DRAINAGE REPORT
FOR
PIÑON POINTE V & VI AT VENTANA RANCH
(TRACTS Y-1A-1A-3 & Y-1A-1A-4)

APRIL 11, 2003

Prepared for:

SIVAGE THOMAS HOMES
7445 PAN AMERICAN FREEWAY
ALBUQUERQUE, NM 87109

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON STREET NE
ALBUQUERQUE, NM 87109

PREPARED BY:

4/11/03
Jared M. Lee, E.I. **Date**

UNDER THE SUPERVISION OF:

Pam Thies 4/11/03
Pam Thies, P.E. **Date**

TABLE OF CONTENTS

Page

APPENDICES

EXHIBITS

I. PURPOSE

The purpose of this report is to present the drainage management plans for Piñon Pointe V & VI at Ventana Ranch (Tracts Y-1A-1A-3 and Y-1A-1A-4 of the Ventana Ranch Master Plan) and to obtain approval of the prelirminary/final plat and grading plan by the City of Albuquerque. The proposed development of Piñon Pointe V & VI consists of 188 single family detached residential lots on approximately 28.80 acres.

II. METHODOLOGIES

Site conditions will be analyzed for a 10-year and 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993.

The site, as described in the 'Site Location and Characteristics' section below, is approximately 28.80 acres. Therefore, Part A of the DPM, Section 22.2, which provides a simplified procedure for projects with sub-basins smaller than 40 acres, was used.

The existing approved drainage report referenced in the preparation of this plan is the "Las Ventanas Subdivision Drainage Master Plan" (LVDMP) prepared by Bohannan Huston (originally dated April 1995 and updated October 1995). Additional information was provided in "Addendum #2 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities" and "Addendum #3 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities", which were prepared by Bohannan-Huston in 1997 and 1999 respectively. These reports identified downstream drainage improvements, including the AMAFCA North Branch Piedras Marcadas Diversion Channel, which was built in phases from 1995 to 1998 by Sandia Properties, to which developed flows from this tract will ultimately drain.

III. SITE LOCATION AND CHARACTERISTICS

Ventana Ranch is a 940-acre development located west of Paradise Hills between Paseo del Norte and Irving Boulevards. Piñon Pointe V and VI is located in the northwestern quadrant of the Ventana Ranch Master Plan. Piñon Pointe V and VI is bounded by Piñon Pointe III and IV to the east, Las Ventanas Road/ Piñon Pointe II to the south, Irving Blvd. bounds the proposed subdivision to the north and Ventana Ranch Open Space Tract (Tract Y-1A-1A-5) to the west. The site will be accessible from Las Ventanas Road and Piñon Pointe II.

IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS

In its existing condition, the site consists of mass graded terrain with slopes ranging 5% to less than 1%. The proposed subdivision is located within Tracts Y-1A-1A-3 and Y-1A-1A-4 at Ventana Ranch. There is one existing onsite basin, Basin 1 and one basin offsite of Ventana Ranch, Basin 502; see Existing Drainage Basin Map in the Exhibit section at the back of this report. The soils within existing Basins 1 and 502 have a Hydrologic Soil Group (HSG) classification of Type "A". Soils with a Type "A" classification are known to have high infiltration and low runoff characteristics. Basin 502 is broken into two sub-basins, Basin 502-A and 502-B. Existing drainage patterns direct the total runoff from Basin 502A south along the property line of Ventana Ranch to the Tie slope with Piñon Pointe II. The runoff from Basin 502A will continue to flow east along the existing swale in Ventana Ranch and ultimately discharge offsite, with the runoff from Woodstar Avenue in Piñon Pointe II, into an existing tributary, Reach #3. The runoff from 502B will continue to drain to the north as it does historically because this area has not been disturbed. The runoff generated from existing Basin 1, (31.07 acres, Q_{100}=11.4cfs) will flow east to a swale built with hay bales along the property line for phase IV of Piñon Pointe. The hay bales along the boundary to Piñon Pointe IV will keep runoff and silt from entering the existing site. The runoff will be directed south along the swale and ultimately discharge into Reach #3, combining with the runoff from 502 and a portion of Piñon Pointe II. All of the flow within Reach #3 will ultimately discharge into the Las Ventanas Dam. There are no recognized FEMA Floodplains within the proposed development.

