City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 2, 2002

Dave Thompson, P.E.
Thompson Engineering Consultants
P.O. Box 15954
Rio Rancho, New Mexico 87174

RE: THE TRAILS @ TAYLOR RANCH (E-10/D16)
Engineers Certification For Release of Financial Guaranty
Engineers Stamp dated 12/20/2001
Engineers Certification dated 6/28/2002

Dear Mr. Thompson:

Based upon the information provided in your Engineers Certification submittal dated June 7, 2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Public Works Department

c: Arlene Portillo, PWD – ~~#682181~~ #681381
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 4, 2002

David Thompson
Thompson Engineering Services, Inc.
P.O. Box 15954
Rio Ranch, New Mexico 87174

RE: Grading and Drainage Plan for Trails at Taylor Ranch (E10-D16) Dated December 20, 2001.

Dear Mr. Thompson:

The above referenced plan received December 21, 2001 is approved for rough grading of the property. Please remind the contractor of the Top Soil Disturbance Permit. Please bring the original mylar or a print so that I can sign the rough grading box and the contractor can obtain his excavation permit.

If you have any questions please call me a 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 30, 2001

David Thompson
Thompson Engineering Services, Inc.
P.O. Box 15954
Rio Ranch, New Mexico 87174

RE: Grading and Drainage Plan for Trails at Taylor Ranch (E10-D16) Dated November 30, 2001

Dear Mr. Thompson:

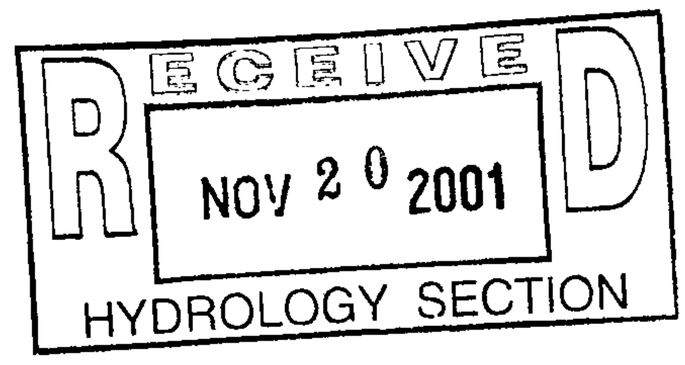
The above referenced plan received November 20, 2001 is approved for Preliminary Plat action at DRB. After the DRB Board approves Preliminary Plat then resubmit to this office for Rough Grading approval. Prior to financial guarantees being released, an Engineer's Certification for the completion of site grading and drainage per the DPM Checklist is required for Hydrology approval.

If you have any questions please call me a 924-3982.

Sincerely,

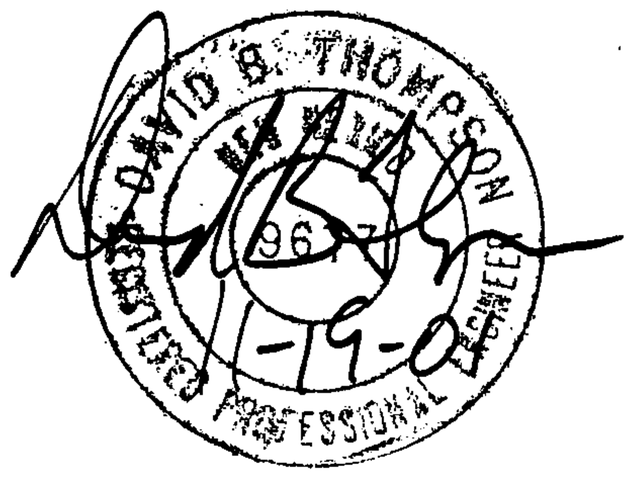
Carlos A. Montoya
City Floodplain Administrator

DRAINAGE REPORT
FOR
THE TRAILS AT TAYLOR RANCH
SUBDIVISION



Prepared by:
Thompson Engineering Consultants, Inc.
P.O. Box 15954
Rio Rancho, NM 87174

November 2001



INTRODUCTION AND SITE LOCATION

The proposed Trails at Taylor Ranch Subdivision is located on the west side of Albuquerque on Montano Road just east of Whiteman Drive. The property will be subdivided into 41 residential lots. The site generally drains from north to south. The 4.5 acre site was originally included in the SAD 197 drainage report. The drainage plan for this subdivision will follow the SAD 197 Final Storm Drainage Report, dated August 1985.

METHODOLOGY

The hydrologic and hydraulic criteria in Section 22 of the City of Albuquerque Development Process Manual (DPM), entitled "Drainage, Flood Control, and Erosion Control," was followed to perform the analyses given in this report. The design storm used for both the existing undeveloped and developed conditions of the Tuscany West Unit 5 Subdivision is the 100-year, 6-hour storm event for peak flow computations.

Street capacities were modeled using HEC-RAS to determine normal depths and conjugate depths. A hydraulic analysis of the storm sewer collection system was performed to assist in the sizing of the infrastructure.

EXISTING DRAINAGE CONDITIONS

INTRODUCTION

The site is located north of Montano Road and east of Whiteman Drive. The site has an average slope of about 1.0%. The site slopes from north to south to Montano Road. The total fall in elevation from north to south is 9 feet. The site is sparsely vegetated.

The FEMA Flood Insurance Rate Map Number 35001C0114D, effective date September 20, 1996, shown in Figure 1, does not indicate the presence of any floodplains on or near the site.

OFF-SITE FLOWS

There are no offsite flows that reach the site.

ON-SITE FLOWS

For the existing conditions hydrologic analysis, land treatment types A and B were used to determine peak flows. There is only one on-site drainage basin. The 4.5 acre on-site

basin drains to Montano Road. The on-site Basin the land treatments are 82% A and 18%B. The peak flows from the on-site basin is 6.4 cfs.

DEVELOPED DRAINAGE CONDITIONS

DRAINAGE BASIN DELINEATION

Plate 1 shows that the site only has one basin. Following the SAD 197Final Storm Drainage Report, the flows from the site are routed to Montano Road via a storm sewer. All of the flows are collected in a storm sewer in subdivision Street and discharged to an existing 24" RCP stub from the 48" storm sewer in Montano Road. The Montano Road storm sewer eventually drains to the Mariposa Diversion Channel.

HYDROLOGIC ANALYSIS

To determine the peak flows of each basin a hydrologic analysis was performed in accordance to section 22.2 of the Development Process Manual (DPM). The analysis included the 100-year 6-hour storm and the 10-year 6-hour storm. The 100-year 6-hour storm was the basis for determining peak flows to size the storm sewer inlets (see Appendix A). The 10-year 6-hour storm was the basis for determining peak flows to calculate the hydraulic grad line in the proposed storm sewer extension (see Appendix A). The property is located in Zone 1, which has a 100-year 6-hour storm event of 2.20 inches.

The site and Montano Road were assigned land treatment values in accordance with Tables A-4 and A-5 of the DPM's section 22.2. Table 1 shows the Land Treatments and peak flows for each basin. See Appendix A for hydrologic calculations.

