DRAINAGE REPORT
FOR
VENTANA VISTA SUBDIVISION
AT VENTANA RANCH WEST

JULY 20, 2005

Prepared for:

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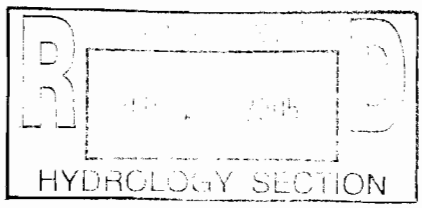

PREPARED BY:

Scott J Steffen 7-21-05

Scott Steffen, P.E. **Date**

Bohannan Huston INC.

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APPENDICES

EXHIBITS

I. PURPOSE

The purpose of this report is to present the drainage management plan for the Ventana Vista Subdivision at Ventana Ranch West and to obtain approval of the preliminary plat and grading plan by the Development Review Board (DRB). The proposed development of the Ventana Vista Subdivision consists of 128 single family detached residential lots on approximately 31 acres.

II. METHODOLOGIES

Drainage conditions were analyzed utilizing the 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 Arid-lands Hydrologic Model (AHYMO) was utilized to determine peak flow rates for design of the storm drainage improvements within the project. The results are included in Appendix A. Street capacities were analyzed using Manning's equation, consistent with the revised DPM Section 22.2. The storm drain system was analyzed using current DPM methods for gravity flow conditions. All data and calculations supporting this study are located in Appendix B.

This report will reference the following City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) approved studies prepared for the Ventana Ranch Subdivision development.

1) *Las Ventanas Subdivision Drainage Master Plan*, dated April 1995
2) *Ventana Ranch West Subdivision Drainage Management Plan*, dated October 2003
3) *Drainage Report for Piñon Pointe at Ventana Ranch,* dated December 2000

The *Las Ventanas Subdivision Drainage Master Plan*, prepared by Bohannan Huston (originally dated April 1995 and updated October 1995) dated April 1995 (hereafter referred to as the LVSDMP), was prepared to summarize the findings of a hydrologic analysis of existing and developed drainage conditions for the proposed Las Ventanas Subdivision and formulates a drainage master plan for the development of the property. The report evaluated drainage in

Las Ventanas Subdivision based on the Piedras Marcadas Hydrologic model prepared by Molzen-Corbin & Associates in 1993, and provided a conceptual plan for drainage in order to determine drainage facilities sizes and total costs. In addition, it provided drainage outfall alternatives for the Las Ventanas Subdivision. Additional information was provided in "The Final Addendum No. 4 for The Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities" prepared by Bohannan Huston dated December 1997. This report identifies downstream drainage improvements and confirms that the storm drain hydraulics for the North Outfall or the West Branch Calabacillas Storm Drain Diversion presented in Addendum 3, have not been changed. The developed flows from this tract will ultimately drain into the West Branch Calabacillas Storm Drain.

The *Ventana Ranch West Subdivision Drainage Management Plan* was prepared by Bohannan Huston dated October 2003 (hereafter referred to as the VRWSDMP). This report addresses the drainage patterns, peak flow rates and drainage infrastructure requirements for the Ventana Ranch West development. The report references previous drainage studies related to the site, including the Las Ventanas Management Plan, the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities (including its four addendums) and the Piedras Marcadas DMP (Molzen-Corbin, May 1993).

The *Drainage Report for Piñon Pointe at Ventana Ranch* was prepared by Bohannan Huston. This report addresses the drainage patterns, peak flow rates and drainage infrastructure requirements for the Piñon Pointe Subdivision. The majority of developed runoff from the Ventana Vista Subdivision will ultimately discharge into an existing detention pond near the west end of the Piñon Pointe Subdivision.

III. SITE LOCATION AND CHARACTERISTICS

Ventana Ranch West is a 290-acre development directly west of the Ventana Ranch Subdivision. It is bound by Irving Blvd and the Calabacillas Arroyo to the north, Paseo del Norte to the south and Del Oeste Boulevard to the west. Ventana Vista Subdivision is bound by Ventana Ranch to the east, Ventana Ridge Road to the north, and Ventana West Parkway to the west. The site will be accessible from Ventana West Parkway.

IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS

Ventana Vista Subdivision is currently undeveloped land sloping from west to east. The soils onsite consist primarily of fine to medium grained silty sands with traces of clayey sands, silts and slightly silty to poorly graded sands. Existing drainage patterns direct the runoff east toward the existing Ventana Ranch Subdivision. There are no recognized FEMA Floodplains within the proposed development.

V. DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS

Ventana Vista Subdivision is a proposed single-family residential development with 128 lots on 31 acres. Proposed street configurations are shown on the *Preliminary Plat*, **Exhibit 1**. The VRWSDMP allows for full discharge of developed flows from the Ventana Vista Subdivision into existing detention facilities.

The percent impervious land treatment for the proposed conditions is determined from Table A-5 of the DPM, Section 22.2. The land treatment values used in the AHYMO analysis are the same as the VRWSDMP.

A. Offsite Flows

No offsite surface flows reach the Ventana Vista Subdivision from the north or east because the ground slopes away from the site on these sides. The offsite flow from Ventana West Parkway is prevented from entering the subdivision by a high point located at the subdivision entrance and intercepted by a storm drain system in the street. A small amount of developed runoff from the Ventana Ridge Subdivision is conveyed through the Ventana Vista Subdivision in a storm drain that is located in an easement at the northeast corner of the site.

B. Onsite Flows

A natural high point located at the southern end of the subdivision divides the developed runoff into two separate storm drain systems. Please refer to Exhibit 2 for basin locations and flow directions. Runoff from the majority of the Ventana Vista Subdivision will discharge to an existing storm drain in Avenida Vista Ventana. This storm drain is part of the master planned storm drain system built by the Ventana Ranch West Phase 1 Public Improvement District. In addition to the Ventana Vista Subdivision, this storm drain collects flow from developments west of Ventana West Parkway. This master plan storm drain discharges into a detention pond located within a City of Albuquerque tract near the Piñon Pointe Subdivision. The detention pond has been designed to accept developed flows from the Ventana Vista Subdivision. Developed flow generated from the southern portion of Ventana Vista is conveyed to an existing storm drain in the Cantabria Subdivision in Ventana Ranch. Both existing storm drain systems have been sized to accommodate developed flow from the Ventana Vista Subdivision. All sump inlets in the Ventana Vista Subdivision are designed to accommodate the 100-year 6-hour storm event since easements located near the sump inlets can act as emergency spillways.

At the southern end of the subdivision, Lot 55 will have onsite ponding to reduce retaining walls in that corner. All of the developed runoff created from the lot will drain to a permanent retention pond in the backyard. The pond will be owned and maintained by the lot owner.

VI. CONCLUSION

The VRWSDMP governs the development of Ventana Vista Subdivision at Ventana Ranch West. Increases in runoff, depth and velocity due to proposed development are within parameters anticipated by 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, silt fencing and sedimentation basins, are proposed to prevent soil washing or blowing into paved streets, storm drains, and existing development areas. This drainage plan maintains the overall drainage pattern of the area and allows for the safe management of storm runoff in permanent as well as interim conditions.

