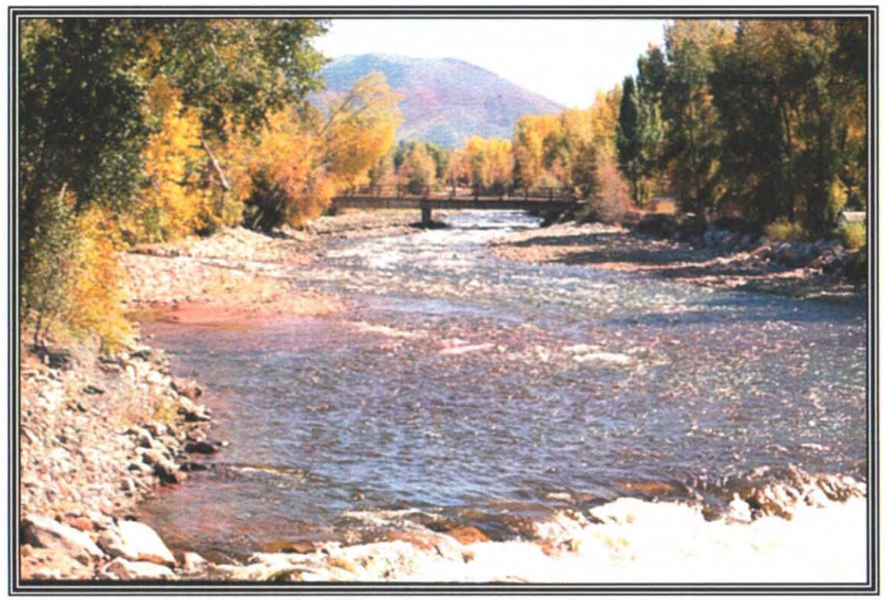
FLOODPLAIN INFORMATION REPORT

ROARING FORK RIVER

TOWN OF BASALT,
EAGLE AND PITKIN COUNTIES, COLORADO



PREPARED FOR:
TOWN OF BASALT,
EAGLE AND PITKIN COUNTIES, COLORADO

PREPARED BY:
Matrix Design Group, Inc.
1601 Blake St., Suite 508
Denver, Colorado 80202
(303) 572-0200

NOVEMBER 14, 2001

This Floodplain Information Report, Roaring Fork River, Town of Basalt, Eagle & Pitkin Counties, Colorado was prepared under the supervision and direction of the undersigned Professional Engineer:

COLORADO REGISTERED
ROBERT D. KREHBIEL
29113
PROFESSIONAL ENGINEER

11/14/01

Matrix Design Group, Inc.
Integrated Design Solutions

101 MIDLAND AVENUE • BASALT, CO 81621
(970) 927-4701 • FAX (970) 927-4703

TOWN OF BASALT

September 18, 2001

Ms Sally Magee
Water Resources Engineer
Federal Emergency Management Agency
Federal Center Plaza
500 C Street, SW
Washington, DC 20472

Dear Ms Magee:

Under Town Ordinance No. 25, Series of 2000, (copy enclosed), the Town of Basalt has given itself the legal authority to impose a requirement for no net increase in flood elevations (zero-rise floodway) for Reach II on the Roaring Fork River, on an interim basis. Reach II extends from the Lower Bypass Bridge on Colorado Highway 82 at the downstream limit to the Upper Bypass Bridge on Highway 82 at the upstream limit and includes the central core of Basalt. The Town has further instructed staff to complete the necessary code amendments to impose this regulation on a long-term basis, until such time as the River Master Plan is implemented and a new FIS determines new floodplain and floodway line delineations for Reach II of the Roaring Fork River.

Town staff is currently working with the FEMA Region VIII staff to draft necessary code revisions. Our understanding is that as long as a local jurisdiction has both the legal authority to regulate the floodplain, as stated above, and the intention to enforce the legal requirement, FEMA will publish a zero-rise floodway as part of that jurisdiction's Flood Insurance Study (FIS). The Town of Basalt hereby states its willingness to enforce the legal requirements it has adopted. The Town, therefore, requests that FEMA publish the zero-rise floodway (no net increase in the elevation of the floodplain) to be recognized by all governing bodies involved in the FIS.

The Town anticipates that the remaining two governing bodies within Reach II, Eagle and Pitkin Counties, will submit the same type of statement to you, in a timely fashion, and will pursue the necessary code revisions.

Thank you for your patience and for your willingness to support a local submittal in lieu of a FEMA contractor submittal.

Please contact me or the Project Manager, Betsy Paussa, with any questions, comments or concerns, at 970-927-4701.

Sincerely,

Mayor Richard P. Stevens
Town of Basalt

bp

Tom Baker, Town Administrator
Bob Gish, Public Services Manager, Town of Basalt
Rod Kuharich, CWCB

Pitkin County Public Works

76 Service Center Road
Aspen, Colorado 81611
(970) 920-5390
Fax: (970) 920-5374

Betsy Paussa, Project Manager
Town of Basalt
101 Midland Ave
Basalt, CO 81621

Date: 10/5/01.
Re: Letter of Intent

Betsy,

This is to follow up on our meeting of September 25th 2001 with the Board of County Commissioners of Pitkin County. At that time the Board gave the following direction to the county staff.

- The staff was to prepare an ordinance to amend the county's floodplain regulations to incorporate relevant portions of the recommendations from the River Stewardship Committee and the proposed regulations to be adopted by the Town of Basalt. This would allow for a consistent set of floodplain regulations throughout the lower reach of the Roaring Fork River in Pitkin County and the Town of Basalt.
- The staff was to prepare a request to the Federal Emergency Management Agency (FEMA) to adopt new floodplain mapping, including a zero-rise floodway, from the confluence of Snowmass Creek and the Roaring Fork River to the Eagle/Garfield County line on the Roaring Fork.

B.W. Eylar, County Engineer

RFFloodplain_Letter of intent_Basalt

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PREFACE

This report presents the results of a floodplain study for the Roaring Fork River in Eagle & Pitkin Counties and the Town of Basalt, Colorado. The Report was prepared by Matrix Design Group, Inc. of Denver, Colorado at the request of the Town of Basalt Board of Trustees and Pitkin County in cooperation with the Colorado Water Conservation Board.

Copies of this report are available for public inspection or distribution, for a nominal fee, at the offices listed below.

Town of Basalt
101 Midland Avenue
Basalt, Colorado 81621

Pitkin County Public Works
76 Service Center Road
Aspen, Colorado 81611

Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Matrix Design Group, Inc.
1601 Blake Street, Suite 508
Denver, Colorado 80202

SECTION 1 - INTRODUCTION

1.1 Authorization

This report was authorized by the Colorado Water Conservation Board in joint sponsorship with the Town of Basalt, and Eagle & Pitkin Counties, Colorado.

The Board's power and duty is to devise and formulate methods, means and plans for bringing about the greater utilization of the waters of the state and prevention of flood damages there from and to designate and approve storm or floodway runoff channels or basins, and to make such designations available to legislative bodies of cities and incorporated towns; to county planning commissions; and to boards of adjustment of cities; incorporated towns; and counties of this state as stated in Section 37-60-105 (1) (C) of the Colorado revised Statutes 1973.

The cities, incorporated towns, and counties within the study area may provide zoning regulations to establish, regulate, restrict, and limit such uses on or along any stream or floodwater runoff channel or basin, as such storm or flood water runoff channel or basin, as such storm or floodwater runoff channel or basin has been designated and approved by the Colorado Water Conservation Board, in order to lessen or avoid the hazards to persons or damage to property resulting from the accumulation of storm or flood waters, as stated in Sections 30-28-111 and 31-23-201 of the Colorado Revised Statutes, 1975. Upon official approval of this report by the Colorado Water Conservation Board, the areas described as being inundated by the 100-year flood may be designated as flood hazard areas and their use regulated accordingly by local governmental entities.

1.2 Previous Studies

The Roaring Fork River floodplain was originally studied by Wright-McLaughlin Engineers in August 1976 for Pitkin County, and in February 1978 for Eagle County.

The hydrologic and hydraulic analyses for the Roaring Fork River in Eagle County were performed by Gingery Associates, Inc. for the Federal Insurance Administration, under Contract no. H-4549. This work, which was completed in January 1979 and published in May 1980, covered all significant flooding sources affecting the unincorporated areas of Eagle County.

The hydrologic and hydraulic analyses for the Roaring Fork River in Basalt and unincorporated Pitkin County were performed by Denver Engineering Corporation (DEC), for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-C-1184. The DEC work was completed in April 1985. The Flood Insurance Study for the Town of Basalt was published June 4, 1987.

FEMA realized many changes had occurred in the river since the previous studies and a new study was needed. In 1997 through 1999, J.F. Sato & Associates, Inc. contracted with FEMA to redefine the 100-year floodplain and floodway, beginning at the Garfield/Eagle County line and extending upstream through the Wingo Bridge. A HEC-RAS model was developed and floodplain mapping prepared for submittal to FEMA. The Town of Basalt objected to the delineation, and Mr. John Liou of FEMA Region VIII visited the site to investigate concerns, specifically the split flow that may occur at the Upper Basalt Bypass Bridge on Highway 82. According to Mr. Liou, the levee constructed upstream of the bridge is not a "FEMA compliant levee," and the model was re-run to show a split flow scenario. The model was submitted to FEMA, but never approved.

The Town of Basalt contract with McLaughlin Water Engineers, Ltd. to review and modify the HEC-RAS model in Reach II (Lower to Upper Basalt Bypass Bridges) as part of a river master plan for the town. The Town of Basalt also contract with Matrix Design Group, Inc. to review and modify the HEC-RAS model in Reach III (Willits Lane to the Lower Basalt Bypass Bridge, including the River Oaks Subdivision). Reach I (Wingo Bridge to Upper Basalt Bypass Bridge) had been modeled by the Roaring Fork Club for their river restoration project, and the LOMR was accepted by the CWCB and FEMA in 1998. In 2000, Pitkin County contracted with Matrix Design Group to model the reach from Wingo Bridge upstream to the confluence with Snowmass Creek. The Town of Basalt then contracted with Matrix Design Group, Inc. in 2000 to coordinate and finalize the four floodplain studies into one complete **Floodplain Information Report** for Reaches I, II and III, and to model the 10, 50 and 500 year floodplains, dated July 24, 2000.

This **Floodplain Information Report** was republished November 14, 2001 to include detailed floodplain mapping with base flood elevations in the area south of the Town of Basalt, know as "South Side" where floodwaters split at the Upper Basalt Bypass Bridge and flow overland. This report also includes new topographic mapping obtained for the Town of Basalt area in January 2001 from Aero-Metric, Inc. This new report also includes a *Floodway delineation* that was not present in the earlier edition.

1.3 Purpose and Scope

The Roaring Fork River floodplain was restudied in 2000 to 2001 by Matrix Design Group, Inc. and McLaughlin Water Engineers, Ltd. of Denver, Colorado for the Town of Basalt. A new analysis was required due to the following reasons:

1. Channel instability caused by floods in 1983, 1984, 1985 and 1995 which have significantly altered the Roaring Fork River channel alignment and grade in and around the Town of Basalt. The Roaring Fork and Fryingpan Rivers Multi-Objective Planning Study completed by BRW, Inc. in June 1999 for the Colorado Water Conservation Board demonstrated that the low flow channel has even migrated outside of the previously defined FEMA 100-year floodplain in some areas of the Roaring Fork River.

2. Encroachment of the Roaring Fork River channel by the Colorado Department of Transportation for the construction of the Highway 82 Bypass bifurcated the floodplain, forcing flood flows to split at the Upper Basalt Bypass Bridge. Flood flows will be either be fully routed through the bridge, or breach the non-FEMA compliant levee and enter the region of the Town of Basalt known as "South Side."

3. Encroachment of the Roaring Fork River channel by development since the base mapping was completed for previous studies.

4. Reconstruction of the Wingo Bridge and Waterman Bridge, and construction of the Upper Basalt Bypass Bridge, Midland Avenue Bridge and Lower Basalt Bypass Bridge since the original studies.

This report was prepared to provide information relative to the occurrence of floods and to guide local officials in planning the use and regulation of the floodplain areas so that flood hazards and future flood damages are minimized. It includes information on historical floods, existing factors, which influence the flood hazards, and the nature and extent of probable future floods.

The report data includes flooded area maps delineating the 100 and 500-year flood boundaries, flood profiles and floodwater surface elevations for the 10, 50, 100 and 500-year floods at selected reference points. The floodway analysis is based upon a "Zero-Rise" concept or "No Adverse Impact" to conveyance, whereby only the areas of ineffective flow and shallow flooding are excluded from the 100-year floodplain to determine the floodway.

1.4 Coordination

The results of the year 2000 **Floodplain Information Report** for Basalt were reviewed by the Colorado Water Conservation Board and adopted at their Board Meeting in Gunnison, Colorado July 24 & 25, 2000.

A final Town of Basalt Board of Trustees community meeting was held on July 25, 2000 to adopt the 2000 Floodplain Information Report. The meeting was attended by representatives of the CWCB, Matrix Design Group, McLaughlin Water Engineers, the Town of Basalt, and Pitkin County. No significant problems were raised at the meeting.

Meetings were held on September 25, 2001 with both the Board of County Commissioners of Pitkin County and the Town of Basalt Board of Trustees to present the revised Floodplain Information Report for acceptance of the more stringent "Zero Rise" floodway delineation for the portions of this Roaring Fork River study within their respective jurisdictions. A similar workshop meeting was held with the Eagle County Board of County Commissioners on November 13, 2001 to review the "Zero Rise" floodway delineation.

SECTION 2 - STUDY AREA DESCRIPTION

2.1 Drainage Basin Characteristics

The Roaring Fork River is a major tributary to the Colorado River. The headwaters of the Roaring Fork River start above the City of Aspen and continue approximately 60 miles downstream to the confluence at the City of Glenwood Springs. At the confluence with the Colorado River, the Roaring Fork River has a 1,460 square mile drainage basin. Major tributaries to the Roaring Fork are the Crystal River, Fryingpan River, Maroon Creek, Castle Creek and Hunter Creek.

2.2 Study Reach Description

This Floodplain Information Report is prepared for 9.6 miles of the Roaring Fork River beginning at the Garfield/Eagle County Line and continuing upstream through Eagle County, the Town of Basalt and Pitkin County to the confluence with Snowmass Creek.

The Roaring Fork River bank-full channel in the study area has an average range of about 90 to 120 feet wide as it flows through an alluvial valley. The average channel grade is 0.0127 feet per foot upstream of the Town of Basalt, transitioning to 0.0087 feet per foot west of the Town. The lower study reach has an average grade of approximately 0.007 feet per foot. The stream channel is braided, having a bed composed mostly of gravel, cobbles, and small round boulders ranging in the 6 to 15-inch diameter size. There are many riffles and rapids with many shallow pools along its course. Several irrigation ditches divert from the Roaring Fork along this reach. In most areas, the riverbanks are low with steep slopes (often over 45 degrees), being composed mostly of sand, gravel, and cobbles, with little or no vegetation

below the mean annual high water mark. The steep slopes and lack of vegetation reduce the resistance of the banks to scour.

2.3 Climate

Precipitation varies widely throughout the Roaring Fork Basin above Basalt. On the continental Divide, near Independence Pass, the average annual precipitation is 26.3 inches with 17.5 inches occurring during the winter months (November – April). Near Basalt, the average annual precipitation is approximately 17.2 inches with 8.7 inches occurring during the winter months November through April. Data on precipitation from the National Oceanic and Atmospheric Administration indicate that in the Aspen area, the 100-year 24-hour storm would produce 2.6 inches of precipitation.

Temperature and precipitation varies greatly from location-to-location and season-to-season within the drainage basin and are important variables in flooding conditions. Above normal spring temperatures can cause early and heavy flows on the Roaring Fork River. Records from the Aspen weather station indicate that the month of July has the highest normal total precipitation for the year at 2.06 inches. The month of March follows closely with 1.98 inches of total precipitation. The first month with a normal spring temperature above the freezing point is April with a mean monthly temperature of 38.6 ° Fahrenheit.

Flood flows on the Roaring Fork River typically result from rapid melting of the mountain snowpack during the period from May to early July. Snowmelt runoff may occasionally be augmented by rain. The snowmelt runoff is characterized by sustained periods of high flows and marked diurnal fluctuation. Examination of meteorological and climatological conditions and precipitation and stream flow records show that summer cloudbursts are not a great flood threat on these streams.

2.4 Channel Instability

Cobble-bed streams such as the Roaring Fork River exhibit instability problems when the cobble particles are mobilized. Those particles begin to move when the water exceeds a shear stress on the bed particles beyond the threshold value for incipient motion. When flow rates and velocities are high enough to mobilize the cobble, the channel becomes unstable. Calculations can estimate the flow conditions under which cobble will be mobilized. Bedload calculations and sediment rating curves have been developed specifically to estimate the flow frequency (i.e. 5-year flow conditions, 10-year flow conditions, 25-year flow conditions) under which particle mobilization will occur at particular locations of stream instability.

2.5 Maps and Surveys

The topographic mapping for this study from the Garfield/Eagle County line through the Wingo Bridge was provided by the Greenhorne & O'Mara. This mapping was available at scales of 1" = 200'. The contour interval of the mapping was 2 feet. The upper Pitkin County mapping from the Wingo Bridge to the confluence with Snowmass Creek was obtained from the Roaring Fork Railroad Holding Authority and was produced with a contour interval of 5 feet.

On November 8, 2000, Aero-Metric, Inc. of Fort Collins, Colorado flew over the Town of Basalt to produce high resolution imagery and topographic mapping for the town, and specifically for the area known as "South Side." Horizontal and vertical Ground control was set by Sopris Engineering, LLC of Carbondale, Colorado. This new topographic information with 2-foot contour interval was incorporated into the base topographic mapping for this study.

Sopris Engineering surveyed 44 cross-sections in areas of special interest (e.g. bridges, wide valley bottoms, or where floodplain development had occurred). In addition, bridge measurements were verified and spot elevations taken at critical points.

Generally, field surveys agreed well with topographic mapping except in areas of heavy brush where the topographic contours appeared to be high in certain locations.

Vertical control points for the cross sections were three-quarter inch rebar pins, which were used as aerial control for the mapping. These points are shown on the mapping and are designed by letters and numbers similar to CA-35.

The basis of vertical control for the surveyed Roaring Fork River cross-sections is **NAVD 29** sea level datum originating at USGS benchmark for Township 8 South, Range 87 West, Section 12 TR62. The locations of the four benchmarks used in the survey are described below:

1.

NAME	ORDER	ELEVATION
TR88 AP4	THIRD	6,585.1

DESCRIPTION:
Station mark is small disk attached to a pipe projecting 3 cm from a 1.6-ft. round concrete post flush with the ground. It is 16.1-ft. south of, and slightly higher than the road center, 8.2-ft. north of the right-of-way fence, 13.8-ft. west of the north post to a deer gate at a jog in the fence, 1.3-ft. north of a fiberglass witness post and 3.6-ft. east of a fiberglass witness post.

To reach from the junction of State Highway 82 and the Basalt turnoff (at stoplight, about 0.4 miles south of Basalt), go west on Highway 82 for 1.35 miles to a paved road right just before reaching the crossroad. Turn right, north, for 0.05 miles to a T-intersection. Turn right, east, on paved road for 0.1 miles to the station on the right at jog in the fence line.

2.

NAME	ORDER	ELEVATION
D158	SECOND	6,898.60

DESCRIPTION:
A standard disk, stamped 158 1934 and set in the top of a concrete post 5.8 miles northwest from Woody Creek. It is located 5.8 miles northwest along the Denver & Rio Grande Western Railroad from benchmark A 158 at Woody Creek, Pitkin County, 0.2 miles east of the station at Rose, 330 feet east of milepost 387, 56 feet west of a corrugated pipe culvert, 40 feet northwest of the center of a road crossing, 30 feet southeast of pole 2547, 20 feet north of the centerline of the track, and 4 feet higher than the top of the rail.

3.

NAME	ORDER	ELEVATION
E158	SECOND	6,749.18, THIS SURVEY – 6,749.43 PUBLISHED

DESCRIPTION:
A standard disk, stamped E 158 1934. The station is located about 2.9 miles east-southeast of Emma, 1.8 miles southeast of Basalt and 1.3 miles south of he Eagle-Pitkin County Line, in the northeast ¼ of Section 20, T 8 S, R 86 W, of the 6th PM at State Highway 82 milepost 24.8. Land ownership is the old railroad right-of-way. To reach the station from the bridge, go over the Fryingpan River just upstream of the confluence with the Roaring Fork River in Basalt, go southeast on the old State Highway 82 for 1.75 miles to the crossing of the railroad tracks and the highway and the station on the right. The station is a

standard disk set in the southeast corner of the abutment of a railroad bridge crossing the Roaring Fork River. It is 250.0 feet west-northwest of the center of the crossing of State Highway 82, 228.0 feet west-northwest of railroad milepost 385, 108.3 feet east of the center of the bridge over the Roaring Fork River, 6.07 feet south of the near rail, 1.3 feet north of the southern edge of the abutment, 1.0 feet southwest of a witness post, 0.7 feet east of the west edge of the abutment, about 2.0 feet below the near rail and at Bridge 384A over the Roaring Fork River and the siding at Wingo.

4.

NAME	ORDER	ELEVATION
G158	SECOND	6,640.81

DESCRIPTION:
A standard disk, stamped G 158 1934 and set in the top of a concrete post. It is located 7.6 miles southeast from Carbondale, in Eagle County, 7.6 miles southeast along the Denver & Rio Grande Western Railroad from the station at Carbondale, Garfield County, 190 feet southeast of the center of a road crossing, 45 feet east of a residential home, 30 feet southwest of the centerline of the track, 6 feet northwest of an east fence corner, and 3.5 feet northeast of the fence.

SECTION 3 - FLOOD HISTORY

This section of the report also includes information concerning basin hydrology, including flood flows computed by the U.S. Army Corps of Engineers by analyzing the stream gage records.

To understand the history of channel instability and its occurrence on the Roaring Fork, the history of flooding was documented using USGS gage records. Flooding has occurred on the Roaring Fork River in the years 1912, 1914, 1918, 1921, 1952, 1957, 1958, 1983, 1984, 1985 and 1995. Ruedi Reservoir dam constructed in May 1968 on the Fryingpan River has significantly reduced the peak flood discharges on the lower Roaring Fork River. The recent flooding in the spring 1995 was roughly estimated as a one in fifty year event in Aspen and a one in twenty-five year flood event further down valley.

3.1 Gage Records

There are only four active USGS gages located on the main stem of the Roaring Fork River. Three other gages have existed in the past, but are no longer active, although records from those gages are useful. The gages are listed in order from upstream to downstream.

TABLE 1
USGS GAGING STATIONS

Station Number	Station Name	Drainage Area (sq. mi.)	Gage Elevation (feet MSL)	Period of Record	Status	Peak Recorded Discharge (cfs)
09072550	RFR above Lost Man Creek			1980-1986	Inactive	1,900 cfs in 1985
09073300	RFR above Difficult Creek	76	8,120	1979 to Present	**Active**	2,350 cfs in 1985
09073400	RFR near Aspen	108	8,014	1964 to Present	**Active**	2,230 cfs in 1985 & 1995
09073500	RFR at Aspen			1910-1921 1932-1964	Inactive	1,800 cfs in 1957
09075500	RFR below Aspen			1913-1918	Inactive	5,000 cfs in 1918
09081000	RFR near Emma	853	6,470	1997 to Present	**Active**	3,800 cfs in 1999
09085000	RFR at Glenwood Springs	1,451	5,720	1905 to Present	**Active**	19,000 cfs in 1957

Graphs of the data from five of these gages were taken from the USGS Water Resources web site at ***http://nwis-colo.cr.usgs.gov/*** and are shown on the following pages for the years of operation. The Emma Gage is too recent to have published data. (See Figures 1 through 4)

Figure 1

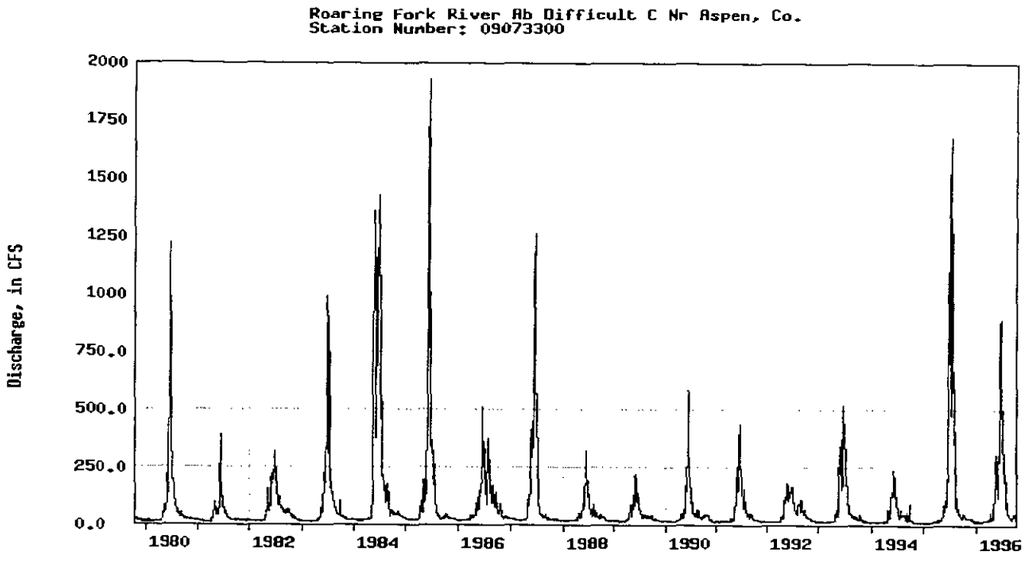


Figure 2

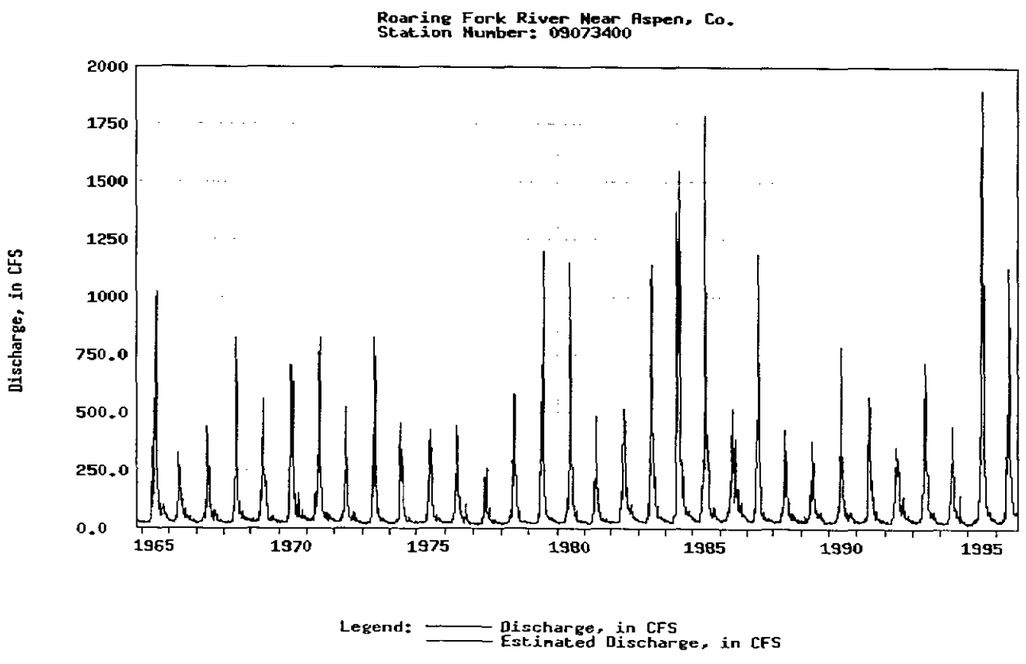


Figure 3

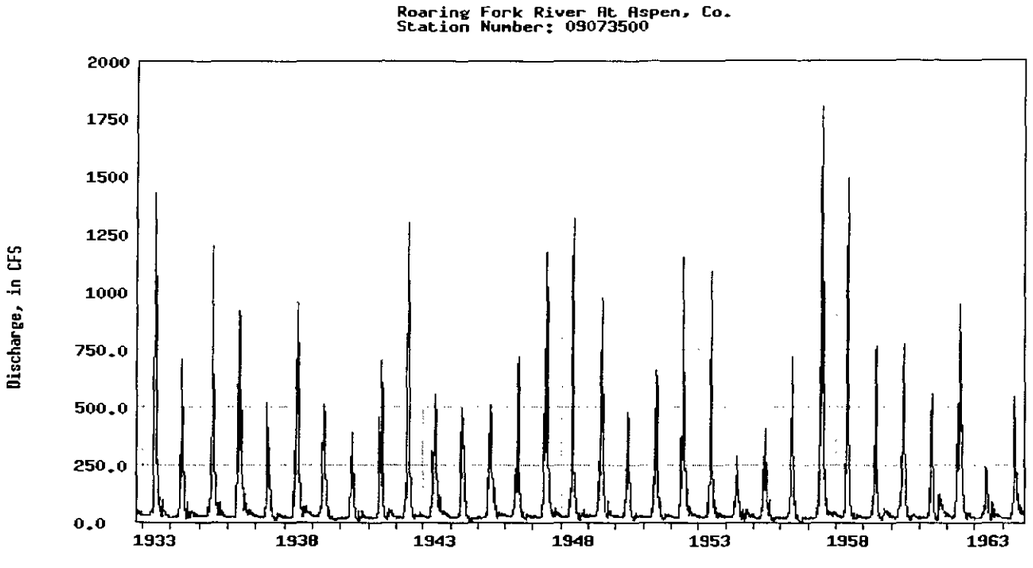
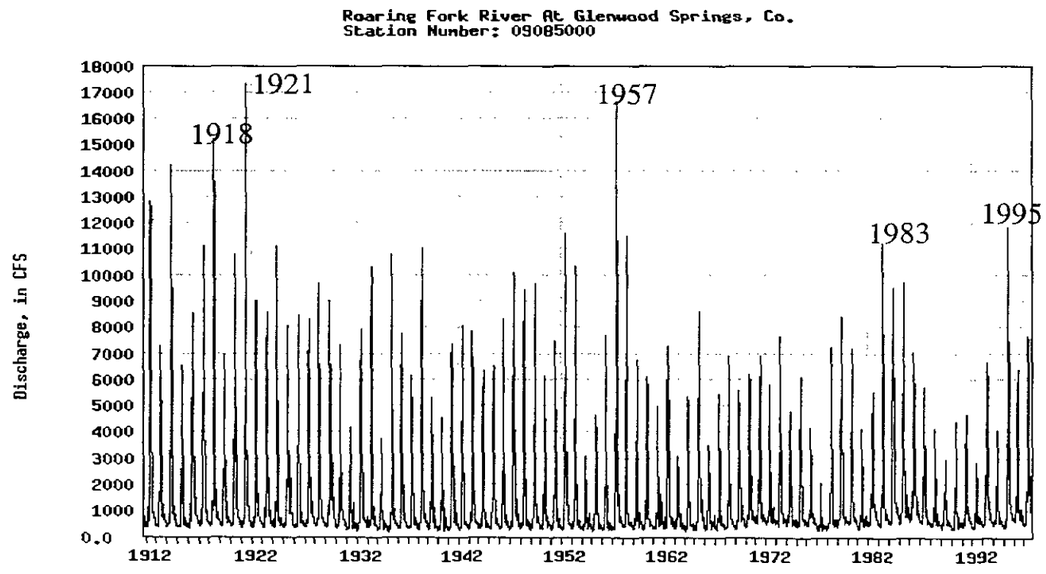


Figure 4



3.2 Flood Protection Measures

The only substantial structure that affects the flow in the Roaring Fork River is the Ruedi Dam, located on the Fryingpan River approximately 17 miles east of Basalt. The Ruedi Dam is part of the Fryingpan-Arkansas Project to divert water from the Colorado River basin to the Arkansas River basin. Ruedi Reservoir was constructed by the U.S. Bureau of Reclamation and made operational May 1968.

The dam was designed for an inflow design flood of 17,500 cfs at a 15-day volume of 100,000 acre-feet. The probable maximum discharge is 5,540 cfs from the spillway and 1,810 cfs from the outlet structure. The total probable maximum discharge from the outlet structure and spillway is 7,350 cfs, approximating the 500-year flood in the Town of Basalt.

Ruedi Reservoir has a total capacity of 102,373 acre-feet at the spillway and provides replacement water for out-of-priority depletions to the Colorado River by the Fryingpan Arkansas Project, as well as water for West Slope agricultural, municipal, and industrial uses on a contractual basis. The reservoir is also operated for recreation, wildlife habitat, and indirectly for flood control.

Permanently assigned flood control storage in Ruedi Reservoir could not be economically justified at the time of construction. However, annual storage of snowmelt runoff indirectly provides the objective of flood control and can appreciably reduce the downstream flood menace in the Fryingpan, Roaring Fork and Colorado Rivers. If the reservoir is operated carefully for flood control by evacuation of storage prior to forecasted heavy inflow, complete control of most snowmelt floods in the reservoir can be attained. There is still a possibility of rare extreme floods that exceed the capacity of Ruedi Reservoir to control them. With the exception of these extreme events, the operation of Ruedi Reservoir reduces and stabilizes flows downstream from the dam. By providing more uniform flows, fish habitat can be established to provide better fishing conditions in early months of the fishing season.

The U.S. Army Corps of Engineers hydrology for the Roaring Fork River is based upon the assumption that Ruedi Reservoir will act as a flood control reservoir for major runoff events, including the one in 500-year event. Ruedi Reservoir was not constructed as a flood control reservoir, but provides residual storage that can capture flood events based upon normal operation. It is conceivable that the storage volume reserved in the spring for filling would not be adequate to contain a prolonged flood event, and the emergency spillway would release water uncontrolled. This situation began to occur during the spring runoff in 1995, although the discharge on the Fryingpan River was maintained below the maximum safe channel capacity.

3.3 Ruedi Reservoir Operations during the Spring 1995

According to the Annual Operation Plans of the Fryingpan Arkansas Project for the Water Year 1995-1996, the following describes the operation of Ruedi Reservoir during the 1995 flooding event:

> *Releases were increased throughout June to delay the filling of the Reservoir beyond the customary date of July 1 to avoid a spill of the reservoir caused by continuing precipitation on an unusually late occurring snowpack. The peak average daily inflow of 1,796 cfs occurred on June 17, 1995. The Reservoir filled to the crest of the spillway on July 11, 1995. Outlet works releases were reduced, forcing [the water level to rise above the overflow spillway], and the flow below the Reservoir was maintained below the maximum safe channel capacity. The maximum average daily release of 933 cfs was made July 13, 1995, and the maximum storage of 103,927 acre-feet occurred on July 14, 1995. Releases were then reduced until they were below the recommended maximum fishery flow [250 cfs] by the middle of August.*

> *The total April through September inflow was 154,235 acre-feet, which was 130% of average and greater than the reasonable maximum forecast inflow. The high inflows were due, in part, to waters left in the Fryingpan River Basin which normally would have been diverted to the East Slope but were not because the reservoirs on the East Slope had filled during the spring runoff.*
>
> *No call was placed on the Colorado River at the Cameo gage by senior water right holders due to high flows in the Colorado River throughout the irrigation season. Because of that, there were no releases made for either Project depletions or for depletions caused by Ruedi Reservoir water contract holders during the 1995 water year. High flows in the Colorado River also eliminated the need to release any water to augment the habitat of endangered aquatic species in the Colorado River downstream of the Grand Valley Diversion Dam and above the confluence with the Gunnison River.*
>
> *The Corps of Engineers estimated that the operation of Ruedi Reservoir to fill the operating storage, the Boustead Tunnel diversion and Turquoise Lake prevented $1,770,000 of flood damage in the Colorado River Basin during 1995.*

3.4 Summary of Historical Floods

Information pertaining to the older flood history of the study area came form two main sources; interviews with long time local residents and a U.S. Army Corps of Engineers letter report entitled "investigation of Flood Problems on Roaring Fork River, Colorado, " March 7, 1958.

> *Mr. Richard Lucksinger of Basalt, was an Eagle County Commissioner during the July of 1957 flood and was interviewed by the Corps of Engineers. Mr. Lucksinger said that around July 4, 1957, a heavy rain melted large volumes of snow, which still remained due to an unusually cold spring and late summer. He remembered that the river rose rapidly to flood height in about 15 minutes and stayed up for three days. According to Mr. Lucksinger the Roaring Fork River rose high enough to wash against the bottom of the Emma Bridge, which washed out and had to be replaced. Pilings for the new bridge were about 60 feet deep. During the flood, the river changed course several times; sometimes going under the bridge, sometime to one side or the other. The areas now occupied by trailer parks in the floodplain in Basalt were several feet deep in water.*
>
> *He stated that a couple of agricultural fields along the Roaring Fork were washed out and also that the entire valley where the KOA Campground is now located had been completely flooded several times in his memory. Mr. Lucksinger also said the Fryingpan River does not flood very often but during the 1957 flood, it washed out a road 60 feet from the river.*

The following excerpts from the Corps of Engineers letter report also described the July 1957 flood.

> *In compliance with the requests, an inspection of the problem areas on the Roaring Fork River was made by Corps representatives on 12 and 13 December 1957. The inspection covered a 14-mile reach beginning 2 miles above Basalt, Colorado, and ending at Carbondale, Colorado, 12 miles below Basalt...*
>
> *Floods on the Roaring Fork result from snowmelt and occur principally during the month of June. The flood of July 1, 1957 had an instantaneous peak discharge of 18,700 cfs at the Glenwood Springs gage. This flood was the maximum of 49 years of record, and its magnitude has an estimated frequency of occurrence of once in approximately 60 years.*

The river in the problem area is characterized by low banks, braided channels, and a considerable amount of gravel, cobbles, and snags deposited on gravel bars. The river carries a large bedload of gravel and cobbles, some of the latter being more than 6 inches in diameter. The capacity of the channel has been reduced by this sediment. In some instances, where channel changes took place during the flood, the original channels were so filled with sediment that nearly all of the present flows are discharging through the "new" channels. Generally, however, the "new" channels are old watercourses abandoned by the river in previous year. The littered condition of the channels, and the increased danger of bank erosion, inundation, and additional channel changes resulting from this condition, constitutes the present flood problem.

No urban areas are affected by floods. The principal items damaged by the 1957 flood were the agricultural lands and roads and bridges adjacent to, or over, the river. A few farm buildings were flooded. The total known damages in all categories in this reach amounted to slightly more than $45,000.

A common type of damage from the 1957 flood was bank erosion. The slope of the stream ranges from 65 feet per mile above Basalt to 40 feet per mile below Basalt. Velocities probably in excess of 10 feet per second occurred during the 1957 flood. The banks are composed largely of sand, gravel, and cobbles overlain by a comparatively thin mantle of soil, and are quite erosible. Spoil-type dikes, constructed by local interests with material bulldozed in the process of channel clearing, proved to be very erosible.

A substantial percentage of the total damages were due to overtopping of the low banks and the inundation of pasture and croplands. The banks in most instances range form 2 to 5 feet in height. In two locations, where old channel areas have been reclaimed, considerable volumes of overflow and widespread flooding resulted from bank overtopping at the upper ends of the areas.

More than one-half of the known damages in the 1957 flood were caused to roads and bridges in the area, with nearly $24,000 of damages being caused to three bridges and their abutments. Two of these were public bridges and have since been restored. A third bridge, which was private was completely destroyed and has not been replaced.

The 18,700 cfs instantaneous peak discharge referred to in the Corps of Engineers letter report has been revised to 19,000 cfs by the U.S. Geological Survey. This is the maximum instantaneous peak discharge recorded at the Glenwood Springs gage on the Roaring Fork River through 2000.

More recent flooding on the Roaring Fork River has occurred in 1983, 1984, 1985 and 1995. According to USGS records from the Roaring Fork River at Glenwood Springs gage, the flood peaks occurred on: June 25, 1983; July 1, 1984; June 9, 1985; and July 13, 1995. These floods, although less significant than the 1957 flood in magnitude, impacted the residents of the Roaring Fork Valley. Flooding was marked by dramatic lateral shifts in the low flow channel, mobilization of the cobble bed and bank material, floating debris from fallen trees, changes in channel form to a braided pattern and localized flood damage. In 1995, a portion of the Two Rivers Road in the Town of Basalt was eroded by the floodwaters. Isolated sand bagging occurred along the banks of the Roaring Fork River in Lazy Glen subdivision, the Roaring Fork Mobile Home Park, the Pan & Fork Mobile Home Park and River Oaks subdivision to protect property from flood damage. Work crews from the Colorado Department of Transportation (CDOT) were stationed on the Upper Basalt Bypass Bridge to remove trees and other debris from the bridge piers.

SECTION 4 - HYDROLOGIC AND HYDRAULIC ANALYSIS

4.1 Hydrologic Analysis

The hydrologic analysis for this study of the Roaring Fork drainage basin was completed by the U.S. Army Corps of Engineers. A regional analysis of stream data taken at gages in the Roaring Fork Basin was performed and natural flow frequency curves were developed. The peak flows determined for the 10, 50, 100 and 500-year floods were used to determine the flood profiles and the 100-year floodplain for this report. Table 2 lists the peak discharges for these floods on the Roaring Fork River.

TABLE 2
DESIGN FLOOD FLOWS
FOR THE ROARING FORK RIVER

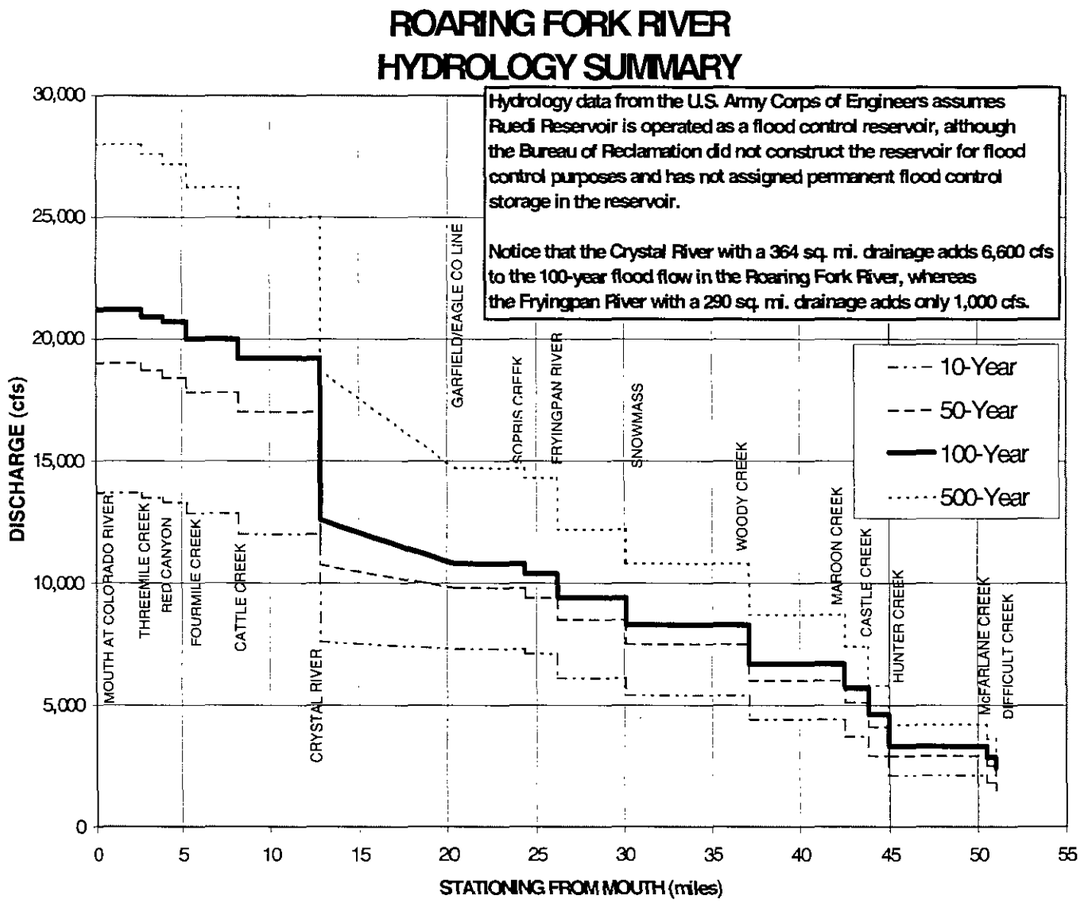
Stream Reach	Cumulative Drainage Area (Sq. mi.)	Flood Peaks in cfs For Different Return Intervals			
		10-yr	50-yr	100-yr	500-yr
Fryingpan River, above Basalt	298	2,250	3,300	3,950	7,150
Roaring Fork River, above Fryingpan River*	510	6,100	8,500	9,400	12,200
Roaring Fork River, above Sopris Creek, below Fryingpan River	850	7,100	9,400	10,400	14,300
Roaring Fork river, above Garfield County Line, below Sopris Creek	870	7,300	9,800	10,800	14,700

Source: U.S. Army Corps of Engineers study values published in Flood Hazard Reports.

* Peak discharges were taken from Floodplain Information Report, Roaring Fork River, Wright-McLaughlin Engineers, 1976.

U.S. Army Corps of Engineers completed hydrologic analyses of the Roaring Fork River, and the published information is presented graphically in Figure 5.

Figure 5



4.2 Hydraulic Analysis

The water surface elevations for floods of the selected recurrence intervals were computed through use of the Corps of Engineers' HEC-RAS backwater computer program. A total of 112 cross sections were analyzed for the hydraulic analysis of the Roaring Fork River and were secured from topographic mapping and field surveys. The locations of these cross sections are shown by reference point on the flooded area maps and the flood profiles in the back of this report. The 10, 50, 100, and 500-year flood elevations and discharges are listed in Table 3. Channel roughness factors (Manning's n) for these computations were assigned on the basis of field inspection of the floodplain areas.

Starting water-surface elevations for Roaring Fork River calculated using critical depth at the beginning and end of the study. This is a reasonable assumption due to the steep gradient.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are, thus, considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

The flooded area maps, which show the boundaries of the 100-year and 500-year floods. The low hazard area is shown on the flooded area maps by cross-hatching.

4.2.1 Lazy Glen Trail Court

Lazy Glen Trailer Court, located upstream of the Highway 82 bridge, is on a historic floodplain. Fill and small dikes have been placed to control flooding. Detailed analysis shows that the smaller floods such as the 5 or 10-year flood, would not flood any portion of Lazy Glen but the 100-year flood would overflow into the area at two points. Only one ranch building occupies the floodplain in the reach above the Lazy Glen Trailer Court. The upstream reach of the study area is largely confined within well-defined natural banks.

4.2.2 South Side Flow Split

The construction of Highway 82 through the town of Basalt effectively divided the Roaring Fork River and its floodplain between the "North" and "South" Channels. The main channel is included in the North Channel and carries the regular flows. The resulting South Channel is considered active only during flood flows and has no distinguished or established natural channel or centerline. Map RF5 shows the "South Side" Flood Area entire area as well as the various physical and floodplain related information. The area south of Highway 82, know as "South Side," has developed extensively and can be categorized into three reaches:

- The upper reach is primarily undeveloped ranch land and continues from the flow split at the Upper Bypass Bridge to river station 47+75 as shown on the enclosed work maps.
- The middle reach is an urbanized area down stream of the upper reach that creates complex flow conditions and is the focus of the two-dimensional modeling described below.
- The lower reach, downstream of the urbanized area, is differentiated from the middle reach by the highway 82 embankment (river station 6+60).

After flood flows are conveyed through the middle reach, they flow over the highway embankment and down into the lower reach. Floodwater in this area flows through partially developed areas and back into the main channel downstream of the wastewater treatment plant. J.F. Sato, FEMA's subcontractor, previously completed modeling and floodplain delineation in order to update floodplain maps and reflect development impacts, including those created by the Highway 82 construction. In order to establish the floodplain on the South Side, J.F. Sato completed a flow split analyses and determined that approximately

4400 cfs would split to the South Side in the 100-year flood event. After this flow split determination, a HEC-RAS model was completed on the South Side.

McLaughlin Water Engineers, Ltd. review determined that the model was only approximate because it did not account for the highly complex flow through the buildings, nor did it include a number of complex flow splits that occur within the second and third reaches. At most of these flow splits, floodwaters flow from the South Side back over the highway and into the North Channel. J.F. Sato used the most recent version of HEC-RAS, but the software did not take into account the two-dimensional flow splits over the highway.

The Town of Basalt was concerned about mapping quality and the level of detail in hydraulic modeling FEMA used to generate the proposed 100-year floodplain map. McLaughlin Water Engineers, Ltd. was retained by the Town of Basalt to complete a new floodplain mapping study based upon more detailed hydraulic modeling and new topographic mapping.

South Side Floodplain Mapping
McLaughlin Water Engineers used the U.S. Army Corps of Engineers' HEC-RAS 3.0 model to delineate the floodplain of the Roaring Fork River on the south side of Highway 82 (South Side) through the town of Basalt. The software's new split flow capabilities allowed McLaughlin Water Engineers to model the numerous flow splits that occur throughout the South Side floodplain. In addition, sophisticated two-dimensional modeling was used to aid in the application of the HEC-RAS models.

New topographic mapping of the Town of Basalt, (available after J.F. Sato's floodplain study), was used to cut cross sections and delineate the regulatory floodplain. The new aerial photography allowed the team to locate buildings, roads, and other features that obstructed the floodplain.

South Side HEC-RAS Model
McLaughlin Water Engineers cut a total of 53 cross-sections from the split at the Upper Bypass Bridge on Highway 82 to the confluence of the south side split flow and the main stem river. This confluence is located downstream of the wastewater treatment plant. The average centerline distance between cross sections was roughly 215 feet. All cross sections were cut perpendicular to flow. Flow obstructions (such as buildings and roads) were coded directly into the cross-sectional geometry. Manning's "n" (roughness) values ranged from 0.18 to 0.035 with 0.08 being the most frequent estimate of roughness in the floodplain. Cross section 62 from the main stem model was used as the downstream limit of the south side split flow model. Manning's "n" values were adjusted in certain sections to account for effective conveyance areas between cross sections.

After initially running backwater calculations on the South Side, it was determined that flow would spill over Highway 82 and into the main stem floodplain at two locations. (These flow splits were not identified on the previous mapping by J.F. Sato.) The first location was near the downstream limit of the original South Side model and cross sections were cut across the highway to model the flow as it reached the north side of the highway.

The second flow split was much farther upstream and was modeled using lateral (side-spill) weirs in HEC-RAS 3.0. Subsequently, other lateral weirs were placed at locations where significant flows would spill over the highway and the crest of each weir was set as the elevation at which flow would begin to spill. Lateral weirs were also placed at the downstream limits of the study where flow can split as it spills over the highway near the wastewater treatment plant. It was found that approximately 2400 cfs flows out of the extents of the cross sections to the east of the wastewater treatment plant, leaving roughly 1200 cfs to join the main stem floodplain west of the treatment plant. Estimates of other spill flows are shown on

the provided work maps.

Highway Spill Model
Modeling of the South Side indicated that approximately 600 cfs spills over Highway 82 and back into the main stem floodplain upstream of Emma bridge. To model this flow, seven cross sections were cut between the flow split over the highway and cross section 76.38 on the main stem model. After re-running the main stem model with the split flow deducted, the water surface elevation of cross section 76.38 was used as the downstream boundary condition on the new highway spill model. The average centerline distance between cross sections was 190 feet. Manning's roughness values ranged from 0.035 to 0.3.

Trailers and some other obstructions were modeled using higher roughness values, thus the upper limit of 0.3 for Manning's "n" values. Lateral weirs were also used in this model to calculate the amount of flow spilling into zones beyond the extents of each cross section. The elevation of each lateral weir was set as the elevations at which flow would spill without returning to the main flow. Locations on the cross sections that corresponded to the energy head at critical spill elevations were used to locate the lateral weirs along the cross section ends. It was found that roughly 145 cfs splits away from the downstream spill over Highway 82 and flows west on both the north and south sides of the highway.

HEC-RAS Calibration Using Two-Dimensional Hydraulic Analysis
The Roaring Fork River split flow at the Highway 82 Upper Basalt Bypass Bridge was previously modeled by J.F. Sato using HEC-RAS, the one-dimensional hydraulic model developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. The team decided to employ a two-dimensional model as a tool for increasing the accuracy of a one-dimensional solution to the flow field for various reasons. First, the complex nature of the floodplain lends itself to a two-dimensional solution because of number of buildings in the floodplain and the intricate, mountainous topography. Second, shallow flooding and flow splits downstream of the initial split create a complex problem that can affect the accuracy of a one-dimensional model. Third, while the assumption of one-dimensional flow may be a good approximation in many instances, when used by itself it is not very accurate for floodplains with ill-defined, numerous flow paths, numerous obstructions, and non-parallel flow stream lines. The two-dimensional modeling tool helped McLaughlin Water Engineers make informed decisions when applying the one-dimensional model.

Due to instability, the model was restricted to include only areas that were completely inundated. We estimate that more than 50 iterations were used to generate a model that would converge to a solution of the governing flow equations. These iterations were used, in part, to converge on the true extents of flooding in the model.

Once the extent of the model had been defined, the downstream boundary condition was set using the critical flow depth at the location of the downstream spill over Highway 82 (where the south side split and the main stem flow rejoin). Buildings within the wetted area were blocked out so that flow would be forced around those locations. To obtain model convergence in the shallow and high velocity flow, Manning's "n" values, and the eddy viscosity (a measure of energy losses due to turbulence), were increased until stability was reached.

South Side Model Results
Results from the two-dimensional model were used to build a more accurate one-dimensional model. Flow trace animations and the distribution of velocity magnitudes were the primary results of interest from the SMS model. Figure 6 is a snapshot of the flow trace animation and illustrates the flow around

the buildings and general flow patterns. When setting up the HEC-RAS model for the South Side split, the flow trace animation was run to show areas of high velocity and flow concentration.

The SMS flow trace animation and velocity distributions allowed the team to more accurately locate flow concentrations between buildings and where the flow was effective in the floodplain. The animation also facilitated cutting cross sections and adjusting Manning's "n" values to account for the two dimensional flow characteristics.

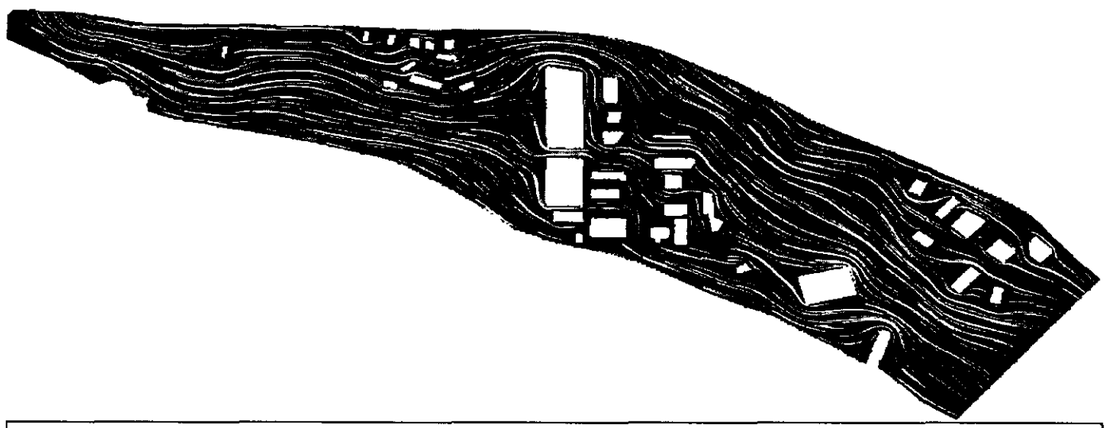


Figure 6 - Flow trace animation snapshot created from the solution of the two-dimensional flow field using

4.2.2 River Oaks Subdivision

The River Oaks Subdivision, located on the north bank (right descending bank) between the Lower Basalt Bypass Bridge and Hook's Bridge was an area that was originally mapped outside of the 100-year floodplain mapping by Wright McLaughlin Engineers the 1978. Although the undeveloped land, as it was during the time of mapping, was shown to be outside of the floodplain, the land was only marginally above the 100-year floodplain, usually less than one foot.

Due to the development of the River Oaks Subdivision and apparent risk to flooding after the 1995 flood, the area was studied in greater detail using 17 surveyed cross sections. This new study showed the channel bed to be nearly 4-feet higher than the 1978 Wright McLaughlin Engineers study in the reach of the river adjacent to River Oaks Subdivision (cross section 30 through 46.1). This may be the result of channel aggradation upstream of the bridge and/or mapping inaccuracies in the 1978 study resulting from aerial interpretation.

Floodwater will inundate the River Oaks Subdivision and flow northerly. Flow into the subdivision has been classified as "ineffective flow" since it becomes hydraulically disconnected from the main channel and will not be flowing in the direction of the channel. It is estimated that the 100-year flood will overtop Willits Lane over a distance of 320 feet, with a maximum depth of 1.65 feet. The low point in the roadway is elevation 6483.04, while flooding is estimated to be elevation 6484.69 at Willits Lane. The anticipated flow that will enter the Basalt Industrial Park is estimated to be 120 cfs that must be managed in the local drainage system. This flow will be ineffective and shallow sheet flow (Zone 'X'). The Basalt Industrial Park is inundated by the 500-year flood.

SECTION 5 - INTERPRETATION AND USE OF REPORT DATA

5.1 Flood Frequency and Discharge

The 10, 50, 100, and 500-year flood events were used as the flood frequencies for this floodplain analysis. Thus, the data developed in this report will be compatible not only for regulation purposes and State of Colorado H. B. 1041 designations, but are also for FEMA flood insurance rate studies.

The 500-year flood event is important in making the public aware that floods larger than the 100-year flood can and do occur. The 500-year flood event can also be used for regulating developments within the floodplain.

5.2 Flood Elevations

The flood frequency elevation and discharge data table, Table 3, lists the 10, 50, 100, and 500-year flood elevations at selected reference points (cross-section locations). Base flood elevation contours are shown on the mapping for the 100-year flood. The flooded area sheets give the plan view of the flooded area on a contour base map, and the high water elevations for the 100-year flood can be interpolated from this information. The flood profile plates show the streambed elevation and the high water elevations for all four frequency floods. Also, the cross section figures in the Appendix of this report show a graphical representation of the high water elevations at valley cross sections throughout the study reach.

The flood profiles may be used in areas where controversy arises over the 100-year flood boundary on the flooded area sheets. Since the flood profile plates give the elevation and distance or stationing from a known point, the high water elevations can be surveyed on the ground to alleviate any discrepancies on the base map.

Table 4 shows the Floodway data. The communities of the Town of Basalt, Pitkin County and Eagle County support a "Zero-Rise" floodway rather than the national standard of a "One-Foot Rise" floodway. The exhaustive studies of this river in the ***Roaring Fork and Fryingpan Rivers Multi-Objective Planning Project*** by the Colorado Water Conservation Board in 1999, and this ***Floodplain Information Report*** have concluded that the one-foot rise that was allowed over the past 25 years has already been used in many areas. In other words, the residential and commercial development, the construction of new bridges and roads, as well as other encroachments of levees and fill material have forced the elevation of the floodway to rise past the allowable one foot in many areas. The inherent channel instability on the Roaring Fork River is a further significant hazard that is not considered in current floodplain modeling. Therefore, by adopting a zero rise floodway, the communities are simply enforcing the spirit of the original regulation. Furthermore, the threat to life and property by flooding has been shown to be a genuine cause for concern. Because of the severe danger of flooding and cumulative rise in the flood elevations over the past 25 years, it is the zero rise floodway that the Town of Basalt, Pitkin County and Eagle County have endorsed for the following summarized reasons:

1. Protection of life and property from high velocity floodwaters on this steep channel,
2. No adverse impact to flood conveyance due to past changes that have occurred,
3. Channel instability which is not considered in floodplain modeling, and
4. Added measure of conservatism due to modeling and mapping inaccuracies.

