DRAINAGE REPORTS

ABBREVEATED WATER & SEWER NEED REPORTS

WATER STUDY

WASTERWATER STUDY

STORMWATER WAIVER APPLICATION

CivTech

October 30, 2011

Mr. Hugh Smeed
Crown Community Development
7325 Janes Avenue
Woodridge, IL 60517

c/o Mr. Steven Voss, LVA
Southwest Development Services, LLC
Email: sjvoss@lvadesign.com
Phone: 480-994-0994

Re: ***Sereno Canyon Resort - Trip Generation Comparison and Operational Analysis Statement – Scenario 1***

Dear Mr. Smeed:

This trip generation statement has been prepared for Sereno Canyon Conceptual Land Use Plan in Scottsdale, Arizona. This proposed development located on 350 acres, consists of high end resort development located roughly east of 121st Place, west of 128th Street, south of Ranch Gate Road and north of the McDowell Sonoran preserve. The original access for the development was to occur on Alameda Road to the west and Ranch Gate Road to the north. The roadway connections have been revised and the project will now obtain its main access through Ranch Gate Road at 125th Place and 128th Street to the west in the future. The option evaluated herein as "Scenario 1" includes one primary access at the north end of the property to Ranch Gate Road. A secondary access which will primarily service the resort employees and visitors will be provided along 128th Street. The access at Alameda Road, to the west, is now planned to allow vehicles to enter from the adjacent subdivision (by reservation) to visit the resort restaurant. The Alameda access will be controlled by an electric gate and will allow residents of Sereno Canyon to use this access as an exit only.

The purpose of this statement is to determine the trip generation impact of the Sereno Canyon Conceptual Land Use Plan in Scottsdale, Arizona. The specific objectives of this statement are to:

- Determine the trip generation potential of the proposed plan; and,
- Compare the trip generation potentials to determine the trip generation impact of allowing the proposed Sereno Canyon conceptual land use plan development.
- Determine if the site creates any operational impacts to the off-site streets and intersections.

16-ZN-2011
1st: 12/19/2011

EXISTING TRIP GENERATION

The subject has an approved site plan for single family housing development with 128 single family residences.

The trip generation for the previously approved site plan is summarized in **Table 1**. This trip generation was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation, 8th Edition*. A detailed trip generation worksheet is included as an **Attachment**.

Table 1: Trip Generation of Existing Development

Land Use	Land Use Code	Size	Units	Weekday Trips Generated						
				Daily Total	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Homes	210	128	DU	1,226	24	62	96	82	48	130

A possible development of the property as a single family home development with a maximum of 128 homes could generate as many as approximately 1,226 daily trips, with approximately 96 trips occurring during the AM peak hour and 130 trips occurring during the PM peak hour. Of these trips Alameda Road could have 1,110 daily trips.

PROPOSED DEVELOPMENT TRIP GENERATION

The proposed Sereno Canyon Spa and Resort is proposed to consist of a Resort Hotel consisting of 96 rooms, 108 Casitas (condominium type units) detached from the resort, 102 Resort Villas and 44 Resort Estate Homes. The Casitas and Resort Villas both have the capacity to become a part of the rental pool even though they may be for sale units and privately owned. The operation of privately owned units which are leased back to the hotel rental pool allows for flexibility to provide additional resort rooms during high demand. Ownership units are typically occupied by their residents approximately 33 percent of the time. The remaining usage will come from resort nights. The Resort Estate Homes were assumed to be single family detached residences. A conceptual site plan has been included as an **Attachment**. The potential trip generation for the site was estimated utilizing rates provided in the ITE *Trip Generation, 8th Edition*. **Table 2** summarizes the trip generation potential of the currently proposed development. A detailed trip generation worksheet is included as an **Attachment**.

Table 2: Trip Generation of Proposed Development

Land Use	Land Use Code	Size	Units	Weekday Trips Generated						
				Daily Total	AM Peak Hour			PM Peak Hour		
					Enter	Exit	Total	Enter	Exit	Total
Resort Estates	210	44	DU	422	8	25	33	28	17	45
Resort Villas	210	34	DU	326	7	19	26	22	13	35
Resort Villas	330	68	Keys	340	19	7	26	15	19	34
Resort Casitas	233	36	DU	212	5	16	21	13	7	20
Resort Casitas	330	72	Keys	360	19	8	27	15	21	36
Resort Hotel	330	96	Keys	480	26	10	36	21	27	48
Total Trips				2,140	84	85	169	114	104	218

The proposed development could generate approximately 2,140 daily trips, with approximately 169 trips occurring during the AM peak hour and 218 trips occurring during the PM peak hour.

TRIP GENERATION COMPARISON

The proposed land uses are predicted to generate more trips than the currently approved residential planned unit development use for an entire day (approximately 914 more daily trips), and during the peak hours (approximately 73 more hourly trips in the AM and 88 PM more hourly trips in the PM peak hours). However, Alameda's Daily Trips will be removed from 1,060 to 305 (71% reduction) due to the exit only condition.

STUDY AREA

CivTech contracted Field Data Services (FDS) to conduct turning movement counts on Thursday, October 13th, 2011 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM Traffic at the following intersections of Ranch Gate Road/118th Street, Happy Valley Road/ Alameda Road, Alameda Road/ 120th Place and Alameda Road/121st Place. The intersections analyzed for level of service operations were the main site access, Ranch Gate Road/ 125th Place, Ranch Gate Road/118th Street and Happy Valley Road/Alameda Road.

EXISTING CAPACITY ANALYSIS

Peak hour capacity analyses have been conducted for the study intersections based on existing conditions and traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM), Special Report 209,* Updated 2000. All signalized and unsignalized intersections have been analyzed as such using the methodologies presented in the *Highway Capacity Manual, Special Report 209,* Updated 2000, and using TRAFFIX Software version 8.0 under the HCM 2000 methodologies.

The concept of level-of-service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels-of-service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. **Table 3** lists the level of service criteria for signalized and unsignalized intersections.

Table 3 – Level-of-Service Criteria for Controlled Intersections

Level-of-Service	Unsignalized Control Delay (sec/veh)	Signalized Control Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10-15	> 10-20
C	> 15-25	> 20-35
D	> 25-35	> 35-55
E	> 35-50	> 55-80
F	> 50	> 80

Source: Exhibit 16-2 and Exhibit 17-2, Highway Capacity Manual 2000

Table 4 – Existing Peak Hour Levels of Service

ID	Intersection	Stop Control	Approach	Existing Peak Hour LOS	
				AM	PM
1	118th Street. & Ranch Gate Rd.	1-way stop (WB)	NB	A	A
			SB	A	A
			WB	A	A
			Overall	**A**	**A**
2	.Ranch Gate Rd & 125th Pl.	1-way stop (WB)	NB	A	A
			EB	A	A
			WB	A	A
			Overall	**A**	**A**
3	Happy Valley Rd & Alameda Rd	2-way stop (EB/WB)	NB	A	A
			SB	A	A
			EB	A	A
			WB	B	A
			Overall	**A**	**A**

All existing study intersections are expected to operate with an overall passing level of service (LOS A or better). Results of the existing level-of-service analyses are shown in **Table 4** for both peak hours. The output sheets for the existing conditions have been included as an **Attachment**.

INTERSECTION CAPACITY ANALYSIS

Future peak hour capacity analyses have been conducted for the study intersections. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM), Special Report 209,* Updated 2000, *Synchro 6* and using *Traffix Version 8.0* under the HCM 2000 methodology.

The concept of level-of-service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels-of-service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service criteria for signalized and unsignalized intersections are as shown earlier in **Table 3**.

Table 5 – Total Traffic Peak Hour Levels of Service of Proposed Development

ID	Intersection	Stop Control	Approach	Existing Peak Hour LOS	
				AM	PM
1	118th Street. & Ranch Gate Rd.	1-way stop (WB)	NB	A	A
			SB	A	B
			WB	A	A
			Overall	**A**	**A**
2	.Ranch Gate Rd & 125th Pl.	1-way stop (WB)	NB	A	A
			EB	A	A
			WB	A	A
			Overall	**A**	**A**
3	Happy Valley Rd & Alameda Rd	2-way stop (EB/WB)	NB	A	A
			SB	A	A
			EB	A	A
			WB	B	B
			Overall	**A**	**A**
4	128th Street & Ranch Gate Rd.	1-way stop (NB)	NB	A	A
			EB	A	A
			WB	A	A
			Overall	**A**	**A**

It is assumed that residential site generated traffic from the southern portion of the site will be distributed westbound along Alameda Drive (exiting trips only). All residential trips entering Sereno Canyon will obtain access from 125th Place and Ranch Gate Road. All resort traffic was assumed to utilize Ranch Gate Road and 128th Street. Traffic generated by the residential uses on the northern portion of the site was assumed to utilize Ranch Gate Road. All of the intersection approaches within the study area continue to operate at acceptable levels of service (LOS B or better) when the site generated traffic is added to the existing traffic volumes. Results of the total traffic level-of-service analyses are shown in **Table 5** for both peak hours. The output sheets for the existing conditions have been included as an **Attachment**.

CONCLUSIONS

From the previous, the following has been concluded.

- The existing property with a planned unit development use could generate as many as 1,226 daily trips, with approximately 96 trips occurring during the AM peak hour and 130 trips occurring during the PM peak hour.

- The proposed land uses (Sereno Canyon Spa and Resort) could generate as many as 2,140 daily trips, with approximately 169 trips occurring during the AM peak hour and 218 trips occurring during the PM peak hour.

- The proposed land uses are predicted to generate more trips than currently approved site plan (Planned Unit Development)— approximately 914 more daily trips, 73 more hourly trips in the AM and 88 PM more hourly trips in the PM peak hours.

- The daily trips along Alameda Road are reduced from 1,060 to 305 with the proposed plan. Also per the proposed plan Alameda Road will be restricted to an exit only access.

- All intersections operate at an acceptable level of service (LOS A) in the existing condition.

- All intersection approaches operate at an acceptable level of service (LOS B or better) when the site generated traffic is added to the network.

- An additional 190 westbound daily trips could be expected along Alameda Drive at the buildout of the Sereno Canyon development.

In closing, this trip generation comparison statement has been prepared to meet City of Scottsdale requirements, and to permit the City to assess the traffic impacts of the proposed rezoning. Should you wish to discuss this information further, please contact me at (480) 659-4250.

Sincerely,

CivTech Inc.