Table 1 Developed Drainage Conditions

BASINS	Area (acres)	10yr-6hr Peak Flow (cfs)	100yr-6hr Peak Flow (cfs)	Land Treatment
110	1.52	3.26	5.41	20%B, 20%C, 60%D
120	2.98	6.47	10.70	20%B, 20%C, 60%D
Montano	0.57	1.48	2.31	21%C, 79%D

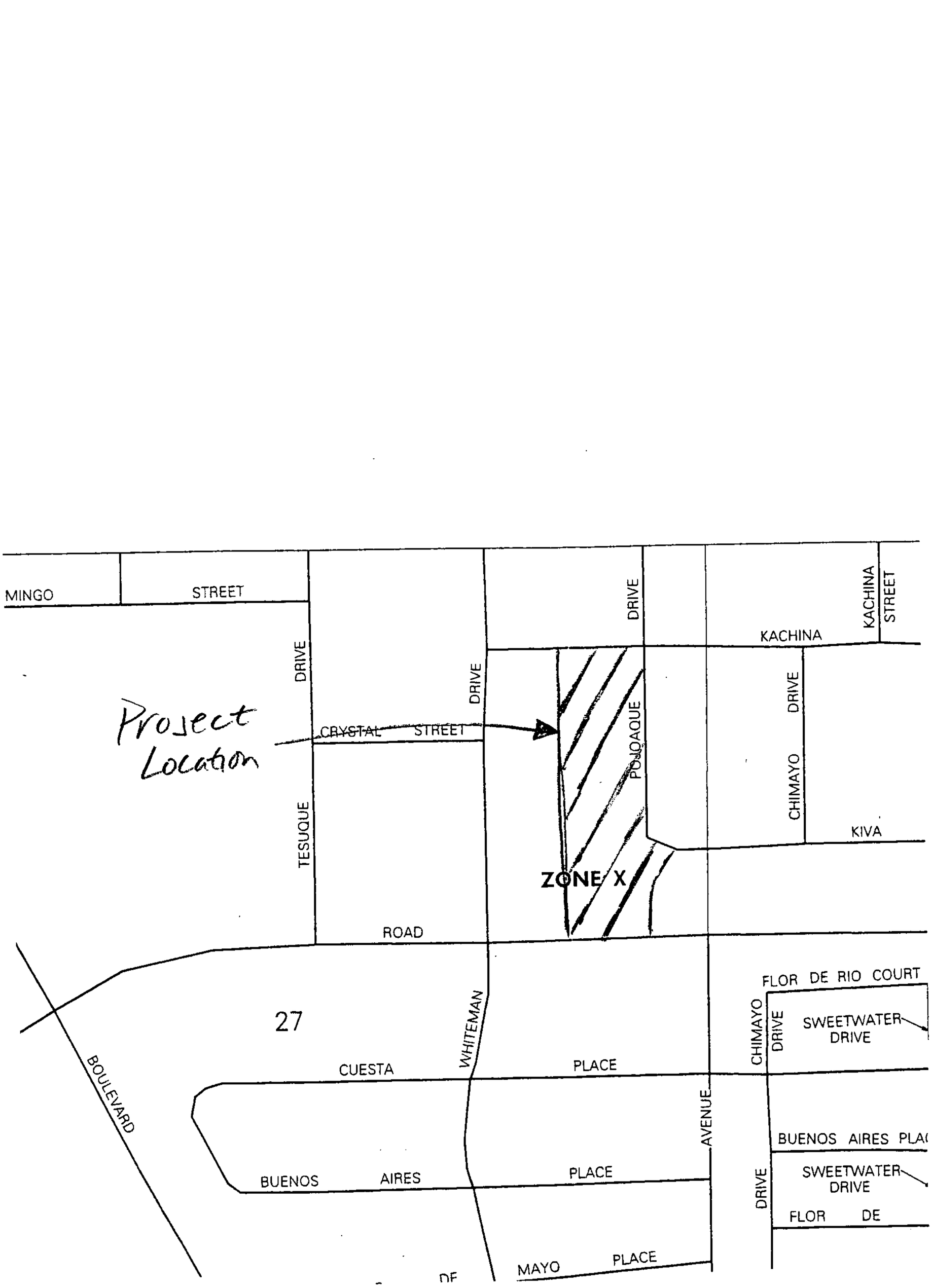


Figure 1 FEMA Flood Insurance Rate Map

DRAINAGE CONCEPT

Introduction

This drainage report addresses the drainage concept for the developed condition of the Trails at Taylor Ranch subdivision. The site is divided into tw0 drainage basins. Basins 110 and 120 drains to Montano Road. The drainage concept follows the SAD 197 Final Storm Water Drainage Plan Report. Tract C1 was included in SAD 197 Drainage Report in basins 4 & 5. According to SAD 197, each basin was allowed 12 cfs discharge into the proposed storm sewer in Montano Road during a 10-year storm and 19 cfs discharge during a 100-year storm. A subsequent Drainage Plan for Executive Apartments, located just east of the site decreased the allowable 100-year and 10-year discharge from Tract C1 by 0.94 cfs and 0.60 cfs, respectively. In 1998, the SAD 224 Engineer's Drainage Report, diverted a portion of the SAD 197 Basin 5 to Basin 6. The lots on the east side of Whiteman Drive, which was included in Basin 5 in the SAD 197 Drainage Report, was diverted to Basin 6. These lots which drained to the east now drain to the west to Whiteman Drive from the back of the pad to the front of the lot. The back yard of these lots drain to a retention pond located in the back yard. These retention ponds are sized for the 100-year, 10-day volume. The SAD 224 Drainage Report shows that the proposed 100-year peak flows from the Montano Basin (SAD 197 Basin 6) is 68 cfs, which is lower than the 100-year peak flows of 121 cfs allowed for Basin 6 by the SAD 197 Drainage Report. Therefore, there is enough capacity in the Montano Road storm sewer to allow for free discharge from the Trails at Taylor Ranch Subdivision. Refer to Appendix C for copies of the SAD 197 and SAD 224 Drainage Reports.

Street Hydraulic Analysis

A hydraulic analysis of the street flows was completed to determine normal depth and sequent depth of the flow (see Appendix B). The sequent depth must remain within the street right-of-way. Therefore, the sequent depth must be equal to or less than 0.87 feet. A HEC-RAS model was developed for Picture Rock Drive. HEC-RAS automatically calculates the energy grade depth, which is always greater than the sequent depth. Therefore, if the energy grade depth is equal to or less than 0.87 feet for a street section with a standard curb and gutter and 0.53 feet for a street section with mountable curb and gutter, then the sequent depth is also less than 0.87 feet and 0.53 feet respectively. On Picture Rock Drive at the property line between lots 7 and 8 (Basin 110), the energy grade depth is 0.39 feet which is less than the maximum of 0.53 for mountable curb and gutter. Also, on Picture Rock Drive from the property line between lots 7 and 8 to the property line between lots 18 and 19 (Basins 110 & 120), the energy grade depth is 0.54 feet which is just slightly greater than the maximum of 0.53 for mountable curb and gutter. The normal depth in this section is 0.45 feet with a Froude Number of 0.87, which is subcritical. Since it is flowing at subcritical, it is unlikely that the depth of flow will reach the energy grade depth. Therefore, west of the property line between lots 18 and 19 to the

subdivision boundary, the curb and gutter section will be mountable. From Montano Road to the property line between lots 18 and 19 will be standard in order to install storm inlets. An analysis for 10-year peak flow was completed to help determine the required storm inlets. Table 2 shows the results of the analysis including the energy grade depth.

