CITY OF
Albuquerque

May 30, 1996

Martin J. Chávez, Mayor

Ronald Bohannan
Tierra West Dev.
4421 McCleod NE Suite D
Albuquerque, NM 87109

RE: GIRARD AND CANDELARIA (G16-D111) GRADING AND DRAINAGE PLAN FOR BUILDING, GRADING AND SO #19 PERMIT APPROVALS. ENGINEER'S STAMP DATED MAY 5, 1996.

Dear Mr. Bohannan:

Based on the information provided on your May 8, 1996 submittal, the above referenced project is approved for Building and SO #19 permits.

In the future, when you need a SO #19 permit, please check the "OTHER" box on the Drainage Information Sheet and request SO #19 permit approval.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Arlene Portillo
Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *GIRARD AND CANDELARIA* **ZONE ATLAS/DRNG. FILE #:** *G-16* / D111

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

LEGAL DESCRIPTION: *LOT B-1 IN CAMPBELLS TRACT*

CITY ADDRESS: *NORTHEAST CORNER OF GIRARD AND CANDELARIA*

ENGINEERING FIRM: *TIERRA WEST DEV. MGT. SER.* **CONTACT:** *RONALD R. BOHANNAN*

ADDRESS: *4421 McCleod Rd. NE Suite D, 87109* **PHONE:** *(505) 883-7592*

OWNER: *SOUTHWEST CANDELARIA PARNERSHIP* **CONTACT:** *JOHN PIPER*

ADDRESS: *20 FIRST PLAZA, SUITE 230, ALB. NM 87102* **PHONE:** *(505) 242-4818*

ARCHITECT: *JLS ARCHITECTS* **CONTACT:** *JOE SLAGEL*

ADDRESS: *414 2ND STREET, ALB, NM 87102* **PHONE:** *(505) 246- 0870*

SURVEYOR: *SOUTHWEST SURVEYING CO., INC.* **CONTACT:** *FRANK WILSON*

ADDRESS: *333 LOMAS BLVD, ALB. 87102* **PHONE:** *(505) 247-4444*

CONTRACTOR: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- X DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- X NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAN APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D. APPROVAL
- ____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S. A. D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ____ *OTHER/CHANGES*

↑ SO # 19

DATE SUBMITTED: *5 /6 /96*

BY: *SARA McCOLLAM*

RECEIVED
MAY - 8 1996
HYDROLOGY SECTION

Tierra West Development
Management Services

May 6, 1996

Mrs. Lisa Ann Manwill
Engineering Associate
Hydrology Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Girard and Candelaria (G16-D111) Drainage and Grading Plan

Dear Mrs. Manwill:

The purpose of this letter is to address the comments we received from you regarding the drainage report and grading plan for Girard and Candelaria.

1. During our April 30, 1996, meeting it was decided that we would limit the discharge to half of the existing flow and pond the rest of the discharge on-site.

2. Half of the runoff discharge will need to be ponded on-site. Pond calculations have been added to the drainage report.

3. A diagram has been added to the drainage report to show the dimensions of the sidewalk culvert as used in the calculations. Invert elevations for the sidewalk culvert are shown in section B-B on the grading plan.

4. The pipe and orifice calculations have been added as a result of not free discharging. The flows in the calculations have been changed to half of the existing flow on the site.

5. An SO #19 Permit approval sign-off block has been added to the plans. A request for an SO #19 Permit was also submitted on the Drainage Information Sheet.

4421 McLeod Rd. NE, Suite D • Albuquerque, NM 87109 • (505) 883-7592

If you have any questions regarding this matter, please do not hesitate to contact me at 883-7592.

Sincerely,

Sara McCollam

Sara McCollam

Enclosures

cc: John Piper

JN: 950049
SCM/db

950049

DRAINAGE REPORT

for

Girard and Candelaria

Prepared by

Tierra West Development Management Sevices
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

Prepared for

John Piper
Southwest Candelaria Partnership
20 First Plaza, Suite 230
Albuquerque, New Mexico 87102

March 1996

Ronald R. Bohannan P.E. No. 7868

TABLE OF CONTENTS

SCALE IN FEET

250 0 500 1000

PHOTOCOPY- NOT TO SCALE

North

AGIS

Map Amended through June 02, 1994

LEGAL DESCRIPTION

TION

RGE

SEC 8

UNIFORM PROPERTY CODE

1-010-000

G-16-Z

Location and Location Map

The site is located at the northeast corner of Girard and Candelaria just west of the North Diversion Channel and is identified as Lot B-1 in Campbells Tract. The site is shown on the attached Zone Atlas Map G-16 and contains approximately 1.46 acres, which is divided into two lots. Lot B-2 contains .8825 acres and consists of an 9600 SF existing building. Lot B-1 is partially developed and contains .5813 acres and is the location of a proposed 7500 SF new free standing industrial building. The purpose of this report is to provide the drainage analysis and management plan for the site.