V. PROPOSED HYDRAULIC AND HYDROLOGIC CONDITIONS

For additional assistance throughout this portion of the report, please refer to the Existing Drainage Basin Map, Proposed Drainage Basin Map and the Grading and Drainage Plan enclosed in the Exhibit section of this report.

Piñon Pointe V and VI will be graded together even though phase VI may not be develop concurrently with phase V. The runoff generated within phase VI of Piñon Pointe will flow through the graded streets and pond at the proposed low point until the infrastructure of Piñon Pointe VI is constructed. Since the run-off from phase VI, stays on-site, the interim runoff conditions pose no impact to phase V. The street capacities and inlet analysis for this report were based on the assumption that the runoff from phase VI would be developed flow, which generate higher flows than actually exist. In the interim, Piñon Pointe VI will remain graded and the actual runoff generated within phase VI will be less than what was assumed.

Discharge generated by Piñon Pointe V and VI will flow east on Red Finch Court, Wood Stork Court, Snowy Egret Court, and Sanderling Road and south on Condor Drive and Weymouth Street when fully developed. There are two sump conditions, one located at the southern end of Condor Drive and will be developed during phase V of Piñon Pointe. The other is located midway along Woodquail Drive and will be developed with phase VI of Piñon Pointe. Inlets will collect the developed flow on Red Finch Court, Woodquail Drive, Condor Drive and Weymouth Street. The flow collected by these inlets will be carried via storm drain to an existing 72" storm drain in Las Ventanas Road built with Piñon Pointe II offsite and ultimately be carried to the Las Ventanas Dam. Any residual will discharge onto Las Ventanas Road and be collected by inlets downstream.

A. On-Site Basins

The On-site Basins described below were analyzed based on the assumption that Piñon Pointe V and VI (Tracts Y-1A-1A-3 & Y-1A-1A-4) were built concurrently and all the flow generated within this subdivision is developed flow. For reasons supporting this assumption, refer to the previous section in this report.

The proposed site is broken into four (4) major basins. Three of the four basins have been divided into sub-basins for analysis reasons. Major basins are described below. For sub-basin data, see Appendix A at the back of this report.

Basin A (12.25ac, Q100=44.29cfs) encompasses almost all of Phase VI, the entire length of Red Finch Court, Wood Stork Court, Woodquail Drive and a potion of Snowy Egret Court, up to a high point located near the phase boundary. It consists of Sub-basins A-1, A-2, A-3, A-4, A-5 and A-6; see Appendix A for more information. Basin A contains eighty-two (82) lots, #1-82 in Phase VI. The runoff from Basin A-4 and Offsite 1 will flow to inlets located at the end of Red Finch Court. Basins A-3 and Offsite 2 will flow to inlets located at the end of Wood Stork Court. The combined runoff of Basins A-1, A-2, A-5, A-6, offsite and the residual from A-3 (7.08 cfs) and from A-4 (7.20 cfs), will flow down Woodquail Drive and combine at a low point midway along the street, where it will be collected by inlets in a sump condition.

Basin B (13.79 ac, Q100=49.8cfs) encompasses the entire length of Condor Drive Sanderling Road, Griffon Drive and the remaining portion of Snowy Egret Road, and contains Sub-basins B-1, B-2, B-3, B-4 and B-5; see Appendix A for more information. Basin B consists of ninety-four (94) lots, #1-74, and #77-96 in Phase V. Basin B-1 and B-3 will flow to inlets located on Condor Drive just south of the intersection of Sanderling Road. The combined runoff of Basin B-4, B-5 and the residual from B-2 and B-3 (19.8 cfs) will flow south down Condor Drive and be collected by inlets in a sump condition.

Basin C (4.65 ac, Q100=9.35cfs) encompasses the entire length of Redpoll Road and Weymouth Street and contains Sub-basins C-1 and C-2. Basin C consists of ten (10) lots, #97-106 in Phase V. All of the runoff generated by basin C will flow south on Weymouth Street and be collected by inlets, leaving a residual flow (3.78 cfs) to run down to Las Ventanas Road.

Basin D (0.29 ac, Q100=1.04cfs) consists of two (2) lots, #75-76 in Phase V. Runoff generated by Basin D will flow south down Griffon Drive to Woodstar Rd. and be

collected by existing inlets in Piñon Pointe II and the residual flow will run to Las Ventanas Road.