Table 2 Street Hydraulic Analysis

Street	Width (ft)	Slope (%)	Contributing Basins	Flow (cfs)	Normal Depth (ft)	Energy Grade Depth (ft)
Picture Rock	28	1.78	110	5.41	0.28	0.39
Picture Rock	28	0.50	110 & 120	16.10	0.45	0.54
Picture Rock	28	0.50	110 &120	9.70 (10-yr)	0.39	0.45

Drainage Description

Following the SAD 197 Storm Drainage Report, peak flows from drainage basins 210 and 220 will be discharged to the Montano storm drainage system via an underground storm sewer in Picture Rock Drive. Peak flows from Basin 100 will flow into Kachina Street to be collected downstream by a storm sewer system which drains into the Montano Storm Sewer. All of the flows from Basins 110 & 120 will be collected in a storm sewer to be drained to an existing 24" RCP stub at the intersection of Montano Road and Picture Rock Drive. A 24" Storm sewer will be extended in Picture Rock Drive to the 24" RCP stub. One-half of the 10-year street flows (4.85 cfs) will be collected by a series of inlets with a single grate Type A inlet upstream and a double grate Type A inlet downstream. At a 10-year street depth of 0.39 feet the inlets can collect as much as 5.75 cfs (Appendix B). The extra capacity will allow for some clogging in the inlet. The 6.4 cfs difference between the 100-year flows and the 10-year flows will either be collected in the storm sewer or drain into Montano Road. According to the SAD 197 Storm Drainage Report, Basin 5 has a 100-year peak flow of 19 cfs. As mentioned above 0.94 cfs is allocated to the Executive Apartments, and 2.3 cfs is collected by the storm sewer inlet in Montano Road. Therefore, the remaining peak flow from Basin 5 for the subdivision is 15.76 cfs which is slightly less than the 16.1 cfs runoff from the subdivision. The remaining 0.34 cfs will flow in Montano Road to be collected downstream into the storm sewer. The 100 year street capacity in this location of Montano Road is 48 cfs according to the SAD 197 Report.

The record drawings for the Montano Road storm sewer indicates that at a manhole at station 18+90 there is an 18" RCP from a storm inlet and a 24" RCP from Tract C1. The hydraulic grade line through the manhole shows that the allowable 10-year discharge into the manhole from Tract C1 and the storm inlet is 12 cfs which was the flow from Basin 5 in the SAD 197 Drainage Report. As mentioned previously, 0.6 cfs was allocated to the Executive Apartments. Table 1 shows that the 10-year flow into the Montano Road storm inlet is 1.5 cfs. Subtracting 0.6 cfs and 1.5 cfs from 12 cfs allowed leaves 9.9 cfs available for the Trails at Taylor Ranch Subdivision. Basins 110 and 120 from the site

drains to the Montano Road storm sewer. Therefore, the 10-year flow that drains to the Montano Road storm sewer from the site is 9.7 cfs which is less than the 9.9 cfs allowed.

Storm Sewer Hydraulics Analysis

Once the hydrologic analysis was completed, a hydraulics analysis was performed to size the proposed storm sewer pipes. A hydraulic grade line analysis for a 10-year storm event was performed following the City of Albuquerque DPM. The beginning hydraulic grade was obtained from the Montano Road record drawings. The hydraulic grade analysis indicates that a 24" RCP extension will collect the 10-year storm flows. The hydraulics analysis is shown in Appendix B.

Grading Plan

Plate 1 shows the Mass Grading Plan for the subdivision. The majority of Picture Rock Drive drains to Montano Road. The slope of Picture Rock Drive from lot 2 to lot 8 is 1.78%. At lot 8 the slope changes to 0.5% and continues to Montano Road.

Drainage Details

Drainage details for the project are shown on Plate 1. Details include street sections, typical retaining wall detail, typical lot grading detail and erosion control detail.

HYDROLOGIC CALCULATIONS
SECTION 22.2 OF THE DPM
5-Sep-01

THE TRAILS AT TAYLOR RANCH
ZONE 1

	TYPE A	TYPE B	TYPE C	TYPE D
100-YR PEAK DISCHARGE	1.29	2.03	2.87	4.37
100-YR EXCESS RUNOFF	0.44	0.67	0.99	1.97
10-YR PEAK DISCHARGE	0.24	0.76	1.49	2.89
10-YR EXCESS RUNOFF	0.08	0.22	0.44	1.24

BASIN	AREA	LAND TREATMENT				PEAK FLOW	RUNOFF 6-HR	RUNOFF 24-HR	RUNOFF 6-HR	CFS/AC
		TYPE A	TYPE B	TYPE C	TYPE D					
	acres					CFS	ac-ft	ac-ft	CF	CFS
100-YR										
110	1.52		0.32	0.32	0.88	5.41	0.189	0.218	8221	3.56
120	2.98		0.61	0.60	1.77	10.70	0.374	0.433	16297	3.59
MONTANO	0.57			0.12	0.45	2.31	0.084	0.099	3649	4.05
TOTAL SITE	4.50					16.11	0.56	0.65	24518	3.58
EXISTING	4.50	3.69	0.81			6.40	0.18	0.18	7864	1.42
10-YR										
110	1.52		0.32	0.32	0.88	3.26	0.109	0.138	4728	2.15
120	2.98		0.61	0.60	1.77	6.47	0.216	0.275	9413	2.17
MONTANO	0.57			0.12	0.45	1.48	0.051	0.066	2217	2.60
TOTAL SITE	4.50					9.74	0.32	0.41	14140	2.16
ANALYSIS POINT										
110,120	4.50									
100-YR						16.11				

Trails at Taylor Ranch

Drainage Analysis

Area = 4.5 acres Zone I

100yr-6 hour Storm = 2.20 inches

EXISTING CONDITIONS

Subdivision Drains to Montana Road

Use 82% A + 18% B for existing Condition

Peak Flow

3.69 (1.29) + 0.81 (2.03) = 6.4 CFS

Developed Conditions

290x229

BASIN #10+20 4.24 acres

Determine Impervious area

Road 28' F-F w/2-4' wide Sidewalks

Length of Road = 807 FT

(28+8) x 807 = 29,052 SF

Lot Pads = 30 x 55.5 = 1665 SF

Driveway 20x20 = 400

TOTAL PER LOT 2065 SF

2065 X 39 (# of Lots) = 80,535 SF

TOTAL IMPERVIOUS = 29,052 + 80,535 = 109,587 SF

2.52 ac

Assume Pervious area is split between Type B + Type C Treatment

CALCULATE 100YR PEAK FLOW

$0.96(2.03) + 0.86(2.87) + 2.52(4.37) = 15.2$ CFS

CALCULATE 10 YR PEAK FLOW

$0.86(0.76) + 0.86(1.49) + 2.52(2.89) = 9.2$ CFS

Basin 100 0.26 ACRES (ADD TO BASIN 110)