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TABLE 3

FLOOD FREQUENCY - ELEVATION AND DISCHARGE DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	Streambed Elevation (feet)	10-Year Flood		50-Year Flood		100-Year Flood		500-Year Flood	
				Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)
10	0+00	Garfield/Eagle Co. Line	6368.11	6373.68	7,300	6374.38	9,800	6374.53	10,800	6374.99	14,700
12	7+70		6370.98	6379.64	7,300	6380.34	9,800	6380.43	10,800	6380.73	14,700
14	26+63		6386.71	6393.36	7,300	6393.90	9,800	6394.27	10,800	6395.28	14,700
16	43+39		6405.30	6409.67	7,300	6410.31	9,800	6410.40	10,800	6410.89	14,700
18	63+56		6412.69	6422.93	7,300	6423.24	9,800	6423.33	10,800	6423.93	14,700
20	76+37		6420.98	6429.47	7,300	6431.23	9,800	6431.38	10,800	6431.97	14,700
22	86+45		6426.69	6435.49	7,300	6435.47	9,800	6435.73	10,800	6436.53	14,700
24	98+87		6439.90	6445.89	7,300	6446.90	9,800	6447.35	10,800	6449.43	14,700
26	109+02		6447.35	6455.51	7,300	6456.42	9,800	6456.73	10,800	6457.61	14,700
27.1	116+91		6452.61	6459.82	7,300	6460.62	9,800	6460.88	10,800	6461.82	14,700
29.1	123+24		6459.12	6464.36	7,300	6465.50	9,800	6465.86	10,800	6467.00	14,700
30	128+84		6462.20	6469.79	7,300	6470.45	9,800	6470.68	10,800	6471.50	14,700
32.1	134+00		6465.05	6472.85	7,300	6473.85	9,800	6474.20	10,800	6475.36	14,700
33	136+05		6465.37	6473.80	7,300	6474.71	9,800	6475.02	10,800	6476.14	14,700
34		Hook's Bridge									
35	136+55		6462.67	6475.82	7,300	6477.49	9,800	6478.09	10,800	6480.04	14,700
36.1	138+10		6468.83	6476.08	7,300	6477.80	9,800	6478.44	10,800	6480.57	14,700
37.1	141+40		6469.53	6477.43	7,300	6478.78	9,800	6479.35	10,800	6481.51	14,700
38.1	143+96		6471.48	6479.48	7,300	6480.36	9,800	6480.79	10,800	6482.12	14,700
39.1	147+61		6473.80	6482.08	7,300	6483.11	9,800	6483.43	10,800	6484.46	14,700
39.2	151+98		6478.44	6483.65	7,300	6484.42	9,800	6484.69	10,800	6485.87	14,700
39.3	155+58		6479.87	6486.81	7,300	6487.26	9,800	6487.44	10,800	6487.77	14,700
41.1	159+63		6482.94	6488.73	7,300	6489.56	9,800	6489.86	10,800	6490.76	14,700
42.1	164+88		6484.22	6492.04	7,300	6492.89	9,800	6493.19	10,800	6494.09	14,700
43.1	173+11		6489.52	6496.52	7,300	6497.51	9,800	6497.94	10,800	6499.46	14,700
46.1	180+46		6493.92	6501.92	7,300	6503.19	9,800	6503.62	10,800	6505.21	14,700
46.6	187+26		6499.61	6507.45	7,300	6508.41	9,800	6508.76	10,800	6509.92	14,700
47	189+69		6502.20	6510.03	7,300	6511.10	9,800	6511.49	10,800	6512.95	14,700
48		Lower Basalt Bypass Bridge									
49	190+74		6504.81	6512.08	7,300	6513.36	9,800	6513.87	10,800	6515.59	14,700
50.1	194+61		6505.68	6513.69	7,300	6514.88	9,800	6515.33	10,800	6516.93	14,700
52	204+21		6510.13	6519.11	7,100	6520.12	9,400	6520.50	10,400	6521.92	14,300
54	212+75		6519.35	6527.34	7,100	6528.30	9,400	6528.75	10,400	6530.30	14,300

TABLE 3

FLOOD FREQUENCY - ELEVATION AND DISCHARGE DATA

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				Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)
56	219+11		6525.13	6533.41	7,100	6534.51	9,400	6534.94	10,400	6536.58	14,300
58	223+53		6524.49	6535.57	7,100	6536.74	9,400	6537.22	10,400	6538.98	14,300
60	231+83		6531.40	6537.62	7,100	6538.47	9,400	6538.71	10,400	6540.23	14,300
62	239+98		6539.35	6546.57	7,100	6547.13	9,400	6547.30	10,400	6548.01	14,300
64	249+52		6541.90	6550.50	7,100	6551.22	9,400	6551.53	10,400	6552.57	14,300
66	256+52		6553.30	6558.34	7,100	6558.86	9,400	6559.05	10,400	6559.76	14,300
68	261+78		6557.06	6561.52	7,100	6562.16	9,400	6562.42	10,400	6563.31	14,300
70	267+38		6559.00	6565.21	7,100	6565.73	9,400	6565.92	10,400	6566.67	14,300
71	270+68		6563.00	6568.92	7,100	6569.55	9,400	6569.73	10,400	6570.29	14,300
72.5	274+78		6566.00	6571.51	7,100	6572.18	9,400	6572.46	10,400	6573.50	14,300
73	276+38		6567.00	6572.58	7,100	6572.96	9,400	6573.09	10,400	6573.56	14,300
75	283+58		6573.40	6579.23	7,100	6579.65	9,400	6579.83	10,400	6580.44	14,300
76.1	287+78		6576.50	6583.21	7,100	6583.77	9,400	6583.94	10,400	6585.01	14,300
76.2	288+85		6577.15	6584.09	7,100	6584.92	9,400	6585.51	10,400	6585.70	14,300
76.35		Midland Avenue Bridge									
76.38	289+49		6577.15	6585.80	7,100	6587.08	9,400	6588.06	10,400	6590.61	14,300
76.65	292+19		6579.90	6587.09	7,100	6587.82	9,400	6588.27	10,400	6591.06	14,300
78	293+59		6581.56	6589.87	7,100	6590.77	9,400	6591.08	10,400	6591.58	14,300
80.5	294+49		6582.08	6590.59	7,100	6591.52	9,400	6591.87	10,400	6592.85	14,300
81	297+09		6587.43	6593.63	6,100	6595.65	8,500	6596.02	9,400	6596.88	12,200
82		Emma Bridge									
83	297+49		6587.43	6596.21	6,100	6597.68	8,500	6598.00	9,400	6598.80	12,200
83.6	301+44		6591.70	6598.57	6,100	6599.39	8,500	6599.66	9,400	6600.40	12,200
85.6	308+24		6599.80	6606.10	6,100	6606.84	8,500	6607.09	9,400	6607.82	12,200
86.4	310+45		6602.72	6608.25	6,100	6609.21	8,500	6609.49	9,400	6610.27	12,200
86.5	315+07		6605.85	6614.18	6,100	6615.12	8,500	6615.47	9,400	6616.28	12,200
88.5	319+97		6611.32	6619.81	6,100	6620.39	8,500	6620.54	9,400	6621.06	12,200
88.6	323+82		6616.33	6624.30	6,100	6625.15	8,500	6625.45	9,400	6626.33	12,200
90	326+72		6630.00	6632.61	6,100	6633.23	8,500	6633.45	9,400	6634.20	12,200
92	Bridge	Upper Basalt Bypass Bridge									
94	327+36		6630.00	6634.33	6,100	6635.75	8,500	6636.27	9,400	6638.56	12,200
96	332+59		6629.90	6636.35	6,100	6637.36	8,500	6637.75	9,400	6638.90	12,200
98	339+10		6641.49	6646.47	6,100	6647.05	8,500	6647.21	9,400	6647.73	12,200
100	347+20		6648.00	6655.18	6,100	6656.13	8,500	6656.46	9,400	6657.41	12,200

TABLE 3

FLOOD FREQUENCY - ELEVATION AND DISCHARGE DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	Streambed Elevation (feet)	10-Year Flood		50-Year Flood		100-Year Flood		500-Year Flood	
				Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)
104.3	349+20		6655.00	6658.69	6,100	6659.63	8,500	6659.99	9,400	6661.09	12,200
104.6	352+00		6656.00	6662.13	6,100	6662.84	8,500	6663.08	9,400	6664.01	12,200
105	354+70		6660.00	6665.08	6,100	6665.81	8,500	6666.01	9,400	6666.78	12,200
105.3	355+80		6662.00	6667.72	6,100	6668.59	8,500	6668.85	9,400	6669.68	12,200
105.6	357+55		6662.00	6670.86	6,100	6671.45	8,500	6671.64	9,400	6672.00	12,200
106	359+40		6663.00	6671.59	6,100	6672.00	8,500	6672.07	9,400	6673.12	12,200
106.05	Bridge	Waterman Bridge									
106.1	359+60		6663.50	6672.13	6,100	6673.36	8,500	6673.96	9,400	6675.79	12,200
106.5	361+45		6664.50	6672.59	6,100	6674.00	8,500	6674.61	9,400	6676.47	12,200
107	364+05		6667.25	6675.49	6,100	6676.83	8,500	6677.22	9,400	6678.29	12,200
107.5	365+80		6671.25	6680.60	6,100	6681.83	8,500	6682.04	9,400	6682.65	12,200
108	366+90		6675.00	6682.80	6,100	6683.35	8,500	6683.59	9,400	6683.99	12,200
108.3	368+50		6677.00	6684.63	6,100	6685.59	8,500	6685.90	9,400	6685.96	12,200
108.6	370+45		6680.00	6687.86	6,100	6688.69	8,500	6688.99	9,400	6689.78	12,200
109	372+40		6682.00	6690.12	6,100	6691.03	8,500	6691.32	9,400	6692.51	12,200
109.5	375+25		6688.67	6694.35	6,100	6694.97	8,500	6695.16	9,400	6695.77	12,200
110	378+05		6689.00	6696.34	6,100	6697.04	8,500	6697.28	9,400	6697.89	12,200
111	382+45		6697.00	6701.94	6,100	6703.06	8,500	6703.42	9,400	6704.48	12,200
112	385+95		6699.00	6705.39	6,100	6706.45	8,500	6706.81	9,400	6707.81	12,200
115	392+20		6709.06	6715.46	6,100	6716.59	8,500	6716.98	9,400	6718.08	12,200
116	Bridge	Railroad Bridge									
117	392+60		6707.35	6717.42	6,100	6718.84	8,500	6719.30	9,400	6720.60	12,200
118	396+87		6713.35	6720.67	6,100	6721.94	8,500	6722.41	9,400	6723.75	12,200
120	399+75		6715.13	6724.05	6,100	6725.51	8,500	6726.02	9,400	6727.57	12,200
122	403+17		6719.35	6726.06	6,100	6727.18	8,500	6727.59	9,400	6728.86	12,200
123	407+00		6725.06	6731.31	6,100	6732.52	8,500	6732.92	9,400	6734.19	12,200
124	410+87		6727.35	6734.95	6,100	6736.12	8,500	6736.55	9,400	6737.72	12,200
126	416+68		6731.90	6739.30	6,100	6740.81	8,500	6741.35	9,400	6742.87	12,200
128	421+04		6740.20	6747.56	6,100	6748.93	8,500	6749.40	9,400	6750.66	12,200
129	Bridge	Wingo Bridge									
130	421+99		6745.00	6752.43	6,100	6756.44	8,500	6756.71	9,400	6758.27	12,200
132	428+80		6754.80	6760.49	6,100	6761.37	8,500	6761.68	9,400	6762.53	12,200
134	431+40		6756.20	6762.68	6,100	6763.71	8,500	6764.02	9,400	6764.90	12,200
136	433+72		6760.29	6765.09	6,100	6766.53	8,500	6766.92	9,400	6767.77	12,200

TABLE 3

FLOOD FREQUENCY - ELEVATION AND DISCHARGE DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	Streambed Elevation (feet)	10-Year Flood		50-Year Flood		100-Year Flood		500-Year Flood	
				Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)	Water Surface Elevation (feet)	Peak Discharge (cfs)
138	439+70		6766.77	6773.51	6,100	6774.25	8,500	6774.51	9,400	6775.44	12,200
140	443+37		6769.14	6776.98	6,100	6778.38	8,500	6778.85	9,400	6780.08	12,200
142	445+97		6773.10	6779.75	6,100	6781.16	8,500	6781.60	9,400	6782.80	12,200
144	447+02		6775.77	6780.99	6,100	6782.65	8,500	6783.19	9,400	6784.63	12,200
146	449+23		6777.21	6784.06	6,100	6785.32	8,500	6785.72	9,400	6787.00	12,200
148	453+21		6782.25	6788.45	6,100	6789.59	8,500	6790.04	9,400	6791.35	12,200
150	459+62		6787.28	6794.20	6,100	6795.54	8,500	6796.07	9,400	6797.35	12,200
152	462+20		6791.38	6797.10	6,100	6798.35	8,500	6798.75	9,400	6800.89	12,200
154	467+57		6795.34	6802.40	6,100	6803.53	8,500	6803.95	9,400	6804.71	12,200
158	481+64		6814.76	6819.82	6,100	6820.94	8,500	6821.38	9,400	6822.58	12,200
162	500+97	D/S Confluence Snowmass Creek	6834.13	6841.86	6,100	6843.17	8,500	6843.63	9,400	6844.94	12,200

TABLE 4

FLOODWAY DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	FLOODWAY			BASE FLOOD ELEVATION		
			Top Width (feet)	Section Area (sq. feet)	Mean Velocity (fps)	Regulatory Water Surface (feet)	Floodway Water Surface (feet)	Increase (feet)
10	0+00	Garfield/Eagle Co. Line	963	1,910	5.7	6374.53	6374.57	0.0
12	7+70		1135	2,255	4.8	6380.43	6380.44	0.0
14	26+63		367	1,078	10.0	6394.27	6394.27	0.0
16	43+39		502	1,350	8.1	6410.40	6410.41	0.0
18	63+56		1384	2,563	4.2	6423.33	6423.33	0.0
20	76+37		996	1,950	5.5	6431.38	6431.38	0.0
22	86+45		250	1,381	7.8	6435.73	6435.77	0.0
24	98+87		161	845	12.8	6447.35	6447.35	0.0
26	109+02		413	1,244	8.7	6456.73	6456.73	0.0
27.1	116+91		277	1,472	7.3	6460.88	6460.92	0.0
29.1	123+24		275	995	10.9	6465.86	6465.89	0.0
30	128+84		270	1,025	10.5	6470.68	6470.68	0.0
32.1	134+00		231	1,196	9.0	6474.20	6474.21	0.0
33	136+05		146	963	11.2	6475.02	6475.03	0.0
34		Hook's Bridge						
35	136+55		138	1,357	8.0	6478.09	6478.09	0.0
36.1	138+10		187	1,417	7.6	6478.44	6478.44	0.0
37.1	141+40		312	1,479	7.3	6479.35	6479.35	0.0
38.1	143+96		347	1,270	8.5	6480.79	6480.79	0.0
39.1	147+61		561	1,937	5.6	6483.43	6483.43	0.0
39.2	151+98		340	1,197	9.0	6484.69	6484.69	0.0
39.3	155+58		421	1,341	8.1	6487.44	6487.45	0.0
41.1	159+63		293	1,123	9.6	6489.86	6489.86	0.0
42.1	164+88		313	1,153	9.4	6493.19	6493.19	0.0
43.1	173+11		150	847	12.8	6497.94	6497.98	0.0
46.1	180+46		201	1,314	8.2	6503.62	6503.62	0.0
46.6	187+26		185	1,024	10.6	6508.76	6508.80	0.0
47	189+69		165	1,103	9.8	6511.49	6511.49	0.0
48		Lower Basalt Bypass Bridge						
49	190+74		139	1,046	10.3	6513.87	6513.87	0.0
50.1	194+61		134	1,001	10.8	6515.33	6515.34	0.0
52	204+21		130	769	13.5	6520.50	6520.50	0.0
54	212+75		112	741	14.0	6528.75	6528.75	0.0

TABLE 4

FLOODWAY DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	FLOODWAY			BASE FLOOD ELEVATION		
			Top Width (feet)	Section Area (sq. feet)	Mean Velocity (fps)	Regulatory Water Surface (feet)	Floodway Water Surface (feet)	Increase (feet)
56	219+11		165	1,017	10.2	6534.94	6534.96	0.0
58	223+53		298	2,014	5.2	6537.22	6537.23	0.0
60	231+83		346	1,032	10.1	6538.71	6538.72	0.0
62	239+98		433	1,313	7.9	6547.30	6547.30	0.0
64	249+52		444	2,029	5.1	6551.53	6551.54	0.0
66	256+52		368	1,072	9.7	6559.05	6559.07	0.0
68	261+78		605	2,196	4.7	6562.42	6562.42	0.0
70	267+38		545	1,555	6.7	6565.92	6565.98	0.1
71	270+68		472	1,832	7.1	6569.73	6569.73	0.0
72.5	274+78		680	2,944	3.5	6572.46	6572.47	0.0
73	276+38		698	1,571	6.6	6573.09	6573.12	0.0
75	283+58		607	1,627	6.4	6579.83	6579.92	0.1
76.1	287+78		568	1,939	6.2	6583.94	6584.07	0.1
76.2	288+85		520	2,529	4.2	6585.51	6585.51	0.0
76.35		Midland Avenue Bridge						
76.38	289+49		610	4,288	2.4	6588.06	6588.27	0.2
76.65	292+19		610	2,381	4.4	6588.27	6588.67	0.4
78	293+59		817	3,190	3.3	6591.08	6591.08	0.0
80.5	294+49		548	1,930	5.4	6591.87	6591.87	0.0
81	297+09		353	1,048	9.0	6596.02	6596.09	0.1
82		Emma Bridge						
83	297+49		528	1,875	5.0	6598.00	6598.00	0.0
83.6	301+44		295	1,288	7.3	6599.66	6599.66	0.0
85.6	308+24		300	1,050	9.0	6607.09	6607.13	0.0
86.4	310+45		293	967	9.7	6609.49	6609.49	0.0
86.5	315+07		289	921	10.2	6615.47	6615.47	0.0
88.5	319+97		252	937	10.0	6620.54	6620.55	0.0
88.6	323+82		171	782	12.0	6625.45	6625.49	0.0
90	326+72		301	972	9.7	6633.45	6633.45	0.0
92	Bridge	Upper Basalt Bypass Bridge						
94	327+36		282	2,403	6.7	6636.27	6636.27	0.0
96	332+59		246	1,360	6.9	6637.75	6637.75	0.0
98	339+10		481	1,186	7.9	6647.21	6647.21	0.0
100	347+20		158	762	12.3	6656.46	6656.46	0.0

TABLE 4

FLOODWAY DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	FLOODWAY			BASE FLOOD ELEVATION		
			Top Width (feet)	Section Area (sq. feet)	Mean Velocity (fps)	Regulatory Water Surface (feet)	Floodway Water Surface (feet)	Increase (feet)
104.3	349+20		325	1,072	8.8	6659.99	6659.99	0.0
104.6	352+00		281	978	9.6	6663.08	6663.08	0.0
105	354+70		224	870	10.8	6666.01	6666.01	0.0
105.3	355+80		211	866	10.9	6668.85	6668.86	0.0
105.6	357+55		520	1,400	6.7	6671.64	6671.65	0.0
106	359+40		97	682	13.8	6672.07	6672.18	0.1
106.05	Bridge	Waterman Bridge						
106.1	359+60		105	905	10.4	6673.96	6673.96	0.0
106.5	361+45		136	844	11.1	6674.61	6674.61	0.0
107	364+05		221	1,088	9.4	6677.22	6677.24	0.0
107.5	365+80		818	2,132	4.4	6682.04	6682.10	0.1
108	366+90		452	1,360	6.9	6683.59	6683.64	0.1
108.3	368+50		358	1,307	7.2	6685.90	6686.07	0.2
108.6	370+45		336	1,268	7.4	6688.99	6688.99	0.0
109	372+40		327	1,359	6.9	6691.32	6691.32	0.0
109.5	375+25		406	1,344	7.0	6695.16	6695.19	0.0
110	378+05		339	1,233	7.6	6697.28	6697.29	0.0
111	382+45		161	754	12.5	6703.42	6703.42	0.0
112	385+95		239	1,209	7.8	6706.81	6706.86	0.0
115	392+20		138	722	13.0	6716.98	6716.98	0.0
116	Bridge	Railroad Bridge						
117	392+60		161	1,179	8.0	6719.30	6719.30	0.0
118	396+87		103	668	14.1	6722.41	6722.41	0.0
120	399+75		137	944	10.0	6726.02	6726.03	0.0
122	403+17		145	844	11.1	6727.59	6727.60	0.0
123	407+00		115	721	13.0	6732.92	6732.92	0.0
124	410+87		144	809	11.6	6736.55	6736.60	0.1
126	416+68		106	691	13.6	6741.35	6741.50	0.1
128	421+04		112	694	13.6	6749.40	6749.40	0.0
129	Bridge	Wingo Bridge						
130	421+99		142	1,669	6.8	6756.71	6757.35	0.6
132	428+80		222	958	9.8	6761.68	6761.68	0.0
134	431+40		234	962	9.8	6764.02	6764.02	0.0
136	433+72		270	982	9.6	6766.92	6766.92	0.0

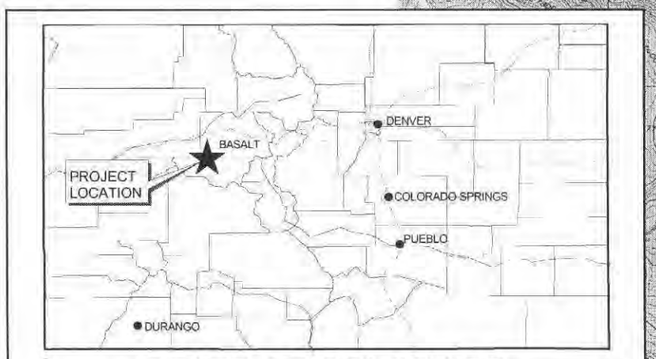
TABLE 4

FLOODWAY DATA

ROARING FORK RIVER, EAGLE & PITKIN COUNTIES, COLORADO

Reference Section Number	Stationing from County Line (feet)	Reference Location	FLOODWAY			BASE FLOOD ELEVATION		
			Top Width (feet)	Section Area (sq. feet)	Mean Velocity (fps)	Regulatory Water Surface (feet)	Floodway Water Surface (feet)	Increase (feet)
138	439+70		142	897	10.5	6774.51	6774.54	0.0
140	443+37		163	841	11.2	6778.85	6778.85	0.0
142	445+97		133	864	11.4	6781.60	6781.62	0.0
144	447+02		201	1,061	8.9	6783.19	6783.19	0.0
146	449+23		108	853	13.3	6785.72	6785.74	0.0
148	453+21		151	813	11.7	6790.04	6790.13	0.1
150	459+62		181	831	11.3	6796.07	6796.07	0.0
152	462+20		106	679	13.9	6798.75	6798.75	0.0
154	467+57		141	826	11.4	6803.95	6804.00	0.1
158	481+64		165	826	11.4	6821.38	6821.61	0.2
162	500+97	D/S Confluence Snowmass Creek	111	707	13.3	6843.63	6843.68	0.1

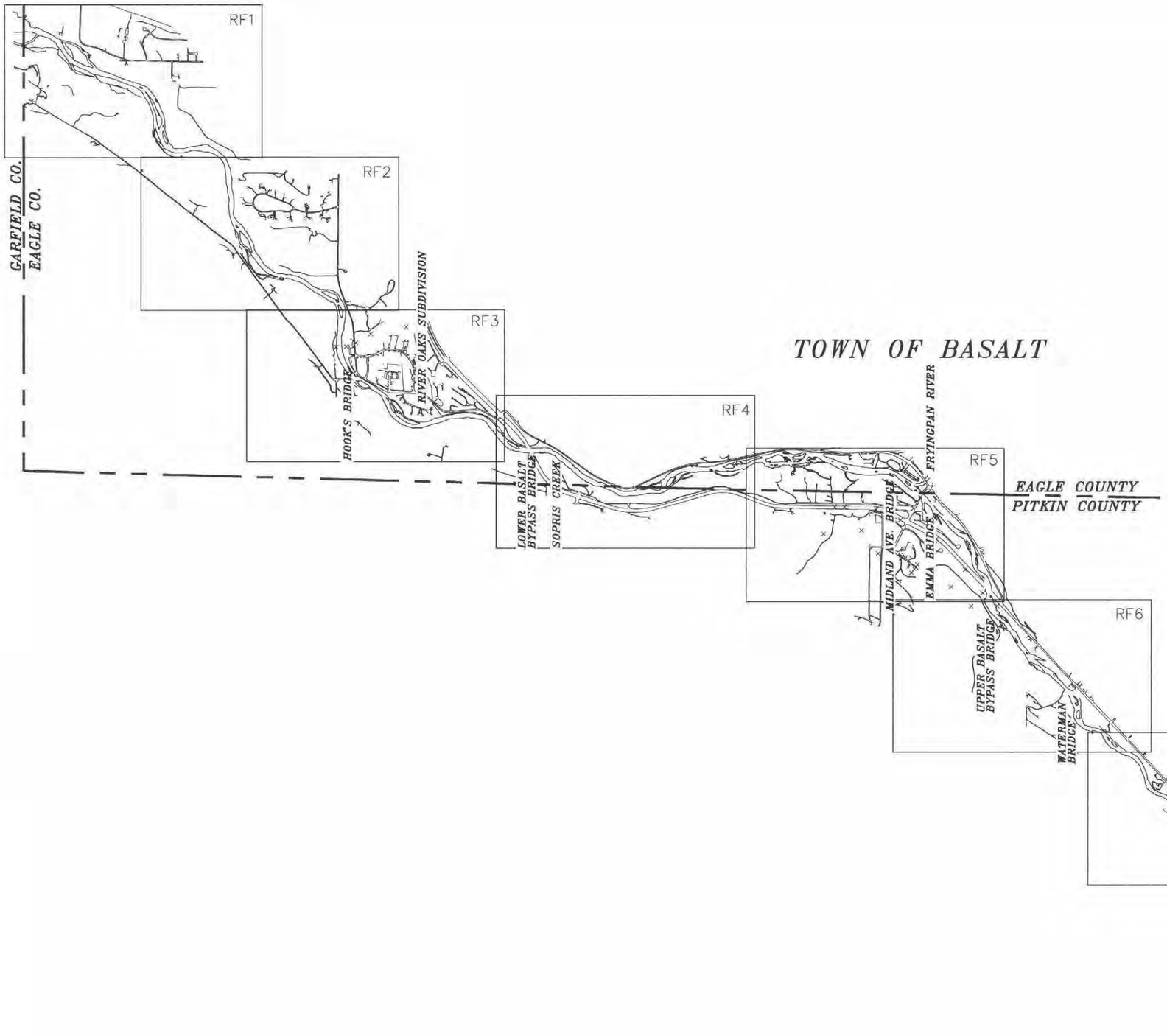
PROJECT REACH



LOCATION MAP :
ROARING FORK RIVER
EAGLE COUNTY, PITKIN COUNTY, AND BASALT, COLORADO

N
400 0 400 800 1200 Feet

SURVEY NOTE:
BASIS OF VERTICAL CONTROL
IS NAVD 29.



Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 508
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	INDEX
DRAWN BY: LDZ	HORIZ.: 1"=1400'		
CHECKED BY: RDK	VERT.: N/A	SHEET NO. 1 OF 8 SHEETS	

END OF STUDY

GARFIELD CO.
EAGLE CO.

SECTION 33
SECTION 4

SECTION 33
SECTION 34

SECTION 34 T7S
SECTION 3 T8S

T7S
T6S

LEGEND

- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval

KEY MAP

Matrix Design Group, Inc.
Integrated Design Solutions
1401 Blake Street, Suite 508
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001
DRAWN BY: LDZ	HORIZ.: 1"=400'	RF1
CHECKED BY: RDK	VERT.: N/A	SHEET NO. 1 OF 8 SHEETS

R:\00.014.006\dwg\Basalt-Fldplain-Aug2001-9-10-01.dwg 1/14/2001 02:55:02 PM MST

LEGEND

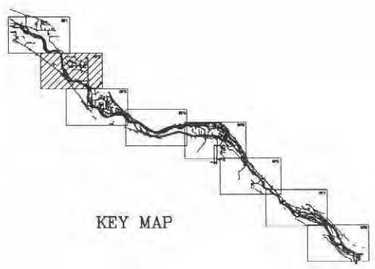
- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval

KEY MAP



Matrix Design Group, Inc.
Integrated Design Solutions
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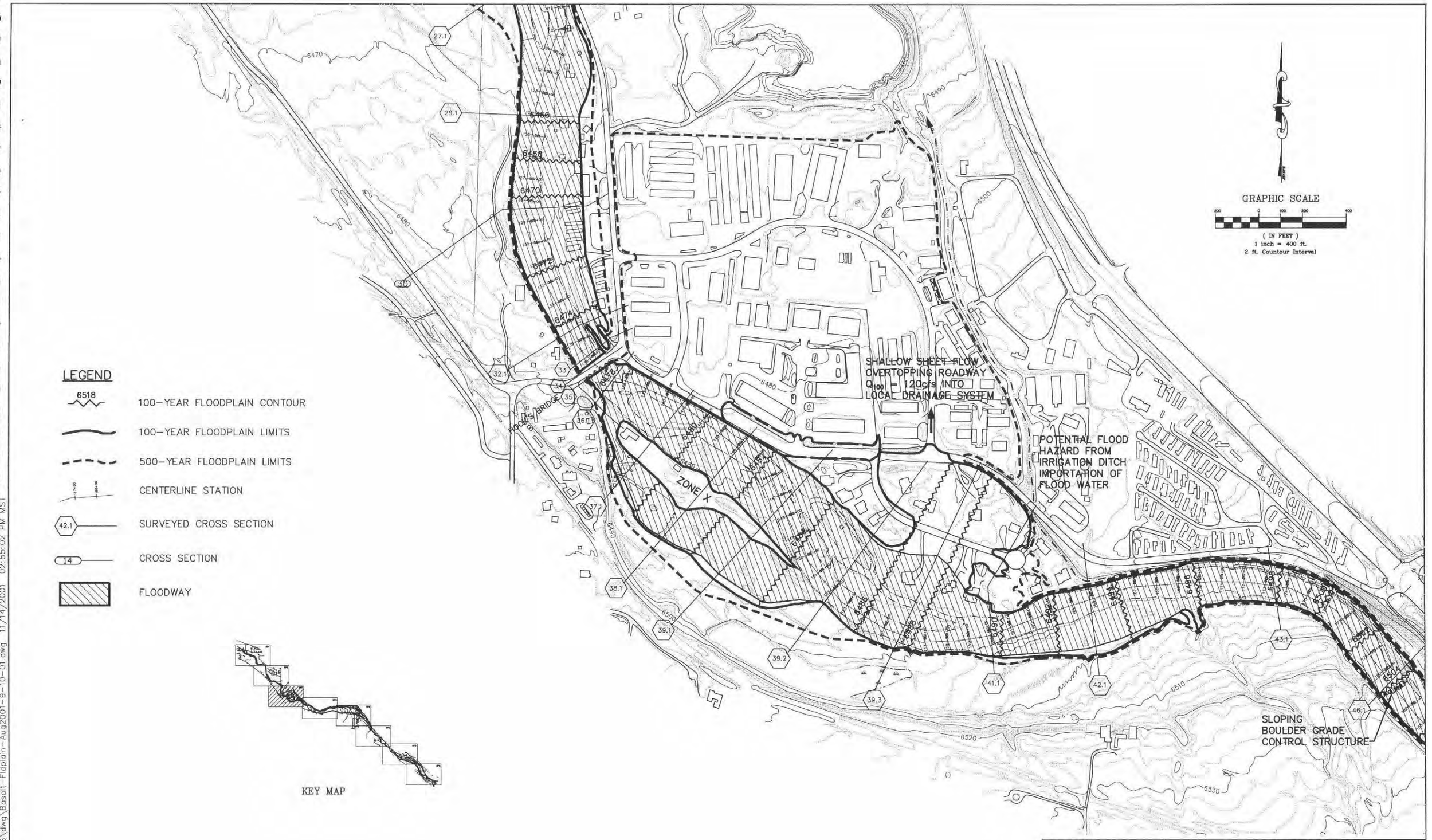
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF2
DRAWN BY: MJK	HORIZ: 1"=400'	SHEET NO. 2 OF 8 SHEETS	
CHECKED BY: RDK	VERT.: N/A		



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Fax 303.572.0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF3
DRAWN BY: MJK	HORIZ.: 1"=400'	SHEET NO. 3 OF 8 SHEETS	
CHECKED BY: RDK	VERT.: N/A		

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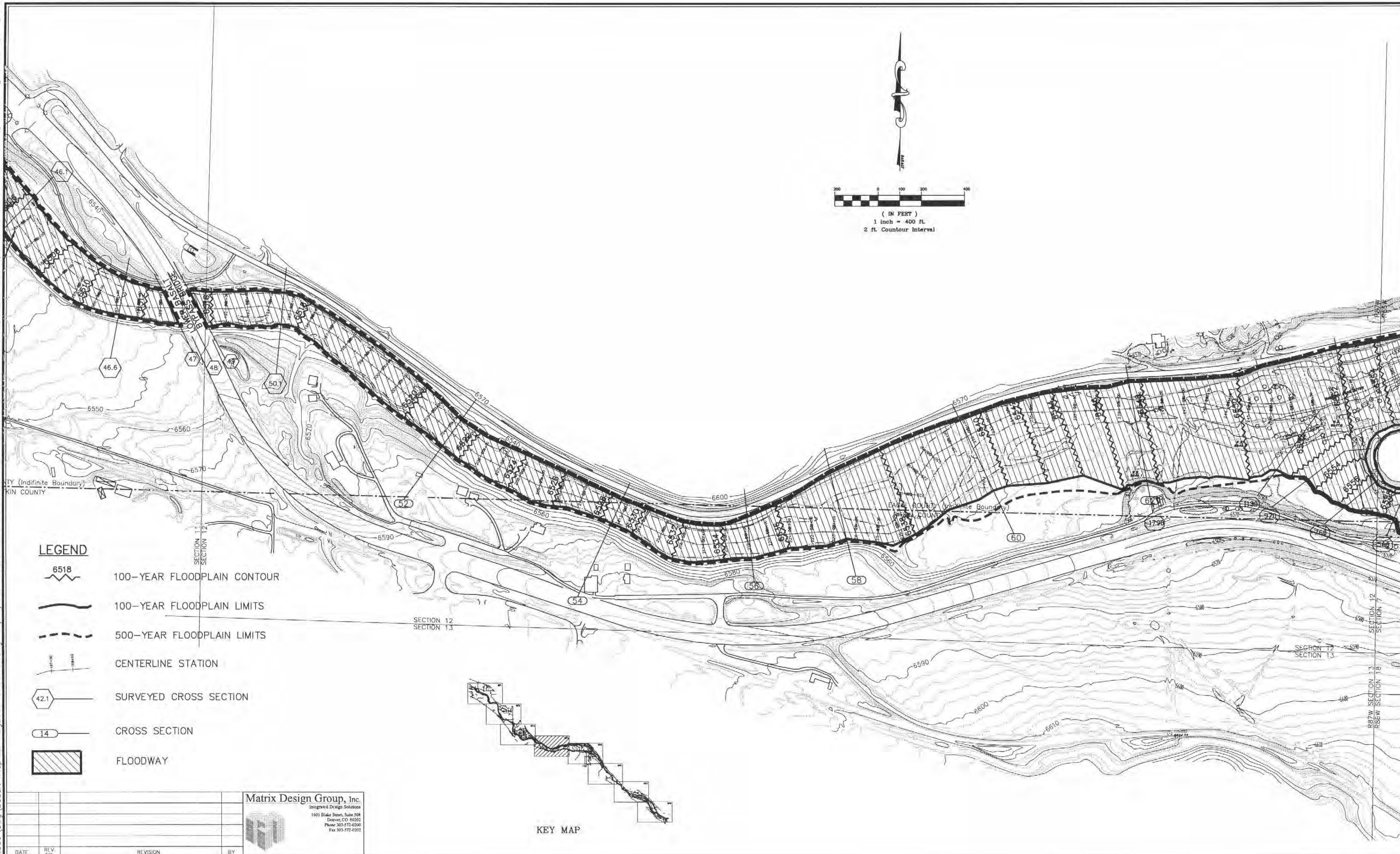
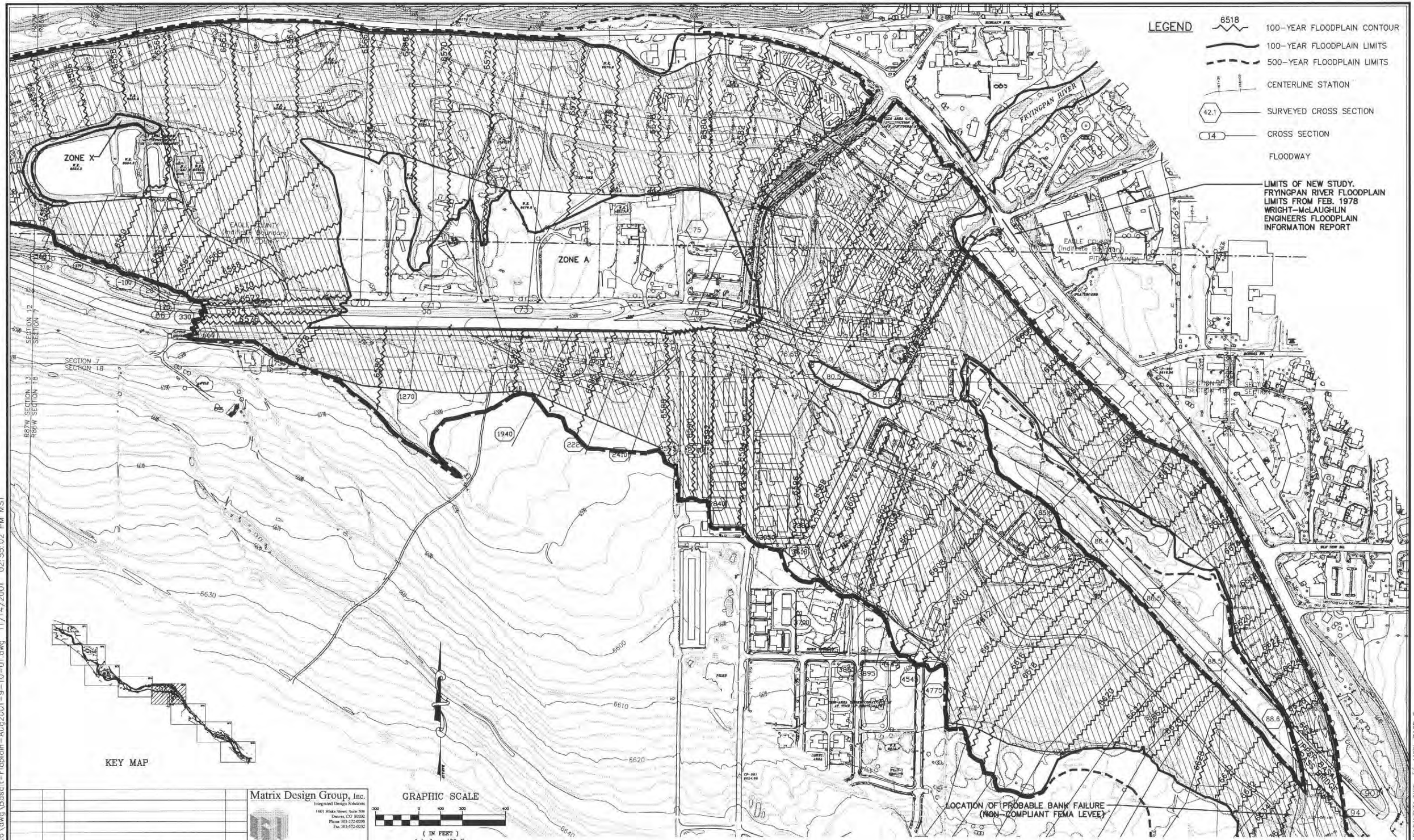


TOWN OF BASALT	REACH II OF THE ROARING FORK RIVER STUDY	FLOOD HAZARD AREA DELINEATION EAGLE AND PITKIN COUNTIES	McLaughlin Water	DESIGN: REM, JMC, ARB, BK DETAIL: LLU, ARB, MAP, BK CHECK: RDK	PROJECT NUMBER 98-044.001 DATE: NOVEMBER 14, 2001	DRAWING NUMBER RF-4

MWESTRIP.DWG 08/24/1999



DATE	REV. NO.	REVISION	BY

Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 330
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

TOWN OF BASALT	REACH II OF THE ROARING FORK RIVER STUDY	FLOOD HAZARD AREA DELINEATION EAGLE AND PITKIN COUNTIES	McLaughlin Water Engineers, Ltd.	2420 Alcott Street, Denver, CO 80211 PH. 303.458.8650; Fax 303.458.8766 email mwe@mwwater.com	DESIGN: REM, JMC, ARB, BK DETAIL: LLU, ARB, MAF, BK CHECK: RDK	PROJECT NUMBER 98-044.001 DATE: NOVEMBER 14, 2001	DRAWING NUMBER RF5

R:\00.014.026\dwg\Basalt-Fldplain-Aug2001-9-10-01.dwg 11/14/2001 02:55:02 PM MST

05/25/2000 BASALT3A.DWG // VIEW: PAGE-8

LOCATION OF PROBABLE BANK FAILURE
(NON-COMPLIANT FEMA LEVEE)

WATERMAN BRIDGE

SECTION 18
SECTION 17

SECTION 17
SECTION 20

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval

LEGEND

- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

KEY MAP

Matrix Design Group, Inc.
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ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF6
DRAWN BY: WJK	HORIZ.: 1"=400'		
CHECKED BY: RDK	VERT.: N/A	SHEET NO. 6 OF 8 SHEETS	

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SECTION 20
SECTION 21

SECTION 16
SECTION 21

RR BRIDGE

RIVER BLVD RD

WINGO BRIDGE

STATE HWY 82

ZONE X

LEGEND

- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval

KEY MAP

Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 500
Denver, CO 80202
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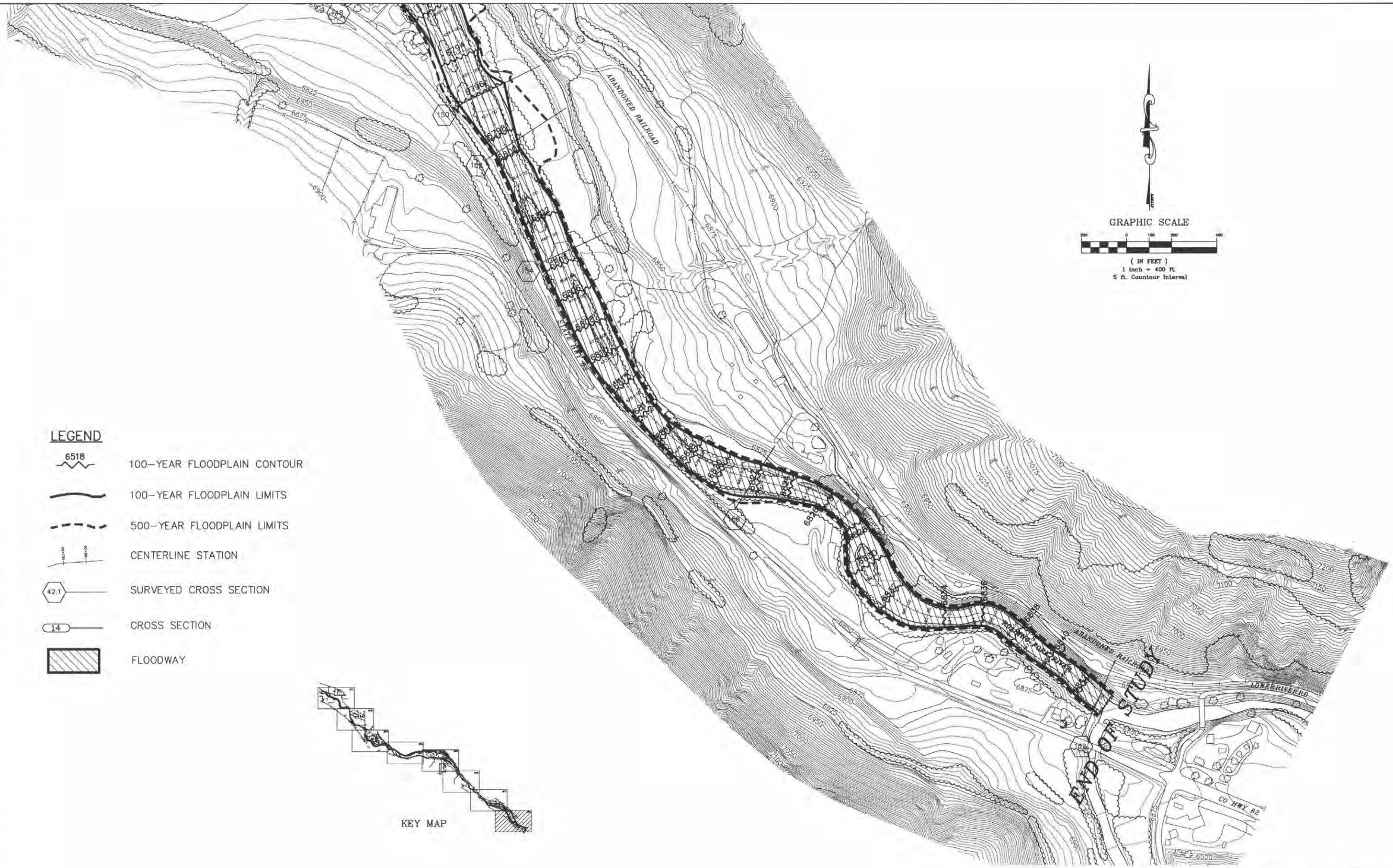
Fax 303-572-0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF7
DRAWN BY: MJK	HORIZ.: 1"=400'	SHEET NO. 7 OF 8 SHEETS	
CHECKED BY: RDK	VERT.: N/A		

R:\02.014.006\dwg\Basell-Flplain-Aug2001-9-10-01.dwg 11/14/2001 02:55:02 PM MST



LEGEND

- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

KEY MAP

Matrix Design Group, Inc.
Integrated Design Solutions
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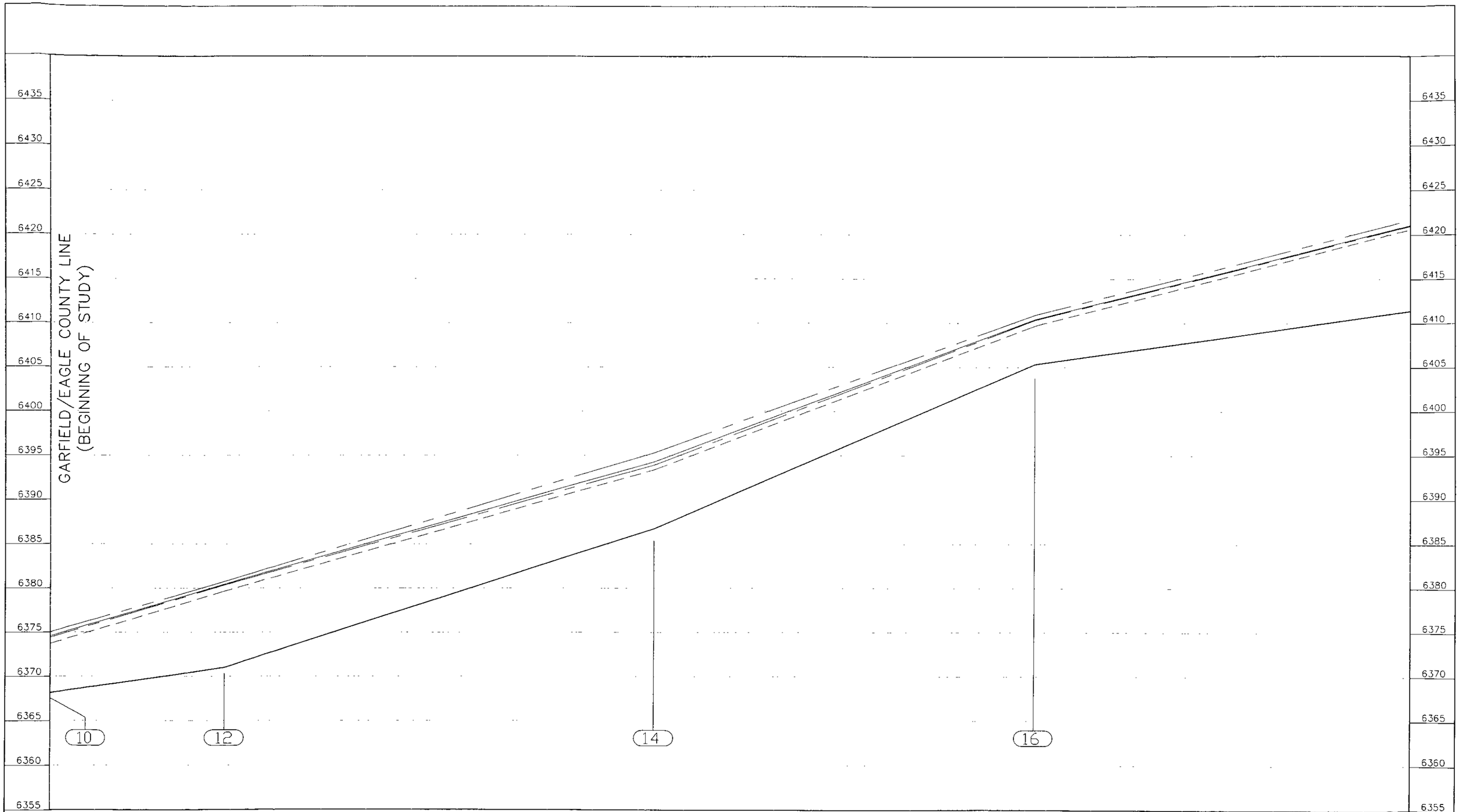
ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF8
DRAWN BY: MJK	HORZ.: 1"=400'		
CHECKED BY: RDK	VERT.: N/A	SHEET NO. 8 OF 8 SHEETS	

R:\00.014.006\dwg\3asalt-Tldplain-Aug2001-9-10-01.dwg 11/14/2001 02:55:02 PM MST



200 0 100 200 400
SCALE: 1"=400' Horiz.
SCALE: 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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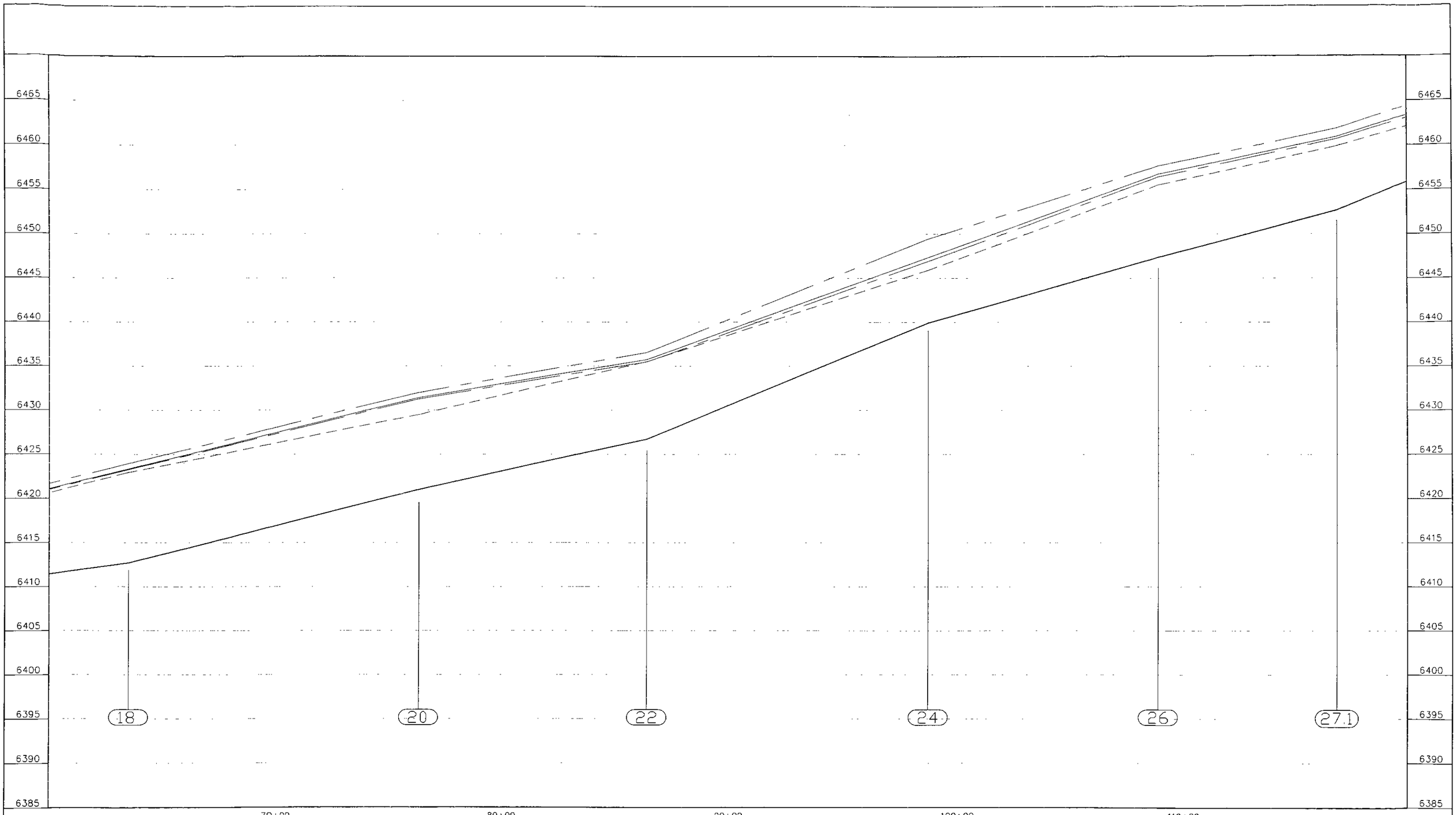
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE	DATE ISSUED 07/24/00	1P
DRAWN BY	MJK	HORIZ 1"=400'		
CHECKED BY	RDK	VERT 1"=10'	SHEET NO 1 OF 9	



200 0 100 200 400

SCALE: 1"=400' Horiz.
SCALE: 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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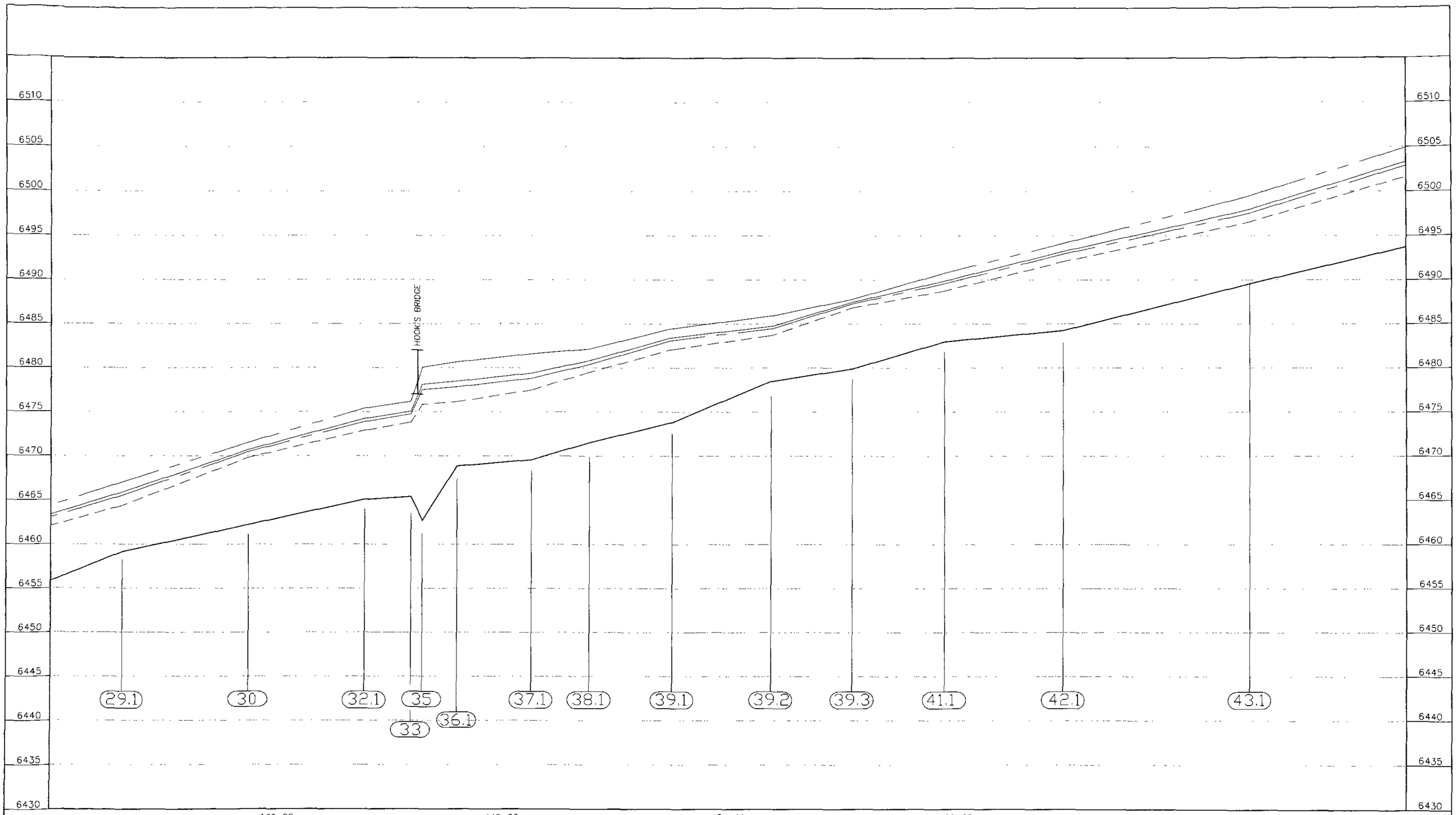
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE	DATE ISSUED 07/24/00	2P
DRAWN BY	MJK	HORIZ: 1"=400'		
CHECKED BY	RDK	VERT 1"=10'	SHEET NO 2 OF 9	



200 0 100 200 400
SCALE. 1"=400' Horiz.
SCALE. 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

Matrix Design Group, Inc.
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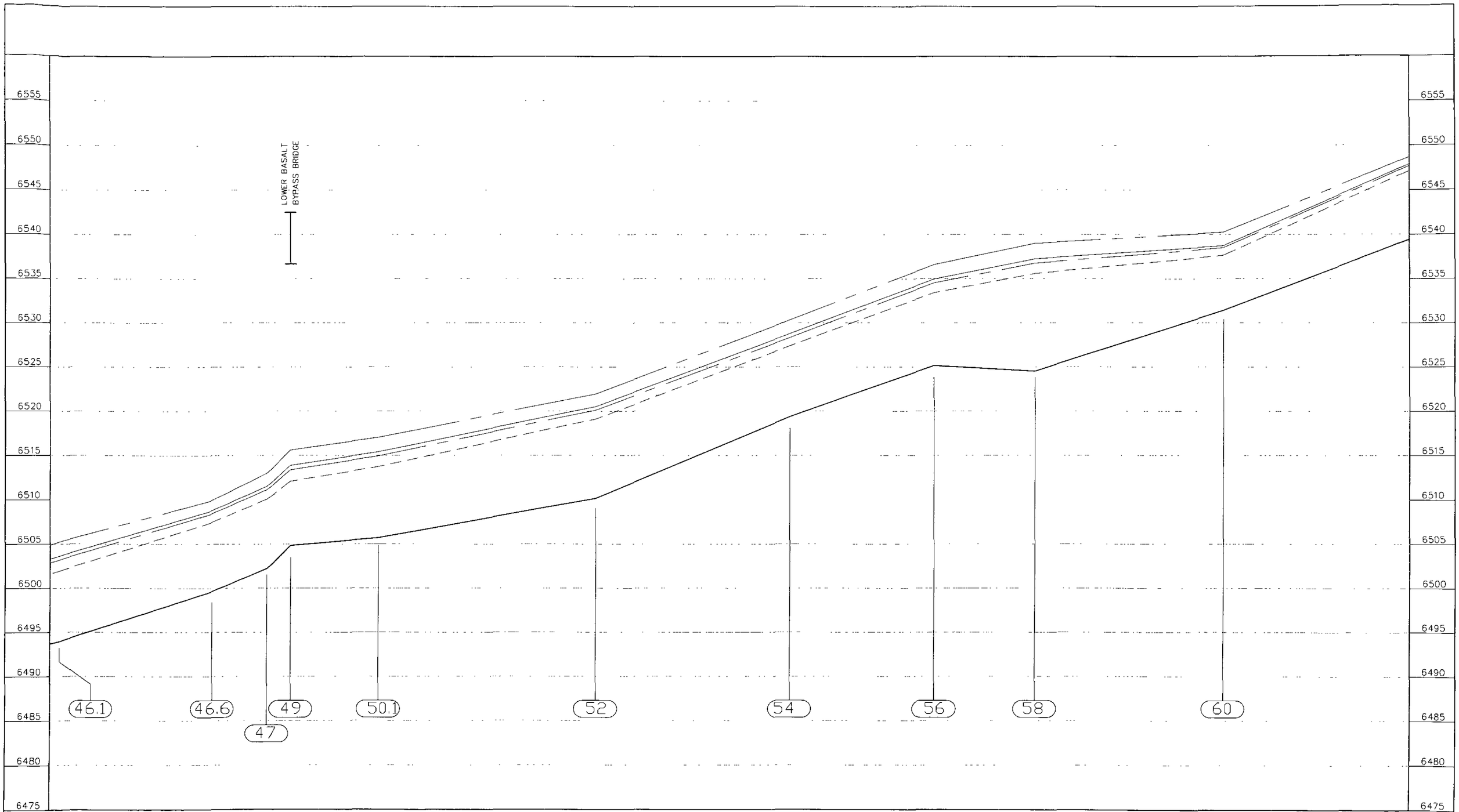
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	ROK	SCALE	DATE ISSUED: 07/24/00
DRAWN BY	MJK	HORIZ 1"=400'	SHEET NO. 3 OF 9
CHECKED BY	ROK	VERT 1"=10'	3P



200 0 100 200 400
SCALE: 1"=400' Horiz.
SCALE: 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

Matrix Design Group, Inc.
Integrated Design Solutions
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Denver, CO 80202
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Fax 303-572-0202

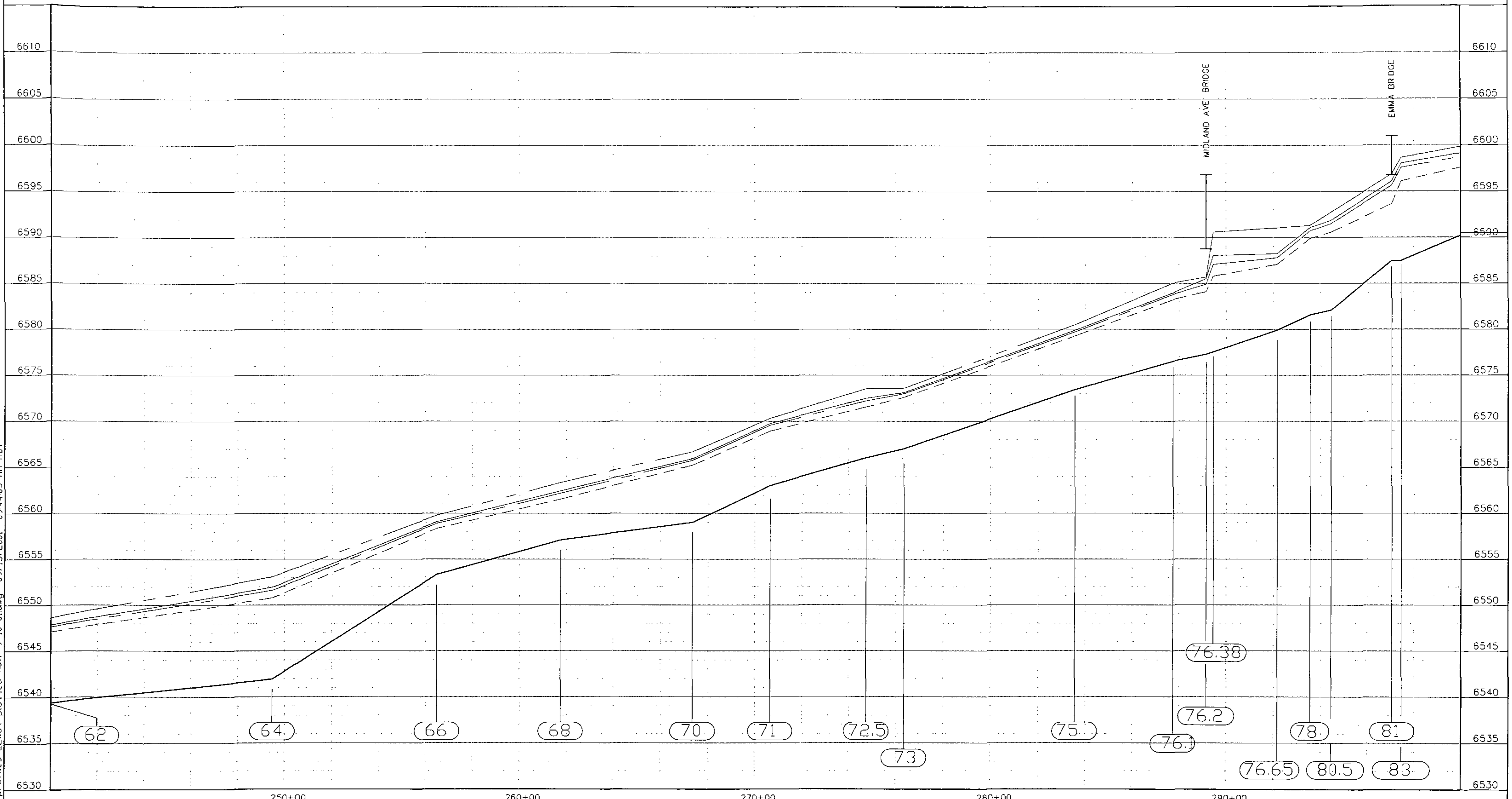
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE		DATE ISSUED 07/24/00	4P
DRAWN BY	MJK	HORIZ	1"=400	SHEET NO 4 OF 9	
CHECKED BY	RDK	VERT	1"=10		



200 0 100 200 400
SCALE: 1"=400' Horiz
SCALE: 1"=10' Vert

LEGEND:

CROSS SECTION	00
500 YEAR FLOOD	
100 YEAR FLOOD	
50 YEAR FLOOD	
10 YEAR FLOOD	
STREAM BED	

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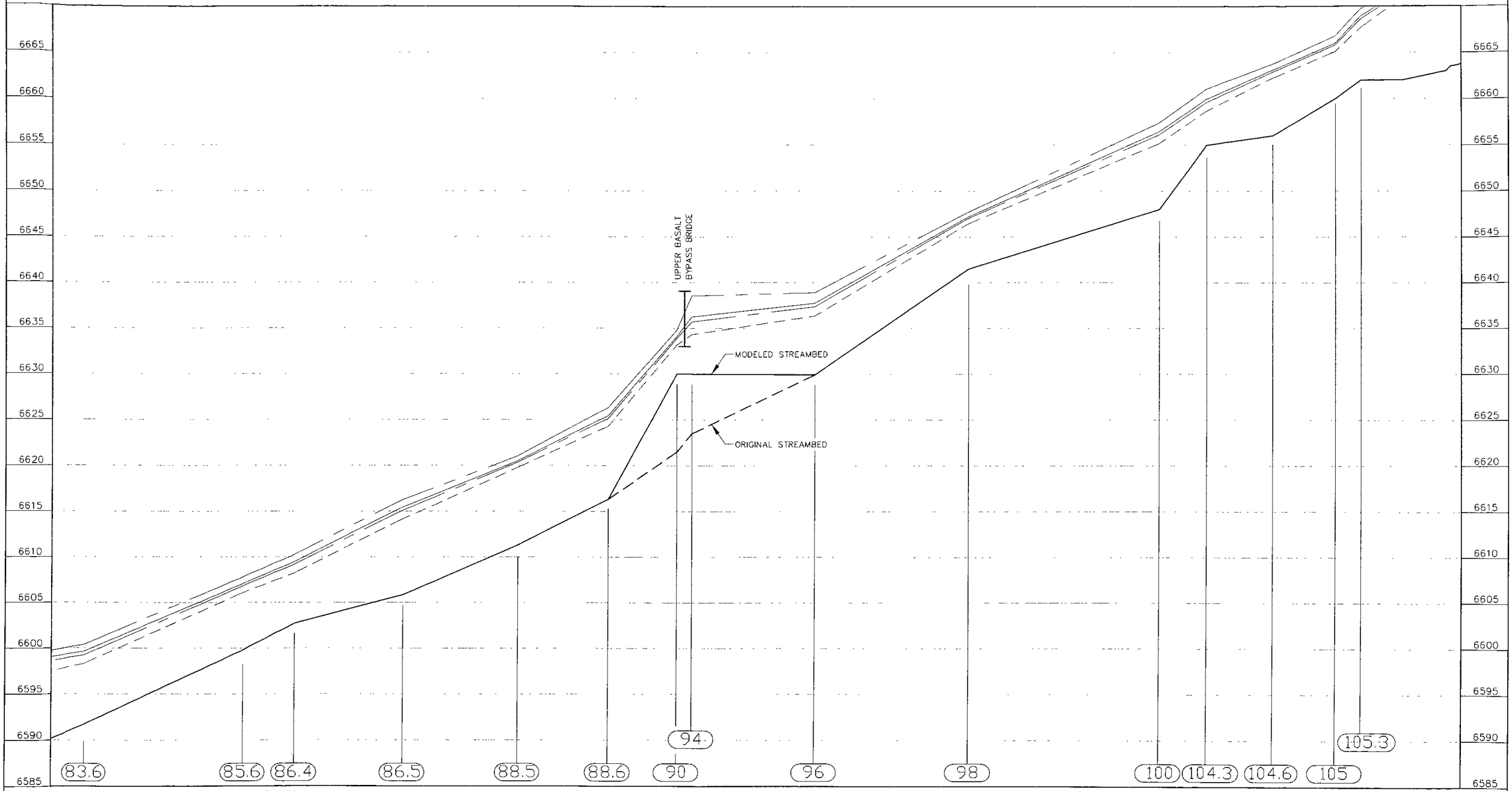
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY: RDK DRAWN BY: MJK CHECKED BY: RDK	SCALE HORIZ 1"=400' VERT 1"=10'	DATE ISSUED: 07/24/00 SHEET NO. 5 OF 9	5P



200 0 100 200 400
SCALE 1"=400' Horiz
SCALE 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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Fax 303-572-0202

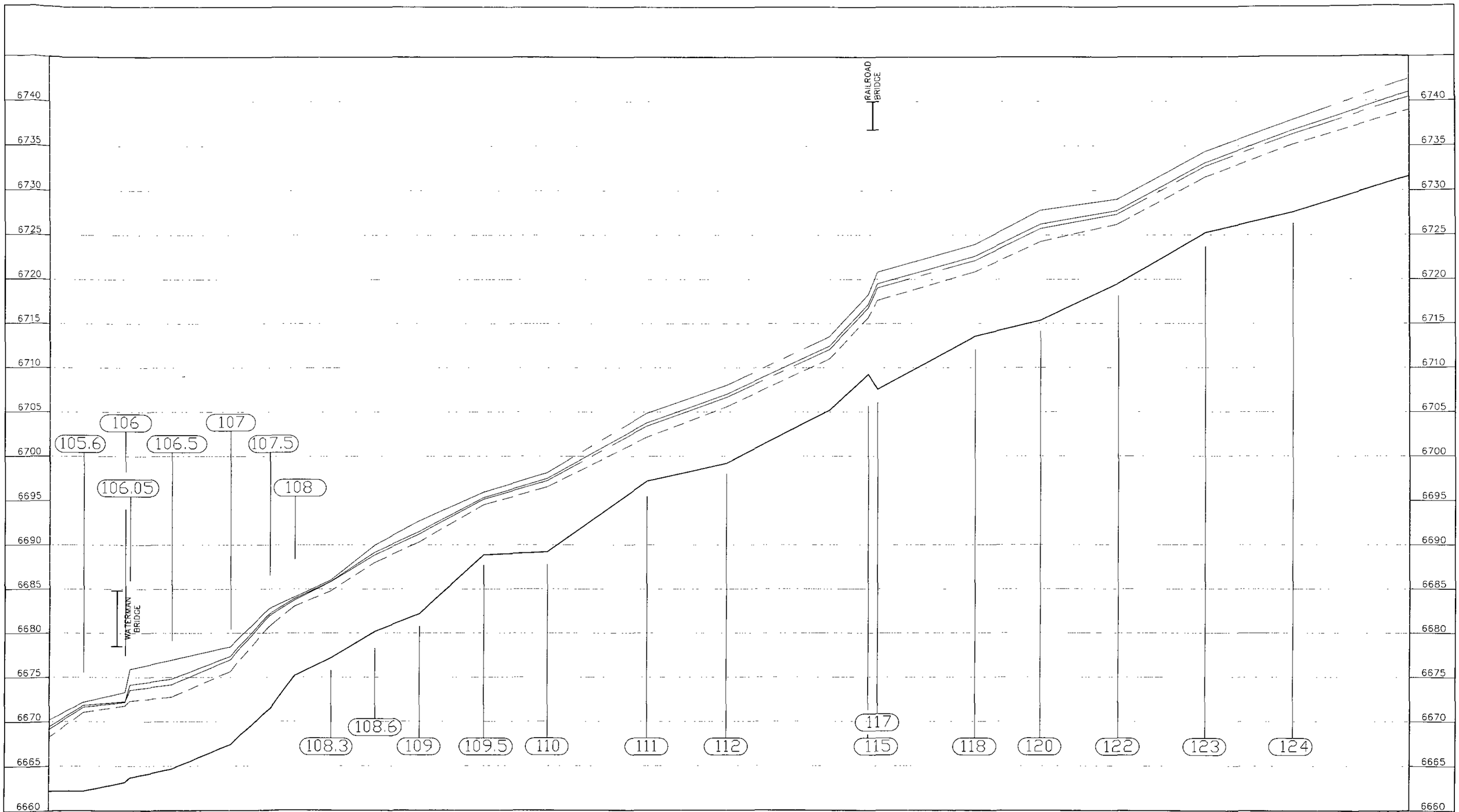
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE		DATE ISSUED 07/24/00	6P
DRAWN BY	MJK	HORIZ	1"=400'		
CHECKED BY	RDK	VERT	1"=10'	SHEET NO 6 OF 9	



