



June 4, 1997

Martin J. Chávez, Mayor

Tamara K. Morgan, P.E.  
Bohannon Huston Inc.  
7500 Jefferson NE  
Albuquerque, New Mexico 87109

**RE: Grading and Drainage Plan for Tuscan Ridge Subdivision (A11/D1B) Submitted for Preliminary Plat and Rough Grading Permit Approval, Engineer's Stamp Dated 4/18/97 on Plans, Report Dated 5/13/97.**

Dear Ms. Morgan:

Based on the information provided in the resubmittal of May 13, 1997, the above referenced report, along with the Grading and Drainage Plan dated April 18, 1997, are approved for Preliminary Plat action. The Grading and Drainage plan is also approved for Rough Grading Permit release.

As you are aware, a top-soil disturbance permit must be obtained before any grading may occur. Please be advised that the Engineer's Certification must be in compliance with this approved plan.

If you should have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology  
Larry Caudill, Environmental Health  
Norm Gregory, Centex Real Estate  
File

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103





# **REVISED DRAINAGE REPORT FOR TUSCANY RIDGE SUBDIVISION TRACTS 1, 2 & 3 TUSCANY VILLAS**

Prepared for:

**CENTEX REAL ESTATE CORPORATION  
5111 JUAN TABO NE  
ALBUQUERQUE, NM 87111**

Prepared by:



**BOHANNAN-HUSTON INC.**

ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS

COURTYARD I, 7500 JEFFERSON NE ALBUQUERQUE, NM 87109 TEL (505) 823-1000 FAX (505) 821-0892

REVISED DRAINAGE REPORT  
FOR  
TUSCANY RIDGE SUBDIVISION  
TRACTS 1, 2 & 3  
TUSCANY VILLAS

MAY 1997

PREPARED BY:

BOHANNAN-HUSTON INC.  
COURTYARD I, 7500 JEFFERSON STREET N.E.  
ALBUQUERQUE, NM 87109

PREPARED FOR:

Centex Real Estate Corporation  
5111 Juan Tabo NE  
Albuquerque, NM 87111

PREPARED BY:

*Bruce Stidworthy* <sup>4/21/97</sup>  
Bruce Stidworthy, E.I. <sup>5/13/97 (revised)</sup>  
Date

UNDER THE SUPERVISION OF:

*Tamara K. Morgan* <sup>4/18/97</sup>  
Tamara K. Morgan, P.E. <sup>5/13/97</sup>  
Date  
REGISTERED PROFESSIONAL ENGINEER  
NEW MEXICO  
#10998

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## **I. PURPOSE**

The purpose of this report is to present the drainage management plan for preliminary plat and rough grading approval for the proposed Tuscany Ridge Subdivision. The Drainage Ordinance and the Development Process Manual (DPM) were utilized to develop this plan.

## **II. SITE LOCATION AND EXISTING CONDITIONS**

Tuscany Ridge Subdivision consists of Tuscany Villas, Tracts 1, 2 and 3 (hereafter referred to as the Site). The site is bounded by Unplatted Lands, Paradise North Sub'd, Paradise Heights Unit 2, Bandelier Drive, and Tuscany Sub'd Unit 3. (See Zone Atlas sheet A-11.) The total area of Tracts 1, 2 and 3 is  $\pm 26.4$  acres.

The Site is included in the area addressed by the "Drainage Report for Tuscany West Subdivision, Units 1 & 2" prepared by Community Sciences Corp., and dated October 28, 1996. That report was approved in January, 1997, and is identified by City of Albuquerque Hydrology File (A11/D1A). Under existing conditions, the flows from the Site drain in a southeasterly direction, to the existing underground storm drain system in Bandelier Dr. The Bandelier storm drain system drains to the Calabacillas Arroyo.

## **III. DOWNSTREAM FACILITIES**

As is discussed in Section IV, HYDROLOGIC/DYDRAULIC ANALYSIS, of this report, there are two primary discharge points for the proposed development. The first point is the storm drain in Palazzo Road. This storm drain ties to the proposed 36" storm drain in Tuscany Drive. The Tuscany Drive storm drain ties

to the existing storm drain in Bandelier Drive. The second primary discharge point is the proposed storm drain in Vista Bella Place. That storm drain ties to the existing Bandelier Drive storm drain. The Bandelier storm drain discharges to the Calabacillas Arroyo. Both the existing and proposed downstream facilities have been analyzed to verify sufficient capacity to accept the flows proposed by this report. That analysis is contained in Appendix III.