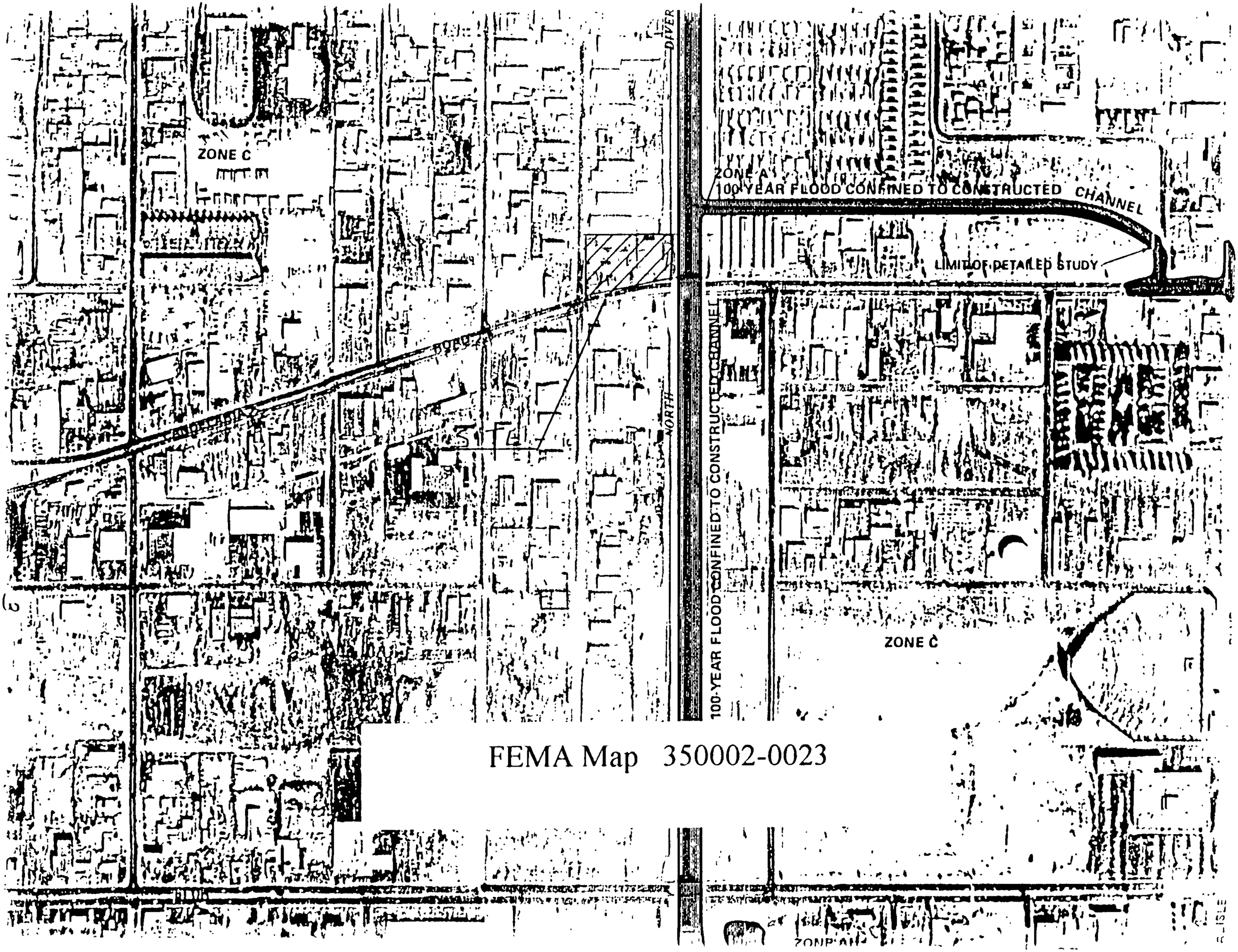
Existing Drainage Conditions

The site lies just west of the North Diversion Channel. All upland flow is intercepted by this channel. The site is partially developed with an existing 9600 square foot building and the balance is vacant but paved. Research with the property owners have indicated this site was an abandoned service station. The natural slope is from southeast to northwest at approximately two percent. There is one existing basin on the site, which has a runoff of 6.51 cfs. The runoff drains from the site towards the northwest side of the property. The runoff is then collected in an existing pond at the north end of the property. The controlled runoff from this pond drains into Girard, then south to Candelaria.

FEMA and Soil Conditions

The site is located on FEMA Map section 350002 panel 23 as shown on the attached excerpt. The map shows that the site does not lie within any 100 year flood plain.

The Soil Conservation Service Soil Survey of Bernalillo County classifies only one soil



FEMA Map 350002-0023

type on the site. The soil is a Wink-Embudo complex, which is a mixture of a fine sandy loam and a gravelly fine sandy loam. This soil has a moderate hazard of water erosion and medium runoff.

On-Site Drainage Management Plan

All flows will continue to be routed to the north and into the existing pond. The flow rate of the proposed basin would be 6.54 cfs. All flows would be diverted towards the north end of the proposed development area and allowed to sheet flow into a proposed pond area. The proposed pond will include the existing pond which will be enlarged, and it will extend south into the parking lot area. Flows from the existing building on the site will also be collected and routed to the north end of the property. It was decided on the April 30, 1996 meeting to discharge half of the existing runoff flow to the street and pond the rest of the runoff flow. A 14" pipe and 10.5" orifice plate will drain the pond at a flow rate of 3.26 cfs, which is half of the existing flow rate, to the sidewalk culvert. An expansion box, 20" high, will be placed at the transition between the pipe and the sidewalk culvert. A single 24" sidewalk culvert will route the flow under the sidewalk into Girard Blvd. The balance of the runoff flow will be allowed to pond on-site. The entrance on the west side of the property would be used as an emergency overflow where the runoff will drain into Girard Boulevard and south to Candelaria.