In summary, an existing 72" storm drain will collect the runoff generated by Piñon Pointe V and VI (Tracts Y-1A-1A-3 and Y-1A-1A-4) and ultimately discharge into the Las Ventanas Dam located south of the Cantabella Subdivision in Ventana Ranch. See Appendix C, Inlet Analysis, for flow distributions.

B. Off-Site Basin

There will be three (3) proposed offsite basins, Basins 1, 2, and 3 and one basin offsite of Ventana Ranch, Basin 502; see Existing Drainage Basin Map in the Exhibit section at the back of this report. The soil within Basins 1, 2, and 3 and the existing Basin 502, exhibit a Hydrologic Soil Group (HSG) classification of Type "A", which is known to have high infiltrative and low runoff characteristics.

Offsite Basins 1 (0.87ac, Q_{100}= 2.41cfs), 2 (0.81ac, Q_{100}= 2.26cfs), and 3 (0.58ac, Q_{100}= 1.61cfs) are located along the western border. The flow generated within these basins will travel to the streets adjacent to each respective basin. The flow will then travel along the streets until it reaches the inlets at Woodquail Drive in a sump condition.

The existing Basin 502 was established with the Las Ventanas Drainage Master Plan, which was prepared by Bohannan-Huston in April 1995. The terrain within this basin consists of undulating hills with slopes ranging from 1% to 5%, and undisturbed soil. Existing Basin 502 is divided into two sub-basins, Basin 502-A and 502-B. Basin 502-A (16.74ac, Q_{100}= 21.24cfs undeveloped, Q_{100}=58.44cfs developed) is the southern portion of Basin 502, located adjacent to the property line to Ventana Ranch. The runoff generated within this basin will run along the property boundary where we are proposing a berm, and direct the flow to a low point where a Type "D" inlet sitting on top of a manhole will direct the flow into a proposed 24" SD that runs under Offsite Basin 1 to the proposed storm drain in Red Finch Court. Basin 502-B (5.02ac, Q_{100}= 6.38cfs undeveloped, Q_{100}=17.54cfs developed) is the northern portion of Basin 502, located adjacent to the

property line to Ventana Ranch. The runoff from this basin will be directed through Offsite Basin 3 by concrete ribbon channel. The flow will then travel along the streets until it reaches the inlets at Woodquail Drive. See the grading plans for the berm grading along the western boundary.

Addendums #2 and #3 discuss the design of the existing storm drain that will carry the runoff to the Las Ventanas Dam; see excerpts in Appendix E and F in the back of this report.

In Summary, all of the flow generated by the basins mentioned above would eventually discharge into the existing 72" storm drain in Las Ventanas Road with some residual flows going into Las Ventanas Road. Inlets located downstream on Las Ventanas Road will collect the additional runoff generated by the basins mentioned above. The runoff collected by the inlets in Piñon Pointe V and VI, will carry the water via two storm drain systems and discharge to the existing 72" storm drain. All of the runoff in the existing 72" storm drain will eventually discharge into the Las Ventanas Dam.

VI. CONCLUSION

The LVDMP governs the development of Tracts Y-1A-1A-3 and Y-1A-1A-4 (Piñon Pointe V and VI) of the Ventana Ranch subdivision. Increases in runoff, depth and velocity due to proposed development are within parameters anticipated within the previously approved Master Drainage Plan for this area. These flows can be safely conveyed by the improvements proposed in this drainage plan to existing drainage facilities, which have adequate capacity to accept such runoff. Erosion and dust control, consisting of erosion control berms, snow fencing and sedimentation basins, are proposed to prevent soil washing or blowing into paved streets, storm drains, and existing development areas. Therefore, we believe this report supports the preliminary/final plat and grading plan submittals and should be approved as requested.

