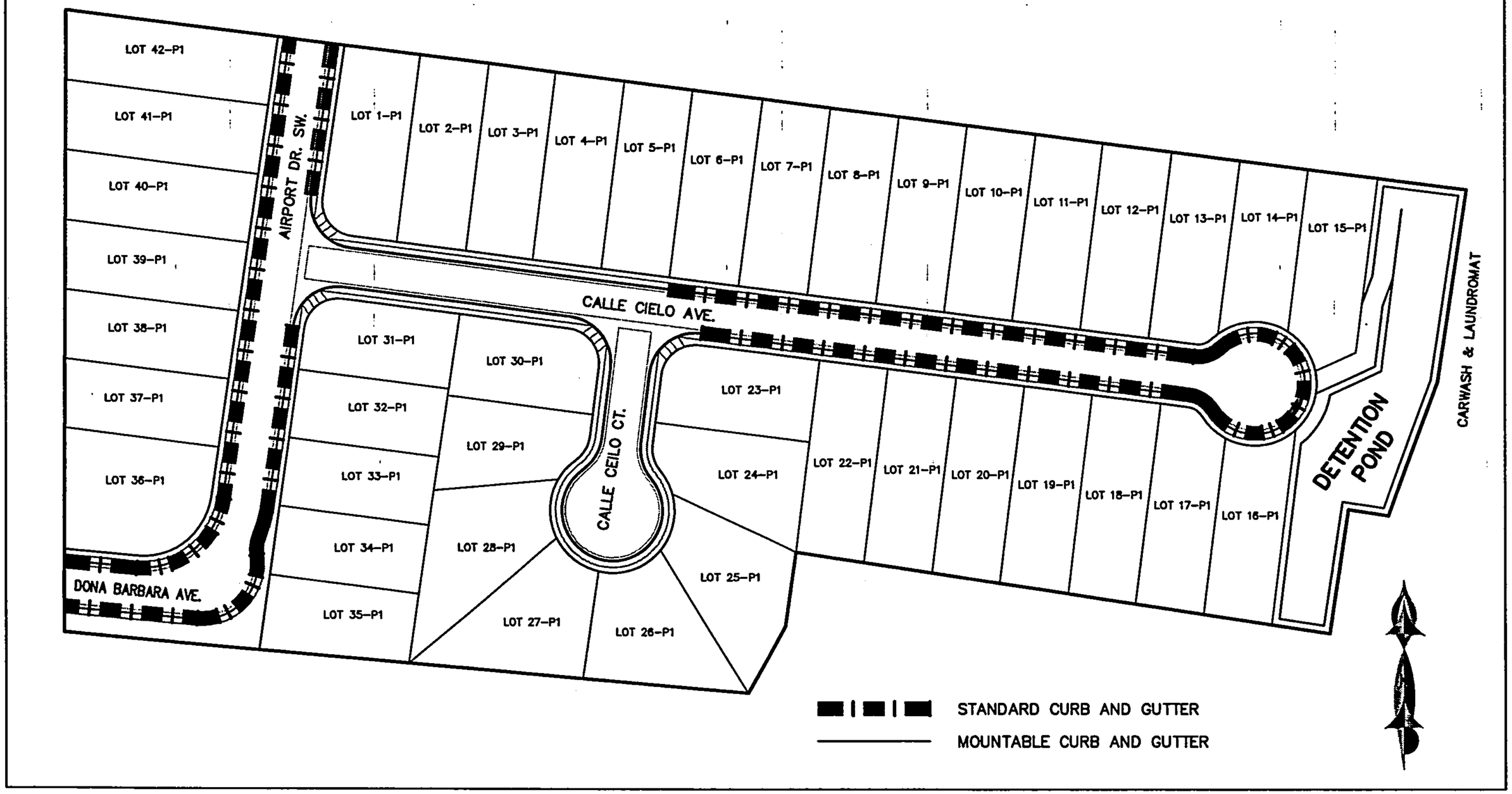
```
     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   37.812     CFS    UNIT VOLUME =     .9991        B =    526.28       P60 = 1.8700
     AREA =       .009577 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


     K =    .122295HR     TP =    .133300HR     K/TP RATIO =    .917440      SHAPE CONSTANT, N =  3.858675
     UNIT PEAK =   26.903     CFS    UNIT VOLUME =     .9999        B =    345.63       P60 = 1.8700
     AREA =       .010376 SQ MI     IA =     .44808 INCHES     INF =    1.10462 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

* BASIN 211.00
COMPUTE NM HYD       ID=20 HYD NO=211.001 AREA=0.023641 SQ MI
                     PER A=0.00 PER B=62.00 PER C=31.00 PER D=7.00
                     TP=0.1333 HR MASS RAINFALL=-1

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   6.5335     CFS    UNIT VOLUME =     .9976        B =    526.28       P60 = 1.8700
     AREA =       .001655 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


     K =    .122617HR     TP =    .133300HR     K/TP RATIO =    .919857      SHAPE CONSTANT, N =  3.848008
     UNIT PEAK =   56.888     CFS    UNIT VOLUME =     1.000        B =    344.91       P60 = 1.8700
     AREA =       .021986 SQ MI     IA =     .45000 INCHES     INF =    1.11000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

*
ADD HYD              ID=30 HYD NO=210.10 ID=10 ID=20
*
* BASIN OFFSITE
COMPUTE NM HYD       ID=40 HYD NO=213.011 AREA=0.003782 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

     K =    .163684HR     TP =    .133300HR     K/TP RATIO =   1.227936     SHAPE CONSTANT, N =  2.899764
     UNIT PEAK =   7.7610     CFS    UNIT VOLUME =     .9978        B =    273.54       P60 = 1.8700
     AREA =       .003782 SQ MI     IA =     .65000 INCHES     INF =    1.67000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

*
ADD HYD              ID=50 HYD NO=213.0111 ID=30 ID=40
*
* BASIN ON-SITE
COMPUTE NM HYD       ID=60 HYD NO=213.021 AREA=0.013576 SQ MI
                     PER A=0.00 PER B=25.00 PER C=25.00 PER D=50.00
                     TP=0.1333 HR MASS RAINFALL=-1

     K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   26.799     CFS    UNIT VOLUME =     .9989        B =    526.28       P60 = 1.8700
     AREA =       .006788 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 =   18.061     CFS    UNIT VOLUME =     .9997        B =    354.67       P60 = 1.8700
     AREA =       .006788 SQ MI     IA =     .42500 INCHES     INF =    1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330
```

```
*
ADD HYD              ID=70 HYD NO=213.0211 ID=50 ID=60
*
*************************************************************
*                    PONDING CONDITION                      *
*************************************************************
*
ROUTE RESERVOIR      ID=80 HYD NO=500.0 INFLOW ID=70 CODE=24
                     OUTFLOW(CFS)      STORAGE(AC-FT)  ELEVATION(FT)
                          0.0000            0.0000        4961.00
                          0.2331            0.3417        4962.00
                          0.3416            0.6834        4963.00
                          0.4231            1.0251        4964.00
                          0.4913            1.3668        4965.00
                          0.5511            1.7085        4966.00
                          0.6050            2.1834        4967.00
                          0.6545            2.6583        4968.00
                          0.7005            3.1333        4969.00
                          0.7436            3.6082        4970.00
                          0.7844            4.0831        4971.00

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

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

    .00          .00     4961.00        .000        .00
    .80          .00     4961.00        .000        .00
   1.60        82.65     4966.18       1.793        .56
   2.40         3.97     4969.44       3.342        .72
   3.20          .66     4969.58       3.407        .73
   4.00          .31     4969.54       3.388        .72
   4.80          .29     4969.48       3.359        .72
   5.60          .33     4969.42       3.332        .72
   6.40          .03     4969.35       3.302        .72
   7.20          .00     4969.26       3.255        .71
   8.00          .00     4969.16       3.208        .71
   8.80          .00     4969.06       3.162        .70
   9.60          .00     4968.96       3.115        .70
  10.40          .00     4968.86       3.069        .69
  11.20          .00     4968.77       3.023        .69
  12.00          .00     4968.67       2.978        .69
  12.80          .00     4968.58       2.933        .68
  13.60          .00     4968.48       2.888        .68
  14.40          .00     4968.39       2.843        .67
  15.20          .00     4968.30       2.799        .67
  16.00          .00     4968.20       2.755        .66
  16.80          .00     4968.11       2.711        .66
  17.60          .00     4968.02       2.668        .66
  18.40          .00     4967.93       2.625        .65
  19.20          .00     4967.84       2.582        .65
 PEAK DISCHARGE =          .725 CFS - PEAK OCCURS AT HOUR    3.13
 MAXIMUM WATER SURFACE ELEVATION =     4969.577
 MAXIMUM STORAGE =         3.4073 AC-FT      INCREMENTAL TIME=     .033330HRS

*
*************************************************************
*
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 08:02:54
```