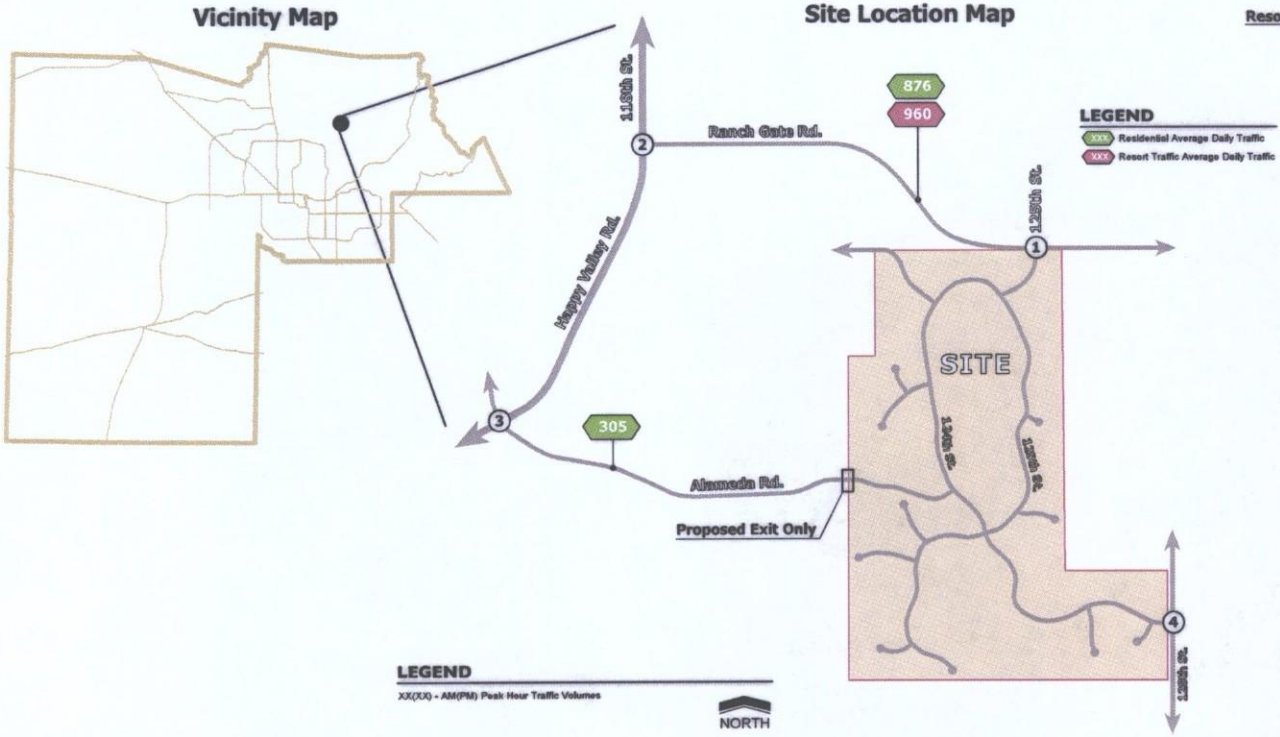
Dawn D. Cartier
President/Senior Traffic Engineer

Attachments

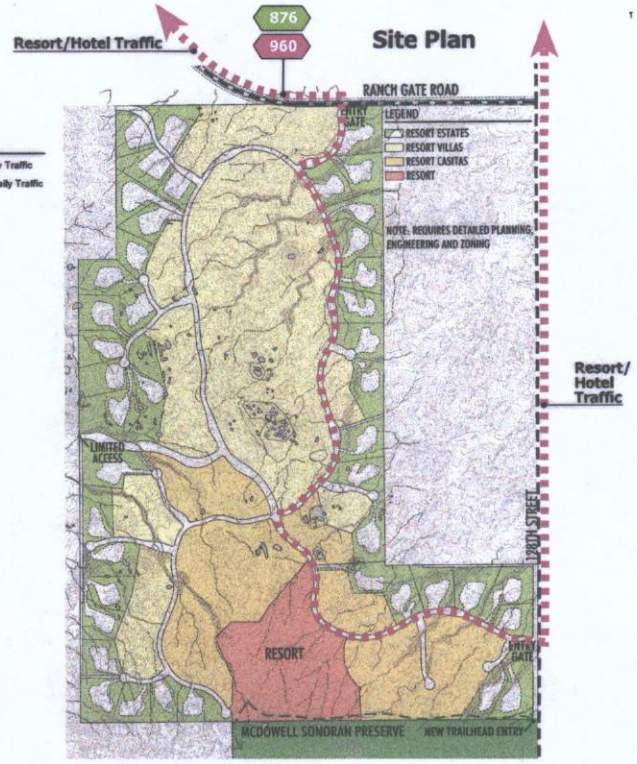
CivTech

Vicinity Map

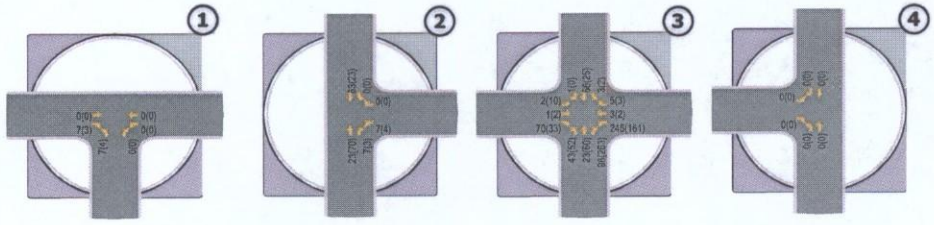
Site Location Map



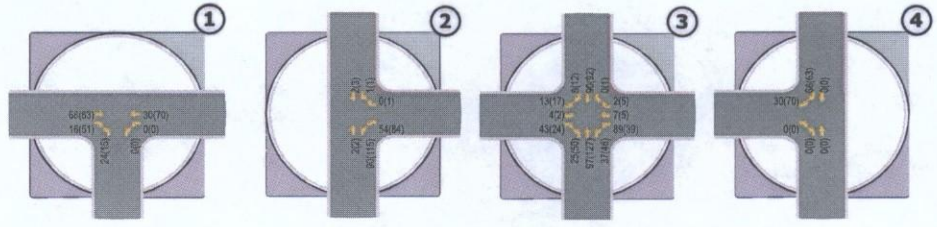
Site Plan



Previously Approved Total Traffic (128 SFR)



Proposed Total Traffic



JE Fuller/Hydrology & Geomorphology, Inc.

Date: January 9, 2012

To: City of Scottsdale, Development Services Department
7447 E. Indian School Road, Scottsdale, AZ 85251

From: JE Fuller/Hydrology & Geomorphology, Inc.
Brian Schalk, P.E., CFM
1 W. Deer Valley Road, Phoenix, AZ 85027
brianschalk@jefuller.com; 623-889-0166 x308

Re: Sereno Canyon Master Drainage Plan Amendment

To Whom It May Concern:

Due to the proposed revision of the Sereno Canyon land-use plan, the *Sereno Canyon Master Drainage Plan Amendment* (*Master Drainage Plan Amendment*) is being submitted to the City of Scottsdale (City) for review and approval. Revision of land-use entails a change from the existing Rural Neighborhoods plan to a Resort/Tourism plan on the 350-acre site. The currently approved Master Drainage Plan (MDP) is documented in the *Sereno Canyon Mater Drainage Plan* report (*Approved MDP*), dated November 15, 2006.

The drainage and flood mitigation approach presented in the *Master Drainage Plan Amendment* adheres to the concepts approved by the City and documented in the *Approved MDP*. However, the computations and calculations presented in the *Master Drainage Plan Amendment* are in accordance with the City's current *Grading and Drainage Design Standards and Policies* (January 2010). Notable hydrologic computational differences between the original MDP and that presented in the *Master Drainage Plan Amendment* include the following:

1. Changes to proposed land-use type.
2. Rainfall data updated from NOAA Atlas 2 to NOAA Atlas 14.
3. HEC-1 subbasin hydrologic routing computation modified from Kinematic Wave methodology to Clark Unit Hydrograph methodology.
4. HEC-1 runoff loss computation modified from SCS Curve Number methodology to Green and Ampt Loss Rate methodology.

Please feel free to contact me with questions and/or comments regarding the *Master Drainage Plan Amendment*.

Sincerely,

Brian Schalk, P.E., CFM
brianschalk@jefuller.com
623-889-0166 x308

10-GP-2011 & 16-ZN-2011
2nd: 1/9/2012

SERENO CANYON
MASTER DRAINAGE PLAN

AMENDMENT

JANUARY 9, 2012

Prepared by:
JE Fuller/Hydrology & Geomorphology, Inc.
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Prepared for:
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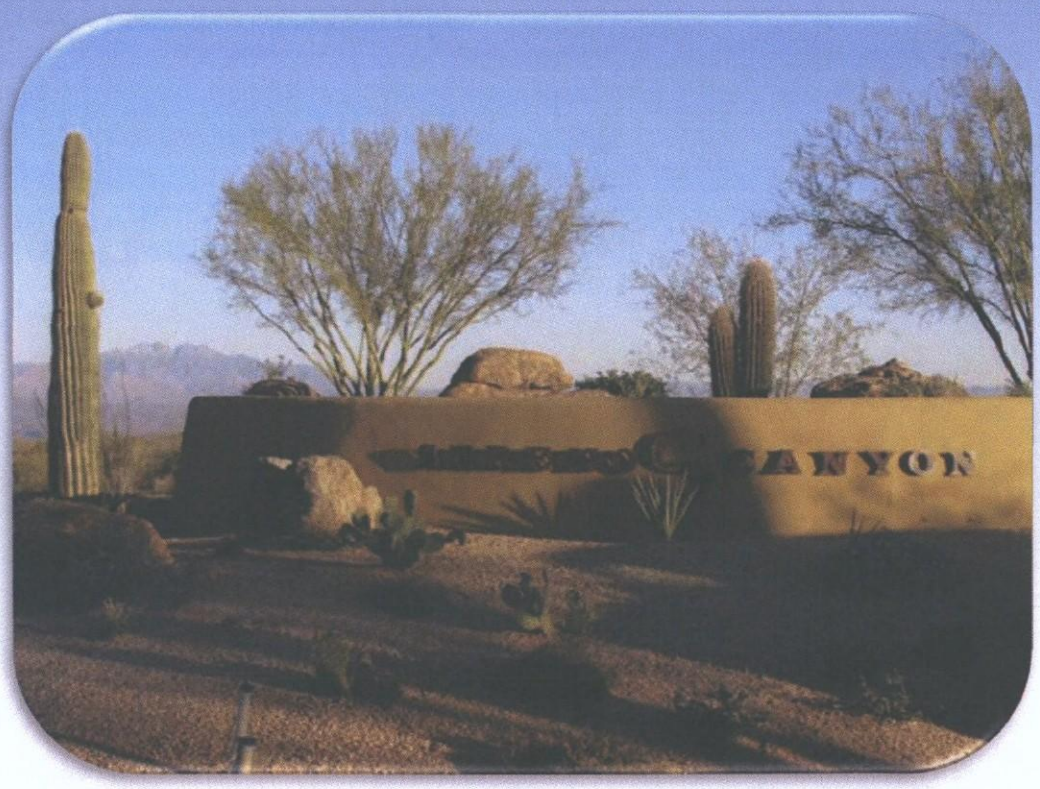
City of Scottsdale Plan Check #7424-05-6



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List of DVD Materials

- Sereno Canyon Master Drainage Report Amendment (.pdf format)
- Site visit photographs and photograph locations shape file.
- Existing condition and proposed condition HEC-1 modeling (2-, 10-, and 100-year, 6-hour) and associated shape files.
- HEC-RAS modeling and 100-year, 6-hour floodplain shape files (.prj format).

1 Introduction

1.1 Project Name, Location and Size

The proposed Sereno Canyon Spa and Resort (Sereno Canyon Development) is a planned 350-acre spa and resort development located in the northeastern portion of Scottsdale, AZ. The site is located in Section 11, Township 4, Range 5 East of the Gila and Salt River Base and Meridian. The site is bound to the west by the existing Sonoran Crest Development (122nd Street alignment), to the east by the 128th Street alignment, to the north by the Happy Valley Road alignment, and to the south by the McDowell Mountain Sonoran Preserve. A location and vicinity map are provided in Appendix A.