200 0 100 200 400
SCALE: 1"=400' Horiz
SCALE: 1"=10' Vert

LEGEND:
CROSS SECTION (00)
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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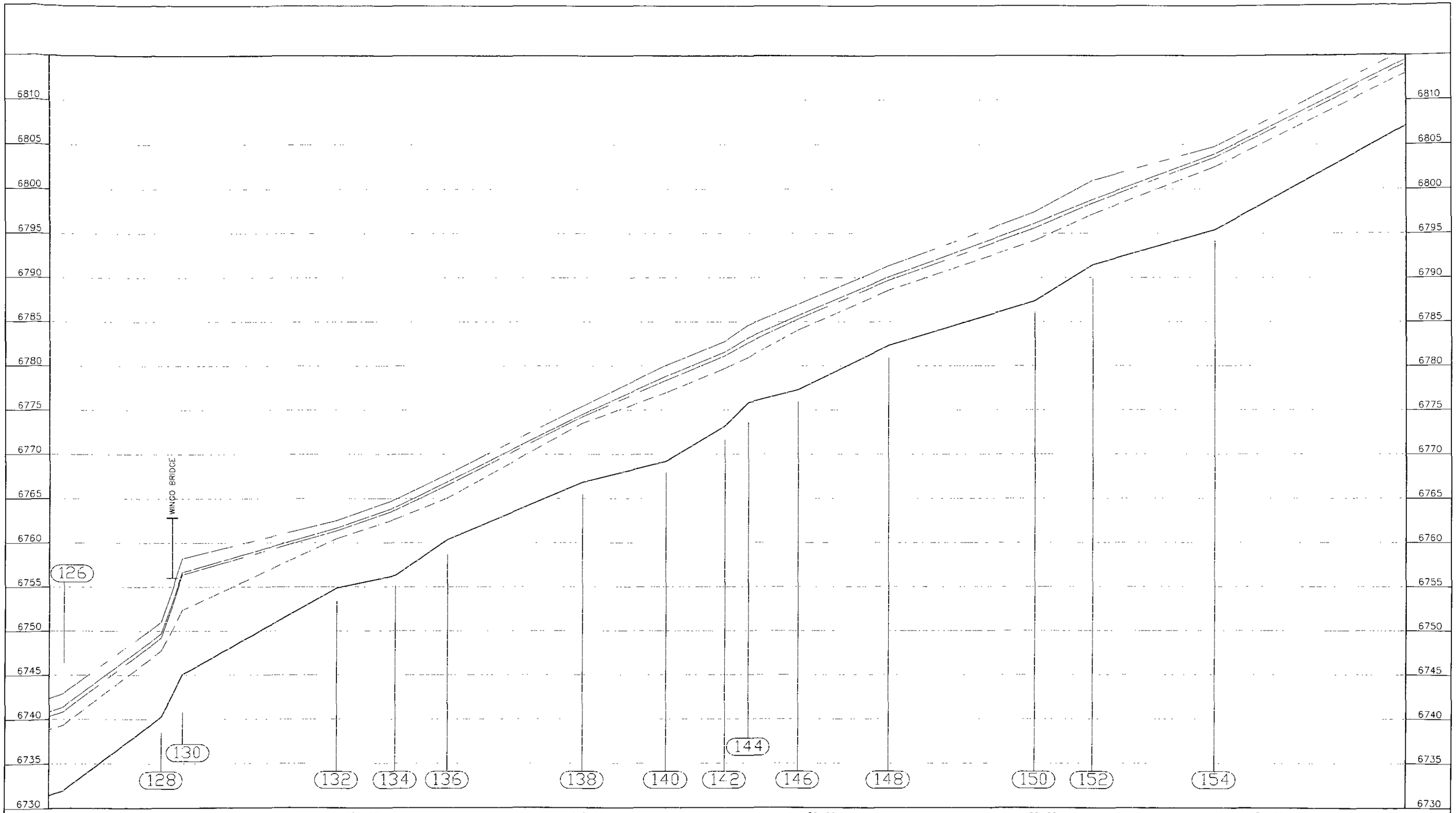
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE		DATE ISSUED 07/24/00	7P
DRAWN BY	MJK	HORIZ.	1"=400'		
CHECKED BY	RDK	VERT	1"=10'	SHEET NO. 7 OF 9	



200 0 100 200 400

SCALE: 1"=400' Horiz.
SCALE: 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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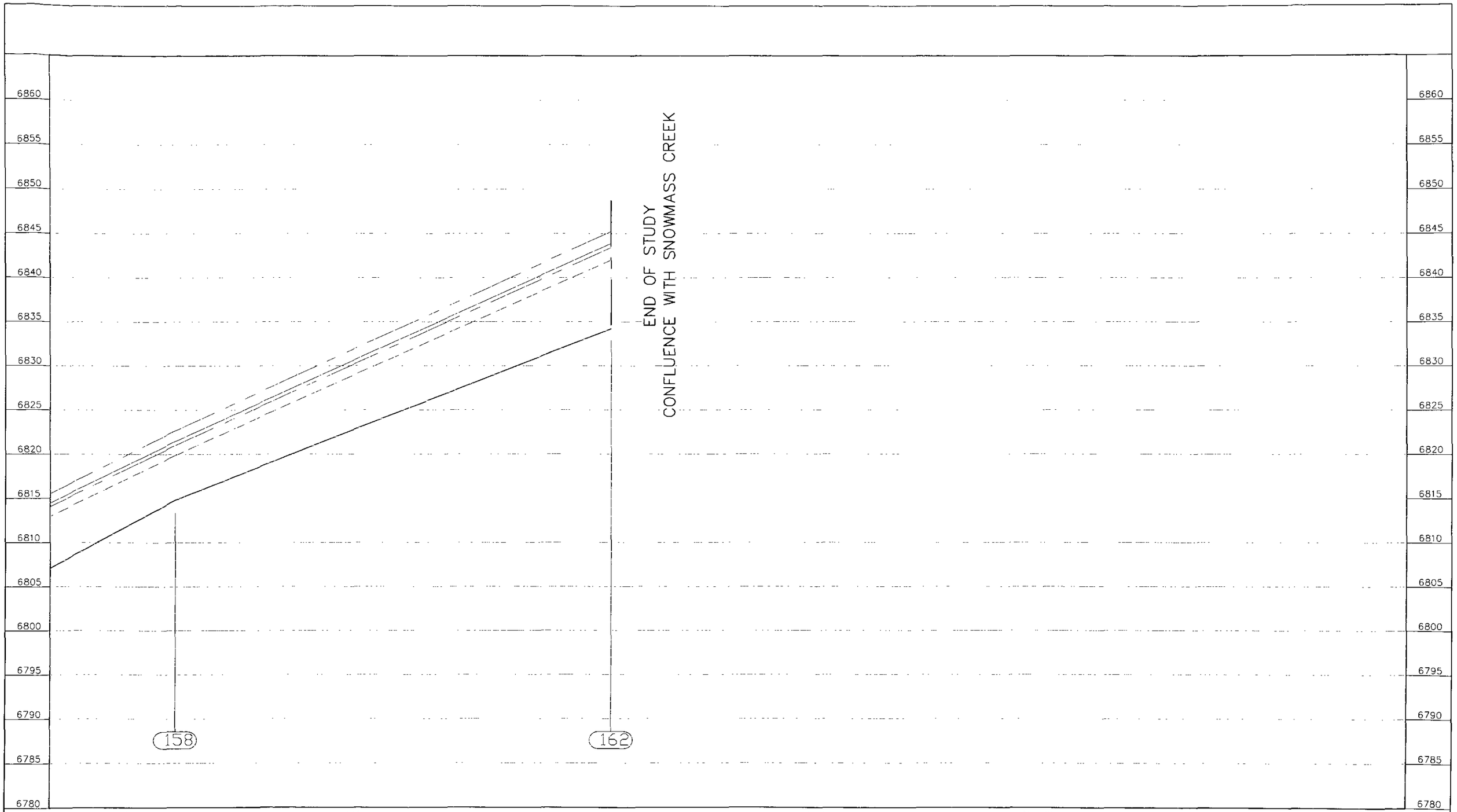
ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE		DATE ISSUED 07/24/00	8P
DRAWN BY	MJK	HORIZ	1"=400'		
CHECKED BY	RDK	VERT	1"=10'	SHEET NO 8 OF 9	



200 0 100 200 400
SCALE. 1"=400' Horiz
SCALE. 1"=10' Vert

LEGEND:

CROSS SECTION (00)

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

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Denver, CO 80202
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Fax 303-572-0202

ROARING FORK RIVER

EAGLE & PITKIN COUNTIES

FLOODPLAIN PROFILES

GARFIELD/EAGLE CO. LINE TO SNOWMASS CREEK

DESIGNED BY	RDK	SCALE		DATE ISSUED: 07/05/00	9P
DRAWN BY	WJK	HORIZ	1"=400'		
CHECKED BY	RDK	VERT	1"=10'	SHEET NO. 9 OF 9	

Roaring Fork River - Eagle & Pitkin Cnty

Reach-1

Legend

EG 100 Year

WS 100 Year

Ground

Elevation (ft)

6900
6800
6700
6600
6500
6400
6300

12 14 16 18 20 22 24 26 27.1 29.1 30 32.1 37.1 39.1 39.3 42.1 43.1 46.1 46.6 50.1 52 54 56 60 62 64 66 68 70 72.5 75 76.2 80.5 83.6 85.6 86.5 88.6 96 98 100 105 106.5 108 109 110 112 115 120 123 126 129 132 138 142 148 150 154 158 162

0 10000 20000 30000 40000 50000 60000

Main Channel Distance (ft)

HEC-RAS Plan: Floodplain River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	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)	
Reach-1	10	10 Year	7300.00	6368.11	6373.68	6373.68	6374.71	0.007144	8.95	1186.34	646.14	0.79
Reach-1	10	50 Year	9800.00	6368.11	6374.38	6374.38	6375.28	0.006662	8.85	1803.33	1081.67	0.77
Reach-1	10	100 Year	10800.00	6368.11	6374.53	6374.53	6375.46	0.006768	9.13	1958.30	1107.10	0.78
Reach-1	10	500 Year	14700.00	6368.11	6374.99	6374.99	6376.05	0.007269	10.13	2488.84	1190.05	0.82
Reach-1	12	10 Year	7300.00	6370.98	6379.64	6379.64	6380.58	0.006573	9.49	1499.26	1019.75	0.76
Reach-1	12	50 Year	9800.00	6370.98	6380.34	6380.34	6380.99	0.005377	8.67	2406.43	1503.03	0.69
Reach-1	12	100 Year	10800.00	6370.98	6380.43	6380.43	6381.11	0.005709	9.03	2536.39	1504.43	0.72
Reach-1	12	500 Year	14700.00	6370.98	6380.73	6380.73	6381.55	0.006863	10.30	2985.94	1509.26	0.79
Reach-1	14	10 Year	7300.00	6386.71	6393.36	6393.17	6394.77	0.008336	9.66	814.35	266.61	0.86
Reach-1	14	50 Year	9800.00	6386.71	6393.90	6393.90	6395.76	0.009437	11.19	959.21	270.83	0.93
Reach-1	14	100 Year	10800.00	6386.71	6394.27	6394.27	6396.12	0.008560	11.24	1084.99	371.38	0.90
Reach-1	14	500 Year	14700.00	6386.71	6395.28	6395.28	6397.31	0.007611	12.02	1468.16	389.01	0.88
Reach-1	16	10 Year	7300.00	6405.30	6409.67	6409.51	6410.58	0.010598	7.72	980.89	1075.00	0.89
Reach-1	16	50 Year	9800.00	6405.30	6410.31	6410.05	6411.28	0.008823	7.99	1289.12	1763.66	0.83
Reach-1	16	100 Year	10800.00	6405.30	6410.40	6410.21	6411.50	0.009672	8.53	1332.20	1766.50	0.88
Reach-1	16	500 Year	14700.00	6405.30	6410.89	6410.80	6412.34	0.010548	9.87	1579.45	1782.61	0.94
Reach-1	18	10 Year	7300.00	6412.69	6422.93	6422.93	6423.57	0.003551	8.07	2033.03	1429.32	0.57
Reach-1	18	50 Year	9800.00	6412.69	6423.24	6423.24	6423.95	0.004094	8.96	2490.37	1452.64	0.61
Reach-1	18	100 Year	10800.00	6412.69	6423.33	6423.28	6424.09	0.004431	9.40	2616.19	1458.98	0.64
Reach-1	18	500 Year	14700.00	6412.69	6423.93	6423.71	6424.58	0.003976	9.43	3499.81	1502.81	0.62
Reach-1	20	10 Year	7300.00	6420.98	6429.47	6429.47	6431.83	0.011334	12.33	591.89	127.08	1.01
Reach-1	20	50 Year	9800.00	6420.98	6431.23	6431.23	6432.26	0.004548	9.16	1820.93	1009.40	0.66
Reach-1	20	100 Year	10800.00	6420.98	6431.38	6431.38	6432.45	0.004715	9.49	1975.42	1025.20	0.68
Reach-1	20	500 Year	14700.00	6420.98	6431.97	6431.97	6433.10	0.004911	10.30	2593.97	1086.14	0.70
Reach-1	22	10 Year	7300.00	6426.69	6435.49		6435.97	0.001965	5.57	1314.47	252.95	0.43
Reach-1	22	50 Year	9800.00	6426.69	6435.47		6436.35	0.003568	7.49	1311.26	252.88	0.58
Reach-1	22	100 Year	10800.00	6426.69	6435.73		6436.69	0.003713	7.87	1376.76	254.27	0.59
Reach-1	22	500 Year	14700.00	6426.69	6436.53		6437.88	0.004390	9.34	1581.54	258.39	0.66
Reach-1	24	10 Year	7300.00	6439.90	6445.89	6445.89	6448.14	0.010311	12.14	625.11	146.48	0.98
Reach-1	24	50 Year	9800.00	6439.90	6446.90	6446.90	6449.59	0.009618	13.32	777.69	156.49	0.98
Reach-1	24	100 Year	10800.00	6439.90	6447.35	6447.35	6450.12	0.008997	13.55	849.50	161.15	0.96
Reach-1	24	500 Year	14700.00	6439.90	6449.43	6449.43	6451.78	0.005572	12.91	1470.48	373.97	0.79
Reach-1	26	10 Year	7300.00	6447.35	6455.51	6455.35	6457.02	0.007418	10.26	838.26	270.93	0.83
Reach-1	26	50 Year	9800.00	6447.35	6456.42	6456.42	6458.04	0.006606	10.87	1161.61	459.58	0.80
Reach-1	26	100 Year	10800.00	6447.35	6456.73	6456.73	6458.36	0.006354	11.05	1305.40	472.36	0.80
Reach-1	26	500 Year	14700.00	6447.35	6457.61	6457.61	6459.43	0.006305	12.06	1738.29	508.89	0.81
Reach-1	27.1	10 Year	7300.00	6452.61	6459.82		6460.47	0.002769	6.49	1170.08	281.17	0.51
Reach-1	27.1	50 Year	9800.00	6452.61	6460.62		6461.46	0.002964	7.41	1397.50	287.19	0.54
Reach-1	27.1	100 Year	10800.00	6452.61	6460.88		6461.80	0.003089	7.79	1471.49	289.02	0.56
Reach-1	27.1	500 Year	14700.00	6452.61	6461.82		6463.02	0.003397	9.00	1807.27	381.17	0.60
Reach-1	29.1	10 Year	7300.00	6459.12	6464.36	6464.36	6466.36	0.010929	11.39	653.41	169.17	0.99

Reach	River Sta	Profile	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)	
Reach-1	29.1	50 Year	9800.00	6459.12	6465.50	6465.50	6467.64	0.008517	11.84	890.33	265.73	0.91
Reach-1	29.1	100 Year	10800.00	6459.12	6465.86	6465.86	6468.06	0.008108	12.07	987.32	275.51	0.90
Reach-1	29.1	500 Year	14700.00	6459.12	6467.00	6467.00	6469.49	0.007439	13.08	1319.63	306.66	0.89
Reach-1	30	10 Year	7300.00	6462.20	6469.79	6468.78	6471.02	0.006361	8.91	818.91	189.69	0.76
Reach-1	30	50 Year	9800.00	6462.20	6470.45	6470.01	6472.10	0.007290	10.30	971.59	706.49	0.83
Reach-1	30	100 Year	10800.00	6462.20	6470.68	6470.28	6472.48	0.007578	10.82	1031.20	723.88	0.85
Reach-1	30	500 Year	14700.00	6462.20	6471.50	6471.42	6473.86	0.008202	12.46	1278.54	788.43	0.90
Reach-1	32.1	10 Year	7300.00	6465.05	6472.85		6473.97	0.005114	8.57	894.34	213.11	0.69
Reach-1	32.1	50 Year	9800.00	6465.05	6473.85		6475.18	0.004871	9.40	1116.43	229.99	0.69
Reach-1	32.1	100 Year	10800.00	6465.05	6474.20		6475.61	0.004828	9.72	1196.81	235.00	0.69
Reach-1	32.1	500 Year	14700.00	6465.05	6475.36		6477.13	0.004839	10.93	1480.79	251.92	0.71
Reach-1	33	10 Year	7300.00	6465.37	6473.80	6472.57	6475.14	0.005224	9.30	784.54	142.96	0.70
Reach-1	33	50 Year	9800.00	6465.37	6474.71	6473.56	6476.49	0.005760	10.70	915.70	144.96	0.75
Reach-1	33	100 Year	10800.00	6465.37	6475.02	6473.92	6476.98	0.005992	11.23	961.61	145.65	0.77
Reach-1	33	500 Year	14700.00	6465.37	6476.14	6475.31	6478.75	0.007214	12.97	1133.69	160.62	0.86
Reach-1	34		Bridge									
Reach-1	35	10 Year	7300.00	6462.67	6475.82	6472.06	6476.57	0.001778	6.94	1051.55	131.73	0.43
Reach-1	35	50 Year	9800.00	6462.67	6477.49	6473.16	6478.40	0.001781	7.69	1275.01	136.37	0.44
Reach-1	35	100 Year	10800.00	6462.67	6478.09	6473.56	6479.07	0.001790	7.96	1357.41	139.65	0.45
Reach-1	35	500 Year	14700.00	6462.67	6480.04	6475.05	6481.30	0.001902	9.01	1632.23	181.32	0.47
Reach-1	36.1	10 Year	7300.00	6468.83	6476.08	6474.38	6476.98	0.003317	7.67	976.97	187.50	0.57
Reach-1	36.1	50 Year	9800.00	6468.83	6477.80	6475.22	6478.73	0.002398	7.81	1305.33	194.49	0.51
Reach-1	36.1	100 Year	10800.00	6468.83	6478.44	6475.53	6479.38	0.002185	7.88	1430.75	197.09	0.49
Reach-1	36.1	500 Year	14700.00	6468.83	6480.57	6476.67	6481.61	0.001779	8.33	2007.98	336.42	0.46
Reach-1	37.1	10 Year	7300.00	6469.53	6477.43	6476.52	6478.35	0.005278	7.76	972.78	254.29	0.68
Reach-1	37.1	50 Year	9800.00	6469.53	6478.78	6477.21	6479.68	0.003577	7.75	1318.82	259.64	0.59
Reach-1	37.1	100 Year	10800.00	6469.53	6479.35	6477.45	6480.24	0.003076	7.68	1487.22	336.04	0.56
Reach-1	37.1	500 Year	14700.00	6469.53	6481.51	6478.35	6482.22	0.001754	7.13	2636.46	621.00	0.44
Reach-1	38.1	10 Year	7300.00	6471.48	6479.48	6479.48	6481.29	0.006174	12.31	898.05	256.29	0.81
Reach-1	38.1	50 Year	9800.00	6471.48	6480.36	6480.36	6482.42	0.006415	13.55	1132.34	288.78	0.84
Reach-1	38.1	100 Year	10800.00	6471.48	6480.79	6480.79	6482.81	0.006052	13.63	1271.54	356.20	0.83
Reach-1	38.1	500 Year	14700.00	6471.48	6482.12	6482.12	6484.03	0.005288	14.04	1881.27	563.34	0.79
Reach-1	39.1	10 Year	7300.00	6473.80	6482.08		6482.66	0.002364	6.46	1342.60	346.27	0.48
Reach-1	39.1	50 Year	9800.00	6473.80	6483.11		6483.76	0.002210	6.98	1795.60	575.20	0.47
Reach-1	39.1	100 Year	10800.00	6473.80	6483.43		6484.10	0.002197	7.18	1997.39	665.42	0.48
Reach-1	39.1	500 Year	14700.00	6473.80	6484.46		6485.26	0.002318	8.07	2829.64	907.72	0.50
Reach-1	39.2	10 Year	7300.00	6478.44	6483.65	6483.58	6484.84	0.012254	8.82	849.01	622.24	0.97
Reach-1	39.2	50 Year	9800.00	6478.44	6484.42	6484.15	6485.66	0.009067	9.03	1126.40	643.66	0.87
Reach-1	39.2	100 Year	10800.00	6478.44	6484.69	6484.36	6485.97	0.008473	9.19	1225.14	651.07	0.85
Reach-1	39.2	500 Year	14700.00	6478.44	6485.87	6485.13	6486.50	0.003534	7.16	2734.96	832.95	0.58

Reach	River Sta	Profile	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)	
Reach-1	39.3	10 Year	7300.00	6479.87	6486.81	6486.18	6487.66	0.005288	7.57	1106.73	907.19	0.68
Reach-1	39.3	50 Year	9800.00	6479.87	6487.26	6486.95	6488.37	0.006177	8.80	1324.33	910.55	0.75
Reach-1	39.3	100 Year	10800.00	6479.87	6487.44	6487.18	6488.63	0.006362	9.17	1412.77	912.86	0.76
Reach-1	39.3	500 Year	14700.00	6479.87	6487.77	6487.77	6488.29	0.003497	7.13	3032.12	917.10	0.57
Reach-1	41.1	10 Year	7300.00	6482.94	6488.73	6488.65	6490.42	0.007294	10.79	806.02	455.63	0.84
Reach-1	41.1	50 Year	9800.00	6482.94	6489.56	6489.56	6491.50	0.007230	11.86	1043.49	593.86	0.86
Reach-1	41.1	100 Year	10800.00	6482.94	6489.86	6489.86	6491.89	0.007174	12.21	1137.73	624.50	0.86
Reach-1	41.1	500 Year	14700.00	6482.94	6490.76	6490.76	6492.17	0.005136	11.30	2180.22	705.51	0.74
Reach-1	42.1	10 Year	7300.00	6484.22	6492.04	6490.84	6493.52	0.004803	9.86	803.72	285.78	0.70
Reach-1	42.1	50 Year	9800.00	6484.22	6492.89		6494.72	0.005204	11.19	1063.42	312.21	0.74
Reach-1	42.1	100 Year	10800.00	6484.22	6493.19		6495.12	0.005291	11.60	1156.60	313.49	0.76
Reach-1	42.1	500 Year	14700.00	6484.22	6494.09	6494.09	6496.49	0.005930	13.26	1439.84	317.36	0.82
Reach-1	43.1	10 Year	7300.00	6489.52	6496.52		6498.85	0.008257	12.50	637.60	137.48	0.91
Reach-1	43.1	50 Year	9800.00	6489.52	6497.51	6497.50	6500.43	0.008531	14.10	777.73	146.51	0.95
Reach-1	43.1	100 Year	10800.00	6489.52	6497.94	6497.94	6501.01	0.008339	14.51	840.87	150.40	0.95
Reach-1	43.1	500 Year	14700.00	6489.52	6499.46	6499.46	6503.06	0.007770	15.91	1094.29	188.27	0.95
Reach-1	46.1	10 Year	7300.00	6493.92	6501.92		6502.79	0.003538	7.51	979.00	194.47	0.58
Reach-1	46.1	50 Year	9800.00	6493.92	6503.19		6504.19	0.003147	8.03	1234.64	203.13	0.56
Reach-1	46.1	100 Year	10800.00	6493.92	6503.62		6504.68	0.003058	8.28	1322.57	203.82	0.56
Reach-1	46.1	500 Year	14700.00	6493.92	6505.21		6506.48	0.002785	9.09	1647.32	206.35	0.56
Reach-1	46.6	10 Year	7300.00	6499.61	6507.45	6507.45	6509.53	0.007446	13.06	775.89	183.32	0.88
Reach-1	46.6	50 Year	9800.00	6499.61	6508.41	6508.41	6510.83	0.007590	14.39	952.69	186.66	0.91
Reach-1	46.6	100 Year	10800.00	6499.61	6508.76	6508.76	6511.31	0.007635	14.86	1017.84	187.60	0.92
Reach-1	46.6	500 Year	14700.00	6499.61	6509.92	6509.92	6513.03	0.008016	16.66	1238.43	190.77	0.97
Reach-1	47	10 Year	7300.00	6502.20	6510.03	6508.48	6511.12	0.004088	8.38	870.64	158.11	0.63
Reach-1	47	50 Year	9800.00	6502.20	6511.10	6509.39	6512.47	0.004223	9.40	1042.63	163.13	0.66
Reach-1	47	100 Year	10800.00	6502.20	6511.49	6509.76	6512.97	0.004270	9.76	1106.87	164.96	0.66
Reach-1	47	500 Year	14700.00	6502.20	6512.95	6511.02	6514.78	0.004292	10.86	1353.04	171.81	0.68
Reach-1	48		Bridge									
Reach-1	49	10 Year	7300.00	6504.81	6512.08	6510.58	6513.37	0.004442	9.12	800.53	134.91	0.66
Reach-1	49	50 Year	9800.00	6504.81	6513.36	6511.64	6514.93	0.004291	10.04	976.05	137.82	0.66
Reach-1	49	100 Year	10800.00	6504.81	6513.87	6511.97	6515.52	0.004200	10.33	1045.86	138.97	0.66
Reach-1	49	500 Year	14700.00	6504.81	6515.59	6513.32	6517.61	0.004066	11.40	1289.03	142.87	0.67
Reach-1	50.1	10 Year	7300.00	6505.68	6513.69		6515.10	0.004342	9.62	780.64	131.13	0.67
Reach-1	50.1	50 Year	9800.00	6505.68	6514.88		6516.67	0.004373	10.82	940.15	135.44	0.69
Reach-1	50.1	100 Year	10800.00	6505.68	6515.33		6517.26	0.004359	11.23	1001.89	137.07	0.70
Reach-1	50.1	500 Year	14700.00	6505.68	6516.93		6519.36	0.004346	12.65	1225.68	142.82	0.72
Reach-1	52	10 Year	7100.00	6510.13	6519.11	6519.01	6521.41	0.010080	12.17	589.44	130.37	0.96
Reach-1	52	50 Year	9400.00	6510.13	6520.12	6520.08	6522.85	0.009433	13.31	726.32	141.24	0.96
Reach-1	52	100 Year	10400.00	6510.13	6520.50	6520.49	6523.42	0.009336	13.80	780.12	142.77	0.97
Reach-1	52	500 Year	14300.00	6510.13	6521.92	6521.92	6525.46	0.008758	15.29	986.79	148.52	0.97

Reach	River Sta	Profile	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)	
Reach-1	54	10 Year	7100.00	6519.35	6527.34	6527.22	6529.81	0.009476	12.80	583.44	113.92	0.95
Reach-1	54	50 Year	9400.00	6519.35	6528.30	6528.30	6531.40	0.009689	14.37	693.68	116.46	0.99
Reach-1	54	100 Year	10400.00	6519.35	6528.75	6528.75	6532.04	0.009451	14.83	746.38	117.66	0.99
Reach-1	54	500 Year	14300.00	6519.35	6530.30	6530.30	6534.35	0.008997	16.53	932.32	121.67	0.99
Reach-1	56	10 Year	7100.00	6525.13	6533.41		6534.79	0.006289	9.47	763.11	167.11	0.76
Reach-1	56	50 Year	9400.00	6525.13	6534.51		6536.09	0.005476	10.14	949.03	170.74	0.74
Reach-1	56	100 Year	10400.00	6525.13	6534.94		6536.61	0.005286	10.44	1022.36	172.16	0.73
Reach-1	56	500 Year	14300.00	6525.13	6536.58		6538.53	0.004566	11.32	1309.00	177.57	0.71
Reach-1	58	10 Year	7100.00	6524.49	6535.57		6535.96	0.001277	5.10	1521.36	303.06	0.36
Reach-1	58	50 Year	9400.00	6524.49	6536.74		6537.19	0.001209	5.56	1877.32	307.24	0.36
Reach-1	58	100 Year	10400.00	6524.49	6537.22		6537.69	0.001183	5.73	2024.15	308.95	0.36
Reach-1	58	500 Year	14300.00	6524.49	6538.98		6539.54	0.001084	6.26	2574.14	315.26	0.35
Reach-1	60	10 Year	7100.00	6531.40	6537.62	6537.62	6539.17	0.012592	9.98	711.43	229.74	1.00
Reach-1	60	50 Year	9400.00	6531.40	6538.47	6538.47	6540.01	0.012558	9.96	949.74	332.62	1.00
Reach-1	60	100 Year	10400.00	6531.40	6538.71	6538.71	6540.33	0.012009	10.22	1029.59	345.92	0.99
Reach-1	60	500 Year	14300.00	6531.40	6540.23		6541.57	0.006183	9.41	1620.28	422.53	0.75
Reach-1	62	10 Year	7100.00	6539.35	6546.57		6547.73	0.008956	10.03	1005.10	406.47	0.88
Reach-1	62	50 Year	9400.00	6539.35	6547.13		6548.43	0.008785	10.84	1239.03	427.45	0.89
Reach-1	62	100 Year	10400.00	6539.35	6547.30		6548.71	0.009101	11.32	1315.38	434.08	0.92
Reach-1	62	500 Year	14300.00	6539.35	6548.01	6548.01	6549.71	0.009405	12.63	1632.08	460.21	0.95
Reach-1	64	10 Year	7100.00	6541.90	6550.50		6550.87	0.001634	4.95	1572.51	455.24	0.39
Reach-1	64	50 Year	9400.00	6541.90	6551.22		6551.68	0.001722	5.56	1903.41	461.17	0.41
Reach-1	64	100 Year	10400.00	6541.90	6551.53		6552.01	0.001733	5.78	2043.85	463.66	0.42
Reach-1	64	500 Year	14300.00	6541.90	6552.57		6553.19	0.001834	6.61	2591.58	577.85	0.44
Reach-1	66	10 Year	7100.00	6553.30	6558.34	6558.34	6559.53	0.013492	8.77	810.03	340.45	1.00
Reach-1	66	50 Year	9400.00	6553.30	6558.86	6558.86	6560.25	0.013086	9.46	993.91	364.22	1.01
Reach-1	66	100 Year	10400.00	6553.30	6559.05	6559.05	6560.53	0.012928	9.78	1063.37	367.16	1.01
Reach-1	66	500 Year	14300.00	6553.30	6559.76	6559.76	6561.56	0.012076	10.76	1329.60	378.22	1.01
Reach-1	68	10 Year	7100.00	6557.06	6561.52		6561.83	0.002042	4.68	1721.27	600.51	0.42
Reach-1	68	50 Year	9400.00	6557.06	6562.16		6562.54	0.002028	5.17	2125.17	688.64	0.43
Reach-1	68	100 Year	10400.00	6557.06	6562.42		6562.83	0.002028	5.37	2308.37	729.87	0.44
Reach-1	68	500 Year	14300.00	6557.06	6563.31		6563.80	0.001990	5.97	3025.56	872.76	0.44
Reach-1	70	10 Year	7100.00	6559.00	6565.21	6565.21	6566.41	0.007356	9.54	1138.98	529.82	0.81
Reach-1	70	50 Year	9400.00	6559.00	6565.73	6565.73	6567.12	0.007733	10.56	1419.72	541.87	0.85
Reach-1	70	100 Year	10400.00	6559.00	6565.92	6565.92	6567.41	0.008035	11.03	1518.79	546.06	0.87
Reach-1	70	500 Year	14300.00	6559.00	6566.67	6566.67	6568.52	0.008654	12.57	1971.37	664.32	0.92
Reach-1	71	10 Year	7100.00	6563.00	6568.92	6568.92	6570.17	0.010303	10.31	1081.74	1051.84	0.94
Reach-1	71	50 Year	9400.00	6563.00	6569.55	6569.55	6570.90	0.009715	10.99	1377.51	1077.36	0.93
Reach-1	71	100 Year	10400.00	6563.00	6569.73	6569.73	6571.19	0.010064	11.47	1464.79	1081.80	0.95
Reach-1	71	500 Year	14300.00	6563.00	6570.29	6570.29	6572.22	0.011931	13.41	1732.45	1091.99	1.05

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	72.5	10 Year	7100.00	6566.00	6571.51		6571.71	0.001711	4.36	2291.41	680.10	0.39
Reach-1	72.5	50 Year	9400.00	6566.00	6572.18		6572.42	0.001711	4.84	2746.76	681.30	0.40
Reach-1	72.5	100 Year	10400.00	6566.00	6572.46		6572.72	0.001693	5.01	2940.11	681.80	0.40
Reach-1	72.5	500 Year	14300.00	6566.00	6573.50		6573.82	0.001618	5.57	3648.85	683.66	0.40
Reach-1	73	10 Year	7100.00	6567.00	6572.58	6572.58	6573.40	0.014857	8.96	1275.67	847.29	1.04
Reach-1	73	50 Year	9400.00	6567.00	6572.96	6572.96	6573.87	0.014100	9.65	1597.37	870.69	1.04
Reach-1	73	100 Year	10400.00	6567.00	6573.09	6573.09	6574.05	0.014157	9.99	1713.56	878.99	1.05
Reach-1	73	500 Year	14300.00	6567.00	6573.56	6573.56	6574.71	0.014269	11.12	2131.12	908.20	1.08
Reach-1	75	10 Year	7100.00	6573.40	6579.23		6580.03	0.006252	7.71	1242.27	696.88	0.72
Reach-1	75	50 Year	9400.00	6573.40	6579.65		6580.60	0.006647	8.58	1547.22	738.85	0.76
Reach-1	75	100 Year	10400.00	6573.40	6579.83		6580.82	0.006706	8.87	1679.73	756.36	0.77
Reach-1	75	500 Year	14300.00	6573.40	6580.44		6581.59	0.006849	9.83	2150.26	780.11	0.80
Reach-1	76	10 Year	7100.00	6576.50	6583.21	6583.21	6584.49	0.009580	10.11	1216.50	785.11	0.91
Reach-1	76	50 Year	9400.00	6576.50	6583.77	6583.77	6585.25	0.009900	11.10	1519.07	821.14	0.94
Reach-1	76	100 Year	10400.00	6576.50	6583.94	6583.94	6585.56	0.010417	11.64	1617.27	832.34	0.97
Reach-1	76	500 Year	14300.00	6576.50	6585.01	6585.01	6585.88	0.005618	9.62	3103.23	1007.23	0.73
Reach-1	77	10 Year	7100.00	6577.15	6584.09	6584.09	6586.15	0.008148	11.81	680.61	878.88	1.00
Reach-1	77	50 Year	9400.00	6577.15	6584.92	6584.92	6587.44	0.007853	13.05	823.30	994.62	1.01
Reach-1	77	100 Year	10400.00	6577.15	6585.51	6585.51	6586.87	0.004496	10.60	2865.79	1061.51	0.78
Reach-1	77	500 Year	14300.00	6577.15	6585.70	6585.70	6588.08	0.007556	14.04	3016.43	1089.68	1.02
Reach-1	78		Mult Open									
Reach-1	79.35	10 Year	7100.00	6577.15	6585.80	6584.04	6586.50	0.002042	7.39	3076.66	915.21	0.53
Reach-1	79.35	50 Year	9400.00	6577.15	6587.08	6584.91	6587.87	0.001807	7.90	4189.75	1059.72	0.51
Reach-1	79.35	100 Year	10400.00	6577.15	6588.06	6585.51	6588.76	0.001378	7.50	5121.25	1089.14	0.46
Reach-1	79.35	500 Year	14300.00	6577.15	6590.61	6586.06	6591.10	0.000784	6.76	8481.83	1200.56	0.36
Reach-1	79.65	10 Year	7100.00	6579.90	6587.09	6587.09	6588.66	0.024430	10.59	1461.01	771.24	0.87
Reach-1	79.65	50 Year	9400.00	6579.90	6587.82	6587.82	6589.62	0.024815	11.57	1944.86	867.82	0.89
Reach-1	79.65	100 Year	10400.00	6579.90	6588.27	6587.99	6590.02	0.022586	11.53	2250.63	914.62	0.86
Reach-1	79.65	500 Year	14300.00	6579.90	6591.06	6588.91	6591.54	0.004920	6.83	5445.90	1133.52	0.43
Reach-1	80	10 Year	7100.00	6581.56	6589.87	6588.42	6590.49	0.007457	6.77	2273.43	1016.55	0.50
Reach-1	80	50 Year	9400.00	6581.56	6590.77	6589.19	6591.45	0.007320	7.33	3019.62	1051.20	0.51
Reach-1	80	100 Year	10400.00	6581.56	6591.08	6589.44	6591.80	0.007440	7.60	3283.89	1056.65	0.51
Reach-1	80	500 Year	14300.00	6581.56	6591.58	6590.34	6592.68	0.010620	9.47	3708.82	1062.86	0.62
Reach-1	80.5	10 Year	7100.00	6582.08	6590.59	6588.53	6591.13	0.006369	6.20	1310.33	557.45	0.46
Reach-1	80.5	50 Year	9400.00	6582.08	6591.52	6589.60	6592.07	0.005679	6.41	1752.14	661.92	0.44
Reach-1	80.5	100 Year	10400.00	6582.08	6591.87	6590.01	6592.42	0.005423	6.47	1940.51	695.09	0.44
Reach-1	80.5	500 Year	14300.00	6582.08	6592.85	6590.99	6593.42	0.005297	6.95	2699.26	973.25	0.44
Reach-1	81	10 Year	6100.00	6587.43	6593.63	6593.63	6595.92	0.034119	12.12	503.28	111.54	1.01
Reach-1	81	50 Year	8500.00	6587.43	6595.65	6595.65	6597.34	0.017804	10.75	899.89	315.62	0.76
Reach-1	81	100 Year	9400.00	6587.43	6596.02	6596.02	6597.68	0.016804	10.80	1022.74	349.95	0.74
Reach-1	81	500 Year	12200.00	6587.43	6596.88	6596.88	6598.52	0.015635	11.17	1355.52	429.39	0.73

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	82		Bridge									
Reach-1	83	10 Year	6100.00	6587.43	6596.21	6593.63	6596.83	0.006193	6.66	1091.07	367.67	0.45
Reach-1	83	50 Year	8500.00	6587.43	6597.68	6595.65	6598.17	0.004439	6.28	1731.31	503.00	0.39
Reach-1	83	100 Year	9400.00	6587.43	6598.00	6596.02	6598.49	0.004455	6.39	1892.56	532.01	0.39
Reach-1	83	500 Year	12200.00	6587.43	6598.80	6596.87	6599.33	0.004490	6.78	2361.53	648.39	0.40
Reach-1	83.6	10 Year	6100.00	6591.70	6598.57		6599.23	0.005861	7.04	974.64	302.31	0.69
Reach-1	83.6	50 Year	8500.00	6591.70	6599.39		6600.20	0.005400	7.84	1223.13	305.06	0.69
Reach-1	83.6	100 Year	9400.00	6591.70	6599.66		6600.53	0.005339	8.14	1304.85	305.75	0.69
Reach-1	83.6	500 Year	12200.00	6591.70	6600.40		6601.74	0.006810	10.22	1643.62	583.35	0.80
Reach-1	85.6	10 Year	6100.00	6599.80	6606.10	6606.10	6607.48	0.010376	10.12	744.57	290.22	0.94
Reach-1	85.6	50 Year	8500.00	6599.80	6606.84	6606.84	6608.46	0.009822	11.16	971.12	319.06	0.94
Reach-1	85.6	100 Year	9400.00	6599.80	6607.09	6607.09	6608.79	0.009750	11.52	1049.37	328.44	0.95
Reach-1	85.6	500 Year	12200.00	6599.80	6607.82	6607.82	6609.74	0.009261	12.40	1299.63	356.77	0.95
Reach-1	86.4	10 Year	6100.00	6602.72	6608.25	6608.11	6609.81	0.010117	10.05	627.64	223.54	0.92
Reach-1	86.4	50 Year	8500.00	6602.72	6609.21	6609.21	6610.88	0.008688	10.60	900.60	296.67	0.88
Reach-1	86.4	100 Year	9400.00	6602.72	6609.49	6609.49	6611.23	0.008601	10.89	981.57	299.83	0.89
Reach-1	86.4	500 Year	12200.00	6602.72	6610.27	6610.27	6612.18	0.008268	11.60	1225.76	344.98	0.89
Reach-1	86.5	10 Year	6100.00	6605.85	6614.18	6614.18	6615.83	0.011795	10.33	601.14	207.55	0.98
Reach-1	86.5	50 Year	8500.00	6605.85	6615.12	6615.12	6616.98	0.010056	11.08	822.22	266.36	0.94
Reach-1	86.5	100 Year	9400.00	6605.85	6615.47	6615.47	6617.36	0.009313	11.19	920.76	288.82	0.92
Reach-1	86.5	500 Year	12200.00	6605.85	6616.28	6616.28	6618.36	0.008587	11.94	1167.28	313.28	0.90
Reach-1	86.6	10 Year	6100.00	6611.32	6619.81		6620.83	0.008698	8.11	753.58	253.71	0.83
Reach-1	86.6	50 Year	8500.00	6611.32	6620.39		6621.78	0.009396	9.47	900.48	254.90	0.88
Reach-1	86.6	100 Year	9400.00	6611.32	6620.54		6622.10	0.010027	10.05	938.59	255.21	0.92
Reach-1	86.6	500 Year	12200.00	6611.32	6621.06	6620.99	6623.08	0.010941	11.43	1071.55	259.03	0.98
Reach-1	88.6	10 Year	6100.00	6616.33	6624.30	6624.30	6626.02	0.012497	10.54	579.14	172.75	1.01
Reach-1	88.6	50 Year	8500.00	6616.33	6625.15	6625.15	6627.28	0.011548	11.72	728.79	177.91	1.00
Reach-1	88.6	100 Year	9400.00	6616.33	6625.45	6625.45	6627.72	0.011218	12.09	782.79	180.05	1.00
Reach-1	88.6	500 Year	12200.00	6616.33	6626.33	6626.33	6628.99	0.010418	13.11	943.70	186.52	0.99
Reach-1	90	10 Year	6100.00	6630.00	6632.61	6632.61	6633.78	0.012300	8.93	749.17	357.38	0.97
Reach-1	90	50 Year	8500.00	6630.00	6633.23	6633.23	6634.64	0.011370	9.89	960.02	405.29	0.97
Reach-1	90	100 Year	9400.00	6630.00	6633.45	6633.45	6634.93	0.011049	10.19	1037.55	422.20	0.97
Reach-1	90	500 Year	12200.00	6630.00	6634.20	6634.20	6635.68	0.008859	10.40	1419.22	465.27	0.89
Reach-1	92		Bridge									
Reach-1	94	10 Year	6100.00	6630.00	6634.33	6633.28	6635.07	0.004823	6.91	883.10	457.37	0.64
Reach-1	94	50 Year	8500.00	6630.00	6635.75	6634.03	6636.47	0.003379	6.80	1250.35	557.86	0.56
Reach-1	94	100 Year	9400.00	6630.00	6636.27	6634.29	6636.98	0.002999	6.73	1396.21	594.41	0.53
Reach-1	94	500 Year	12200.00	6630.00	6638.56	6635.04	6638.74	0.000704	3.94	3928.53	715.98	0.27
Reach-1	96	10 Year	6100.00	6629.90	6636.35		6636.89	0.002576	5.92	1030.73	224.69	0.49

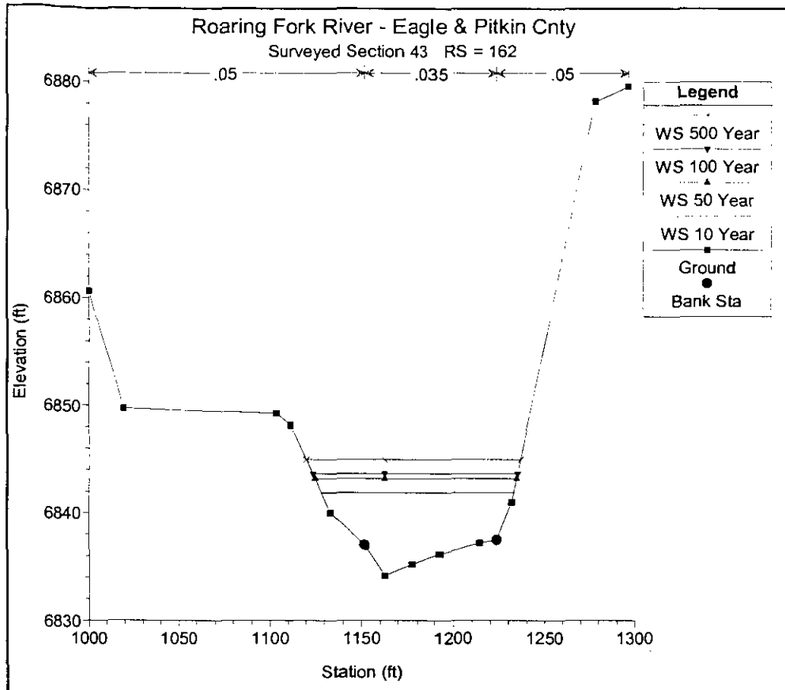
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	96	50 Year	8500.00	6629.90	6637.36		6638.06	0.002754	6.71	1266.59	240.45	0.52
Reach-1	96	100 Year	9400.00	6629.90	6637.75		6638.49	0.002744	6.91	1360.26	246.43	0.52
Reach-1	96	500 Year	12200.00	6629.90	6638.90		6639.62	0.002505	7.00	2105.80	843.11	0.50
Reach-1	98	10 Year	6100.00	6641.49	6646.47	6646.47	6647.47	0.009354	8.14	836.04	588.71	0.86
Reach-1	98	50 Year	8500.00	6641.49	6647.05	6647.05	6648.19	0.008826	8.92	1125.03	633.70	0.86
Reach-1	98	100 Year	9400.00	6641.49	6647.21	6647.21	6648.43	0.008968	9.26	1208.82	646.51	0.87
Reach-1	98	500 Year	12200.00	6641.49	6647.73	6647.73	6649.11	0.008768	10.01	1482.96	687.67	0.88
Reach-1	100	10 Year	6100.00	6648.00	6655.18	6655.18	6657.00	0.011636	10.81	564.51	286.32	0.99
Reach-1	100	50 Year	8500.00	6648.00	6656.13	6656.13	6658.35	0.010896	11.96	710.66	312.55	0.99
Reach-1	100	100 Year	9400.00	6648.00	6656.46	6656.46	6658.82	0.010691	12.33	762.17	328.69	0.99
Reach-1	100	500 Year	12200.00	6648.00	6657.41	6657.41	6660.17	0.010128	13.35	914.38	421.22	0.99
Reach-1	102	10 Year	6100.00	6655.00	6658.69	6658.69	6659.63	0.012770	8.98	885.05	552.75	0.99
Reach-1	102	50 Year	8500.00	6655.00	6659.63	6659.20	6660.39	0.007827	8.21	1417.34	578.09	0.80
Reach-1	102	100 Year	9400.00	6655.00	6659.99	6659.36	6660.70	0.006631	7.94	1628.56	587.84	0.75
Reach-1	102	500 Year	12200.00	6655.00	6661.09	6659.83	6661.69	0.004253	7.46	2396.13	708.67	0.62
Reach-1	104	10 Year	6100.00	6656.00	6662.13	6662.13	6663.44	0.009722	10.74	725.74	341.25	0.93
Reach-1	104	50 Year	8500.00	6656.00	6662.84	6662.84	6664.39	0.009641	11.88	918.31	449.50	0.95
Reach-1	104	100 Year	9400.00	6656.00	6663.08	6663.08	6664.72	0.009617	12.26	986.04	486.10	0.96
Reach-1	104	500 Year	12200.00	6656.00	6664.01	6664.01	6665.33	0.007258	11.91	1646.10	727.69	0.86
Reach-1	104.5	10 Year	6100.00	6660.00	6665.08	6665.08	6666.50	0.010419	10.05	664.46	219.62	0.94
Reach-1	104.5	50 Year	8500.00	6660.00	6665.81	6665.81	6667.56	0.010361	11.21	826.16	224.30	0.96
Reach-1	104.5	100 Year	9400.00	6660.00	6666.01	6666.01	6667.93	0.010742	11.73	871.64	296.99	0.99
Reach-1	104.5	500 Year	12200.00	6660.00	6666.78	6666.78	6669.00	0.010275	12.61	1047.14	375.03	0.99
Reach-1	105	10 Year	6100.00	6662.00	6667.72	6667.72	6669.30	0.009971	11.14	633.31	202.74	0.95
Reach-1	105	50 Year	8500.00	6662.00	6668.59	6668.59	6670.45	0.009395	12.22	815.19	309.09	0.95
Reach-1	105	100 Year	9400.00	6662.00	6668.85	6668.85	6670.84	0.009455	12.67	872.17	353.89	0.96
Reach-1	105	500 Year	12200.00	6662.00	6669.68	6669.68	6671.97	0.009071	13.66	1060.49	496.84	0.96
Reach-1	105.5	10 Year	6100.00	6662.00	6670.86	6670.86	6671.90	0.005756	9.06	1060.70	648.14	0.73
Reach-1	105.5	50 Year	8500.00	6662.00	6671.45	6671.45	6672.61	0.005998	10.00	1464.51	724.33	0.76
Reach-1	105.5	100 Year	9400.00	6662.00	6671.64	6671.64	6672.85	0.006067	10.30	1607.44	750.30	0.77
Reach-1	105.5	500 Year	12200.00	6662.00	6672.00	6672.00	6673.52	0.007340	11.80	1883.00	798.00	0.86
Reach-1	106	10 Year	6100.00	6663.00	6671.59	6669.97	6673.07	0.004526	9.76	625.12	122.60	0.67
Reach-1	106	50 Year	8500.00	6663.00	6672.00	6671.27	6674.54	0.007302	12.80	664.01	155.98	0.86
Reach-1	106	100 Year	9400.00	6663.00	6672.07	6671.72	6675.12	0.008641	14.00	671.20	162.12	0.94
Reach-1	106	500 Year	12200.00	6663.00	6673.12	6673.12	6676.98	0.009451	15.77	773.39	248.27	0.99
Reach-1	105.05		Bridge									
Reach-1	106.1	10 Year	6100.00	6663.50	6672.13	6669.76	6673.25	0.003147	8.49	718.65	101.83	0.56
Reach-1	106.1	50 Year	8500.00	6663.50	6673.36	6671.02	6674.93	0.003708	10.06	845.00	103.86	0.62
Reach-1	106.1	100 Year	9400.00	6663.50	6673.96	6671.46	6675.62	0.003637	10.35	907.99	104.86	0.62
Reach-1	106.1	500 Year	12200.00	6663.50	6675.79	6672.71	6677.67	0.003371	11.03	1161.76	244.80	0.61

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	106.5	10 Year	6100.00	6664.50	6672.59	6672.19	6674.34	0.008708	10.61	574.87	131.20	0.89
Reach 1	106.5	50 Year	8500.00	6664.50	6674.00	6673.27	6675.94	0.006717	11.20	771.54	148.99	0.82
Reach 1	106.5	100 Year	9400.00	6664.50	6674.61	6673.64	6676.55	0.005849	11.18	865.74	157.14	0.78
Reach 1	106.5	500 Year	12200.00	6664.50	6676.47	6674.71	6678.37	0.004139	11.13	1181.19	330.22	0.68
Reach 1	107	10 Year	6100.00	6667.25	6675.49	6675.49	6677.71	0.007404	12.26	632.95	192.21	0.87
Reach 1	107	50 Year	8500.00	6667.25	6676.83	6676.83	6679.27	0.006653	13.23	913.27	383.18	0.85
Reach 1	107	100 Year	9400.00	6667.25	6677.22	6677.22	6679.77	0.006657	13.68	997.84	405.03	0.85
Reach 1	107	500 Year	12200.00	6667.25	6678.29	6678.29	6681.22	0.006714	14.95	1239.53	470.39	0.88
Reach 1	107.5	10 Year	6100.00	6671.25	6680.60	6680.60	6682.98	0.008092	12.66	579.08	610.19	0.90
Reach 1	107.5	50 Year	8500.00	6671.25	6681.83	6681.83	6683.08	0.004496	10.66	1913.11	799.64	0.69
Reach 1	107.5	100 Year	9400.00	6671.25	6682.04	6682.04	6683.33	0.004667	11.06	2079.68	817.15	0.71
Reach 1	107.5	500 Year	12200.00	6671.25	6682.65	6682.65	6684.04	0.004951	12.00	2595.21	857.24	0.74
Reach 1	108	10 Year	6100.00	6675.00	6682.80	6682.64	6683.94	0.007128	9.21	991.23	432.08	0.80
Reach 1	108	50 Year	8500.00	6675.00	6683.35	6683.35	6684.84	0.008275	10.77	1231.85	447.13	0.88
Reach 1	108	100 Year	9400.00	6675.00	6683.59	6683.59	6685.15	0.008230	11.11	1340.28	453.75	0.88
Reach 1	108	500 Year	12200.00	6675.00	6683.99	6683.99	6686.05	0.010039	12.93	1525.07	464.81	0.99
Reach 1	108.5	10 Year	6100.00	6677.00	6684.63	6684.63	6686.22	0.007821	11.20	837.67	286.86	0.86
Reach 1	108.5	50 Year	8500.00	6677.00	6685.59	6685.59	6687.34	0.007572	12.16	1138.82	339.90	0.87
Reach 1	108.5	100 Year	9400.00	6677.00	6685.90	6685.90	6687.71	0.007519	12.46	1246.86	357.02	0.87
Reach 1	108.5	500 Year	12200.00	6677.00	6685.96	6685.96	6688.90	0.012199	15.95	1267.34	360.17	1.11
Reach 1	109	10 Year	6100.00	6680.00	6687.86	6687.86	6689.25	0.006243	10.71	958.10	362.36	0.78
Reach 1	109	50 Year	8500.00	6680.00	6688.69	6688.69	6690.30	0.006522	11.96	1286.06	438.85	0.82
Reach 1	109	100 Year	9400.00	6680.00	6688.99	6688.99	6690.63	0.006417	12.22	1422.58	468.93	0.82
Reach 1	109	500 Year	12200.00	6680.00	6689.78	6689.78	6691.51	0.006276	12.98	1822.65	547.64	0.82
Reach 1	109	10 Year	6100.00	6682.00	6690.12	6690.12	6691.70	0.005166	11.17	1011.13	359.91	0.74
Reach 1	109	50 Year	8500.00	6682.00	6691.03	6691.03	6692.84	0.005523	12.51	1344.70	373.06	0.78
Reach 1	109	100 Year	9400.00	6682.00	6691.32	6691.32	6693.22	0.005676	12.99	1453.14	377.24	0.79
Reach 1	109	500 Year	12200.00	6682.00	6692.51	6692.51	6694.49	0.005285	13.70	1947.99	462.92	0.78
Reach 1	109.5	10 Year	6100.00	6688.67	6694.35	6694.35	6695.51	0.008023	10.07	1036.47	453.76	0.85
Reach 1	109.5	50 Year	8500.00	6688.67	6694.97	6694.97	6696.35	0.008511	11.34	1324.15	482.19	0.90
Reach 1	109.5	100 Year	9400.00	6688.67	6695.16	6695.16	6696.63	0.008784	11.81	1416.58	490.98	0.92
Reach 1	109.5	500 Year	12200.00	6688.67	6695.77	6695.77	6697.43	0.008960	12.86	1725.37	519.25	0.95
Reach 1	110	10 Year	6100.00	6689.00	6696.34		6697.10	0.004093	7.01	916.39	356.56	0.60
Reach 1	110	50 Year	8500.00	6689.00	6697.04		6698.06	0.004574	8.21	1172.23	372.18	0.65
Reach 1	110	100 Year	9400.00	6689.00	6697.28		6698.40	0.004700	8.59	1262.47	377.54	0.67
Reach 1	110	500 Year	12200.00	6689.00	6697.89	6697.08	6699.31	0.005253	9.79	1496.67	391.10	0.72
Reach 1	111	10 Year	6100.00	6697.00	6701.94	6701.94	6703.98	0.011575	11.47	531.91	132.22	1.01
Reach 1	111	50 Year	8500.00	6697.00	6703.06	6703.06	6705.45	0.009986	12.43	708.16	183.74	0.97
Reach 1	111	100 Year	9400.00	6697.00	6703.42	6703.42	6705.94	0.009624	12.78	776.54	192.25	0.96
Reach 1	111	500 Year	12200.00	6697.00	6704.48	6704.48	6707.32	0.008687	13.67	991.52	208.88	0.94
Reach 1	112	10 Year	6100.00	6699.00	6705.39		6706.56	0.004863	9.21	869.03	219.14	0.69

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	112	50 Year	8500.00	6699.00	6706.45		6707.91	0.004962	10.45	1112.17	236.91	0.72
Reach-1	112	100 Year	9400.00	6699.00	6706.81		6708.38	0.004981	10.85	1198.18	239.79	0.73
Reach-1	112	500 Year	12200.00	6699.00	6707.81		6709.69	0.005105	12.01	1441.60	247.76	0.75
Reach-1	115	10 Year	6100.00	6709.06	6715.46	6715.46	6717.57	0.011673	11.66	523.24	126.36	1.01
Reach-1	115	50 Year	8500.00	6709.06	6716.59	6716.59	6719.09	0.010824	12.70	669.49	133.93	1.00
Reach-1	115	100 Year	9400.00	6709.06	6716.98	6716.98	6719.61	0.010648	13.01	722.75	137.73	1.00
Reach-1	115	500 Year	12200.00	6709.06	6718.08	6718.08	6721.06	0.010232	13.86	880.40	147.99	1.00
Reach-1	114		Bridge									
Reach-1	113	10 Year	6100.00	6707.35	6717.42	6714.37	6718.16	0.002470	6.90	883.52	146.00	0.49
Reach-1	113	50 Year	8500.00	6707.35	6718.84	6715.54	6719.76	0.002576	7.70	1104.00	159.64	0.52
Reach-1	113	100 Year	9400.00	6707.35	6719.30	6715.95	6720.29	0.002572	7.97	1179.18	161.43	0.52
Reach-1	113	500 Year	12200.00	6707.35	6720.60	6717.34	6721.80	0.002554	8.77	1393.05	168.54	0.53
Reach-1	122	10 Year	6100.00	6713.35	6720.67	6720.67	6723.22	0.010168	13.00	492.92	101.14	0.98
Reach-1	122	50 Year	8500.00	6713.35	6721.94	6721.94	6725.09	0.009574	14.50	624.03	105.26	0.98
Reach-1	122	100 Year	9400.00	6713.35	6722.41	6722.41	6725.73	0.009242	14.91	674.72	107.82	0.98
Reach-1	122	500 Year	12200.00	6713.35	6723.75	6723.75	6727.59	0.008617	16.12	823.74	115.43	0.97
Reach-1	121	10 Year	6100.00	6715.13	6724.05		6725.45	0.005526	9.66	673.46	141.91	0.73
Reach-1	121	50 Year	8500.00	6715.13	6725.51		6727.12	0.004719	10.45	888.30	153.19	0.70
Reach-1	121	100 Year	9400.00	6715.13	6726.02		6727.70	0.004498	10.69	967.32	157.08	0.69
Reach-1	121	500 Year	12200.00	6715.13	6727.57		6729.39	0.003851	11.23	1216.45	163.71	0.66
Reach-1	120	10 Year	6100.00	6719.35	6726.06		6727.61	0.006969	10.00	621.26	138.73	0.80
Reach-1	120	50 Year	8500.00	6719.35	6727.18		6729.11	0.006641	11.22	791.69	165.45	0.81
Reach-1	120	100 Year	9400.00	6719.35	6727.59		6729.63	0.006447	11.56	861.13	175.17	0.81
Reach-1	120	500 Year	12200.00	6719.35	6728.86		6731.10	0.005664	12.23	1096.88	192.95	0.78
Reach-1	123	10 Year	6100.00	6725.06	6731.31	6731.31	6733.68	0.009513	12.99	538.44	116.99	0.97
Reach-1	123	50 Year	8500.00	6725.06	6732.52	6732.52	6735.42	0.009122	14.48	682.41	121.45	0.98
Reach-1	123	100 Year	9400.00	6725.06	6732.92	6732.92	6736.02	0.009067	15.00	731.86	123.15	0.98
Reach-1	123	500 Year	12200.00	6725.06	6734.19	6734.19	6737.75	0.008515	16.20	891.68	128.18	0.98
Reach-1	124	10 Year	6100.00	6727.35	6734.95		6736.94	0.007384	11.69	584.60	129.81	0.86
Reach-1	124	50 Year	8500.00	6727.35	6736.12		6738.60	0.007307	13.16	744.20	141.97	0.88
Reach-1	124	100 Year	9400.00	6727.35	6736.55		6739.17	0.007195	13.59	806.05	148.19	0.88
Reach-1	124	500 Year	12200.00	6727.35	6737.72		6740.77	0.007015	14.81	990.23	165.36	0.89
Reach-1	126	10 Year	6100.00	6731.90	6739.30	6739.30	6742.12	0.009508	13.67	475.14	90.51	0.97
Reach-1	126	50 Year	8500.00	6731.90	6740.81	6740.81	6744.19	0.008650	15.08	621.06	104.74	0.96
Reach-1	126	100 Year	9400.00	6731.90	6741.35	6741.35	6744.88	0.008278	15.44	679.97	110.13	0.95
Reach-1	126	500 Year	12200.00	6731.90	6742.87	6742.87	6746.81	0.007546	16.50	858.61	125.60	0.93
Reach-1	128	10 Year	6100.00	6740.20	6747.56	6747.56	6750.05	0.009669	12.75	500.95	110.03	0.97
Reach-1	128	50 Year	8500.00	6740.20	6748.93	6748.93	6751.87	0.008554	13.95	662.72	124.53	0.94
Reach-1	128	100 Year	9400.00	6740.20	6749.40	6749.40	6752.49	0.008267	14.33	721.98	129.09	0.94
Reach-1	128	500 Year	12200.00	6740.20	6750.66	6750.66	6754.23	0.007853	15.54	891.73	139.30	0.94