#### **IV. HYDROLOGIC/HYDRAULIC ANALYSIS**

The August 1991 changes to the DPM Section 22.2 were utilized to determine the hydrologic discharges and volumes presented in this report.

##### **Off-site**

There are two off-site basins (O1, O2) which contribute flows to the site. Basins O1 and O2 contribute 1.1cfs each to the cul-de-sacs of Monte Bello Ct. and Sole Rosso Ct. respectively. Basins O1 and O2 are undeveloped, and have typical slopes of 2% to 3%. 1.1cfs each, from Basins O1 and O2 are conveyed to the proposed streets by an asphalt valley gutter. This valley gutter will be within a public drainage easement, please see the proposed conditions basin map, and the grading plan.

A third off-site basin, Basin O3, merits some discussion. Basin O3 lies west of the site, primarily within Paradise Heights Unit 2. Basin O3 is 100% land treatment type A, and is to remain undisturbed. Flows from the basin ( $Q_{100} = 24.4\text{cfs}$ ) will sheet flow onto Bandelier Drive. Bandelier Drive does have sufficient capacity to handle the flows, as the "Drainage Report for Tuscany West Subdivision, Units 1 & 2" anticipated a total flow in Bandelier of 58.1cfs. This report proposes to discharge a total of

56.6cfs to Bandelier Drive (32.2cfs from Tuscan Ridge, and 24.4cfs from Basin O3).

### On-site

The total flow generated by the site is 92.2cfs. Flows from the site are discharged to three basic locations. Basins 1, 2, 3, 4, 5, 5A and 5B, as well as Basins O1 and O2 discharge to the east, to a storm drain in Tuscan Drive (being constructed with Tuscan Subdivision, Unit 3). Basins 6, 7, 8, 9 and 10 discharge to Bandelier Dr. Basin 12 drains to a temporary retention pond. Analysis of the surface street flow is contained in Appendix ?. The basin data table on the proposed conditions basin map shows the hydrologic calculations for the basins. A thorough discussion of the basins and the proposed drainage system follows. (Please note that all flows given in the text below are for the 100yr, 6hr storm, unless otherwise noted).

Off-site Basins O1 and O2 drain into on-site Basin 1, which combines with Basin 2, for a total flow in Sole Grande Road (at Analysis Pt. 2) of 26.0cfs.. The combined flow enters Basin 3, and 13.6cfs are taken into Inlets #1 and 2. Basin 3 generates a 100yr flow of 8.3cfs, this combines with the residual flow from Inlets 1 and 2 (12.4cfs) for a total flow of 20.7cfs at Analysis Pt. 3 (AP3). Inlets 3 and 4 receive 12.6cfs, and allow a bypass flow of 8.1cfs. Basin 4 ( $Q_{100} = 7.6\text{cfs}$ ) flows into Vista Bella Place, and combines with the residual from Inlets 3 and 4, for a total of 15.7cfs at AP4. Inlets 5 & 6 then receive 11.7cfs, and allow residual flow of 4.7cfs.

Basin 5 generates a  $Q_{100}$  of 2.9cfs. This flow enters Vista Bella Place, and combines with the residual flow from Inlets 5 & 6. The resulting half-street flow for both the west and east halves of the street is

3.8cfs (see AP5W and AP5E on the Analysis Point table on the proposed conditions basin map). From AP5E, 2.8cfs enter Basin 5B, and 1.0cfs enters Basin 9.

Basin 5A ( $Q_{100} = 1.2\text{cfs}$ ) combines with AP5W, for a total of 5.0cfs at AP6W. Inlet 7 receives 4.5cfs, and allows a residual flow of 0.5cfs. The total flow entering Basin 9 is 1.5cfs. Basin 5B generates 1.4cfs, which combines with the 2.8cfs from Vista Bella Place, for a total of 4.2cfs entering Inlets 8 and 9 (Inlets 8 and 9 are in sump condition). The total discharge to the storm drain in Tuscany Drive is 45.9cfs.