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =07/18/2005
INPUT FILE = VISTA.HYM USER NO.= AHYMO-S-9702c1BohanHu-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	
S	PROJECT NAME: VENTANA VISTA AT VENTANA RANCH WEST										
S	DATE: JULY 2005										
S	INPUT FILE NAME: VISTA.HYM										
S	OUTUPUT FILE NAME: VISTA.OUT										
S	PROJECT NUMBER: 060091										
S	COMMENTS: 100 YEAR-6 HOUR STORM										
*S	//										
START										TIME=	.00
RAINFALL	TYPE= 1									RAIN6=	2.200
S											
S	BASIN A DISCHARGES SOUTHEAST TO EXISTING STORM DRAIN										
COMPUTE NM HYD	BASIN.A	-	1	.00940	20.37	.715	1.42702	1.500	3.386	PER IMP=	53.80
S											
S	BASINS B, C, D, E DISCHARGE NORTHEAST TO EXISTING STORM DRAIN										
COMPUTE NM HYD	BASIN.B	-	2	.01510	32.86	1.157	1.43635	1.500	3.400	PER IMP=	54.60
S											
COMPUTE NM HYD	BASIN.C	-	4	.00950	20.68	.728	1.43635	1.500	3.401	PER IMP=	54.60
S											
ADD HYD	B.C	2& 4	5	.02460	53.53	1.884	1.43632	1.500	3.400		
S											
COMPUTE NM HYD	BASIN.D	-	6	.00490	10.67	.375	1.43635	1.500	3.403	PER IMP=	54.60
S											
ADD HYD	B.C.D	5& 6	7	.02950	64.21	2.260	1.43632	1.500	3.401		
S											
COMPUTE NM HYD	BASIN.E	-	8	.00890	19.37	.682	1.43635	1.500	3.401	PER IMP=	54.60
S											
ADD HYD	B.C.D.E	7& 8	9	.03840	83.58	2.942	1.43632	1.500	3.401		
S											
FINISH											

VENTANA VISTA SUBDIVISION AT VENTANA RANCH WEST
Internal Street and Storm Drain Inlet Capacity Calculations
July 2005

1. **Avenida Vista Cerros**
   Basin C
   Q = 20.7 cfs

   The total amount of developed runoff from Basin C will flow north towards Avenida Vista Ventana and does not exceed the street capacity of Avenida Vista Cerros. Therefore, inlets are not required in Avenida Vista Cerros. Roll curb may be installed to Lot 89. See PC stream output.

2. **Cerrada Vista Cerros**
   Basin D
   Q = 10.7 cfs

   The total amount of developed runoff produced from Basin D does not exceed the street capacity of Cerrada Vista Cerros. Therefore, inlets are not required in Cerrada Vista Cerros. Runoff will flow south towards Avenida Vista Ventana. Roll curb may be installed to Avenida Vista Ventana. See PC stream output.

3. **Avenida Vista Ventana**
   Basin E
   Q = 19.4 cfs

   The total amount of developed runoff produced from Basins C, D, and E exceeds the street capacity of Avenida Vista Ventana. Therefore, inlets will be placed beginning at the Avenida Vista Cerros intersection to intercept a portion of the flow (See Grading Plan for proposed inlet locations). The remaining surface flow will continue east towards sump inlets near Lot 26. Roll curb may be installed to Avenida Vista Cerros. See PC stream output and inlet nomograph.

4. **Avenida Vista Sol**
   Basin B
   Q = 32.9 cfs

   A portion of the developed runoff from Avenida Vista Cerros at the southern end will flow into Calle Vista Este since Avenida Vista Cerros will be superelevated in that area. The total amount of developed runoff produced from Basin B exceeds the street capacity of Avenida Vista Sol. Therefore, inlets will be placed beginning at Lot 31 to intercept a portion of the flow (See Grading Plan for proposed inlet locations). These inlets are located on the east side of the street since Avenida Vista Sol is superelevated in that area. The remaining surface flow will continue north towards sump inlets at Lot 26. These sump inlets will capture the remaining runoff from Basins B, C, D, and E without exceeding the top-of-curb height. The inlets are designed to accommodate flows from the 100-year 6-hour design storm since an easement located nearby can act as an emergency spillway. The inlets will connect to an existing storm drain built by the Ventana Ranch West Phase 1 Public Improvements District. Roll curb may be installed to Calle Vista Este. See PC stream output and inlet nomographs.

5. **Avenida Vista Sol**
   Basin A
   Q = 20.4 cfs

   The total amount of developed runoff produced from Basin A does not exceed the street capacity of southern Avenida Vista Sol. Therefore, intermediate inlets are not required. A single sump inlet located near a proposed easement will capture all the developed runoff from Basin A since all of Avenida Vista Sol in Basin A will be superelevated west to east. (See Grading Plan for proposed inlet locations). The inlet is designed to accommodate flows from the 100-year 6-hour design storm since the easement located nearby can act as an emergency spillway. The inlet will connect to an existing storm drain in the Cantabria Subdivision. Roll curb may be installed to Lot 49. See PC stream output and inlet nomograph.

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 9 (BASIN C) Avenida Vista Cerros

MANNING'S N= .017 SLOPE= .021

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	41.17	0.67
2	8.38	0.67	6	25.00	0.41	10	41.63	0.67
3	8.83	0.67	7	39.00	0.13	11	50.00	0.83
4	9.00	0.00	8	41.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.36	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.57	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.74	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.90	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	1.05	1.56	0.02	0.07	
0.06	0.06	0.06	0.1	1.97	1.18	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.31	2.19	0.03	0.10	
0.08	0.08	0.10	0.1	2.63	1.43	2.50	0.03	0.11	
0.09	0.09	0.13	0.2	2.96	1.55	2.81	0.04	0.13	
0.10	0.10	0.16	0.3	3.29	1.66	3.13	0.04	0.14	
0.11	0.11	0.19	0.3	3.62	1.77	3.44	0.05	0.16	
0.12	0.12	0.23	0.4	3.95	1.88	3.75	0.05	0.17	
0.13	0.13	0.26	0.5	4.28	1.98	4.07	0.06	0.19	
0.14	0.14	0.31	0.6	5.30	1.91	5.07	0.06	0.20	
0.15	0.15	0.37	0.7	6.32	1.90	6.08	0.06	0.21	
0.16	0.16	0.43	0.8	7.34	1.92	7.08	0.06	0.22	
0.17	0.17	0.51	1.0	8.36	1.96	8.09	0.06	0.23	
0.18	0.18	0.59	1.2	9.38	2.01	9.09	0.06	0.24	
0.19	0.19	0.69	1.4	10.40	2.07	10.10	0.07	0.26	
0.20	0.20	0.80	1.7	11.42	2.14	11.10	0.07	0.27	
0.21	0.21	0.91	2.0	12.44	2.22	12.11	0.08	0.29	
0.22	0.22	1.04	2.4	13.46	2.29	13.11	0.08	0.30	
0.23	0.23	1.17	2.8	14.49	2.37	14.12	0.09	0.32	
0.24	0.24	1.32	3.2	15.51	2.45	15.12	0.09	0.33	
0.25	0.25	1.48	3.7	16.53	2.53	16.13	0.10	0.35	
0.26	0.26	1.64	4.3	17.55	2.61	17.13	0.11	0.37	
0.27	0.27	1.82	4.9	18.57	2.69	18.14	0.11	0.38	
0.28	0.28	2.00	5.6	19.59	2.77	19.14	0.12	0.40	
0.29	0.29	2.20	6.3	20.61	2.85	20.15	0.13	0.42	
0.30	0.30	2.41	7.1	21.63	2.93	21.15	0.13	0.43	
0.31	0.31	2.62	7.9	22.65	3.01	22.16	0.14	0.45	
0.32	0.32	2.85	8.8	23.67	3.09	23.16	0.15	0.47	
0.33	0.33	3.09	9.8	24.69	3.17	24.17	0.16	0.49	ROLL CURB LIMIT
0.34	0.34	3.33	10.8	25.71	3.25	25.17	0.16	0.50	
0.35	0.35	3.59	11.9	26.74	3.32	26.18	0.17	0.52	
0.36	0.36	3.86	13.1	27.76	3.40	27.18	0.18	0.54	
0.37	0.37	4.13	14.4	28.78	3.47	28.19	0.19	0.56	
0.38	0.38	4.42	15.7	29.80	3.55	29.19	0.20	0.58	
0.39	0.39	4.72	17.1	30.82	3.63	30.20	0.20	0.59	
0.40	0.40	5.03	18.6	31.84	3.70	31.20	0.21	0.61	
0.41	0.41	5.34	20.2	32.86	3.77	32.21	0.22	0.63	
0.42	0.42	5.66	22.2	32.88	3.92	32.21	0.24	0.66	
0.43	0.43	5.99	24.4	32.90	4.07	32.22	0.26	0.69	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	6.63	28.9	32.94	4.35	32.23	0.29	0.74	
0.46	0.46	6.95	31.2	32.96	4.49	32.23	0.31	0.77	
0.47	0.47	7.28	33.6	32.98	4.62	32.24	0.33	0.80	
0.48	0.48	7.60	36.2	33.00	4.76	32.24	0.35	0.83	
0.49	0.49	7.92	38.7	33.03	4.89	32.25	0.37	0.86	STREET CAPACITY
0.50	0.50	8.24	41.4	33.05	5.02	32.25	0.39	0.89	
0.51	0.51	8.57	44.1	33.07	5.15	32.26	0.41	0.92	
0.52	0.52	8.89	46.9	33.09	5.27	32.26	0.43	0.95	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 9 (BASIN C) Avenida Vista Cerros