Street Flow Capacity Calculations

STREET FLOW CAPACITY

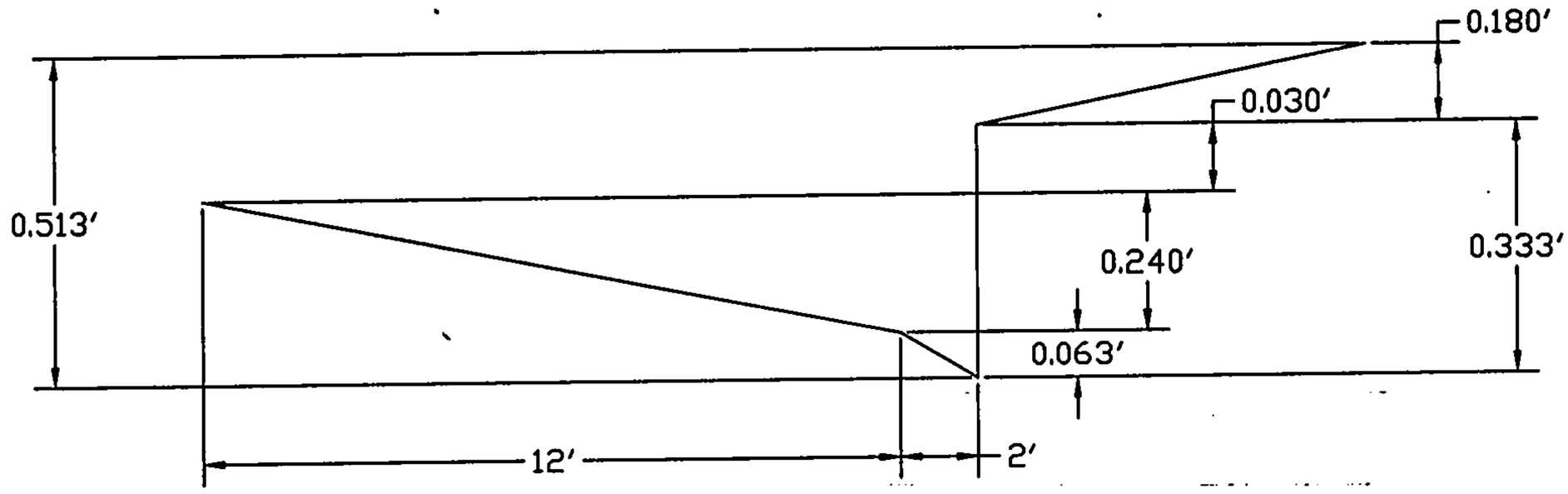
Attached are the street flow calculations for mountable curb and standard curb. The flow capacity for 4" mountable curb is 9.63 cfs. Therefore, the mountable curb is only used for 30% of the Calle Lindo (up to east end of Lot 5 on the north side of and up to Calle Lindo Ct. on the south side). Mountable curb is also proposed for Calle Lindo Ct. The remaining portion of Calle Lindo to the east of the Calle Lindo Ct. will be Standard Curb and Gutter on both side of the street. See the following exhibit for location of the mountable and standard curb and gutter. Airport Drive has been designed for standard curb and gutter based on the drainage design for Puño De Tierra Subdivision (prepared by Mark Goodwin and Associates).



STREET CURB LAYOUT

NTS

28' F-F / 46' ROW STREET CROSS-SECTION (HALF STREET DETAIL - 4" CURB)



FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½
n = 0.017
SLOPE = 0.03198

HALF STREET CALCULATIONS

FULL STREET FLOW

@Y > 0.0625
A1 = ½ Y (Y/0.03125) = 16Y²
P1 = SQRT[Y² + (Y/0.03125)²] + Y = SQRT(1025 Y²) + Y

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	0.02	0.82	0.92	0.020613	0.02
0.0500	0.0400	1.6508	0.0837	0.05	0.10	1.31	1.03	0.065442	0.05
0.0625	0.0625	2.0635	0.0972	0.09	0.19	1.52	0.03	0.094924	0.00

@ 0.0625 < Y < 0.333 & Y1 = Y - 0.0625
A2 = A1 + ½Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1² + 2Y1
P2 = P1 + SQRT[Y1² + (Y1/0.02)²] + Y1 = P1 + SQRT(2501 Y²) + Y1

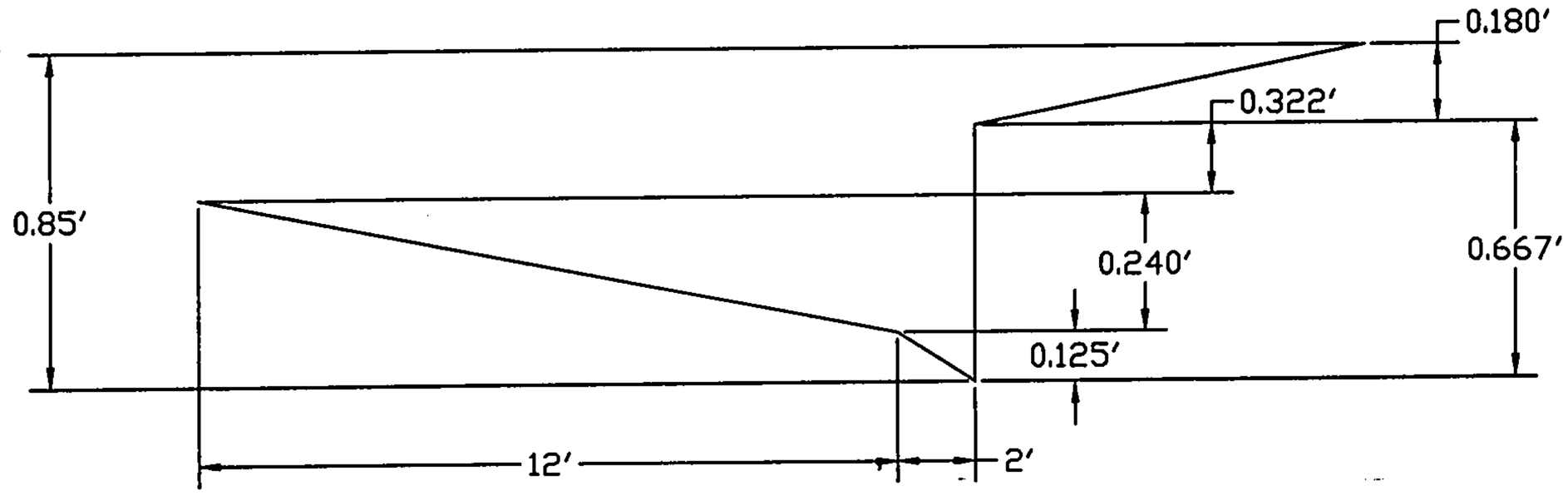
0.1000	0.1727	3.9764	0.1235	0.33	0.67	1.93	1.08	0.1931	0.11
0.1500	0.4289	6.5269	0.1628	1.09	2.18	2.55	1.16	0.3818	0.18
0.2500	1.3164	11.6279	0.2340	4.82	9.63	3.66	1.29	0.9145	0.35
0.3300	2.3864	15.7087	0.2847	10.62	21.24	4.45	1.37	1.4686	0.49
0.3330	2.4328	15.8617	0.2865	10.90	21.79	4.48	1.37	1.4914	0.50