PINON POINTE UNIT 4 & 5 @ VENTANA RANCH

	BASIN I.D.	AREA (AC)	UNITS #	% LAND TREATMENT A	B	C	D	DISCHARGE (CFS) 10 YR	100YR
				HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (DEVELOPED)					
	A-1	1.99	14	0.00%	19.64%	19.64%	60.72%	4.37	7.20
	A-2	1.90	12	0.00%	19.64%	19.64%	60.72%	4.15	6.85
	A-3	3.35	22	0.00%	19.64%	19.64%	60.72%	7.34	12.11
	A-4	3.34	22	0.00%	19.64%	19.64%	60.72%	7.33	12.08
	A-5	1.06	8	0.00%	19.64%	19.64%	60.72%	2.32	3.83
	A-6	0.61	4	0.00%	19.64%	19.64%	60.72%	1.35	2.22
	B-1	4.39	31	0.00%	19.64%	19.64%	60.72%	9.63	15.88
	B-2	5.45	39	0.00%	19.64%	19.64%	60.72%	11.95	19.70
	B-3	1.23	8	0.00%	19.64%	19.64%	60.72%	2.70	4.45
	B-4	2.16	14	0.00%	19.64%	19.64%	60.72%	4.73	7.79
	B-5	0.56	2	0.00%	19.64%	19.64%	60.72%	1.22	2.01
	C-1	1.75	10	0.00%	19.64%	19.64%	60.72%	3.83	6.32
	C-2	0.72	0	0.00%	5.00%	5.00%	90.00%	1.97	3.03
	D	0.29	2	0.00%	19.64%	19.64%	60.72%	0.63	1.04
SUBTOTAL		**28.80**	**188**					**63.50**	**104.49**
	OFFSITE 1	0.87	0	0.00%	10.00%	90.00%	0.00%	1.22	2.41
	OFFSITE 2	0.81	0	0.00%	10.00%	90.00%	0.00%	1.14	2.26
	OFFSITE 3	0.58	0	0.00%	10.00%	90.00%	0.00%	0.81	1.61
	502 - A	16.74	0	0.00%	11.80%	40.00%	48.20%	34.67	58.44
	502 - B	5.02	0	100.00%	0.00%	0.00%	0.00%	1.26	6.38
SUBTOTAL		**24.02**	**0.00**					**39.10**	**71.10**
TOTAL		**52.82**						**102.61**	**175.59**

NOTES:

1) Impervious percentages were calculated from the DPM equation A-4, with the remaining percentages distributed to land treatment type B, due to the relatively flat terrain

N=UNITS/ACRES = 6.5
%D= 7*SQRT((N*N)+(5*N)) = 60.7 %

*Table A-4
**Table A-11

PINON POINTE 5 & 6 @ VENTANA RANCH

ANALYSIS POINT	CONTRIBUTING BASINS	FLOW (CFS) 100 YEAR	STREET NAME	WIDTH (feet)
1	A-4, OFFSITE 1	14.5	RED FINCH COURT	28
2	A-3, OFFSITE 2	14.4	WOOD STORK COURT	28
3	A-1, A-2, A-6, OFFSITE 3, OFFSITE 502-B, A-3/OFFSITE 2(RES)	31.3	WOODQUAIL DRIVE	28
3	A-5, A-4/OFFSITE 1(RES)	11.0	WOODQUAIL DRIVE	28
4	B-1	15.9	SNOWY EGRET COURT	28
5	B-1, B-3	20.3	CONDOR DRIVE	28
6	B-2	19.7	SANDERLING ROAD	38
7	B-1/B-2/B-3(RES), B-4	27.6	CONDOR DRIVE	28
8	B-5	2.0	WOODSTAR AVENUE	32
9	B-1/B-2/B-3/B-4(RES), B-5	14.4	CONDOR DRIVE	28
10	C-1	6.3	WEYMOUTH STREET	28
11	C-1, C-2	9.3	WEYMOUTH STREET	52
12	D	1.0	GRIFFON DRIVE	28
13	A-1, A-2, OFFSITE 3 OFFSITE 502-B	22.0	WOODQUAIL DRIVE	28
14	A-1, A-2, OFFSITE 3 OFFSITE 502-B	22.0	SNOWY EGRET COURT	28

1. See attached street section hydraulic analysis

MASTER STORM DRAIN HYDROLOGIC VOLUMETRIC & DISCHARGE DATA

PINON POINTE UNIT 5

HYDRAULIC EVALUATION OF INLETS - HEC12 METHOD
100-YEAR STORM - 1/2 STREET FLOWS W/ 20% CLOGGING FACTOR
15% REDUCTION IN ROUTED Q'S FOR ATTENUATION

Qi = Intercepted Flow
Qb = Bypass Flow
S = Longitudinal Slope
Sx = Cross Slope
Vo = Gutter Velocity where splash-over first occurs

Eo = Ratio of frontal flow to total gutter flow
Rf = Ratio of frontal flow intercepted to total frontal flow
Rs = Ratio of side flow intercepted to total side flow
E = Efficiency