IMPERVIOUS AREA

ROAD $(28+8) \times 52 = 1872$

LOTS $2065 \times 2 = 4130$

6002 SF $= 0.14$ ac

Calculate 100yr Peak Flow

$0.06(2.03) + 0.06(2.87) + 0.14(4.37) = 0.9$ CFS

Calculate 10yr Peak Flow

$0.06(0.76) + 0.06(1.49) + 0.14(2.89) = 0.5$ CFS

Montano Road Basin to Storm Inlet at Sta 18+90

Area = ½ROW (18+90 − 14+25)
(Down stream Storm Inlet; Next Upstream Storm inlet)

Area = 29,695 SF = 0.57 acres

Impervious area = $465 \times (30+6) + (16+50 - 14+95) \times 12 + (14+95 - 14+25 \times 13) = 19,510$ SF $= 0.45$ Ac

$Q_{100} = 0.12(2.87) + 0.45(4.37) = 2.31$ CFS

$Q_{10} = 0.12(1.49) + 0.45(2.89) = 1.48$ CFS

PLOT .20. DR

10 YEAR PEAK FLOW S=0.5%

HEC-RAS Plan: Plan 01 River: Typical Street Reach: ~~40'~~ 20' F-F

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
40' F-F	5	9.74	100.00	100.39		100.45	0.004677	1.94	5.02	28.02	0.81
40' F-F	4.5	9.74	99.75	100.14		100.20	0.005483	2.04	4.79	28.02	0.87
40' F-F	4	9.74	99.50	99.90		99.95	0.004411	1.91	5.11	28.02	0.79
40' F-F	3.5	9.74	99.25	99.64		99.70	0.005170	2.00	4.87	28.02	0.85
40' F-F	3	9.74	99.00	99.39		99.45	0.004762	1.95	4.99	28.02	0.81
40' F-F	2.5	9.74	98.75	99.14		99.20	0.005334	2.02	4.83	28.02	0.86
40' F-F	2	9.74	98.50	98.90		98.95	0.004567	1.93	5.06	28.02	0.80
40' F-F	1.5	9.74	98.25	98.63		98.70	0.005720	2.06	4.72	28.01	0.88
40' F-F	1	9.74	98.00	98.40	98.37	98.45	0.004189	1.88	5.19	28.02	0.77

20'

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 5 Profile: PF#1

W.S. Elev (ft)	100.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.45	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		5.02	
E.G. Slope (ft/ft)	0.004677	Area (sq ft)		5.02	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	142.4	Conv. (cfs)		142.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.71	
Min Ch El (ft)	100.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.05	
C & E Loss (ft)	0.00	Cum SA (acres)		0.26	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4.5 Profile: PF#1

W.S. Elev (ft)	100.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.20	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		4.79	
E.G. Slope (ft/ft)	0.005483	Area (sq ft)		4.79	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)		2.04	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	131.5	Conv. (cfs)		131.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.69	
Min Ch El (ft)	99.75	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		0.04	
C & E Loss (ft)	0.00	Cum SA (acres)		0.23	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4 Profile: PF#1

W.S. Elev (ft)	99.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.95	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		5.11	
E.G. Slope (ft/ft)	0.004411	Area (sq ft)		5.11	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)		1.91	
Max Chl Dpth (ft)	0.40	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	146.7	Conv. (cfs)		146.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.72	
Min Ch El (ft)	99.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		0.03	
C & E Loss (ft)	0.00	Cum SA (acres)		0.19	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3.5 Profile: PF#1

W.S. Elev (ft)	99.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.70	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		4.87	
E.G. Slope (ft/ft)	0.005170	Area (sq ft)		4.87	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	2.00	Avg. Vel. (ft/s)		2.00	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	135.5	Conv. (cfs)		135.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.70	
Min Ch El (ft)	99.25	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.03	
C & E Loss (ft)	0.00	Cum SA (acres)		0.16	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3 Profile: PF#1

W.S. Elev (ft)	99.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.45	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		4.99	
E.G. Slope (ft/ft)	0.004762	Area (sq ft)		4.99	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	141.1	Conv. (cfs)		141.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.71	
Min Ch El (ft)	99.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.02	
C & E Loss (ft)	0.00	Cum SA (acres)		0.13	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2.5 Profile: PF#1

W.S. Elev (ft)	99.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.20	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		4.83	
E.G. Slope (ft/ft)	0.005334	Area (sq ft)		4.83	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	133.4	Conv. (cfs)		133.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.69	
Min Ch El (ft)	98.75	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.02	
C & E Loss (ft)	0.00	Cum SA (acres)		0.10	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2 Profile: PF#1

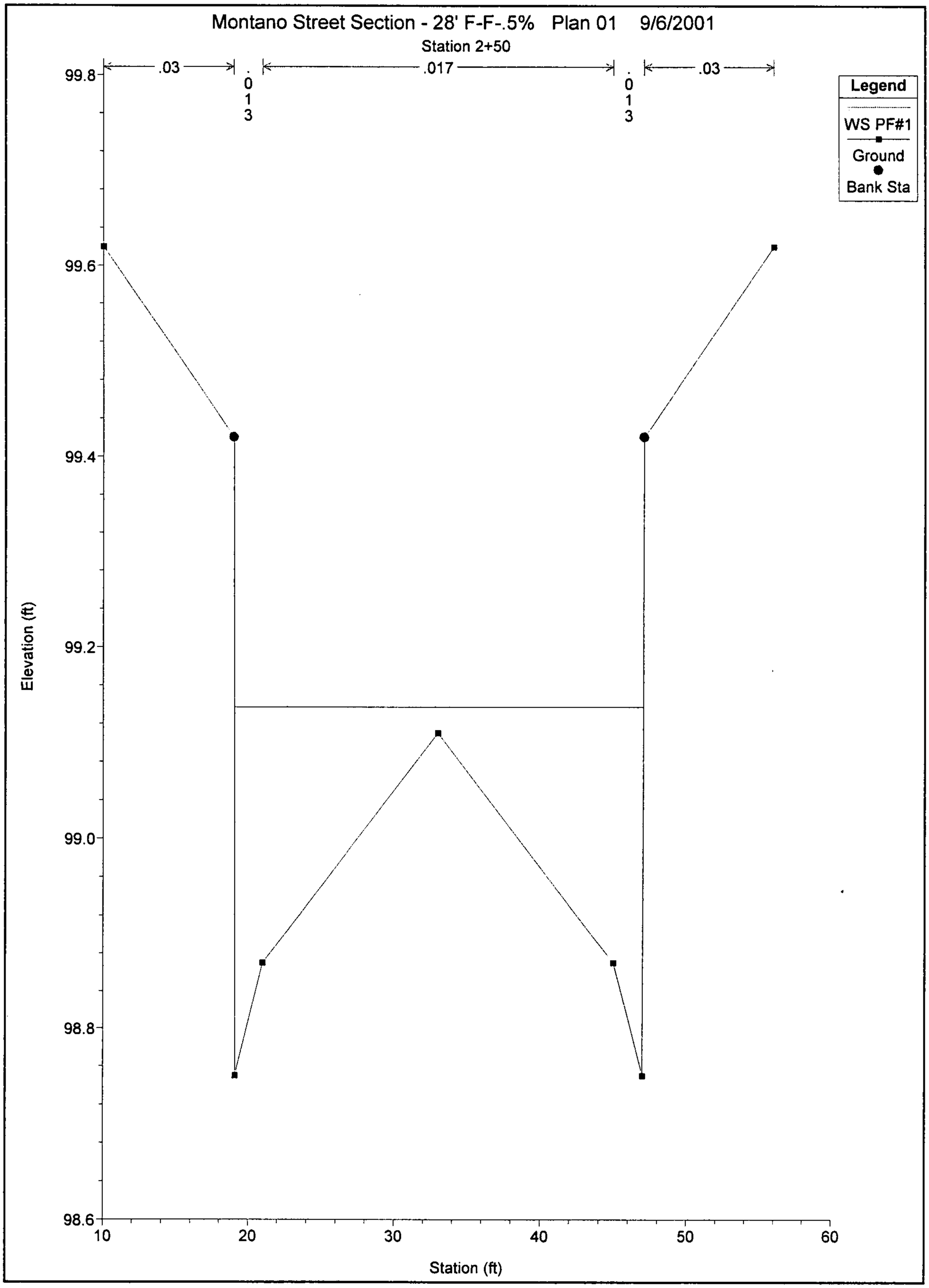
W.S. Elev (ft)	98.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.95	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		5.06	
E.G. Slope (ft/ft)	0.004567	Area (sq ft)		5.06	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)		1.93	
Max Chl Dpth (ft)	0.40	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	144.1	Conv. (cfs)		144.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.71	
Min Ch El (ft)	98.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.00	Cum SA (acres)		0.06	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1.5 Profile: PF#1