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	129		Bridge									
Reach-1	130	10 Year	6100.00	6745.00	6752.43	6751.35	6753.95	0.005271	10.08	688.53	136.29	0.73
Reach-1	130	50 Year	8500.00	6745.00	6756.44	6752.51	6757.43	0.001758	8.20	1255.93	328.07	0.46
Reach-1	130	100 Year	9400.00	6745.00	6756.71	6752.93	6757.85	0.001960	8.82	1295.16	346.64	0.48
Reach-1	130	500 Year	12200.00	6745.00	6758.27	6754.10	6759.69	0.002037	9.88	1519.02	434.15	0.51
Reach-1	132	10 Year	6100.00	6754.80	6760.49	6760.49	6762.13	0.007131	10.79	702.33	563.17	0.83
Reach-1	132	50 Year	8500.00	6754.80	6761.37	6761.37	6763.35	0.007270	12.10	903.29	591.28	0.86
Reach-1	132	100 Year	9400.00	6754.80	6761.68	6761.68	6763.76	0.007287	12.51	972.63	594.96	0.87
Reach-1	132	500 Year	12200.00	6754.80	6762.53	6762.53	6764.96	0.007425	13.72	1165.86	608.36	0.90
Reach-1	134	10 Year	6100.00	6756.20	6762.68	6762.68	6764.46	0.006686	10.94	656.75	338.18	0.81
Reach-1	134	50 Year	8500.00	6756.20	6763.71	6763.71	6765.72	0.006402	11.98	901.24	446.48	0.82
Reach-1	134	100 Year	9400.00	6756.20	6764.02	6764.02	6766.13	0.006443	12.39	975.54	481.90	0.83
Reach-1	134	500 Year	12200.00	6756.20	6764.90	6764.90	6767.32	0.006558	13.54	1185.45	512.65	0.85
Reach-1	136	10 Year	6100.00	6760.29	6765.09	6765.09	6767.18	0.021667	11.73	558.06	173.63	0.99
Reach-1	136	50 Year	8500.00	6760.29	6766.53	6766.53	6768.55	0.014978	11.79	890.71	277.76	0.86
Reach-1	136	100 Year	9400.00	6760.29	6766.92	6766.92	6768.96	0.014145	11.96	1001.04	287.09	0.84
Reach-1	136	500 Year	12200.00	6760.29	6767.77	6767.77	6770.09	0.014117	13.01	1248.16	292.96	0.86
Reach-1	138	10 Year	6100.00	6766.77	6773.51		6774.64	0.007946	8.62	756.50	152.89	0.63
Reach-1	138	50 Year	8500.00	6766.77	6774.25		6775.95	0.010258	10.59	870.53	157.05	0.73
Reach-1	138	100 Year	9400.00	6766.77	6774.51		6776.41	0.010986	11.25	911.20	158.50	0.76
Reach-1	138	500 Year	12200.00	6766.77	6775.44		6777.86	0.011859	12.72	1071.29	232.78	0.80
Reach-1	140	10 Year	6100.00	6769.14	6776.98	6775.78	6778.77	0.015244	10.90	601.29	108.77	0.74
Reach-1	140	50 Year	8500.00	6769.14	6778.38	6777.27	6780.65	0.015195	12.34	770.05	254.66	0.76
Reach-1	140	100 Year	9400.00	6769.14	6778.85	6777.73	6781.24	0.015053	12.75	857.83	361.85	0.76
Reach-1	140	500 Year	12200.00	6769.14	6780.08	6779.62	6782.82	0.014953	13.89	1103.81	500.08	0.78
Reach-1	142	10 Year	6100.00	6773.10	6779.75	6779.25	6781.60	0.008073	11.06	586.48	151.32	0.87
Reach-1	142	50 Year	8500.00	6773.10	6781.16	6780.44	6783.31	0.007300	11.92	766.11	220.30	0.85
Reach-1	142	100 Year	9400.00	6773.10	6781.60	6780.86	6783.87	0.007208	12.26	832.36	236.44	0.85
Reach-1	142	500 Year	12200.00	6773.10	6782.80	6782.14	6785.43	0.007144	13.25	1035.73	311.43	0.86
Reach-1	144	10 Year	6100.00	6775.77	6780.99	6780.89	6782.60	0.010733	10.23	625.37	236.93	0.96
Reach-1	144	50 Year	8500.00	6775.77	6782.65	6781.72	6784.06	0.005686	9.61	964.95	278.00	0.74
Reach-1	144	100 Year	9400.00	6775.77	6783.19	6782.10	6784.58	0.004964	9.59	1079.99	293.18	0.70
Reach-1	144	500 Year	12200.00	6775.77	6784.63	6782.94	6786.08	0.003871	9.83	1394.26	329.07	0.65
Reach-1	146	10 Year	6100.00	6777.21	6784.06	6784.06	6786.53	0.009947	12.81	525.42	188.20	0.98
Reach-1	146	50 Year	8500.00	6777.21	6785.32	6785.32	6788.38	0.009355	14.31	663.22	193.53	0.98
Reach-1	146	100 Year	9400.00	6777.21	6785.72	6785.72	6789.02	0.009323	14.87	708.18	195.54	0.99
Reach-1	146	500 Year	12200.00	6777.21	6787.00	6787.00	6790.90	0.008863	16.22	851.63	275.85	0.99
Reach-1	148	10 Year	6100.00	6782.25	6788.45	6788.45	6790.56	0.010192	11.73	555.85	156.20	0.97
Reach-1	148	50 Year	8500.00	6782.25	6789.59	6789.51	6792.09	0.009120	12.88	726.32	198.45	0.95
Reach-1	148	100 Year	9400.00	6782.25	6790.04	6789.88	6792.63	0.008547	13.12	795.05	215.27	0.93
Reach-1	148	500 Year	12200.00	6782.25	6791.35	6790.95	6794.19	0.007343	13.84	996.86	273.23	0.89

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	150	10 Year	6100.00	6787.28	6794.20	6794.09	6796.43	0.008171	12.24	557.66	137.20	0.90
Reach-1	150	50 Year	8500.00	6787.28	6795.54	6795.54	6798.07	0.007266	13.29	778.62	194.98	0.88
Reach-1	150	100 Year	9400.00	6787.28	6796.07	6796.07	6798.58	0.006673	13.37	888.14	219.26	0.86
Reach-1	150	500 Year	12200.00	6787.28	6797.35	6797.35	6799.93	0.005910	13.95	1207.81	279.31	0.83
Reach-1	152	10 Year	6100.00	6791.38	6797.10	6797.10	6799.56	0.009795	12.82	507.29	107.83	0.98
Reach-1	152	50 Year	8500.00	6791.38	6798.35	6798.35	6801.37	0.009198	14.28	644.54	112.81	0.98
Reach-1	152	100 Year	9400.00	6791.38	6798.75	6798.75	6801.99	0.009144	14.82	690.42	114.42	0.99
Reach-1	152	500 Year	12200.00	6791.38	6800.89	6800.89	6803.60	0.005643	13.91	1132.60	276.89	0.81
Reach-1	154	10 Year	6100.00	6795.34	6802.40	6802.18	6804.41	0.008204	11.64	601.06	143.75	0.89
Reach-1	154	50 Year	8500.00	6795.34	6803.53		6806.03	0.008024	13.09	764.82	146.99	0.91
Reach-1	154	100 Year	9400.00	6795.34	6803.95		6806.59	0.007835	13.50	826.87	148.19	0.91
Reach-1	154	500 Year	12200.00	6795.34	6804.71	6804.71	6808.20	0.009063	15.58	941.09	150.39	1.00
Reach-1	156	10 Year	6100.00	6814.76	6819.82	6819.82	6821.98	0.010395	12.25	556.02	138.02	0.99
Reach-1	156	50 Year	8500.00	6814.76	6820.94	6820.94	6823.57	0.009671	13.60	718.81	155.71	0.99
Reach-1	156	100 Year	9400.00	6814.76	6821.38	6821.38	6824.10	0.009164	13.89	789.42	165.28	0.97
Reach-1	156	500 Year	12200.00	6814.76	6822.58	6822.58	6825.58	0.008216	14.77	1002.72	191.32	0.95
Reach-1	158	10 Year	6100.00	6834.13	6841.86	6841.86	6844.43	0.009341	13.30	510.72	104.42	0.97
Reach-1	158	50 Year	8500.00	6834.13	6843.17	6843.17	6846.30	0.008833	14.80	651.51	109.56	0.97
Reach-1	158	100 Year	9400.00	6834.13	6843.63	6843.63	6846.94	0.008690	15.29	701.50	111.32	0.97
Reach-1	158	500 Year	12200.00	6834.13	6844.94	6844.94	6848.80	0.008292	16.61	851.71	116.47	0.98


Roaring Fork River - Eagle & Pitkin Cnty
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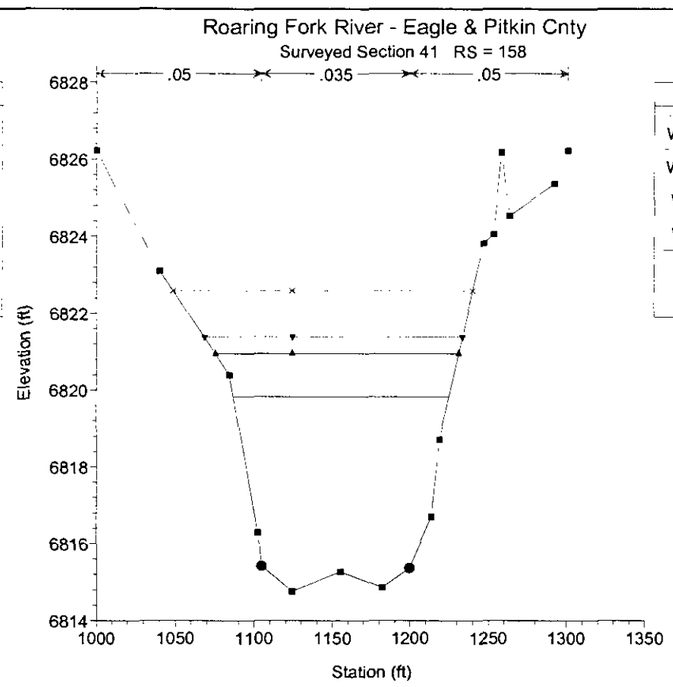
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)


Roaring Fork River - Eagle & Pitkin Cnty
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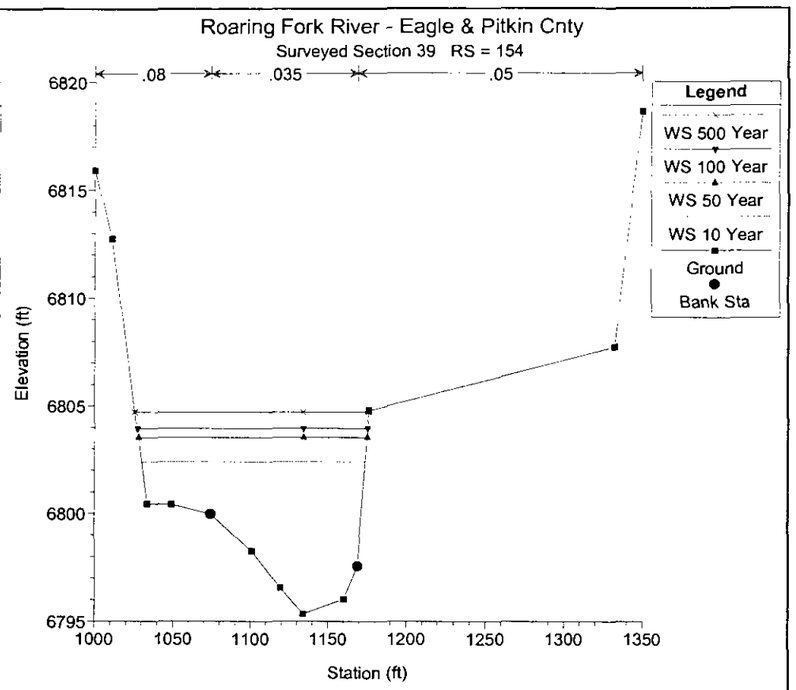
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)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Surveyed Section 39 RS = 154
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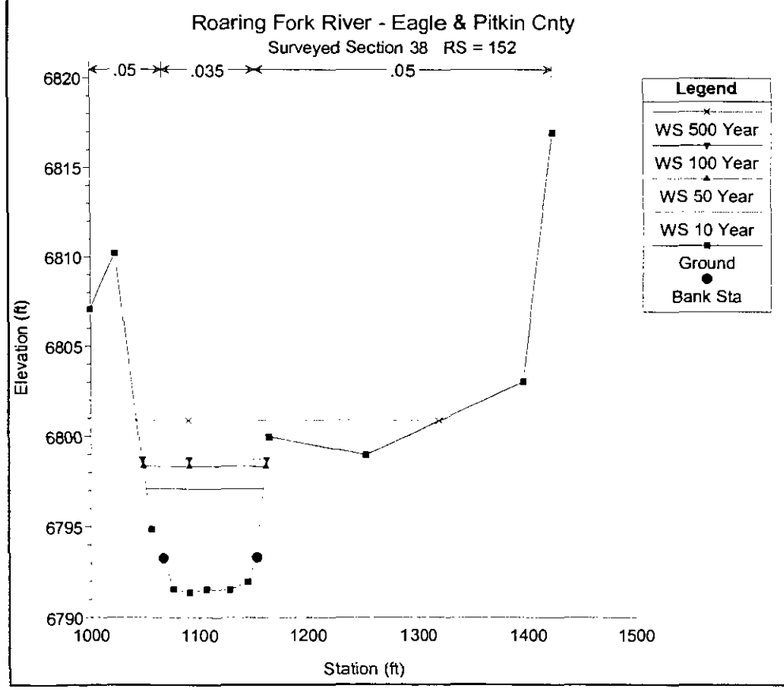
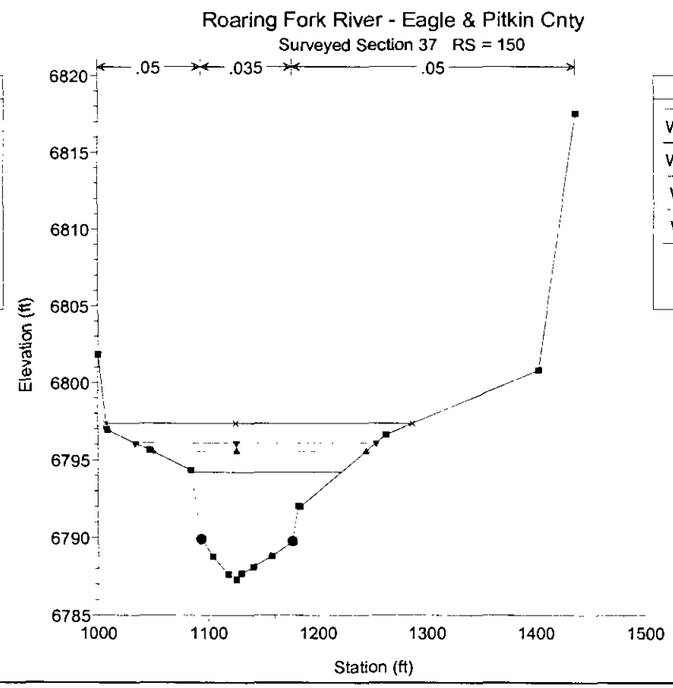
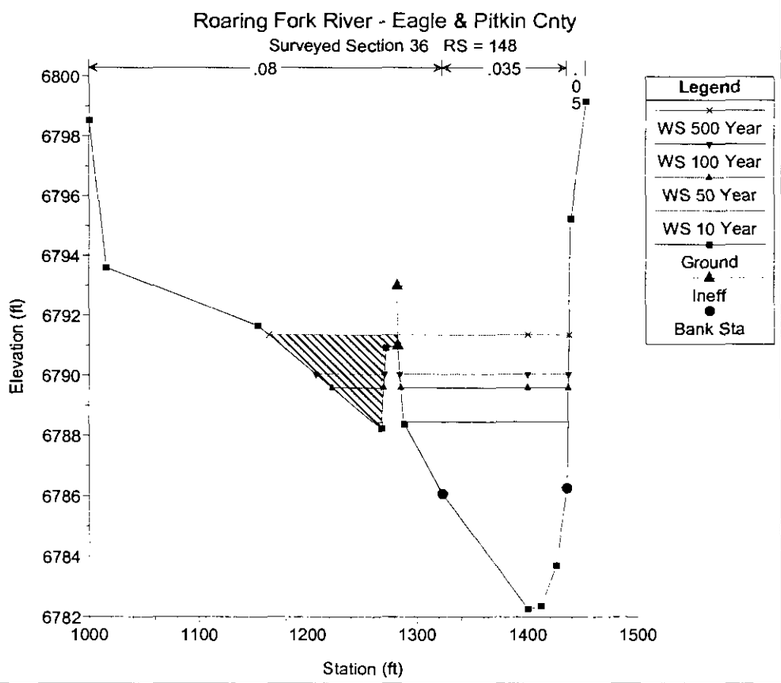
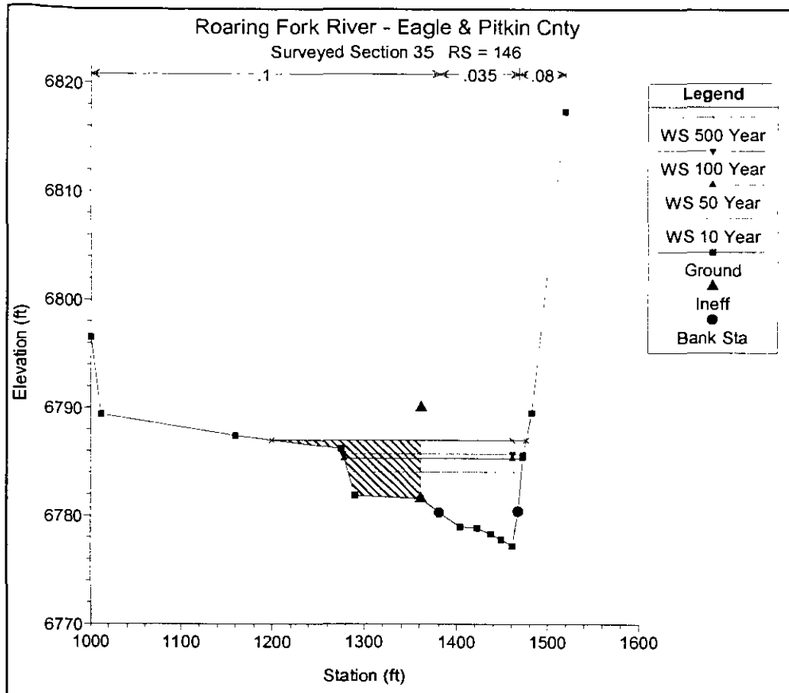
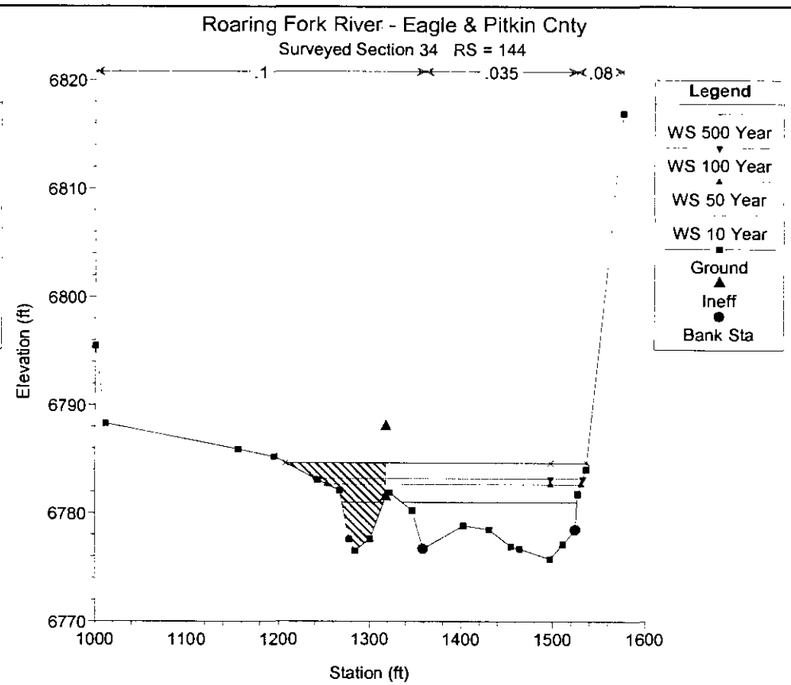
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

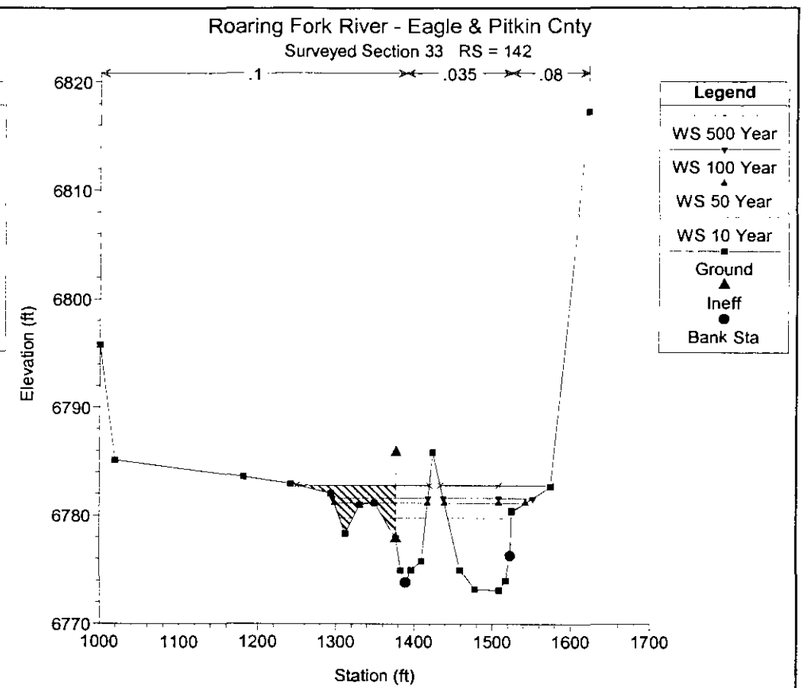

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 38 RS = 152
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

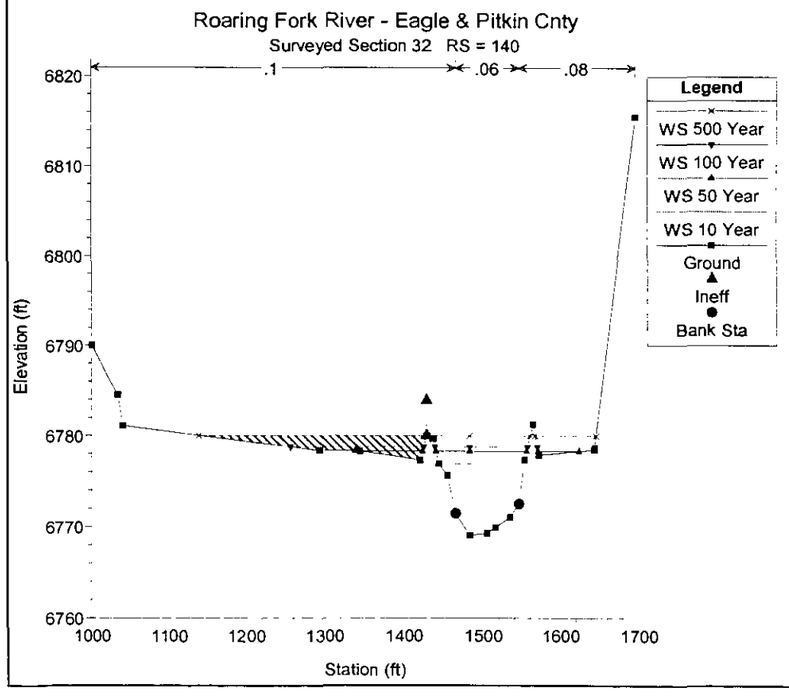

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 37 RS = 150
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

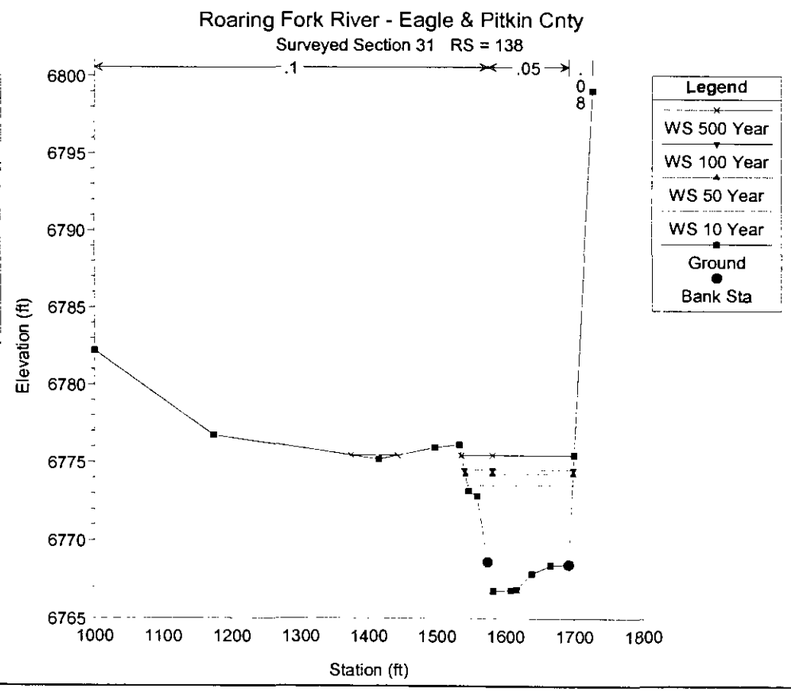

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 36 RS = 148
.08
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

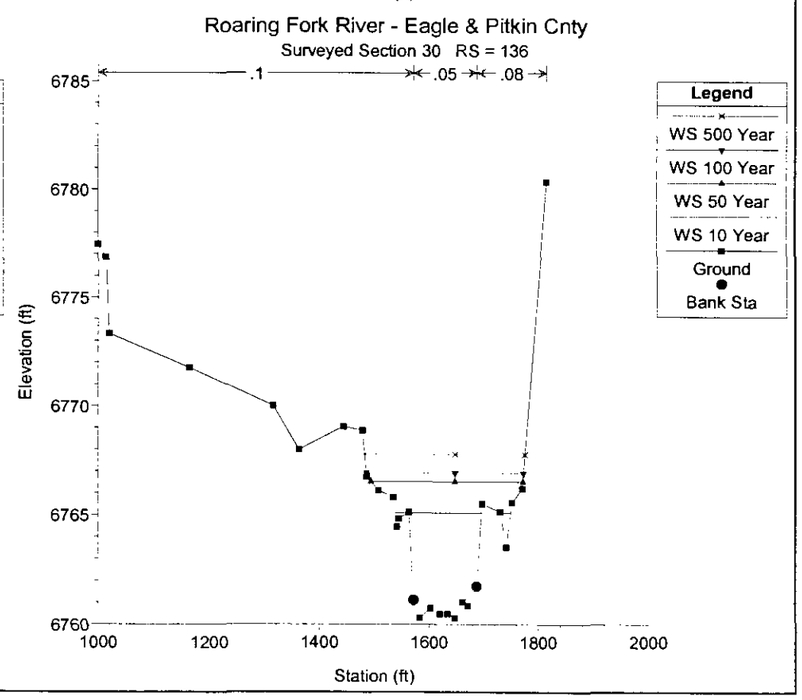

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 35 RS = 146
.1
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
6820
6810
6800
6790
6780
6770
1000
1100
1200
1300
1400
1500
1600
Station (ft)

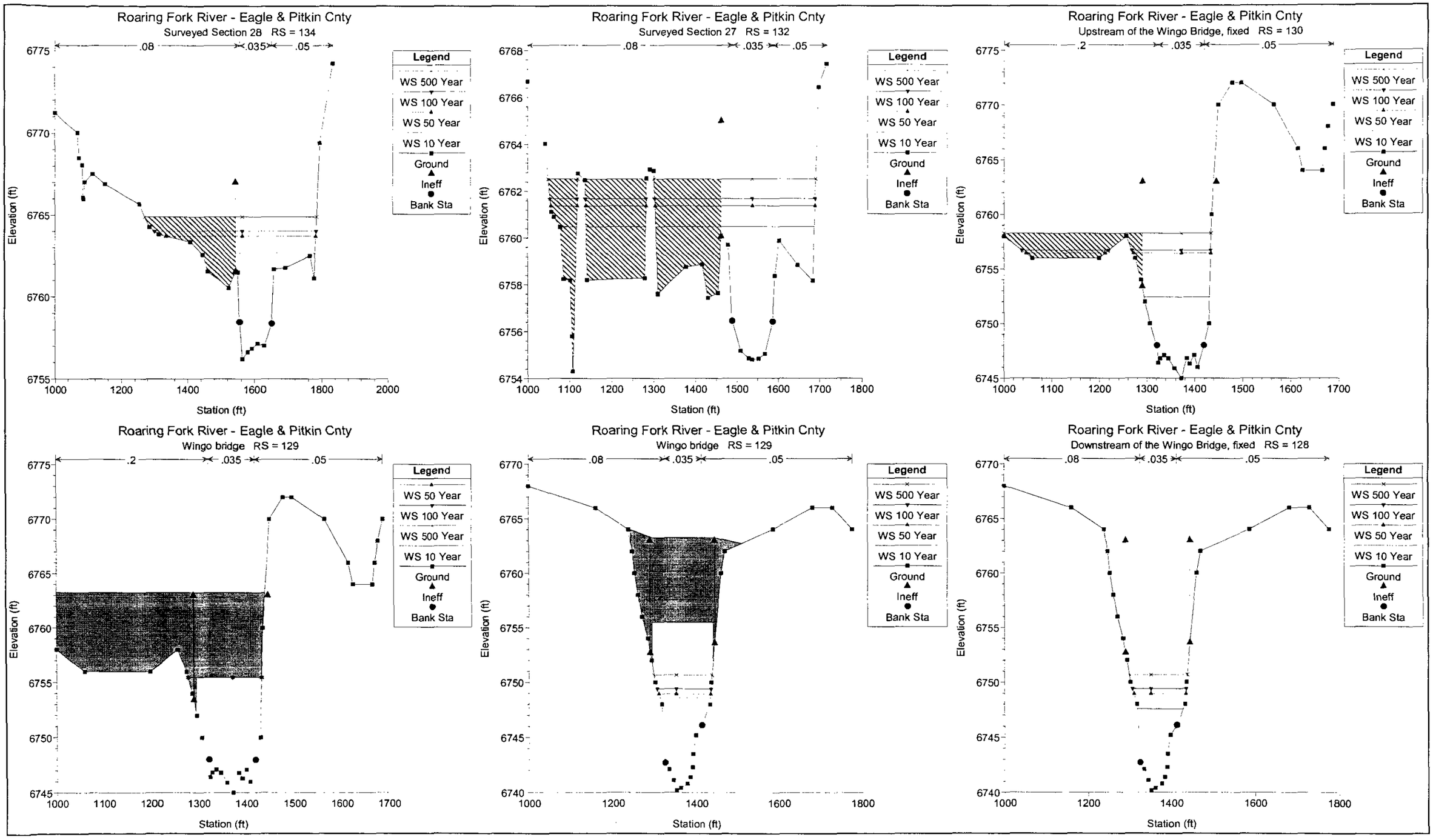

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 34 RS = 144
.1
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
6820
6810
6800
6790
6780
6770
1000
1100
1200
1300
1400
1500
1600
Station (ft)

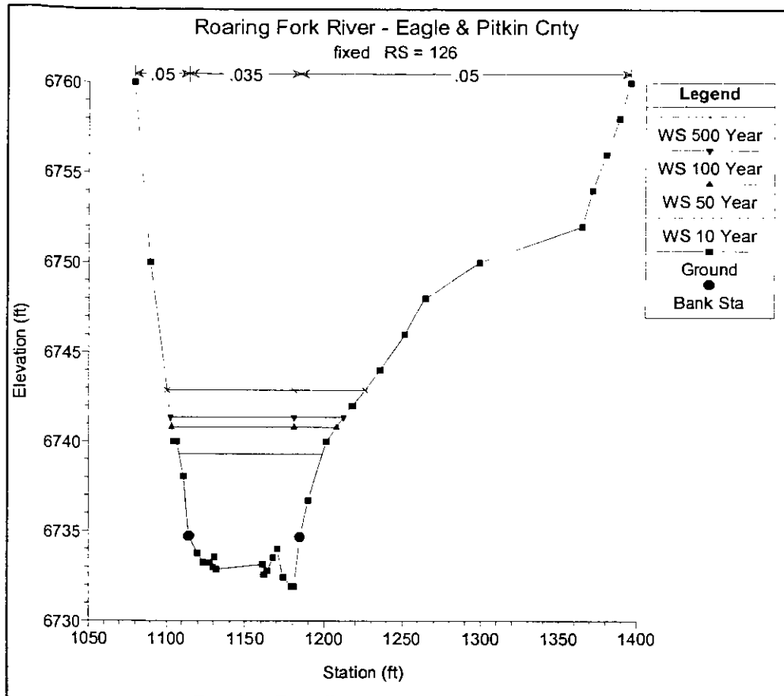

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 33 RS = 142
.1
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
6820
6810
6800
6790
6780
6770
1000
1100
1200
1300
1400
1500
1600
1700
Station (ft)

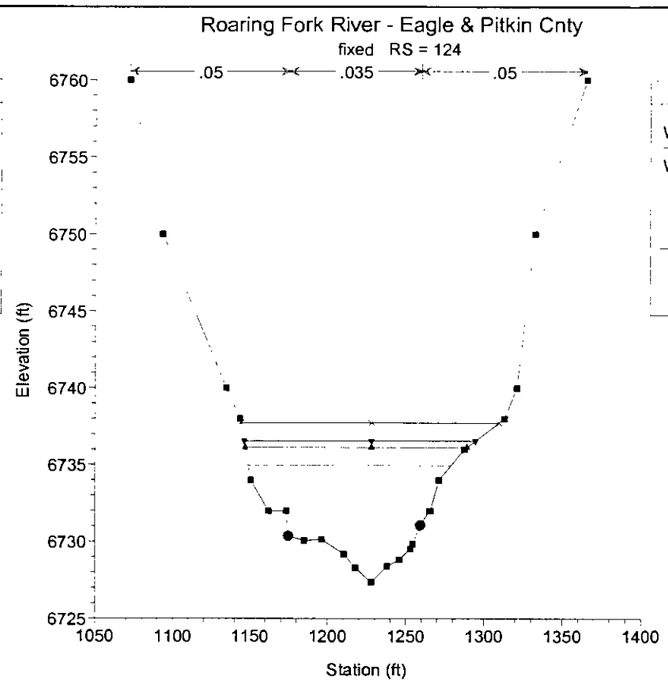

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 32 RS = 140
.1
.06
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
6820
6810
6800
6790
6780
6770
6760
1000
1100
1200
1300
1400
1500
1600
1700
Station (ft)

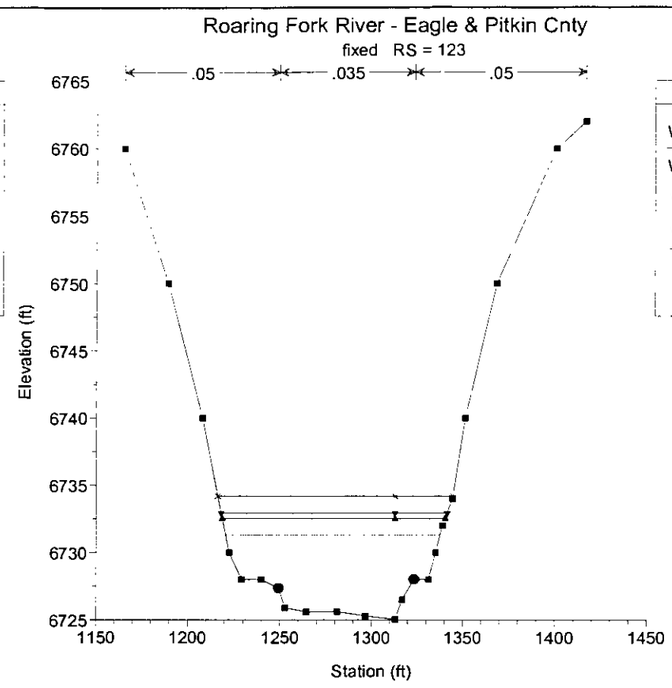

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 31 RS = 138
.1
.05
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
6800
6795
6790
6785
6780
6775
6770
6765
1000
1100
1200
1300
1400
1500
1600
1700
1800
Station (ft)

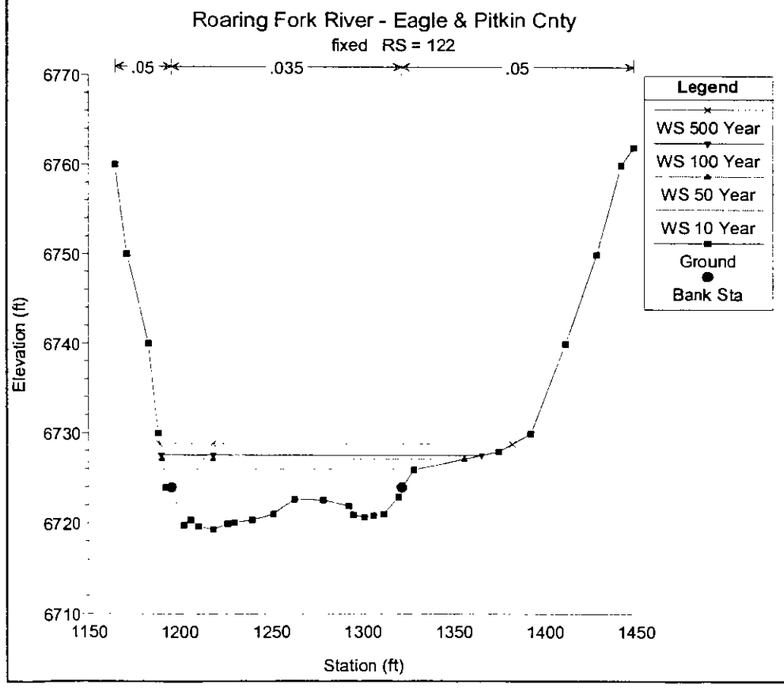

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 30 RS = 136
.1
.05
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
6785
6780
6775
6770
6765
6760
1000
1200
1400
1600
1800
2000
Station (ft)

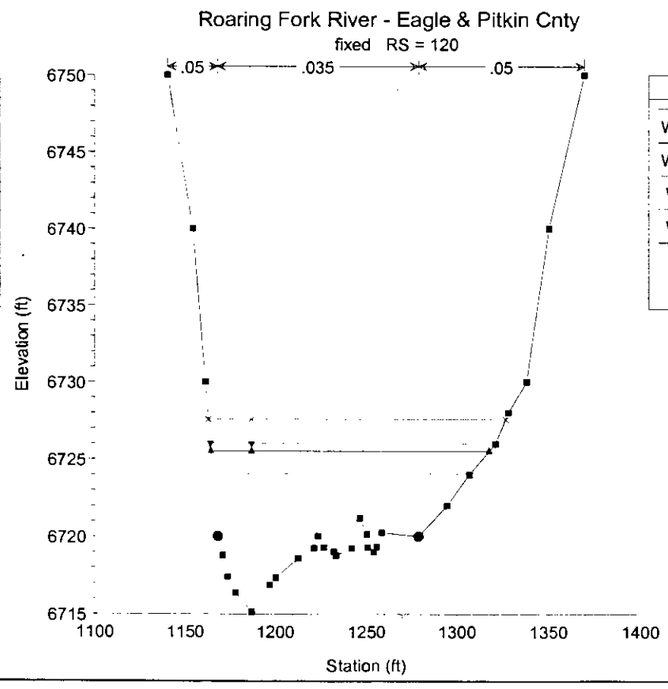

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 28 RS = 134
.08
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Section 27 RS = 132
.08
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Roaring Fork River - Eagle & Pitkin Cnty
Upstream of the Wingo Bridge, fixed RS = 130
.2
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Roaring Fork River - Eagle & Pitkin Cnty
Wingo bridge RS = 129
.2
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 50 Year
WS 100 Year
WS 500 Year
WS 10 Year
Ground
Ineff
Bank Sta
Roaring Fork River - Eagle & Pitkin Cnty
Wingo bridge RS = 129
.08
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Roaring Fork River - Eagle & Pitkin Cnty
Downstream of the Wingo Bridge, fixed RS = 128
.08
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta

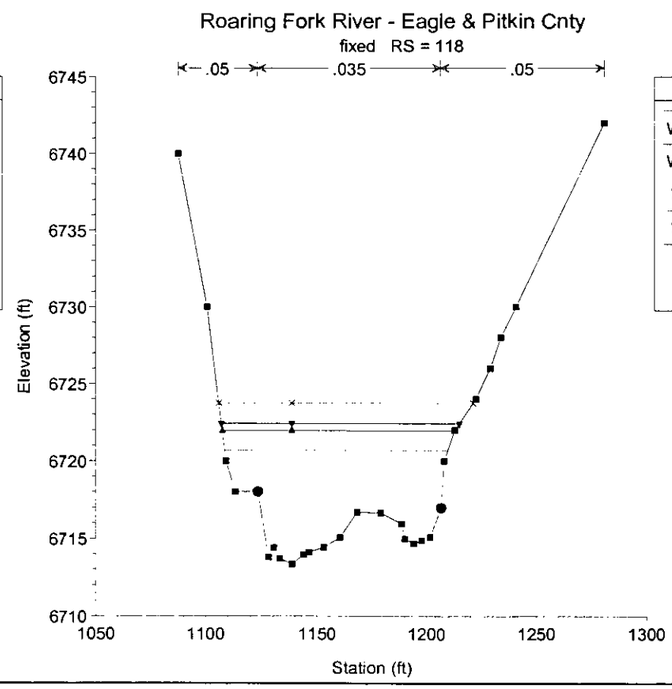

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 126
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

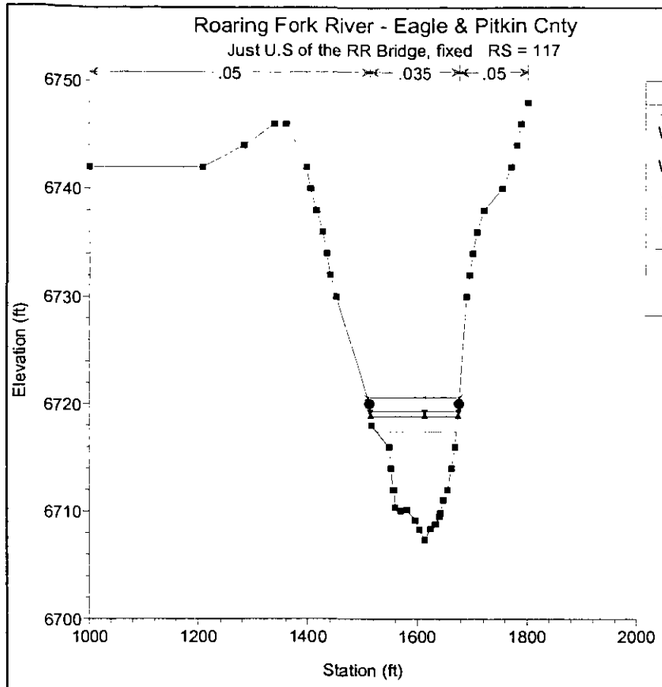

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 124
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

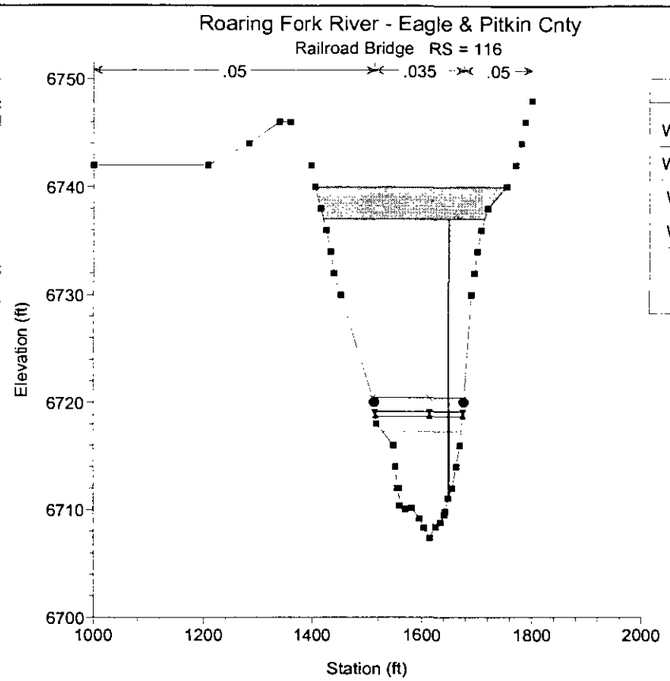

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 123
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

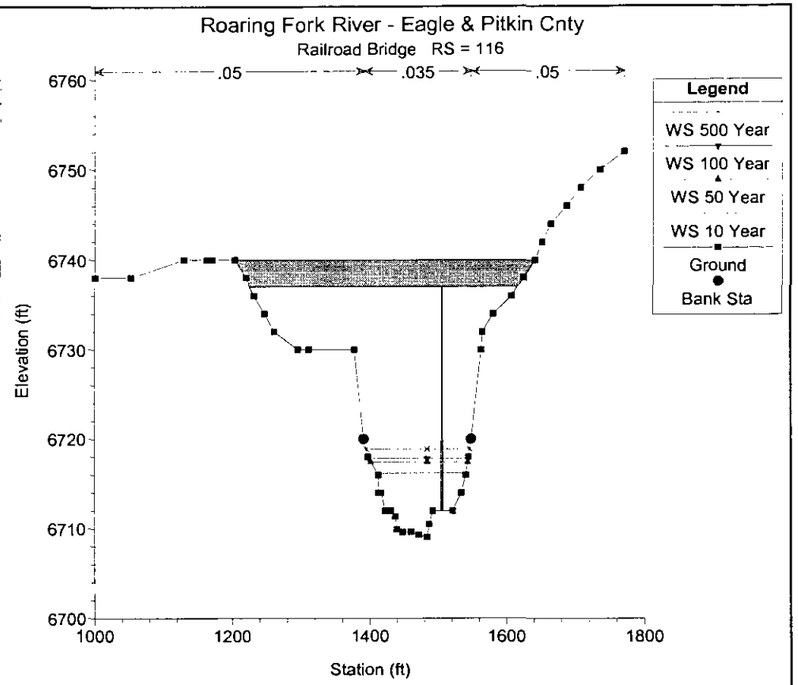

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 122
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

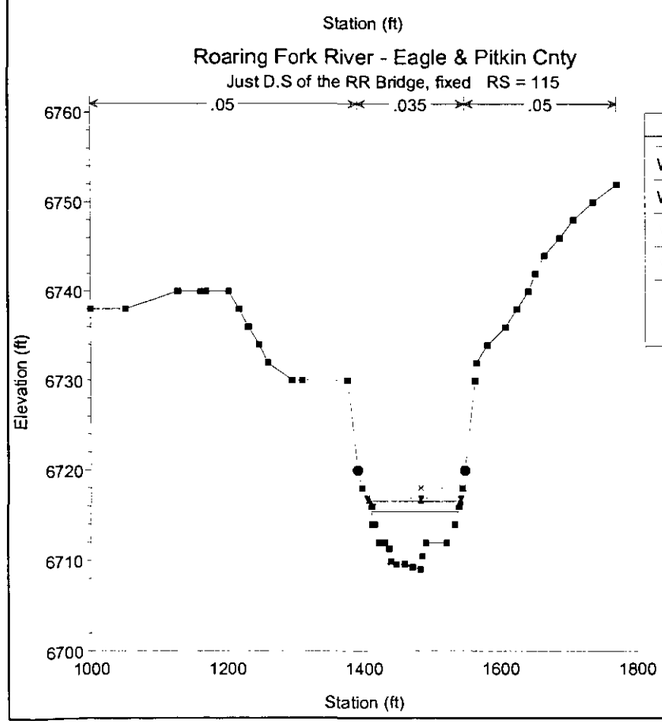

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 120
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

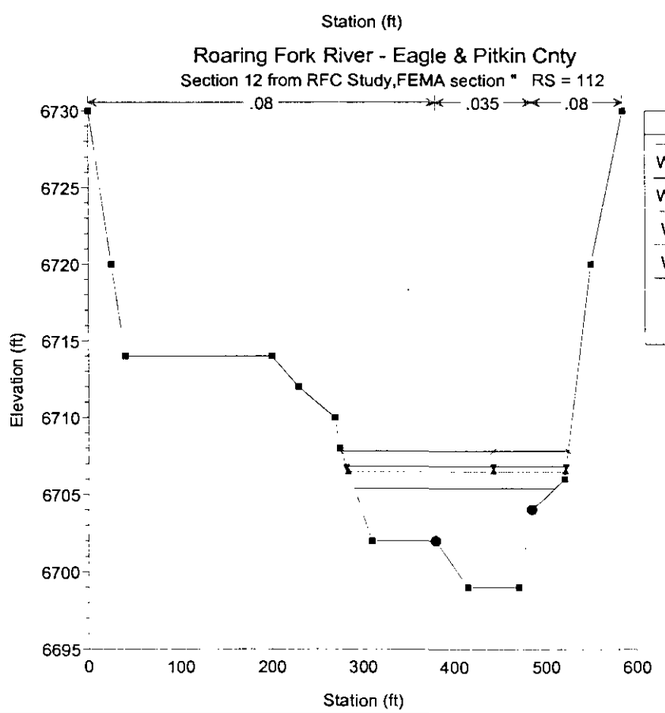

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 118
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

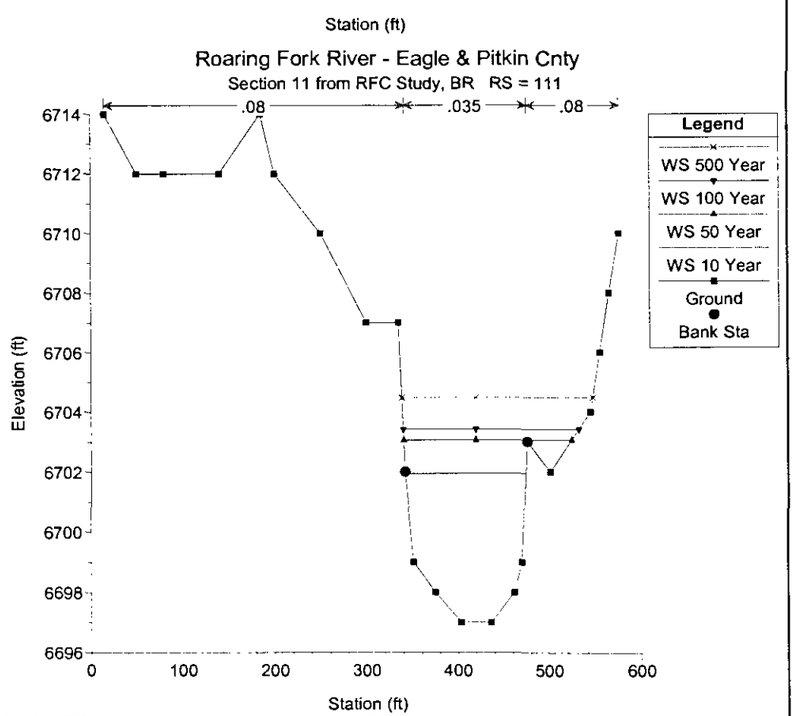

Roaring Fork River - Eagle & Pitkin Cnty
Just U.S of the RR Bridge, fixed RS = 117
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

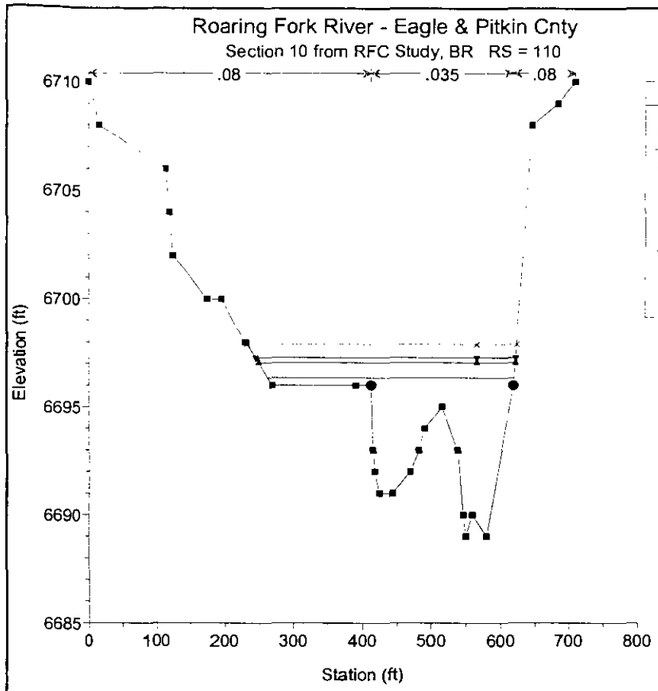

Roaring Fork River - Eagle & Pitkin Cnty
Railroad Bridge RS = 116
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

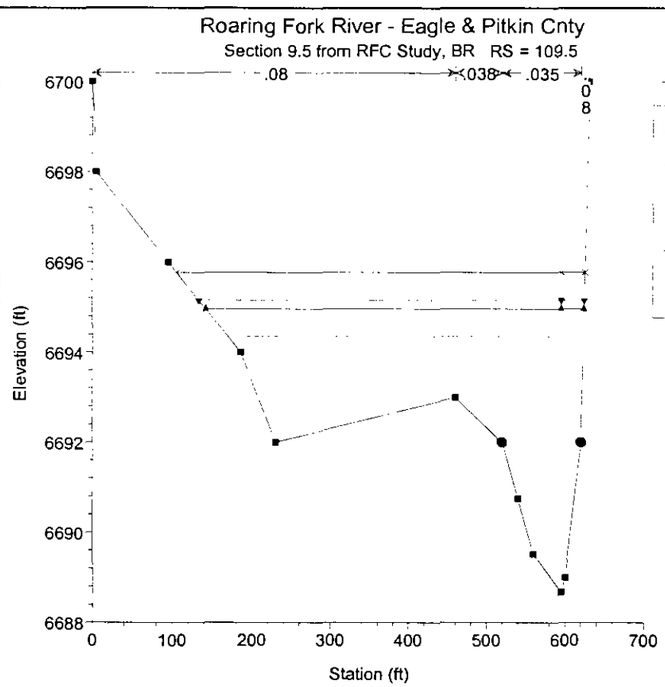

Roaring Fork River - Eagle & Pitkin Cnty
Railroad Bridge RS = 116
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

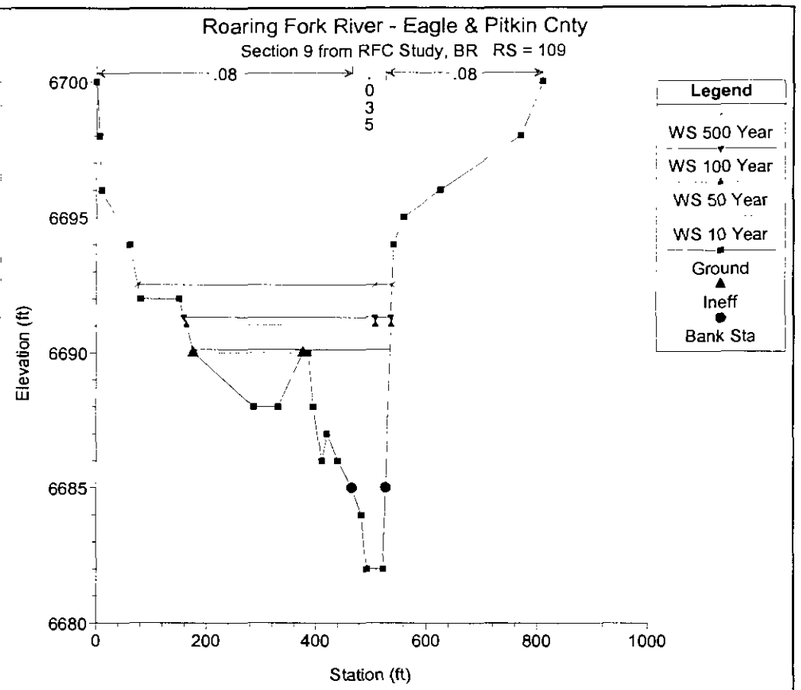

Roaring Fork River - Eagle & Pitkin Cnty
Just D.S of the RR Bridge, fixed RS = 115
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

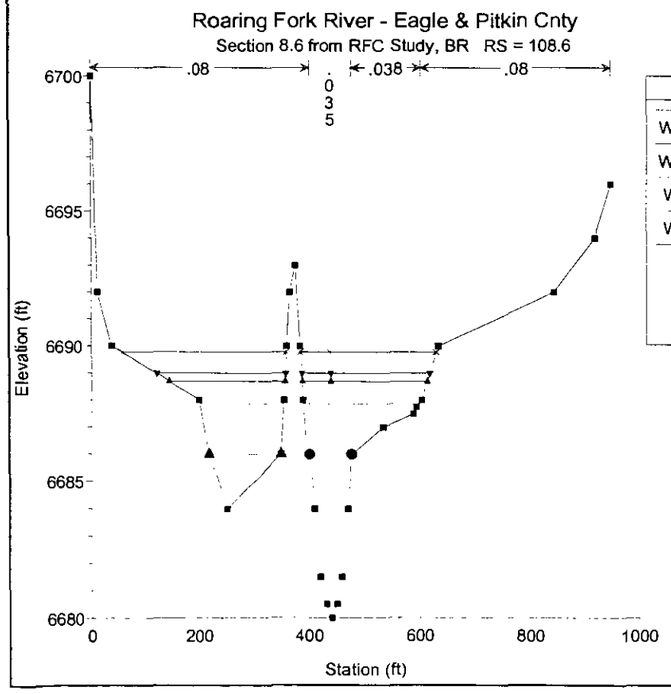

Roaring Fork River - Eagle & Pitkin Cnty
Section 12 from RFC Study,FEMA section " RS = 112
.08
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

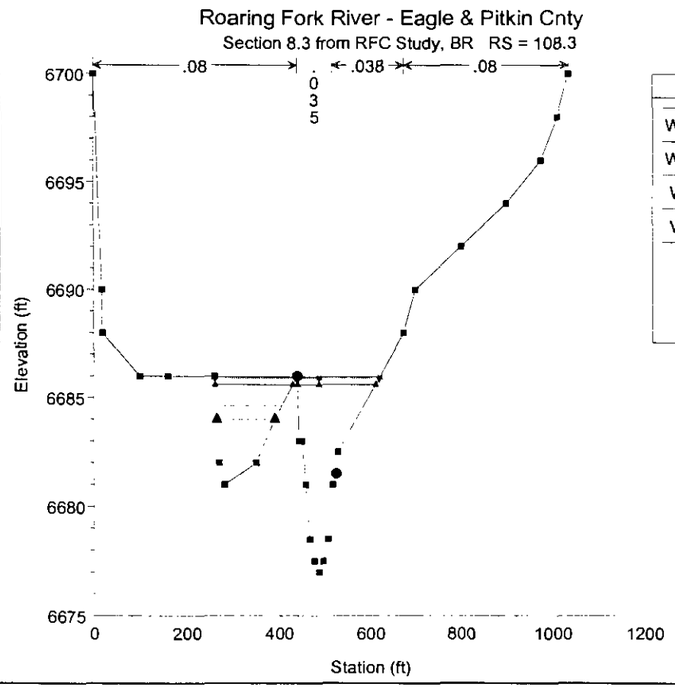

Roaring Fork River - Eagle & Pitkin Cnty
Section 11 from RFC Study, BR RS = 111
.08
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

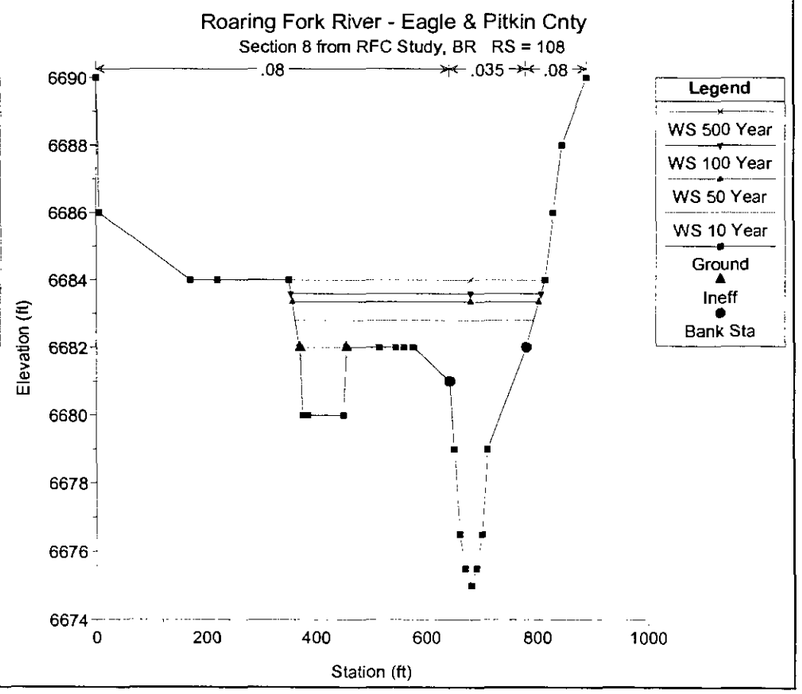

Roaring Fork River - Eagle & Pitkin Cnty
Section 10 from RFC Study, BR RS = 110
.08
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

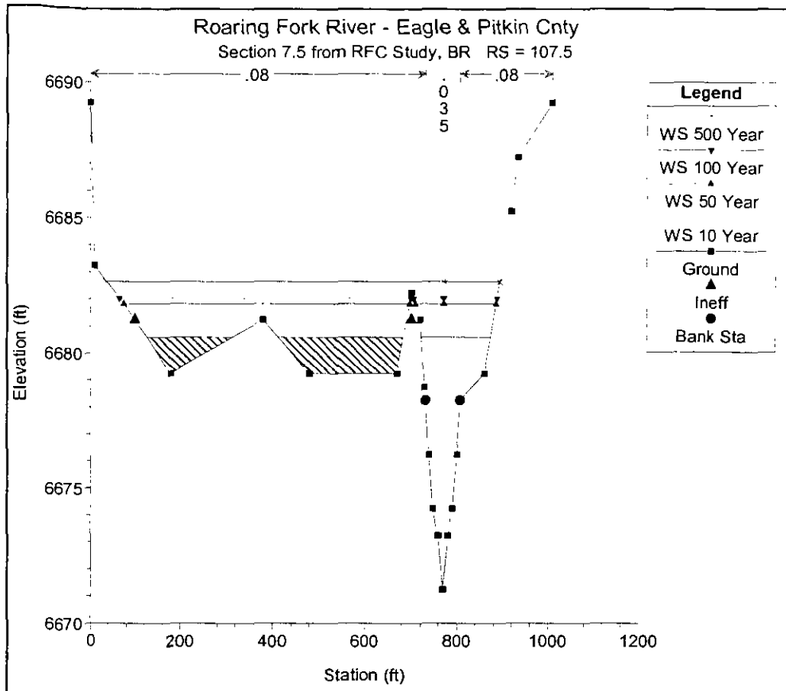

Roaring Fork River - Eagle & Pitkin Cnty
Section 9.5 from RFC Study, BR RS = 109.5
.08
.038
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

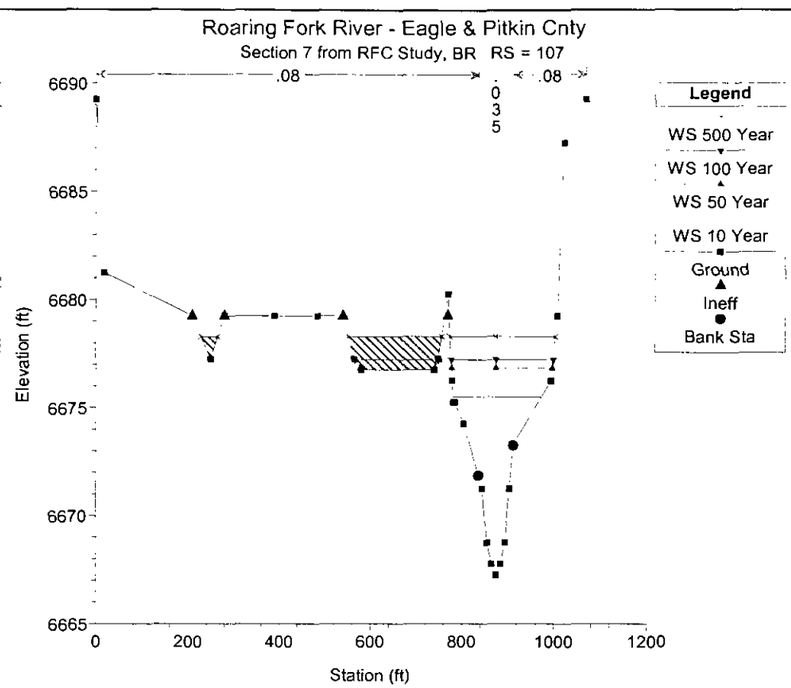

Roaring Fork River - Eagle & Pitkin Cnty
Section 9 from RFC Study, BR RS = 109
.08
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

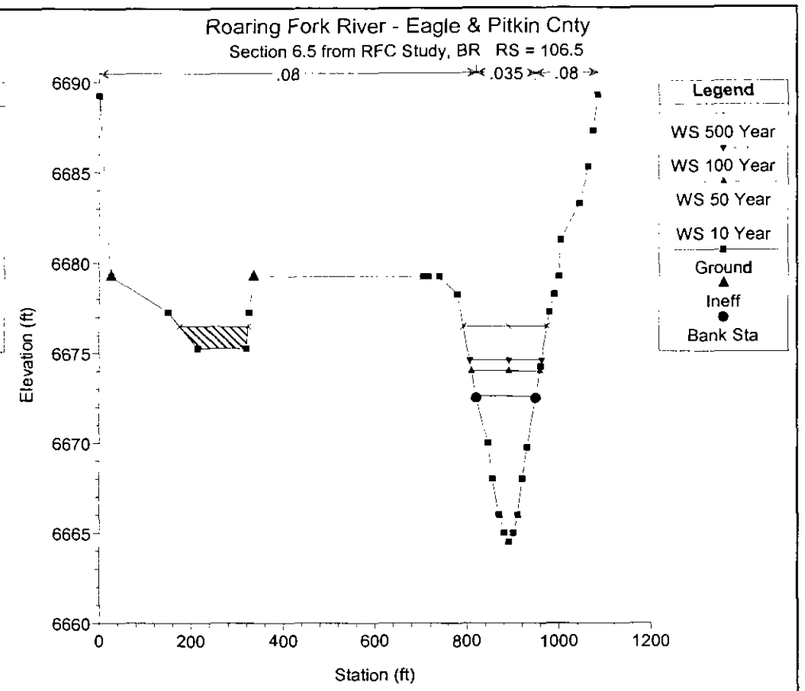

Roaring Fork River - Eagle & Pitkin Cnty
Section 8.6 from RFC Study, BR RS = 108.6
.08
.038
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

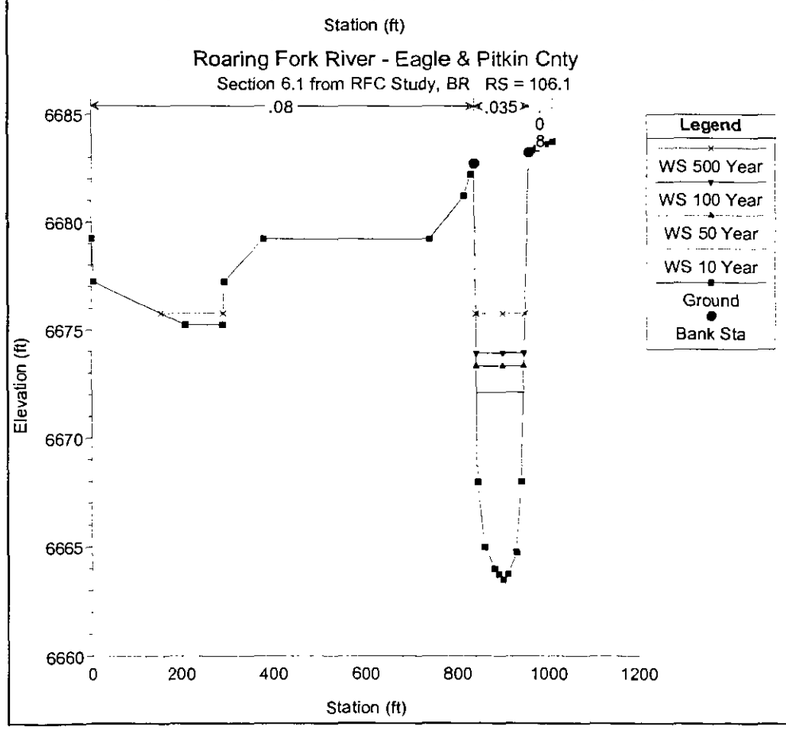

Roaring Fork River - Eagle & Pitkin Cnty
Section 8.3 from RFC Study, BR RS = 108.3
.08
.038
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