MANNING'S N= .017 SLOPE= .006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	41.17	0.67
2	8.38	0.67	6	25.00	0.41	10	41.63	0.67
3	8.83	0.67	7	39.00	0.13	11	50.00	0.83
4	9.00	0.00	8	41.00	0.00	12	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.19	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.30	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.40	0.94	0.00	0.03	
0.04	0.04	0.03	0.0	1.32	0.48	1.25	0.00	0.04	
0.05	0.05	0.04	0.0	1.64	0.56	1.56	0.00	0.05	
0.06	0.06	0.06	0.0	1.97	0.63	1.88	0.01	0.07	
0.07	0.07	0.08	0.1	2.30	0.70	2.19	0.01	0.08	
0.08	0.08	0.10	0.1	2.63	0.77	2.50	0.01	0.09	
0.09	0.09	0.13	0.1	2.96	0.83	2.81	0.01	0.10	
0.10	0.10	0.16	0.1	3.29	0.89	3.13	0.01	0.11	
0.11	0.11	0.19	0.2	3.62	0.95	3.44	0.01	0.12	
0.12	0.12	0.23	0.2	3.95	1.00	3.75	0.02	0.14	
0.13	0.13	0.26	0.3	4.28	1.06	4.07	0.02	0.15	
0.14	0.14	0.31	0.3	5.30	1.02	5.07	0.02	0.16	
0.15	0.15	0.37	0.4	6.32	1.01	6.08	0.02	0.17	
0.16	0.16	0.43	0.4	7.34	1.02	7.08	0.02	0.18	
0.17	0.17	0.51	0.5	8.36	1.05	8.09	0.02	0.19	
0.18	0.18	0.59	0.6	9.38	1.07	9.09	0.02	0.20	
0.19	0.19	0.69	0.8	10.40	1.11	10.10	0.02	0.21	
0.20	0.20	0.80	0.9	11.42	1.15	11.10	0.02	0.22	
0.21	0.21	0.91	1.1	12.44	1.19	12.11	0.02	0.23	
0.22	0.22	1.04	1.3	13.46	1.23	13.11	0.02	0.24	
0.23	0.23	1.17	1.5	14.49	1.27	14.12	0.02	0.25	
0.24	0.24	1.32	1.7	15.51	1.31	15.12	0.03	0.27	
0.25	0.25	1.48	2.0	16.53	1.35	16.13	0.03	0.28	
0.26	0.26	1.64	2.3	17.55	1.40	17.13	0.03	0.29	
0.27	0.27	1.82	2.6	18.57	1.44	18.14	0.03	0.30	
0.28	0.28	2.00	3.0	19.59	1.48	19.14	0.03	0.31	
0.29	0.29	2.20	3.4	20.61	1.52	20.15	0.04	0.33	
0.30	0.30	2.41	3.8	21.63	1.57	21.15	0.04	0.34	
0.31	0.31	2.62	4.2	22.65	1.61	22.16	0.04	0.35	
0.32	0.32	2.85	4.7	23.67	1.65	23.16	0.04	0.36	
0.33	0.33	3.09	5.2	24.69	1.69	24.17	0.04	0.37	ROLL CURB LIMIT
0.34	0.34	3.33	5.8	25.71	1.73	25.17	0.05	0.39	
0.35	0.35	3.59	6.4	26.74	1.78	26.18	0.05	0.40	
0.36	0.36	3.86	7.0	27.76	1.82	27.18	0.05	0.41	
0.37	0.37	4.13	7.7	28.78	1.86	28.19	0.05	0.42	
0.38	0.38	4.42	8.4	29.80	1.90	29.19	0.06	0.44	
0.39	0.39	4.72	9.1	30.82	1.94	30.20	0.06	0.45	
0.40	0.40	5.03	9.9	31.84	1.98	31.20	0.06	0.46	
0.41	0.41	5.34	10.8	32.86	2.02	32.21	0.06	0.47	
0.42	0.42	5.66	11.9	32.88	2.10	32.21	0.07	0.49	
0.43	0.43	5.99	13.0	32.90	2.17	32.22	0.07	0.50	

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	6.63	15.4	32.94	2.33	32.23	0.08	0.53	
0.46	0.46	6.95	16.7	32.96	2.40	32.23	0.09	0.55	
0.47	0.47	7.28	18.0	32.98	2.47	32.24	0.09	0.56	
0.48	0.48	7.60	19.3	33.00	2.54	32.24	0.10	0.58	
0.49	0.49	7.92	20.7	33.03	2.61	32.25	0.11	0.60	
0.50	0.50	8.24	22.1	33.05	2.68	32.25	0.11	0.61	
0.51	0.51	8.57	23.6	33.07	2.75	32.26	0.12	0.63	
0.52	0.52	8.89	25.1	33.09	2.82	32.26	0.12	0.64	
0.53	0.53	9.21	26.6	33.11	2.89	32.27	0.13	0.66	
0.54	0.54	9.53	28.1	33.13	2.95	32.27	0.14	0.68	
0.55	0.55	9.86	29.7	33.15	3.02	32.28	0.14	0.69	ACTUAL FLOW
0.56	0.56	10.18	31.4	33.17	3.08	32.28	0.15	0.71	
0.57	0.57	10.50	33.0	33.19	3.14	32.29	0.15	0.72	
0.58	0.58	10.83	34.7	33.21	3.21	32.29	0.16	0.74	
0.59	0.59	11.15	36.4	33.23	3.27	32.30	0.17	0.76	
0.60	0.60	11.47	38.2	33.25	3.33	32.30	0.17	0.77	
0.61	0.61	11.79	40.0	33.27	3.39	32.31	0.18	0.79	
0.62	0.62	12.12	41.8	33.29	3.45	32.31	0.18	0.80	
0.63	0.63	12.44	43.7	33.31	3.51	32.32	0.19	0.82	
0.64	0.64	12.76	45.6	33.33	3.57	32.32	0.20	0.84	
0.65	0.65	13.09	47.5	33.36	3.63	32.33	0.20	0.85	
0.66	0.66	13.41	49.4	33.38	3.69	32.33	0.21	0.87	STREET CAPACITY
0.67	0.67	13.73	51.4	33.40	3.74	32.34	0.22	0.89	
0.68	0.68	14.06	52.4	34.44	3.73	34.30	0.22	0.90	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 9 (NORTH END, BASIN D) Cerrada Vista Cerros ?