Summary

There is one proposed basin on the site with a developed runoff flow of 6.54 cfs. This flow will be routed into the north end of the now undeveloped section and allowed to pond. Half of the existing flow will then be diverted through a sidewalk culvert to Girard Blvd and will be discharged off-site.

Runoff
Calculations

RUNOFF CALCULATIONS

The site is @ Zone 2

LAND TREATMENT

Proposed: D=90%
B=10%

Existing: C=17%
D=83%

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 2.01 inches

P_{360} = 2.35 inches

P_{1440} = 2.75 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 2.01 x 0.667
= 1.34 inches

P_{360} = 1.57

P_{1440} = 1.83

See the summary output from AHYMO calculations.

Also see the following summary tables.

Runoff
Summary Tables
for
Existing and Proposed
Drainage Basins

DRAINAGE BASINS

EXISTING

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	63763.13	1.4638	0.002287

PROPOSED

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	63763.13	1.4638	0.002287

BASINS RUNOFF CALCULATION RESULTS

EXISTING

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
A	6.51	4.21	0.238	0.146

PROPOSED

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
A	6.54	4.23	0.242	0.15

SEE THE FOLLOWING SHEET FOR SAMPLE CALCULATION ON THE BASINS RUNOFF

Sidewalk Culvert
And
Drainage Pipe
Analysis

Pipe in Pond
950049

Manning's Equation: Q = 1.486/n * Slope^(1/2) * Area * R^(2/3)

n=	0.011
slope=	0.004
Q (cfs)=	3.26

Dia (in)=	Area=	WP=	R=	Q (cfs)=
12	0.785398	3.14159	0.25	2.663007
14	**1.069013**	**3.665188**	**0.291667**	**4.016956**

Orifice Equation: Q = CA sqrt (2gH)

C=	0.6
g (fps)=	32.2
Q (cfs)=	3.26

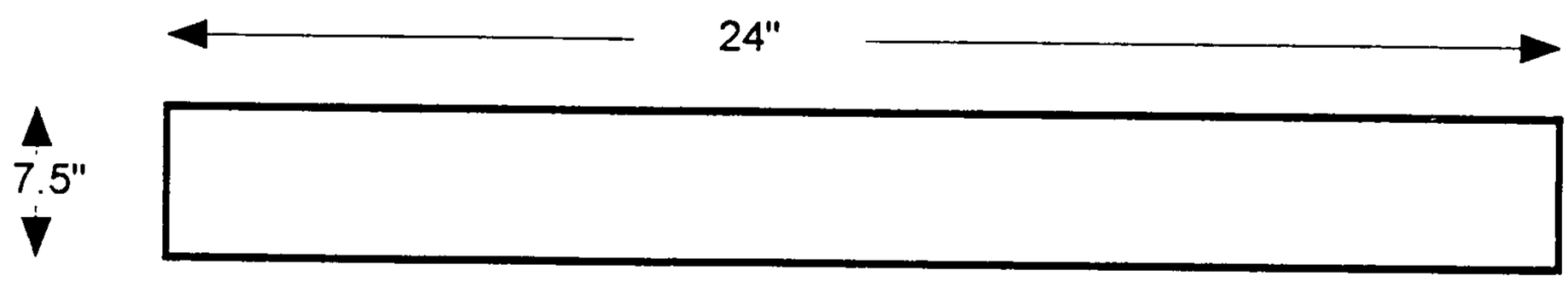
Dia (in)	Area	H (ft)
12	0.785398	0.743135
14	**1.069013**	**0.401126**

Sidewalk Culvert

Mannings Equation 1.486/n *Area *Slope^(1/2) *R^(2/3)	
n=	0.012
Slope=	0.004
Height (ft)=	0.625
Length (ft)=	2
Area=	1.25
WP=	5.25
R=	0.238095
Q (cfs)=	3.760781

Q (cfs)= 3.760781

3.76 cfs greater than 3.26 cfs needed
Use single 24" sidewalk culvert



Expansion Box

Weir Equation Q=CLH^(3/2)	
C=	2.95
L (ft)=	2
Q (cfs)=	3.26

H (ft)= 0.673354

Use 20" high box

Orifice Plate

Orifice Equation Q = CA sqrt(2gH)	
C=	0.6
g=	32.2
H (ft)=	1.25
Q (cfs)=	3.26
Area (SF)=	0.605576

Radius (in)= 5.268545
Diameter = 10.53709

Use orifice plate of 10.5" to limit flow to half of existing the flow rate

Pond Calculations

POND VOLUME CALCULATIONS

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 * D^2

C = (At - Ab) / Dt

Ab =	1,149.27
At =	19,653.48
Dt =	1.50
C =	12336.14

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
5101.77	0	0.00000	0.00
5101.97	0.2	0.01094	0.00
5102.17	0.4	0.03321	0.00
5102.37	0.6	0.06681	0.66
5102.57	0.8	0.11173	2.40
5102.77	1	0.16798	3.32
5102.97	1.2	0.23556	4.04
5103.17	1.4	0.31447	4.65
5103.27	1.5	0.35817	4.93