1.2 Report Purpose

Due to the newly proposed Sereno Canyon Development land-use plan, the *Sereno Canyon Master Drainage Plan Amendment* (*Master Drainage Plan Amendment*) is being submitted to the City of Scottsdale (City) for review and approval. Revision of land-use entails a change from the existing Rural Neighborhoods plan to a Resort/Tourism plan on the 350-acre site. The currently approved Master Drainage Plan (MDP) is documented in the *Conceptual Master Drainage Report for Sereno Canyon*, dated November 15, 2006 (*Approved MDP*).

The *Master Drainage Plan Amendment* documents the revised modeling approach used to estimate hydrologic and hydraulic conditions resulting from the proposed change in land-use. It should be noted that the hydrologic and hydraulic modeling approaches and drainage concepts presented in the *Master Drainage Plan Amendment* adhere significantly to those discussed in the *Approved MDP*. Where differences in modeling approach and/or drainage concepts occur, City reviewers have typically been informed. It should be noted that the *Master Drainage Plan Amendment* is an amendment to the *Approved MDP*; therefore, the reader is encouraged to reference the *Approved MDP* for additional details regarding currently approved drainage concepts and facilities.

1.3 Project Description

Sereno Canyon is intended to be a low-impact development that maintains and incorporates natural Sonoran Desert landscape. It is this natural landscape that is inherent to the proposed development's appeal. Therefore, one significant design objective is to minimize mass grading.

1.3.1 Development Land-Use

As discussed above, the *Master Drainage Plan Amendment* has been prepared because of a proposed change in land-use. Four primary land-use types are being proposed within the Sereno Canyon Development: Estate Residential, Large Lot Residential, Medium Lot Residential and Resort/Townhouse Residential. A brief description of each land-use is provided below. Additional discussion regarding land-use hydrologic properties is provided in Sections 4 and 6. The proposed land-use plan for the Sereno Canyon Development is provided in Appendix A.

1.3.1.1 Estate Lot Residential

Estate lot residential land-use will consist of a single family residence located on lots ranging in size from one acre to five acres. The City land-use code associated with this development is R1-130. The comparable Flood Control District of Maricopa County (FCDMC) land-use code is LU 120.

1.3.1.2 Large Lot Residential

Large lot residential land-use will roughly consist of one resort-style villa unit per acre-sized lot. The City land-use code associated with this development is R1-43. The comparable FCDMC land-use code is LU 130.

1.3.1.3 Medium Lot Residential

Medium lot residential land-use will roughly consist of two resort-style casita units per acre. The City land-use code associated with this development is R1-18. The comparable FCDMC land-use code is LU 140.

1.3.1.4 Resort/Townhouse Residential

The resort/townhouse residential land-use will roughly consist of small, resort-style duplex units serviced by golf cart paths rather than streets. The City land-use code associated with this development is R-4R. A similar FCDMC land-use code, however slightly modified, would be LU 160 (See Section 4.1.3.2).

1.4 Special Conditions

1.4.1 Existing and Proposed Conditions

As discussed with the City, existing condition analyses are based on natural Sonoran Desert landscape. Proposed condition analyses are based on a combination of the revised land-use plan and existing, yet skeletal, infrastructure improvements. Skeletal, on-site infrastructure improvements include various graded roadways (paved and unpaved) and several in-line storage basins. Flow in excess of storage basin capacity is typically conveyed downstream via a combined above-grade drop inlet and culvert structure. Further discussion regarding storage basins and outlet structures is provided in Section 6. In addition, discussion regarding the proposed drainage structures is provided in Section 3.5 of the *Approved MDP*.

1.4.2 Section 404 Washes

A jurisdictional delineation of Waters of the U.S. (WUS) was performed as part of the currently approved master drainage plan. This is discussed in Section 4.0 of the *Approved MDP*.

2 Existing Conditions and Characteristics

For this Master Drainage Plan amendment, the existing condition is considered unaltered, natural Sonoran Desert as documented in the *Approved MDP*. Hydrologic and hydraulic modeling of the existing condition is discussed in Sections 4 and 5, respectively. Photographs of the project site are provided on the attached **DVD**. In addition, photograph locations are provided in shape file format, also located on the attached **DVD**.

2.1 Existing On-Site Conditions and Characteristics

2.1.1 General Description

The proposed Sereno Canyon Spa and Resort is located in the northern planning section of the City of Scottsdale. The site can be characterized as typical Sonoran Desert landscape with small to mid-sized drainages. The project site lies within an area identified as Environmentally Sensitive Lands (ESL) by the City. The site is further classified as Upper Desert within the ESL designation.

On-site elevations range from about 2,890 feet at the highest hill located along the southern boundary of the site to 2,670 feet at the northeast corner of the site.

Vegetation is typical Sonoran-Desert-types with creosote bush, cholla and saguaro cacti, palo verde, ironwood and mesquite trees.

According to the Natural Resource Conservation Services' *Aguila-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties Soil Survey*, the project site is comprised solely of the Gran-Wickenburg soil type (Map Unit 61). However, on-site rock outcroppings do exist. A soils map (**Exhibit B-1**) is provided in Appendix B. The engineering properties for the Gran-Wickenburg soil type are provided in Appendix C.

Existing condition topography and aerial photography for the on-site area is provided on the Existing Drainage Condition exhibit (**Exhibit B-2**), provided in Appendix B.

2.1.2 Small to Mid-Sized Drainages

Small drainages are defined as v-shaped swales having no "sandy channel bottom". Mid-sized drainages are defined by relatively well entrenched channels with a defined "sandy channel bottom"; however, "sandy channel bottoms" are typically less than three feet in width. A well defined ridge line transects the project site in a north-south direction, directing flow either east or west. Slopes of small and mid-size drainages range approximately between 2.5 percent to 4.5 percent. On-site drainages are discussed in more detail in Sections 4 and 5. In addition, on-site drainages are shown on the Existing Drainage Condition exhibit (**Exhibit B-2**), provided in Appendix B.

2.2 Existing Off-Site Contributing Area

The off-site contributing area is comprised of undeveloped Sonoran Desert. The headwaters originate from the northern end of the McDowell Mountains. Similar to the vegetation and soil conditions described above, vegetation is typical of the Sonoran-Desert-type and soils are comprised of the Gran-Wickenburg soil type (Map Units 61 and 63). A soils map (**Exhibit B-1**) is

provided in Appendix B. The engineering properties for the Gran-Wickenburg soil type are provided in Appendix C.

If development is to occur within the off-site contributing area, it will be the responsibility of these developments to maintain the pre-development flow conditions at the Sereno Canyon Development boundary.

Existing condition off-site topography and aerial photography are shown on **Exhibit B-2**, located in Appendix B.

3 Proposed Master Drainage Plan Concept

Discussion regarding hydrologic and hydraulic modeling of the proposed condition is provided in Sections 4 and 5, respectively. Discussion regarding stormwater storage is provided in Section 6.

3.1 Proposed Land-Use

As discussed in Section 1.3.1, the following primary land-uses are being proposed for the Sereno Canyon Development: Estate Residential, Large Lot Residential, Medium Lot Residential and Resort/Townhouse Residential. A brief description of each land-use is provided below. Additional discussion regarding land-use hydrologic properties is provided in Section 4. The proposed land-use plan for the Sereno Canyon Development is provided in Appendix A. In addition, the proposed land-use plan is shown on **Exhibit B-9**, located in Appendix B.

3.1.1.1 Estate Lot Residential

Estate lot residential land-use will consist of a single family residence located on lots ranging in size from one acre to five acres. The City land-use code associated with this development is R1-130. The comparable FCDMC land-use code is LU 120.

3.1.1.2 Large Lot Residential

Large lot residential land-use will roughly consist of one resort-style villa unit per acre-sized lot. The City land-use code associated with this development is R1-43. The comparable FCDMC land-use code is LU 130.

3.1.1.3 Medium Lot Residential

Medium lot residential land-use will roughly consist of two resort-style casita units per acre. The City of Scottsdale (City) land-use code associated with this development is R1-18. The comparable FCDMC land-use code is LU 140.

3.1.1.4 Resort/Townhouse Residential

The resort/townhouse residential land-use will roughly consist of small, resort-style duplex units serviced by golf cart paths rather than streets. The City land-use code associated with this development is R-4R. A similar FCDMC land-use code; however slightly modified by increasing the area of percent impervious (40% to 60%) and decreasing the area of vegetative cover (50% to 40%), would be LU 160 (See Section 4.1.3.2).

3.2 Existing Drainages

The proposed master drainage plan concept for the Sereno Canyon Development allows existing drainages to be maintained in their natural location and condition where possible. Under the plan, flow enters and exits the project site at historic locations. In addition, flow exiting the project site will not adversely impact downstream property owners through increases in peak discharge, volume or velocity.

3.3 Roadway Runoff

Roadway runoff will be conveyed according to the City's *Design Standards and Policy Manual.* Curb openings and/or storm drain outlets will be located at wash crossings. Additional discussion regarding roadway runoff is provided in Section 3.1 of the *Approved MDP.*

3.4 Stormwater Storage Requirement (On-Site Retention)

Stormwater storage basins are shown graphically on the Proposed Drainage Condition exhibit (**Exhibit B-3**), provided in Appendix B. The stormwater storage basins shown on **Exhibit B-3** - as a single closed line - represent a required area necessary to meet the stormwater storage volume requirements. The stormwater storage basins shown on **Exhibit B-3** do not reflect the final design grading of any retention basins. Final design and grading of retention basins will be completed during more detailed site development phasing. Therefore, the shape, precise location, configuration and depths of the stormwater storage basins shown on **Exhibit B-3** will be modified as more detailed design of the Sereno Canyon Development takes place under future phasing. The lines shown represent a calculated estimate of the basin footprint, but cannot be assumed to be identical to the final basin designs which will be completed with the phased final design of the site.

3.4.1 100-Year, 2-Hour Stormwater Storage Volume

As discussed in the *Approved MDP*, 100-year, 2-hour stormwater storage is provided for runoff from the improved areas within the overall project site. This approach to stormwater mitigation is consistent with Section 4-1.807 of the City's *Design Standards and Policy Manual*, which states that the Modified Rational Method is the only acceptable method for determining the required stormwater storage volume. The equation for the Modified Rational Method is as follows:

$Vr = (P/12)/A \cdot C$

Vr = Required storage volume in acre-feet.

P = Precipitation amount, equal to the depth of the 100-year, 2-hour rainfall.

A = Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.

C = Runoff coefficient, Rational Method values.

According to NOAA Atlas 14 rainfall data obtained from the City-approved DDMSW program, the 100-year, 2-hour rainfall for the project site is approximately 2.7 inches. Additional discussion regarding C-values is provided in Section 6. Required stormwater storage volume calculations are provided in Appendix E.

3.4.2 Stormwater Storage Facilities

In accordance with the *Approved MDP*, the required 100-year, 2-hour stormwater storage volume (Section 6) is retained through the use of in-line storage basins. In-line storage basins are located within significant drainages at the following locations:

1. Roadway crossings.
2. Just upstream of development boundaries.
3. Locations where preliminary grading of basins has occurred.

Flows routed through the in-line storage basins are metered by the use of outlet structures, which will typically be designed as either a weir structure or elevated drop inlet structure. Proposed drainage structures are discussed in additional detail in Section 3.5 of the *Approved MDP*.

3.5 Existing Condition Runoff vs. Proposed Condition Runoff

Stormwater storage facilities (Section 3.4.2) have been sized to meet the required stormwater storage volume for the 100-year, 2-hour storm event, as well as to ensure post-development discharges do not adversely impact downstream property owners.