MANNING'S N= .017 SLOPE= .016

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.31	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.50	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.65	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.79	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	0.91	1.56	0.01	0.06	
0.06	0.06	0.06	0.1	1.97	1.03	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.14	2.19	0.02	0.09	
0.08	0.08	0.10	0.1	2.63	1.25	2.50	0.02	0.10	
0.09	0.09	0.13	0.2	2.96	1.35	2.81	0.03	0.12	
0.10	0.10	0.16	0.2	3.29	1.45	3.13	0.03	0.13	
0.11	0.11	0.19	0.3	3.62	1.55	3.44	0.04	0.15	
0.12	0.12	0.23	0.4	3.95	1.64	3.75	0.04	0.16	
0.13	0.13	0.26	0.5	4.28	1.73	4.07	0.05	0.18	
0.14	0.14	0.31	0.5	5.15	1.69	4.93	0.04	0.18	
0.15	0.15	0.36	0.6	6.03	1.70	5.79	0.04	0.19	
0.16	0.16	0.43	0.7	6.91	1.72	6.65	0.05	0.21	
0.17	0.17	0.50	0.9	7.79	1.76	7.51	0.05	0.22	
0.18	0.18	0.58	1.0	8.67	1.81	8.38	0.05	0.23	
0.19	0.19	0.66	1.2	9.54	1.87	9.24	0.05	0.24	
0.20	0.20	0.76	1.5	10.42	1.93	10.10	0.06	0.26	
0.21	0.21	0.87	1.7	11.30	1.99	10.96	0.06	0.27	
0.22	0.22	0.98	2.0	12.18	2.06	11.83	0.07	0.29	
0.23	0.23	1.10	2.3	13.06	2.13	12.69	0.07	0.30	
0.24	0.24	1.23	2.7	13.93	2.20	13.55	0.07	0.31	
0.25	0.25	1.37	3.1	14.81	2.26	14.41	0.08	0.33	
0.26	0.26	1.52	3.6	15.69	2.33	15.27	0.08	0.34	
0.27	0.27	1.68	4.0	16.57	2.40	16.14	0.09	0.36	
0.28	0.28	1.84	4.6	17.45	2.47	17.00	0.09	0.37	
0.29	0.29	2.02	5.1	18.32	2.54	17.86	0.10	0.39	
0.30	0.30	2.20	5.7	19.20	2.61	18.72	0.11	0.41	
0.31	0.31	2.39	6.4	20.08	2.68	19.59	0.11	0.42	
0.32	0.32	2.59	7.1	20.96	2.75	20.45	0.12	0.44	
0.33	0.33	2.80	7.9	21.84	2.81	21.31	0.12	0.45	ROLL CURB LIM
0.34	0.34	3.02	8.7	22.71	2.88	22.17	0.13	0.47	
0.35	0.35	3.25	9.6	23.59	2.95	23.03	0.13	0.48	
0.36	0.36	3.48	10.5	24.47	3.01	23.90	0.14	0.50	ACTUAL Q = 10.5
0.37	0.37	3.72	11.5	25.35	3.08	24.76	0.15	0.52	
0.38	0.38	3.98	12.5	26.23	3.14	25.62	0.15	0.53	
0.39	0.39	4.24	13.6	27.10	3.21	26.48	0.16	0.55	
0.40	0.40	4.50	14.7	27.98	3.27	27.35	0.17	0.57	
0.41	0.41	4.78	16.0	28.86	3.34	28.21	0.17	0.58	
0.42	0.42	5.06	17.5	28.88	3.46	28.21	0.19	0.61	
0.43	0.43	5.35	19.2	28.90	3.59	28.22	0.20	0.63	

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	22.7	28.94	3.83	28.23	0.23	0.68	
0.46	0.46	6.19	24.5	28.96	3.95	28.23	0.24	0.70	
0.47	0.47	6.48	26.4	28.98	4.07	28.24	0.26	0.73	
0.48	0.48	6.76	28.3	29.01	4.19	28.24	0.27	0.75	
0.49	0.49	7.04	30.3	29.03	4.30	28.25	0.29	0.78	
0.50	0.50	7.32	32.3	29.05	4.41	28.25	0.30	0.80	
0.51	0.51	7.61	34.4	29.07	4.52	28.26	0.32	0.83	
0.52	0.52	7.89	36.5	29.09	4.63	28.26	0.33	0.85	STREET CAPACITY

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN E) Avenida Vista Ventana

MANNING'S N= .017 SLOPE= .026

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	41.17	0.67
2	8.38	0.67	6	25.00	0.41	10	41.63	0.67
3	8.83	0.67	7	39.00	0.13	11	50.00	0.83
4	9.00	0.00	8	41.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.40	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.63	0.63	0.01	0.03	
0.03	0.03	0.01	0.0	0.99	0.83	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	1.00	1.25	0.02	0.06	
0.05	0.05	0.04	0.0	1.64	1.17	1.56	0.02	0.07	
0.06	0.06	0.06	0.1	1.97	1.32	1.88	0.03	0.09	
0.07	0.07	0.08	0.1	2.30	1.46	2.19	0.03	0.10	
0.08	0.08	0.10	0.2	2.63	1.59	2.50	0.04	0.12	
0.09	0.09	0.13	0.2	2.96	1.72	2.81	0.05	0.14	
0.10	0.10	0.16	0.3	3.29	1.85	3.13	0.05	0.15	
0.11	0.11	0.19	0.4	3.62	1.97	3.44	0.06	0.17	
0.12	0.12	0.23	0.5	3.95	2.09	3.75	0.07	0.19	
0.13	0.13	0.26	0.6	4.28	2.20	4.07	0.08	0.21	
0.14	0.14	0.31	0.7	5.30	2.12	5.07	0.07	0.21	
0.15	0.15	0.37	0.8	6.32	2.11	6.08	0.07	0.22	
0.16	0.16	0.43	0.9	7.34	2.13	7.08	0.07	0.23	
0.17	0.17	0.51	1.1	8.36	2.18	8.09	0.07	0.24	
0.18	0.18	0.59	1.3	9.38	2.24	9.09	0.08	0.26	
0.19	0.19	0.69	1.6	10.40	2.31	10.10	0.08	0.27	
0.20	0.20	0.80	1.9	11.42	2.39	11.10	0.09	0.29	
0.21	0.21	0.91	2.2	12.44	2.47	12.11	0.09	0.30	
0.22	0.22	1.04	2.6	13.46	2.55	13.11	0.10	0.32	
0.23	0.23	1.17	3.1	14.49	2.64	14.12	0.11	0.34	
0.24	0.24	1.32	3.6	15.51	2.73	15.12	0.12	0.36	
0.25	0.25	1.48	4.2	16.53	2.82	16.13	0.12	0.37	
0.26	0.26	1.64	4.8	17.55	2.91	17.13	0.13	0.39	
0.27	0.27	1.82	5.4	18.57	2.99	18.14	0.14	0.41	
0.28	0.28	2.00	6.2	19.59	3.08	19.14	0.15	0.43	
0.29	0.29	2.20	7.0	20.61	3.17	20.15	0.16	0.45	
0.30	0.30	2.41	7.9	21.63	3.26	21.15	0.17	0.47	
0.31	0.31	2.62	8.8	22.65	3.35	22.16	0.17	0.48	
0.32	0.32	2.85	9.8	23.67	3.44	23.16	0.18	0.50	
0.33	0.33	3.09	10.9	24.69	3.52	24.17	0.19	0.52	ROLL CURB LIMIT
0.34	0.34	3.33	12.0	25.71	3.61	25.17	0.20	0.54	
0.35	0.35	3.59	13.3	26.74	3.70	26.18	0.21	0.56	
0.36	0.36	3.86	14.6	27.76	3.78	27.18	0.22	0.58	
0.37	0.37	4.13	16.0	28.78	3.87	28.19	0.23	0.60	
0.38	0.38	4.42	17.5	29.80	3.95	29.19	0.24	0.62	
0.39	0.39	4.72	19.0	30.82	4.03	30.20	0.25	0.64	
0.40	0.40	5.03	20.7	31.84	4.12	31.20	0.26	0.66	
0.41	0.41	5.34	22.4	32.86	4.20	32.21	0.27	0.68	
0.42	0.42	5.66	24.7	32.88	4.36	32.21	0.30	0.72	
0.43	0.43	5.99	27.1	32.90	4.53	32.22	0.32	0.75	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	6.63	32.1	32.94	4.84	32.23	0.36	0.81	
0.46	0.46	6.95	34.7	32.96	4.99	32.23	0.39	0.85	STREET CAPACITY
0.47	0.47	7.28	37.4	32.98	5.15	32.24	0.41	0.88	
0.48	0.48	7.60	40.2	33.00	5.29	32.24	0.44	0.92	
0.49	0.49	7.92	43.1	33.03	5.44	32.25	0.46	0.95	
0.50	0.50	8.24	46.0	33.05	5.59	32.25	0.48	0.98	
0.51	0.51	8.57	49.1	33.07	5.73	32.26	0.51	1.02	
0.52	0.52	8.89	52.2	33.09	5.87	32.26	0.53	1.05	