W.S. Elev (ft)	98.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.70	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		4.72	
E.G. Slope (ft/ft)	0.005720	Area (sq ft)		4.72	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.01	Top Width (ft)		28.01	
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)		2.06	
Max Chl Dpth (ft)	0.38	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	128.8	Conv. (cfs)		128.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.69	
Min Ch El (ft)	98.25	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.12	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.00	Cum SA (acres)		0.03	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1 Profile: PF#1

W.S. Elev (ft)	98.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.45	Reach Len. (ft)			
Crit W.S. (ft)	98.37	Flow Area (sq ft)		5.19	
E.G. Slope (ft/ft)	0.004189	Area (sq ft)		5.19	
Q Total (cfs)	9.74	Flow (cfs)		9.74	
Top Width (ft)	28.02	Top Width (ft)		28.02	
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)		1.88	
Max Chl Dpth (ft)	0.40	Hydr. Depth (ft)		0.19	
Conv. Total (cfs)	150.5	Conv. (cfs)		150.5	
Length Wtd. (ft)		Wetted Per. (ft)		28.72	
Min Ch El (ft)	98.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			


Montano Street Section - 28' F-F-.5% Plan 01 9/6/2001
Station 2+50
.03
.013
.017
.013
.03
Legend
WS PF#1
Ground
Bank Sta
99.8
99.6
99.4
99.2
99.0
98.8
98.6
Elevation (ft)
10
20
30
40
50
60
Station (ft)

PICTURE ROCK DRIVE

100 YEAR PEAK FLOW S=0.5%

HEC-RAS Plan: Plan 01 River: Typical Street Reach: ~~40~~ 20' F-F

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
40' F-F	5	16.10	100.00	100.46		100.55	0.004536	2.35	6.86	28.04	0.84
40' F-F	4.5	16.10	99.75	100.20		100.29	0.005196	2.45	6.58	28.03	0.89
40' F-F	4	16.10	99.50	99.95		100.04	0.004923	2.41	6.69	28.04	0.87
40' F-F	3.5	16.10	99.25	99.71		99.79	0.004787	2.39	6.75	28.04	0.86
40' F-F	3	16.10	99.00	99.45		99.54	0.005088	2.43	6.63	28.03	0.88
40' F-F	2.5	16.10	98.75	99.20		99.29	0.004965	2.41	6.67	28.04	0.87
40' F-F	2	16.10	98.50	98.95		99.04	0.005427	2.48	6.50	28.03	0.91
40' F-F	1.5	16.10	98.25	98.71		98.80	0.004369	2.32	6.94	28.04	0.82
40' F-F	1	16.10	98.00	98.44	98.43	98.54	0.005979	2.55	6.31	28.03	0.95

20'

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 5 Profile: PF#1

W.S. Elev (ft)	100.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.55	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.86	
E.G. Slope (ft/ft)	0.004536	Area (sq ft)		6.86	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.04	Top Width (ft)		28.04	
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)		2.35	
Max Chl Dpth (ft)	0.46	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	239.0	Conv. (cfs)		239.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.84	
Min Ch El (ft)	100.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		0.06	
C & E Loss (ft)	0.00	Cum SA (acres)		0.26	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4.5 Profile: PF#1

W.S. Elev (ft)	100.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.29	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.58	
E.G. Slope (ft/ft)	0.005196	Area (sq ft)		6.58	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.03	Top Width (ft)		28.03	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)		2.45	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	223.3	Conv. (cfs)		223.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.82	
Min Ch El (ft)	99.75	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.05	
C & E Loss (ft)	0.00	Cum SA (acres)		0.23	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4 Profile: PF#1

W.S. Elev (ft)	99.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.04	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.69	
E.G. Slope (ft/ft)	0.004923	Area (sq ft)		6.69	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.04	Top Width (ft)		28.04	
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		2.41	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	229.5	Conv. (cfs)		229.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.83	
Min Ch El (ft)	99.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.05	
C & E Loss (ft)	0.00	Cum SA (acres)		0.19	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3.5 Profile: PF#1

W.S. Elev (ft)	99.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.79	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.75	
E.G. Slope (ft/ft)	0.004787	Area (sq ft)		6.75	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.04	Top Width (ft)		28.04	
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)		2.39	
Max Chl Dpth (ft)	0.46	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	232.7	Conv. (cfs)		232.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.83	
Min Ch El (ft)	99.25	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.04	
C & E Loss (ft)	0.00	Cum SA (acres)		0.16	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3 Profile: PF#1

W.S. Elev (ft)	99.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.54	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.63	
E.G. Slope (ft/ft)	0.005088	Area (sq ft)		6.63	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.03	Top Width (ft)		28.03	
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)		2.43	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	225.7	Conv. (cfs)		225.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.82	
Min Ch El (ft)	99.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.18	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.03	
C & E Loss (ft)	0.00	Cum SA (acres)		0.13	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2.5 Profile: PF#1