4 Hydrologic Analyses

4.1 Hydrologic Procedures, Parameter Selection and Assumptions

Rainfall runoff modeling was accomplished using the U.S. Army Corps of Engineers HEC-1 computer program, version 4.1. Both existing condition and proposed condition HEC-1 models were developed based on guidelines presented in the City's *Design Standards and Policy Manual* (January 2010) and FCDMC *Hydrology Drainage Design Manual for Maricopa County, AZ* (*FCDMC Hydrology Manual*). In addition, the Drainage Design Management System (DDMS, version 4.6.0) program provided by FCDMC was used to develop the HEC-1 model framework.

HEC-1 models were developed for the 2-, 10- and 100-year, 6-hour events. HEC-1 model identification is provided below in Table 4-1. Additional discussion regarding HEC-1 model input and development is provided below.

Table 4-1. HEC-1 Model Identification

HEC-1 Model	Condition and Storm Event
Sereno_EX_2_6.dat	Existing Condition 2-Year, 6-Hour
Sereno_EX_10_6.dat	Existing Condition 10-Year, 6-Hour
Sereno_EX_100_6.dat	Existing Condition 100-Year, 6-Hour
Sereno_DEV_2_6.dat	Developed Condition 2-Year, 6-Hour
Sereno_DEV_10_6.dat	Developed Condition 10-Year, 6-Hour
Sereno_DEV_100_6.dat	Developed Condition 100-Year, 6-Hour

4.1.1 Design Storm Events

Per the City's *Design Standards and Policy Manual*, hydrologic modeling was completed for the 2-, 10- and 100-year, 6-hour design storm events. Maximum rainfall values for the project area were determined using DDMS and are listed below in Table 4-2.

Table 4-2. Maximum Design Storm Rainfall Values.

Design Storm	Maximum Rainfall Value
2-Year, 6-Hour	1.4 inches
10-Year, 6-Hour	2.1 inches
100-Year, 6-Hour	3.2 inches

The existing condition and proposed condition HEC-1 models use the depth/area record (HEC-1 ID = JD) and cumulative precipitation time series (HEC-1 ID = PC) to simulate the rainfall depths, area reduction and rainfall distributions as outlined in the *FCDMC Hydrology Manual*.

HEC-1 rainfall distribution (HEC-1 PC Record) and depth/area relationships (HEC-1 JD Record) were computed using DDMS.

4.1.2 Subbasin Boundaries

Project specific, on-site, 1-foot contour topography and proposed roadway alignments were used to delineate existing condition and proposed condition subbabasins within the Sereno

Canyon Development. Existing condition and proposed condition subbasin boundaries coincided for a straightforward, direct comparison of pre- versus post-development discharges. Downstream subbasin limits are typically defined by a roadway alignment, multi-stream convergence location, proposed stormwater storage basin location and/or project boundary.

Off-site subbasin boundaries also coincide and were delineated using 2-foot contour topography.

Subbasin boundaries are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B.

4.1.3 Land-Use

4.1.3.1 Existing Condition

The existing condition land-use within the Sereno Canyon Development is natural, unaltered Sonoran Desert landscape. Hydrologic characteristics of the existing condition land-use, applicable for HEC-1 modeling, are listed below in Table 4-3.

Table 4-3, Existing Condition Land-Use Hydrologic Characteristics.

Land-Use Description	City Land-Use Code	FCDMC Land-Use Code	IA	RTIMP	Veg Cover	DTHETA	Kb
Passive Open Space (Mountain Preserve and Washes	Open Space	730	0.10	0%	90%	Normal	Hi

4.1.3.2 Proposed Condition

As discussed above in Section 3.1, the following primary land-uses are being proposed for the Sereno Canyon Development: Estate Residential, Large Lot Residential, Medium Lot Residential and Resort/Townhouse Residential. Hydrologic characteristics of the proposed land-use types, applicable for HEC-1 modeling, are listed below in Table 4-4. Proposed land-use types are provided in Appendix A. In addition, proposed land use types are shown on **Exhibit B-9**, provided in Appendix B.

Table 4-4. Proposed Land-Use Hydrologic Characteristics.

Land-Use Description	City Land-Use Code	FCDMC Land-Use Code	IA	RTIMP	Veg Cover	DTHETA	Kb
Medium Lot Residential - Single Family (2 DU per acre)	R1-18	140	0.25	30%	50%	Normal	Min.
Large Lot Residential - Single Family (1 DU per acre)	R1-43	130	0.30	15%	50%	Normal	Min.
Estate Residential (1/3 DU per acre to 1 DU per acre)	R1-130	120	0.30	5%	30%	Normal	Min.
Resort/Townhouse Residential District	R-4R	165 (Custom)	0.25	60%	40%	Normal	Min.
General Transportation	Road	605 (Custom)	0.10	100%	0%	Normal	Min.

Notes:
1. DU = Dwelling Unit
2. IA = Initial Abstraction
3. RTIMP = Percent Impervious
4. DTHETA = Antecedent Moisture Condition
5. Kb = Resistance Coefficient

4.1.4 Soils

Soils information was obtained from the Natural Resource Conservation Services' *Soil Survey for Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona*. On- and off-site soils are comprised on the Gran-Wickenburg soil type. The on-site soil type is identified as Map Unit 63. The off-site soil types are identified as Map Units 61 and 63. A soils map (**Exhibit B-1**) is provided in Appendix B. The engineering properties for the Gran-Wickenburg soil type are provided in Appendix C.

4.1.5 Rainfall Losses (Infiltration)

Rainfall losses, for both existing condition and proposed condition, were based on the Green and Ampt Infiltration Equation, as outlined in the *FCDMC Hydrology Manual*.

Infiltration is a function of ground surface characteristics, soil characteristics and land management practices. Green and Ampt infiltration calculations require the estimation of the following five parameters:

1. Initial Surface Retention Loss (HEC-1 ID = IA);
2. Hydraulic Conductivitiy (HEC-1 ID = XKSAT);
3. Wetting Front Capillary Suction (HEC-1 ID = PSIF);
4. Volumetric Soil Moisture Deficit (HEC-1 ID = DTHETA); and
5. Percent of Impervious Area within Subbasin (HEC-1 ID = RTIMP).

Rainfall loss parameter computations were made with DDMS. DDMS output tables are provided in Appendix C.

4.1.6 Clark Unit Hydrograph

The Clark Unit Hydrograph calculation, per the *FCDMC Hydrology Manual*, was utilized to compute existing condition and proposed condition peak discharges and volumes at select concentration points. Clark Unit Hydrograph parameters include the time of concentration (T_c), storage coefficient (R) and time-area relation. T_c and R values were computed using DDMS.

4.1.6.1 Time of Concentration

The time of concentration (T_c) for use with the Clark Unit Hydrograph is estimated using the following equation from the *FCDMC Hydrology Manual*:

$$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

T_c = time of concentration.
L = length of hydraulically longest flow path (miles).
S = watercourse slope (feet/mile).
K_b = representative watershed resistance coefficient.
i = average rainfall excess intensity (inches/hour).

Solution for the T_c equation is an iterative process and dependent on i, and was accomplished using the FCDMC's DDMS computer program. The T_c equation parameters L and S are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B. Existing condition and proposed condition subbasin T_c values are provided in the DDMS output tables, provided in Appendix C.

4.1.6.2 Storage Coefficient

The Clark Unit Hydrograph storage coefficient (R) is estimated using the following equation:

$$R = 0.37T_c^{1.11}A^{-0.57}L^{0.80}$$

T_c = time of concentration.
A = drainage area (square miles).
L = length of hydraulically longest flow path (miles).

The R equation parameters A and L are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B. Existing condition and proposed condition subbasin R values are provided in the DDMS output tables, provided in Appendix C.

4.1.6.3 Time-Area Relation

A dimensionless time-area relation of contributing are versus travel time to subbasin outlet is required for the Clark Unit Hydrograph procedure. Because the Sereno Canyon Development is focused on open space and maintaining the natural Sonoran Desert landscape, the Natural

Watershed time-area relation was used for both the HEC-1 modeling of existing and proposed conditions.

4.1.7 Flood Hydrograph Routing

Flood hydrograph routing was performed using the storage routing record (HEC-1 Record = RS) for both channel and reservoir (stormwater storage basin) routing in HEC-1.

4.1.7.1 Channel Routing

HEC-1 normal depth channel routing was used to model the natural desert drainages found within the Sereno Canyon Development. Normal depth channel routing accounts for the time lag and peak flow attenuation of the flood hydrograph. Peak flow attenuation is accomplished through channel storage, which is defined from the following channel characteristics:

1. Eight-point cross-section.
2. Manning's roughness coefficient.
3. Routing reach length.
4. Routing reach slope.

In addition, normal depth routing with HEC-1 requires calculation of the reach storage routing step number (HEC-1 ID = NSTPS), which was computed for each storm event using the FCDMC's DDMS program.

HEC-1 channel routing characteristics are provided in Appendix C.

4.1.7.2 Reservoir (Stormwater Storage Basin) Routing

Reservoir (stormwater storage basin) routing of flow was accomplished with HEC-1 through the use of a stage-storage-discharge relationship (HEC-1 IDs = SE, SV and SQ, respectively). Reservoir routing is only used during hydrologic analysis of the proposed condition to account for flow through stormwater storage basins. Reservoir routing with HEC-1 requires use of a reach storage routing step number (HEC-1 ID = NSTPS) equal to one. Calculations for development of the stage-storage-discharge relationship are provided in Appendix E.

4.1.8 HEC-1 Model Arrangement

HEC-1 subbasin, flood hydrograph routing and combination steps have been assembled to reflect the existing condition and proposed condition model logic that is shown on the HEC-1 schematics (**Exhibits B-5**), provided in Appendix B. HEC-1 simulation logic proceeds downstream until a final concentration point is reached, which is located at the project boundary.

The HEC-1 time specification record (HEC-1 Record = IT) is used to define the number of minutes in the tabulation interval (HEC-1 ID = NMIN) at which peak discharges are computed for each flood hydrograph ordinate, and the number of hydrograph ordinates (HEC-1 ID = NQ) to be computed. The existing condition and proposed condition HEC-1 models use NMIN and NQ values of 1 minute and 2000 ordinates, respectively.

The HEC-1 time interval for input data (HEC-1 Record = IN) is used to define the number of minutes (HEC-1 ID = JMIN)) in each rainfall distribution (HEC-1 ID = PC) tabulation interval. Based on the 6-hour design storm duration, an IN value of 15 minutes was utilized.

4.2 HEC-1 Modeling Results

Existing condition and proposed condition peak discharges were compared to verify the existing condition (pre-development) versus proposed condition (post-development) criteria was met along the project boundary.

Incorporating the 100-year, 2-hour stormwater retention requirement (see Section 6) into the HEC-1 modeling substantially reduces the post-development peak discharge at various locations. At some locations, the required stormwater retention resulted in over a 50 percent reduction of peak discharge. This large reduction is attributed to the difference in hydrologic calculation/computation methodologies for retention requirements and general hydrologic modeling (HEC-1). Rainfall runoff modeling was completed using HEC-1, while the stormwater storage volume calculation was completed using a modified Rational Equation. Typically when comparing peak flows and runoff volumes, values calculated using the Rational Method are higher than those computed with HEC-1.

As shown at this conceptual level of design, retention basins substantially attenuate flow, which can significantly reduce the discharge within a wash. However, as part of the low-impact design concept for wash corridors, the existing-condition flow conditions are maintained to the maximum extent practicable. Therefore, as the level of design detail and analysis increases for subsequent reports, retention basins will be reassessed. Reassessment will include sizing of basins to adequately meet the low impact design concept, while ensuring no adverse impacts to downstream property owners.