Analyzer Report

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Drainage Structure Analyzer

Pipe Hydraulic Analysis

Avenida Vista Ventana

Date: Monday, July 11, 2005 11:29:04

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Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	15.0	cfs
Slope	2.600%	
Size (W x T):	18.00 x 2.0000	

Output Results

Flow Rate	15.0	cfs
Slope	2.600%	
d/D	0.73	
Capacity	16.9	cfs
Velocity	10.83	ft/s
Depth	1.10	ft
Critical Depth	1.40	ft
Size (W x T):	18.00 x 2.0000	

Analyzer Report

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Drainage Structure Analyzer

Pipe Hydraulic Analysis

Avenida Vista Ventana

Date: Monday, July 11, 2005 11:29:54

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Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	30.0	cfs
Slope	2.600%	
Size (W x T):	24.00 x 2.5000	

Output Results

Flow Rate	30.0	cfs
Slope	2.600%	
d/D	0.69	
Capacity	36.5	cfs
Velocity	12.96	ft/s
Depth	1.38	ft
Critical Depth	1.86	ft
Size (W x T):	24.00 x 2.5000	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN B) Avenida Vista Sol

MANNING'S N= .017 SLOPE= .013

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	4	9.00	0.00	7	37.63	1.17
2	8.38	0.67	5	37.00	0.50	8	46.00	1.33
3	8.83	0.67	6	37.17	1.17	9	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.57	0.29	0.56	0.00	0.01
0.02	0.02	0.01	0.0	1.14	0.46	1.13	0.00	0.02
0.03	0.03	0.03	0.0	1.71	0.60	1.69	0.01	0.04
0.04	0.04	0.05	0.0	2.28	0.73	2.25	0.01	0.05
0.05	0.05	0.07	0.1	2.85	0.84	2.81	0.01	0.06
0.06	0.06	0.10	0.1	3.42	0.95	3.38	0.01	0.07
0.07	0.07	0.14	0.1	3.99	1.06	3.94	0.02	0.09
0.08	0.08	0.18	0.2	4.56	1.15	4.50	0.02	0.10
0.09	0.09	0.23	0.3	5.13	1.25	5.06	0.02	0.11
0.10	0.10	0.28	0.4	5.70	1.34	5.63	0.03	0.13
0.11	0.11	0.34	0.5	6.27	1.43	6.19	0.03	0.14
0.12	0.12	0.41	0.6	6.84	1.51	6.75	0.04	0.16
0.13	0.13	0.48	0.8	7.42	1.60	7.31	0.04	0.17
0.14	0.14	0.55	0.9	7.99	1.68	7.88	0.04	0.18
0.15	0.15	0.63	1.1	8.56	1.76	8.44	0.05	0.20
0.16	0.16	0.72	1.3	9.13	1.83	9.00	0.05	0.21
0.17	0.17	0.81	1.6	9.70	1.91	9.56	0.06	0.23
0.18	0.18	0.91	1.8	10.27	1.98	10.13	0.06	0.24
0.19	0.19	1.02	2.1	10.84	2.06	10.69	0.07	0.26
0.20	0.20	1.13	2.4	11.41	2.13	11.25	0.07	0.27
0.21	0.21	1.24	2.7	11.98	2.20	11.81	0.08	0.29
0.22	0.22	1.36	3.1	12.55	2.27	12.38	0.08	0.30
0.23	0.23	1.49	3.5	13.12	2.34	12.94	0.08	0.31
0.24	0.24	1.62	3.9	13.69	2.40	13.50	0.09	0.33
0.25	0.25	1.76	4.3	14.26	2.47	14.06	0.09	0.34
0.26	0.26	1.90	4.8	14.83	2.53	14.63	0.10	0.36
0.27	0.27	2.05	5.3	15.40	2.60	15.19	0.10	0.37
0.28	0.28	2.21	5.9	15.97	2.66	15.75	0.11	0.39
0.29	0.29	2.37	6.4	16.54	2.73	16.31	0.12	0.41
0.30	0.30	2.53	7.1	17.11	2.79	16.88	0.12	0.42
0.31	0.31	2.70	7.7	17.68	2.85	17.44	0.13	0.44
0.32	0.32	2.88	8.4	18.25	2.91	18.00	0.13	0.45
0.33	0.33	3.06	9.1	18.82	2.97	18.56	0.14	0.47
0.34	0.34	3.25	9.9	19.39	3.03	19.13	0.14	0.48
0.35	0.35	3.45	10.6	19.96	3.09	19.69	0.15	0.50
0.36	0.36	3.65	11.5	20.53	3.15	20.25	0.15	0.51
0.37	0.37	3.85	12.3	21.11	3.21	20.81	0.16	0.53
0.38	0.38	4.06	13.3	21.68	3.26	21.38	0.17	0.55
0.39	0.39	4.28	14.2	22.25	3.32	21.94	0.17	0.56
0.40	0.40	4.50	15.2	22.82	3.38	22.50	0.18	0.58
0.41	0.41	4.73	16.2	23.39	3.43	23.06	0.18	0.59
0.42	0.42	4.96	17.3	23.96	3.49	23.63	0.19	0.61
0.43	0.43	5.20	18.4	24.53	3.54	24.19	0.20	0.63
0.44	0.44	5.45	19.6	25.10	3.60	24.75	0.20	0.64

ROLL CURB LIMIT

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.46	0.46	5.95	22.1	26.24	3.71	25.88	0.21	0.67
0.47	0.47	6.21	23.4	26.81	3.76	26.44	0.22	0.69
0.48	0.48	6.48	24.7	27.38	3.81	27.00	0.23	0.71
0.49	0.49	6.75	26.1	27.95	3.87	27.56	0.23	0.72
0.50	0.50	7.03	27.6	28.52	3.92	28.13	0.24	0.74
0.51	0.51	7.31	29.4	28.54	4.02	28.13	0.25	0.76
0.52	0.52	7.59	31.3	28.56	4.12	28.14	0.26	0.78
0.53	0.53	7.88	33.2	28.58	4.22	28.14	0.28	0.81