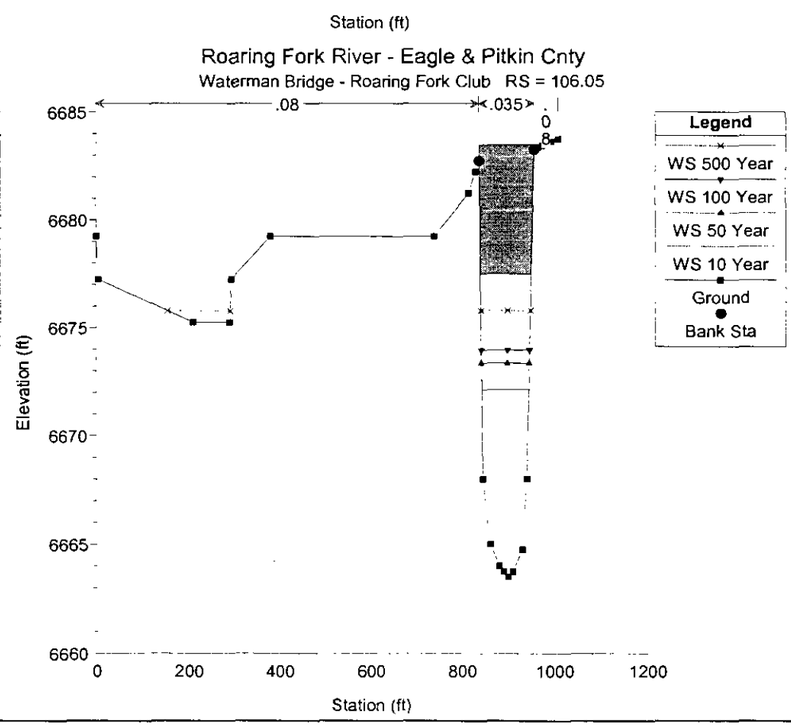

Roaring Fork River - Eagle & Pitkin Cnty
Section 8 from RFC Study, BR RS = 108
.08
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

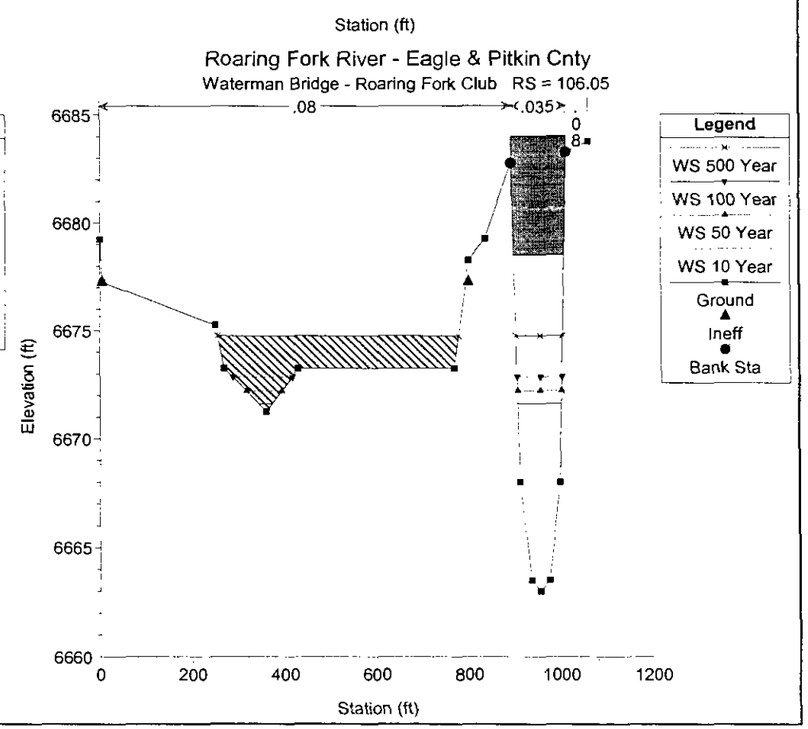

Roaring Fork River - Eagle & Pitkin Cnty
Section 7.5 from RFC Study, BR RS = 107.5
.08
.08
0.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

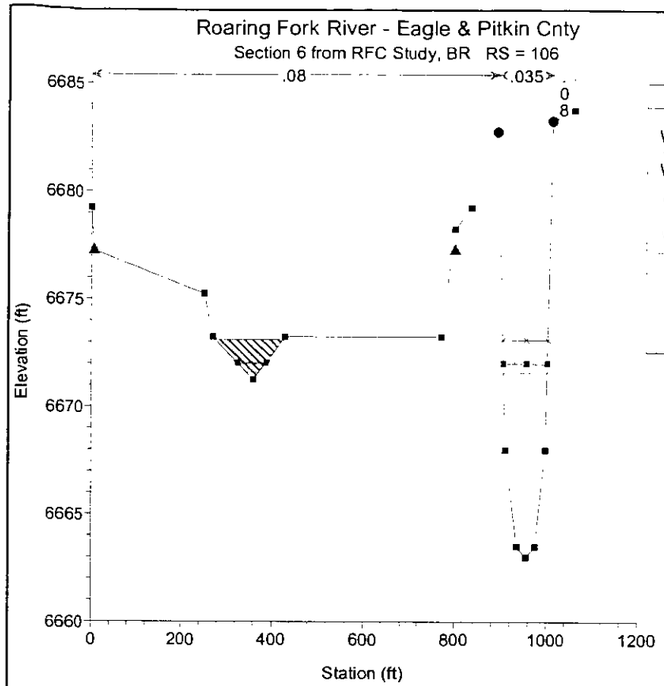

Roaring Fork River - Eagle & Pitkin Cnty
Section 7 from RFC Study, BR RS = 107
.08
.08
0.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

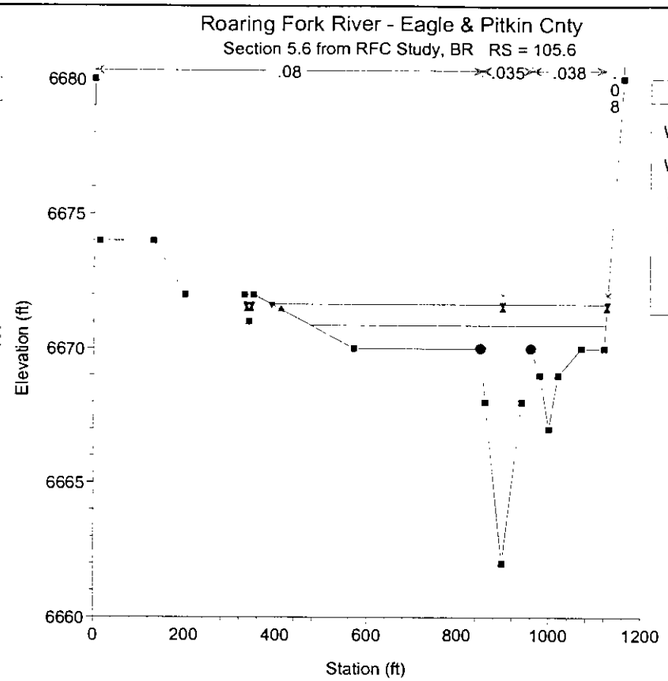

Roaring Fork River - Eagle & Pitkin Cnty
Section 6.5 from RFC Study, BR RS = 106.5
.08
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

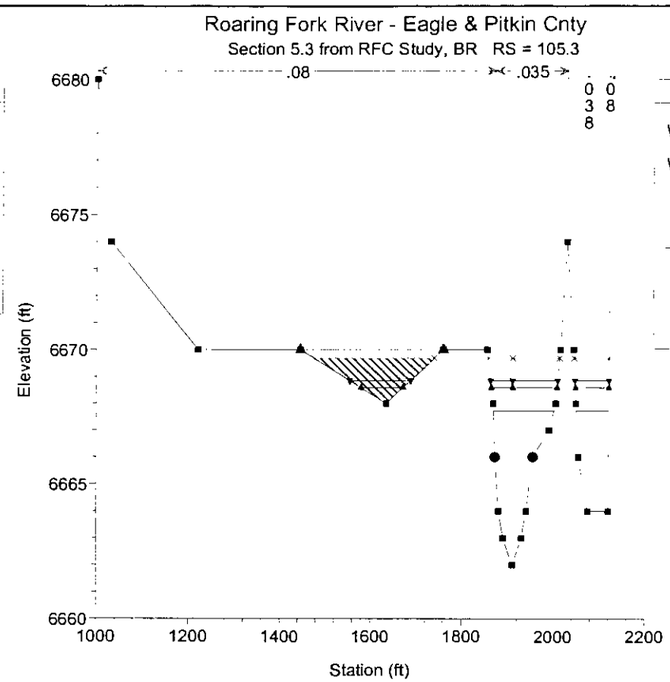

Roaring Fork River - Eagle & Pitkin Cnty
Section 6.1 from RFC Study, BR RS = 106.1
.08
.035
0.8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

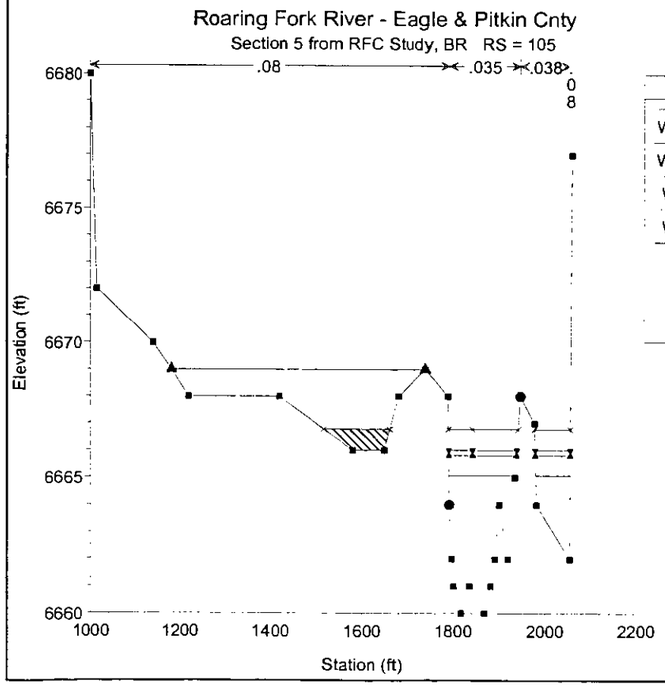

Roaring Fork River - Eagle & Pitkin Cnty
Waterman Bridge - Roaring Fork Club RS = 106.05
.08
.035
0.8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

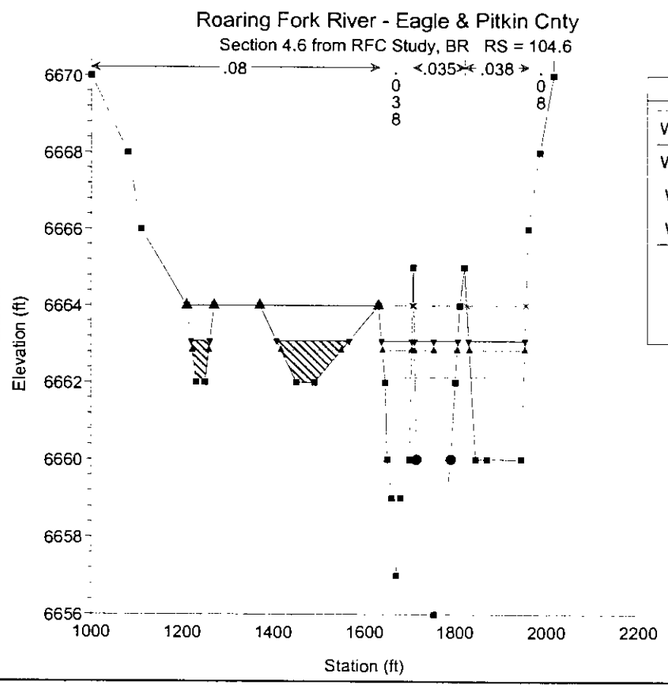

Roaring Fork River - Eagle & Pitkin Cnty
Waterman Bridge - Roaring Fork Club RS = 106.05
.08
.035
0.8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

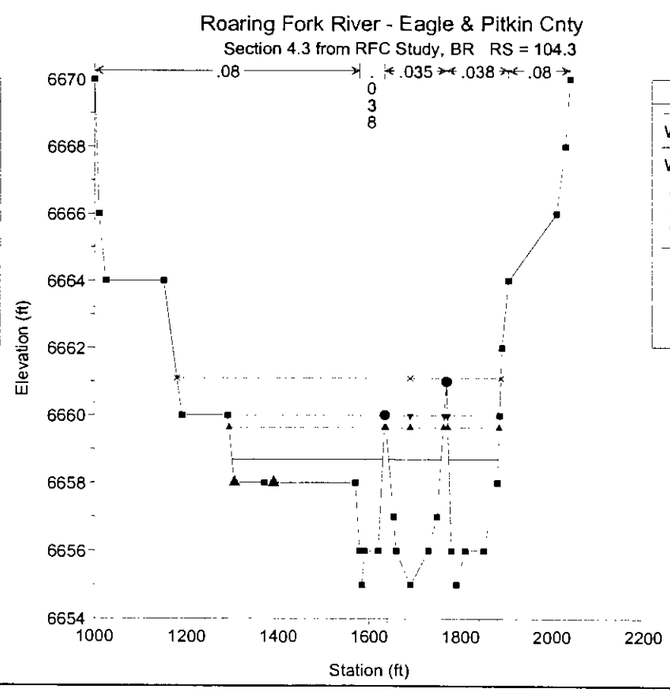

Roaring Fork River - Eagle & Pitkin Cnty
Section 6 from RFC Study, BR RS = 106
.08
.035
0
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

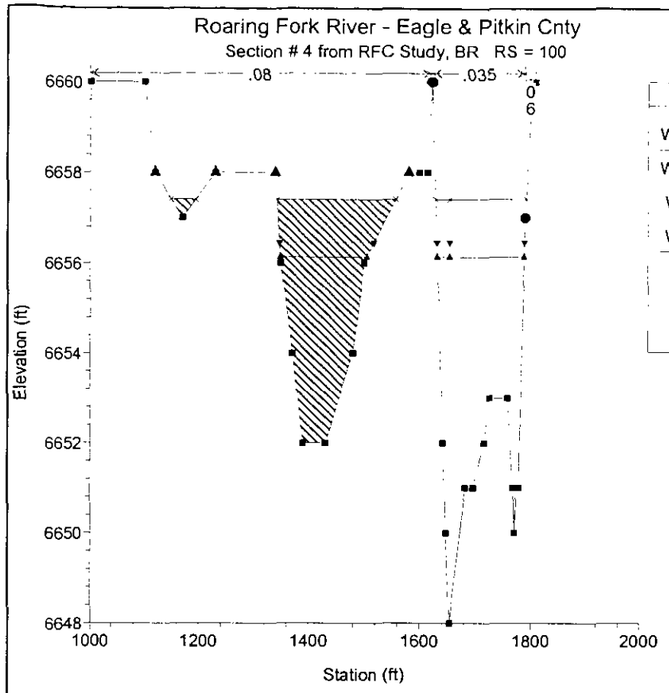

Roaring Fork River - Eagle & Pitkin Cnty
Section 5.6 from RFC Study, BR RS = 105.6
.08
.035
.038
0
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

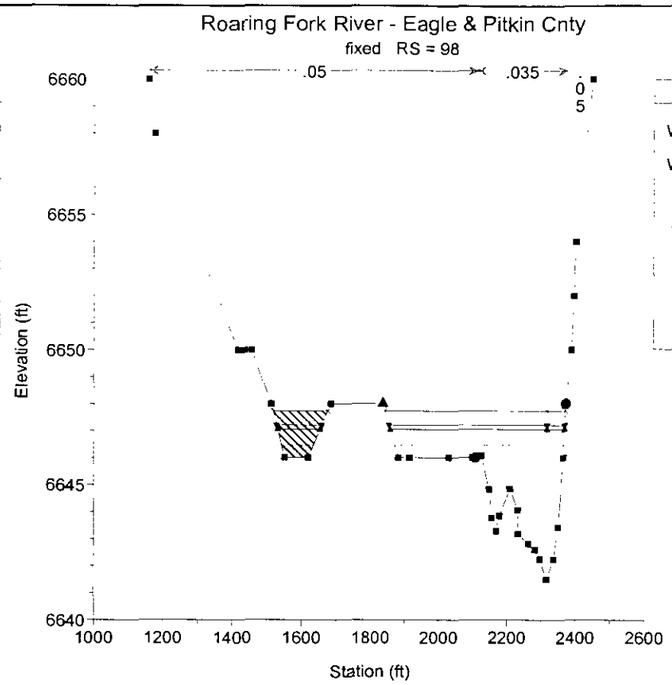

Roaring Fork River - Eagle & Pitkin Cnty
Section 5.3 from RFC Study, BR RS = 105.3
.08
.035
0
0
3
8
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

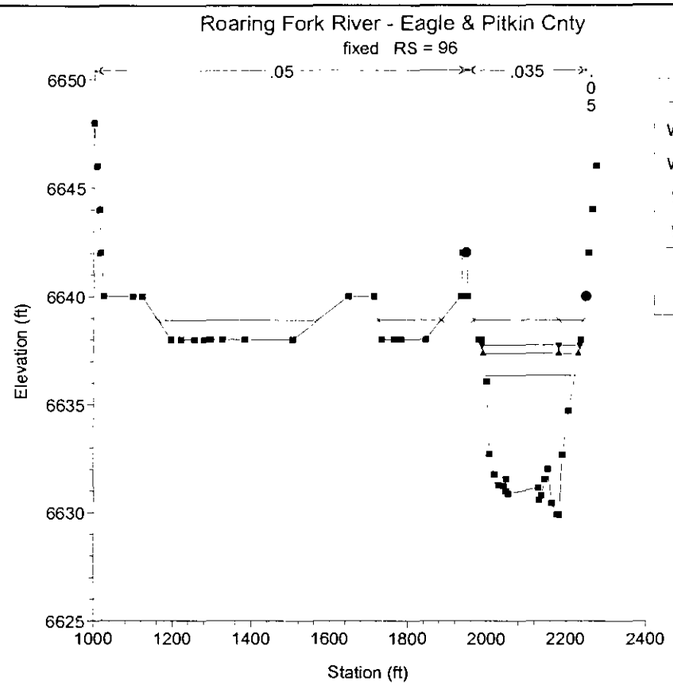

Roaring Fork River - Eagle & Pitkin Cnty
Section 5 from RFC Study, BR RS = 105
.08
.035
.038
0
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

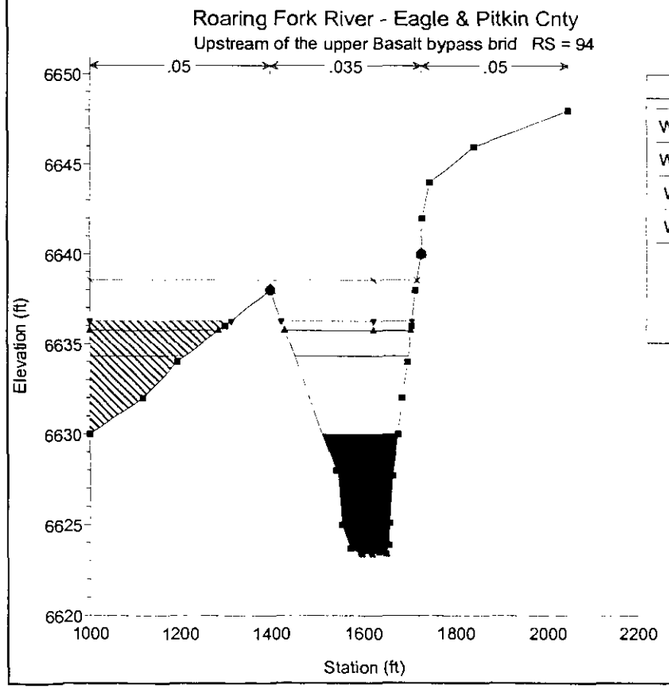

Roaring Fork River - Eagle & Pitkin Cnty
Section 4.6 from RFC Study, BR RS = 104.6
.08
.035
.038
0
3
8
0
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

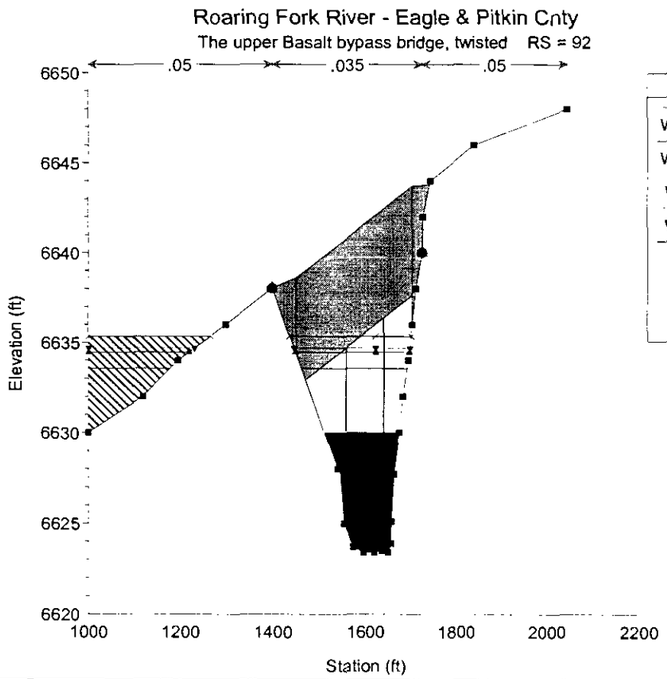

Roaring Fork River - Eagle & Pitkin Cnty
Section 4.3 from RFC Study, BR RS = 104.3
.08
.035
.038
.08
0
3
8
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

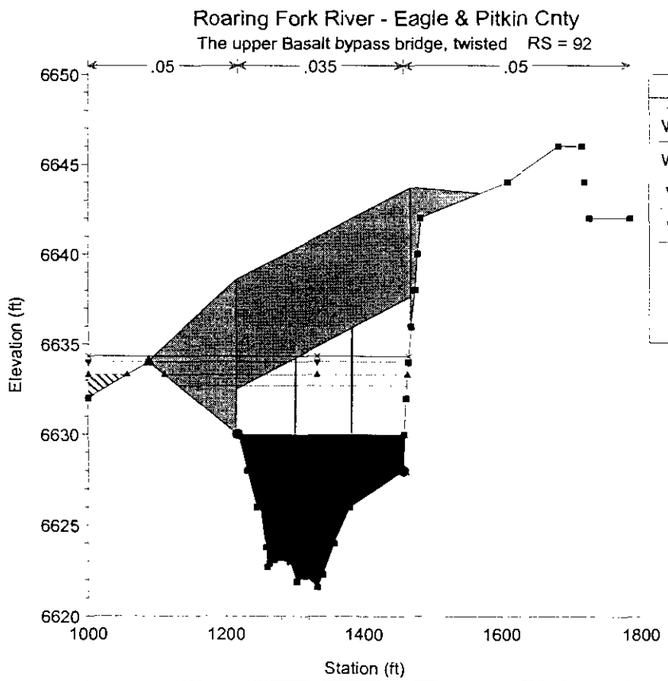

Roaring Fork River - Eagle & Pitkin Cnty
Section # 4 from RFC Study, BR RS = 100
.08
.035
0
6
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

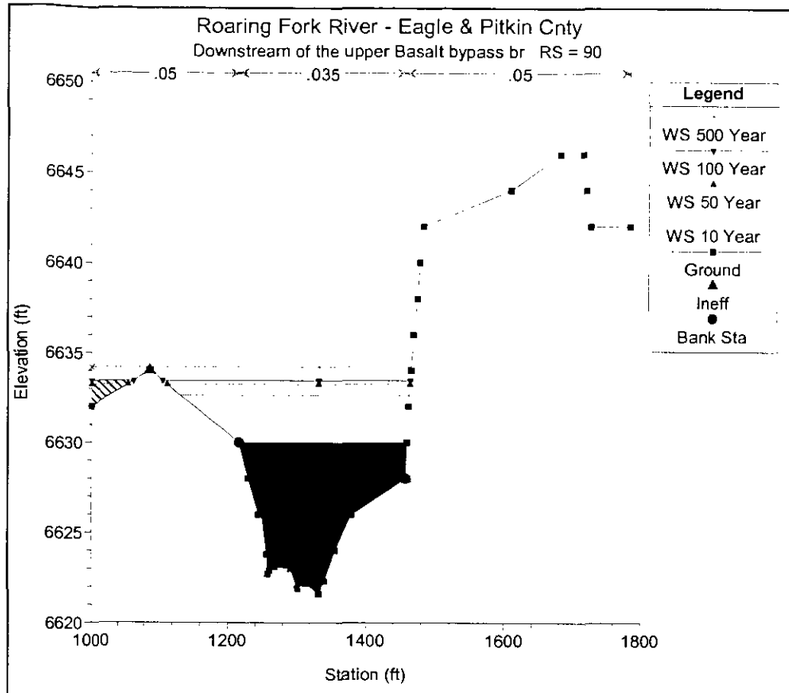

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 98
.05
.035
0
5
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

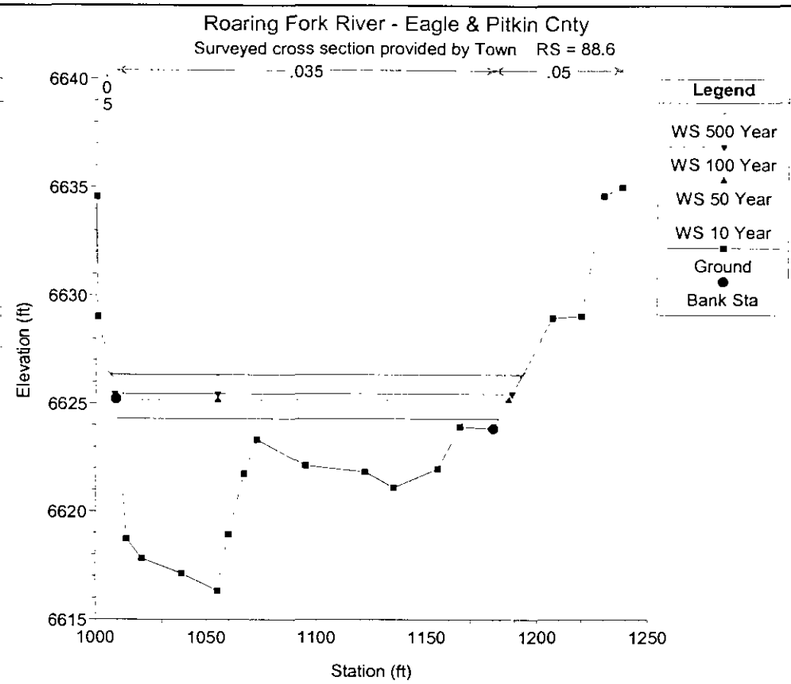

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 96
.05
.035
0
5
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

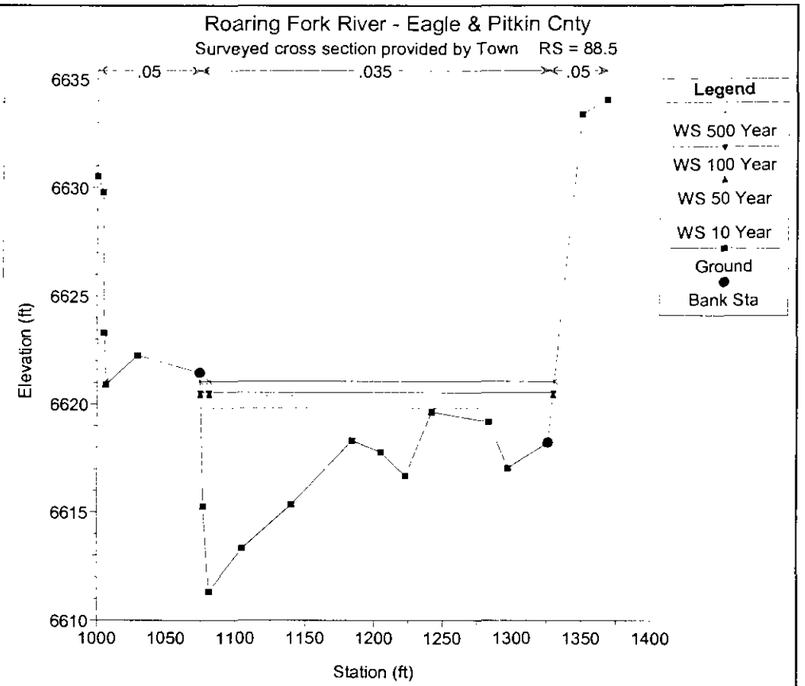

Roaring Fork River - Eagle & Pitkin Cnty
Upstream of the upper Basalt bypass brid RS = 94
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

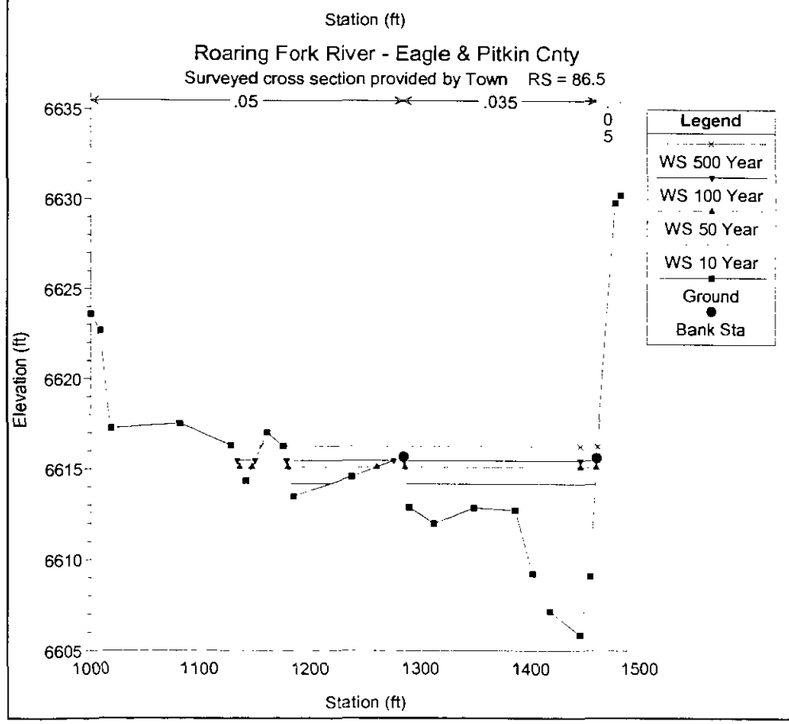

Roaring Fork River - Eagle & Pitkin Cnty
The upper Basalt bypass bridge, twisted RS = 92
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

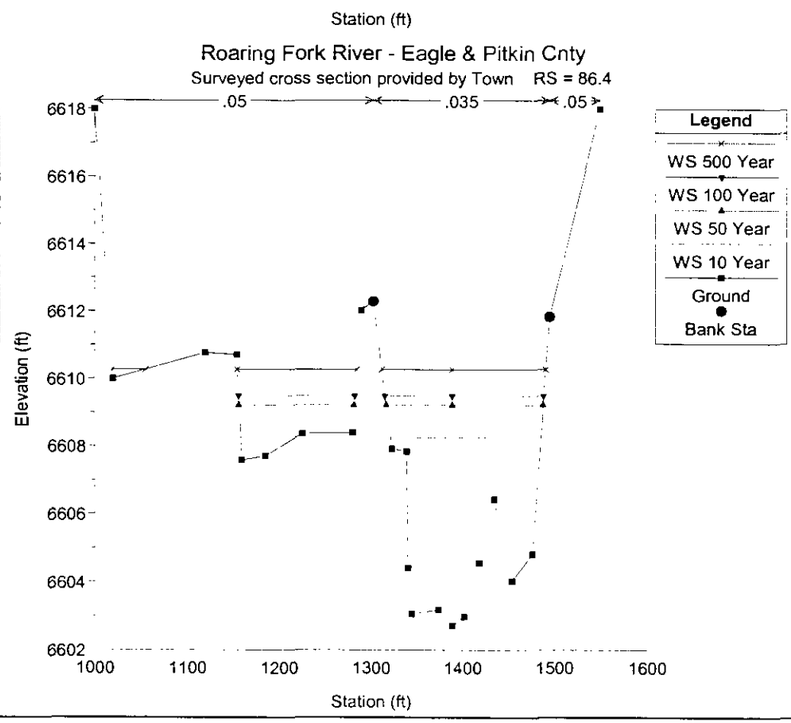

Roaring Fork River - Eagle & Pitkin Cnty
The upper Basalt bypass bridge, twisted RS = 92
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

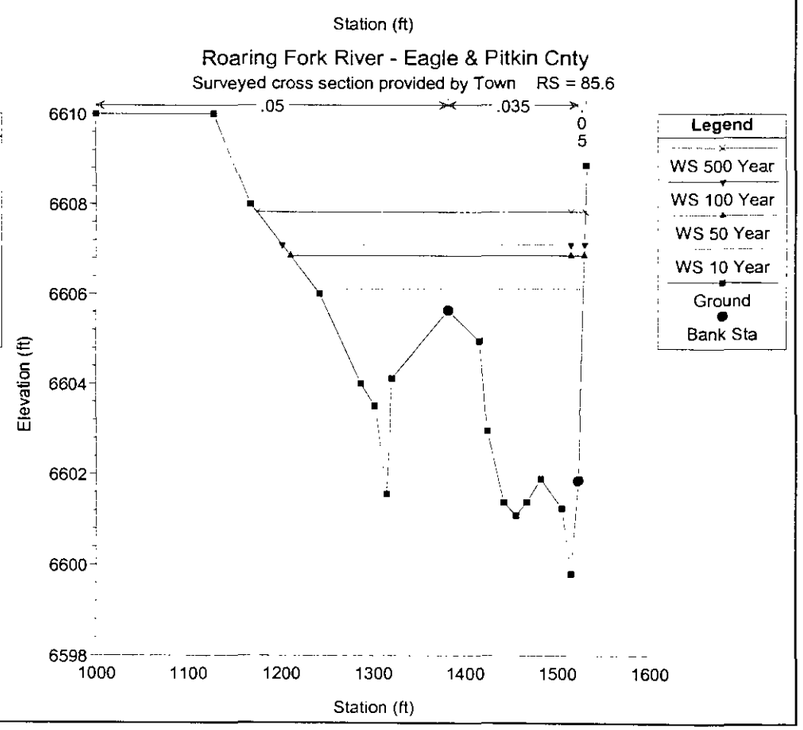

Roaring Fork River - Eagle & Pitkin Cnty
Downstream of the upper Basalt bypass br RS = 90
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

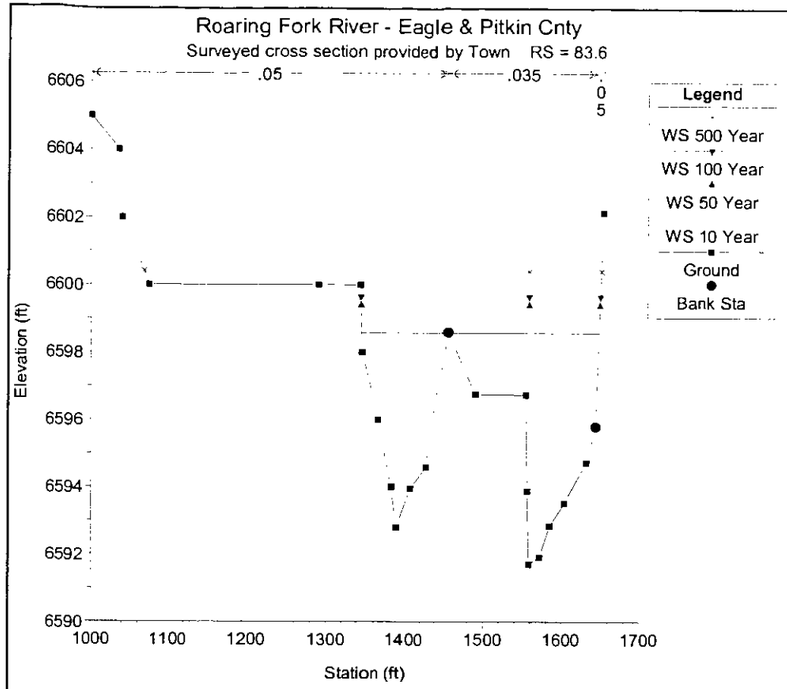

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 88.6
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

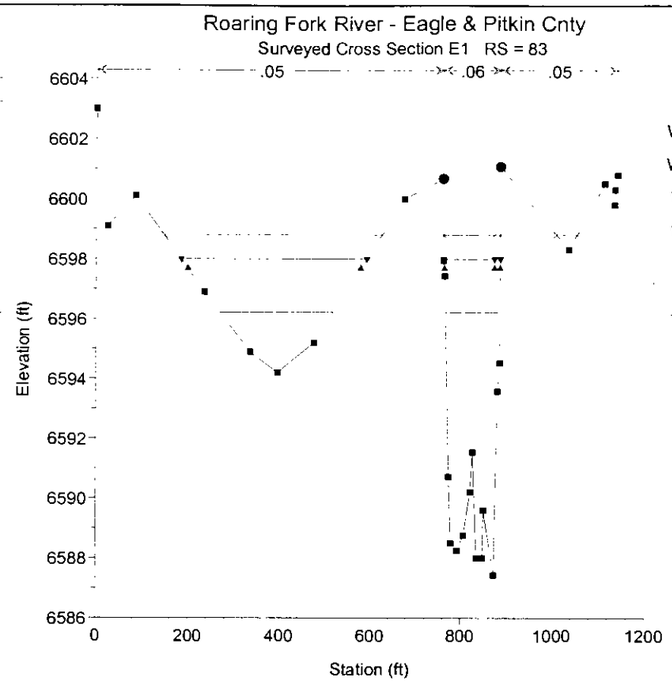

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 88.5
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

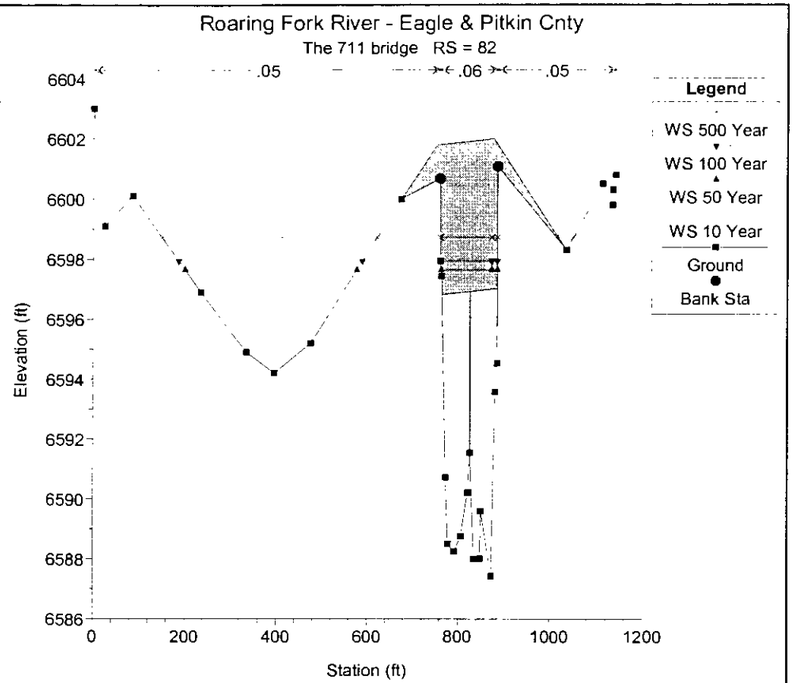

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 86.5
.05
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

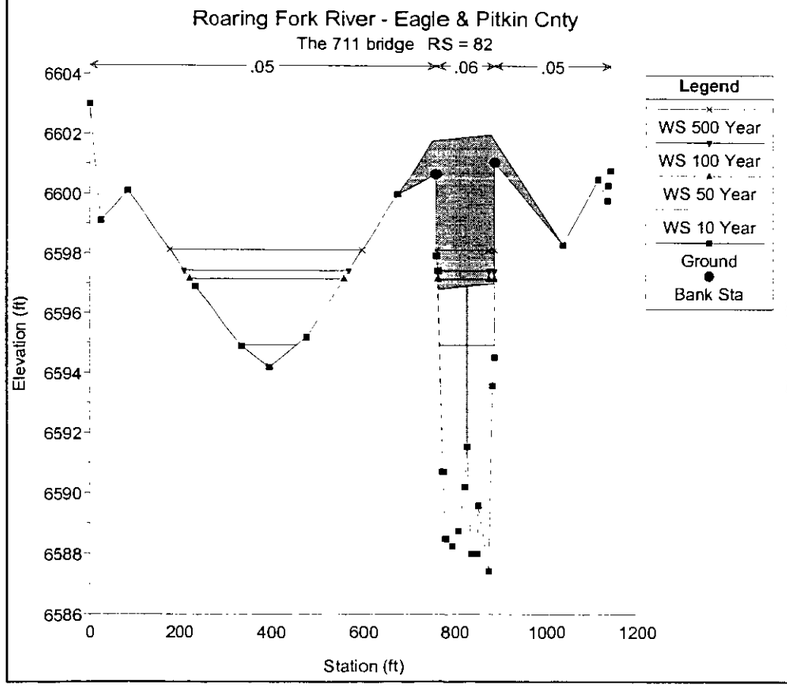

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 86.4
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

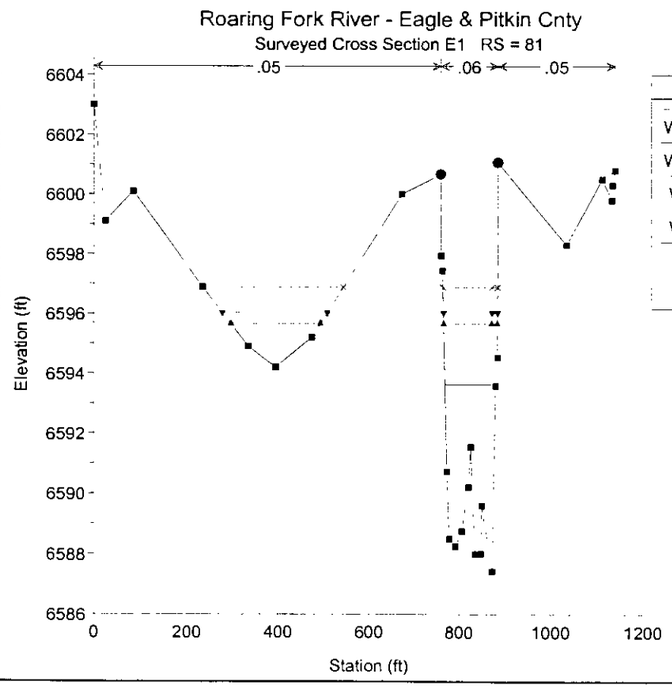

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 85.6
.05
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

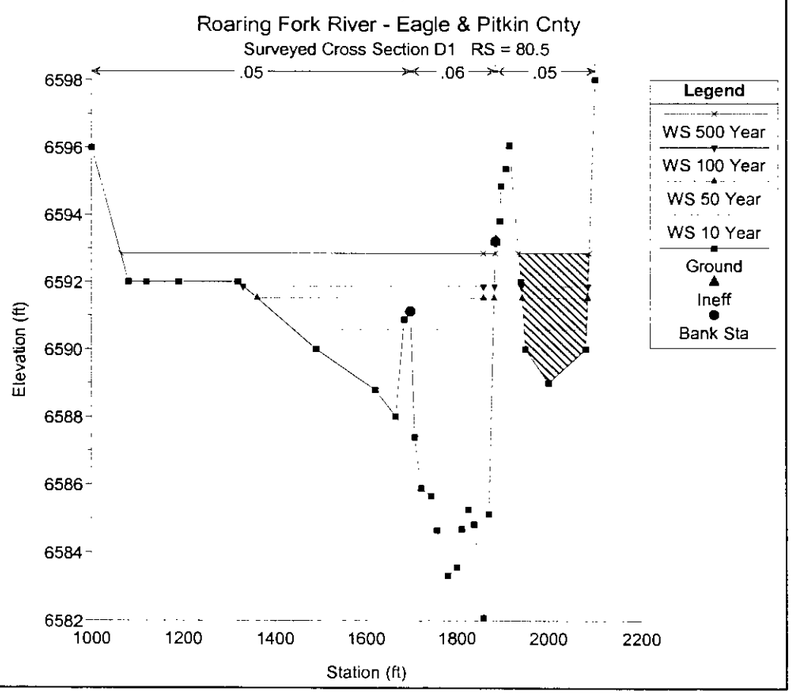

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed cross section provided by Town RS = 83.6
.05
.035
0
5
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

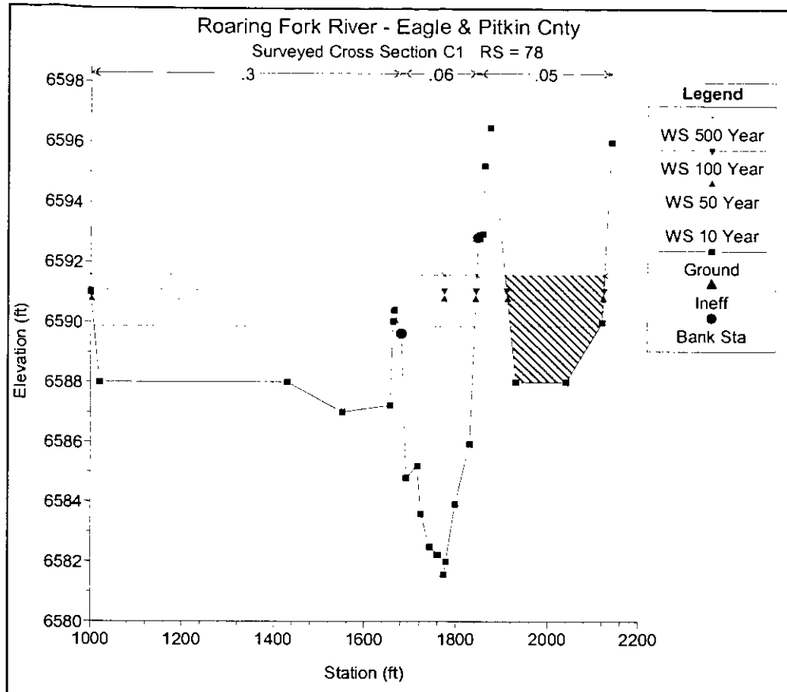

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section E1 RS = 83
.05
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

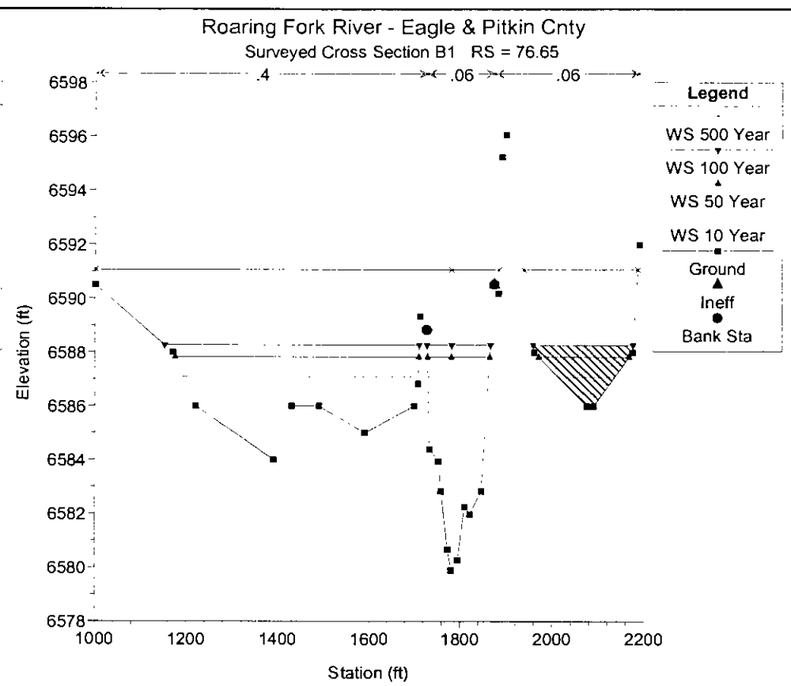

Roaring Fork River - Eagle & Pitkin Cnty
The 711 bridge RS = 82
.05
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

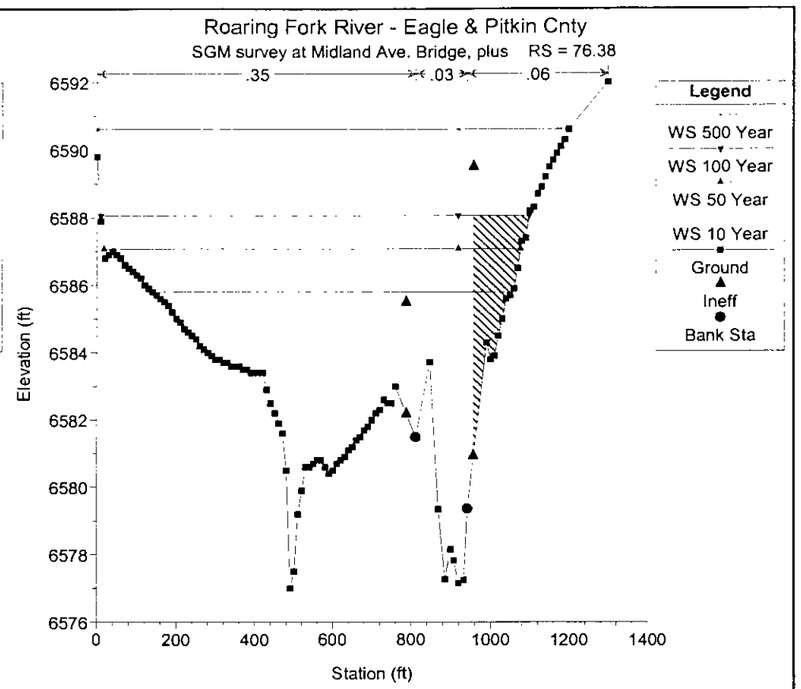

Roaring Fork River - Eagle & Pitkin Cnty
The 711 bridge RS = 82
.05
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

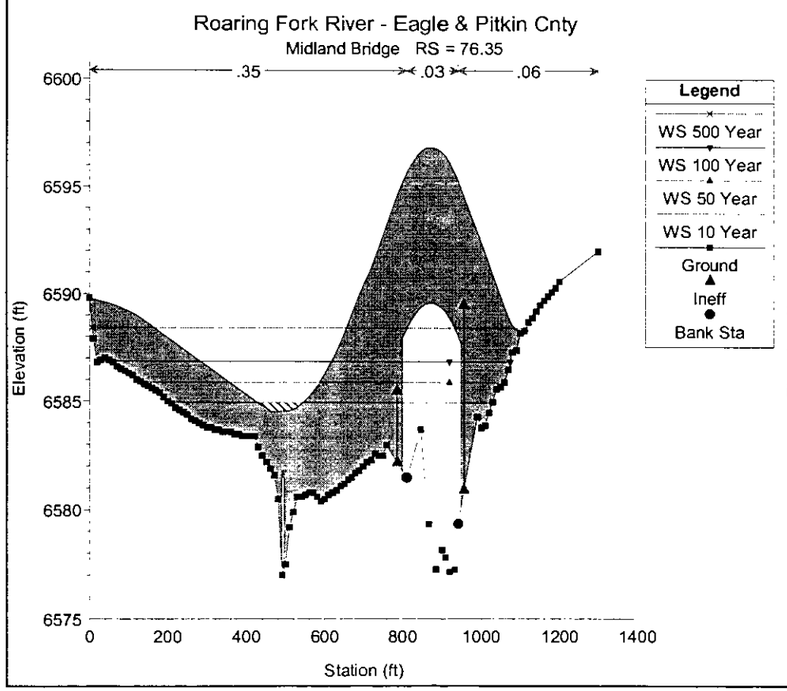

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section E1 RS = 81
.05
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

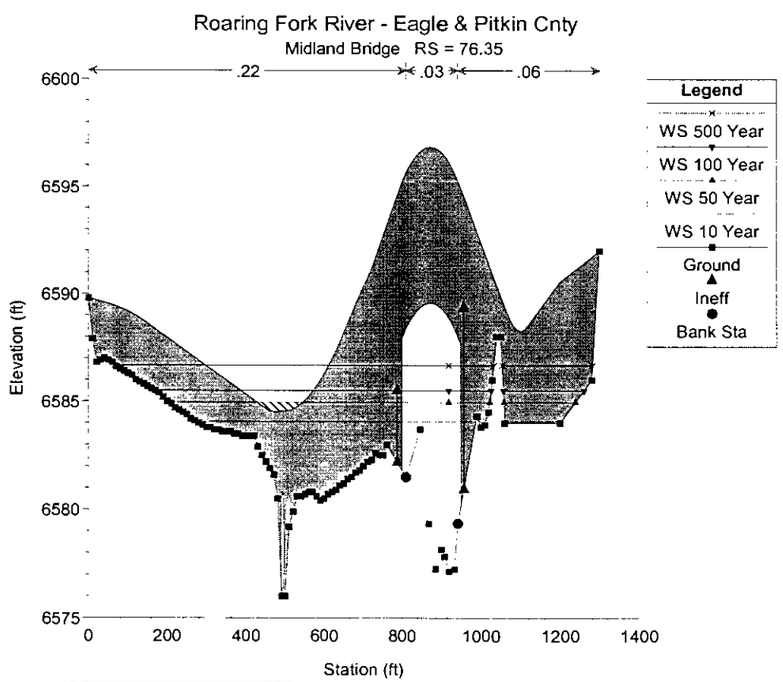

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section D1 RS = 80.5
.05
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

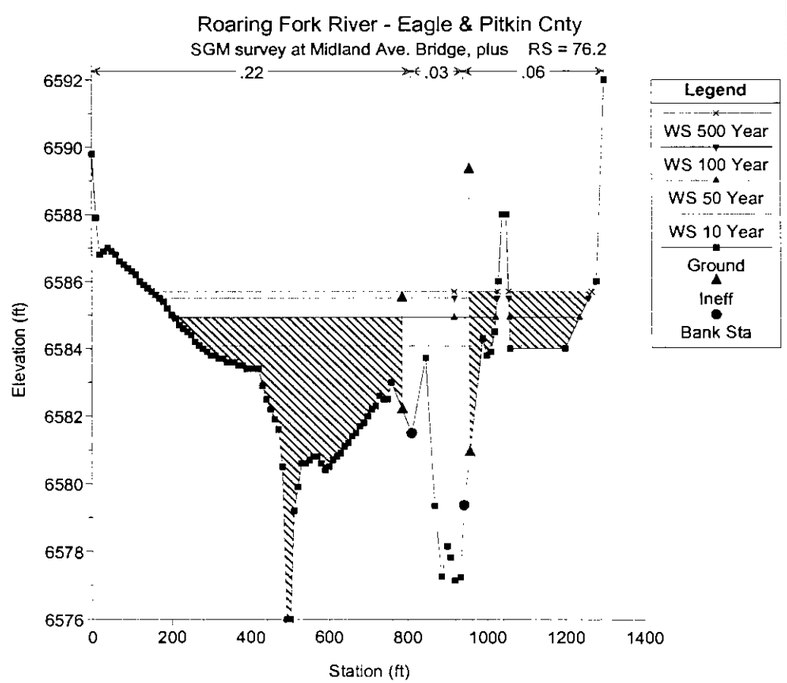

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section C1 RS = 78
.3
.06
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

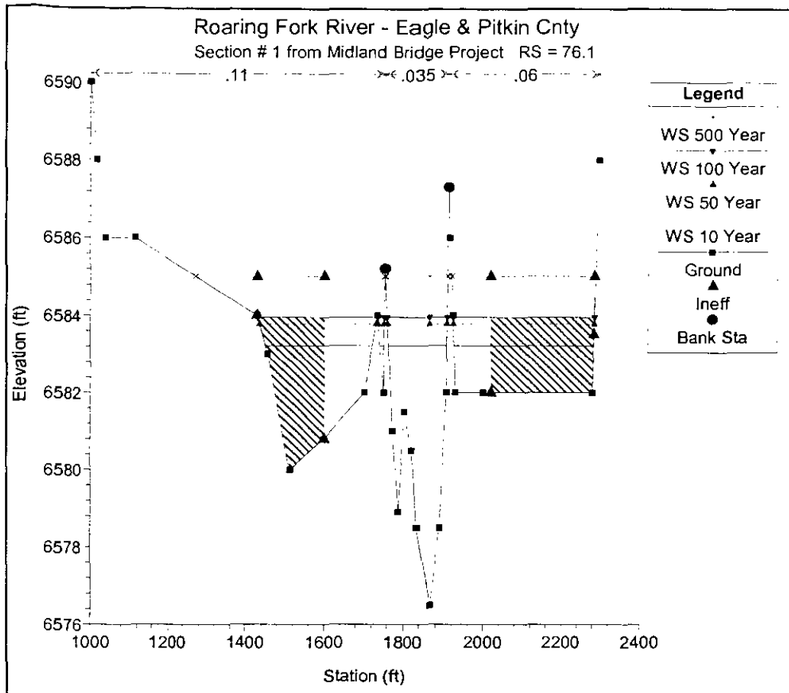

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section B1 RS = 76.65
.4
.06
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

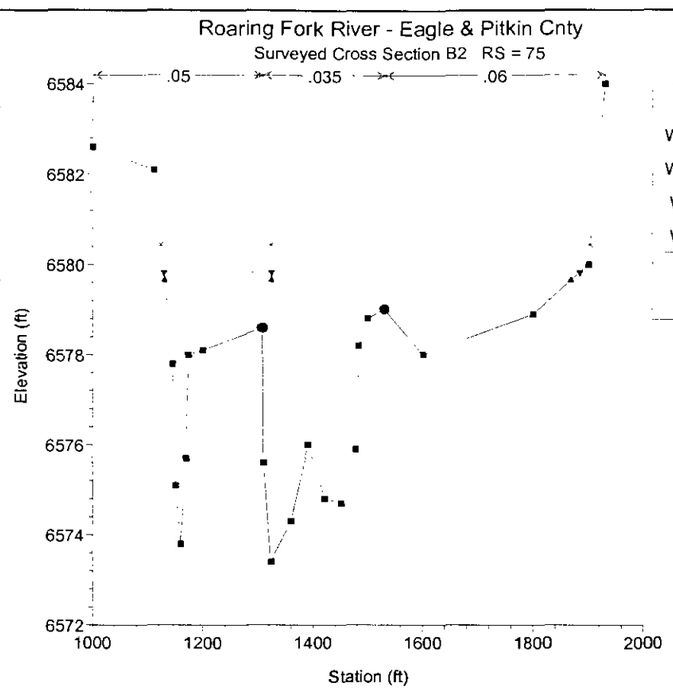

Roaring Fork River - Eagle & Pitkin Cnty
SGM survey at Midland Ave. Bridge, plus RS = 76.38
.35
.03
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

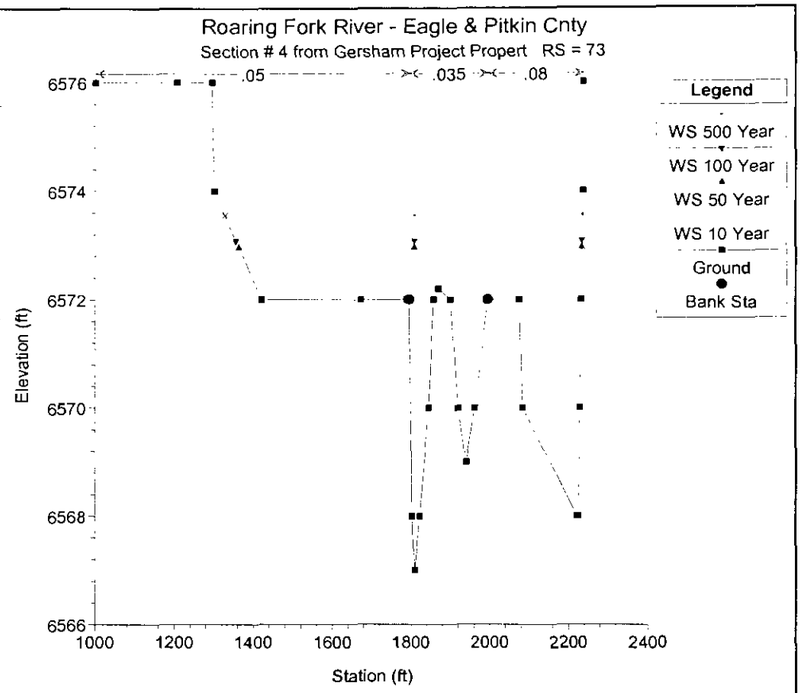

Roaring Fork River - Eagle & Pitkin Cnty
Midland Bridge RS = 76.35
.35
.03
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

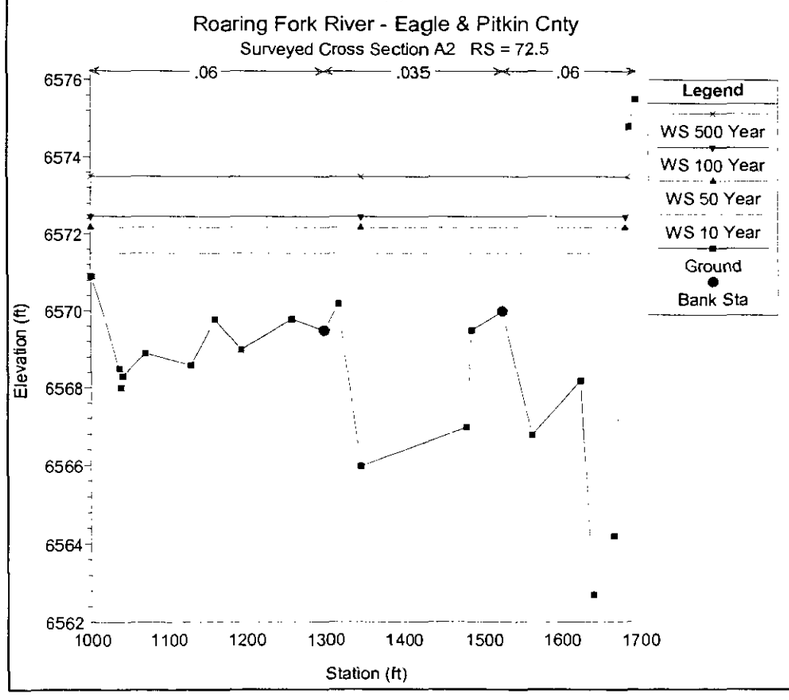

Roaring Fork River - Eagle & Pitkin Cnty
Midland Bridge RS = 76.35
.22
.03
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

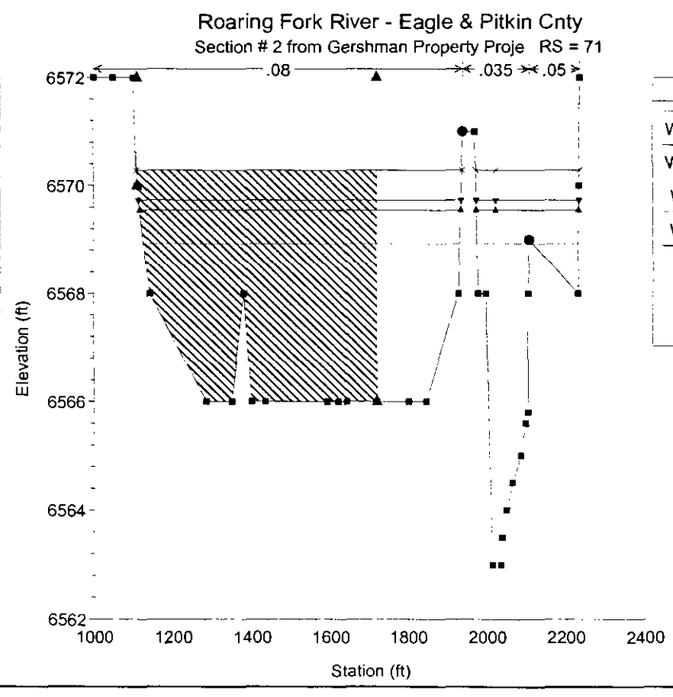

Roaring Fork River - Eagle & Pitkin Cnty
SGM survey at Midland Ave. Bridge, plus RS = 76.2
.22
.03
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

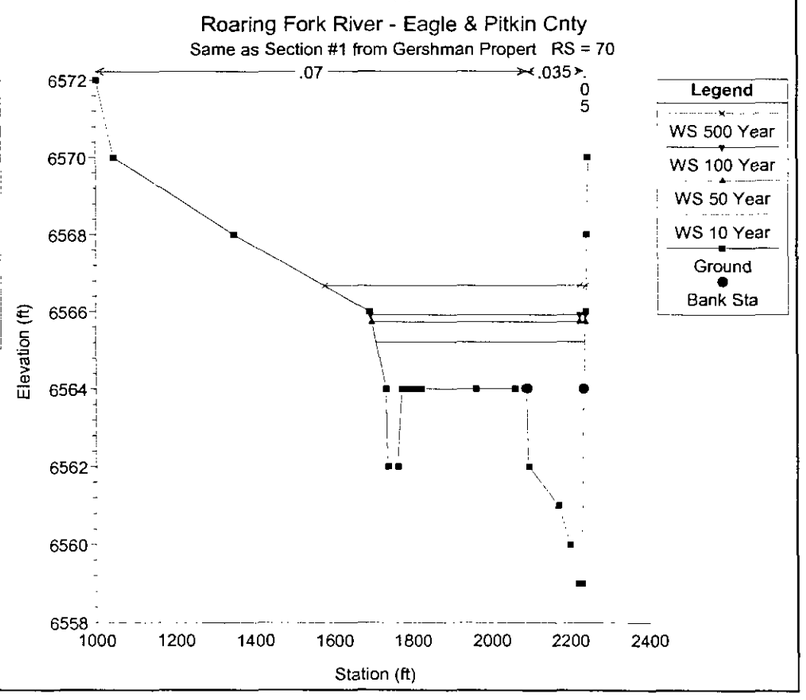

Roaring Fork River - Eagle & Pitkin Cnty
Section # 1 from Midland Bridge Project RS = 76.1
.11
.035
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