@ 0.333 < Y < 0.513 & Y2 = Y - 0.333
A3 = A2 + 14Y2 + ½Y2[Y2/(0.02)] = A2 + 14 Y2 + 25 Y2²
P3 = P2 + SQRT(Y2² + [Y2/(0.02)]²) = P2 + SQRT(2501 Y2²)

0.3500	2.6780	16.7119	0.2950	12.35	24.70	4.61	1.37	1.6140	0.53
0.4000	3.4830	19.2124	0.3203	17.44	34.88	5.01	1.40	2.0027	0.61
0.4500	4.4130	21.7129	0.3457	23.84	47.69	5.40	1.42	2.4314	0.71
0.5130	5.7628	24.8635	0.3773	33.99	67.97	5.90	1.45	3.0256	0.83

→ Max. Q = 9.63 cfs. (up to Top of Curb)

28' F-F / 46' ROW STREET CROSS-SECTION (HALF STREET DETAIL - 8" CURB)



FINDING STREET CAPACITY

Q = 1.49 / n A (A/P)^(2/3) S^½
n = 0.017
SLOPE = 0.03198

HALF STREET CALCULATION

FULL STREET FLOW

@Y ≤ 0.125
A1 = ½ Y (Y / 0.0625) = 8 Y²
P1 = SQRT[Y² + (Y / 0.0625)²] + Y = SQRT(257 Y²) + 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	0.81	0.90	0.0202	0.02
0.0500	0.0200	0.8516	0.0820	0.03	0.05	1.28	1.01	0.0641	0.05
0.1250	0.1250	2.1289	0.1511	0.30	0.59	2.36	1.18	0.2952	0.15

@ 0.125 < Y ≤ 0.365 & Y1 = Y - 0.125
A2 = A1 + ½Y1 (Y1/0.02) + 2Y1 = A1 + 25Y1² + 2Y1
P2 = P1 + SQRT[Y1² + (Y1/0.02)²] + Y1 = P1 + SQRT(2501 Y1²) + Y1

0.2000	0.4156	6.0797	0.1672	1.09	2.17	2.61	1.03	0.5227	0.21
0.2500	0.7656	8.6302	0.1989	2.38	4.76	3.11	1.10	0.7773	0.28
0.3000	1.2406	11.1807	0.2309	4.48	8.96	3.61	1.16	1.0828	0.37
0.3650	2.0450	14.4963	0.2710	8.66	17.32	4.24	1.24	1.5461	0.48

@ 0.365 < Y ≤ 0.667 & Y2 = Y - 0.325
A3 = A2 + 14Y2 + ½Y2[Y2/(0.02)] = A2 + 14 Y2
P3 = P2 + SQRT(Y2² + [Y2/(0.02)]²) = P2 + Y2

0.3965	2.4860	14.5278	0.3082	11.98	23.95	4.82	1.35	1.9102	0.58
0.5000	3.9350	14.6313	0.4167	25.63	51.25	6.51	1.62	3.2563	0.92
0.6000	5.3350	14.7313	0.5081	42.37	84.74	7.94	1.81	4.7649	1.26
0.6667	6.2684	14.7980	0.5640	55.26	110.53	8.82	1.90	5.8774	1.49

@ 0.667 < Y ≤ 0.847 & Y3 = Y - 0.667
A4 = A3 + 14Y3 + ½Y3[Y3/(0.02)] = A3 + 14 Y3 + 25 Y3²
P4 = P3 + SQRT(Y3² + [Y3/(0.02)]²) = P3 + SQRT(2501 Y3²)

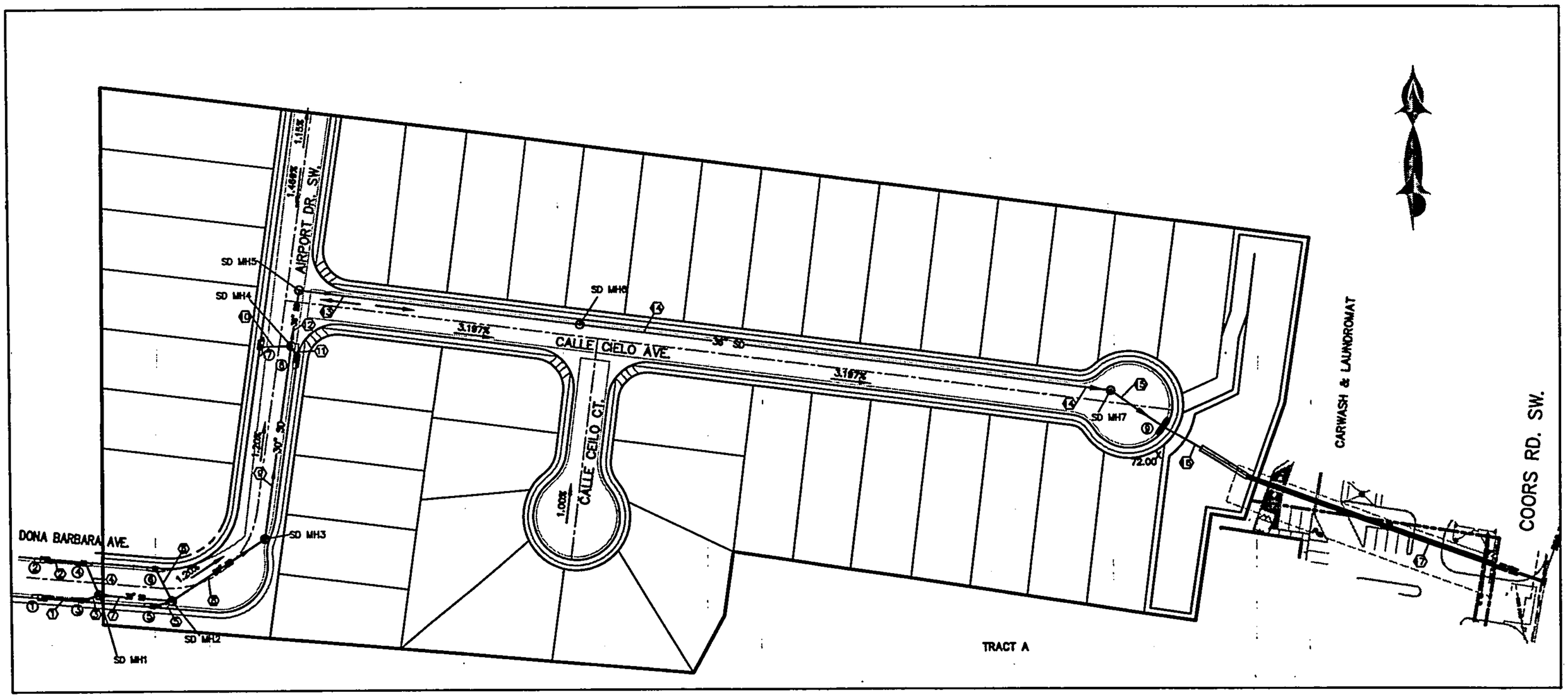
0.7000	6.7628	16.4648	0.5526	58.41	116.82	8.64	1.82	6.0458	1.48
0.7500	7.6086	18.9653	0.5440	64.69	129.38	8.50	1.73	6.3768	1.50
0.8000	8.5794	21.4658	0.5426	72.76	145.52	8.48	1.67	6.7848	1.53
0.8667	10.0691	24.8015	0.5483	86.29	172.59	8.57	1.62	7.4277	1.60