Inlet ID	Total Rtd Q (cfs)	Inlet Width (ft)	Inlet Length (ft)	Ponding Width (ft)	Pond Depth (ft)	Qi (cfs)	Qb (cfs)	S (ft/ft)	Sx (ft/ft)	Vo (fps)	V (fps)	Eo	Rf	Rs	E
ANALYSIS POINTS 5 & 6															
7	20.00	1.54	5.32	24.34	0.49	10.10	9.90	0.0061	0.0200	9.5	3.4	0.16	1.0	0.4	0.51
8	20.00	1.54	5.32	24.34	0.49	10.10	9.90	0.0061	0.0200	9.5	3.4	0.16	1.0	0.4	0.51
ANALYSIS POINT 7															
9	13.80	1.54	5.32	21.18	0.42	7.62	6.18	0.0061	0.0200	9.5	3.1	0.18	1.0	0.5	0.55
10	13.80	1.54	5.32	21.18	0.42	7.62	6.18	0.0061	0.0200	9.5	3.1	0.18	1.0	0.5	0.55
ANALYSIS POINT 11															
11	4.68	1.54	5.32	11.80	0.24	2.79	1.89	0.0159	0.0200	9.5	3.4	0.31	1.0	0.4	0.60
12	4.68	1.54	5.32	11.80	0.24	2.79	1.89	0.0159	0.0200	9.5	3.4	0.31	1.0	0.4	0.60

MASTER STORM DRAIN HYDROLOGIC VOLUMETRIC & DISCHARGE DATA

PINON POINTE UNIT 6

HYDRAULIC EVALUATION OF INLETS - HEC12 METHOD
100-YEAR STORM - 1/2 STREET FLOWS W/ 20% CLOGGING FACTOR
15% REDUCTION IN ROUTED Q'S FOR ATTENUATION

Qi = Intercepted Flow
Qb = Bypass Flow
S = Longitudinal Slope
Sx = Cross Slope
Vo = Gutter Velocity where splash-over first occurs

Eo = Ratio of frontal flow to total gutter flow
Rf = Ratio of frontal flow intercepted to total frontal flow
Rs = Ratio of side flow intercepted to total side flow
E = Efficiency

Inlet ID	Total Rtd Q (cfs)	Inlet Width (ft)	Inlet Length (ft)	Ponding Width (ft)	Pond Depth (ft)	Qi (cfs)	Qb (cfs)	S (ft/ft)	Sx (ft/ft)	Vo (fps)	V (fps)	Eo	Rf	Rs	E
ANALYSIS POINT 1															
1	7.25	1.54	5.32	12.84	0.26	3.65	3.60	0.0244	0.0200	9.5	4.4	0.29	1.0	0.3	0.50
2	7.25	1.54	5.32	12.84	0.26	3.65	3.60	0.0244	0.0200	9.5	4.4	0.29	1.0	0.3	0.50
ANALYSIS POINT 2															
3	7.20	1.54	5.32	12.92	0.26	3.66	3.54	0.0233	0.0200	9.5	4.3	0.29	1.0	0.3	0.51
4	7.20	1.54	5.32	12.92	0.26	3.66	3.54	0.0233	0.0200	9.5	4.3	0.29	1.0	0.3	0.51
ANALYSIS POINT 3															
5	15.67	1.54	5.32	19.07	0.38	7.03	8.64	0.0138	0.0200	9.5	4.3	0.20	1.0	0.3	0.45
6	15.67	1.54	5.32	19.07	0.38	7.03	8.64	0.0138	0.0200	9.5	4.3	0.20	1.0	0.3	0.45

Type "A" Sump - Condor

ANALYSIS OF AN INLET IN A SUMP CONDITION - **Woodquail Drive North of Red Finch Court Intersection**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5

Wing opening	Grate opeining
C= 3.0	C=3.0
L= 4.0 ft	L(double grate)=[2(2.67')+2(1.8')]=8.94 ft
Q=3.0(4.0')H**1.5= 12.0H**1.5	Q=3.0(8.94)H^1.5=26.82*H^1.5