Q = CA*SQRT(2gH)

C =	0.6
Diameter (in	14
Area (Ft^2)=	1.069014
H (Ft) =	Depth of Water
Q (CFS)=	Flow

AHYMO
Input
and
Summary Output

```
**********************************************************************
*                     GIRARD AND CANDELARIA                          *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER PROPOSED CONDITIONS)            *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                     RAIN DAY=2.75 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
*
**********************************************************************
*                     GIRARD AND CANDELARIA                          *
**********************************************************************
*       10-YEAR, 6-HR STORM  (UNDER PROPOSED CONDITIONS)             *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.34 IN RAIN SIX=1.57 IN
                     RAIN DAY=1.83 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/20/1996

INPUT FILE = a:\pcit.dat USER NO.= R_BOHANN.101

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=	2.350
COMPUTE NM HYD	100.10	-	1	.00229	6.54	.242	1.98164	1.500	4.468	PER IMP=	90.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.570
COMPUTE NM HYD	100.10	-	1	.00229	4.23	.150	1.23170	1.500	2.892	PER IMP=	90.00
FINISH											

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/07/1996

INPUT FILE = A:\CIT.DAT USER NO.= R_BOHANN.101

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=	2.350
COMPUTE NM HYD	100.10	-	1	.00229	6.51	.238	1.94748	1.500	4.447	PER IMP=	83.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.570
COMPUTE NM HYD	100.10	-	1	.00229	4.21	.146	1.19677	1.500	2.874	PER IMP=	83.00
FINISH											

```
**********************************************************************
*                     GIRARD AND CANDELARIA                          *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)            *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                     RAIN DAY=2.75 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=0.00 PER C=17.00 PER D=83.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
**********************************************************************
*                     GIRARD AND CANDELARIA                          *
**********************************************************************
*       10-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)             *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.34 IN RAIN SIX=1.57 IN
                     RAIN DAY=1.83 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=0.00 PER C=17.00 PER D=83.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
FINISH
```

AHYMO
Pond
Input and Output

```
**********************************************************************
*                    GIRARD AND CANDELARIA                           *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)            *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                     RAIN DAY=2.75 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1
*
ROUTE RESERVOIR      ID=2 HYD NO=501.0 INFLOW ID=1 CODE=24
```

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)
0.00	0.00000	5101.77
0.66	0.06681	5102.37
2.40	0.11173	5102.57
3.32	0.16798	5102.77
4.04	0.23556	5102.97
4.65	0.31447	5103.17
4.93	0.35817	5103.27

```
*
*
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/02/1996

INPUT FILE = A:POND.DAT USER NO.= R_BOHANN.101

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	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.350
COMPUTE NM HYD	100.10	-	1	.00229	6.54	.242	1.98164	1.500	4.468	PER IMP=	90.00
ROUTE RESERVOIR	501.00	1	2	.00229	2.43	.242	1.98150	1.767	1.659	AC-FT=	.113
FINISH											

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 05/02/1996
         START TIME (HR:MIN:SEC) = 15:02:42     USER NO.= R_BOHANN.I01
         INPUT FILE = A:POND.DAT


**********************************************************************
*                    LANDS OF JOHN PIPER                             *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)            *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
     RAIN DAY=2.75 IN DT=0.033333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
DT =     .033333 HOURS        END TIME =     5.999940 HOURS
   .0000   .0016   .0033   .0049   .0066   .0084   .0102
   .0120   .0139   .0158   .0178   .0199   .0219   .0241
   .0263   .0286   .0309   .0333   .0358   .0384   .0411
   .0439   .0467   .0497   .0529   .0561   .0596   .0631
   .0669   .0709   .0751   .0807   .0866   .0930   .1066
   .1372   .1842   .2517   .3438   .4648   .6192   .8114
  1.0459  1.2628  1.3536  1.4303  1.4985  1.5605  1.6176
  1.6706  1.7202  1.7667  1.8104  1.8516  1.8906  1.9274
  1.9624  1.9955  2.0269  2.0568  2.0851  2.0915  2.0976
  2.1034  2.1088  2.1141  2.1191  2.1239  2.1285  2.1330
  2.1373  2.1414  2.1455  2.1494  2.1532  2.1569  2.1604
  2.1639  2.1673  2.1707  2.1739  2.1771  2.1802  2.1832
  2.1862  2.1891  2.1920  2.1948  2.1975  2.2002  2.2028
  2.2054  2.2080  2.2105  2.2130  2.2154  2.2178  2.2202
  2.2225  2.2248  2.2271  2.2293  2.2315  2.2336  2.2358
  2.2379  2.2400  2.2420  2.2440  2.2460  2.2480  2.2500
  2.2519  2.2538  2.2557  2.2576  2.2594  2.2613  2.2631
  2.2649  2.2666  2.2684  2.2701  2.2718  2.2736  2.2752
  2.2769  2.2786  2.2802  2.2818  2.2834  2.2850  2.2866
  2.2882  2.2897  2.2913  2.2928  2.2943  2.2958  2.2973
  2.2988  2.3002  2.3017  2.3031  2.3046  2.3060  2.3074
  2.3088  2.3102  2.3116  2.3129  2.3143  2.3156  2.3170
  2.3183  2.3196  2.3209  2.3222  2.3235  2.3248  2.3261
  2.3273  2.3286  2.3299  2.3311  2.3323  2.3336  2.3348
  2.3360  2.3372  2.3384  2.3396  2.3408  2.3420  2.3431
  2.3443  2.3454  2.3466  2.3477  2.3489  2.3500

COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   8.1263    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 2.0100
    AREA =      .002058 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033333
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K = .132088HR TP = .133300HR K/TP RATIO = .990905 SHAPE CONSTANT, N = 3.563124
UNIT PEAK = .55744 CFS UNIT VOLUME = .9763 B = 324.91 P60 = 2.0100
AREA = .000229 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

*

ROUTE RESERVOIR ID=2 HYD NO=501.0 INFLOW ID=1 CODE=24

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)
0.00	0.00000	5101.77
0.66	0.06681	5102.37
2.40	0.11173	5102.57
3.32	0.16798	5102.77
4.04	0.23556	5102.97
4.65	0.31447	5103.17
4.93	0.35817	5103.27

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5101.77	.000	.00
.80	.00	5101.77	.000	.00
1.60	4.51	5102.52	.100	1.96
2.40	.27	5102.41	.077	1.05
3.20	.05	5102.17	.044	.44
4.00	.04	5101.99	.025	.25
4.80	.04	5101.90	.015	.15
5.60	.04	5101.85	.009	.09
6.40	.00	5101.83	.006	.06
7.20	.00	5101.80	.003	.03
8.00	.00	5101.79	.002	.02
8.80	.00	5101.78	.001	.01
9.60	.00	5101.77	.000	.00

PEAK DISCHARGE = 2.429 CFS - PEAK OCCURS AT HOUR 1.77
MAXIMUM WATER SURFACE ELEVATION = 5102.576
MAXIMUM STORAGE = .1135 AC-FT INCREMENTAL TIME= .033333HRS

*
*
FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 15:02:42

CITY OF
Albuquerque

Martin J. Chávez, Mayor

Ron Bohannan
Teirra West Dev.
4421 McCleod Rd. NE Suite D
Albuquerque, NM 87109

RE: GIRARD AND CANDELARIA (G16-D111) DRAINAGE AND GRADING PLAN FOR BUILDING AND GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED 4-2-96.

Dear Mr. Bohannan:

Based on information provided on your 4- 3-96 submittal, City Hydrology has the following comments:

1. Your 100-year developed flow is 6.54 cfs and your pond release rate is 6.54 cfs. I essence, you are not detaining anything and are free discharging. You must determine the allowable discharge from a down stream capacity analysis.

2. If you find that you have down stream capacity for free discharge, there is no need for the pond. If you do need the pond, provide volume calculations.

3. It appears that the dimensions used to calculate the sidewalk capacity are rather small. As I see it, you have calculated the capacity of a culvert that is 7 inches deep, 0.5 inches wide, and 24 inches long. Please show a diagram so that I know the location of each dimension. Provide invert elevations for the sidewalk culvert.

4. The pipe and orifice calculations are not needed if you are free discharging. If you are not able to free discharge, make sure that the correct flow is used in the calculations.

5. An SO #19 Permit approval is required to construct the sidewalk culvert. Please submit two plans to this office with the required sign-off block. Also, request SO #19 Permit on the Drainage Information Sheet.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *GIRARD AND CANDELARIA* **ZONE ATLAS/DRNG. FILE #:** *G-16 / D 111*

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

LEGAL DESCRIPTION: *LOT B-1 IN CAMPBELLS TRACT*

CITY ADDRESS: *NORTHEAST CORNER OF GIRARD AND CANDELARIA*

ENGINEERING FIRM: *TIERRA WEST DEV. MGT. SER.* **CONTACT:** *RONALD R. BOHANNAN*

ADDRESS: *4421 McCleod Rd. NE Suite D, 87109* **PHONE:** *(505) 883-7592*

OWNER: *SOUTHWEST CANDELARIA PARNERSHIP* **CONTACT:** *JOHN PIPER*

ADDRESS: *20 FIRST PLAZA, SUITE 230, ALB. NM 87102* **PHONE:** *(505) 242-4818*

ARCHITECT: *JLS ARCHITECTS* **CONTACT:** *JOE SLAGEL*

ADDRESS: *414 2ND STREET, ALB, NM 87102* **PHONE:** *(505) 246- 0870*

SURVEYOR: *SOUTHWEST SURVEYING CO., INC.* **CONTACT:** *FRANK WILSON*

ADDRESS: *333 LOMAS BLVD, ALB. 87102* **PHONE:** *(505) 247-4444*

CONTRACTOR: _____ **CONTACT:** _____

ADDRESS: _____ **PHONE:** _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- X DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ OTHER

PRE-DESIGN MEETING:

- ____ YES
- X NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ____ SKETCH PLAN APPROVAL
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D. APPROVAL
- ____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ S. A. D. DRAINAGE REPORT
- ____ DRAINAGE REQUIREMENTS
- ____ *OTHER/CHANGES*

DATE SUBMITTED: *4 /1 /96*

BY: *SARA McCOLLAM*

RECEIVED
APR - 3 1996
HYDRO...