Existing condition and proposed condition discharges at key locations along the project site boundary are listed in Table 4-5 below. Peak discharges for the 100-year, 6-hour design storm, for both existing and proposed conditions, are listed in table format on the Existing Drainage Condition and Proposed Drainage Condition exhibits (**Exhibits B-2** and **B-3**, respectively), located in Appendix B. Existing condition and proposed condition HEC-1 schematics are shown on **Exhibit B-5**, provided in Appendix B. Existing condition and proposed condition HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided in Appendix C. In addition, peak discharges for existing and proposed condition HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided in table format in Appendix C. Existing condition and proposed condition HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided electronically on the attached **DVD**.

The Existing Drainage Condition and Proposed Drainage Condition exhibits (**Exhibits B-2** and **B-3**, respectively) show the 100-year, 6-hour peak flows entering and exiting the site. A comparison of these flows shows that the proposed condition does not significantly increase discharges exiting the Sereno Canyon Development. Sites with minor increases in discharge may be attributed to large offsite contributing areas with minimal contributing area on-site (Subbasin CE01A) or subbasins with minimal contributing area and minimal improvements under the developed condition.

Table 4-5. Existing and Proposed Condition Discharges (100-Yr, 6-Hr) Along Project Site Boundary.

HEC-1 ID	Existing Condition 100-Year, 6-Hour Peak Discharge (cfs)	Proposed Condition 100-Year, 6-Hour Peak Discharge (cfs)	Existing - Proposed (cfs)
CE01A	201	202	-1
CE04A	46	27	19
CE065A	108	54	54
CE11A	49	13	36
CE17A	57	14	43
CE23A	148	77	71
CE24A	60	26	34
CE25A	25	9	16
CW07A	39	29	10
CW09A	101	68	33
CW10A	107	49	58
SBE02A	75	70	5
SBE03A	14	7	7
SBE08A	2	3	-1
SBE09A	6	7	-1
SBE10A	2	3	-1
SBE12A	4	2	2
SBE13A	7	0	7
SBE16A	2	3	-1
SBE18A	2	0	2
SBE19A	3	3	0
SBE20A	3	3	0
SBE21A	2	3	-1
SBE26A	15	5	10
SBE27A	4	0	4
SBE28A	23	9	14
SBE29A	29	27	2
SBW01A	5	5	0
SBW02A	13	12	1

HEC-1 ID	Existing Condition 100-Year, 6-Hour Peak Discharge (cfs)	Proposed Condition 100-Year, 6-Hour Peak Discharge (cfs)	Existing - Proposed (cfs)
SBW04A	5	6	-1
SBW05A	19	16	3
SBW06A	8	5	3
SBW08A	19	12	7
SBW11A	3	3	0
SBW12A	38	35	3
SBW13A	3	3	0
SBW14A	23	23	0

Notes:

1. HEC-1 model subbasins and concentration points are located along project boundary.

5 Hydraulic Analyses

The hydraulic analyses documented in this report are for existing and proposed watershed conditions. The purpose of the hydraulic modeling was to delineate preliminary floodplain boundaries for washes conveying flow in excess of approximately 50 cfs.

Hydraulic modeling was performed for natural wash corridors using the U.S. Army Corps of Engineers HEC-RAS software, version 4.1. Computations are in accordance with the guidelines presented in the City's *Design Standards and Policy Manual* (January 2010) and the FCDMC's *Hydraulics Drainage Design Manual for Maricopa County, AZ* (*FCDMC Hydraulics Manual*). In addition, HEC-RAS models were developed using HEC-GeoRAS software, which is an extension for use with ArcGIS and was developed through a Cooperative Research Agreement between the USACE Hydrologic Engineering Center and ESRI Inc.

It is the intent of the Sereno Canyon Development to provided assurance that for subsequent design of drainage facilities, a low impact approach will be implemented and maintained within the natural wash corridors. As mentioned above the required stormwater storage facilities substantially reduce discharges within the natural washes.

HEC-RAS model output tables and cross-sections are provided in Appendix D. Location of modeled washes are shown on the Existing Drainage Condition and Proposed Drainage Condition exhibits (**Exhibit B-2** and **B-3**, respectively), located in Appendix B. A HEC-RAS cross-section overview is shown on **Exhibit B-6**, provided in Appendix B. HEC-RAS models are provided electronically on the attached **DVD**.

5.1 HEC-RAS Models

HEC-RAS model file names and general descriptions of each model are provided below. Model names match the HEC-1 subbasin name at the wash outflow location.

- SBE01A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE02A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE04A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE05A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE11A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE17A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE23A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBE24A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBW09A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.
- SBW10A.prj; existing and proposed condition, 100-year, 6-hour peak discharge.

5.2 Topography

Existing condition, project specific, on-site, 1-foot contour topography was used for development of a digital terrain model (DTM), which was then used to cut HEC-RAS cross-sections with HEC-GeoRAS. It should be noted that points and break lines were not provided to JEF with the topography.

5.3 Steady Flow Data

HEC-RAS models were developed for existing and proposed conditions using 100-year, 6-hour peak discharges (see Section 4).

5.4 Boundary Conditions

HEC-RAS model boundary conditions were established as normal depth, with the normal depth slope calculated based upon the project topography.

5.5 Flow Regime

A sub-critical flow regime was used for HEC-RAS modeling of the existing and proposed conditions. A sub-critical flow regime was selected for computation of "conservative" water surface elevations.

5.6 Development of HEC-GeoRAS Import Files

HEC-GeoRAS is an extension for use with ArcGIS and was developed through a Cooperative Research Agreement between the USACE Hydrologic Engineering Center and ESRI Inc. This tool has been designed to process geospatial data for HEC-RAS model development based on a digital terrain model (DTM) and complementary data sets. Conversely, this tool is also capable of exporting model results for use in ArcGIS processing. The HEC-GeoRAS import file applicable for this project include:

- Stream centerline.
- Cross-sectional cut lines.
- Bank stations.
- Flow Path Centerlines.
- Cross-section roughness coefficients (Manning's n-Values).
- Levee locations.

5.6.1 Stream Centerline

The stream centerline defines the predominant center of flow during an event. Typically this line is identified by a stream's thalweg. For HEC-RAS modeling of existing and proposed conditions, the stream centerline was typically taken as the approximate center of the predominant channel conveying the 100-year, 6-hour peak discharge.

5.6.2 Cross-Sectional Cut Lines

Based on the stream centerline and a project DTM, a cross-section cut line defines a section's geometry, length, location (River Station), and alignment to the flow. This cross-section information is processed by HEC-GeoRAS and converted to HEC-RAS format. Cross-section river

stations are based on river-feet distances, and start at zero at the downstream limit and increases upstream based upon the length along the stream centerline.

For HEC-RAS modeling of existing and proposed conditions, a sufficient number of cross-sectional cut lines were placed to reflect changes in channel geometry, profile and roughness. In addition, cross-sectional cut lines were typically spaced close together due to relatively steep channel slopes. Cross sections were spaced at approximately 20-foot intervals. Given the project's intent to maintain natural wash corridors, cross-section locations, alignments and geometries are coincidental for existing and proposed conditions.

Proposed retention basins were not modeled in the proposed-condition models as their precise geometry and configuration is not known. During future design phases and for easement declaration purposes, retention basin grading will be incorporated into the cross-sectional information.

5.6.3 Bank Stations

For HEC-RAS modeling of existing and proposed conditions, bank station locations were selected coincident to the right and left flowpath locations (see section 5.6.4).

5.6.4 Flow Path Centerlines

Flow path centerlines are used to define the hydraulic flow path in the left overbank, main channel, and right overbank by identifying the center-of-mass of flow within these areas. Downstream reach lengths are calculated for each cross-sectional cut line based on the distance between cut lines along the flow path centerlines.

5.6.5 Cross-Section Roughness Coefficients (Manning's n-Value)

Roughness coefficients represent the resistance to flow in channel and overbank areas. HEC-RAS accounts for this roughness by use of the Manning's n-value (n-value). The n-value is determined from the values of the factors that affect the roughness, such as vegetation type and density, bed material and channel irregularities. **Manning's n-values assumed for the sandy channel bottoms and vegetated overbanks typical of Sereno Canyon Development washes are 0.039 and 0.060, respectively.** Photographs of typical washes are provided below. Additional site visit photographs and photograph locations (shape file format) are provided on the attached **DVD**. Manning's n-value calculations are provided in Appendix D. Manning's n-values were delineated based upon 2007 Natural Resources Conservation Service (NRCS) National Agricultural Imagery Program (NAIP) 1-m resolution aerial imagery. A shape file with these Manning's n-value areas is also provided on the attached **DVD**.

5.6.6 Levees

Levees were used to prevent the routing of flow in portions of a cross-section not applicable to the true conveyance. For example, levees were placed at the tops of ridges defining separate conveyance corridors.

5.7 HEC-RAS Modeling Results

As discussed above, the hydraulic analyses documented in this report are for existing and proposed watershed conditions. The purpose of the hydraulic modeling was to delineate floodplain boundaries for washes conveying flow in excess of approximately 50 cfs. Floodplain boundaries are shown on the Existing Drainage Condition and Proposed Drainage Condition exhibits (**Exhibit B-2** and **B-3**, respectively), located in Appendix B. In addition, HEC-RAS model output tables and cross-sections are provided in Appendix D. HEC-RAS models are provided electronically on the attached **DVD**.

Due to hydraulically steep project topography, the modeled washes default to critical depth at many cross-sections. This behavior suggests that a sub-critical flow regime is not realistic for real-world conditions; however, the sub-critical flow regime generates a more conservative water surface elevation and floodplain limit than use of a mixed flow regime. For final hydraulic design of structures, revetment and other engineered features, use of a mixed-flow regime is recommended.

Photograph 5-1. Example of Typical Sereno Canyon Development Wash.

Photograph 5-2. Example of Typical Sereno Canyon Development Wash.

6 Stormwater Storage

Additional discussion regarding the approach to stormwater storage within the Sereno Canyon Development is provided in Sections 3.3 and 3.5 of the *Approved MDP*. The stormwater storage basins will be further assessed during subsequent, more detailed design phases of the Sereno Canyon Development. The storage volumes and basin configurations and locations presented within this report have been estimated using the best available information and a series of assumptions as outlined below.

6.1 Required Volume

As discussed in Section 3.4, according to the City's *Design Standards and Policy Manual*, the 100-year, 2-hour runoff volume is to be retained on-site. Calculation of this volume is to be made using the following Modified Rational Equation (see Section 4-1.807 of City's *Design Standards and Policy Manual*):

$Vr = (P/12)/A \cdot C$

Vr = Required storage volume in acre-feet.

P = Precipitation amount, equal to the depth of the 100-year, 2-hour rainfall.

A = Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.

C = Runoff coefficient, Rational Method values.

Additional discussion regarding the variables in the above equation is provided below. Stormwater storage volume calculations are provided in Appendix E. Stormwater storage basins are shown graphically on the Proposed Drainage Condition exhibit (**Exhibit B-3**), located in Appendix B.

6.1.1 Precipitation

Based on NOAA Atlas 14 data, the 100-year, 2-hour maximum point precipitation value within the Sereno Canyon Development is 2.7 inches.