Q = 23.97
For flow depth = 0.58' Flow

Pipe Flow Capacity Calculations

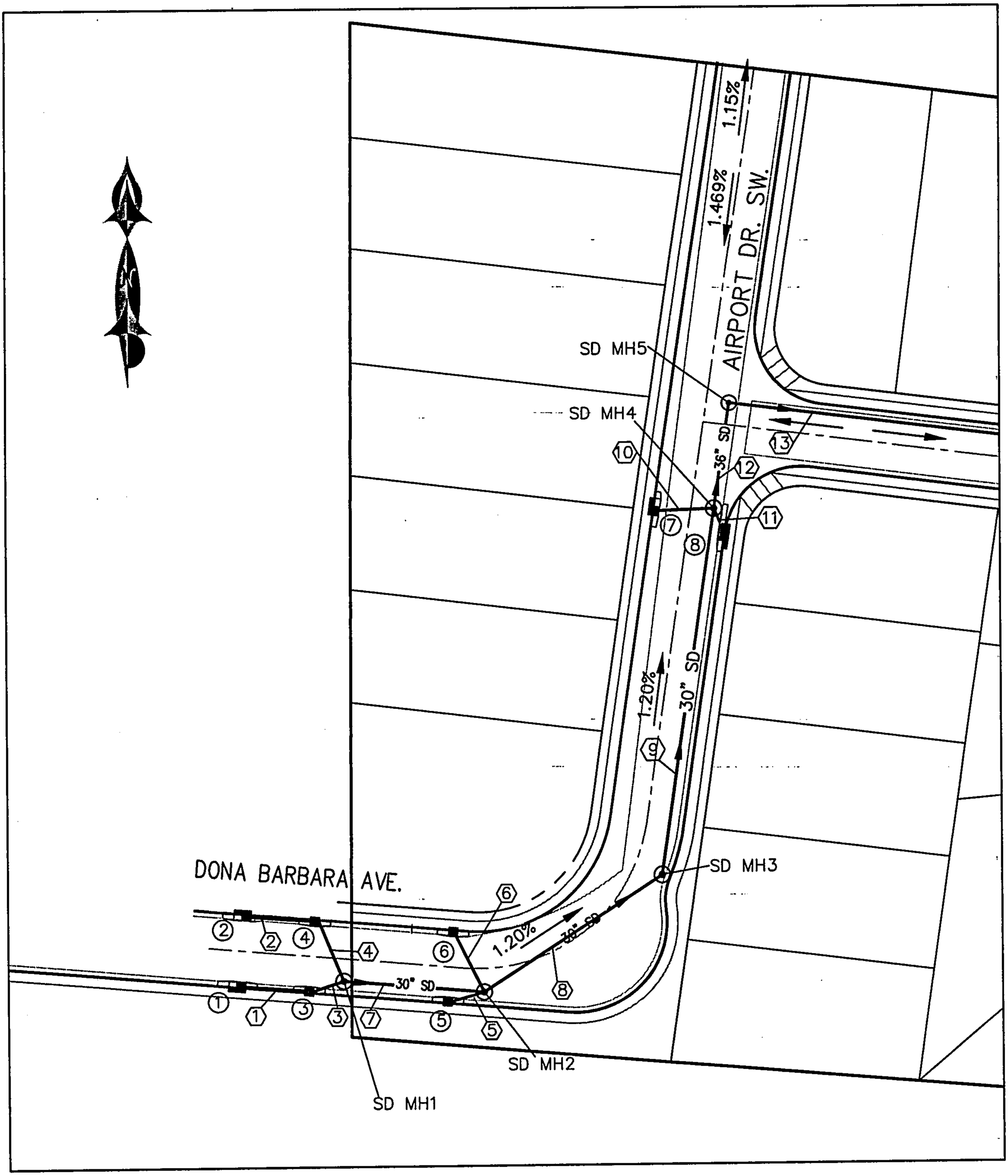
PIPE FLOW CAPACITY

The following sheets are the exhibits for the location of the storm sewer structures on site, summary table for the pipe runoff details, and pipe flow calculations.