ORIFICE: Q=C*A*(2*G*H)**0.5

Grate opening	Wing opening
C=0.6	C=0.6
A(double grate)=8.19 sf	A=2.0 sf
Q=4.194*(64.4*H)^0.5	Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT BOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	Q(100 yr) = 14.35 cfs is provided at this depth
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	
	0.80	0.80	8.59	19.19	35.27	36.36	
	0.90	0.90	10.25	22.90	37.41	43.39	
ROW LIMIT	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE: The total runoff intercepted by the inlet at the low point in the road is:
Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].
THE 100 YR STORM EVENT =14.35 cfs at the sump condition
THE 2 x 100 YR STORM EVENT = 28.70 cfs at the sump condition

Type "A" Sump - Woodquail

ANALYSIS OF AN INLET IN A SUMP CONDITION - **Woodquail Drive North of Red Finch Court Intersection**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR:	Q=C*L*H^1.5		ORIFICE:	Q=C*A*(2*G*H)**0.5
Wing opening	Grate opeining		Grate opening	Wing opening
C= 3.0	C=3.0		C=0.6	C=0.6
L= 4.0 ft	L(double grate)=[2(2.67')+2(1.8')]=8.94 ft		A(double grate)=8.19 sf	A=2.0 sf
Q=3.0(4.0')H**1.5= 12.0H**1.5	Q=3.0(8.94)H^1.5=26.82*H^1.5		Q=4.194*(64.4*H)^0.5	Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT BOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	Q(100 yr) = 28.28 cfs is provided at this depth
	0.80	0.80	8.59	19.19	35.27	36.36	
	0.90	0.90	10.25	22.90	37.41	43.39	
ROW LIMIT	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE: The total runoff intercepted by the inlet at the low point in the road is:
Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].
THE 100 YR STORM EVENT =28.28 cfs at the sump condition
THE 2 x 100 YR STORM EVENT = 56.56 cfs at the sump condition

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:20:37 PM

==========

Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	49.6600	cfs
Slope	0.6000%	
Size (W x T):	36.00 x 3.0000	

Output Results

Flow Rate	49.6600	cfs
Slope	0.6000%	
d/D	0.7867	
Capacity	51.6644	cfs
Velocity	8.3252	ft/s
Depth	2.3600	ft
Critical Depth	2.2900	ft
Size (W x T):	36.00 x 3.0000	

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:21:59 PM

==========

Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	58.4400	cfs
Slope	2.4400%	
Size (W x T):	36.00 x 3.0000	

Output Results

Flow Rate	58.4400	cfs
Slope	2.4400%	
d/D	0.5353	
Capacity	104.1862	cfs
Velocity	15.1712	ft/s
Depth	1.6060	ft
Critical Depth	2.4700	ft
Size (W x T):	36.00 x 3.0000	

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:22:42 PM

==========

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	115.4000 cfs
Slope	0.6000%
Size (W x T):	42.00 x 3.5000

Output Results

Flow Rate	115.4000 cfs
Slope	0.6000%
d/D	1.0000
Capacity	77.9320 cfs
Velocity	11.9944 ft/s
Depth	3.5000 ft
Critical Depth	3.2100 ft
Size (W x T):	42.00 x 3.5000

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:30:37 PM

==========

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	20.2000 cfs
Slope	0.6000%
Size (W x T):	24.00 x 2.5000

Output Results

Flow Rate	20.2000 cfs
Slope	0.6000%
d/D	1.0000
Capacity	17.5232 cfs
Velocity	6.4299 ft/s
Depth	2.0000 ft
Critical Depth	1.6100 ft
Size (W x T):	24.00 x 2.5000

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:31:41 PM

==========

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	35.4400 cfs
Slope	0.6000%
Size (W x T):	36.00 x 3.0000

Output Results

Flow Rate	35.4400 cfs
Slope	0.6000%
d/D	0.6080
Capacity	51.6644 cfs
Velocity	7.8779 ft/s
Depth	1.8240 ft
Critical Depth	1.9300 ft
Size (W x T):	36.00 x 3.0000

Analyzer Report

==========

Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, April 11, 2003 2:32:50 PM

==========

Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	49.7900	cfs
Slope	0.6000%	
Size (W x T):	36.00 x 3.0000	

Output Results

Flow Rate	49.7900	cfs
Slope	0.6000%	
d/D	0.7887	
Capacity	51.6644	cfs
Velocity	8.3265	ft/s
Depth	2.3660	ft
Critical Depth	2.2900	ft
Size (W x T):	36.00 x 3.0000	