6.1.2 Disturbed Area per Land-Use Type and Associated Runoff Coefficient (C-Value)

Disturbed areas are accounted for in the calculation of stormwater storage volumes. If disturbed areas per land-use type were not known, areas of disturbance were assumed based on assessment of similar land-use developments within northern Scottsdale and engineering judgment.

Runoff coefficients for the 100-year storm (C-values) were assigned per disturbed area within a land-use type. For example, only building envelope areas within a parcel were considered to be disturbed for areas within the Estate Lot Residential land-use; and therefore, the assigned C-value for this reduced land-use area does not account for the undisturbed natural landscape. As a result, this C-value for the disturbed area within the Estate Lot Residential land-use is higher

than a C-value obtained from a standard Runoff Coefficient Table. The C-value obtained from a standard Runoff Coefficient Table would be lower to account for undisturbed areas.

Runoff coefficients associated with the disturbed areas within each land-use type are listed below in Table 6-1. Additional discussion regarding disturbed area per land-use and associated C-values is also provided below. A Land-Use C-Value Overview exhibit (**Exhibits B-7**) is located in Appendix B.

Table 6-1. Runoff Coefficient Associated with Disturbed Area Land-Use Types.

Land-Use Description	City of Scottsdale Land-Use Code	Runoff Coefficient
Resort Casita – Medium lot residential, single family (2 dwelling units per acre).	R1-18	0.64
Resort Villa – Large lot residential, single family (1 dwelling unit per acre).	R1-43	0.95
Resort Estates – Estate residential, (1/3 dwelling unit to 1 dwelling unit per acre).	R1-130	0.70
Spa/Resort – Resort/townhouse residential district	R-4R	0.75
Roadway – General Transportation	Road	0.95

6.1.2.1 Estate Lot Residential

Estate lot residential land-use will consist of a single family residence located on lots ranging in size from one acre to five acres. The City land-use code associated with this development is R1-130.

Areas considered for calculation of stormwater storage volumes (disturbed areas) were identified by the building envelopes provided as part of the overall land-use plan. Building envelopes are shown on the Land-Use C-Value Overview and Disturbed Areas Composite C-Values exhibits (**Exhibits B-7** and **B-8**, respectively), located in Appendix B.

Because the disturbed area taken into consideration is limited to the building envelope area (the undisturbed natural landscape was not accounted for in the area, A), a C-value of 0.70 was assigned to the disturbed portion of the Estate Lot Residential land-use.

6.1.2.2 Large Lot Residential

Large lot residential land-use will roughly consist of one resort-style villa unit per acre-sized lot. The City land-use code associated with this development is R1-43.

Because no detailed land-use plan or lot layout has been developed at the time of this MDP amendment submittal, it was assumed that 50 percent of any parcel area within the Large Lot Residential land-use area would be impervious. Therefore, only this impervious, contributing area for this land-use was used for calculation of the Composite C-Value, which is required for stormwater storage volume calculation per subbasin area (see Section 6.1.3 and example

calculation provided in Appendix E). It was further assumed that this impervious, contributing area has a C-value of 0.95.

6.1.2.3 Medium Lot Residential

Medium lot residential land-use will roughly consist of two resort-style casita units per acre. The City land-use code associated with this development is R1-18.

Because no detailed land-use plan or lot layout has been developed at the time of this MDP amendment submittal, the Medium Lot Residential land-use was accounted for as a whole. The C-value for this land-use, 0.64, was taken directly from Figure 4.1-4 of the City's *Design Standards and Policy Manual*.

6.1.2.4 Resort/Townhouse Residential

The resort/townhouse residential land-use will roughly consist of small, resort-style duplex units serviced by golf cart paths rather than streets. The City land-use code associated with this development is R-4R.

Because no detailed land-use plan or lot layout has been developed at the time of this MDP amendment submittal, the Resort/Townhouse Residential land-use was accounted for as a whole. It was assumed that this land-use would be comprised of 60 percent impervious area and 40 percent desert landscaping. According to Figure 4.1-4 of the City's *Design Standards and Policy Manual*, the corresponding impervious area and desert landscaping C-values are 0.95 and 0.45, respectively. The resulting composite land-use C-value is 0.75.

6.1.3 Composite C-Value Calculation for Required Stormwater Storage Volume

Disturbed area land-use C-values (see Section 6.1.2) were areally weighted, per subbasin, to determine the composite C-value for the calculation of the subbasin's required stormwater storage volume. Areally weighting of C-values was accomplished using ArcGIS. The resulting composite C-values used for stormwater storage volume calculations per subbasin are shown on **Exhibit B-8**, located in Appendix B. Required storage volumes were modeled in proposed condition HEC-1 models as reservoir routing steps (see Section 4.1.7).

As an example stormwater storage volume calculation, the required retention volume calculation for Subbasin SBE23D is provided in Appendix E. This example calculation includes the following land-use types: Roads, Estate Residential and Large Lot Residential. In this example the composite C-value is first calculated and then applied to the subbasin area as a whole.

6.2 Stormwater Storage Facilities

6.2.1 Basins

As discussed in Section 3.4, in accordance with the *Approved MDP*, the required 100-year, 2-hour stormwater storage volume (see Section 6.1) is detained through the use of in-line storage basins. In-line storage basins are located within significant drainages at the following strategic locations:

1. Roadway crossings.
2. Just upstream of development boundaries.
3. Locations where preliminary grading of basins has occurred.

Stormwater storage basins are shown graphically on the Proposed Drainage Condition exhibit (**Exhibit B-3**), provided in Appendix B. The stormwater storage basins shown on **Exhibit B-3** - as a single closed line - represent a required area necessary to meet the stormwater storage volume requirements. This line best reflects the ponded depth of flow at an elevation just below the outlet structure's bottom-of-grate elevation. It should be noted that the stormwater storage basins shown on **Exhibit B-3** do not reflect the final design grading of any retention basins. Final design and grading of retention basins will be completed during more detailed site development phasing. Therefore, the shape, precise location, configuration and depths of the stormwater storage basins shown on **Exhibit B-3** will be modified as more detailed design of the Sereno Canyon Development takes place under future phasing.

6.2.2 Outlet Structures

Flows routed through the in-line storage basins are metered by the use of outlet structures, which will typically be designed as either a weir structure or elevated drop inlet structure. For the purpose of this MDP amendment, outlet structures were assumed to be elevated drop inlet structures having grated inlets. In addition, it was assumed that the grated inlets would be constructed at a slope such that the vertical difference between top- and bottom-of-grate was equal to 1.5 feet. Knowing the 100-year peak discharge for each basin (see Section 4), and assuming a hydraulic head on the grate equal to 1.5 feet, the Weir Equation was used to determine the length of required open area at the bottom-of-grate elevation. Therefore, the required length of open area at the bottom-of-grate elevation was calculated as:

$$L = Q_{100}/(C_{weir} \cdot H^{1.5})$$

L = Required length of open area at the bottom-of-grate elevation.

Q_{100} = The 100-year, 6-hour peak discharge entering the basin.

C_{weir} = Weir coefficient = 2.8.

H = Hydraulic head.

Outlet structures range in height from approximately 3 feet to approximately 6 feet from base to top of grate. Height of structures was based on the following:

- Design objective to minimize grading/excavation within a wash.
- Height of already constructed structures.

Weir equation calculations are provided with the stormwater storage volume calculations in Appendix E.

In addition to the grated outlet, outlet structures will be fitted with a stormwater bleed-off pipe. Bleed-off pipes will be designed during subsequent phases and will ensure the drawdown of ponded water will be in accordance with City criteria. Bleed-off was considered hydrologically insignificant and was not accounted for in HEC-1 modeling.

As part of the subsequent detailed design phases, final outlet structure configurations will be determined, but structures will be designed to accommodate flows such that downstream property owners will not be adversely impacted by an increase in peak discharge. Proposed drainage structures are discussed in additional detail in Section 3.5 of the *Approved MDP*.