W.S. Elev (ft)	99.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.29	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.67	
E.G. Slope (ft/ft)	0.004965	Area (sq ft)		6.67	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.04	Top Width (ft)		28.04	
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		2.41	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	228.5	Conv. (cfs)		228.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.83	
Min Ch El (ft)	98.75	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		0.02	
C & E Loss (ft)	0.00	Cum SA (acres)		0.10	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2 Profile: PF#1

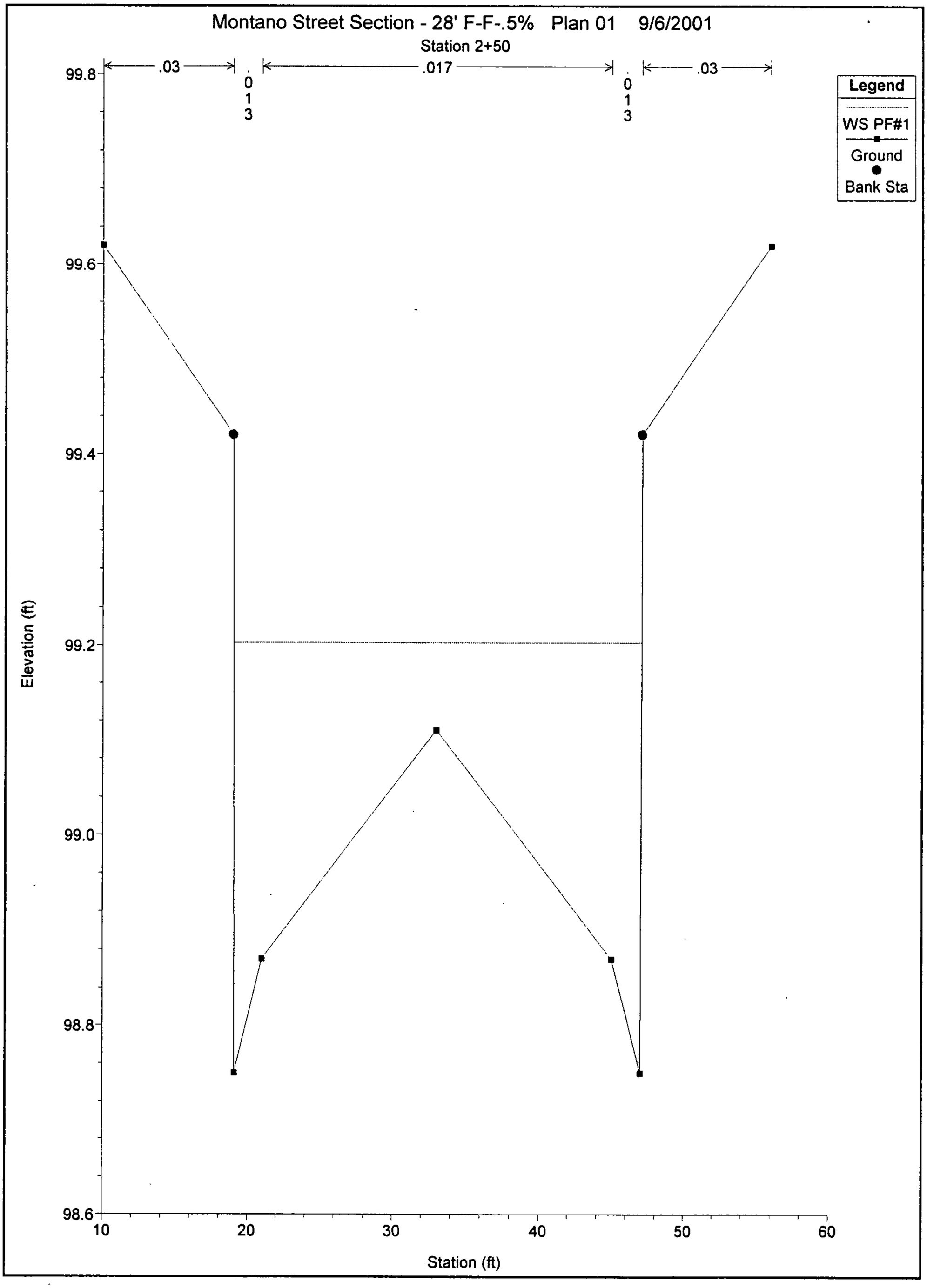
W.S. Elev (ft)	98.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.04	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.50	
E.G. Slope (ft/ft)	0.005427	Area (sq ft)		6.50	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.03	Top Width (ft)		28.03	
Vel Total (ft/s)	2.48	Avg. Vel. (ft/s)		2.48	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	218.5	Conv. (cfs)		218.5	
Length Wtd..(ft)	50.00	Wetted Per. (ft)		28.82	
Min Ch El (ft)	98.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.19	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		0.02	
C & E Loss (ft)	0.00	Cum SA (acres)		0.06	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1.5 Profile: PF#1

W.S. Elev (ft)	98.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.80	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		6.94	
E.G. Slope (ft/ft)	0.004369	Area (sq ft)		6.94	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.04	Top Width (ft)		28.04	
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)		2.32	
Max Chl Dpth (ft)	0.46	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	243.6	Conv. (cfs)		243.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		28.85	
Min Ch El (ft)	98.25	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.00	Cum SA (acres)		0.03	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1 Profile: PF#1

W.S. Elev (ft)	98.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.54	Reach Len. (ft)			
Crit W.S. (ft)	98.43	Flow Area (sq ft)		6.31	
E.G. Slope (ft/ft)	0.005979	Area (sq ft)		6.31	
Q Total (cfs)	16.10	Flow (cfs)		16.10	
Top Width (ft)	28.03	Top Width (ft)		28.03	
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)		2.55	
Max Chl Dpth (ft)	0.44	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	208.2	Conv. (cfs)		208.2	
Length Wtd. (ft)		Wetted Per. (ft)		28.80	
Min Ch El (ft)	98.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			


Montano Street Section - 28' F-F-.5% Plan 01 9/6/2001
Station 2+50
.03
.013
.017
.013
.03
Legend
WS PF#1
Ground
Bank Sta
99.8
99.6
99.4
99.2
99.0
98.8
98.6
Elevation (ft)
10
20
30
40
50
60
Station (ft)

Plum Rd. Drive

100 YEAR PEAK FLOW S=1.78%

HEC-RAS Plan: Plan 01 River: Typical Street Reach: ~~40~~ 28' F-F

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
40' F-F	5	5.40	100.00	100.28	100.31	100.38	0.015089	2.51	2.15	19.98	1.35
40' F-F	4.5	5.40	99.11	99.38	99.42	99.50	0.020127	2.81	1.92	18.80	1.55
40' F-F	4	5.40	98.22	98.50	98.53	98.60	0.016413	2.60	2.08	19.63	1.41
40' F-F	3.5	5.40	97.33	97.61	97.64	97.71	0.014986	2.51	2.16	20.01	1.35
40' F-F	3	5.40	96.44	96.71	96.75	96.83	0.020193	2.81	1.92	18.79	1.55
40' F-F	2.5	5.40	95.55	95.83	95.86	95.93	0.016431	2.60	2.08	19.63	1.41
40' F-F	2	5.40	94.66	94.94	94.97	95.04	0.015007	2.51	2.15	20.01	1.35
40' F-F	1.5	5.40	93.77	94.04	94.08	94.16	0.020181	2.81	1.92	18.79	1.55
40' F-F	1	5.40	92.88	93.16	93.19	93.26	0.016403	2.60	2.08	19.63	1.40