Basin 6 generates 15.7cfs, which discharges down Monte Rosso Place, to AP9. Inlet 10 receives 5.5cfs, and allows 10.2cfs of residual flow to enter Basin 7. This flow, then combines with Basin 7 for a total of 15.0cfs at AP10. Inlet 11 receives 5.0cfs, and allows a residual flow of 10.0cfs. Basin 8 generates 7.5cfs, and discharges to La Terra Bella Road. Basin 9 generates 12.4cfs, and combines with Basin 8 and AP7 for a total of 31.4cfs at AP12. Total surface discharge to Bandelier Drive is 32.2cfs (31.4 at AP12, and 0.8cfs from Basin 10). Total discharge to the storm drain in Bandelier Drive is 10.5cfs.

Basin 12 ( $Q_{100} = 4.1\text{cfs}$ ) discharges to a temporary retention pond on Tract 15A-1, Paradise North Subdivision. The temporary retention pond is sized to hold twice the volume of the 100yr, 24hr storm for Basin 12. An easement and drainage covenant for the pond will be established prior to construction.



## **V. DRAINAGE MANAGEMENT PLAN**

It is proposed that the 149 lots on Tuscany Villas, Tracts 1, 2, and 3 be developed in one phase. Developed flows from the site drain to an existing storm drain in Bandelier, a proposed storm drain (separate project) in Tuscany Drive, and a temporary retention pond. During development the entire site will be graded. Erosion and dust control, consisting of erosion control berms, snow fencing and desiltation basins, will be provided to prevent washing or blowing of sediment into paved streets and storm drains.

## **VI. CONCLUSIONS**

The subject site is within the area addressed by The "Drainage Report for Tuscany West Subdivision, Units 1 & 2", the the drainage plans contained herein were developed accordingly. Increases in runoff, depth and velocity due to proposed development are within anticipated parameters for this area, and can be safely conveyed by the improvements proposed by these drainage plans. It is therefore recommended that this plan be approved as presented.

# TUSCANY RIDGE SUBDIVISION

## *Summary Table of Roadway Capacity*

Note: Depths and Elevs shown are measured from flowline.

Road	Slope	Qpeak	Flow Depth	Curb Type	EGL Elev
Monte Rosso Place	5.00%	15.0	0.33'	Std	0.70'
Monte Rosso Place	6.69%	15.7	0.32'	Std	0.80'
Monte Rosso Place	4.00%	10.0	0.31'	Std	0.58'
Vista Bella Place	5.50%	20.7	0.36	Std	0.47'
Vista Bella Place	7.50%	15.7	0.32'	Std	0.54'
Sole Grande Road	1.00%	26.0	0.49'	Std	0.68'
Sole Grande Road	1.74%	26.0	0.45'	Std	0.72'
Monte Rosso Place	7.50%	6.6	0.19'	Rolled	0.52'
Sole Rosso Court	4.00%	7.5	0.22'	Rolled	0.43'

97196\CDP\A02\STUDY\HYDROLOGY\ROAD CAP.XLS

APPENDIX 1A 1 of 8

# SD CAPACITY ANALYSIS FOR PIPES WITH GRAVITY FLOW

Assume:  $n = .013$ , (RCP)  
Use Manning's EPN.

REACH MH to MH	DIA (IN)	SLOPE	Q (CFS)	DEPTH (IN)	VEL (FPS)
7 to 8	24"	2.75%	10.5	8.7"	10.2
8 to 9	24"	3.83%	10.5	8.0"	11.5
2 to 3	24"	5.10%	37.2	15.2"	17.7
3 to 4	24"	7.30%	26.2	11.0"	18.7
4 to 5	24"	4.70%	13.6	8.6"	13.4



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PROJECT NAME TUSCANY RIDGE SHEET 1 OF 2  
PROJECT NO. 97196 A02 BY BS DATE \_\_\_\_\_  
SUBJECT SD CAPACITY CH'D \_\_\_\_\_ DATE \_\_\_\_\_

APPENDIX T

TUSCANY RIDGE -- Analysis of onsite SD line from Unit 3, MH#4 to New MH#3.