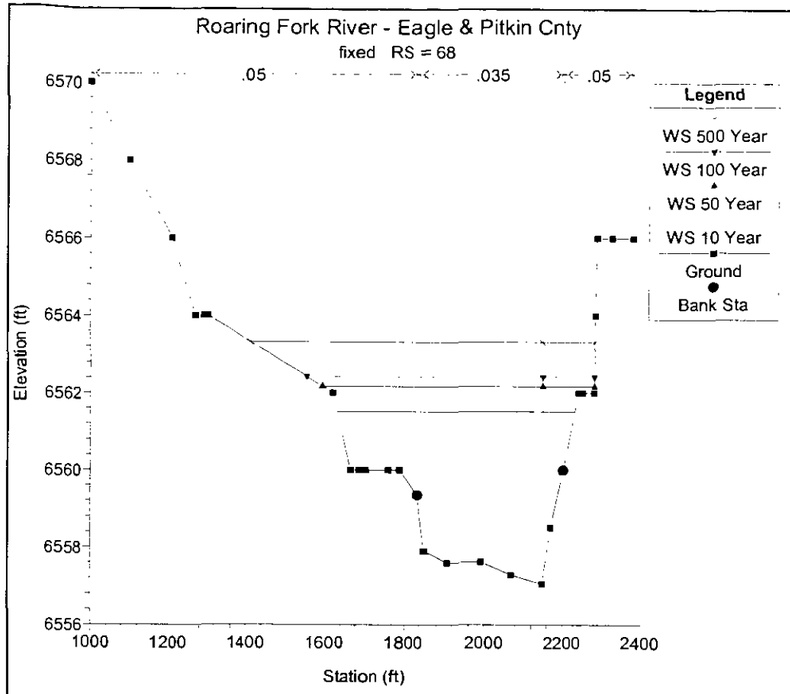

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section B2 RS = 75
.05
.035
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

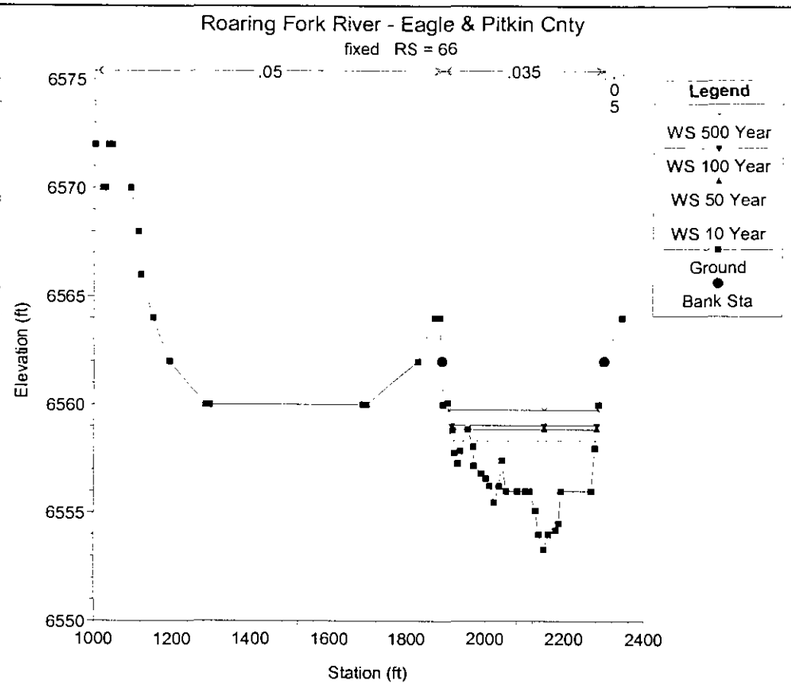

Roaring Fork River - Eagle & Pitkin Cnty
Section # 4 from Gersham Project Propert RS = 73
.05
.035
.08
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

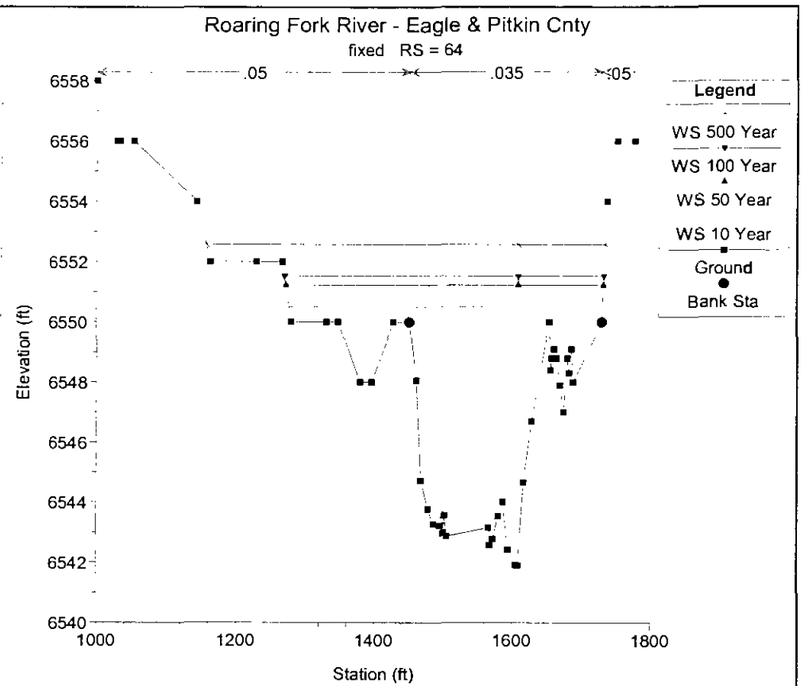

Roaring Fork River - Eagle & Pitkin Cnty
Surveyed Cross Section A2 RS = 72.5
.06
.035
.06
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

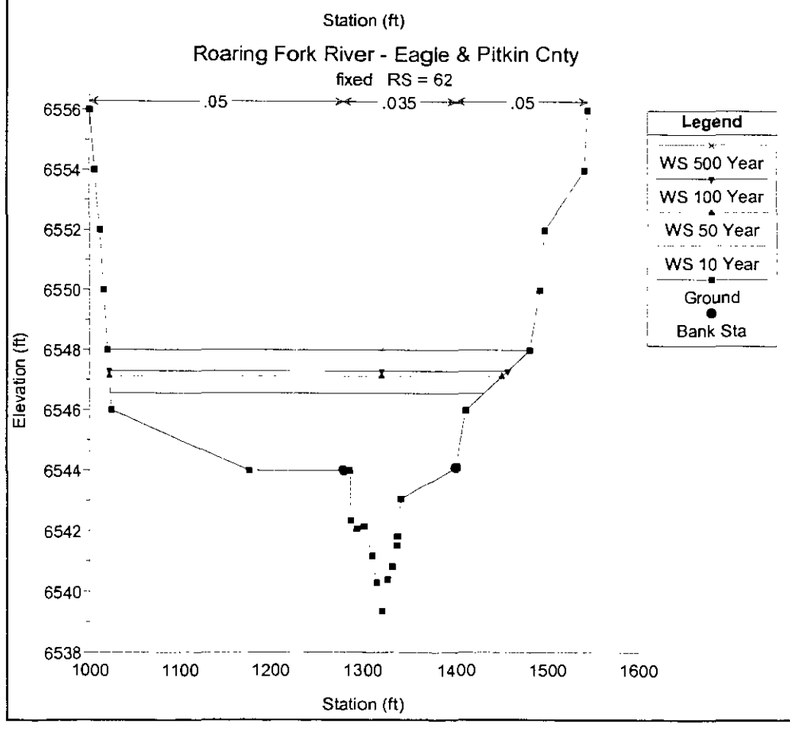

Roaring Fork River - Eagle & Pitkin Cnty
Section # 2 from Gershman Property Proje RS = 71
.08
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

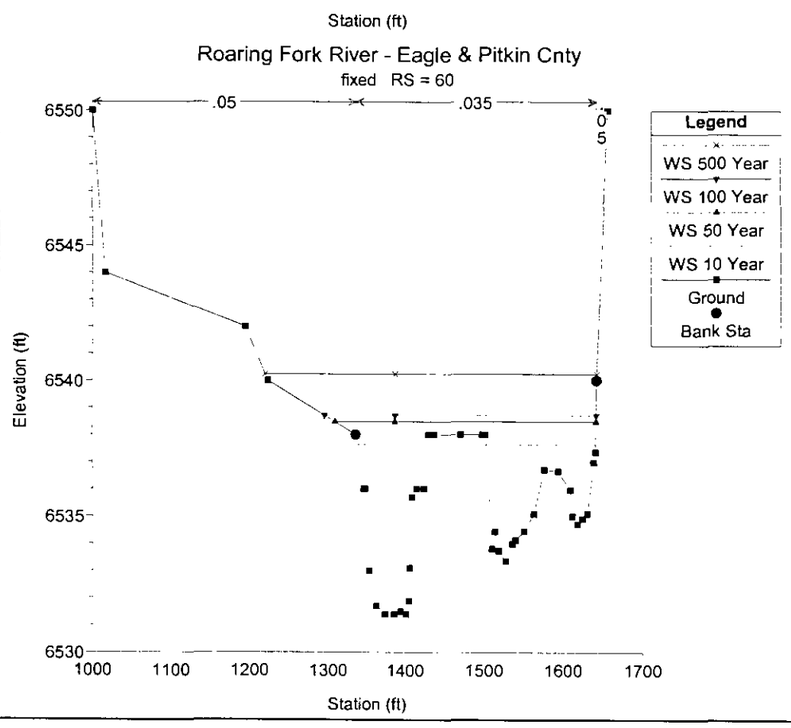

Roaring Fork River - Eagle & Pitkin Cnty
Same as Section #1 from Gershman Propert RS = 70
.07
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

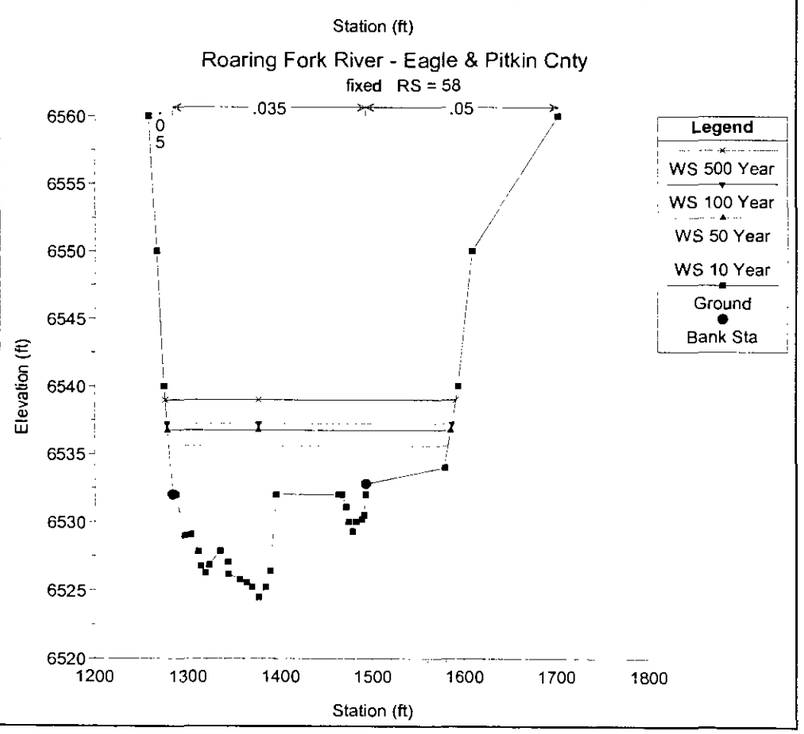

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 68
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

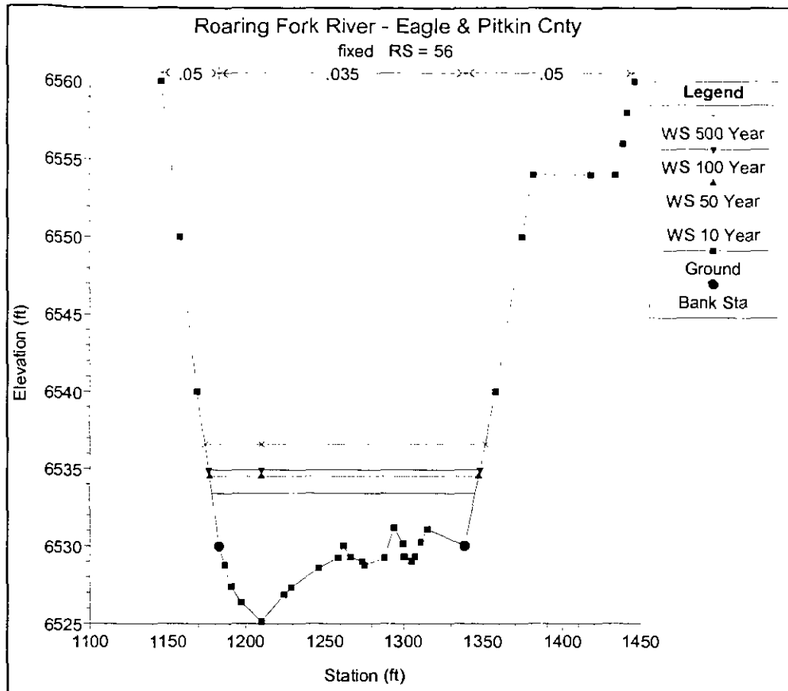

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 66
.05
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

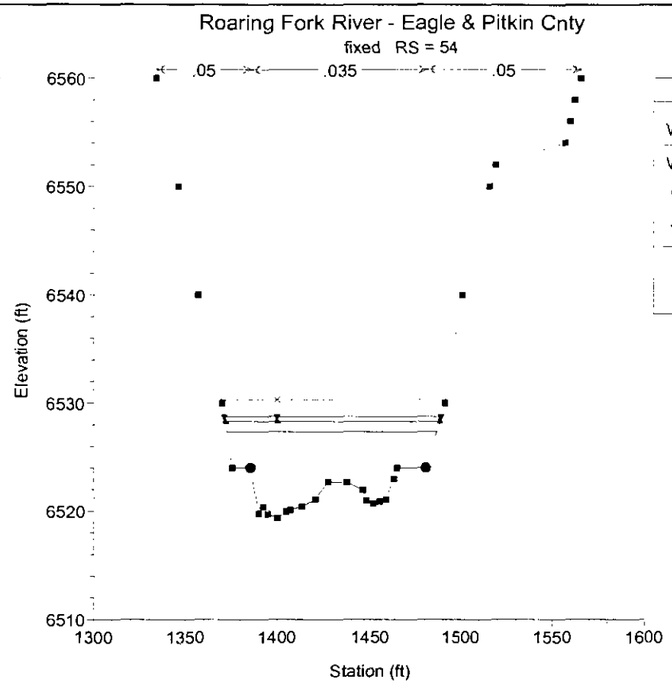

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 64
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

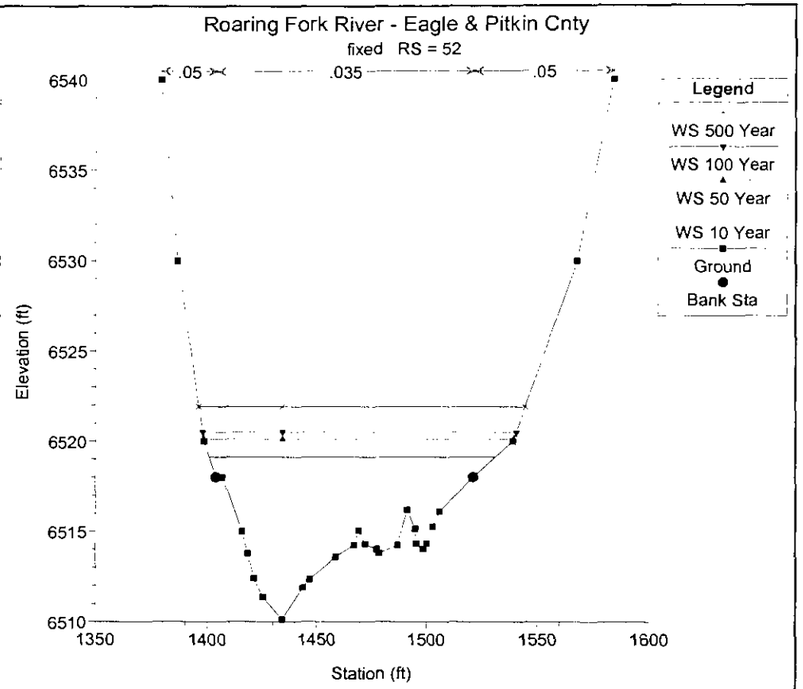

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 62
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

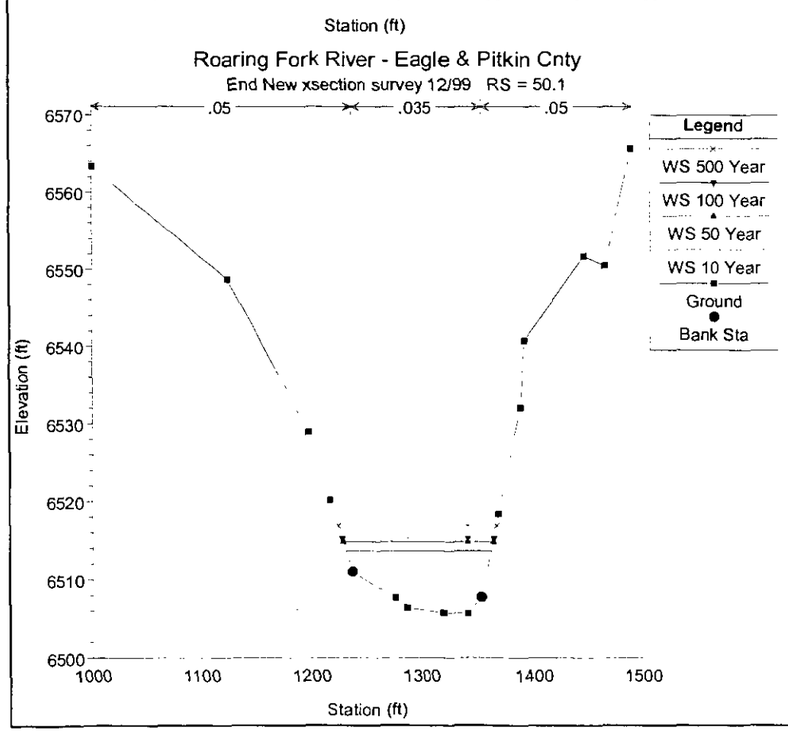

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 60
.05
.035
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

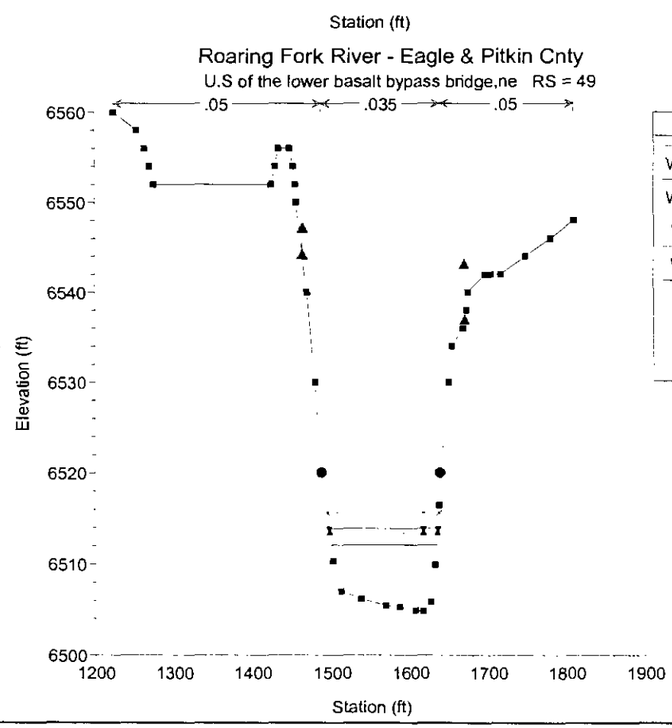

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 58
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

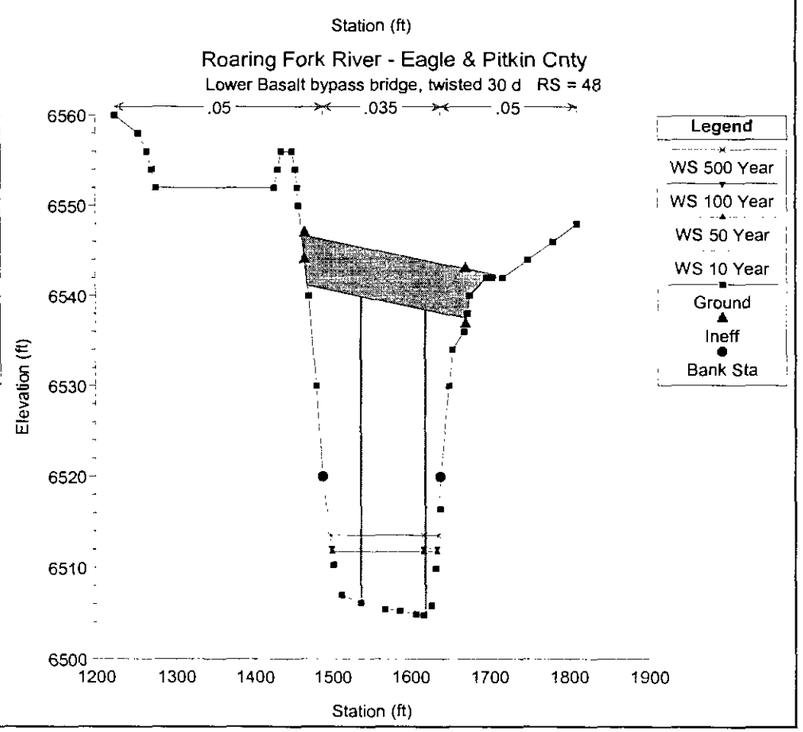

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 56
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

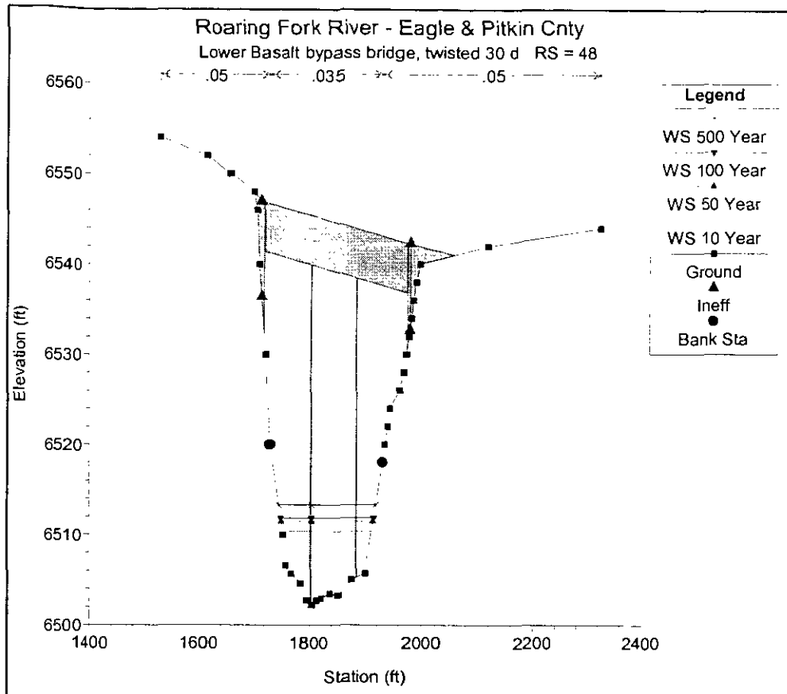

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 54
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

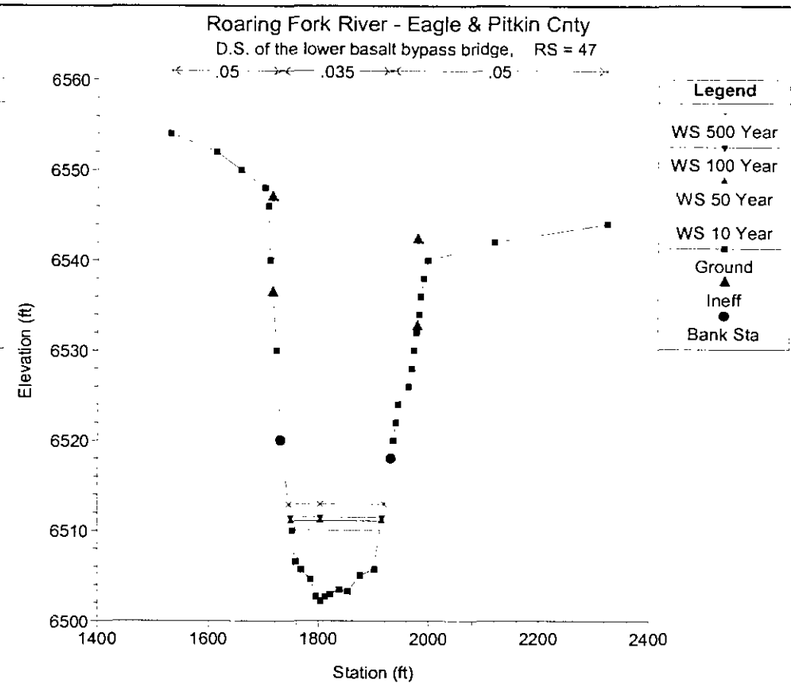

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 52
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

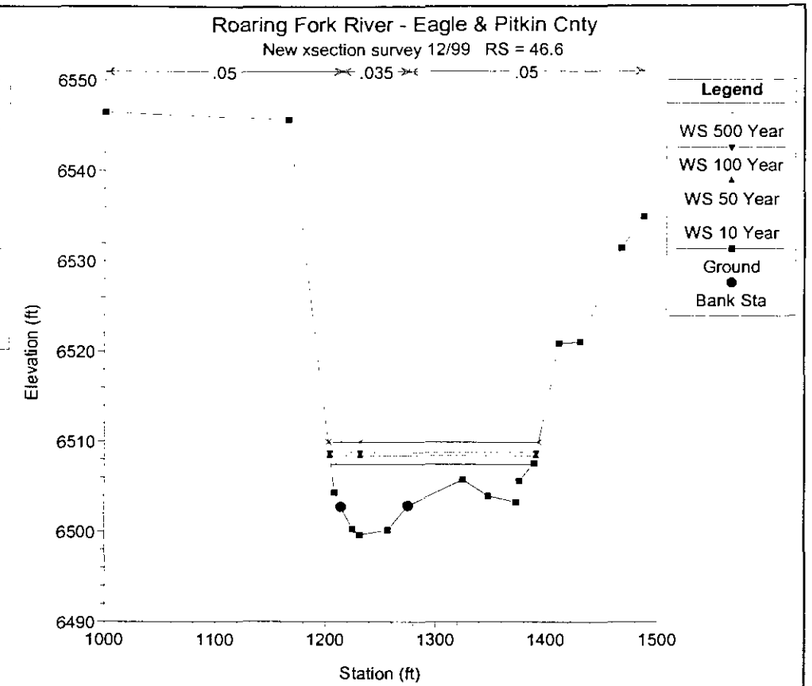

Roaring Fork River - Eagle & Pitkin Cnty
End New xsection survey 12/99 RS = 50.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

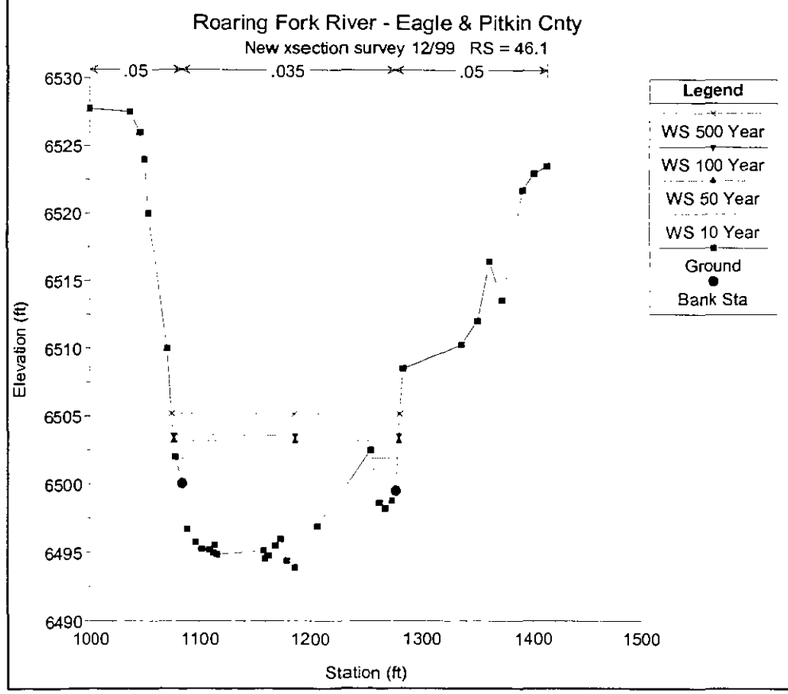

Roaring Fork River - Eagle & Pitkin Cnty
U.S of the lower basalt bypass bridge,ne RS = 49
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

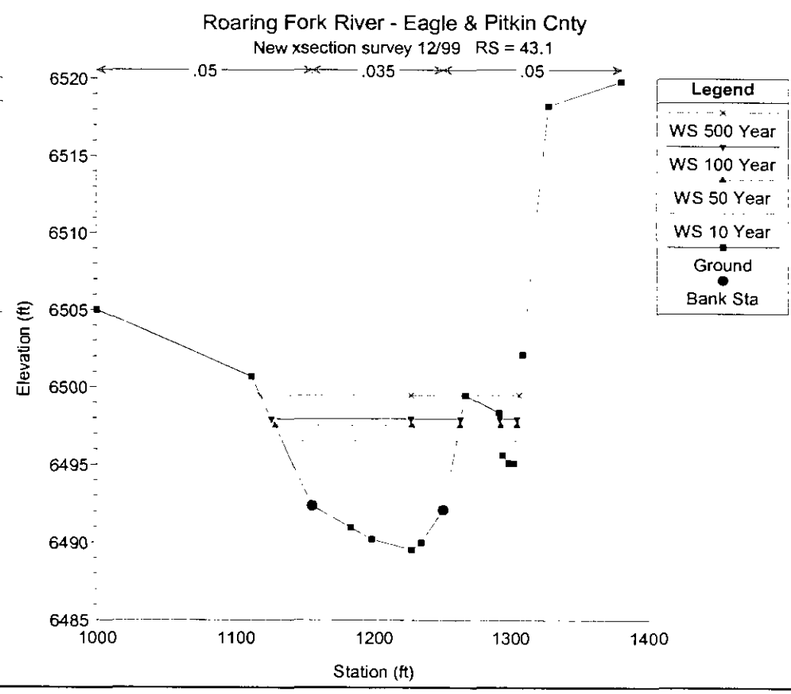

Roaring Fork River - Eagle & Pitkin Cnty
Lower Basalt bypass bridge, twisted 30 d RS = 48
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

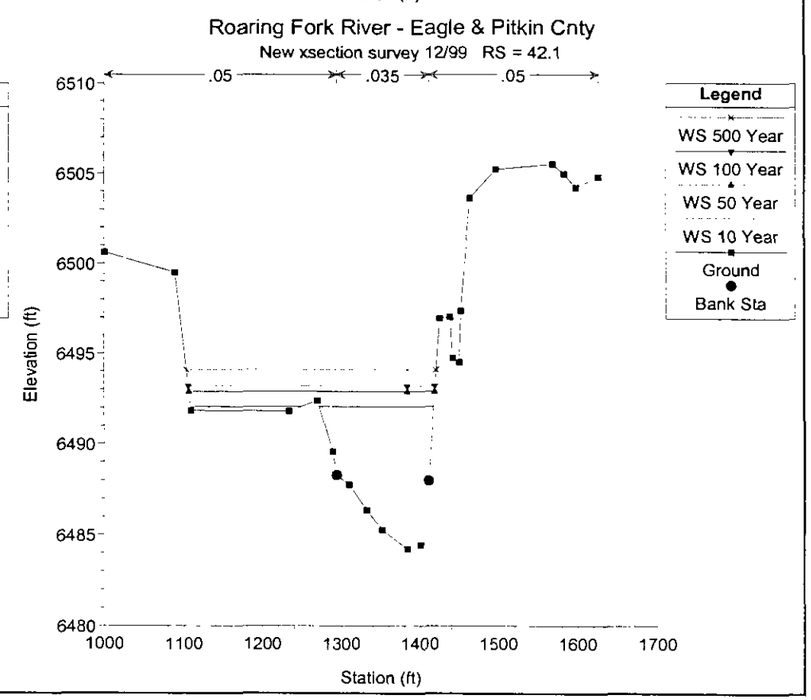

Roaring Fork River - Eagle & Pitkin Cnty
Lower Basalt bypass bridge, twisted 30 d RS = 48
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

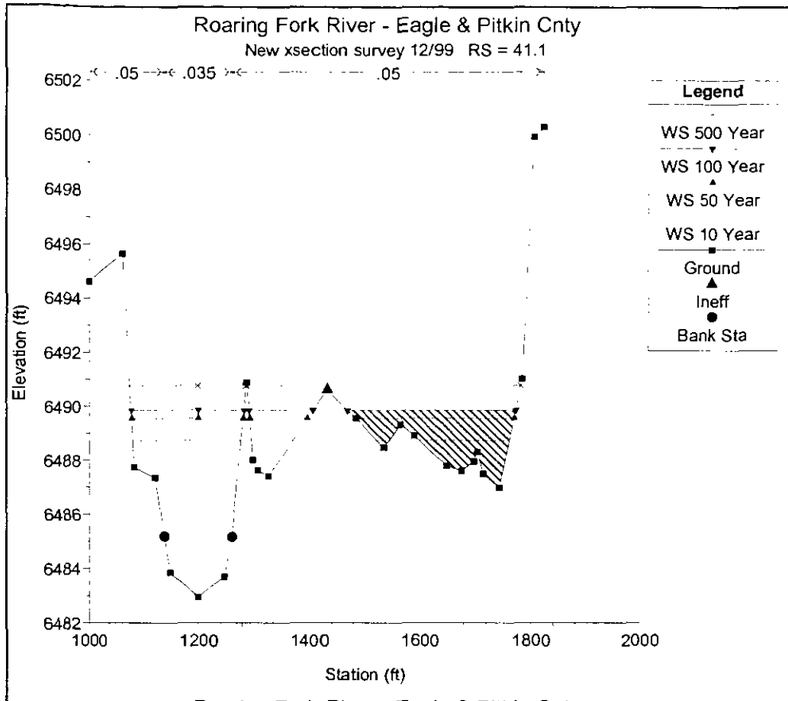

Roaring Fork River - Eagle & Pitkin Cnty
D.S. of the lower basalt bypass bridge, RS = 47
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

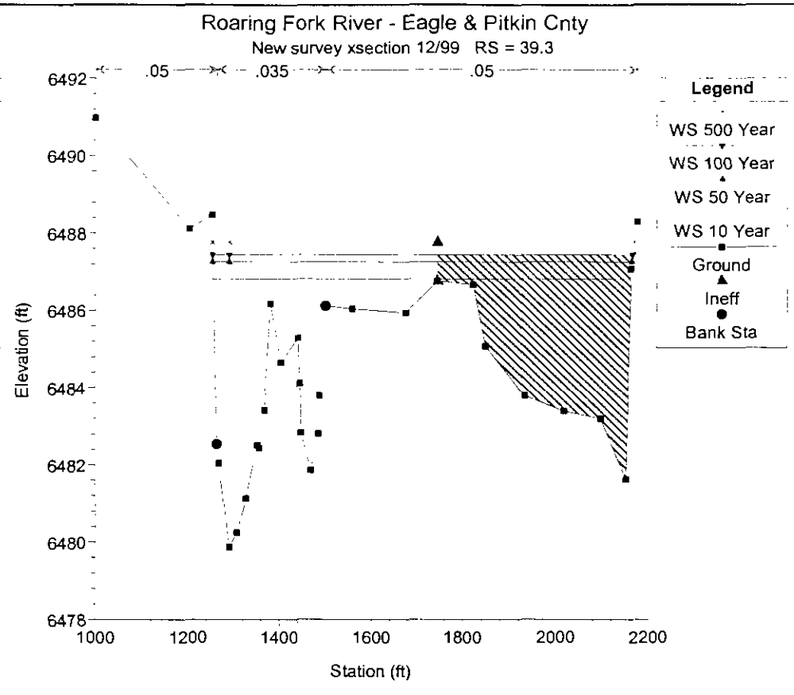

Roaring Fork River - Eagle & Pitkin Cnty
New xsection survey 12/99 RS = 46.6
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

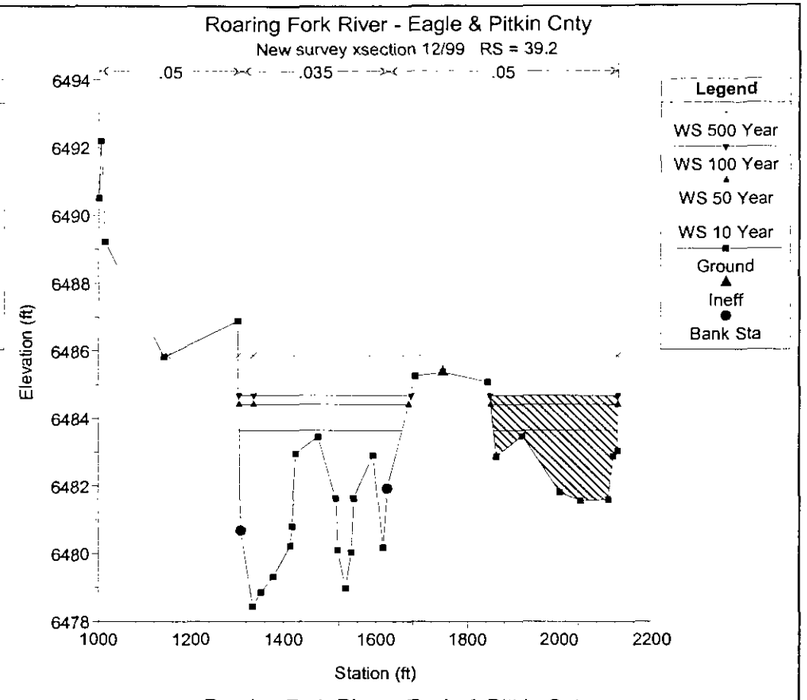

Roaring Fork River - Eagle & Pitkin Cnty
New xsection survey 12/99 RS = 46.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

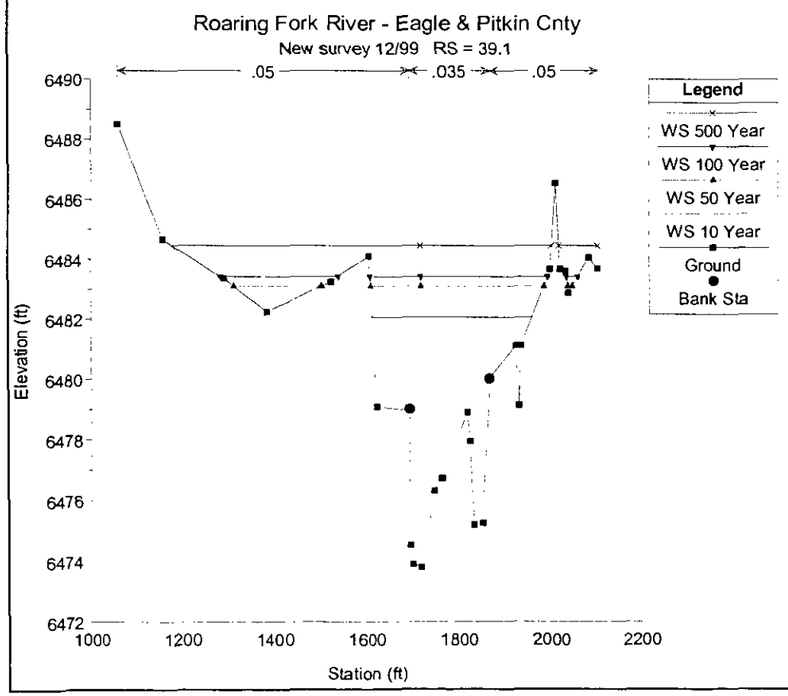

Roaring Fork River - Eagle & Pitkin Cnty
New xsection survey 12/99 RS = 43.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

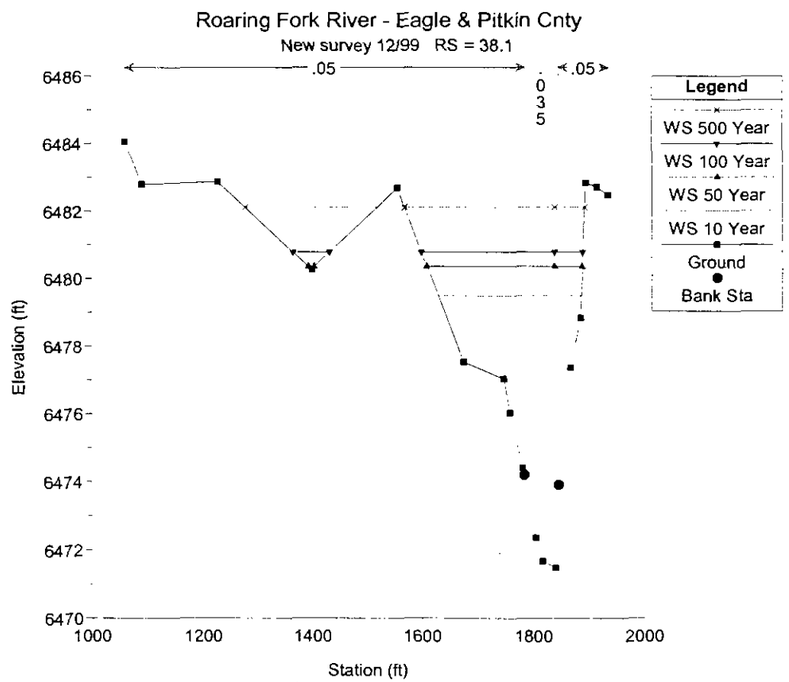

Roaring Fork River - Eagle & Pitkin Cnty
New xsection survey 12/99 RS = 42.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

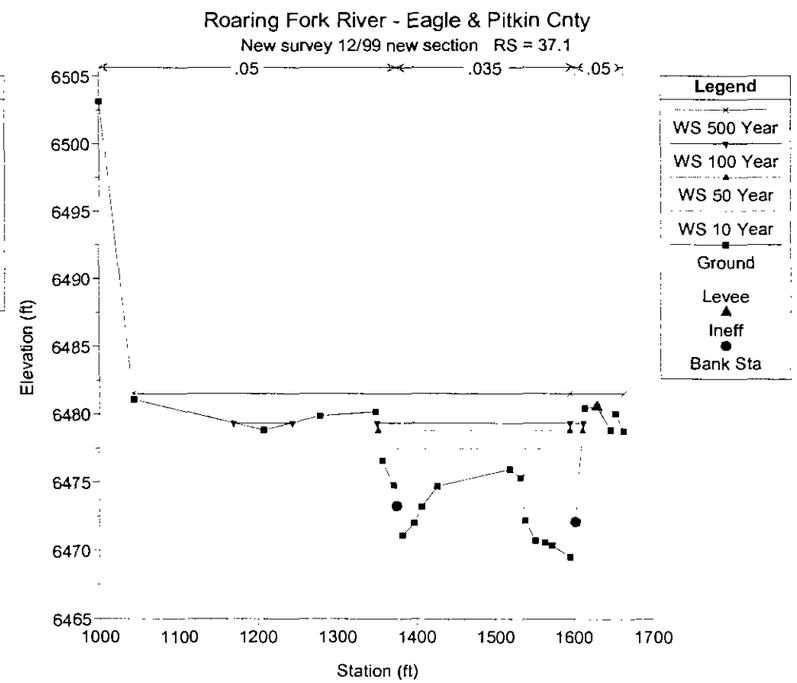

Roaring Fork River - Eagle & Pitkin Cnty
New xsection survey 12/99 RS = 41.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

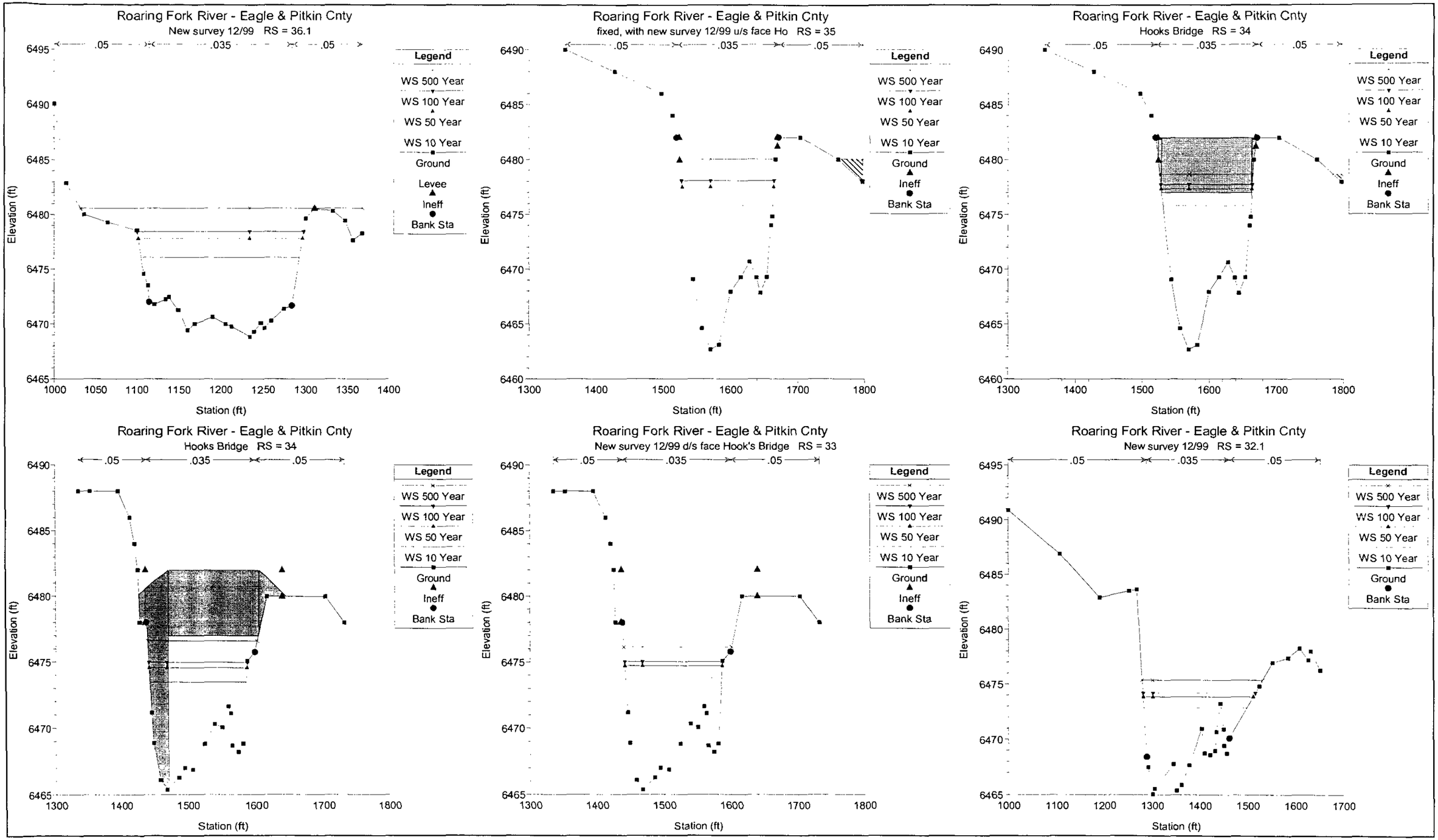

Roaring Fork River - Eagle & Pitkin Cnty
New survey xsection 12/99 RS = 39.3
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

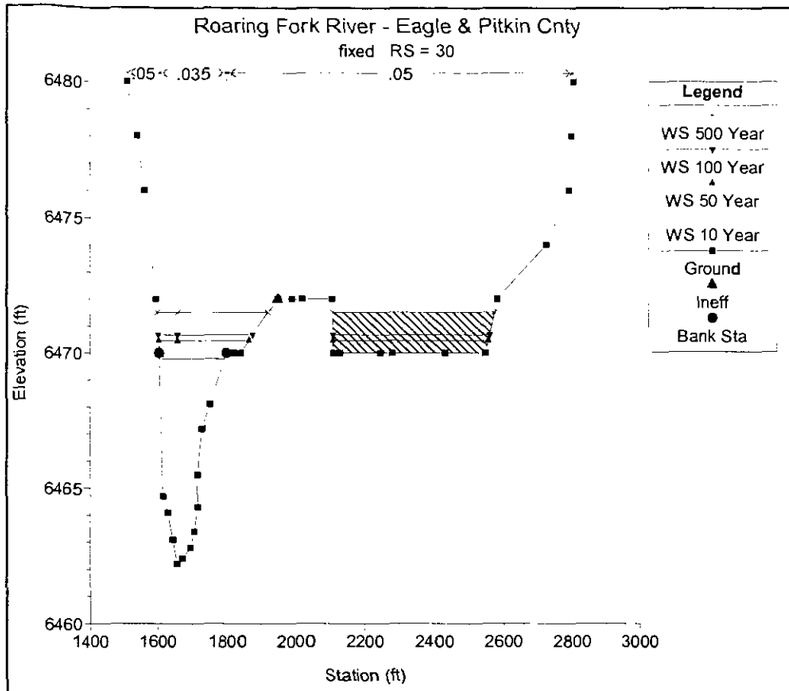

Roaring Fork River - Eagle & Pitkin Cnty
New survey xsection 12/99 RS = 39.2
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

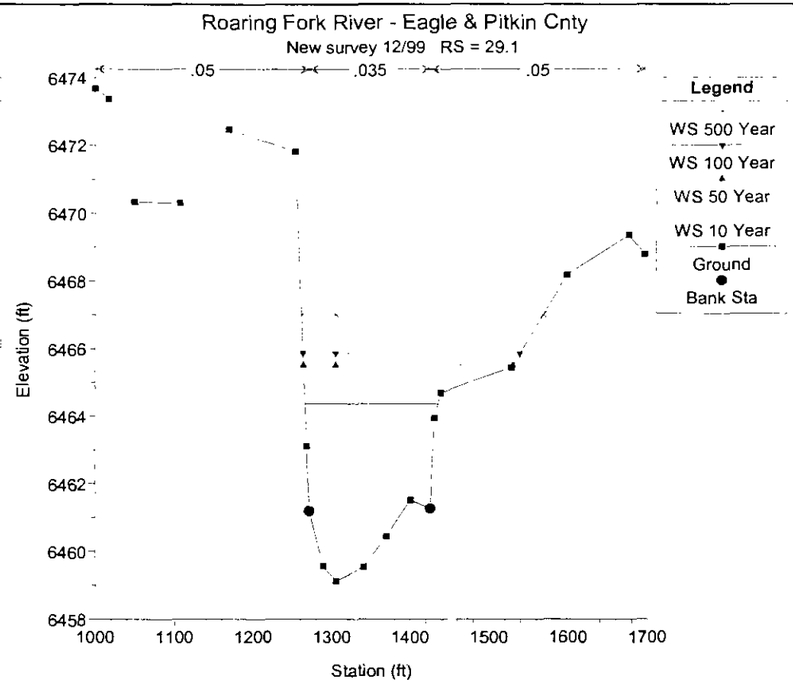

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 39.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

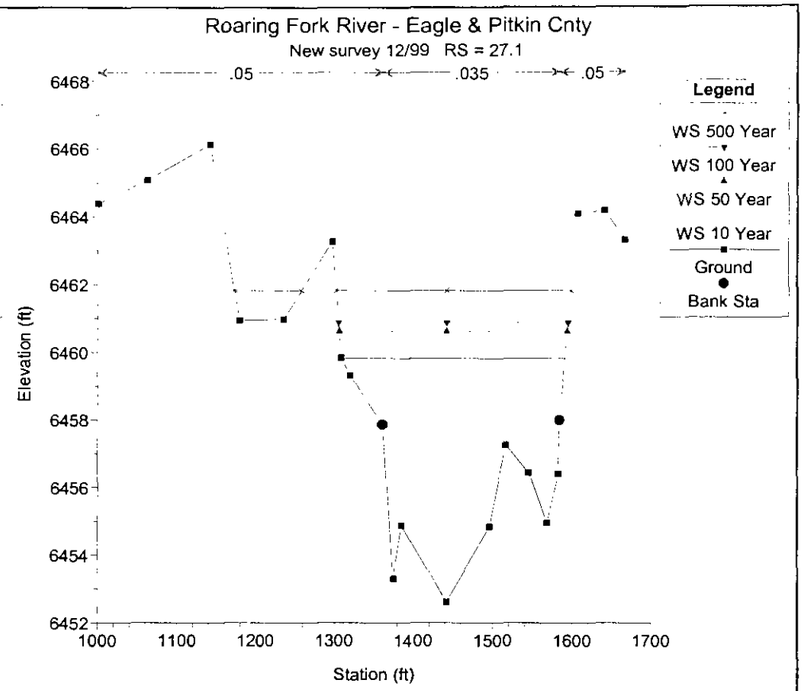

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 38.1
.05
.05
0
3
5
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

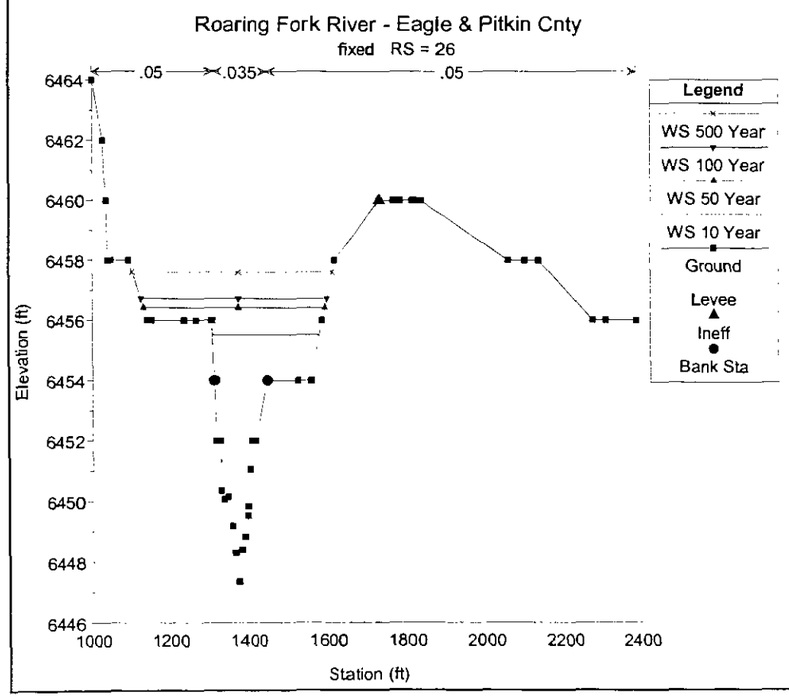

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 new section RS = 37.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

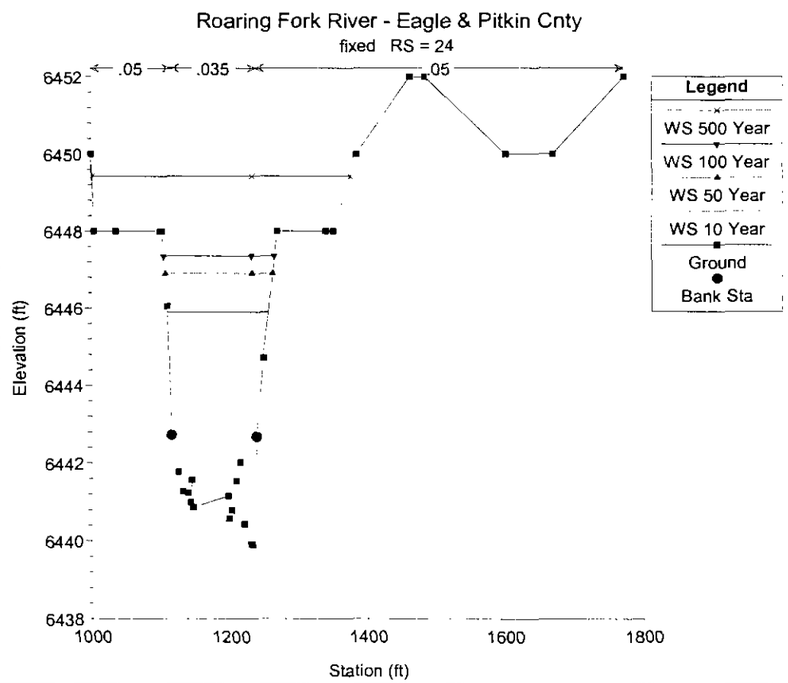

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 36.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Roaring Fork River - Eagle & Pitkin Cnty
fixed, with new survey 12/99 u/s face Ho RS = 35
Roaring Fork River - Eagle & Pitkin Cnty
Hooks Bridge RS = 34
Roaring Fork River - Eagle & Pitkin Cnty
Hooks Bridge RS = 34
Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 d/s face Hook's Bridge RS = 33
Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 32.1

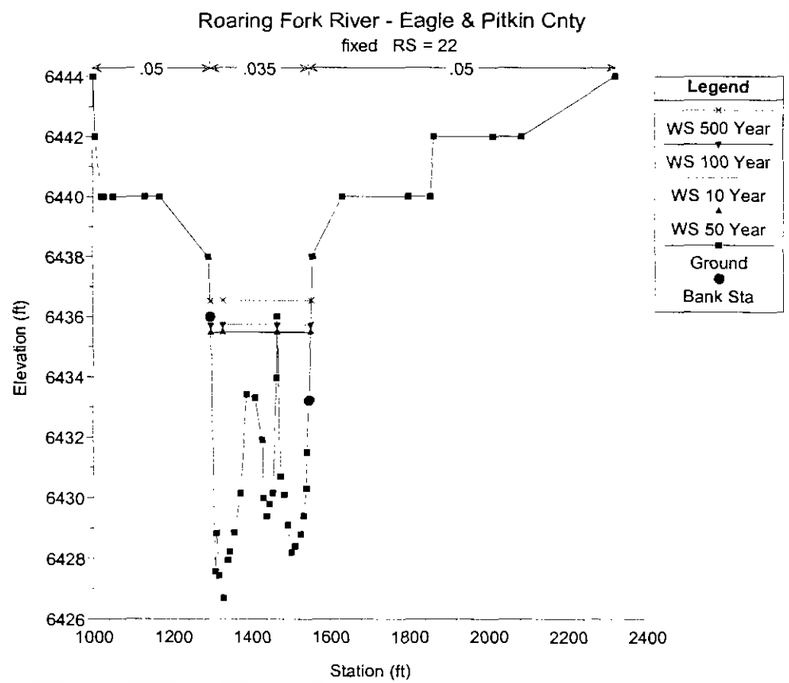

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 30
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

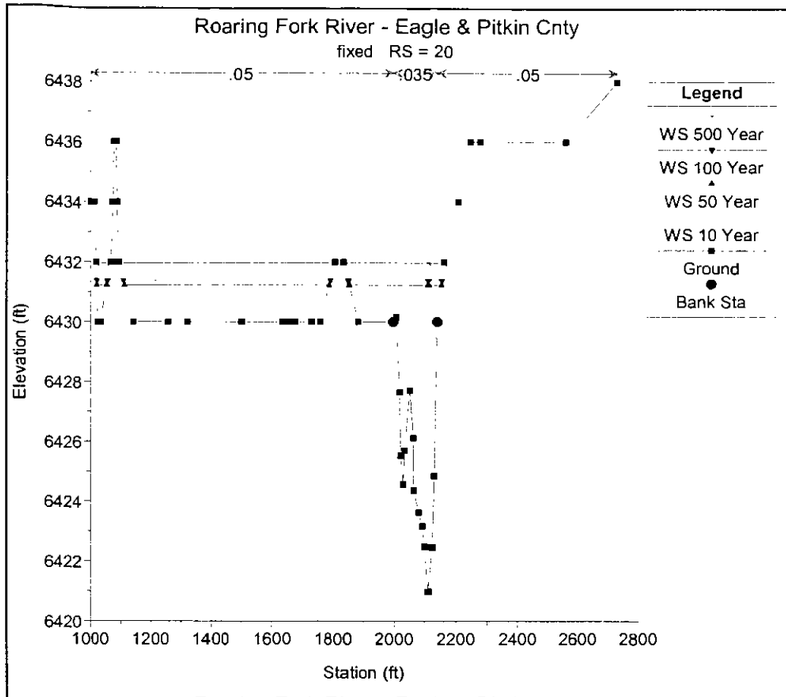

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 29.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

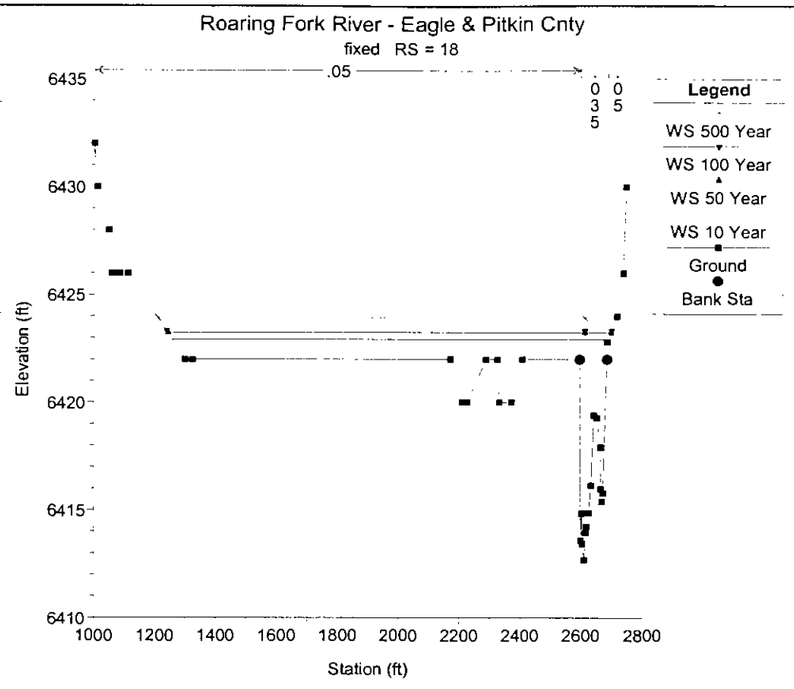

Roaring Fork River - Eagle & Pitkin Cnty
New survey 12/99 RS = 27.1
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

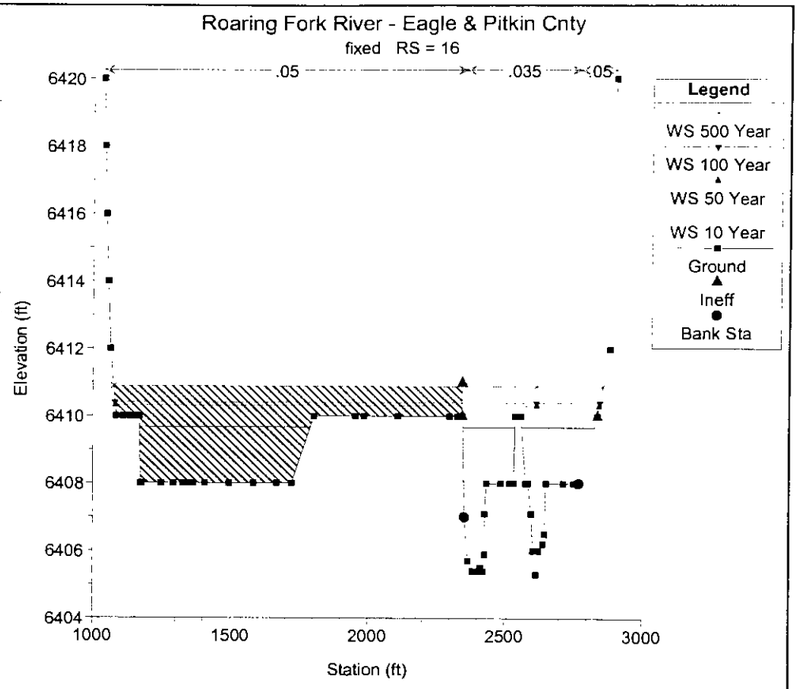

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 26
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

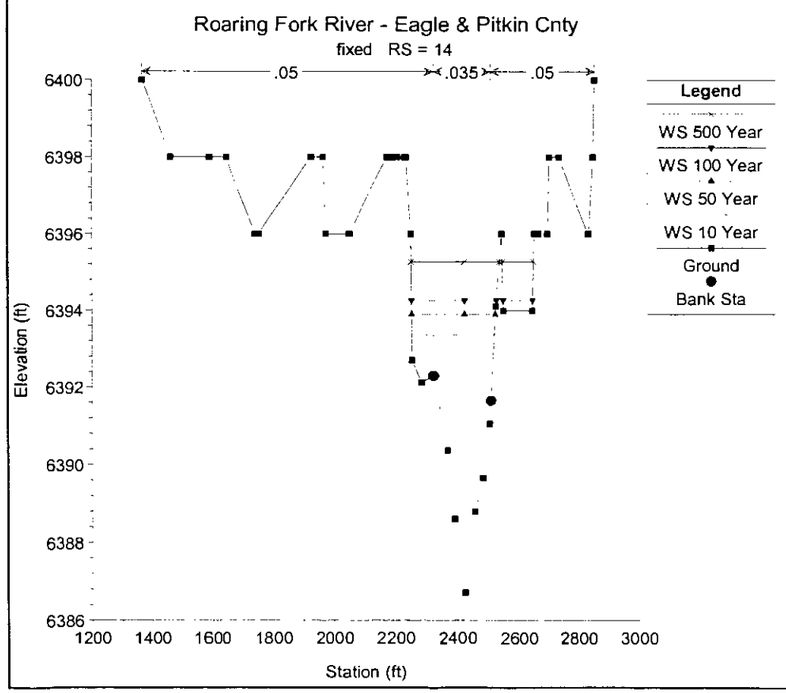

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 24
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