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN B) Avenida Vista Sol

MANNING'S N= .017 SLOPE= .021

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	4	9.00	0.00	7	37.63	1.17
2	8.38	0.67	5	37.00	0.50	8	46.00	1.33
3	8.83	0.67	6	37.17	1.17	9	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.57	0.37	0.56	0.00	0.01	
0.02	0.02	0.01	0.0	1.14	0.58	1.13	0.01	0.03	
0.03	0.03	0.03	0.0	1.71	0.76	1.69	0.01	0.04	
0.04	0.04	0.05	0.0	2.28	0.92	2.25	0.01	0.05	
0.05	0.05	0.07	0.1	2.85	1.07	2.81	0.02	0.07	
0.06	0.06	0.10	0.1	3.42	1.21	3.38	0.02	0.08	
0.07	0.07	0.14	0.2	3.99	1.34	3.94	0.03	0.10	
0.08	0.08	0.18	0.3	4.56	1.47	4.50	0.03	0.11	
0.09	0.09	0.23	0.4	5.13	1.59	5.06	0.04	0.13	
0.10	0.10	0.28	0.5	5.70	1.70	5.63	0.05	0.15	
0.11	0.11	0.34	0.6	6.27	1.82	6.19	0.05	0.16	
0.12	0.12	0.41	0.8	6.84	1.92	6.75	0.06	0.18	
0.13	0.13	0.48	1.0	7.42	2.03	7.31	0.06	0.19	
0.14	0.14	0.55	1.2	7.99	2.13	7.88	0.07	0.21	
0.15	0.15	0.63	1.4	8.56	2.23	8.44	0.08	0.23	
0.16	0.16	0.72	1.7	9.13	2.33	9.00	0.08	0.24	
0.17	0.17	0.81	2.0	9.70	2.43	9.56	0.09	0.26	
0.18	0.18	0.91	2.3	10.27	2.52	10.13	0.10	0.28	
0.19	0.19	1.02	2.7	10.84	2.61	10.69	0.11	0.30	
0.20	0.20	1.13	3.0	11.41	2.70	11.25	0.11	0.31	
0.21	0.21	1.24	3.5	11.98	2.79	11.81	0.12	0.33	
0.22	0.22	1.36	3.9	12.55	2.88	12.38	0.13	0.35	
0.23	0.23	1.49	4.4	13.12	2.97	12.94	0.14	0.37	
0.24	0.24	1.62	4.9	13.69	3.05	13.50	0.14	0.38	
0.25	0.25	1.76	5.5	14.26	3.14	14.06	0.15	0.40	
0.26	0.26	1.90	6.1	14.83	3.22	14.63	0.16	0.42	
0.27	0.27	2.05	6.8	15.40	3.30	15.19	0.17	0.44	
0.28	0.28	2.21	7.5	15.97	3.38	15.75	0.18	0.46	
0.29	0.29	2.37	8.2	16.54	3.46	16.31	0.19	0.48	
0.30	0.30	2.53	9.0	17.11	3.54	16.88	0.19	0.49	
0.31	0.31	2.70	9.8	17.68	3.62	17.44	0.20	0.51	
0.32	0.32	2.88	10.7	18.25	3.70	18.00	0.21	0.53	
0.33	0.33	3.06	11.6	18.82	3.78	18.56	0.22	0.55	ROLL CURB LIMI
0.34	0.34	3.25	12.5	19.39	3.85	19.13	0.23	0.57	
0.35	0.35	3.45	13.5	19.96	3.93	19.69	0.24	0.59	
0.36	0.36	3.65	14.6	20.53	4.00	20.25	0.25	0.61	
0.37	0.37	3.85	15.7	21.11	4.07	20.81	0.26	0.63	
0.38	0.38	4.06	16.8	21.68	4.15	21.38	0.27	0.65	
0.39	0.39	4.28	18.1	22.25	4.22	21.94	0.28	0.67	
0.40	0.40	4.50	19.3	22.82	4.29	22.50	0.29	0.69	
0.41	0.41	4.73	20.6	23.39	4.36	23.06	0.30	0.71	
0.42	0.42	4.96	22.0	23.96	4.43	23.63	0.31	0.73	
0.43	0.43	5.20	23.4	24.53	4.50	24.19	0.32	0.75	
0.44	0.44	5.45	24.9	25.10	4.57	24.75	0.32	0.76	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.46	0.46	5.95	28.0	26.24	4.71	25.88	0.34	0.80	
0.47	0.47	6.21	29.7	26.81	4.78	26.44	0.35	0.82	
0.48	0.48	6.48	31.4	27.38	4.85	27.00	0.36	0.84	
0.49	0.49	6.75	33.2	27.95	4.91	27.56	0.37	0.86	STREET CAPACIT
0.50	0.50	7.03	35.0	28.52	4.98	28.13	0.39	0.89	
0.51	0.51	7.31	37.4	28.54	5.11	28.13	0.41	0.92	
0.52	0.52	7.59	39.8	28.56	5.24	28.14	0.43	0.95	
0.53	0.53	7.88	42.2	28.58	5.36	28.14	0.45	0.98	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN B) Avenida Vista Sol

MANNING'S N= .017 SLOPE= .036

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	4	9.00	0.00	7	37.63	1.17
2	8.38	0.67	5	37.00	0.50	8	46.00	1.33
3	8.83	0.67	6	37.17	1.17	9	0.00	0.00

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.57	0.48	0.56	0.00	0.01	
0.02	0.02	0.01	0.0	1.14	0.76	1.13	0.01	0.03	
0.03	0.03	0.03	0.0	1.71	1.00	1.69	0.02	0.05	
0.04	0.04	0.05	0.1	2.28	1.21	2.25	0.02	0.06	
0.05	0.05	0.07	0.1	2.85	1.40	2.81	0.03	0.08	
0.06	0.06	0.10	0.2	3.42	1.59	3.38	0.04	0.10	
0.07	0.07	0.14	0.2	3.99	1.76	3.94	0.05	0.12	
0.08	0.08	0.18	0.3	4.56	1.92	4.50	0.06	0.14	
0.09	0.09	0.23	0.5	5.13	2.08	5.06	0.07	0.16	
0.10	0.10	0.28	0.6	5.70	2.23	5.63	0.08	0.18	
0.11	0.11	0.34	0.8	6.27	2.38	6.19	0.09	0.20	
0.12	0.12	0.41	1.0	6.84	2.52	6.75	0.10	0.22	
0.13	0.13	0.48	1.3	7.42	2.66	7.31	0.11	0.24	
0.14	0.14	0.55	1.5	7.99	2.79	7.88	0.12	0.26	
0.15	0.15	0.63	1.8	8.56	2.92	8.44	0.13	0.28	
0.16	0.16	0.72	2.2	9.13	3.05	9.00	0.14	0.30	
0.17	0.17	0.81	2.6	9.70	3.18	9.56	0.16	0.33	
0.18	0.18	0.91	3.0	10.27	3.30	10.13	0.17	0.35	
0.19	0.19	1.02	3.5	10.84	3.42	10.69	0.18	0.37	
0.20	0.20	1.13	4.0	11.41	3.54	11.25	0.19	0.39	
0.21	0.21	1.24	4.5	11.98	3.66	11.81	0.21	0.42	
0.22	0.22	1.36	5.1	12.55	3.77	12.38	0.22	0.44	
0.23	0.23	1.49	5.8	13.12	3.89	12.94	0.23	0.46	
0.24	0.24	1.62	6.5	13.69	4.00	13.50	0.25	0.49	
0.25	0.25	1.76	7.2	14.26	4.11	14.06	0.26	0.51	
0.26	0.26	1.90	8.0	14.83	4.22	14.63	0.28	0.54	
0.27	0.27	2.05	8.9	15.40	4.32	15.19	0.29	0.56	
0.28	0.28	2.21	9.8	15.97	4.43	15.75	0.30	0.58	
0.29	0.29	2.37	10.7	16.54	4.54	16.31	0.32	0.61	
0.30	0.30	2.53	11.7	17.11	4.64	16.88	0.33	0.63	
0.31	0.31	2.70	12.8	17.68	4.74	17.44	0.35	0.66	
0.32	0.32	2.88	13.9	18.25	4.84	18.00	0.36	0.68	
0.33	0.33	3.06	15.1	18.82	4.94	18.56	0.38	0.71	ROLL CURB LIMIT
0.34	0.34	3.25	16.4	19.39	5.04	19.13	0.39	0.73	
0.35	0.35	3.45	17.7	19.96	5.14	19.69	0.41	0.76	
0.36	0.36	3.65	19.1	20.53	5.24	20.25	0.43	0.79	
0.37	0.37	3.85	20.5	21.11	5.34	20.81	0.44	0.81	
0.38	0.38	4.06	22.1	21.68	5.43	21.38	0.46	0.84	
0.39	0.39	4.28	23.6	22.25	5.53	21.94	0.47	0.86	STREET CAPACITY
0.40	0.40	4.50	25.3	22.82	5.62	22.50	0.49	0.89	
0.41	0.41	4.73	27.0	23.39	5.71	23.06	0.51	0.92	
0.42	0.42	4.96	28.8	23.96	5.81	23.63	0.52	0.94	
0.43	0.43	5.20	30.7	24.53	5.90	24.19	0.54	0.97	
0.44	0.44	5.45	32.6	25.10	5.99	24.75	0.56	1.00	

□ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.46	0.46	5.95	36.7	26.24	6.17	25.88	0.59	1.05
0.47	0.47	6.21	38.9	26.81	6.26	26.44	0.61	1.08
0.48	0.48	6.48	41.1	27.38	6.35	27.00	0.63	1.11
0.49	0.49	6.75	43.4	27.95	6.43	27.56	0.64	1.13
0.50	0.50	7.03	45.9	28.52	6.52	28.13	0.66	1.16
0.51	0.51	7.31	48.9	28.54	6.69	28.13	0.70	1.21
0.52	0.52	7.59	52.1	28.56	6.86	28.14	0.73	1.25
0.53	0.53	7.88	55.3	28.58	7.02	28.14	0.77	1.30

Analyzer Report

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Drainage Structure Analyzer

Pipe Hydraulic Analysis

Avenida Vista Sol

Date: Monday, July 11, 2005 11:31:07

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Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	6.6	cfs
Slope	3.600%	
Size (W x T):	18.00 x 2.0000	

Output Results

Flow Rate	6.6	cfs
Slope	3.600%	
d/D	0.40	
Capacity	19.9	cfs
Velocity	10.13	ft/s
Depth	0.59	ft
Critical Depth	0.99	ft
Size (W x T):	18.00 x 2.0000	

Analyzer Report

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Drainage Structure Analyzer

Pipe Hydraulic Analysis

Arenida Vista Sol

Date: Monday, July 11, 2005 11:31:41

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Input Data

Shape	Circular	
Material	RC C76-A	
Roughness	0.013000	
Method	Manning	
Flow Rate	13.2	cfs
Slope	3.600%	
Size (W x T):	18.00 x 2.0000	

Output Results

Flow Rate	13.2	cfs
Slope	3.600%	
d/D	0.59	
Capacity	19.9	cfs
Velocity	12.07	ft/s
Depth	0.89	ft
Critical Depth	1.35	ft
Size (W x T):	18.00 x 2.0000	

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN A) Avenida Vista Sol

MANNING'S N= .017 SLOPE= .028

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	4	9.00	0.00	7	37.63	1.17
2	8.38	0.67	5	37.00	0.50	8	46.00	1.33
3	8.83	0.67	6	37.17	1.17	9	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.57	0.42	0.56	0.00	0.01
0.02	0.02	0.01	0.0	1.14	0.67	1.13	0.01	0.03
0.03	0.03	0.03	0.0	1.71	0.88	1.69	0.01	0.04
0.04	0.04	0.05	0.0	2.28	1.07	2.25	0.02	0.06
0.05	0.05	0.07	0.1	2.85	1.24	2.81	0.02	0.07
0.06	0.06	0.10	0.1	3.42	1.40	3.38	0.03	0.09
0.07	0.07	0.14	0.2	3.99	1.55	3.94	0.04	0.11
0.08	0.08	0.18	0.3	4.56	1.69	4.50	0.04	0.12
0.09	0.09	0.23	0.4	5.13	1.83	5.06	0.05	0.14
0.10	0.10	0.28	0.6	5.70	1.97	5.63	0.06	0.16
0.11	0.11	0.34	0.7	6.27	2.10	6.19	0.07	0.18
0.12	0.12	0.41	0.9	6.84	2.22	6.75	0.08	0.20
0.13	0.13	0.48	1.1	7.42	2.34	7.31	0.09	0.22
0.14	0.14	0.55	1.4	7.99	2.46	7.88	0.09	0.23
0.15	0.15	0.63	1.6	8.56	2.58	8.44	0.10	0.25
0.16	0.16	0.72	1.9	9.13	2.69	9.00	0.11	0.27
0.17	0.17	0.81	2.3	9.70	2.80	9.56	0.12	0.29
0.18	0.18	0.91	2.7	10.27	2.91	10.13	0.13	0.31
0.19	0.19	1.02	3.1	10.84	3.02	10.69	0.14	0.33
0.20	0.20	1.13	3.5	11.41	3.12	11.25	0.15	0.35
0.21	0.21	1.24	4.0	11.98	3.23	11.81	0.16	0.37
0.22	0.22	1.36	4.5	12.55	3.33	12.38	0.17	0.39
0.23	0.23	1.49	5.1	13.12	3.43	12.94	0.18	0.41
0.24	0.24	1.62	5.7	13.69	3.53	13.50	0.19	0.43
0.25	0.25	1.76	6.4	14.26	3.62	14.06	0.20	0.45
0.26	0.26	1.90	7.1	14.83	3.72	14.63	0.21	0.47
0.27	0.27	2.05	7.8	15.40	3.81	15.19	0.23	0.50
0.28	0.28	2.21	8.6	15.97	3.91	15.75	0.24	0.52
0.29	0.29	2.37	9.5	16.54	4.00	16.31	0.25	0.54
0.30	0.30	2.53	10.4	17.11	4.09	16.88	0.26	0.56
0.31	0.31	2.70	11.3	17.68	4.18	17.44	0.27	0.58
0.32	0.32	2.88	12.3	18.25	4.27	18.00	0.28	0.60
0.33	0.33	3.06	13.4	18.82	4.36	18.56	0.30	0.63
0.34	0.34	3.25	14.5	19.39	4.45	19.13	0.31	0.65
0.35	0.35	3.45	15.6	19.96	4.53	19.69	0.32	0.67
0.36	0.36	3.65	16.8	20.53	4.62	20.25	0.33	0.69
0.37	0.37	3.85	18.1	21.11	4.71	20.81	0.34	0.71
0.38	0.38	4.06	19.5	21.68	4.79	21.38	0.36	0.74
0.39	0.39	4.28	20.8	22.25	4.87	21.94	0.37	0.76
0.40	0.40	4.50	22.3	22.82	4.96	22.50	0.38	0.78
0.41	0.41	4.73	23.8	23.39	5.04	23.06	0.39	0.80
0.42	0.42	4.96	25.4	23.96	5.12	23.63	0.41	0.83
0.43	0.43	5.20	27.0	24.53	5.20	24.19	0.42	0.85
0.44	0.44	5.45	28.8	25.10	5.28	24.75	0.43	0.87