DRAINAGE REPORT

for

Girard and Candelaria

Prepared by

Tierra West Development Management Sevices
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

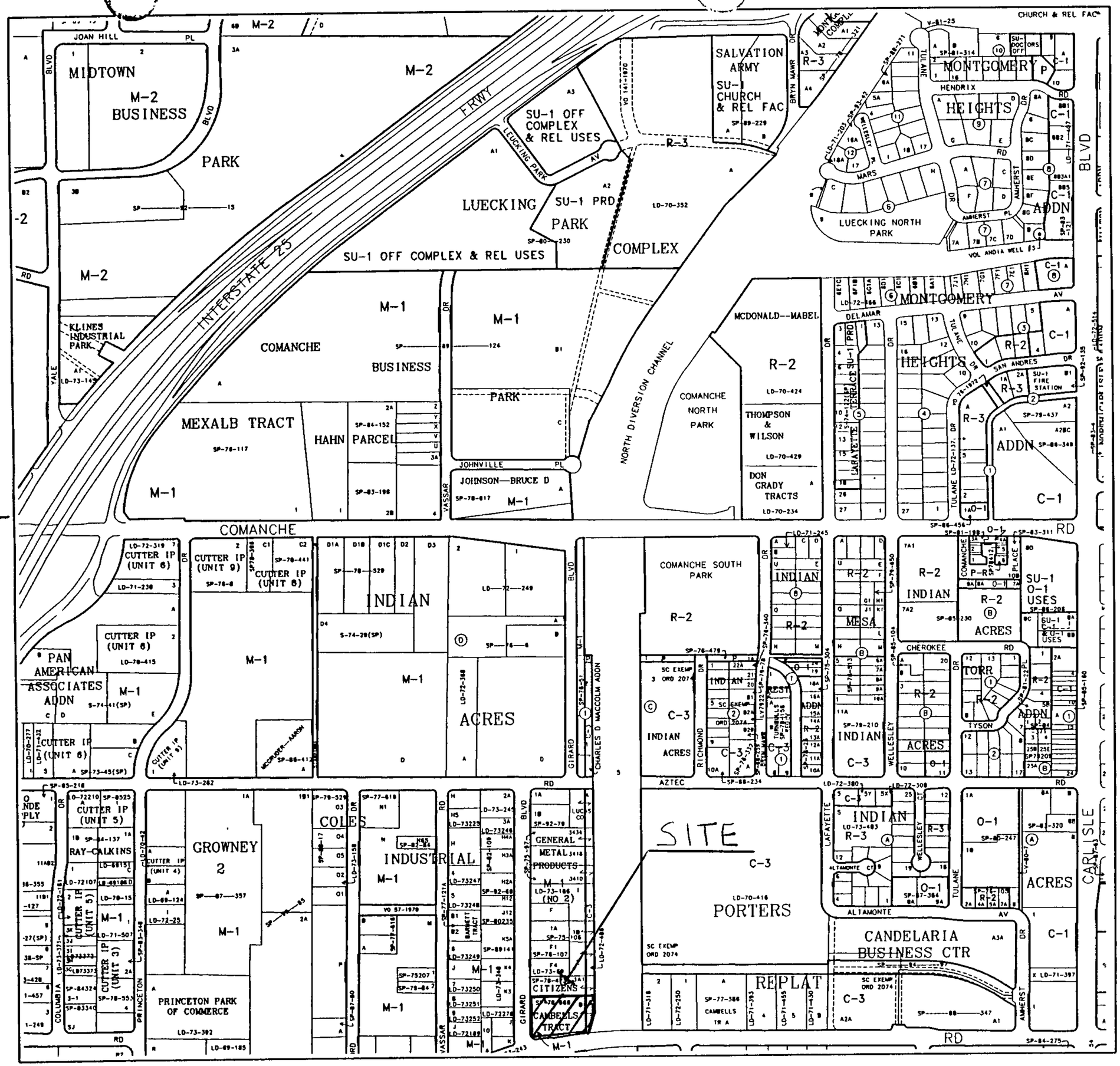
Prepared for

John Piper
Southwest Candelaria Partnership
20 First Plaza, Suite 230
Albuquerque, New Mexico 87102