\*\*\*\*\* HYDRAULIC GRADE LINE CALCULATIONS \*\*\*\*\*

Manning's n = 0.013  
for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JUNCT Angle	Total Losses	HGL(dn)	HGL(up)	Low Point	JUNCTION	
															Dia. 3 (in.)	Junct. Angle
0.00	Exist MH#4	30	45.9	4.91	9.35	410	0.0125	130.00	6.0	90.0	0.00		5236.50	5242.19	0	0
0.00	New MH#1	30	41.7	4.91	8.50	410	0.0103	155.00	6.0	10.0	0.37	5238.13	5238.74	5242.00	30	45
0.00	New MH#2	24	37.2	3.14	11.84	226	0.0270	170.00	6.00	90.00	1.41	5240.34	5240.69	5243.00	18	45
0.00	New MH#3								8.00	0.00	0.31	5245.29	5247.78	5254.50	30	45

SD CAPACITY 2 OF 2

# TUSCANY RIDGE SUBDIVISION

## *Summary Table of Inlet Capacity*

Inlet Number	Inlet Type	Q upstream	Flow Depth	Street Slope	Q into inlet (ea.)	Qbypass (each)
1 & 2	Single A	26.0	0.49'	1.0%	6.8	6.2
3 & 4	Single A	20.7	0.36'	5.5%	6.3	4.05
5 & 6	Single A	15.7	0.31'	7.5%	5.5	2.35
7	Single A	5.0	0.29'	5.5%	4.5	0.5
10	Single A	15.7	0.32'	6.7%	5.5	10.2
11	Single A	15.0	0.33'	5.0%	5.0	10.0

NOTE: Inlets #8 and 9 are in sump condition, see sheet 3 of this appendix for the analysis of those inlets.

97196\CDP\A02\STUDY\HYDROLOGY\INLET CAP.XLS

*APPENDIX 1C 1 OF 3*

# INLET CAPACITY CALCS., INLETS B & G

Single C inlet, in sump condition with three edges capable of accepting flows:

Open Area (for orifice calc in sq. ft.): 3.93

Length of Weir (feet): 5.74

Weir Coefficient 3

Calculation of open area:		
	(in <sup>2</sup> )	(ft <sup>2</sup> )
Total Grate Area	1000.00	6.94
Cross Bar Area	-366.00	-2.54
Supports (ends)	-115.63	-0.80
Areas Counted Twice	<u>47.75</u>	<u>0.33</u>
	566.13	3.93

Calculation of Length of Weir:		
	(in)	(ft)
Total Perimeter of Grate	90.00	7.50
Short Cross Bars	-3.50	-0.29
End Supports	-4.63	-0.39
Bearing Bars	<u>-13.00</u>	<u>-1.08</u>
	68.88	5.74

GROSS INLET CAPACITY = 9.0 cfs

CLOGGING FACTOR = 2.0

(INLETS IN SUMP, W/ NO

TYPE 'A' INLET WITHIN 150')

NET INLET CAPACITY = 4.5 cfs (PER INLET)

ACTUAL FLOW = 2.2 (PER INLET)

# POND VOL. CALCS

## COMPUTE REQ'D VOL.

PER DPM SECT 22.2, USE ZONE 1,  
EXCESS PRECIP. TABLE,

SEE PROPOSED CONDITIONS BASIN  
DATA TABLE,

$$VOL (100yr, 24HR) = 7235 FT^3$$

$$REQ'D VOL = 2 \times V_{(100, 24)} = 14,500 FT^3$$

Pond 1.5  
deep

## COMPUTE ACTUAL POND VOL.

$$MAX WSEL = 5310.5$$

$$POND BOTTOM = 5309.0$$

$$POND BOTTOM AREA = 110' \times 110' = 12,100 FT^2$$

$$ACTUAL POND VOL = 1.5 \times 12,100 = 18,150 FT^3$$

(CALC NEGLECTS ADDL. VOL FROM 3:1 POND SIDE SLOPE)