ROLL CURB LIMIT

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.46	0.46	5.95	32.4	26.24	5.44	25.88	0.46	0.92
0.47	0.47	6.21	34.3	26.81	5.52	26.44	0.47	0.94
0.48	0.48	6.48	36.3	27.38	5.60	27.00	0.49	0.97
0.49	0.49	6.75	38.3	27.95	5.67	27.56	0.50	0.99
0.50	0.50	7.03	40.4	28.52	5.75	28.13	0.51	1.01
0.51	0.51	7.31	43.2	28.54	5.90	28.13	0.54	1.05
0.52	0.52	7.59	45.9	28.56	6.05	28.14	0.57	1.09
0.53	0.53	7.88	48.8	28.58	6.19	28.14	0.60	1.13

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

STREET 3 (BASIN A) Avenida Vista Sol

MANNING'S N= .017 SLOPE= .022

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	4	9.00	0.00	7	37.63	1.17
2	8.38	0.67	5	37.00	0.50	8	46.00	1.33
3	8.83	0.67	6	37.17	1.17	9	0.00	0.00

☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.57	0.38	0.56	0.00	0.01	
0.02	0.02	0.01	0.0	1.14	0.60	1.13	0.01	0.03	
0.03	0.03	0.03	0.0	1.71	0.78	1.69	0.01	0.04	
0.04	0.04	0.05	0.0	2.28	0.95	2.25	0.01	0.05	
0.05	0.05	0.07	0.1	2.85	1.10	2.81	0.02	0.07	
0.06	0.06	0.10	0.1	3.42	1.24	3.38	0.02	0.08	
0.07	0.07	0.14	0.2	3.99	1.37	3.94	0.03	0.10	
0.08	0.08	0.18	0.3	4.56	1.50	4.50	0.04	0.12	
0.09	0.09	0.23	0.4	5.13	1.63	5.06	0.04	0.13	
0.10	0.10	0.28	0.5	5.70	1.74	5.63	0.05	0.15	
0.11	0.11	0.34	0.6	6.27	1.86	6.19	0.05	0.16	
0.12	0.12	0.41	0.8	6.84	1.97	6.75	0.06	0.18	
0.13	0.13	0.48	1.0	7.42	2.08	7.31	0.07	0.20	
0.14	0.14	0.55	1.2	7.99	2.18	7.88	0.07	0.21	
0.15	0.15	0.63	1.4	8.56	2.28	8.44	0.08	0.23	
0.16	0.16	0.72	1.7	9.13	2.38	9.00	0.09	0.25	
0.17	0.17	0.81	2.0	9.70	2.48	9.56	0.10	0.27	
0.18	0.18	0.91	2.4	10.27	2.58	10.13	0.10	0.28	
0.19	0.19	1.02	2.7	10.84	2.67	10.69	0.11	0.30	
0.20	0.20	1.13	3.1	11.41	2.77	11.25	0.12	0.32	
0.21	0.21	1.24	3.5	11.98	2.86	11.81	0.13	0.34	
0.22	0.22	1.36	4.0	12.55	2.95	12.38	0.14	0.36	
0.23	0.23	1.49	4.5	13.12	3.04	12.94	0.14	0.37	
0.24	0.24	1.62	5.1	13.69	3.13	13.50	0.15	0.39	
0.25	0.25	1.76	5.6	14.26	3.21	14.06	0.16	0.41	
0.26	0.26	1.90	6.3	14.83	3.30	14.63	0.17	0.43	
0.27	0.27	2.05	6.9	15.40	3.38	15.19	0.18	0.45	
0.28	0.28	2.21	7.6	15.97	3.46	15.75	0.19	0.47	
0.29	0.29	2.37	8.4	16.54	3.55	16.31	0.20	0.49	
0.30	0.30	2.53	9.2	17.11	3.63	16.88	0.20	0.50	
0.31	0.31	2.70	10.0	17.68	3.71	17.44	0.21	0.52	
0.32	0.32	2.88	10.9	18.25	3.79	18.00	0.22	0.54	
0.33	0.33	3.06	11.8	18.82	3.86	18.56	0.23	0.56	ROLL CURB LIMIT
0.34	0.34	3.25	12.8	19.39	3.94	19.13	0.24	0.58	
0.35	0.35	3.45	13.8	19.96	4.02	19.69	0.25	0.60	
0.36	0.36	3.65	14.9	20.53	4.10	20.25	0.26	0.62	
0.37	0.37	3.85	16.1	21.11	4.17	20.81	0.27	0.64	
0.38	0.38	4.06	17.2	21.68	4.25	21.38	0.28	0.66	
0.39	0.39	4.28	18.5	22.25	4.32	21.94	0.29	0.68	
0.40	0.40	4.50	19.8	22.82	4.39	22.50	0.30	0.70	ACTUAL Q = 20.5 CF
0.41	0.41	4.73	21.1	23.39	4.47	23.06	0.31	0.72	
0.42	0.42	4.96	22.5	23.96	4.54	23.63	0.32	0.74	
0.43	0.43	5.20	24.0	24.53	4.61	24.19	0.33	0.76	
0.44	0.44	5.45	25.5	25.10	4.68	24.75	0.34	0.78	

☐ WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.46	0.46	5.95	28.7	26.24	4.82	25.88	0.36	0.82	
0.47	0.47	6.21	30.4	26.81	4.89	26.44	0.37	0.84	
0.48	0.48	6.48	32.1	27.38	4.96	27.00	0.38	0.86	STREET CAPACITY
0.49	0.49	6.75	34.0	27.95	5.03	27.56	0.39	0.88	
0.50	0.50	7.03	35.8	28.52	5.10	28.13	0.40	0.90	
0.51	0.51	7.31	38.2	28.54	5.23	28.13	0.42	0.93	
0.52	0.52	7.59	40.7	28.56	5.36	28.14	0.45	0.97	
0.53	0.53	7.88	43.2	28.58	5.49	28.14	0.47	1.00	

60" WING 40"@ TC

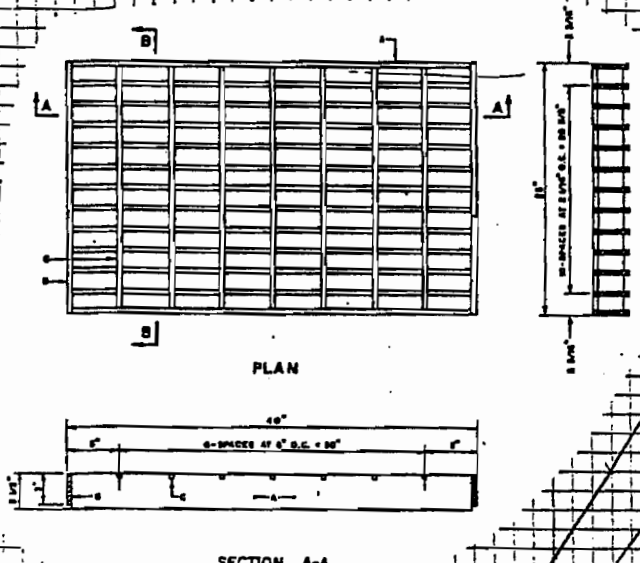
18.5" × 35.5" NET OPEN AREA

18.5" GRATE @ 10" (0.83') BELOW TC

EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4\,h^{1.5}$	$46.2\,h^{1.5}$	$56.0\,h^{1.5}$	$65.7\,h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6A\sqrt{2gh} + 3.3(5')h^{1.5}$

2) & 3) $Q = 3.3\,Ph^{1.5}$



TRIPLE GRATE

DOUBLE GRATE

SINGLE GRATE

GRATE CAPACITY (Q) IN CFS

HEAD (h) IN FEET

TC 0.83'

BOHANNAN-HUSTON INC.

Q = 20.5 cfs

PROJECT NAME BASIN A SHEET ____ OF ____

PROJECT NO. SUMP CONDITION BY ____ DATE ____

SUBJECT RATING CURVE FOR TYPE A INLETS CH'D ____ DATE 8-18-18