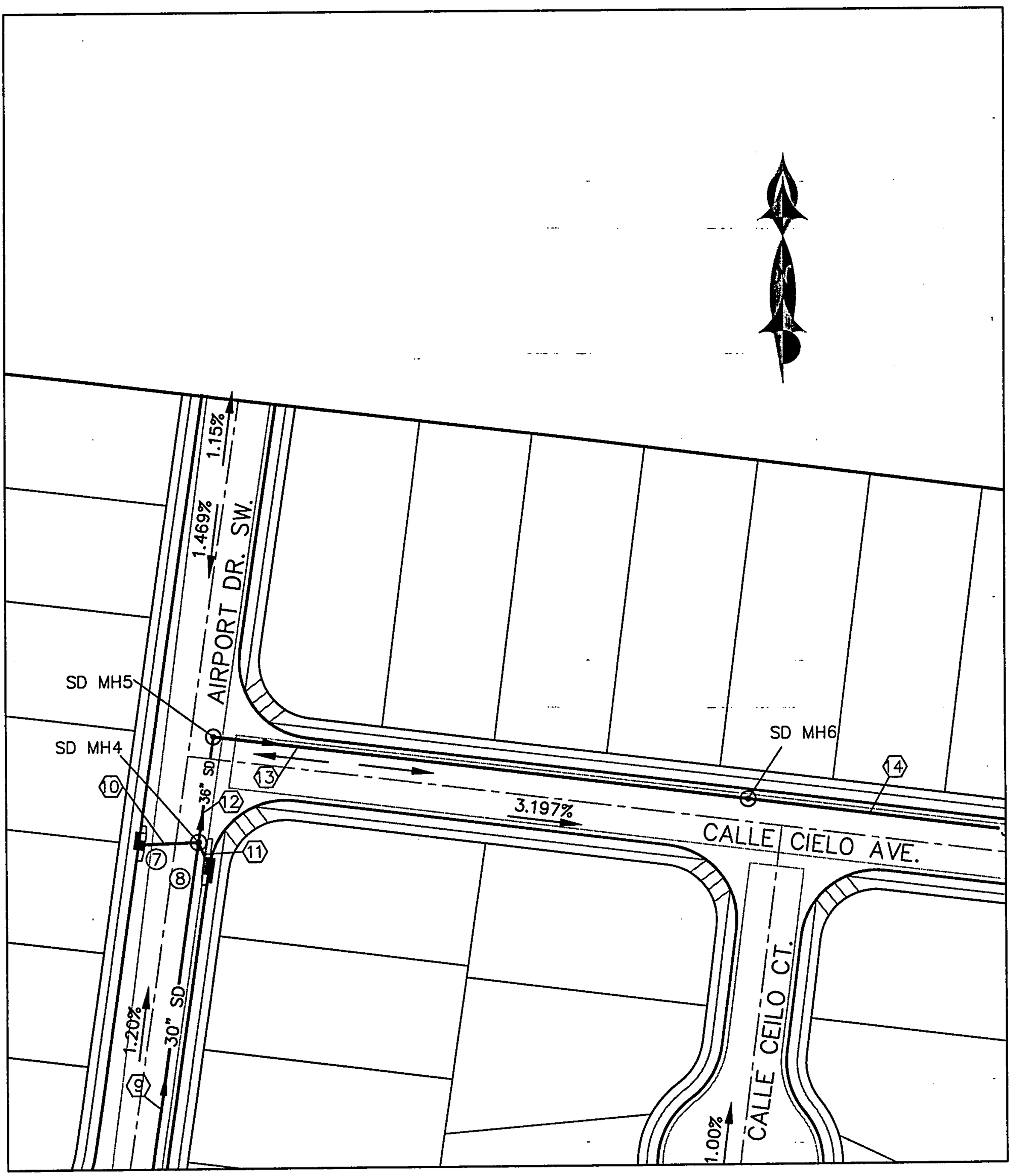
OVERALL STORM SEWER LAYOUT

NTS



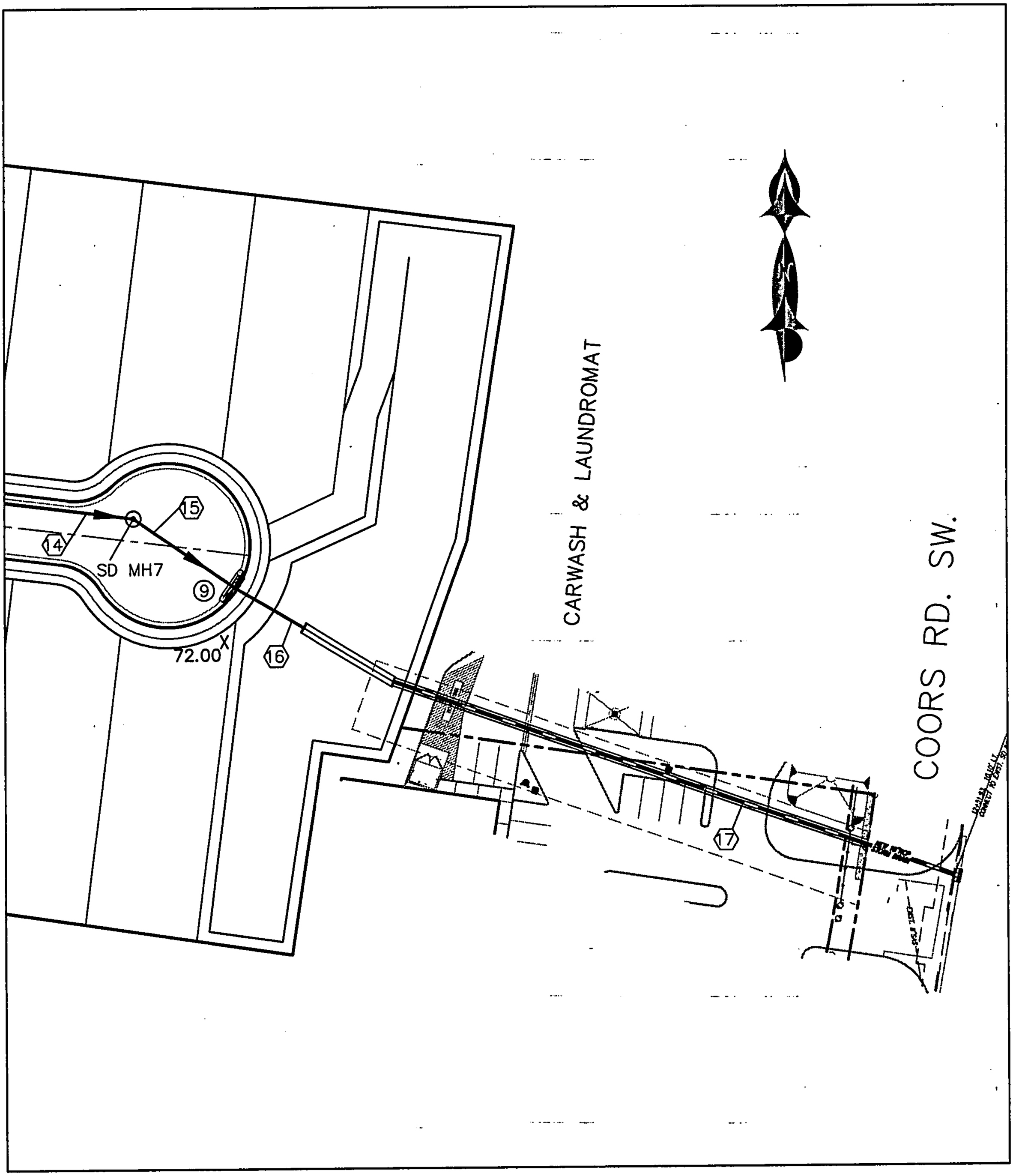
STORM SEWER LAYOUT

NTS



STORM SEWER LAYOUT

NTS



STORM SEWER LAYOUT

NTS

STORM PIPE DETAILS

PIPE #	SIZE (IN)	LENGHT (FT)	SLOPE (%)	FLOW (CFS)	VELOCITY (FT/S)
1	18	26.05	1.00	7.10	6.79
2	18	26.05	1.00	7.10	6.79
3	24	14.07	2.00	13.05	10.14
4	24	28.55	2.00	13.05	10.14
5	18	14.84	1.00	4.05	5.90
6	18	30.47	1.00	4.05	5.90
7	24	62.30	2.00	26.10	12.12
8	30	94.46	0.70	34.20	8.59
9	30	163.30	0.70	34.20	8.59
10	24	26.42	2.00	28.18	12.29
11	24	11.50	2.00	28.18	12.29
12	36	47.44	2.00	90.55	16.33
13	36	236.82	2.00	90.55	16.33
14	36	450.00	2.00	90.55	16.33
15	36	55.54	2.00	90.55	16.33
16	36	34.00	3.59	114.52	21.68
17	18	261.90	0.30%	0.73	2.36

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-1&2

Comment: PIPE 1 & 2

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.012
Discharge.....	7.10 cfs

Computed Results:

Depth.....	0.86 ft
Velocity.....	6.79 fps
Flow Area.....	1.05 sf
Critical Depth....	1.03 ft
Critical Slope....	0.0058 ft/ft
Percent Full.....	57.21 %
Full Capacity.....	11.38 cfs
QMAX @.94D.....	12.24 cfs
Froude Number.....	1.43 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-3&4

Comment: PIPE 3 & 4

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0200 ft/ft
Manning's n.....	0.012
Discharge.....	13.05 cfs

Computed Results:

Depth.....	1.03 ft
Velocity.....	10.14 fps
Flow Area.....	1.29 sf
Critical Depth....	1.35 ft
Critical Slope....	0.0116 ft/ft
Percent Full.....	68.34 %
Full Capacity.....	16.09 cfs
QMAX @.94D.....	17.31 cfs
Froude Number.....	1.86 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-5&6

Comment: PIPE 5 & 6

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.012
Discharge.....	4.05 cfs

Computed Results:

Depth.....	0.62 ft
Velocity.....	5.90 fps
Flow Area.....	0.69 sf
Critical Depth....	0.77 ft
Critical Slope....	0.0046 ft/ft
Percent Full.....	41.22 %
Full Capacity.....	11.38 cfs
QMAX @.94D.....	12.24 cfs
Froude Number.....	1.52 (flow is Supercritical)

Open Channel Flow Module, Version 3.12 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-7

Comment: PIPE 7

Solve For Actual Depth

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0200 ft/ft
Manning's n.....	0.012
Discharge.....	26.10 cfs

Computed Results:

Depth.....	1.30 ft
Velocity.....	12.12 fps
Flow Area.....	2.15 sf
Critical Depth....	1.79 ft
Critical Slope....	0.0100 ft/ft
Percent Full.....	64.80 %
Full Capacity.....	34.66 cfs
QMAX @.94D.....	37.28 cfs
Froude Number.....	2.01 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-8&9

Comment: PIPE 8 & 9

Solve For Actual Depth

Given Input Data:

Diameter.....	2.50 ft
Slope.....	0.0070 ft/ft
Manning's n.....	0.012
Discharge.....	34.20 cfs

Computed Results:

Depth.....	1.89 ft
Velocity.....	8.59 fps
Flow Area.....	3.98 sf
Critical Depth....	1.99 ft
Critical Slope....	0.0063 ft/ft
Percent Full.....	75.57 %
Full Capacity.....	37.18 cfs
QMAX @.94D.....	39.99 cfs
Froude Number.....	1.11 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-10&11

Comment: PIPE 10 & 11

Solve For Actual Depth

Given Input Data:

Diameter.....	2.00 ft
Slope.....	0.0200 ft/ft
Manning's n.....	0.012
Discharge.....	28.18 cfs

Computed Results:

Depth.....	1.37 ft
Velocity.....	12.29 fps
Flow Area.....	2.29 sf
Critical Depth....	1.83 ft
Critical Slope....	0.0115 ft/ft
Percent Full.....	68.47 %
Full Capacity.....	34.66 cfs
QMAX @.94D.....	37.28 cfs
Froude Number.....	1.95 (flow is Supercritical)