$$REQ'D POND VOL = 14,500 FT^3$$

$$ACTUAL POND VOL > 18,150 FT^3$$



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PROJECT NAME TUSCANY RIDGE

SHEET 1 OF 2

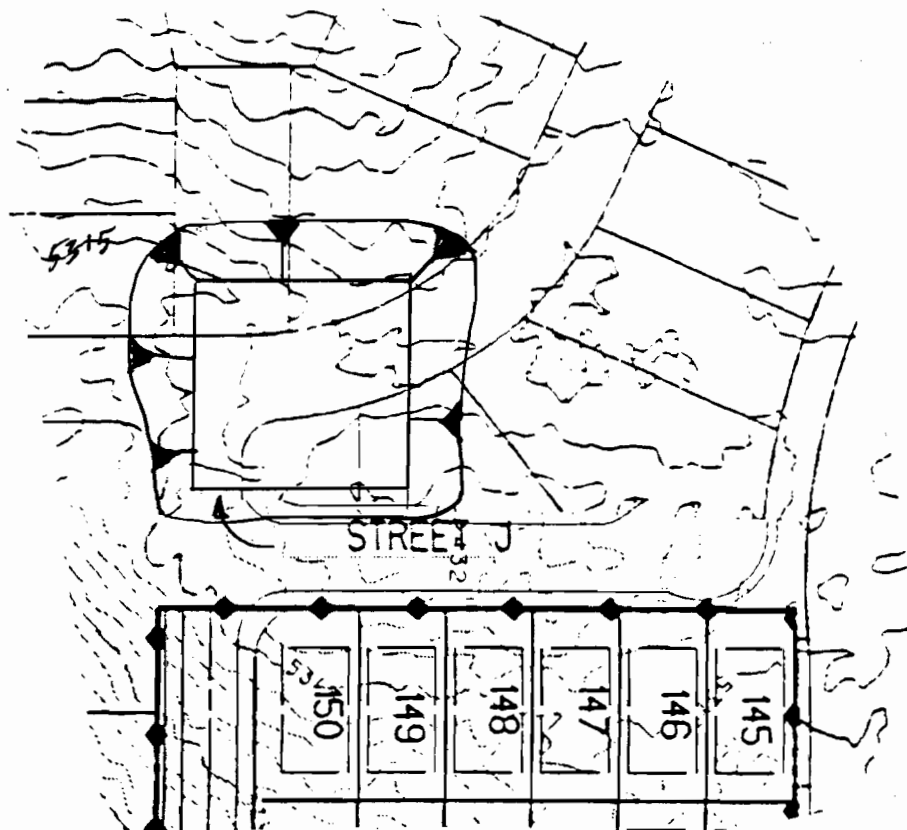
PROJECT NO. 97196A 02


BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT POND VOL

CH'D \_\_\_\_\_ DATE \_\_\_\_\_

# RETN. POND SCHEMATIC.



  
SCALE,  
1" = 100'

POND BOTTOM ELEV = 5309.00

MAX WSEL = 5310.5

MIN. POND BANK ELEV = 5312.0

POND SIDE SLOPES = 3:1

NOTE: A DRNG. ESMT & COVENANT WILL  
BE ESTABLISHED PRIOR TO CONST.

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PROJECT NAME \_\_\_\_\_ SHEET 2 OF 2  
PROJECT NO. \_\_\_\_\_ BY \_\_\_\_\_ DATE \_\_\_\_\_  
SUBJECT \_\_\_\_\_ CH'D \_\_\_\_\_ DATE \_\_\_\_\_



TUSCANY RIDGE -- Analysis of SD line running west up Bandelier, then north up Tuscany Drive (Offsite).

..... HYDRAULIC GRADE LINE CALCULATIONS .....

Manning's n = 0.013  
for pipe

Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)	JUNCTION Dia. 3 (in.)	Junct. Angle
OUTFALL	72	371.6	28.27	13.14	4235	0.0077	112.00	0.0	0.0	0.00		5196.20	5198.00	2.68	5198.88	5198.88	0	0
Exist MH#9	72	351.1	28.27	12.42	4235	0.0069	26.00	8.0	0.0	0.24	5197.06	5197.59	5204.00	2.39	5199.74	5199.99	24	45
Exist MH#8	60	264.5	19.63	13.47	2604	0.0103	163.50	10.00	90.00	1.09	5197.77	5198.44	5203.30	2.82	5200.17	5201.26	36	45
Exist MH#7	60	232.0	19.63	11.82	2604	0.0079	296.50	8.00	0.00	0.56	5200.13	5201.33	5203.88	2.17	5202.95	5203.50	36	45
Exist MH#6	80	215.0	19.63	10.95	2604	0.0068	185.56	8.00	0.00	0.29	5203.69	5204.28	5205.68	1.86	5205.85	5206.15	24	60
Exist MH#5	48	155.1	12.57	12.34	1436	0.0117	70.00	8.00	45.00	1.04	5205.55	5206.08	5206.80	2.37	5207.41	5208.45	36	45
MH#8-T	48	155.1	12.57	12.34	1436	0.0117	23.00	8.00	45.00	0.82	5206.90	5207.44	5207.45	2.37	5209.26	5209.81	24	45
MH#7B-T	42	137.1	9.62	14.25	1006	0.0186	174.00	6.00	0.00	0.27	5207.71	5207.72	5208.90	3.15	5210.08	5210.88		
MH#7-T	36	137.1	7.07	19.40	667	0.0423	184.00	6.00	0.00	3.23	5210.96	5208.35	5215.96	5.84	5214.11	5214.19		
MH#6-T	36	137.1	7.07	19.40	667	0.0423	152.00	6.00	0.00	7.77	5216.12	5216.42	5228.16	5.84	5221.97	5222.26		
MH#5-T	36	137.1	7.07	19.40	667	0.0423	97.00	6.00	0.00	6.42	5222.84	5223.38	5237.93	5.84	5228.68	5229.22		
MH#4-T	24	0.0	3.14	0.00	226	0.0000	0.00	6.00	90.00	4.10	5227.48	5234.78	5442.19	0.00	5233.32	5234.78		
								0.00	0.00	0.00	5234.78	5234.78	5445.14	0.00	5234.78	5234.78		