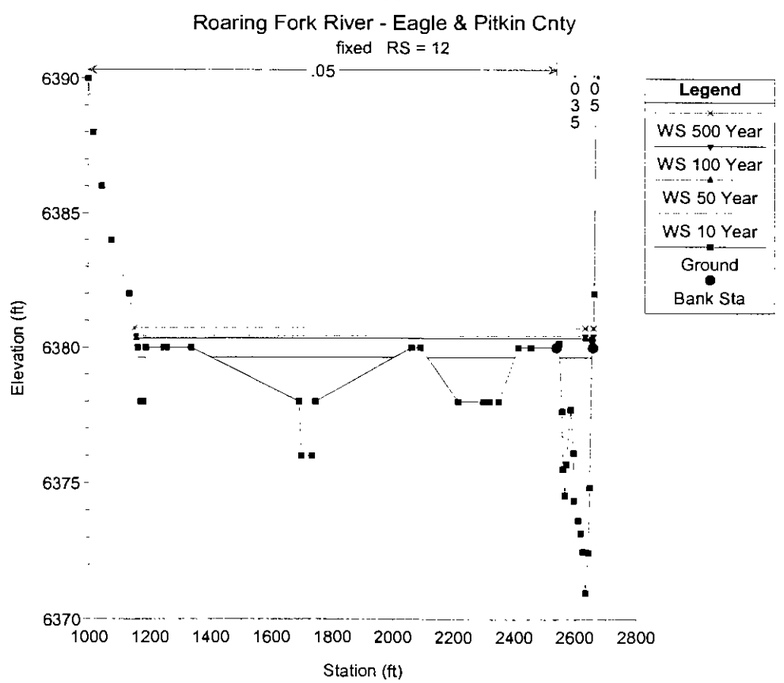

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 22
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 10 Year
WS 50 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

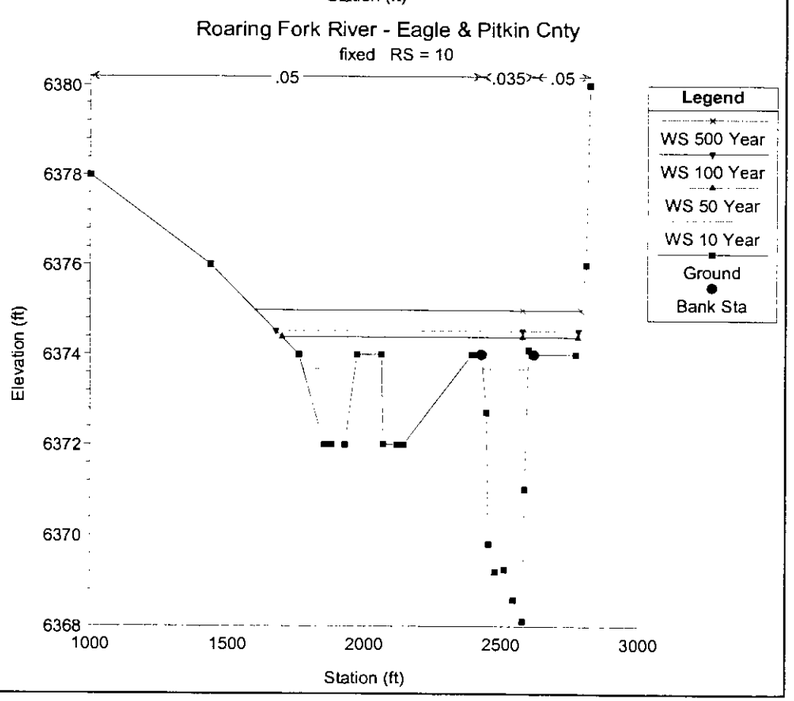

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 20
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)


Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 18
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

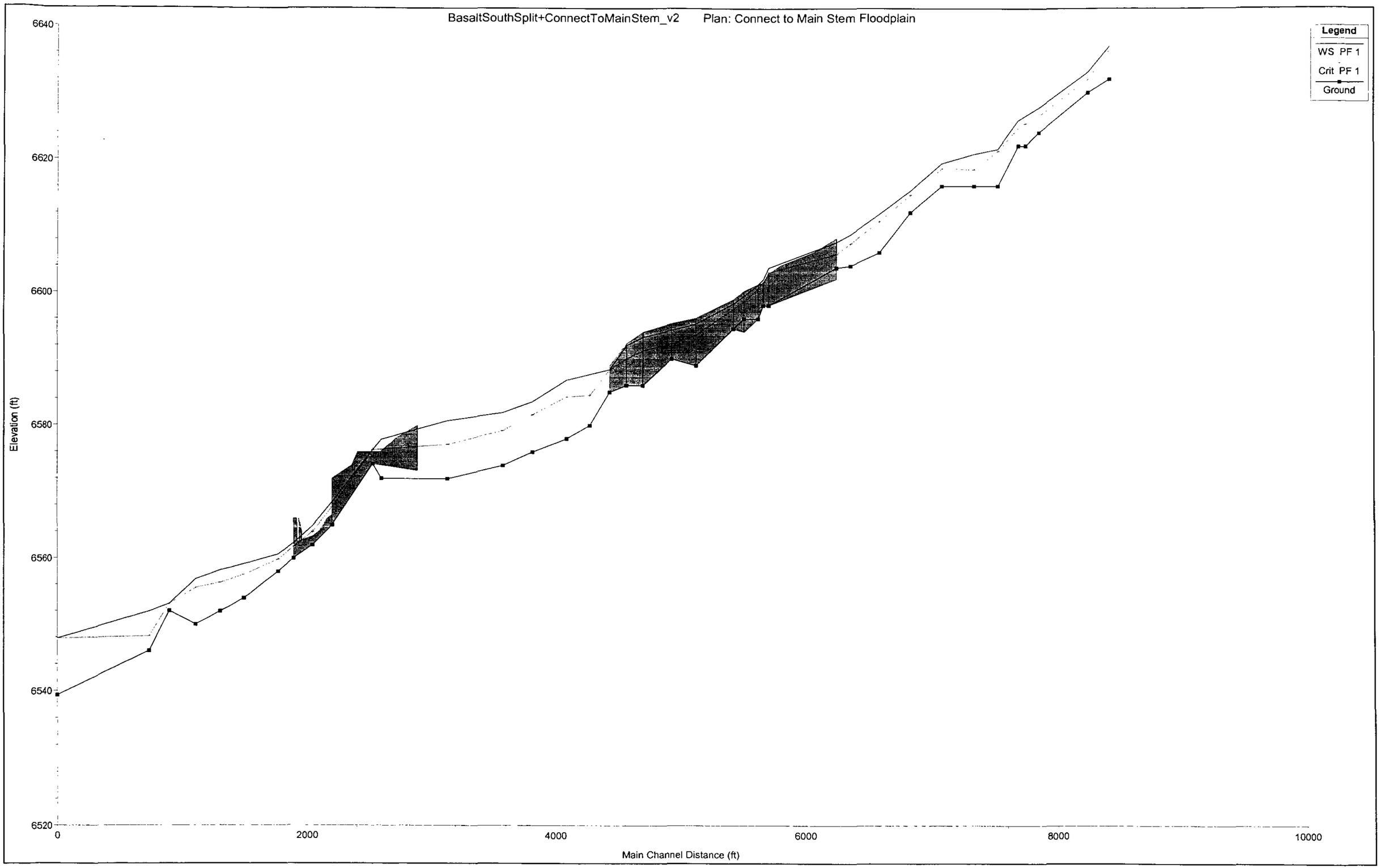

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 16
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 14
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

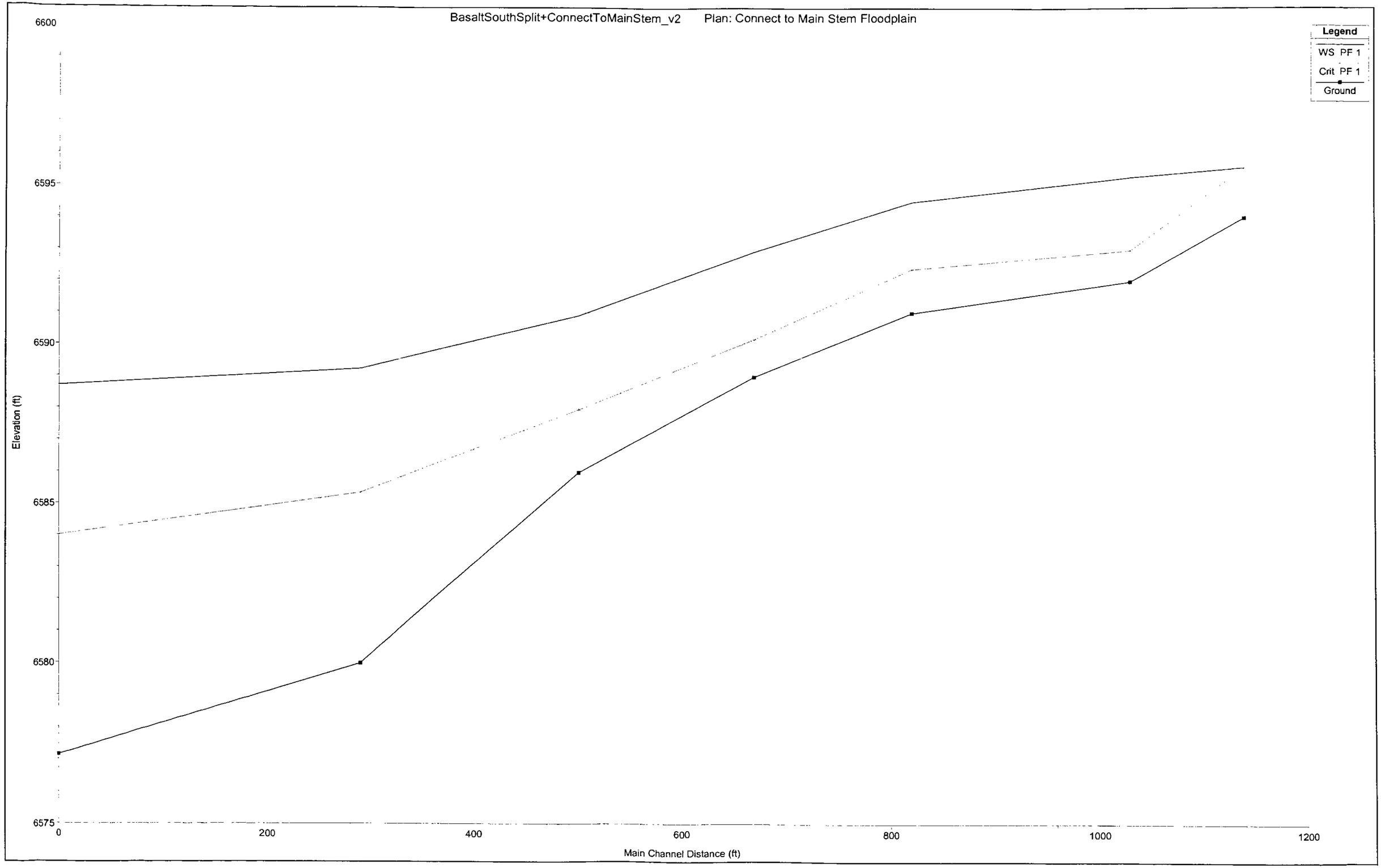

Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 12
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)


Roaring Fork River - Eagle & Pitkin Cnty
fixed RS = 10
.05
.035
.05
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain



BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

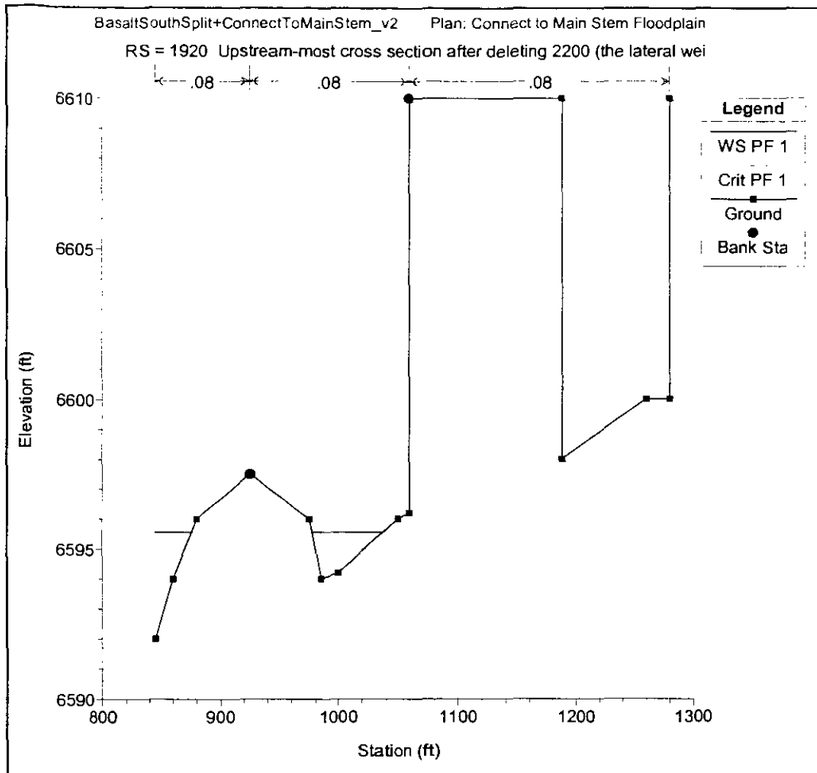


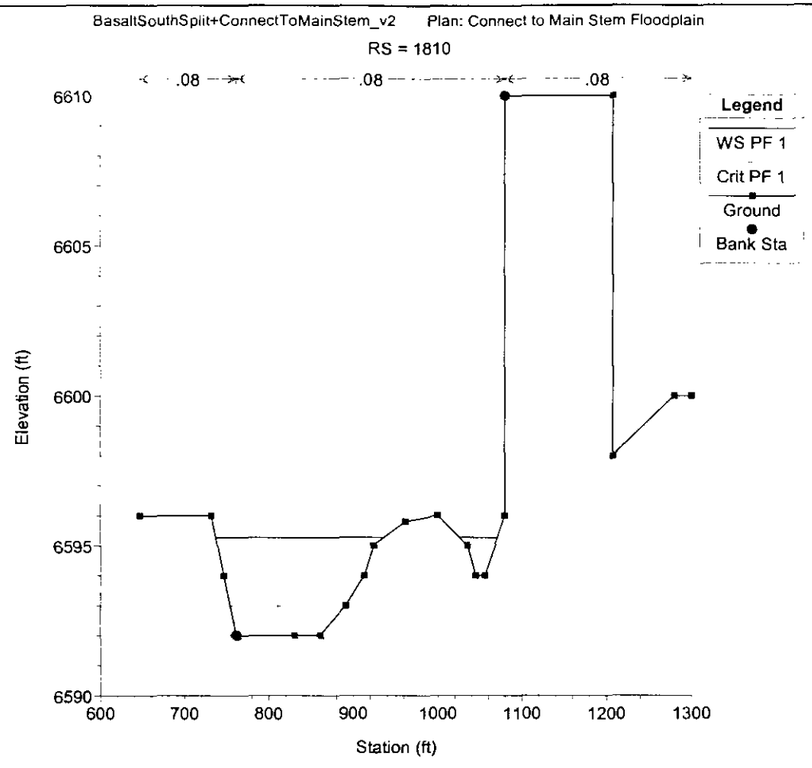
HEC-RAS Plan: HwySplit1 Profile: PF 1

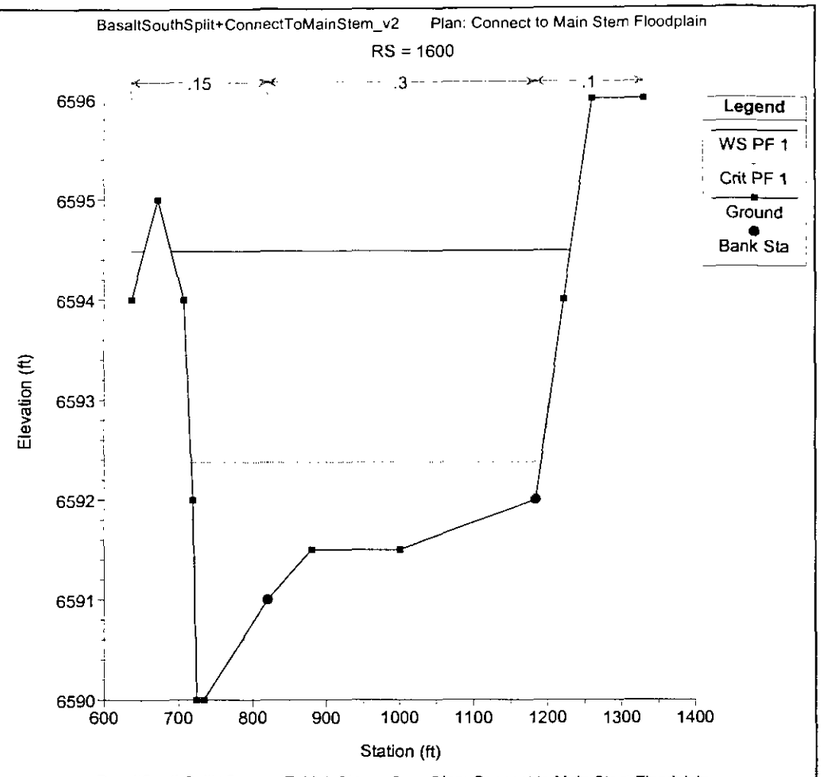
River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SouthSide	Reach 1	6610	4400.00	6632.00	6636.95	6636.43	6637.34	0.027311	5.18	974.18	564.28	0.62
SouthSide	Reach 1	6435	4400.00	6630.00	6633.07	6631.98	6633.39	0.019128	4.62	977.40	434.89	0.52
SouthSide	Reach 1	6040	4400.00	6624.00	6627.69	6626.47	6627.89	0.010341	3.56	1211.99	455.63	0.39
SouthSide	Reach 1	5930	4400.00	6622.00	6626.46	6625.34	6626.76	0.012060	3.18	1093.23	436.92	0.40
SouthSide	Reach 1	5872	4400.00	6622.00	6625.77	6624.62	6626.06	0.014901	3.94	1021.99	398.13	0.46
SouthSide	Reach 1	5710	4400.00	6616.00	6621.54	6621.24	6622.14	0.045637	6.02	728.90	410.64	0.77
SouthSide	Reach 1	5520	4400.00	6616.00	6620.79	6618.49	6620.84	0.002247	1.84	2907.45	1057.63	0.19
SouthSide	Reach 1	5268	4400.00	6616.00	6619.39	6618.62	6619.58	0.018662	3.59	1586.41	916.64	0.49
SouthSide	Reach 1	5020	4400.00	6612.00	6615.27	6614.65	6615.52	0.019246	3.83	1139.96	662.09	0.50
SouthSide	Reach 1	4775	4400.00	6606.00	6611.81	6610.68	6612.09	0.013134	4.65	1075.14	463.44	0.45
SouthSide	Reach 1	4545	4400.00	6604.00	6608.70	6607.34	6608.92	0.015495	4.26	1242.84	578.06	0.47
SouthSide	Reach 1	4435	4400.00	6603.70	6607.54	6605.76	6607.65	0.005135	2.87	1899.59	722.00	0.28
SouthSide	Reach 1	3900	Lat. Weir									
SouthSide	Reach 1	3896	Lat. Weir									
SouthSide	Reach 1	3895	4128.02	6598.00	6603.67	6602.98	6603.87	0.018556	3.88	1166.61	657.83	0.49
SouthSide	Reach 1	3856	Lat. Weir									
SouthSide	Reach 1	3855	3810.82	6598.00	6601.91	6601.54	6602.29	0.036696	5.82	831.54	531.85	0.71
SouthSide	Reach 1	3816	Lat. Weir									
SouthSide	Reach 1	3815	3792.35	6596.00	6601.16	6600.53	6601.40	0.016741	4.74	1152.85	623.52	0.50
SouthSide	Reach 1	3701	Lat. Weir									
SouthSide	Reach 1	3700	3789.76	6596.00	6599.42	6598.62	6599.67	0.014829	4.23	987.96	515.19	0.47
SouthSide	Reach 1	3619	Lat. Weir									
SouthSide	Reach 1	3618	3789.76	6594.50	6598.24	6597.43	6598.46	0.012973	4.36	1055.41	539.00	0.45
SouthSide	Reach 1	3281	Lat. Weir									
SouthSide	Reach 1	3280	3789.76	6589.00	6595.23	6593.63	6595.37	0.008086	3.29	1257.06	449.20	0.35
SouthSide	Reach 1	3051	Lat. Weir									
SouthSide	Reach 1	3050	3789.76	6590.00	6594.30	6592.28	6594.40	0.003869	2.62	1520.91	501.00	0.25
SouthSide	Reach 1	2841	Lat. Weir									
SouthSide	Reach 1	2840	3789.76	6586.00	6593.25	6591.24	6593.39	0.005598	3.34	1350.19	425.00	0.29
SouthSide	Reach 1	2701	Lat. Weir									
SouthSide	Reach 1	2700	3789.20	6586.00	6591.98	6590.02	6592.39	0.011354	5.37	764.73	169.00	0.43
SouthSide	Reach 1	2575	3716.44	6585.00	6588.37	6588.37	6589.44	0.065075	8.32	456.79	230.00	0.96
SouthSide	Reach 1	2410	3716.44	6580.00	6587.65	6584.51	6587.73	0.002163	2.30	1695.87	482.66	0.19
SouthSide	Reach 1	2220	3716.44	6578.00	6586.79	6584.29	6587.03	0.007242	4.14	1016.86	304.68	0.32
SouthSide	Reach 1	1940	3716.44	6576.00	6583.54	6581.59	6584.22	0.014484	7.08	655.15	235.16	0.48
SouthSide	Reach 1	1710	3716.44	6574.00	6581.93	6579.23	6582.14	0.005090	3.88	1065.02	305.00	0.30
SouthSide	Reach 1	1270	3716.44	6572.00	6580.69	6577.14	6580.79	0.001963	2.63	1495.46	285.00	0.19
SouthSide	Reach 1	730	3716.44	6572.00	6577.86	6576.39	6578.42	0.015611	6.06	632.09	159.31	0.52
SouthSide	Reach 1	700	Lat. Weir									
SouthSide	Reach 1	660	3593.75	6574.20	6576.31	6576.31	6576.99	0.021973	6.61	543.34	410.00	1.01
SouthSide	Reach 1	330	3574.48	6565.00	6568.44	6567.67	6568.74	0.020793	4.36	809.34	381.86	0.53
SouthSide	Reach 1	329	Lat. Weir									
SouthSide	Reach 1	170	1546.38	6562.00	6564.84	6563.98	6565.03	0.016315	3.51	440.97	243.71	0.46
SouthSide	Reach 1	20	1215.91	6560.00	6562.30	6561.73	6562.43	0.018423	2.93	420.62	358.32	0.46
SouthSide	Reach 1	-100	1215.91	6558.00	6560.61	6559.83	6560.72	0.011243	2.72	470.71	346.29	0.38

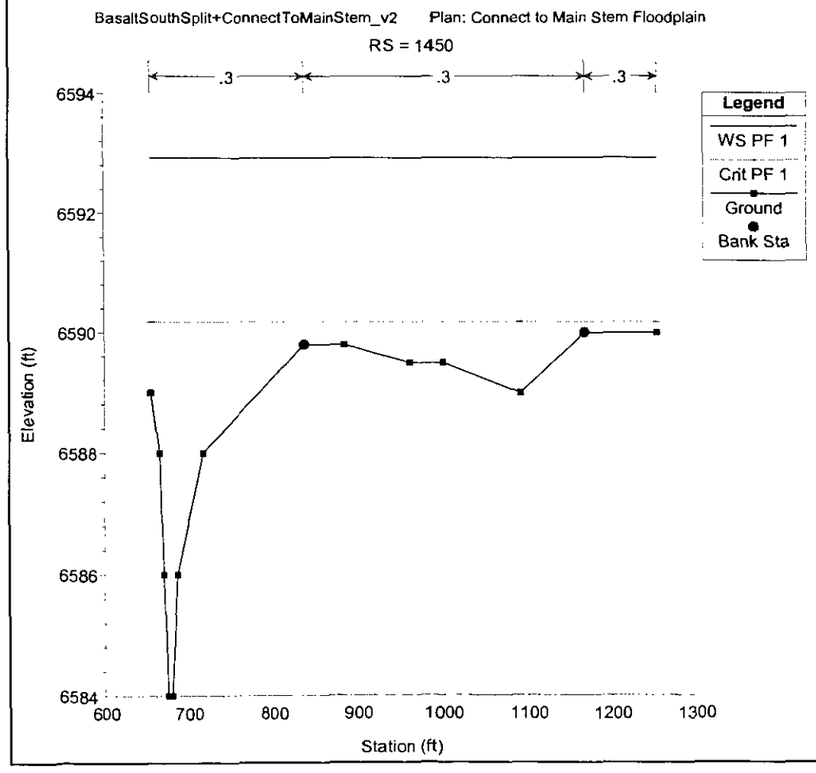
HEC-RAS Plan: HwySplit1 Profile: PF 1 (Continued)

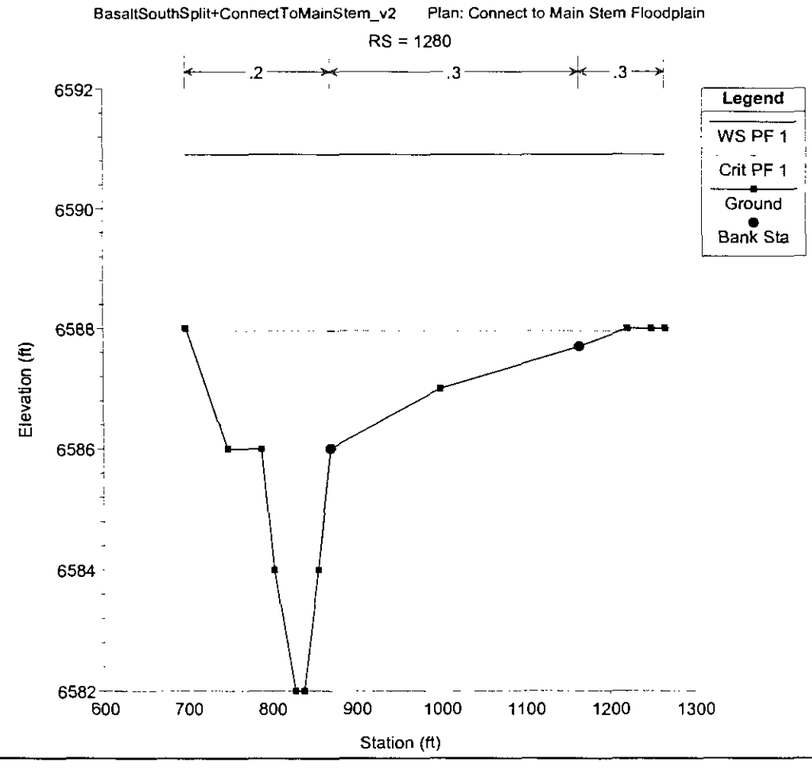
River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SouthSide	Reach 1	-370	1215.91	6554.00	6559.15	6557.55	6559.21	0.003230	2.15	642.27	288.07	0.22
SouthSide	Reach 1	-560	1215.91	6552.00	6558.20	6556.35	6558.38	0.006103	3.72	373.26	119.81	0.32
SouthSide	Reach 1	-760	1215.91	6550.00	6556.84	6555.53	6557.01	0.008752	3.38	385.91	173.68	0.36
SouthSide	Reach 1	-970	1215.91	6552.00	6553.10	6553.10	6553.55	0.055483	4.13	241.66	271.76	0.84
SouthSide	Reach 1	-1130	1215.91	6546.00	6551.94	6548.21	6551.96	0.000196	1.16	1173.48	370.49	0.09
SouthSide	Reach 1	-1790	10388.90	6539.36	6547.82	6547.82	6549.46	0.008911	13.17	1254.75	340.78	0.94
Split1	Reach 1	1920	600.00	6594.00	6595.56	6595.56	6596.12	0.078885	4.81	104.37	91.24	0.90
Split1	Reach 1	1810	600.00	6592.00	6595.27	6592.98	6595.29	0.001335	1.15	527.98	244.75	0.14
Split1	Reach 1	1600	1800.00	6591.00	6594.49	6592.38	6594.52	0.007361	0.86	1545.71	558.24	0.09
Split1	Reach 1	1450	3000.00	6589.00	6592.93	6590.18	6592.95	0.012033	1.23	2260.55	600.00	0.12
Split1	Reach 1	1280	4500.00	6586.00	6590.91	6587.96	6590.98	0.012238	1.36	2452.08	568.00	0.12
Split1	Reach 1	1070	5100.00	6580.00	6589.24	6585.36	6589.31	0.006083	1.90	2658.13	514.18	0.14
Split1	Reach 1	780	6600.00	6577.15	6588.70	6584.01	6589.00	0.000676	5.40	5726.30	1114.21	0.29

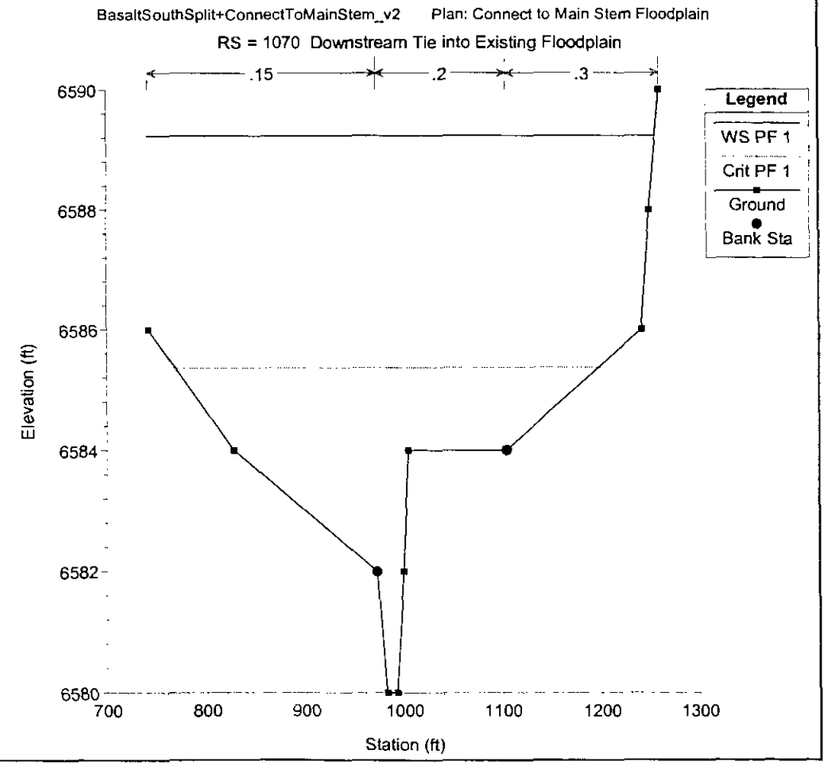

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1920 Upstream-most cross section after deleting 2200 (the lateral wei
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6610
6605
6600
6595
6590
800
900
1000
1100
1200
1300
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1810
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6610
6605
6600
6595
6590
600
700
800
900
1000
1100
1200
1300
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1600
.15
.3
.1
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6596
6595
6594
6593
6592
6591
6590
600
700
800
900
1000
1100
1200
1300
1400
Station (ft)

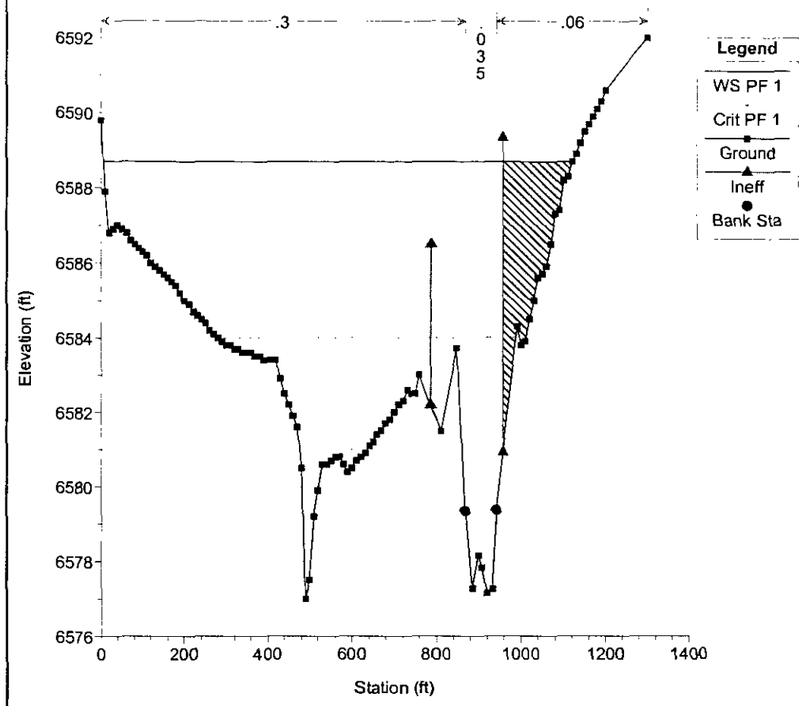

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1450
.3
.3
.3
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6594
6592
6590
6588
6586
6584
600
700
800
900
1000
1100
1200
1300
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1280
.2
.3
.3
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6592
6590
6588
6586
6584
6582
600
700
800
900
1000
1100
1200
1300
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 1070 Downstream Tie into Existing Floodplain
.15
.2
.3
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6590
6588
6586
6584
6582
6580
700
800
900
1000
1100
1200
1300
Station (ft)

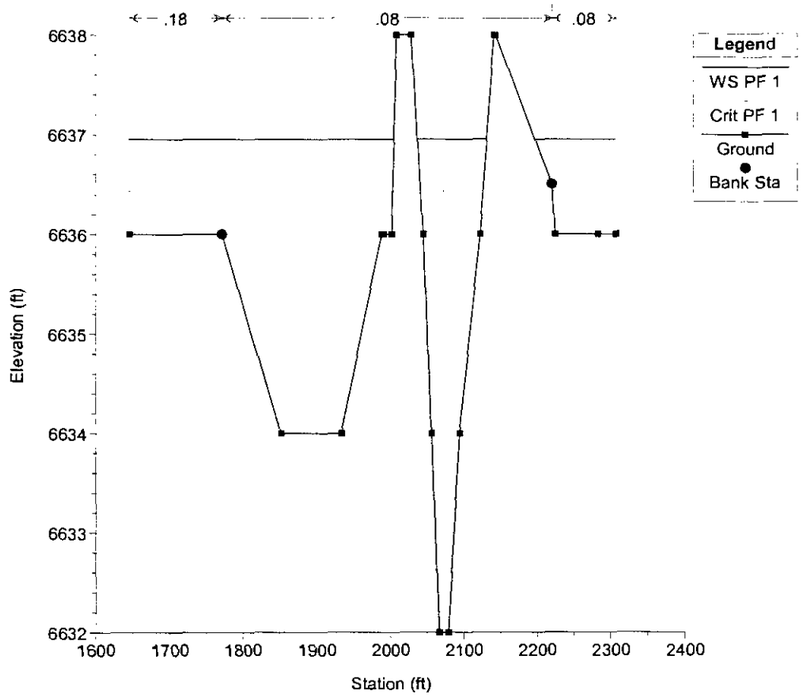
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 780 Main stem cross section 76.38 at the upstream end of Midland Ave



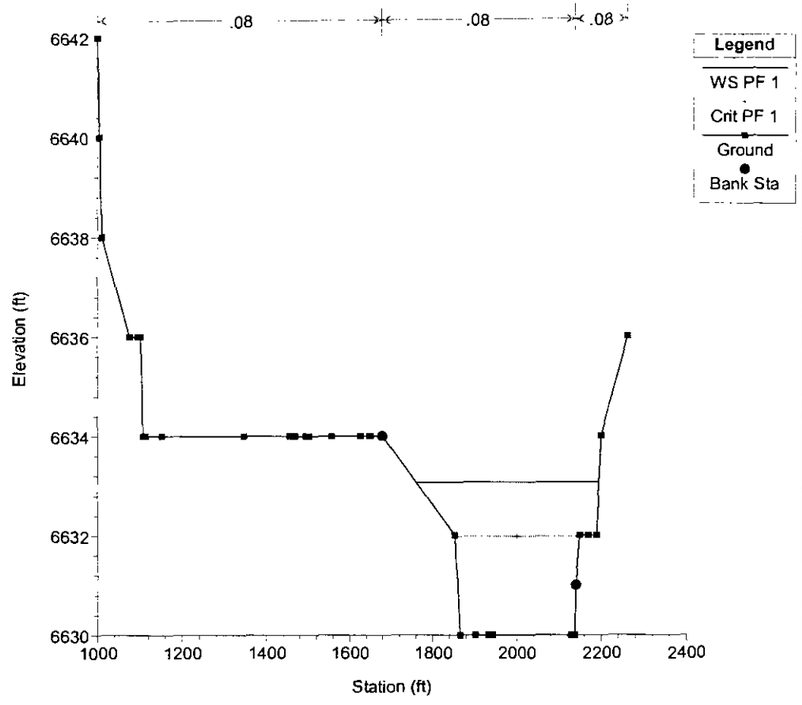
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 6610



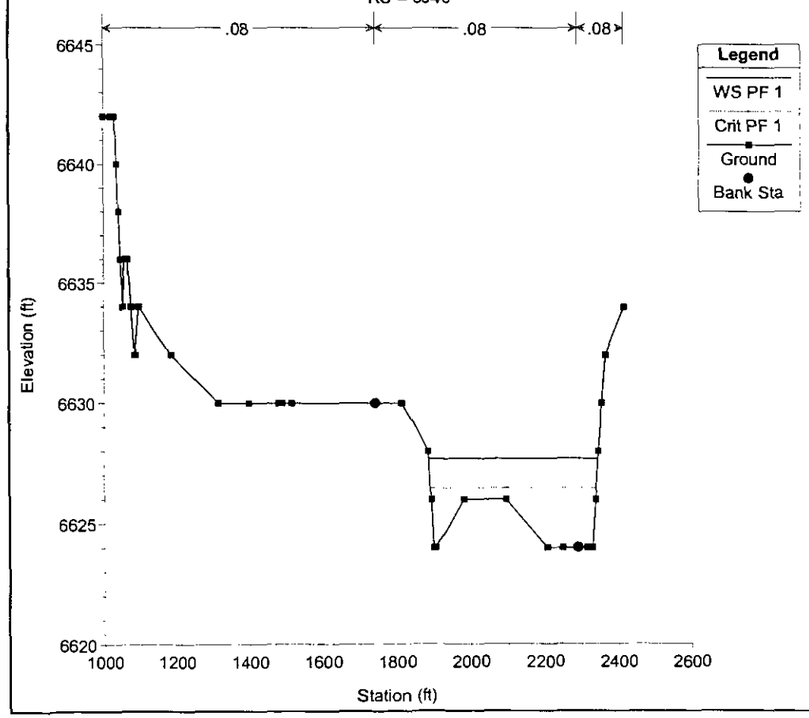
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 6435



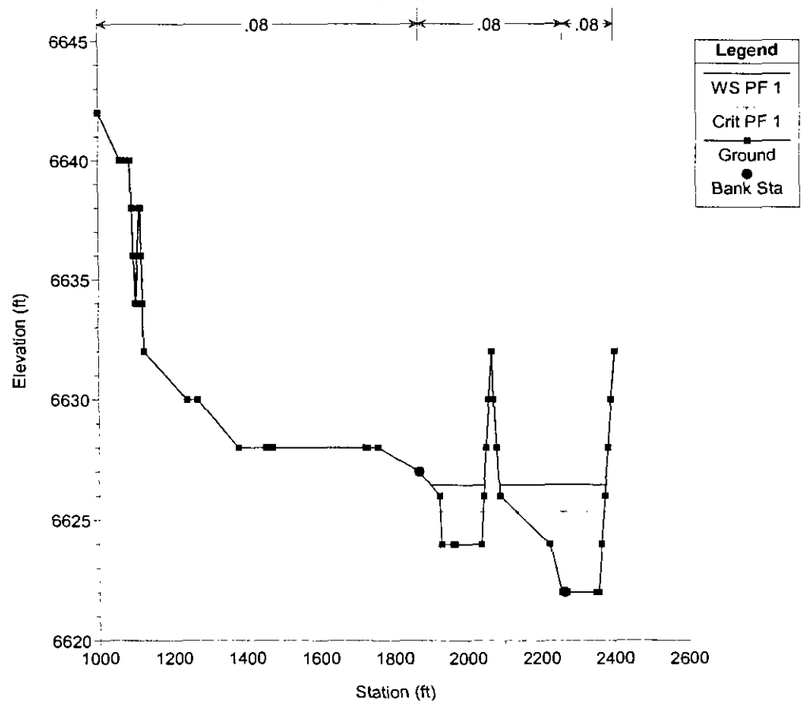
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 6040



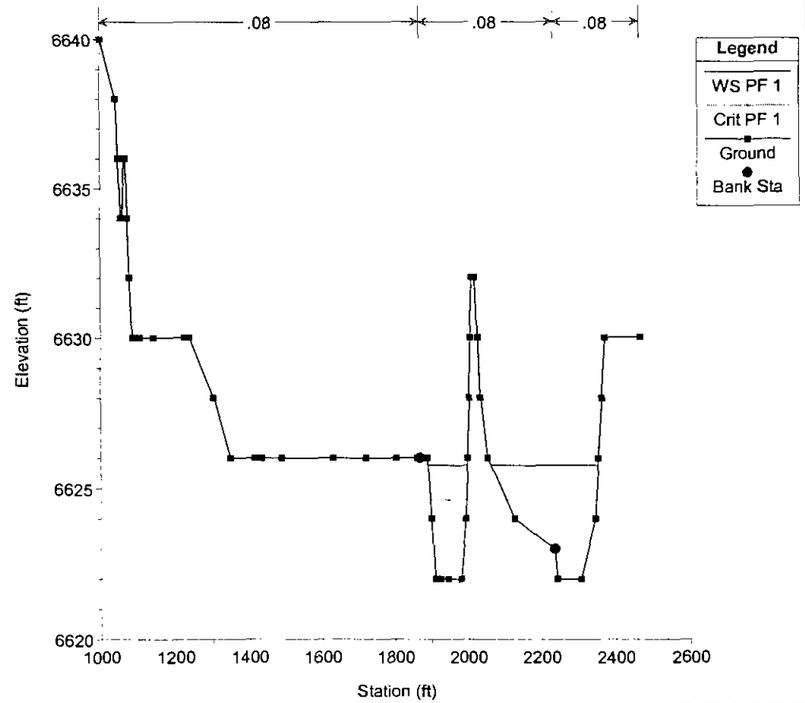
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5930



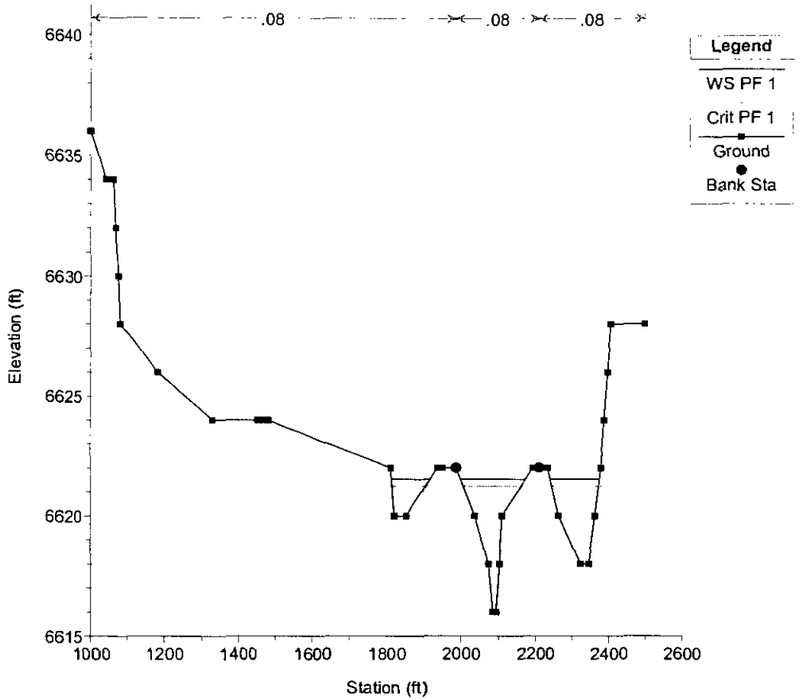
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5872



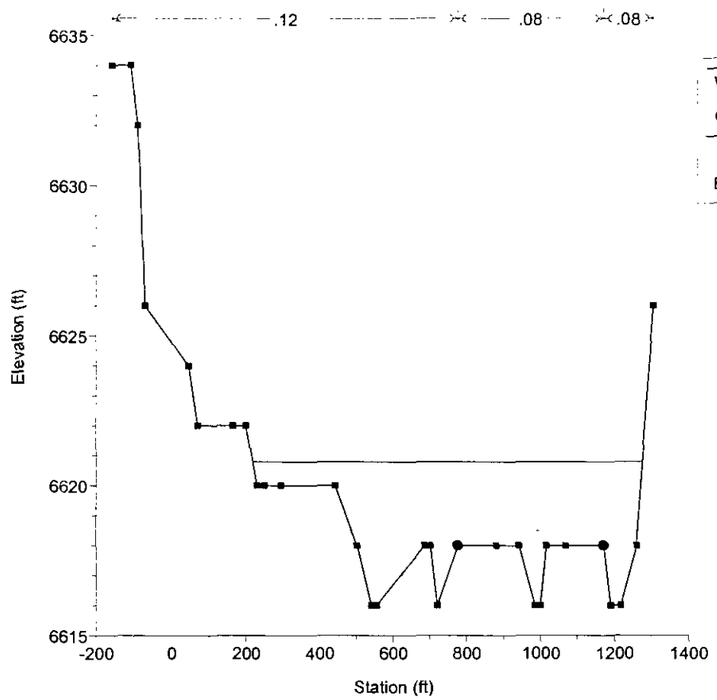
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5710



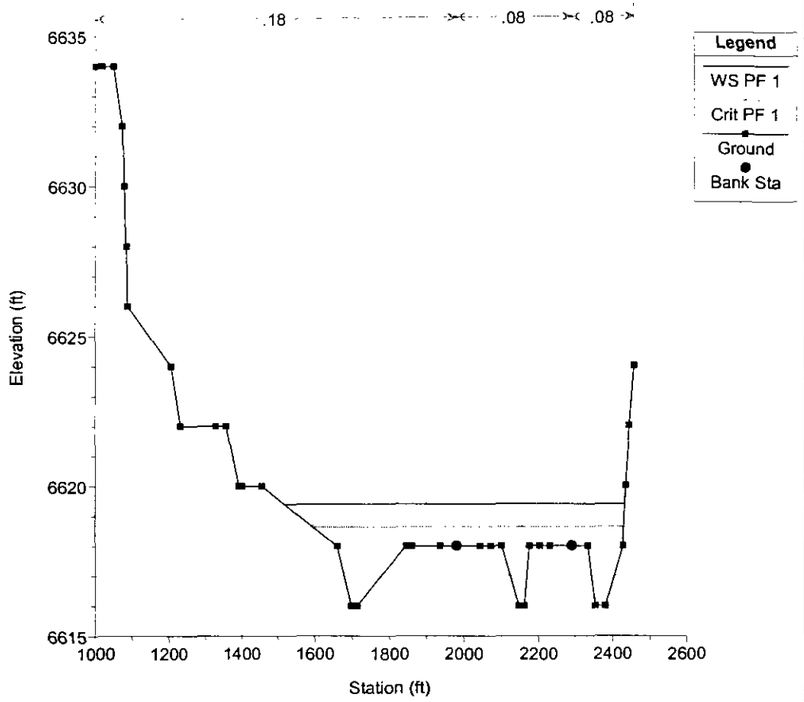
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5520



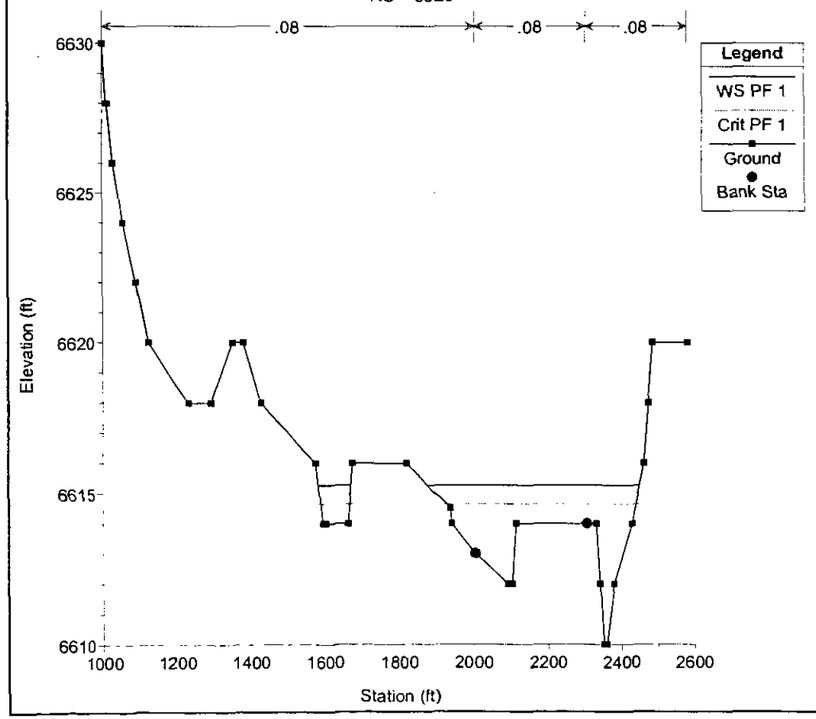
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5268



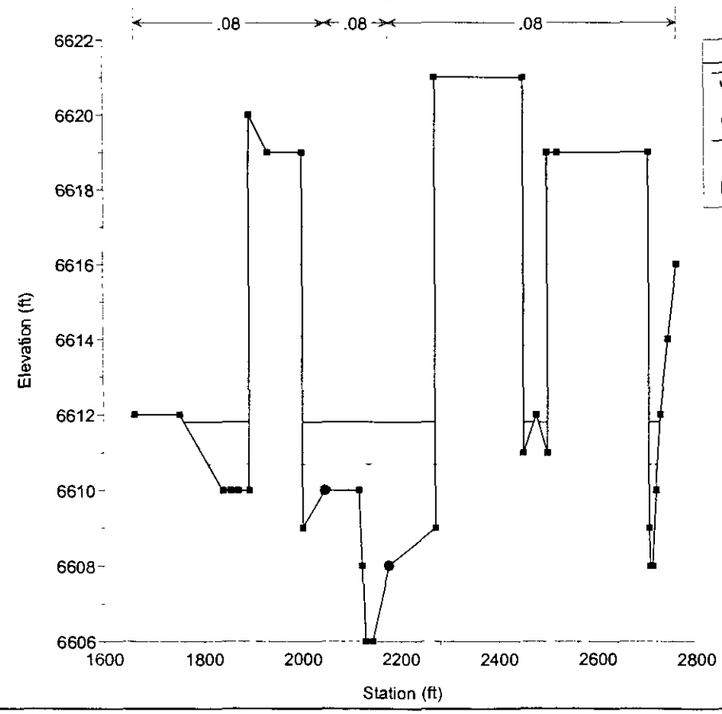
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 5020



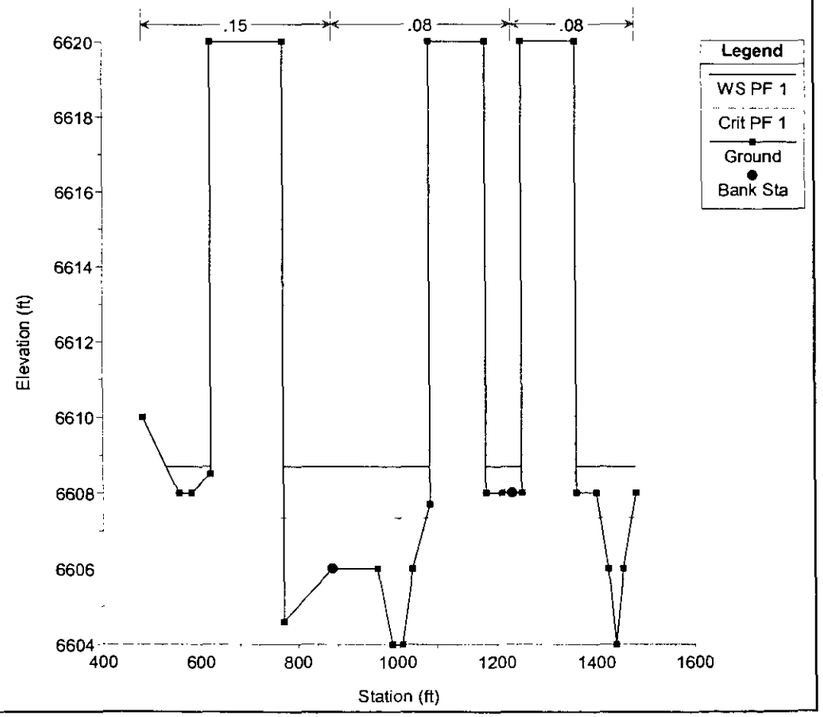
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

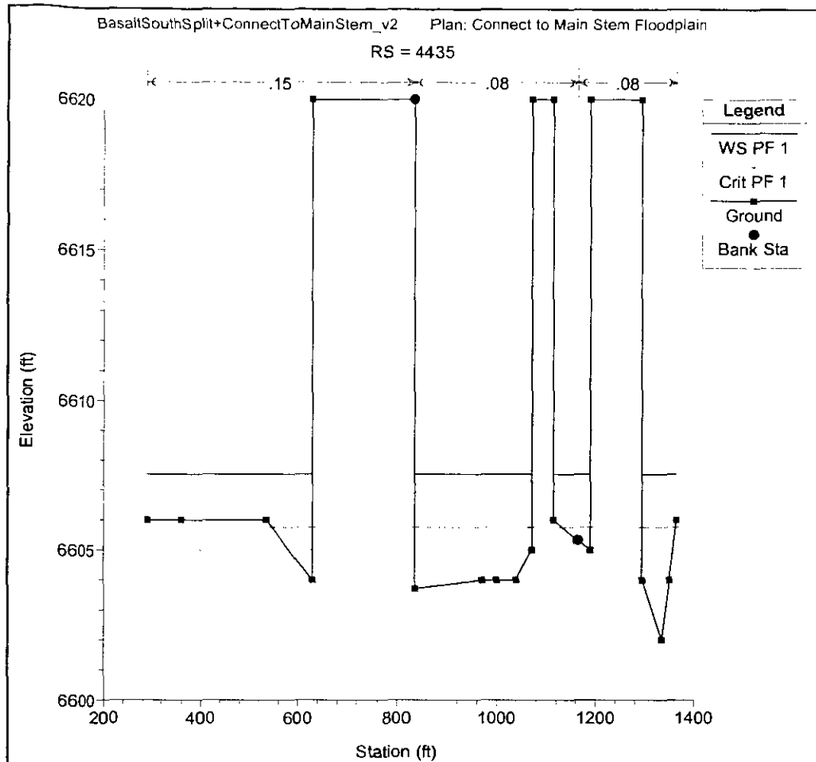
RS = 4775

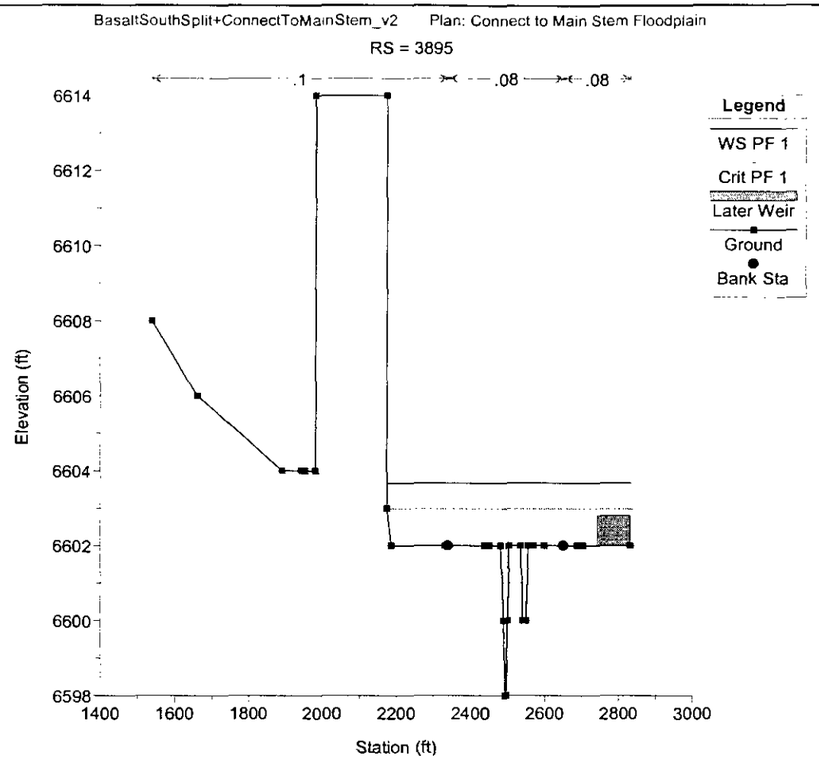


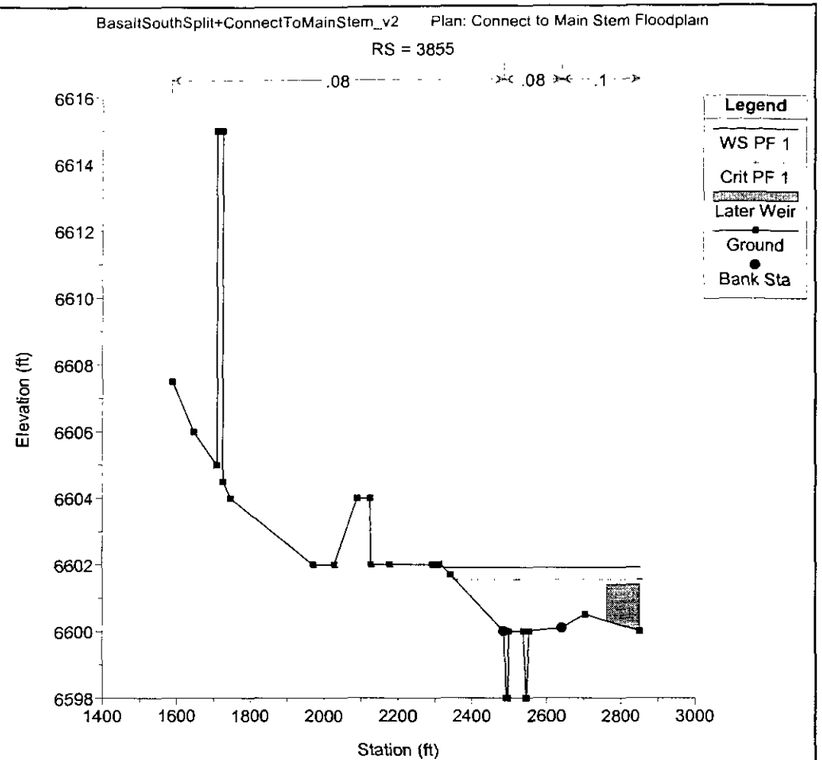
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

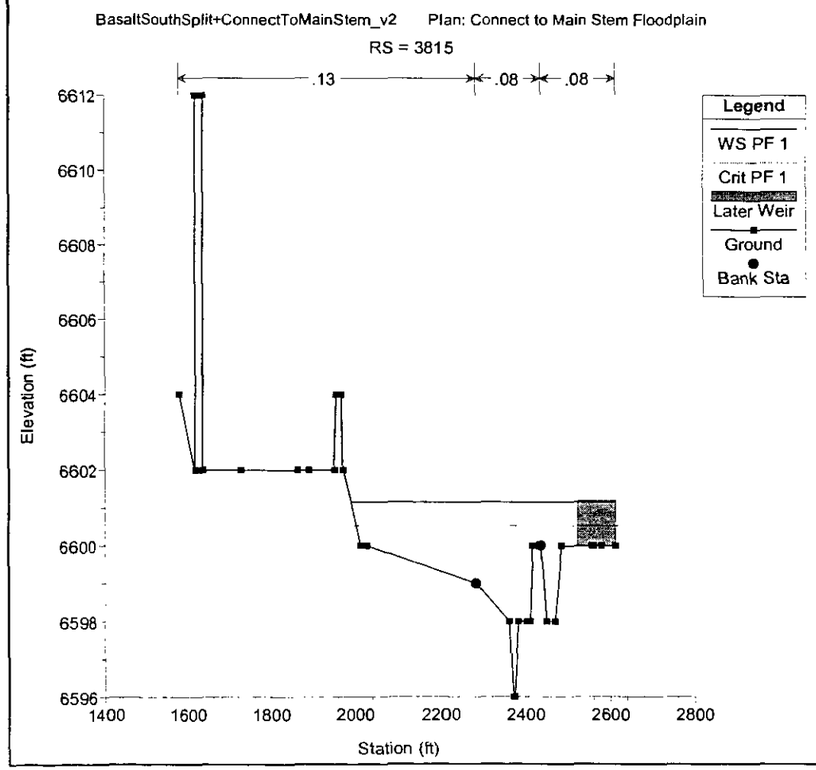
RS = 4545

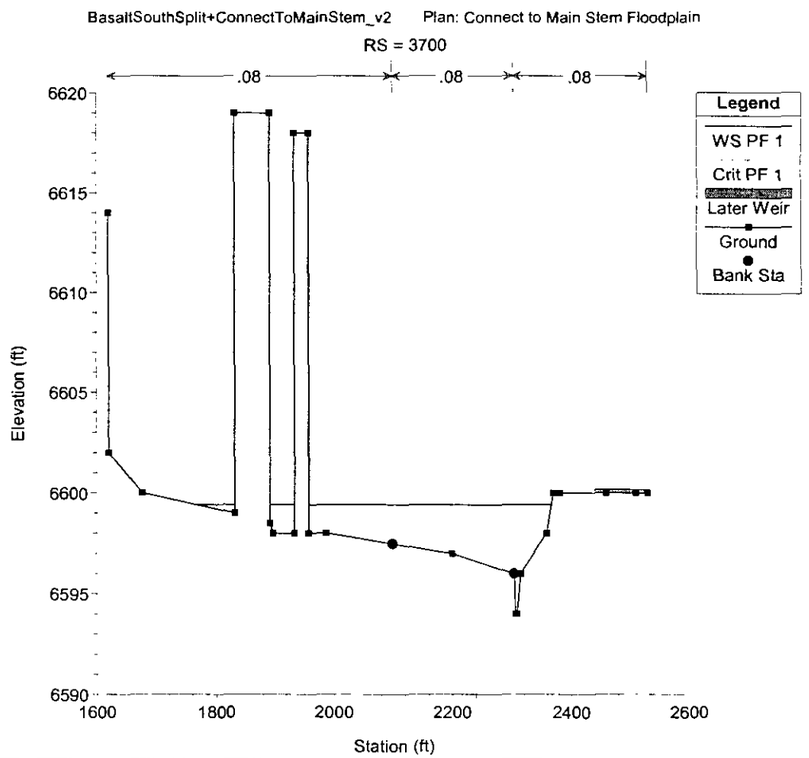


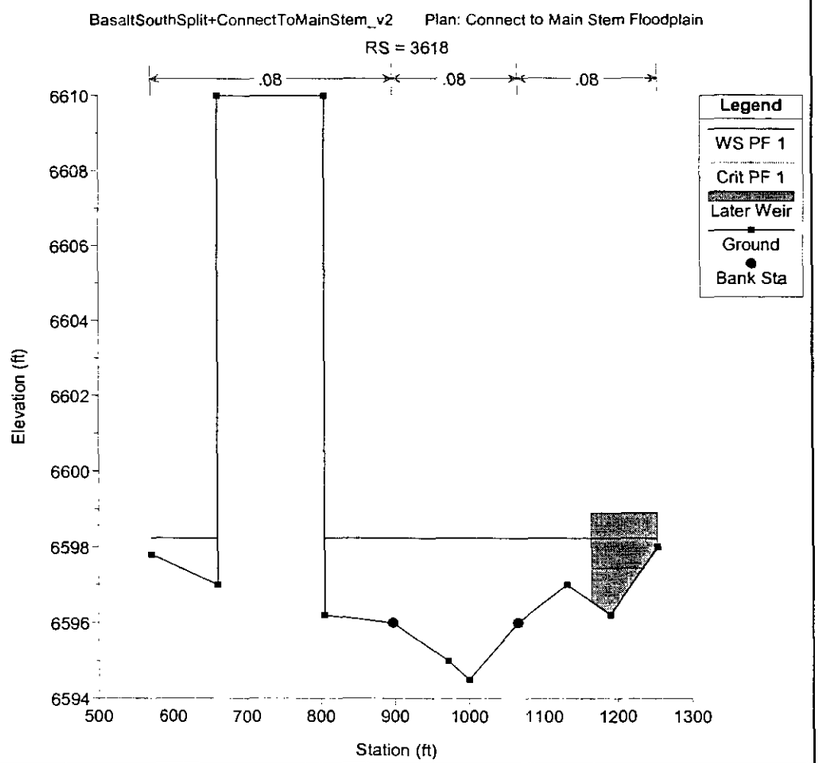

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 4435
.15
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

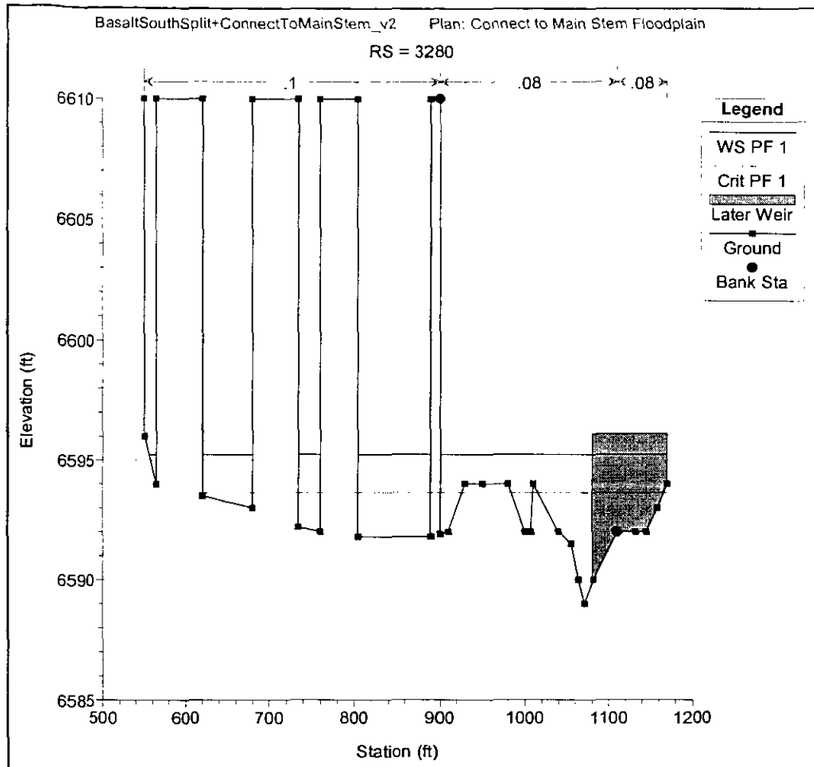

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3895
.1
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