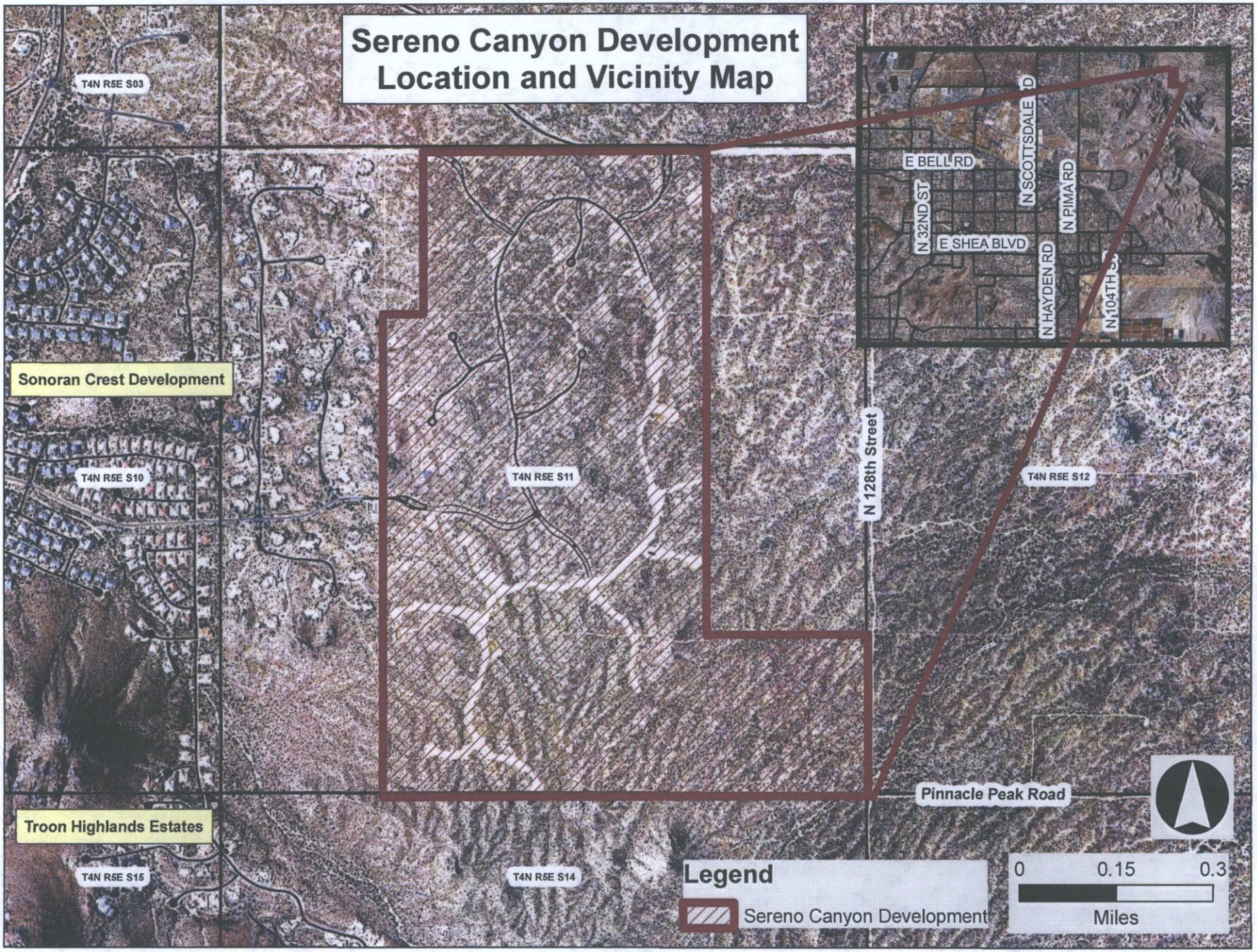
7 Drainage Facility Maintenance

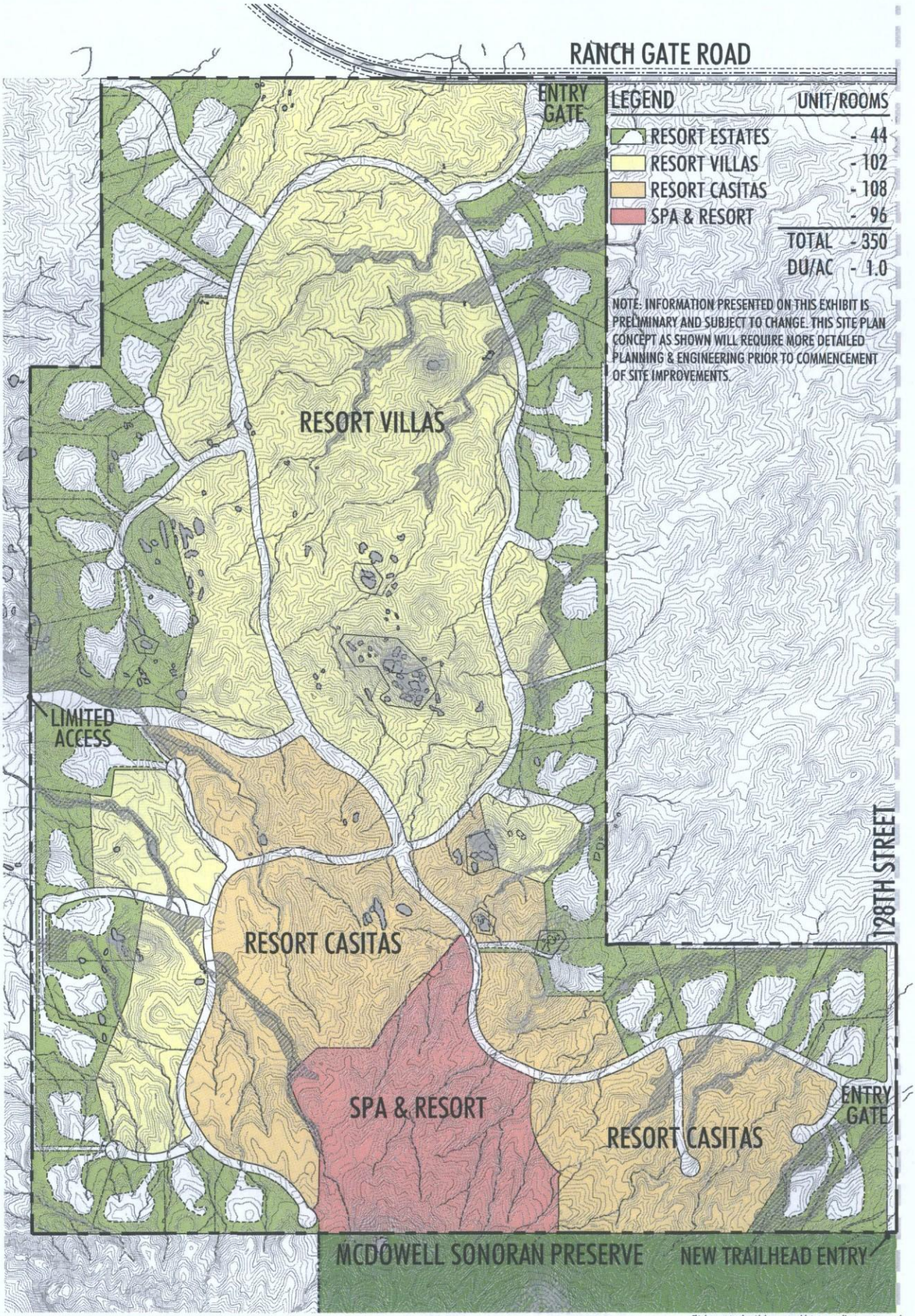
Drainage facilities discussed within the *Approved MDP* and the *Sereno Canyon Master Drainage Plan Amendment* will require maintenance to ensure continued function. A Facility Maintenance Plan will accompany final design of facilities. Maintenance activities will include, but not be limited to, the following:

- Removal of sediment accumulation within stormwater storage basins.
- Repairing of basin sideslopes that have been impacted by rilling form local runoff.
- Maintaining a clear bleed-off pipe at outlet structures.
- Maintain grated inlets at outlet structures.
- Maintaining channel plan, profile and cross-sectional geometry to mitigate against development of unstable channels.

APPENDIX A

Figures


Sereno Canyon Development
Location and Vicinity Map
T4N R5E S03
E BELL RD
N SCOTTSDALE RD
N 32ND ST
N PIMA RD
E SHEA BLVD
N HAYDEN RD
N 104TH ST
Sonoran Crest Development
T4N R5E S10
T4N R5E S11
N 128th Street
T4N R5E S12
Pinnacle Peak Road
Troon Highlands Estates
T4N R5E S15
T4N R5E S14
Legend
Sereno Canyon Development
0
0.15
0.3
Miles



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SERENO CANYON
SPA & RESORT
CONCEPTUAL LAND USE PLAN
SCOTTSDALE, AZ

SCALE: +/- 0' 100' 200' 400'
NORTH
Date: 12-19-2011
Project No: 0425.13
Drawn By: AS
Revised: -

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APPENDIX B

Exhibits

Exhibit B-1

Soils Map

Map Unit Soil ID	Rock Number	Soil Description	XKSAT	Rock Outcrop %
61	645	Gran-Wickenburg complex, 1 to 10 percent slopes	0.15	7%
63	645	Gran-Wickenburg-Rock outcrop complex, 1 to 7 percent slopes	0.14	25%

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400 200 0 400
Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
SOILS DATA