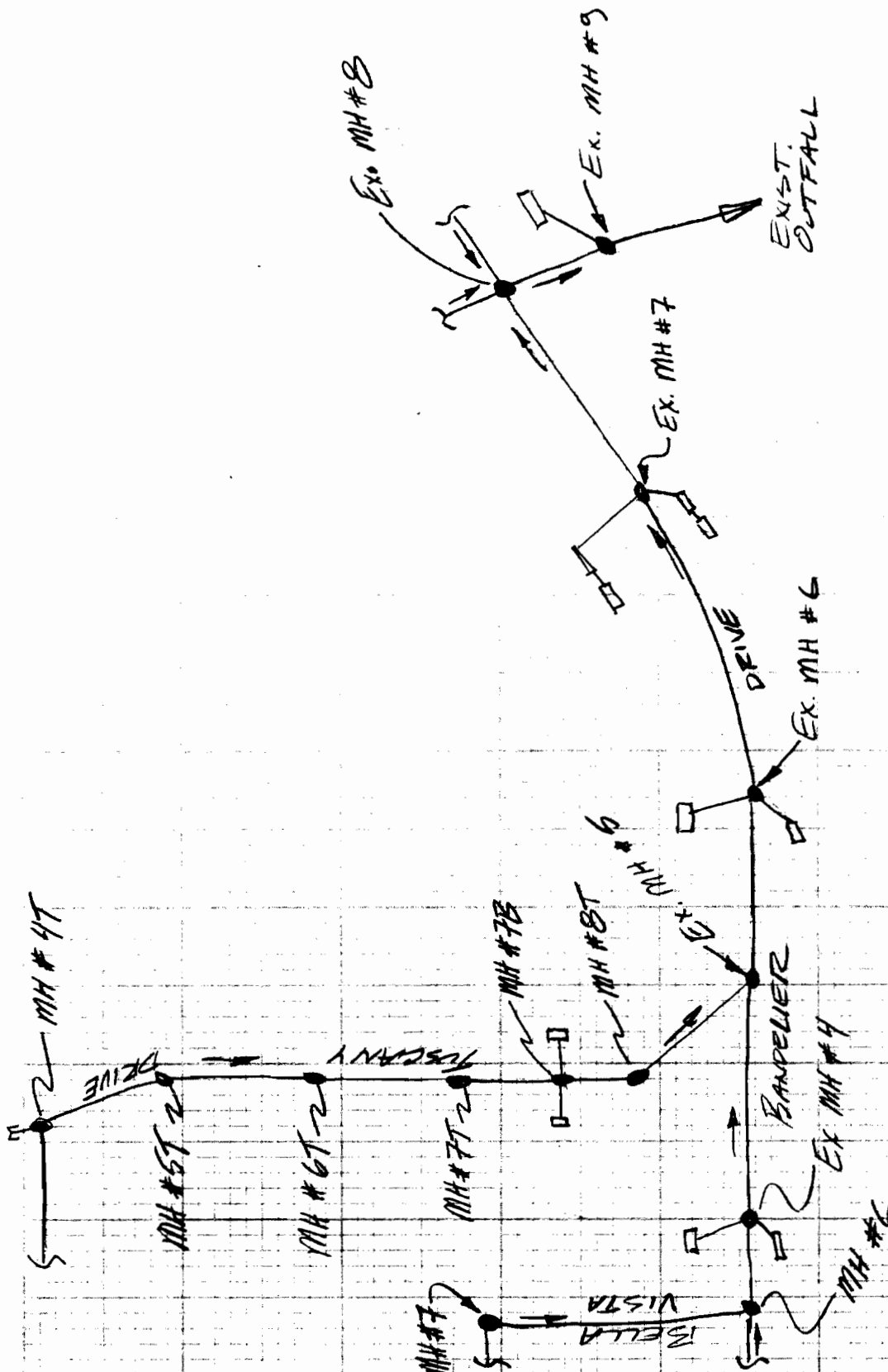
HGL @ ?  
inlet elev.  
profile ok

TUSCANY RIDGE -- Analysis of SD line running west up Bandelier, from Tuscany Drive to Onsite SDMH#7.

..... HYDRAULIC GRADE LINE CALCULATIONS .....

Manning's n = 0.013  
for pipe

Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)	JUNCTION Dia. 3 (in.)	Junct. Angle
Exist MH#5	36	59.9	7.07	8.47	667	0.0081	272.00	8.0	0.0	0.00		5206.08	5206.80	1.12	5207.20	5207.20	0	0
Exist MH#4	36	40.8	7.07	5.77	667	0.0037	30.00	4.0	0.0	2.19	5208.27	5209.33	5211.21	0.52	5209.39	5209.85	36	45
New MH#6	24	10.4	3.14	3.31	226	0.0021	180.00	4.00	90.00	0.11	5209.44	5209.97	5211.71	0.17	5209.96	5210.14	36	0
New MH#7								4.00	90.00	0.38	5210.35	5210.56	5216.80	0.00	5210.52	5210.56	0	0



STORM DRAIN SCHEMATIC  
(DRAINSTREAM SYS.)



PROJECT NAME TUSCANY RIDGE SUB'D SHEET 2 OF 2  
 PROJECT NO. 97196 A 02 BY BS DATE 5/13/97  
 SUBJECT APPENDIX III CH'D \_\_\_\_\_ DATE \_\_\_\_\_

# TUSCANY RIDGE SUBDIVISION

## BASIN COMPARISON

BASIN DATA PROPOSED BY THIS REPORT			MASTER PLAN DATA		
BASIN(S)	Q	DISCHARGES TO	BASIN(S)	Q	DISCHARGES TO
O1, O2, 1 2, 3, 4, 5, 5A 5B, 11	47.7	BANDELIER DR STORM DRAIN, VIA TUSCANY DRIVE STORM DRAIN	600, 605, 620 111	24.4 10.3	TO THE SOUTH BY SURFACE FLOW TO BANDELIER DRIVE BANDELIER DR. STORM DRAIN VIA TUSCANY DRIVE STORM DRAIN