March 1996

Ronald R. Bohannan P.E. No. 7868

TABLE OF CONTENTS



SCALE IN FEET

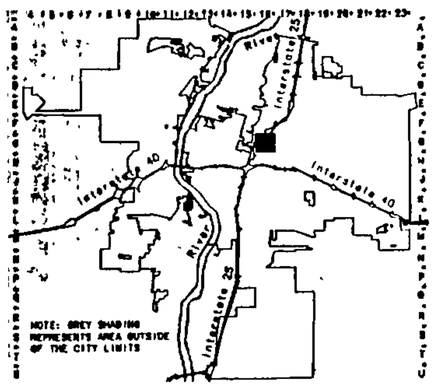
250 0 500 1000

PHOTOCOPY--NOT TO SCALE

North

AGIS — Albuquerque Geographic Information System

Map Amended through June 02, 1994



LEGAL DESCRIPTION

T10N

R3E

SEC 3

UNIFORM PROPERTY CODE

1-016-090

G-16-Z

Location and Location Map

The site is located at the northeast corner of Girard and Candelaria just west of the North Diversion Channel and is identified as Lot B-1 in Campbells Tract. The site is shown on the attached Zone Atlas Map G-16 and contains approximately 1.46 acres, which is divided into two lots. Lot B-2 contains .8825 acres and consists of an 9600 SF existing building. Lot B-1 is partially developed and contains .5813 acres and is the location of a proposed 7500 SF new free standing industrial building. The purpose of this report is to provide the drainage analysis and management plan for the site.

Existing Drainage Conditions

The site lies just west of the North Diversion Channel. All upland flow is intercepted by this channel. The site is partially developed with an existing 9600 square foot building and the balance is vacant but paved. Research with the property owners have indicated this site was an abandoned service station. The natural slope is from southeast to northwest at approximately two percent. There is one existing basin on the site, which has a runoff of 6.51 cfs. The runoff drains from the site towards the northwest side of the property. The runoff is then collected in an existing pond at the north end of the property. The controlled runoff from this pond drains into Girard, then south to Candelaria.

FEMA and Soil Conditions

The site is located on FEMA Map section 350002 panel 23 as shown on the attached excerpt. The map shows that the site does not lie within any 100 year flood plain.

The Soil Conservation Service Soil Survey of Bernalillo County classifies only one soil


ZONE C
ZONE A
100 YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL
LIMIT OF DETAILED STUDY
NORTH
DIVE
ZONE C
100 YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL
ZONE A
BLVD
CARLISLE
ZONE AH
FEMA Map 350002-0023
SITE
3

type on the site. The soil is a Wink-Embudo complex, which is a mixture of a fine sandy loam and a gravelly fine sandy loam. This soil has a moderate hazard of water erosion and medium runoff.

If Qout + Qall release are the same why pond?

On-Site Drainage Management Plan

All flows will continue to be routed to the north and into the existing pond. The flow rate of the proposed basin would be 6.54 cfs. All flows would be diverted towards the north end of the proposed development area and allowed to sheet flow into a proposed pond area. The proposed pond will include the existing pond which will be enlarged, and it will extend south into the parking lot area. Flows from the existing building on the site will also be collected and routed to the north end of the property. A double 24" sidewalk culvert will route the flow under the sidewalk into Girard Blvd. An 18" pipe and 15" orifice plate will drain the pond at the historic flow rate of 6.54 to the sidewalk culvert. An expansion box, two feet high, will be placed at the transition between the pipe and the sidewalk culvert. The entrance on the west side of the property would be used as an emergency overflow where the runoff will drain into Girard Boulevard and south to Candelaria.

Summary

There is one proposed basin on the site with a developed runoff flow of 6.54 cfs. This flow will be routed into the north end of the now undeveloped section and allowed to pond. The flow will then be diverted through a sidewalk culvert to Girard Blvd and will be discharged off site.

Runoff Calculations

RUNOFF CALCULATIONS

The site is @ Zone 2

LAND TREATMENT

Proposed: D=90%
B=10%

Existing: C=17%
D=83%

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 2.01 inches

P_{360} = 2.35 inches

P_{1440} = 2.75 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 2.01 x 0.667
= 1.34 inches

P_{360} = 1.57

P_{1440} = 1.83

See the summary output from AHYMO calculations.

Also see the following summary tables.

Runoff
Summary Tables
for
Existing and Proposed
Drainage Basins

DRAINAGE BASINS - EXISTING

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	63763.13	1.4638	0.002287

DRAINAGE BASINS - PROPOSED

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	63763.13	1.4638	0.002287

BASINS RUNOFF CALCULATION RESULTS - EXISTING

BASIN	Q-100 CFS	Q-10 CFS
A	6.51	4.21

BASINS RUNOFF CALCULATION RESULTS - PROPOSED

BASIN	Q-100 CFS	Q-10 CFS
A	6.54	4.23

SEE THE FOLLOWING SHEET FOR SAMPLE CALCULATION ON THE BASINS RUNOFF

~~Q=1.46(4.40)~~

$Q = \frac{.1464}{.5146}(2.28) + \frac{1.3174}{.9492}(4.7)$

Exist $Q = \cancel{5.63}\ 6.53$

Prop $Q = .2488(3.14) + 1.2150(4.7)$

6.49

No Landscaping anywhere?