Open Channel Flow Module, Version 3.12 (c) 1990
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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-12&13&14&15

Comment: PIPE 12, 13, 14, & 15

Solve For Actual Depth

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0200 ft/ft
Manning's n.....	0.012
Discharge.....	90.55 cfs

Computed Results:

Depth.....	2.20 ft
Velocity.....	16.33 fps
Flow Area.....	5.55 sf
Critical Depth....	2.85 ft
Critical Slope....	0.0136 ft/ft
Percent Full.....	73.22 %
Full Capacity.....	102.19 cfs
QMAX @.94D.....	109.92 cfs
Froude Number.....	1.99 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 20419-16

Comment: PIPE 16

Solve For Actual Depth

Given Input Data:

Diameter.....	3.00 ft
Slope.....	0.0359 ft/ft
Manning's n.....	0.012
Discharge.....	114.52 cfs

Computed Results:

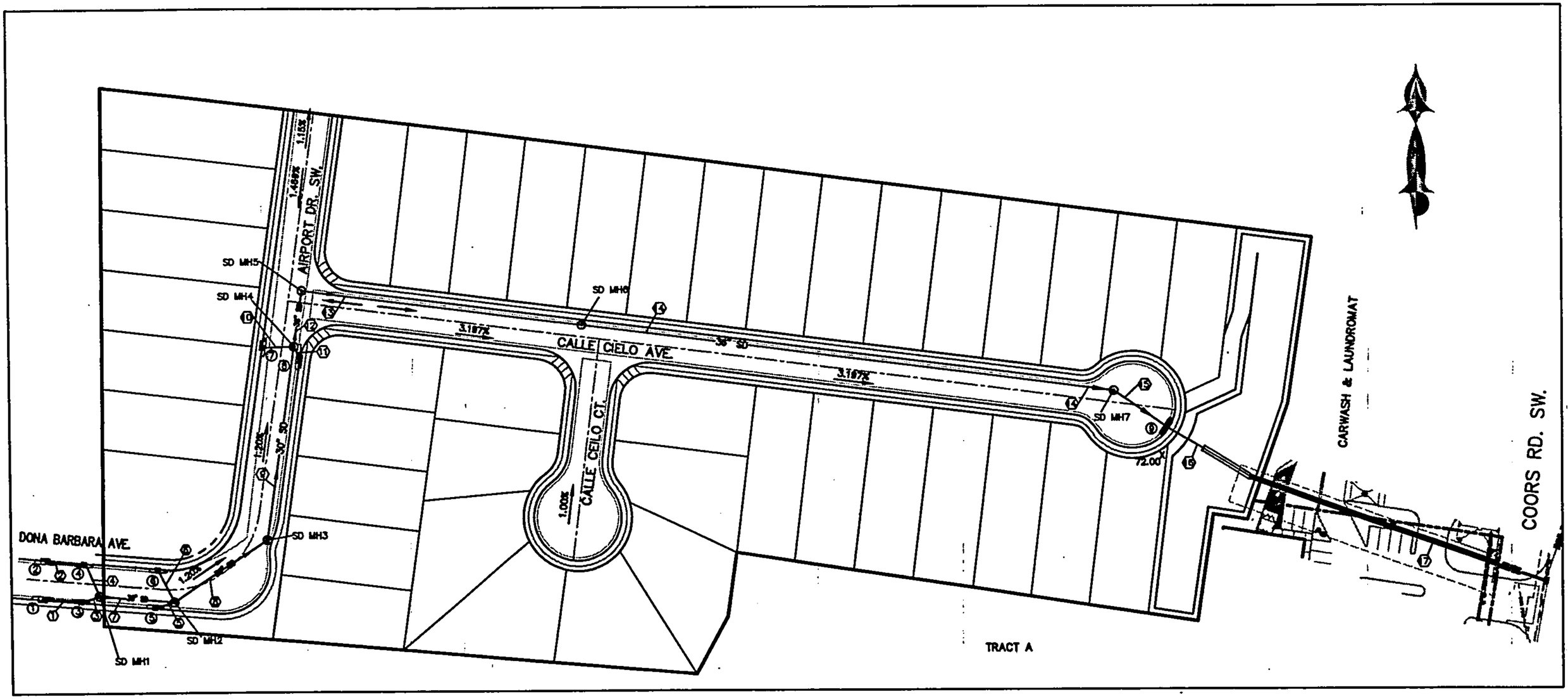
Depth.....	2.10 ft
Velocity.....	21.68 fps
Flow Area.....	5.28 sf
Critical Depth....	2.94 ft
Critical Slope....	0.0225 ft/ft
Percent Full.....	69.95 %
Full Capacity.....	136.91 cfs
QMAX @.94D.....	147.27 cfs
Froude Number.....	2.76 (flow is Supercritical)

Inlet Capacity Calculations

INLET CAPACITY ANALYSIS

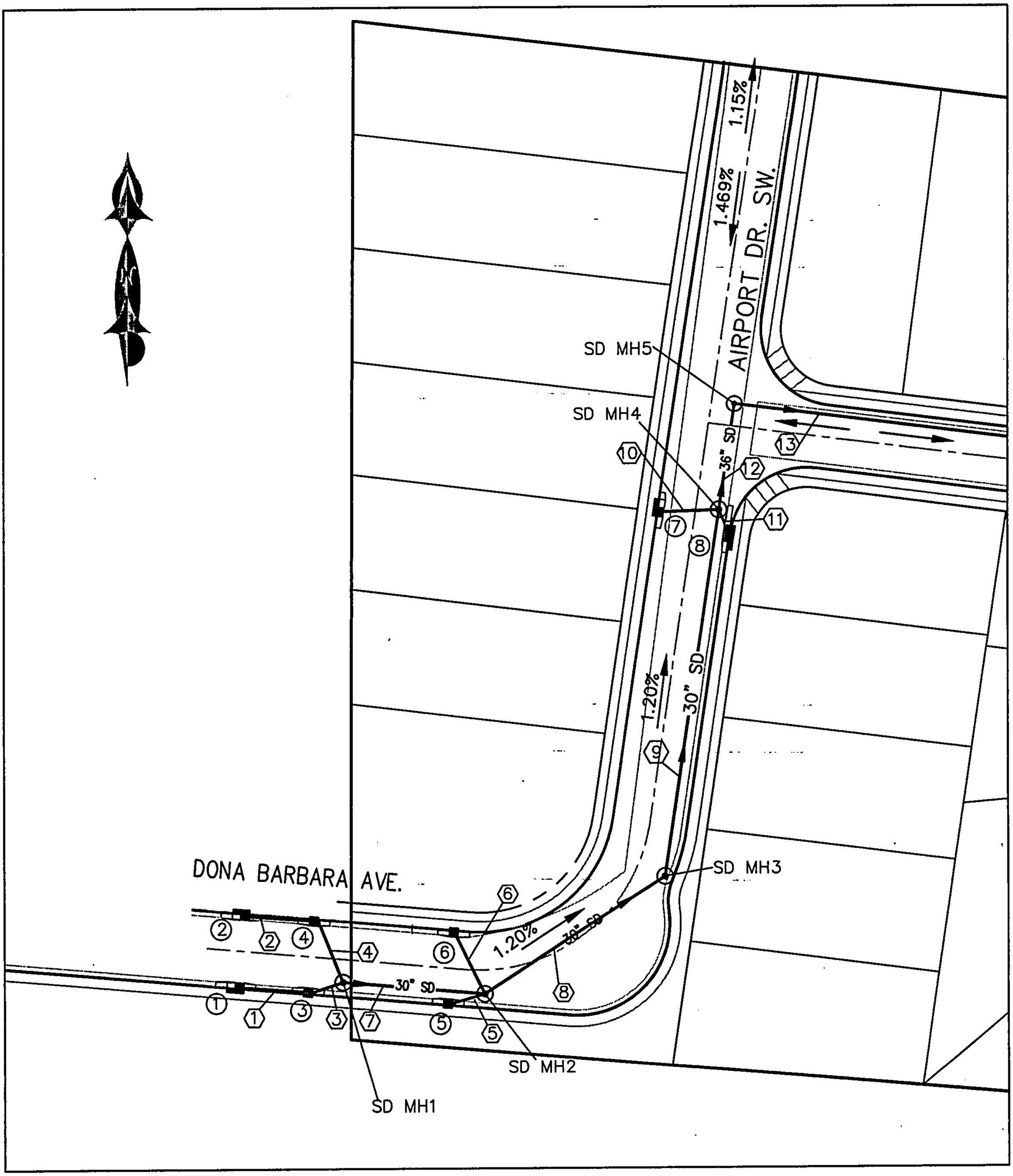
The following sheets are the exhibits for the location of the storm sewer structures on site, summary table for the inlets and manhole details. The inlets on Dona Barbara Ave. were analyzed under the Puño De Tierra Subdivision drainage plan (prepared by Mark Goodwin and Associates). The inlets on Airport were redesigned and re-analyzed by us. The total surface flow on Airport Drive is 56.35 cfs. Two inlets a Double "A" and a Single "A" were used to intercept the runoff on Airport. The inlets were designed for a swamp condition. Single "A" has capacity of 30.45 cfs and Double "A" has a flow capacity of 51.75 cfs. Therefore, the total flow capacity for both inlets is 82.20 cfs which is greater than actual runoff of 56.35 cfs. The inlets on Airport Drive intercept the runoff which has bypassed the inlets on Dona Barbara Ave. (From Basin G, F, and H from Puño De Tierra Subdivision drainage plan) and Basin 211 and the runoff from on-site Basin A (Basin I modified).