6, 7, 8 9, 10	42.7	DIRECTLY TO BANDELIER DRIVE	610, 615, 625, 630 635, 640, 645	42.2	DIRECTLY TO BANDELIER DRIVE
	<b>90.4</b>	<b>TOTAL DISCHARGE TO BANDELIER DRIVE</b>		<b>76.9</b>	<b>TOTAL DISCHARGE TO BANDELIER DRIVE</b>
12	4.1	*CALABACILLAS ARROYO VIA TUSCANY WEST #1 & 2	400	16.9	CALABACILLAS ARROYO VIA TUSCANY WEST #1 & 2
	<b>92.3</b>	<b>**TOTAL Q FROM SITE</b>		<b>93.8</b>	<b>TOTAL Q FROM SITE</b>

\*NOTE: In the interim condition, Basin 12 discharges to a temporary retention pond.

\*\*NOTE: This figure does not include the 2.2cfs from offsite basins O1 & O2.

### Discussion:

The highlighted figures for the total discharge to Bandelier Drive show an increase of 13.5cfs(90.4-76.9). Appendix III of this report, contains a hydraulic grade line analysis which shows that the downstream storm drain system is capable of carrying this additional flow. All future upstream development as per the master plan, was considered in the analysis in Appendix III. The reason for the increase in the discharge to Bandelier Drive is that the eastern portion of master plan Basin 400 now drains to the east, to Bandelier, instead of to the west, to Tuscaney West #1 & 2.

The total discharge from the site is within the flowrate given in the approved master plan.