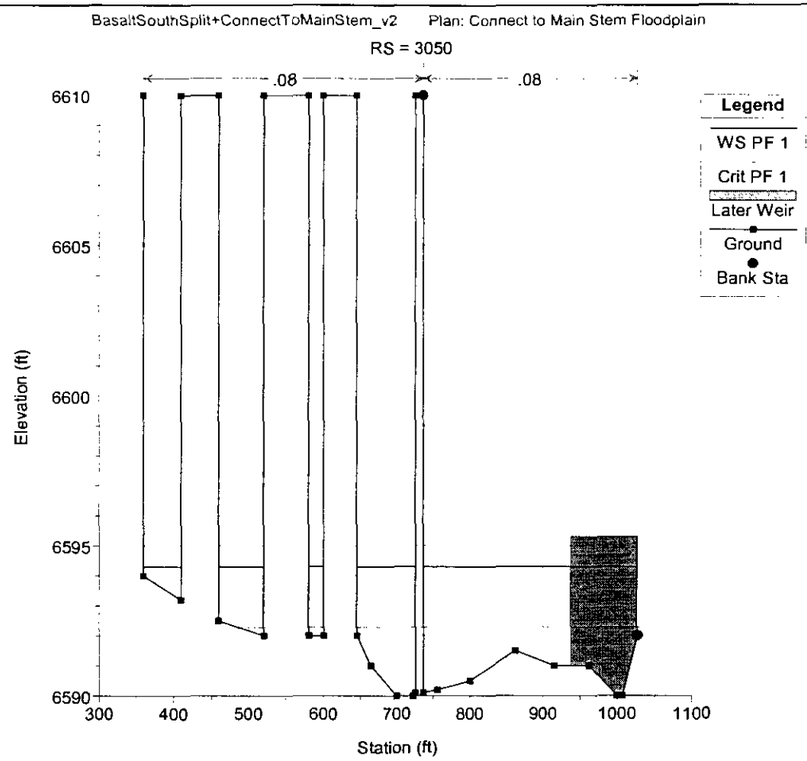

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3855
.08
.08
.1
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

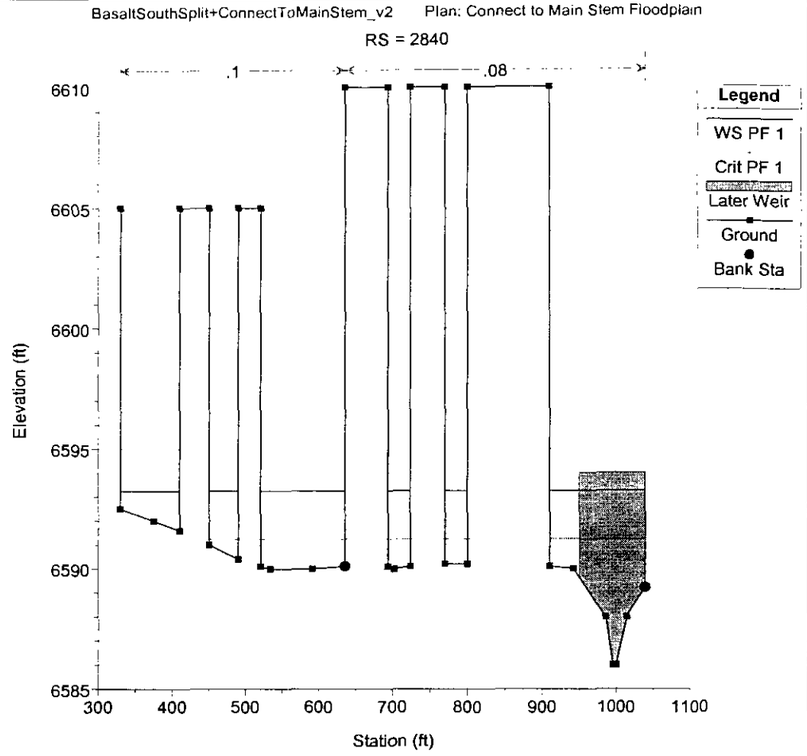

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3815
.13
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

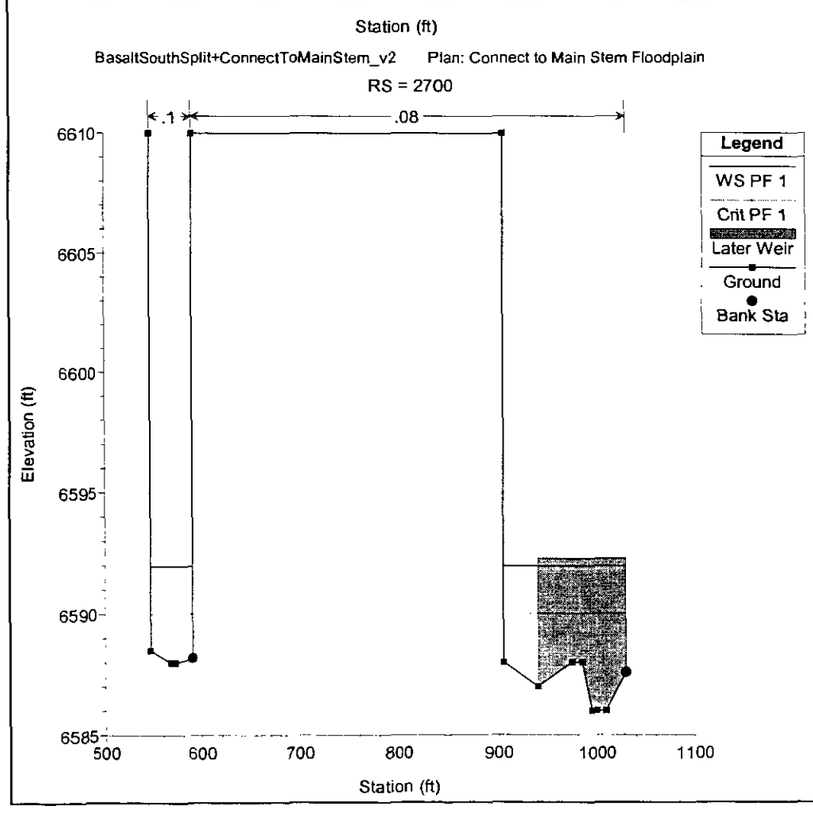

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3700
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

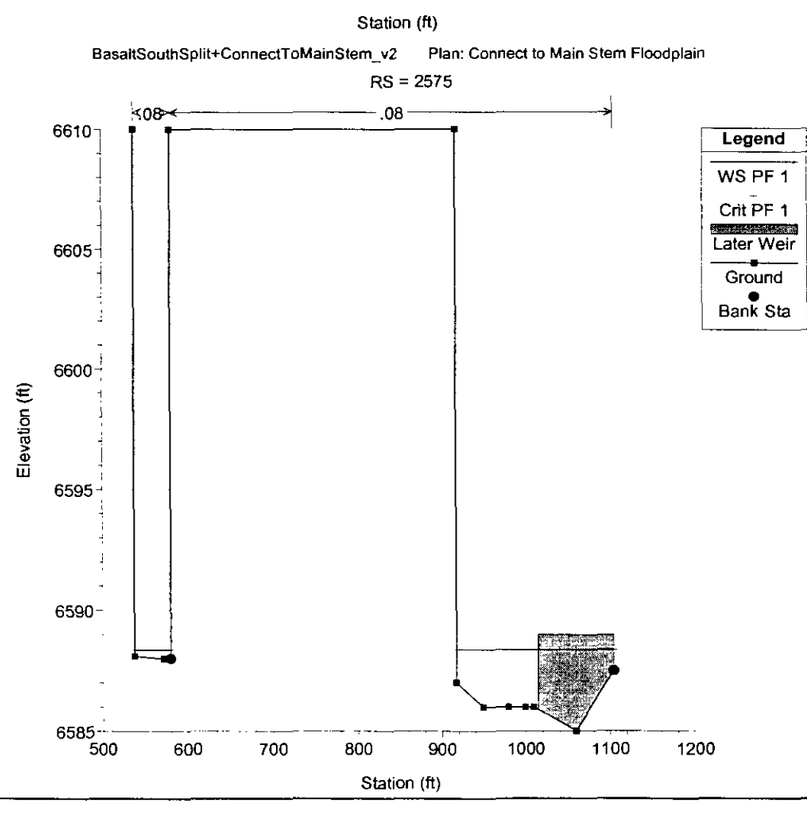

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3618
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

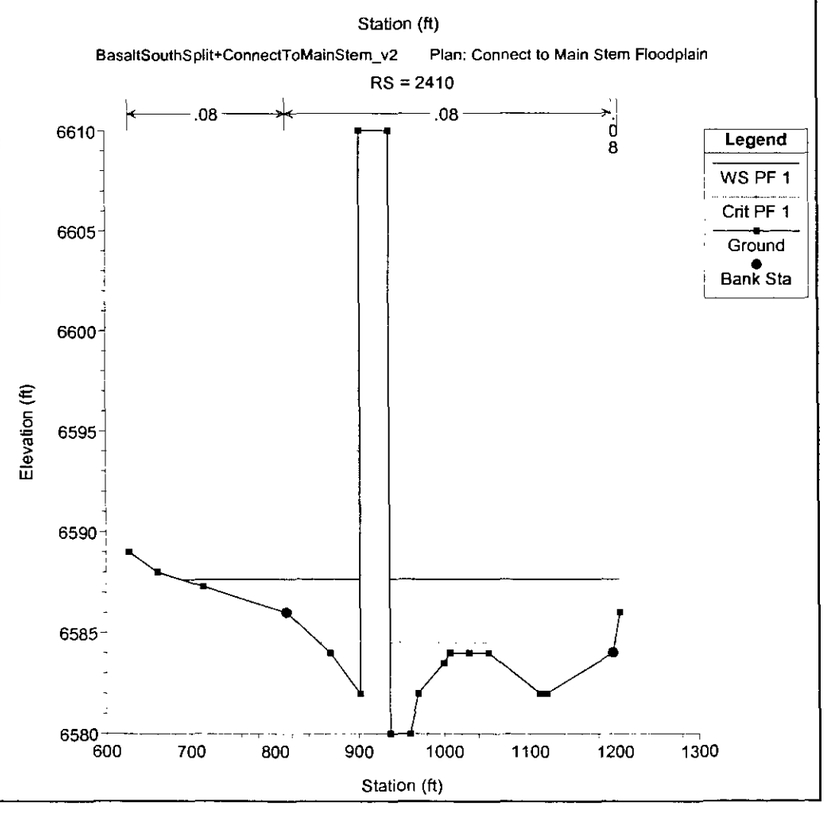

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3280
.1
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 3050
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 2840
.1
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)

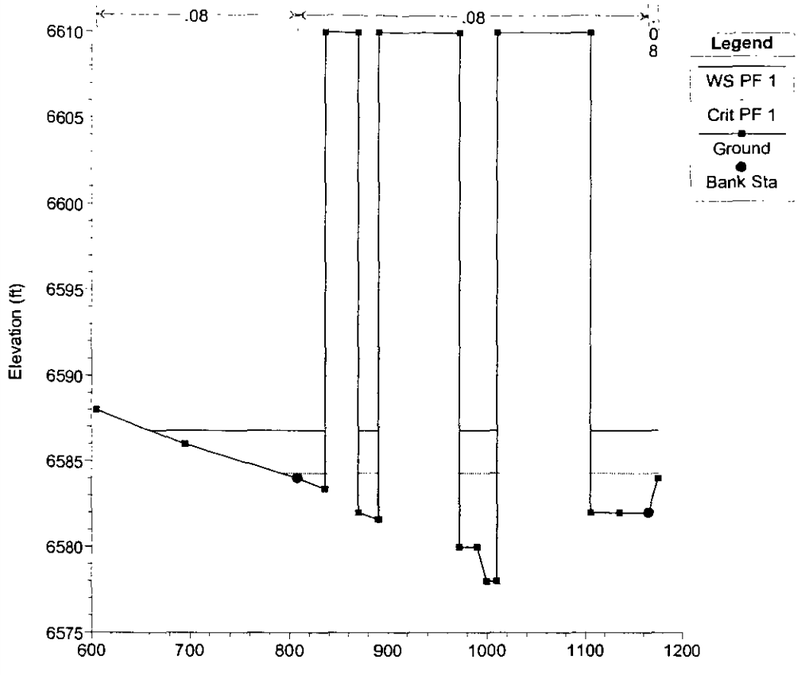

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 2700
.1
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 2575
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 2410
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

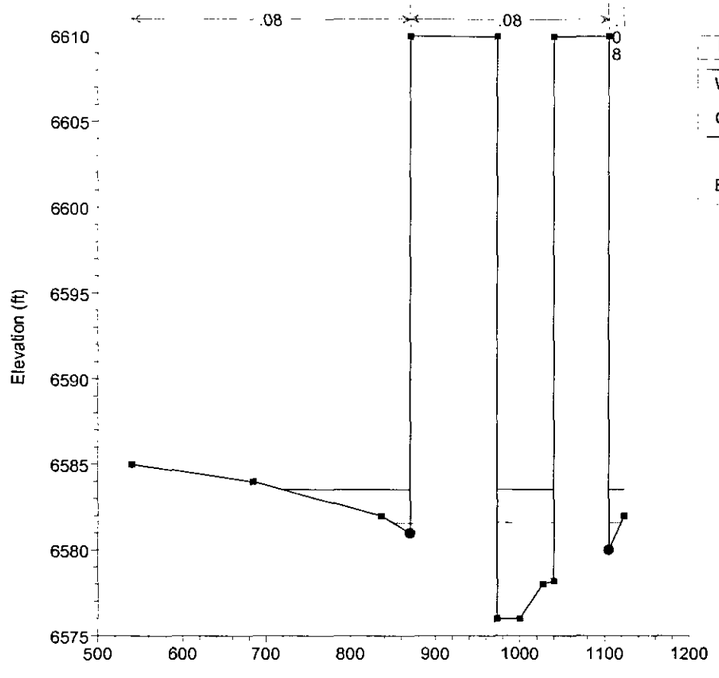
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 2220



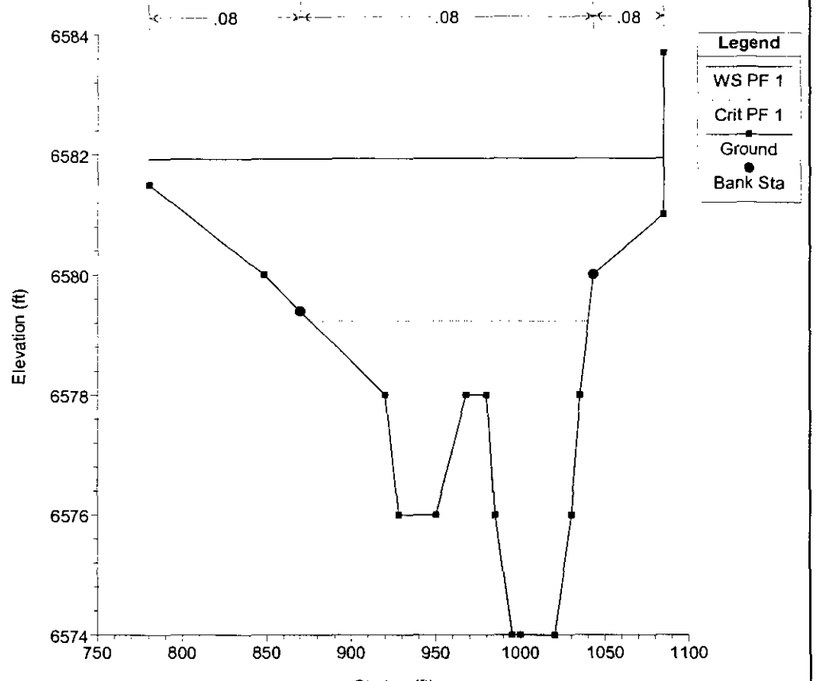
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 1940



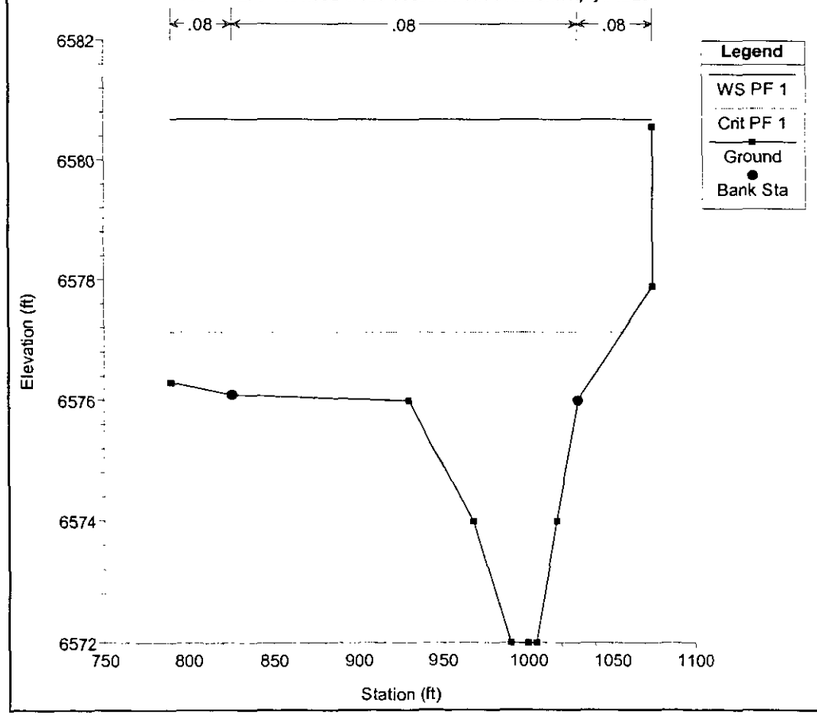
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 1710 Revised cross section from overbank4.prj #1700



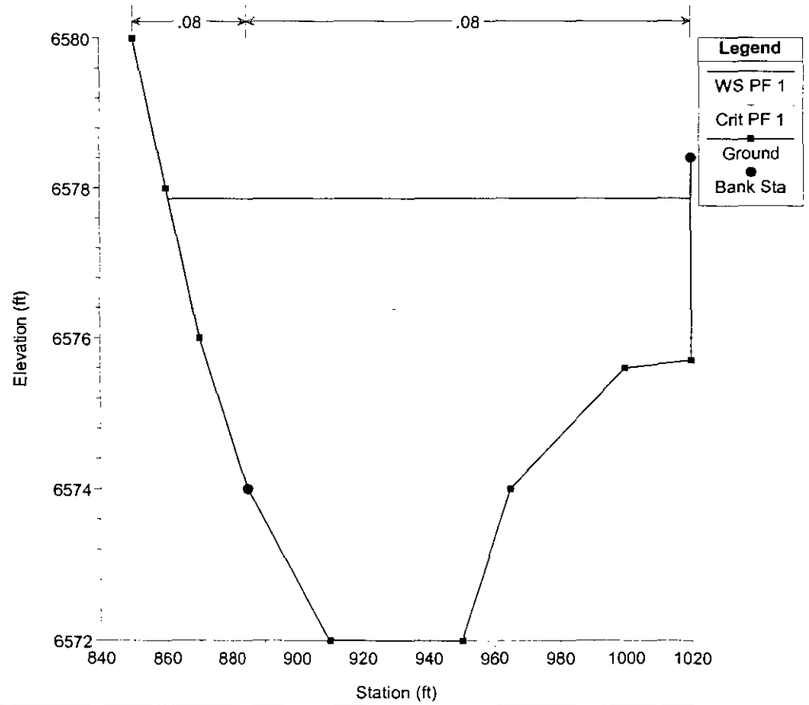
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 1270 Revised cross section from overbank4.prj #1220



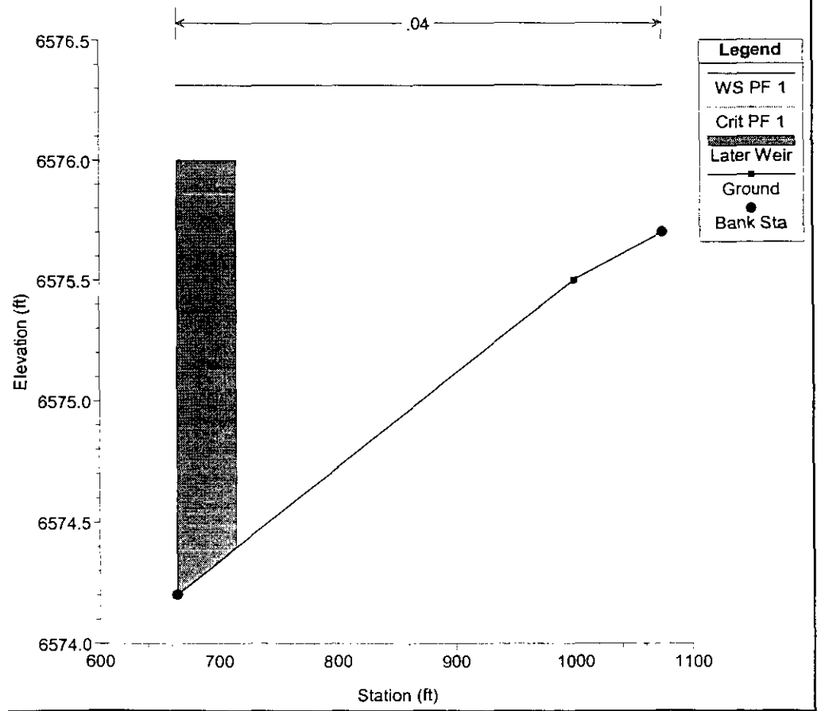
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

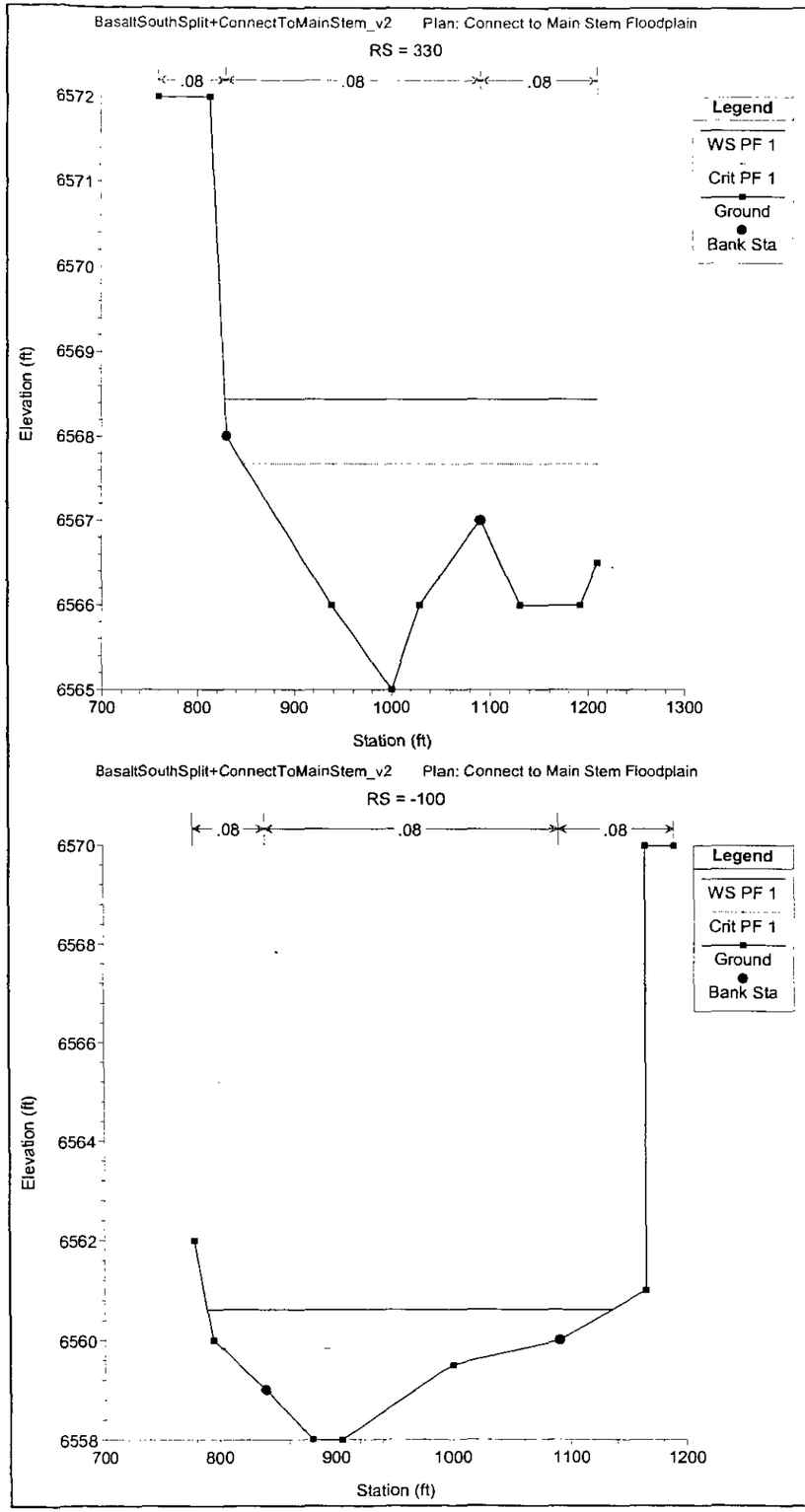
RS = 730 New cross section not in overbank4.prj

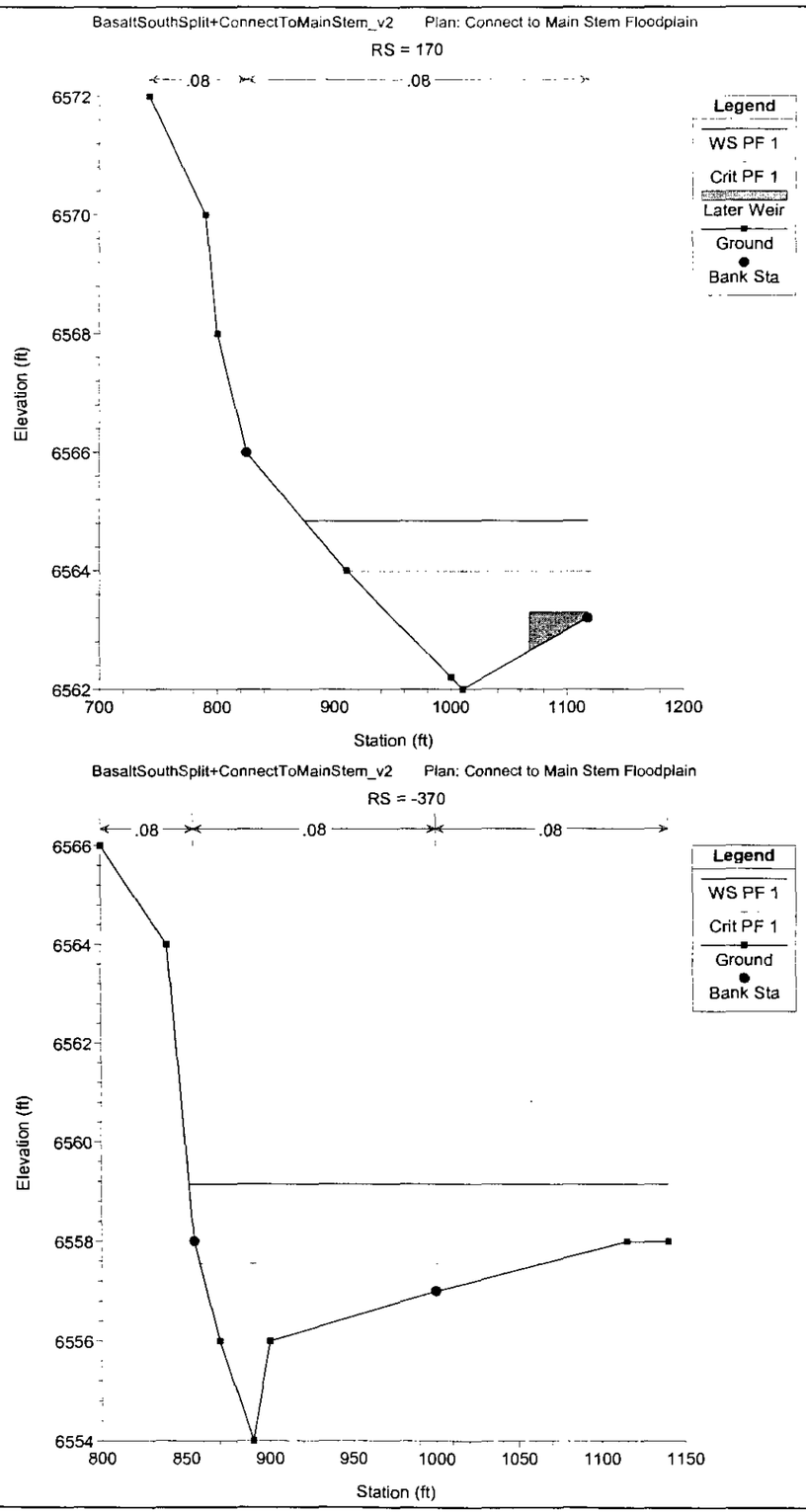


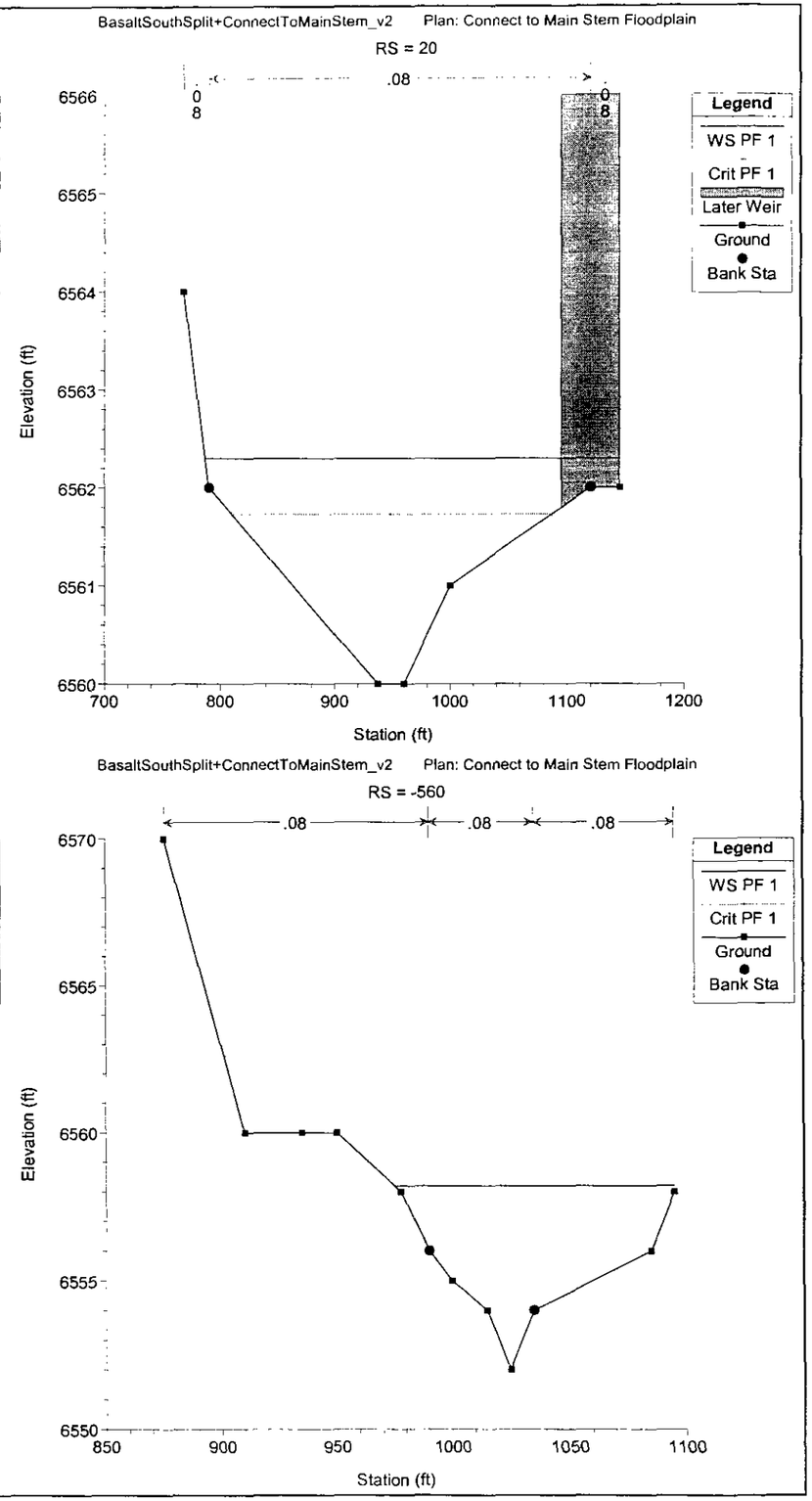
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain

RS = 660




BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 330
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6572
6571
6570
6569
6568
6567
6566
6565
700
800
900
1000
1100
1200
1300
Station (ft)

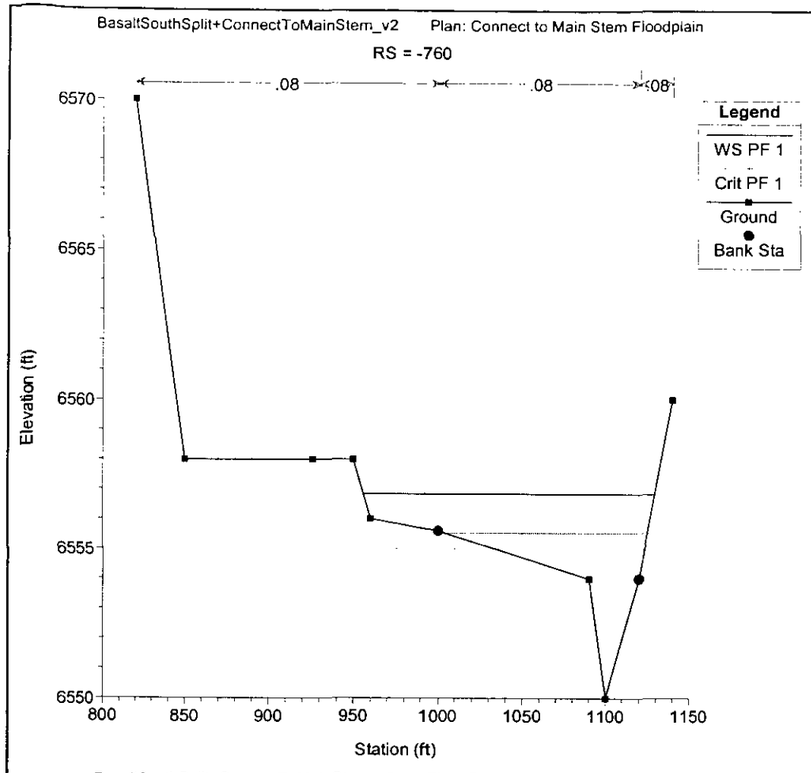

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 170
.08
.08
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
6572
6570
6568
6566
6564
6562
700
800
900
1000
1100
1200
Station (ft)

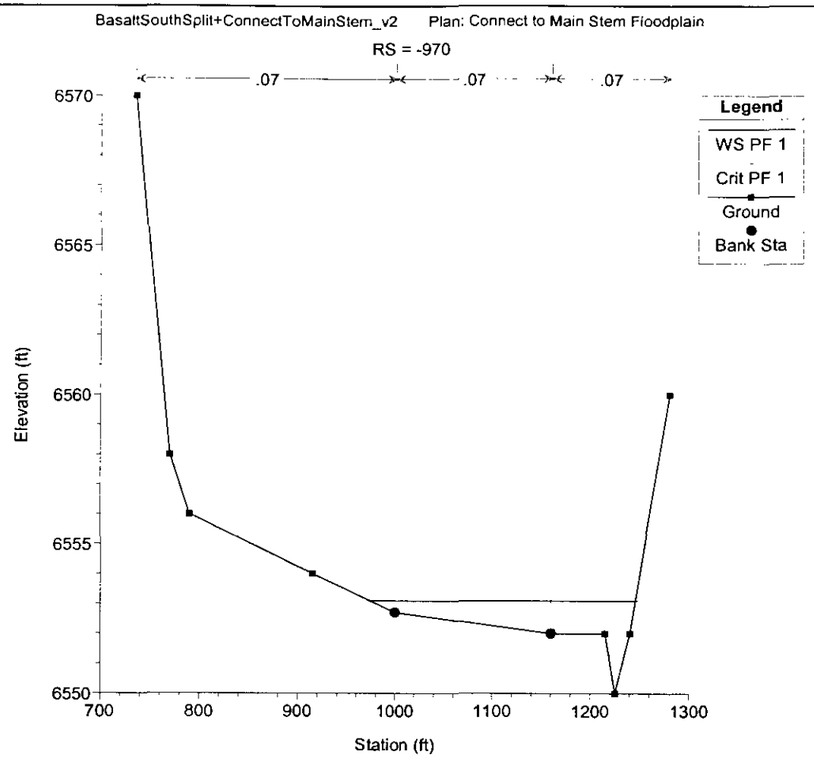

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = 20
.08
0
8
0
8
Legend
WS PF 1
Crit PF 1
Later Weir
Ground
Bank Sta
Elevation (ft)
6566
6565
6564
6563
6562
6561
6560
700
800
900
1000
1100
1200
Station (ft)

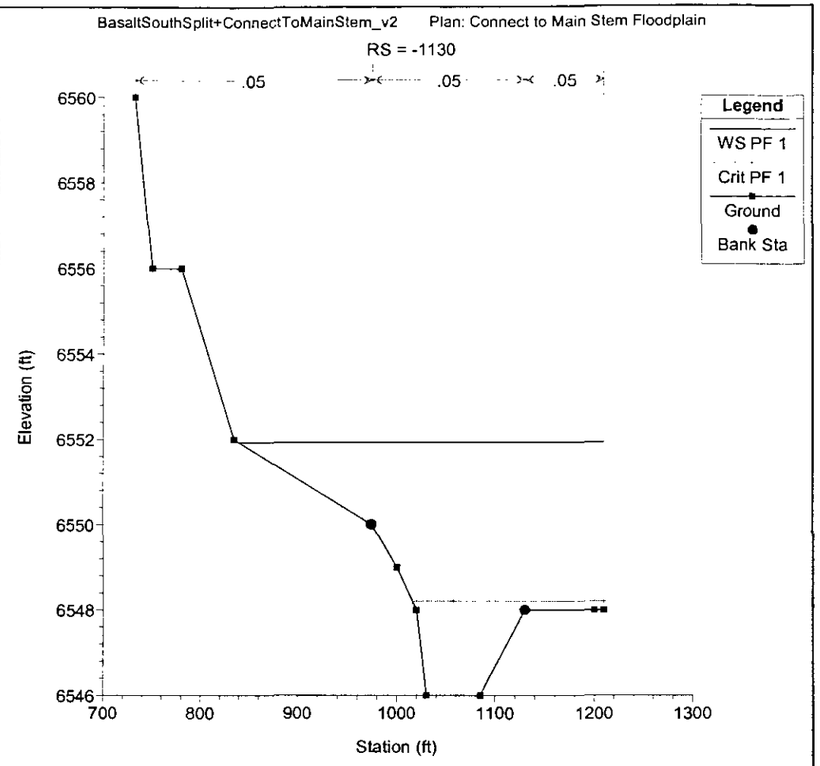
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -100
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6570
6568
6566
6564
6562
6560
6558
700
800
900
1000
1100
1200
Station (ft)

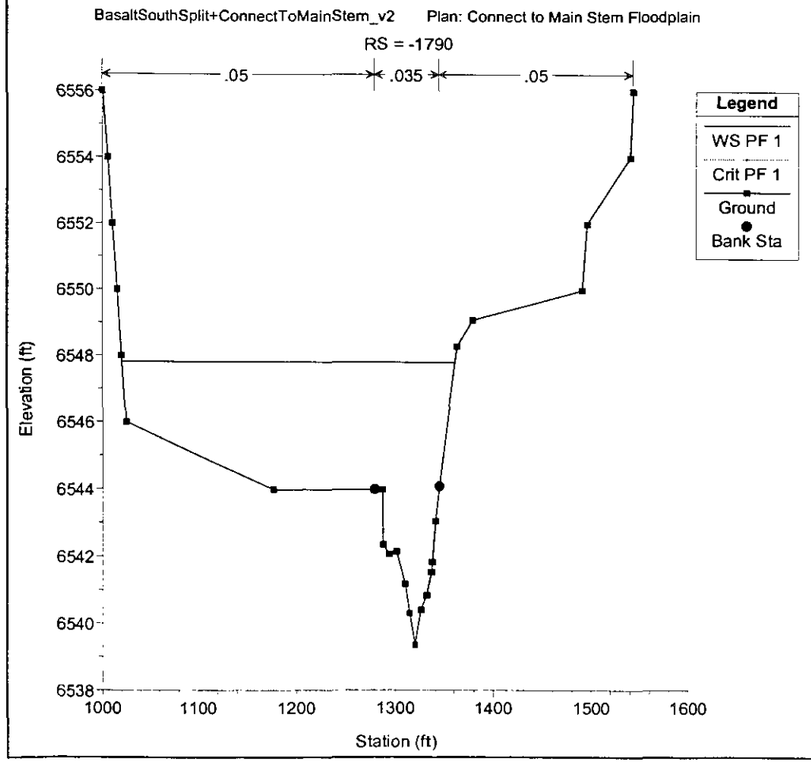
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -370
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6566
6564
6562
6560
6558
6556
6554
800
850
900
950
1000
1050
1100
1150
Station (ft)

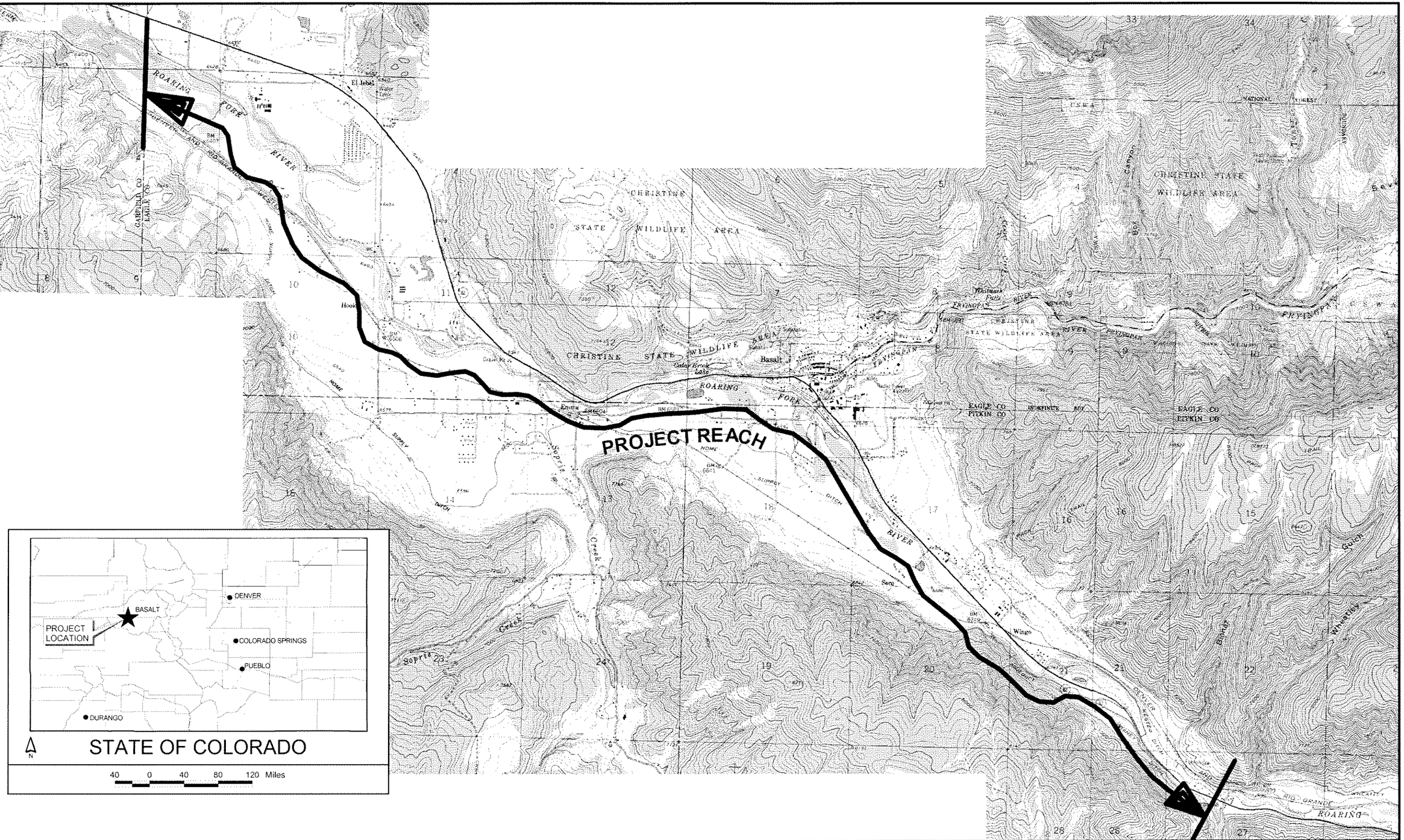
BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -560
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6570
6565
6560
6555
6550
850
900
950
1000
1050
1100
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -760
.08
.08
.08
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6570
6565
6560
6555
6550
800
850
900
950
1000
1050
1100
1150
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -970
.07
.07
.07
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6570
6565
6560
6555
6550
700
800
900
1000
1100
1200
1300
Station (ft)

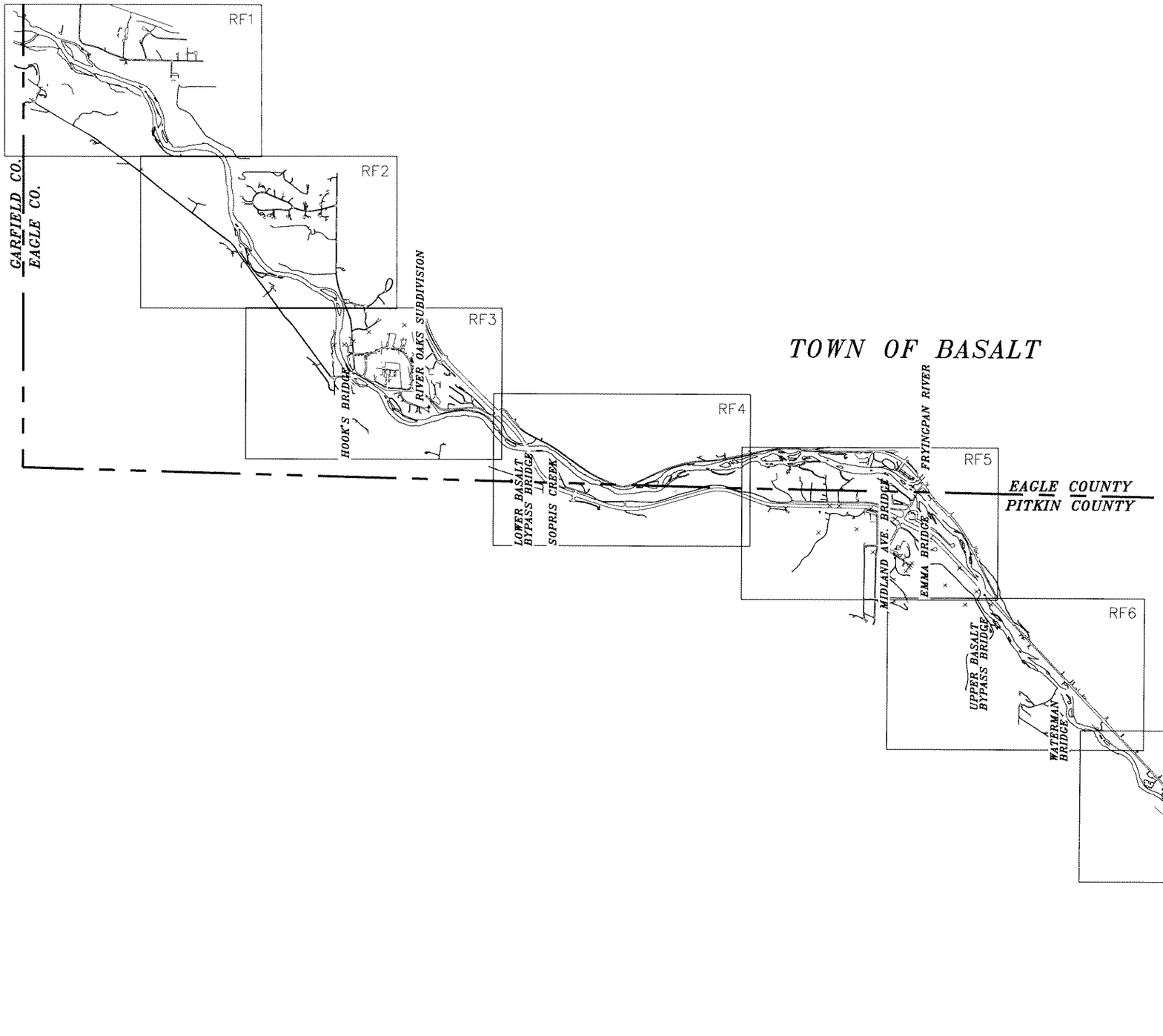

BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -1130
.05
.05
.05
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6560
6558
6556
6554
6552
6550
6548
6546
700
800
900
1000
1100
1200
1300
Station (ft)


BasaltSouthSplit+ConnectToMainStem_v2 Plan: Connect to Main Stem Floodplain
RS = -1790
.05
.035
.05
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
6556
6554
6552
6550
6548
6546
6544
6542
6540
6538
1000
1100
1200
1300
1400
1500
1600
Station (ft)



LOCATION MAP :
ROARING FORK RIVER
EAGLE COUNTY, PITKIN COUNTY, AND BASALT, COLORADO

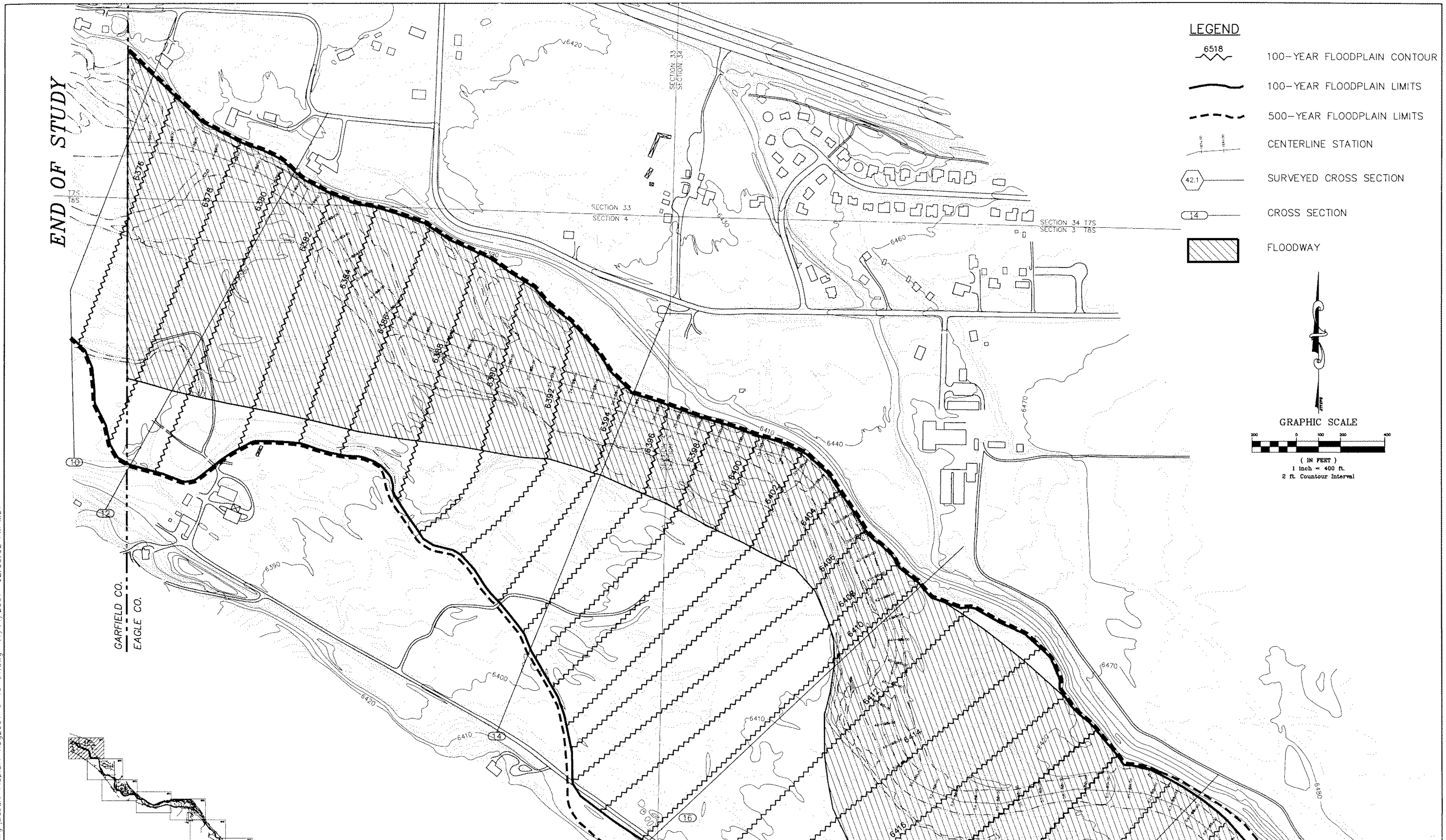
SURVEY NOTE:
BASIS OF VERTICAL CONTROL
IS NAVD 29.



Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 500
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001
DRAWN BY: LDZ	HORIZ.: 1"=1400'	INDEX
CHECKED BY: RDK	VERT.: N/A	SHEET NO. 1 OF 8 SHEETS



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Integrated Design Solutions
1601 Blake Street, Suite 508
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Phone 303.572.0200
Fax 303.572.0202

ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF1
DRAWN BY: LDZ	HORIZ.: 1"=400'	SHEET NO. 1 OF 8 SHEETS	
CHECKED BY: RDK	VERT.: N/A		

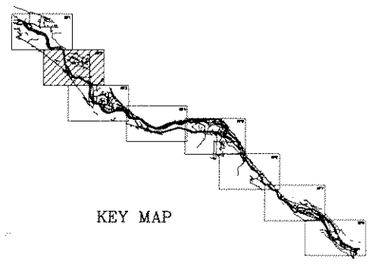
LEGEND

- 6518 — 100-YEAR FLOODPLAIN CONTOUR
- 100-YEAR FLOODPLAIN LIMITS
- 500-YEAR FLOODPLAIN LIMITS
- 1+87.00 / 1+89.00 — CENTERLINE STATION
- 42.1 — SURVEYED CROSS SECTION
- 14 — CROSS SECTION
- FLOODWAY

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval



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ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK	SCALE	DATE ISSUED: NOVEMBER 14, 2001	RF2
DRAWN BY: MJK	HORIZ.: 1"=400'	SHEET NO. 2 OF 8 SHEETS	
CHECKED BY: RDK	VERT.: N/A		

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LEGEND

6518 — 100-YEAR FLOODPLAIN CONTOUR

100-YEAR FLOODPLAIN LIMITS

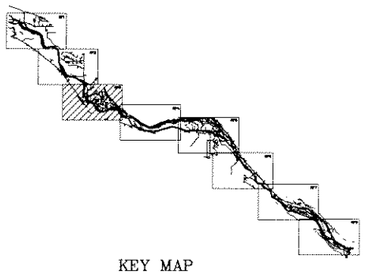
500-YEAR FLOODPLAIN LIMITS

CENTERLINE STATION

42.1 — SURVEYED CROSS SECTION

14 — CROSS SECTION

FLOODWAY



KEY MAP

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 400 ft.
2 ft. Countour Interval

SHALLOW SHEET FLOW OVERTOPPING ROADWAY Q_{100} = 120cfs INTO LOCAL DRAINAGE SYSTEM

POTENTIAL FLOOD HAZARD FROM IRRIGATION DITCH IMPORTATION OF FLOOD WATER

ZONE X

SLOPING BOULDER GRADE CONTROL STRUCTURE

HOOK'S BRIDGE

Matrix Design Group, Inc.
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ROARING FORK RIVER
FLOOD HAZARD AREA DELINEATION
EAGLE & PITKIN COUNTIES

DESIGNED BY: RDK
DRAWN BY: MJK
CHECKED BY: RDK
SCALE:
HORIZ.: 1"= 400'
VERT.: N/A
DATE ISSUED: NOVEMBER 14, 2001
SHEET NO. 3 OF 8 SHEETS

RF3

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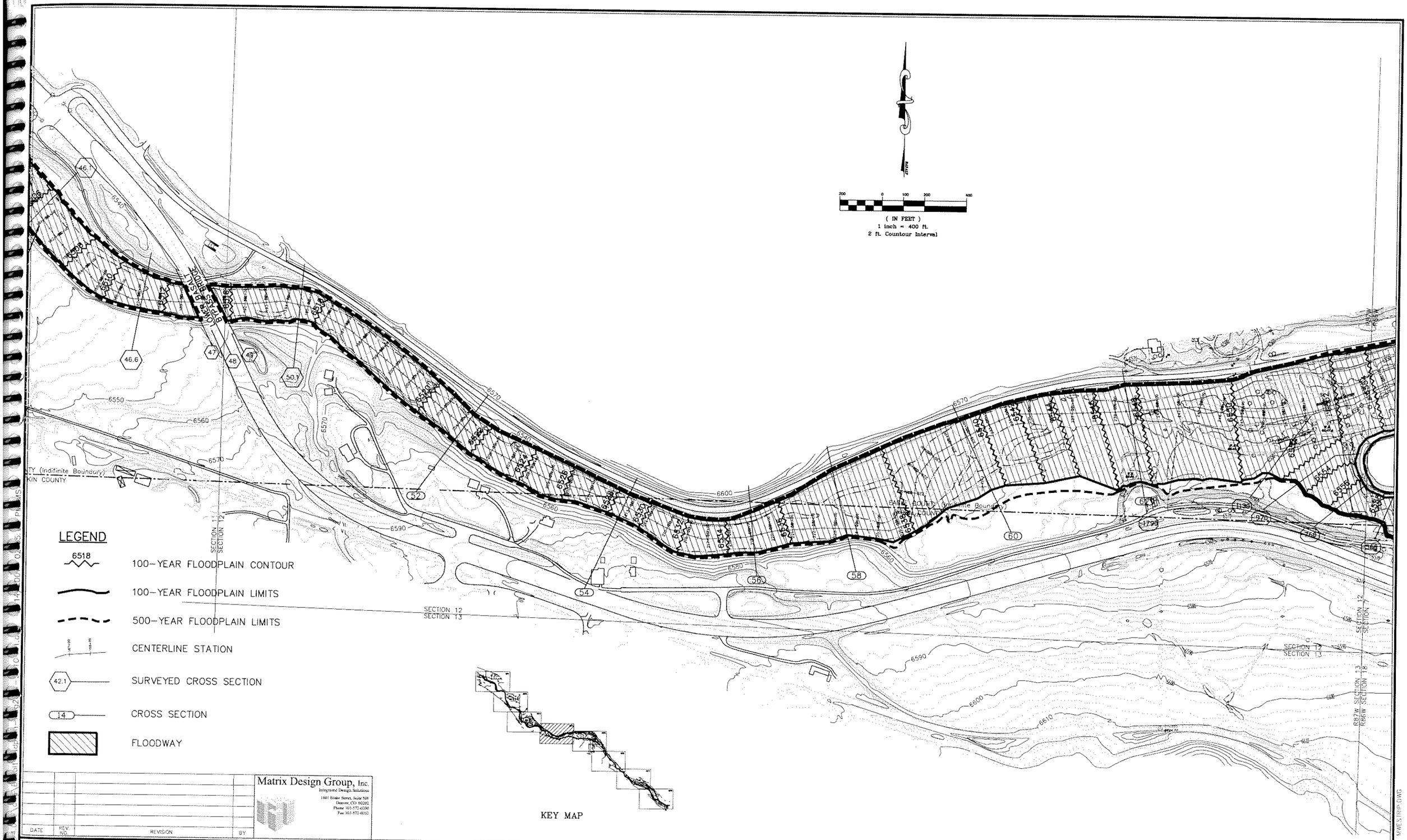


DATE	REV. NO.	REVISION	BY

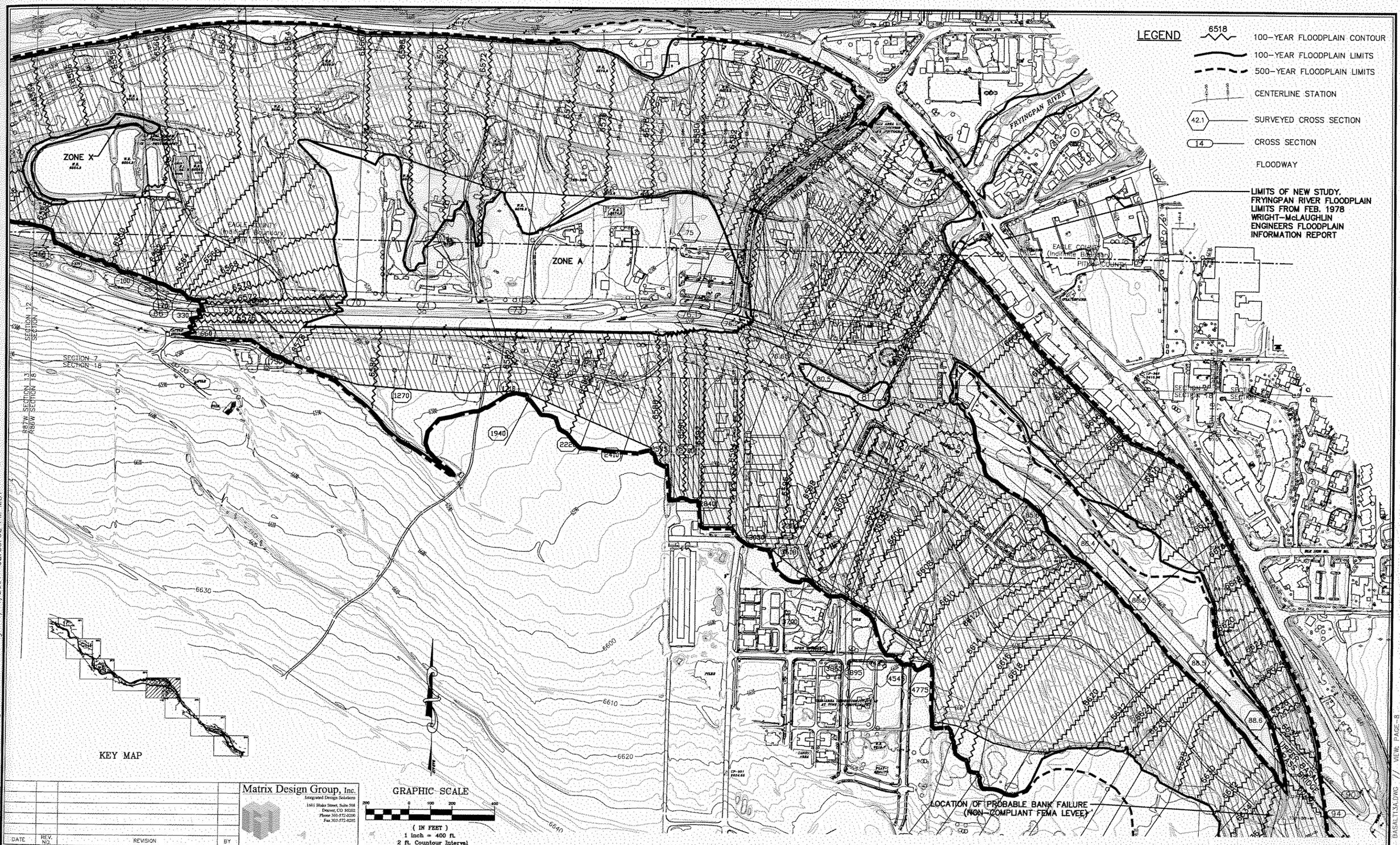
Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 320
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

TOWN OF BASALT	REACH II OF THE ROARING FORK RIVER STUDY	FLOOD HAZARD AREA DELINEATION EAGLE AND PITKIN COUNTIES	McLaughlin Water Engineers	2420 Alcott Street, Denver, CO 80211 PH. 303.454.5550, Fax 303.480.9766 email mwe@mwewater.com	DESIGN: REM, JMC, ARB, BK DETAIL: LLU, ARB, MAP, BK CHECK: RDK

PROJECT NUMBER 98-044.001
DATE: NOVEMBER 14, 2001

DRAWING NUMBER RF-4

MWE STRIP.DWG
08/24/1999



DATE	REV. NO.	REVISION	BY

Matrix Design Group, Inc.
Integrated Design Solutions
1601 Blake Street, Suite 508
Denver, CO 80202
Phone 303-572-0200
Fax 303-572-0202

TOWN OF BASALT	REACH II OF THE ROARING FORK RIVER STUDY	FLOOD HAZARD AREA DELINEATION EAGLE AND PITKIN COUNTIES	McLaughlin Water Engineers, Ltd. 2420 Alcott Street, Denver, CO 80211 PH. 303.458.5550; Fax 303.480.9766 email mwe@mwewater.com	DESIGN: REM, JMC, ARB, BK DETAIL: LLU, ARB, MAP, BK CHECK: RDK	PROJECT NUMBER: 98-044.001 DATE: NOVEMBER 14, 2001	DRAWING NUMBER RF5

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05/26/2000 - BASALT13A.DWG // VIEW: PAGE-B