On-site Basin B along with offsite runoff from the south (San Jose Tracts) will surface flow at a runoff rate of 23.97 cfs to the east end of Calle Lindo Ave. to a Double "A" inlet with a capacity of 56.35 cfs.



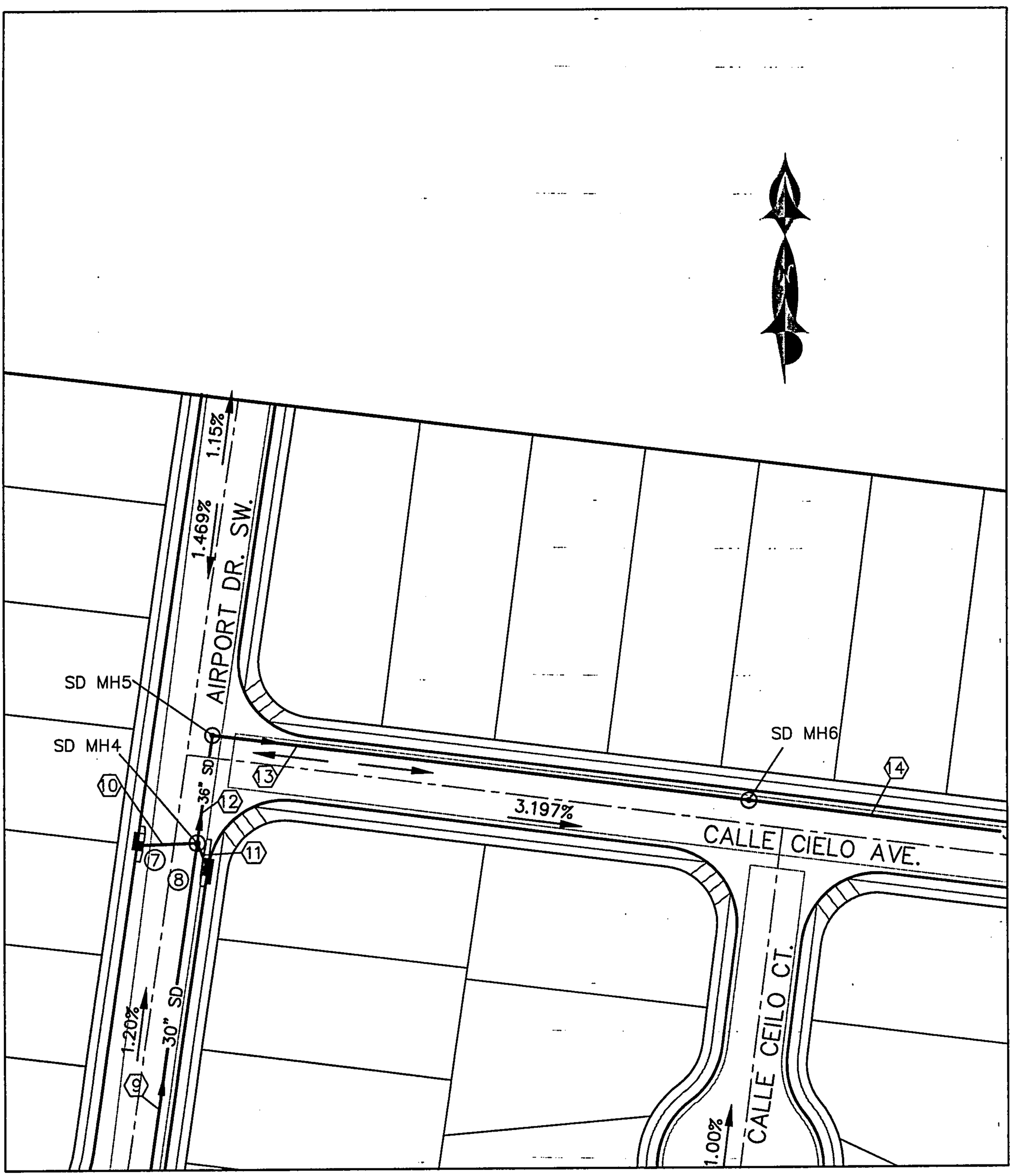
OVERALL STORM SEWER LAYOUT

NTS



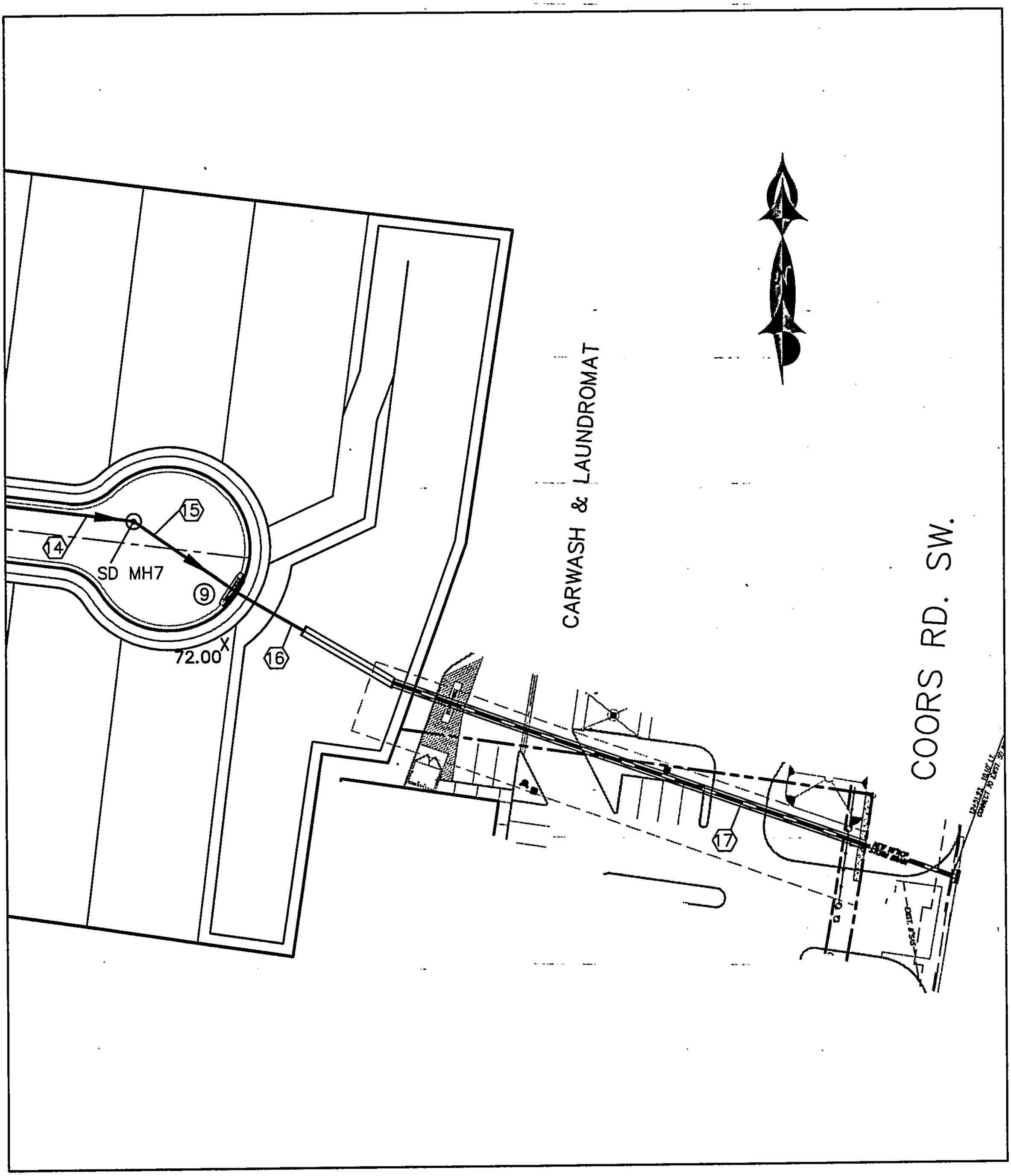
STORM SEWER LAYOUT

NTS



STORM SEWER LAYOUT

NTS



STORM SEWER LAYOUT

NTS

STORM INLET DETAILS

INLET #	TYPE	INV. IN	INV. OUT	FLOW INTERCEPTED
1	"A"	----	4982.72	7.10
2	"A"	----	4982.72	7.10
3	"A"	4981.95	4981.85	5.95
4	"C"	4981.95	4981.85	5.95
5	"A"	----	4980.35	4.05
6	"C"	----	4980.35	4.05
7	DBL "A"	----	4978.66	28.18
8	"A"	----	4978.66	28.18
9	DBL "A"	9	4978.66	23.97

STORM MH DETAILS

MH #	TYPE	INV. IN	INV. OUT	MH SIZE (DIA.) (FT)
1	"E"	4981.28	4981.18	4
2	"E"	4980.04	4979.94	6
3	"E"	4979.38	4979.28	4
4	"E"	4978.13	4978.08	4
5	"E"	4977.08	4976.98	4
6	"E"	4972.14	4972.04	4
7	"E"	4963.04	4962.94	4

STORM DROP INLET DRAINAGE CAPACITY

Single 'A' (in ponding conditions)

Area at the grate:

L = 44 3/8" - 2(6"$_{ends}$) - 7(½ $_{middle\ bars}$)
= 28 7/8"
= 2.41'

W = 25 ½" - 13(½"$_{middle\ bars}$)
= 19"
= 1.58'

Area = 2.41' x 1.58'
= 3.81 ft^2

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

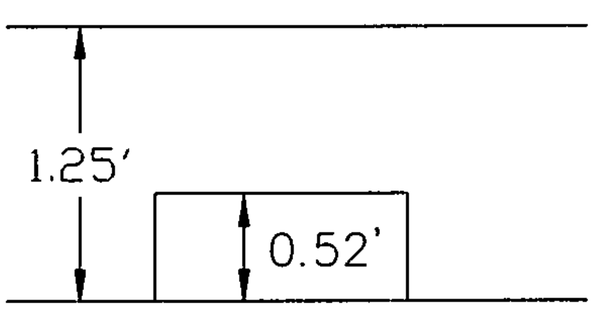