Sidewalk Culvert
And
Drainage Pipe
Analysis

Pipe in Pond
950049

Manning's Equation: Q = 1.486/n * Slope^(1/2) * Area * R^(2/3)

n=	0.011
slope=	0.004
Q (cfs)=	6.54

Dia (in)=	Area=	WP=	R=	Q (cfs)=
12	0.785398	3.14159	0.25	2.663007
18	**1.767144**	**4.712385**	**0.375**	**7.851434**

Orifice Equation: Q = CA sqrt (2gH)

C=	0.6
g (fps)=	32.2
Q (cfs)=	6.54

Dia (in)	Area	H (ft)
12	0.785398	2.990805
18	**1.767144**	**0.590776**

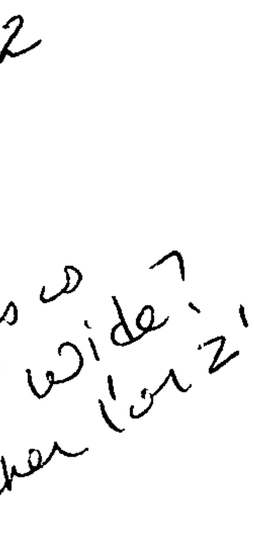
Pond Vol calcs

Sidewalk Culvert

Mannings Equation 1.486/n *Area *Slope^(1/2) *R^(2/3)	
n=	0.012
Slope=	0.004
Height (ft)=	0.583333
Length (ft)=	2
Bottom (ft)	0.041667
Area=	1.208333
WP=	5.168402
R=	0.233792
1/2Q (cfs)=	3.59149

Q (cfs)= 7.182979

7.18 cfs greater than 6.54 cfs needed
Use double 24" sidewalk culvert

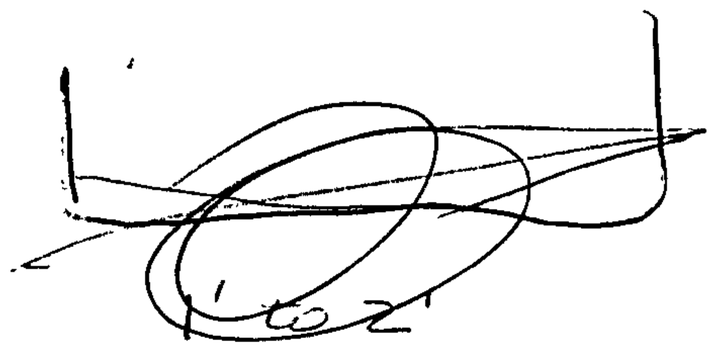


Sidewalk Culvert Box

Weir Equation Q=CLH^(3/2)	
C=	2.68
L (ft)=	4
Q (cfs)=	6.54

H (ft)= 0.71932

Use 24" high box



Orifice Plate

Orifice Equation Q = CA sqrt(2gH)	
C=	0.6
g=	32.2
H (ft)=	1.25
Q (cfs)=	6.54
Area (SF)=	1.214867

Radius (in)= 7.462267
Diameter = 14.92453

Use orifice plate of 15" to limit flow to historic rate

AHYMO
Input
and
Summary Output

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/20/1996

INPUT FILE = a:\pcit.dat USER NO.= R_BOHANN.I01

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= 2.350
COMPUTE NM HYD	100.10	-	1	.00229	6.54	.242	1.98164	1.500	4.468	PER IMP= 90.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.570
COMPUTE NM HYD	100.10	-	1	.00229	4.23	.150	1.23170	1.500	2.892	PER IMP= 90.00
FINISH										

```
**********************************************************************
*                    CITIZENS SUBDIVISION                            *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER PROPOSED CONDITIONS)            *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                     RAIN DAY=2.75 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
*
**********************************************************************
*                    CITIZENS SUBDIVISION                            *
**********************************************************************
*       10-YEAR, 6-HR STORM  (UNDER PROPOSED CONDITIONS)             *
**********************************************************************
*
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.34 IN RAIN SIX=1.57 IN
                     RAIN DAY=1.83 IN DT=0.033333 HR
COMPUTE NM HYD       ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                     PER A=0.00 PER B=10.00 PER C=0.00 PER D=90.00
                     TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*
*
FINISH
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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/07/1996

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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	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.350
COMPUTE NM HYD	100.10	-	1	.00229	6.51	.238	1.94748	1.500	4.447	PER IMP=	83.00
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	1.570
COMPUTE NM HYD	100.10	-	1	.00229	4.21	.146	1.19677	1.500	2.874	PER IMP=	83.00
FINISH											

```
**********************************************************************
*                    CITIZENS SUBDIVISION                            *
**********************************************************************
*       100-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)            *
**********************************************************************
*
START               TIME=0.0
*
* BASIN A
*
RAINFALL            TYPE=1 RAIN QUARTER=0.0 IN
                    RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                    RAIN DAY=2.75 IN DT=0.033333 HR
COMPUTE NM HYD      ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                    PER A=0.00 PER B=0.00 PER C=17.00 PER D=83.00
                    TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*
*
**********************************************************************
*                    CITIZENS SUBDIVISION                            *
**********************************************************************
*       10-YEAR, 6-HR STORM  (UNDER EXISTING CONDITIONS)             *
**********************************************************************
*
START               TIME=0.0
*
* BASIN A
*
RAINFALL            TYPE=1 RAIN QUARTER=0.0 IN
                    RAIN ONE=1.34 IN RAIN SIX=1.57 IN
                    RAIN DAY=1.83 IN DT=0.033333 HR
COMPUTE NM HYD      ID=1 HYD NO=100.1 AREA=0.002287 SQ MI
                    PER A=0.00 PER B=0.00 PER C=17.00 PER D=83.00
                    TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*
*
FINISH
```