20'

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 5 Profile: PF#1

W.S. Elev (ft)	100.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	100.38	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	100.31	Flow Area (sq ft)		2.15	
E.G. Slope (ft/ft)	0.015089	Area (sq ft)		2.15	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	19.98	Top Width (ft)		19.98	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	44.0	Conv. (cfs)		44.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		20.48	
Min Ch El (ft)	100.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)		Cum Volume (acre-ft)		0.02	
C & E Loss (ft)		Cum SA (acres)		0.18	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4.5 Profile: PF#1

W.S. Elev (ft)	99.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
E.G. Elev (ft)	99.50	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	99.42	Flow Area (sq ft)		1.92	
E.G. Slope (ft/ft)	0.020127	Area (sq ft)		1.92	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	18.80	Top Width (ft)		18.80	
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.81	
Max Chl Dpth (ft)	0.27	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	38.1	Conv. (cfs)		38.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		19.27	
Min Ch El (ft)	99.11	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		0.02	
C & E Loss (ft)	0.00	Cum SA (acres)		0.16	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 4 Profile: PF#1

W.S. Elev (ft)	98.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	98.60	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	98.53	Flow Area (sq ft)		2.08	
E.G. Slope (ft/ft)	0.016413	Area (sq ft)		2.08	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	19.63	Top Width (ft)		19.63	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	42.1	Conv. (cfs)		42.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		20.12	
Min Ch El (ft)	98.22	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.01	Cum SA (acres)		0.13	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3.5 Profile: PF#1

W.S. Elev (ft)	97.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	97.71	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	97.64	Flow Area (sq ft)		2.16	
E.G. Slope (ft/ft)	0.014986	Area (sq ft)		2.16	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	20.01	Top Width (ft)		20.01	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	44.1	Conv. (cfs)		44.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		20.51	
Min Ch El (ft)	97.33	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.00	Cum SA (acres)		0.11	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 3 Profile: PF#1

W.S. Elev (ft)	96.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
E.G. Elev (ft)	96.83	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	96.75	Flow Area (sq ft)		1.92	
E.G. Slope (ft/ft)	0.020193	Area (sq ft)		1.92	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	18.79	Top Width (ft)		18.79	
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.81	
Max Chl Dpth (ft)	0.27	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	38.0	Conv. (cfs)		38.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		19.26	
Min Ch El (ft)	96.44	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.00	Cum SA (acres)		0.09	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2.5 Profile: PF#1

W.S. Elev (ft)	95.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	95.93	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	95.86	Flow Area (sq ft)		2.08	
E.G. Slope (ft/ft)	0.016431	Area (sq ft)		2.08	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	19.63	Top Width (ft)		19.63	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	42.1	Conv. (cfs)		42.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		20.12	
Min Ch El (ft)	95.55	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.01	Cum SA (acres)		0.07	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 2 Profile: PF#1

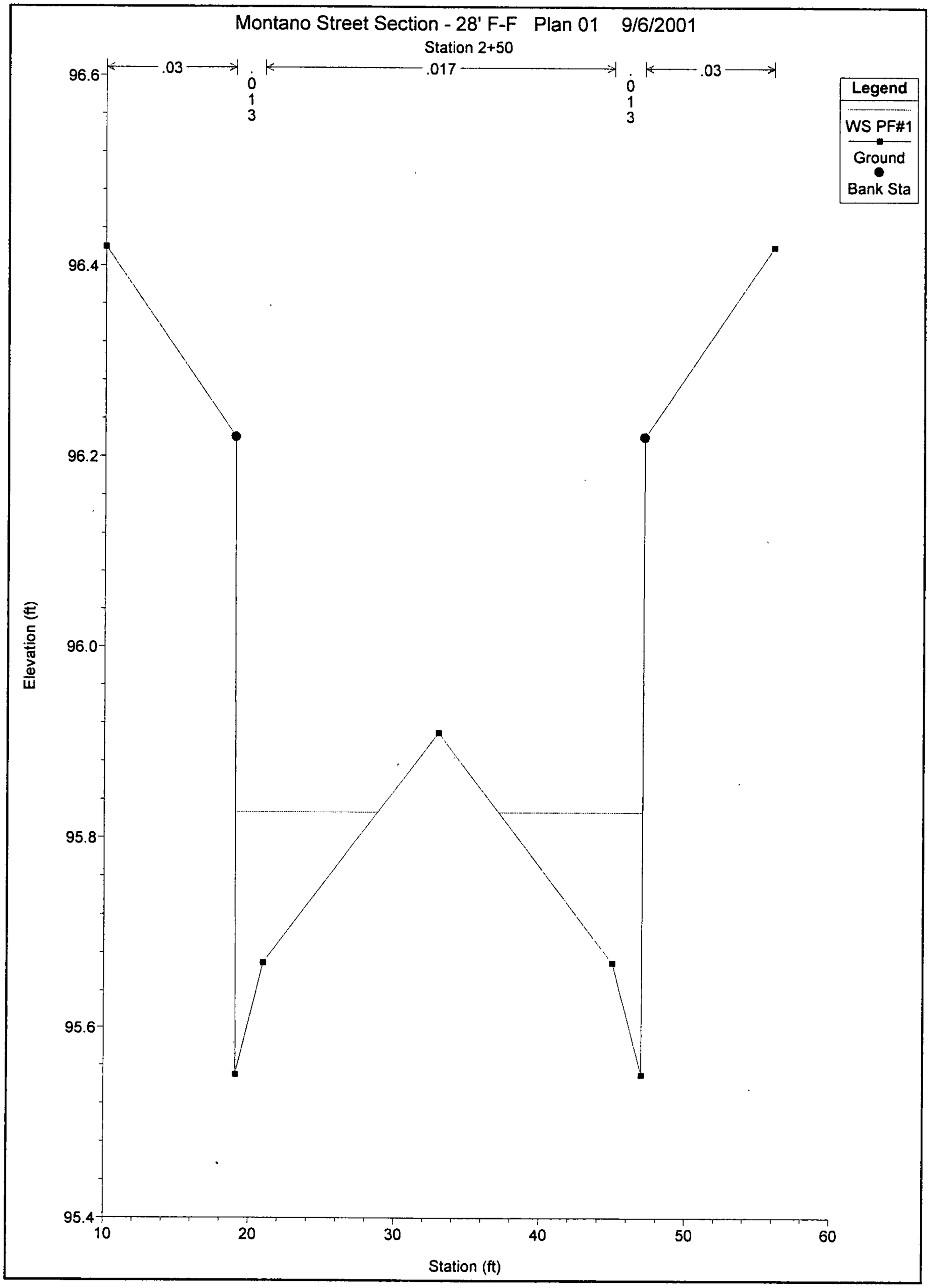
W.S. Elev (ft)	94.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	95.04	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	94.97	Flow Area (sq ft)		2.15	
E.G. Slope (ft/ft)	0.015007	Area (sq ft)		2.15	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	20.01	Top Width (ft)		20.01	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	44.1	Conv. (cfs)		44.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		20.50	
Min Ch El (ft)	94.66	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		0.00	
C & E Loss (ft)	0.00	Cum SA (acres)		0.04	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1.5 Profile: PF#1