Area at the throat:

L = 7.45'

H = 10 ¾" - 4 ½"
= 6 ¼"
= 0.5208'

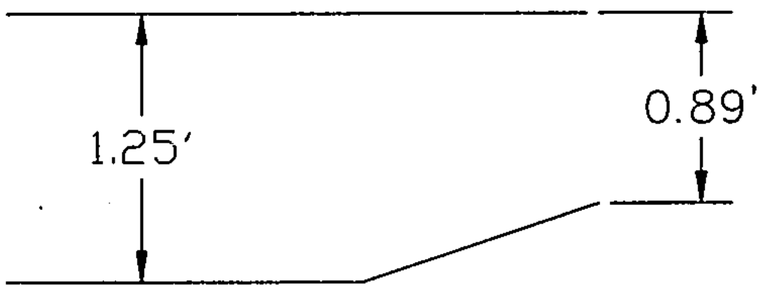
Area = 7.45' x 0.5208'
= 3.88 ft^2 at the throat

THROAT



H=1.25
Q=CA$\sqrt{2gH}$
Q=0.60(3.88)$\sqrt{2(32.2)(1.25)}$
Q=20.89 CFS

GRATE



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 CFS

TOTAL

Q=20.89+9.56=30.45 CFS

STORM DROP INLET DRAINAGE CAPACITY

Double 'A' (in ponding conditions)

Area at the grate:

L = 88 ¾" - 2(6"$_{ends}$) - 6"$_{center\ piece}$ - 14(½ $_{middle\ bars}$)
= 63 ¾"
= 5.3125'

W = 25 ½" - 13(½"$_{middle\ bars}$)
= 19"
= 1.5833'

Area = 5.3125' x 1.5833'
= 8.41 ft^2

Effective Area = 8.41- 8.41 (0.5 $_{clogging\ factor}$)
= 4.21 ft^2 at the grate

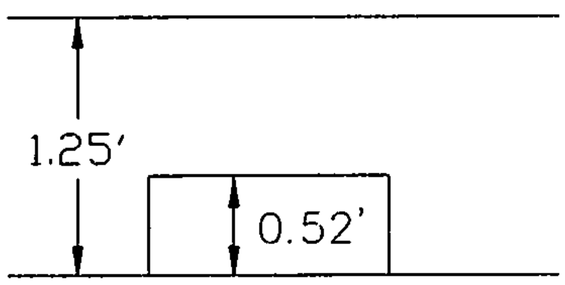
Area at the throat:

L = 10.95'

H = 10 ¾" - 4 ½"
= 6 ¼"
= 0.5208'

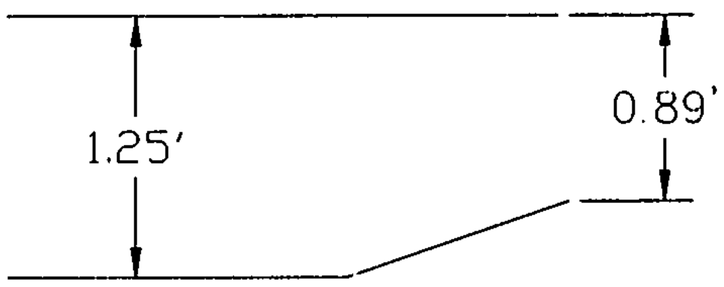
Area = 10.95' x 0.5208'
= 5.70 ft^2 at the throat

THROAT



H=1.25
$Q=CA\sqrt{2gH}$
$Q=0.60(5.70)\sqrt{2(32.2)(1.25)}$
Q=30.68 CFS

GRATE



H=(1.25+0.89)/2=1.08
$Q=CA\sqrt{2gH}$
$Q=0.60(4.21)\sqrt{2(32.2)(1.08)}$
Q=21.07 CFS

TOTAL

Q=21.07+30.68=51.75 CFS ←

2

Number Of Inlets Provided:

One Single "A" and One Double "A" Total Q = 30.45 + 51.75 = 82.20 cfs

The maximum flow intercepted by the inlets (required) 56.35 cfs (28.18 cfs each)