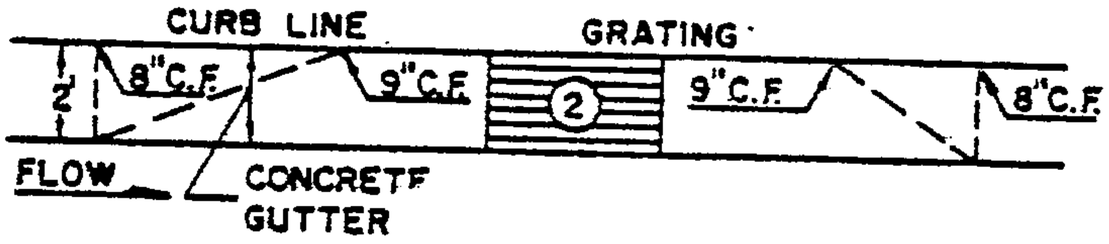
W.S. Elev (ft)	94.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
E.G. Elev (ft)	94.16	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	94.08	Flow Area (sq ft)		1.92	
E.G. Slope (ft/ft)	0.020181	Area (sq ft)		1.92	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	18.79	Top Width (ft)		18.79	
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.81	
Max Chl Dpth (ft)	0.27	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	38.0	Conv. (cfs)		38.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		19.26	
Min Ch El (ft)	93.77	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.35	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		0.00	
C & E Loss (ft)	0.00	Cum SA (acres)		0.02	

Plan: Plan 01 River: Typical Street Reach:40' F-F Riv Sta: 1 Profile: PF#1

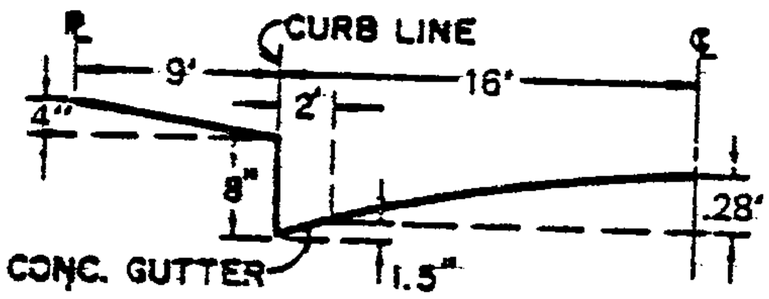
W.S. Elev (ft)	93.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
E.G. Elev (ft)	93.26	Reach Len. (ft)			
Crit W.S. (ft)	93.19	Flow Area (sq ft)		2.08	
E.G. Slope (ft/ft)	0.016403	Area (sq ft)		2.08	
Q Total (cfs)	5.40	Flow (cfs)		5.40	
Top Width (ft)	19.63	Top Width (ft)		19.63	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	42.2	Conv. (cfs)		42.2	
Length Wtd. (ft)		Wetted Per. (ft)		20.12	
Min Ch El (ft)	92.88	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.27	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)			
C & E Loss (ft)	0.01	Cum SA (acres)			


Montano Street Section - 28' F-F Plan 01 9/6/2001
Station 2+50
.03
.013
.017
.013
.03
Legend
WS PF#1
Ground
Bank Sta
Elevation (ft)
96.6
96.4
96.2
96.0
95.8
95.6
95.4
10
20
30
40
50
60
Station (ft)

GRATING CAPACITIES FOR TYPE "A" , "C" and "D"



GRATING & GUTTER PLAN

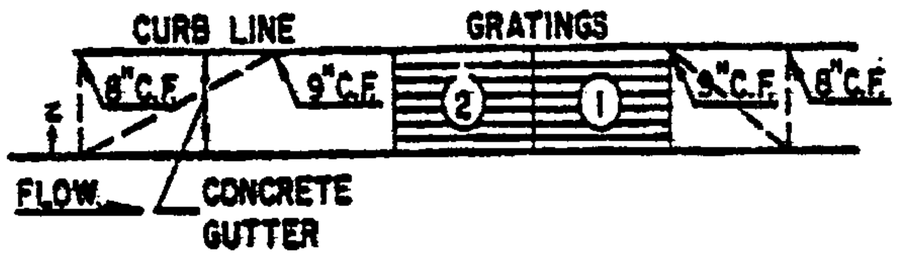


TYPICAL HALF STREET SECTION
(ABOVE BASIN)

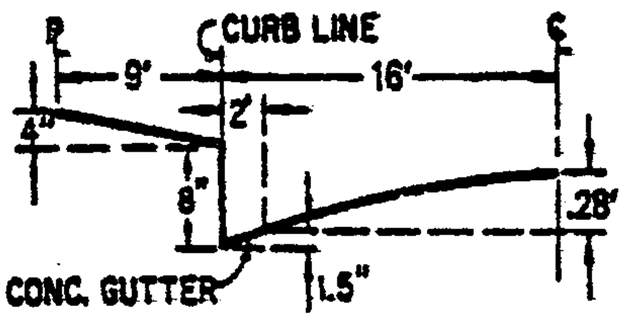
100 YEAR
Depth = 0.45'
S = 0.005

10 YEAR
DEPTH = 0.39'
S = 0.005

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

100 YR
Q=5.0CFS

10 YR
Q=3.0CFS

100 YEAR,
Depth=0.45
S=0.005
10 YEAR
DEPTH=0.39'
S=0.005

0.39' 0.94'

PLATE 22.3 D-6

SUMMARY OF HYDRAULIC CALCULATIONS

CLOSED CONDUIT

BY: DBT

DATE: 9/5/2001

SHEET: 1 of 1

PROJECT: TRAAILS AT TAYLOR RANCH TAYLOR RANCH TRAIL

10 year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
										JUNCTION		LOSSES										
STATION	STRUCT	D	Q	A	V	K	Sf	L	DELTA	D	ANGLE	hf	hb	hj	hmh	ht	hmisc	SUM	E.G.	hv	H.G.	GROUND ELEV.
																					5136.94	
18+90	Montano Road												0.00				0.00	0.00	5137.09	0.15	5136.94	5138.97
		24	9.7	3.14	3.09	226.29	0.0018	60				0.11						0.11	5137.20	0.15	5137.05	
	MH 1								45				0.02	0.00	0.01	0.00		0.03	5137.23	0.15	5137.08	5138.30
		24	9.7	3.14	3.09	226.29	0.0018	35				0.06						0.06	5137.29	0.15	5137.14	
	INLET												0.00	0.00	0.00	0.00		0.00	5137.29	0.00	5137.29	5138.30
		24	0	3.14	0.00	226.29	0.0000	0				0.00						0.00	5137.29	0.00	5137.29	
REMARKS:										Manning's n: 0.013												