SCOTTSDALE, ARIZONA

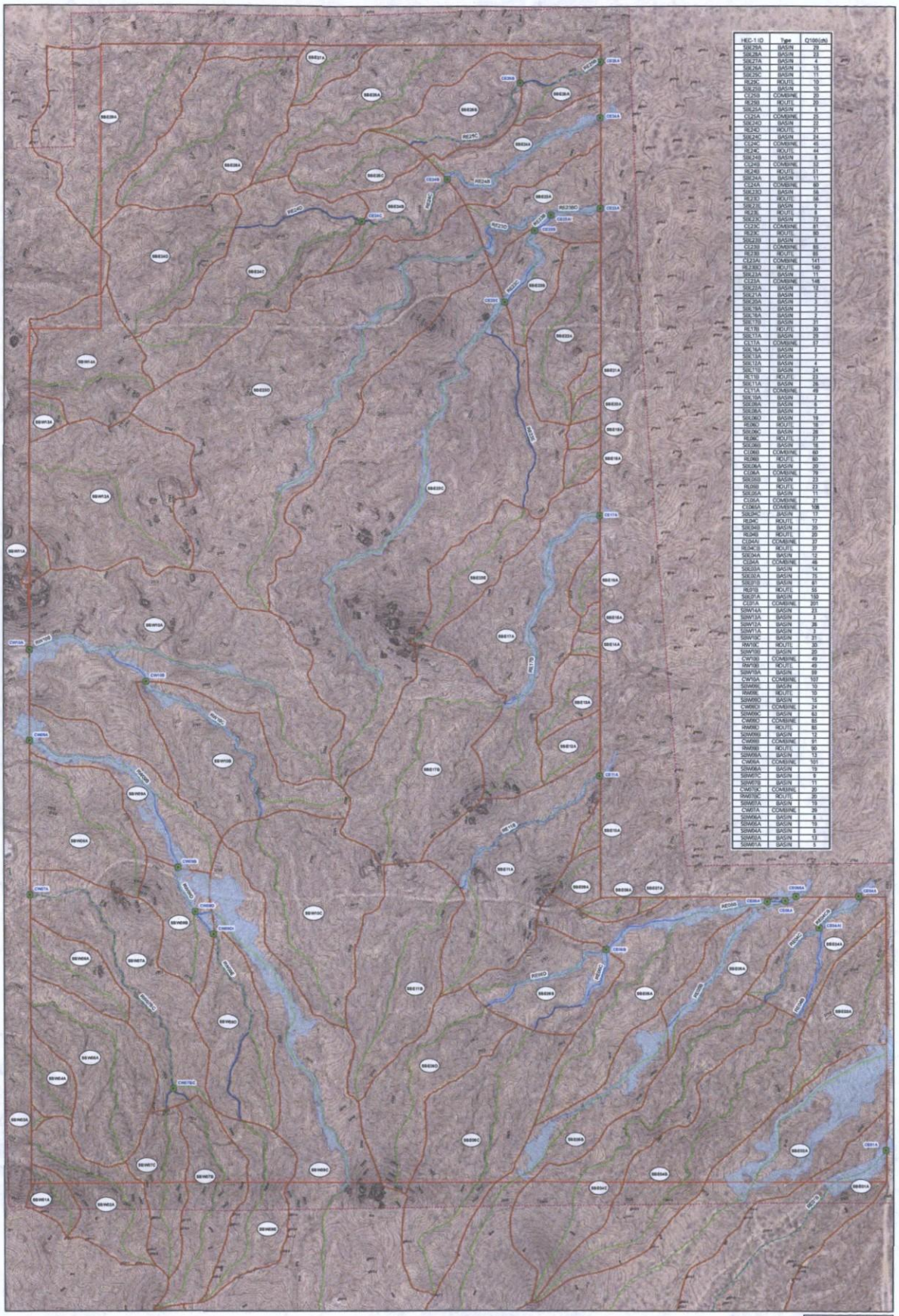
JANUARY 2012

Legend

- Sereno Canyon Project Boundary
- Sub-Basins
- Roads

Exhibit B-2

Existing Drainage Condition



HEC-1 ID	Type	Q100(cfs)
SB29A	BASIN	29
SB28A	BASIN	23
SB27A	BASIN	4
SB26A	BASIN	15
SB25C	BASIN	11
RL25C	ROUTE	10
SB25B	BASIN	10
CL25B	COMBINE	20
RL25B	ROUTE	20
SB25A	BASIN	6
CL25A	COMBINE	25
SB24D	BASIN	22
RL24D	ROUTE	21
SB24C	BASIN	24
CL24C	COMBINE	45
RL24C	ROUTE	44
SB24B	BASIN	6
CL24B	COMBINE	52
RL24B	ROUTE	51
SB24A	BASIN	11
CL24A	COMBINE	60
SB23D	BASIN	55
RL23D	ROUTE	56
SB23E	BASIN	9
RL23E	ROUTE	9
SB23C	BASIN	72
CL23C	COMBINE	81
RL23C	ROUTE	80
SB23B	BASIN	8
CL23B	COMBINE	85
RL23B	ROUTE	86
CL23AA	COMBINE	141
RL23BD	ROUTE	140
SB23A	BASIN	11
CL23A	COMBINE	148
SB22A	BASIN	12
SB21A	BASIN	2
SB25A	BASIN	3
SB19A	BASIN	2
SB16A	BASIN	2
SB17B	BASIN	31
RL17B	ROUTE	30
SB17A	BASIN	28
CL17A	COMBINE	57
SB16A	BASIN	2
SB13A	BASIN	2
SB12A	BASIN	4
SB27B	BASIN	24
RL11B	ROUTE	23
SB11A	BASIN	35
CL11A	COMBINE	49
SB10A	BASIN	2
SB08A	BASIN	5
SB08A	BASIN	7
SB03D	BASIN	19
RL09D	ROUTE	18
SB09C	BASIN	28
RL09C	ROUTE	27
SB09B	BASIN	18
CL09B	COMBINE	80
RL09B	ROUTE	80
SB06A	BASIN	20
CL06A	COMBINE	79
SB05B	BASIN	13
RL09B	ROUTE	22
SB05A	BASIN	11
CL05A	COMBINE	31
CD05A	COMBINE	108
SB24C	BASIN	17
RL24C	ROUTE	17
SB24D	BASIN	20
RL24D	ROUTE	20
CD04A	COMBINE	37
RL04C	ROUTE	37
SB34A	BASIN	12
CD34A	COMBINE	48
SB33A	BASIN	14
SB38A	BASIN	75
SB31B	BASIN	61
RL31B	ROUTE	56
SB31A	BASIN	150
CL31A	COMBINE	201
SBW14A	BASIN	23
SBW13A	BASIN	3
SBW12A	BASIN	28
SBW11A	BASIN	3
SBW10C	BASIN	31
RW10C	ROUTE	30
SBW09B	BASIN	20
CW10B	COMBINE	49
RW10B	ROUTE	49
SBW10A	BASIN	18
CW10A	COMBINE	107
SDM09C	BASIN	10
RM09C	ROUTE	10
SDM09D	BASIN	15
CW09D	COMBINE	24
SDM09C	BASIN	53
CW09C	COMBINE	65
RW09C	ROUTE	65
SDM09B	BASIN	12
CW09B	COMBINE	81
RW09B	ROUTE	80
SDM09A	BASIN	13
CW06A	COMBINE	101
SDM08A	BASIN	13
SBM07C	BASIN	9
SBW07B	BASIN	11
CW07BC	COMBINE	20
RW07BC	ROUTE	20
SDM07A	BASIN	19
CW07A	COMBINE	39
SDM06A	BASIN	6
SDM05A	BASIN	5
SBM04A	BASIN	13
SDM01A	BASIN	1

Aerial Imagery dated 2007

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200 100 0 200 Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
EXISTING CONDITION DRAINAGE EXHIBIT

SCOTTSDALE, ARIZONA

JANUARY 2012

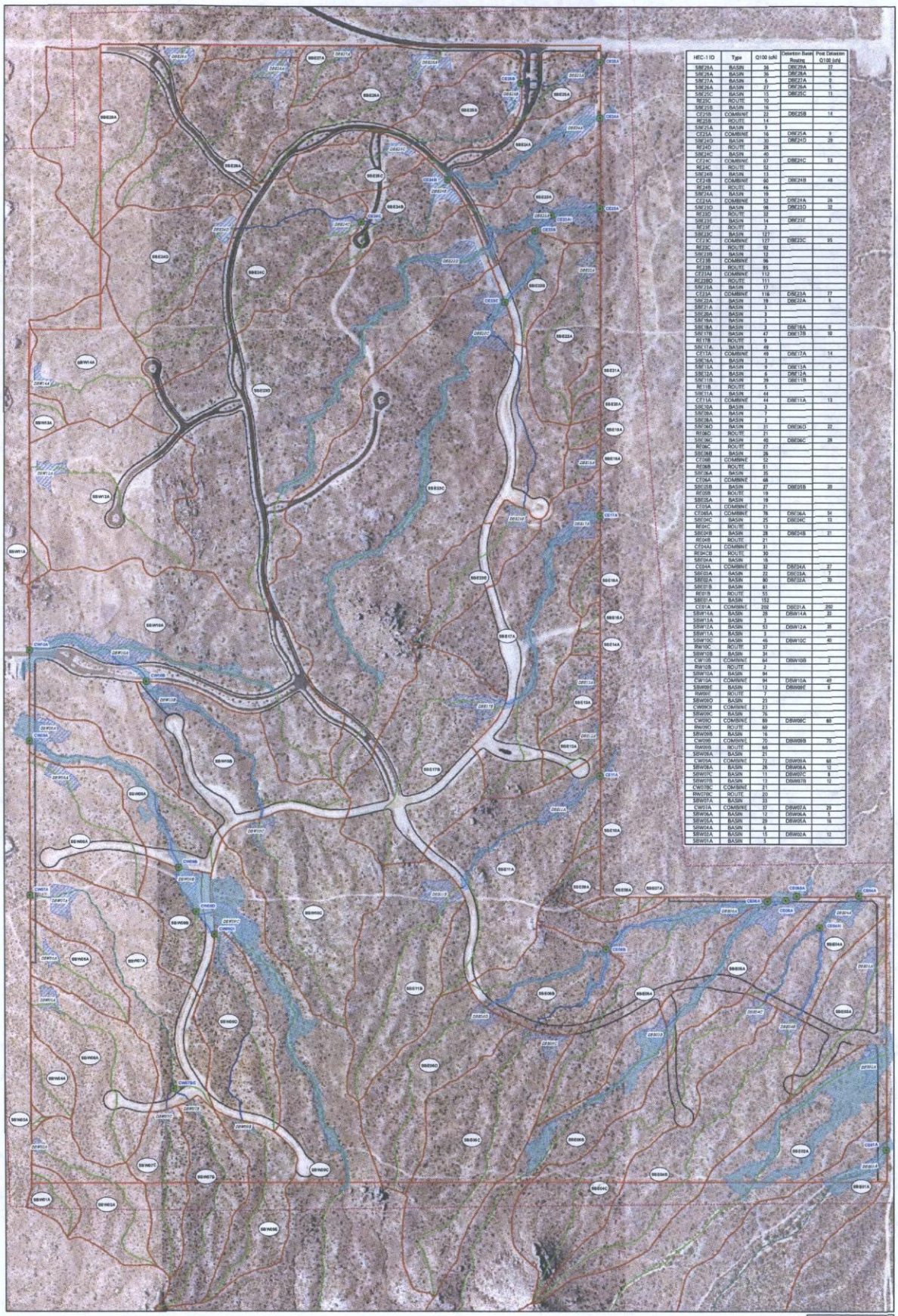
Legend

- Concentration Points
- Existing Floodplains
- Sub-Basins
- 1-Foot Contour Interval Limits
- Sereno_Canyon_Project_Boundary

Sub-Basin Flowline
Type
- Route
- TC
- TC and Route

Exhibit B-3

Proposed Drainage Condition



HEC-11D	Type	Q100 (cfs)	Detention Basin Routing	Post Detention Q100 (cfs)
SBE29A	BASIN	36	DBE29A	27
SBE28A	BASIN	36	DBE28A	9
SBE27A	BASIN	6	DBE27A	6
SBE26A	BASIN	27	DBE26A	5
SBE25C	BASIN	15	DBE25C	11
RE25C	ROUTE	10		
SBE25B	BASIN	16		
CE25B	COMBINE	32	DBE25B	14
RE25B	ROUTE	14		
SBE25A	BASIN	9		
CE25A	COMBINE	16	DBE25A	9
SBE24D	BASIN	30	DBE24D	28
RE24D	ROUTE	28		
SBE24C	BASIN	45		
CE24C	COMBINE	67	DBE24C	53
RE24C	ROUTE	52		
SBE24B	BASIN	13		
CE24B	COMBINE	60	DBE24B	48
RE24B	ROUTE	48		
SBE24A	BASIN	19		
CE24A	COMBINE	52	DBE24A	26
SBE23D	BASIN	98	DBE23D	32
RE23D	ROUTE	32		
SBE23E	BASIN	14	DBE23E	2
RE23E	ROUTE	3		
SBE23C	BASIN	127		
CE23C	COMBINE	127	DBE23C	95
RE23C	ROUTE	92		
SBE23B	BASIN	12		
CE23B	COMBINE	96		
RE23B	ROUTE	85		
CE23AI	COMBINE	112		
RE23BO	ROUTE	111		
SBE23A	BASIN	17		
CE23A	COMBINE	118	DBE23A	77
SBE22A	BASIN	19	DBE22A	5
SBE21A	BASIN	3		
SBE20A	BASIN	3		
SBE19A	BASIN	3		
SBE18A	BASIN	3	DBE18A	0
SBE17B	BASIN	47	DBE17B	10
RE17B	ROUTE	9		
SBE17A	BASIN	49		
CE17A	COMBINE	49	DBE17A	14
SBE16A	BASIN	3		
SBE13A	BASIN	5	DBE13A	0
SBE12A	BASIN	6	DBE12A	2
SBE11B	BASIN	39	DBE11B	6
RE11B	ROUTE	5		
SBE11A	BASIN	44		
CE11A	COMBINE	44	DBE11A	13
SBE10A	BASIN	3		
SBE09A	BASIN	7		
SBE08A	BASIN	1		
SBE06D	BASIN	31	DBE06D	22
RE06D	ROUTE	21		
SBE06C	BASIN	45	DBE06C	28
RE06C	ROUTE	27		
SBE06B	BASIN	28		
CE06B	COMBINE	52		
RE06B	ROUTE	51		
SBE06A	BASIN	35		
CE06A	COMBINE	68		
SBE05B	BASIN	27	DBE05B	20
RE05B	ROUTE	19		
SBE05A	BASIN	19		
CE05A	COMBINE	21		
CE04BA	COMBINE	76	DBE06A	54
SBE04C	BASIN	25	DBE04C	13
RE04C	ROUTE	13		
SBE04B	BASIN	28	DBE04B	21
RE04B	ROUTE	21		
CE04AI	COMBINE	31		
RE04CB	ROUTE	30		
SBE04A	BASIN	16		
CE04A	COMBINE	32	DBE04A	27
SBE03A	BASIN	22	DBE03A	7
SBE02A	BASIN	80	DBE02A	70
SBE01B	BASIN	61		
RE01B	ROUTE	55		
SBE01A	BASIN	153		
CE01A	COMBINE	202	DBE01A	202
SBW14A	BASIN	26	DBW14A	22
SBW13A	BASIN	3		
SBW12A	BASIN	53	DBW12A	35
SBW11A	BASIN	3		
SBW10C	BASIN	46	DBW10C	40
RW10C	ROUTE	37		
SBW10B	BASIN	34		
CW10B	COMBINE	84	DBW10B	2
RW10B	ROUTE	2		
SBW10A	BASIN	84		
CW10A	COMBINE	94	DBW10A	49
SBW09E	BASIN	12	DBW09E	8
RW09E	ROUTE	7		
SBW09D	BASIN	23		
CW09DI	COMBINE	23		
SBW09C	BASIN	76		
CW09D	COMBINE	89	DBW09C	69
RW09D	ROUTE	69		
SBW09B	BASIN	16		
CW09B	COMBINE	70	DBW09B	70
RW09B	ROUTE	68		
SBW08A	BASIN	21		
CW08A	COMBINE	72	DBW08A	68
SBW08A	BASIN	26	DBW08A	12
SBW07C	BASIN	11	DBW07C	8
SBW07B	BASIN	13	DBW07B	12
CW07BC	COMBINE	21		
RW07BC	ROUTE	20		
SBW07A	BASIN	33		
CW07A	COMBINE	37	DBW07A	29
SBW06A	BASIN	12	DBW06A	5
SBW05A	BASIN	29	DBW05A	16
SBW04A	BASIN	6		
SBW02A	BASIN	15	DBW02A	12
SBW01A	BASIN	5		

Aerial Imagery dated 2010

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200 100 0 200 Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
PROPOSED DRAINAGE CONDITION EXHIBIT

SCOTTSDALE, ARIZONA

JANUARY 2012

Legend

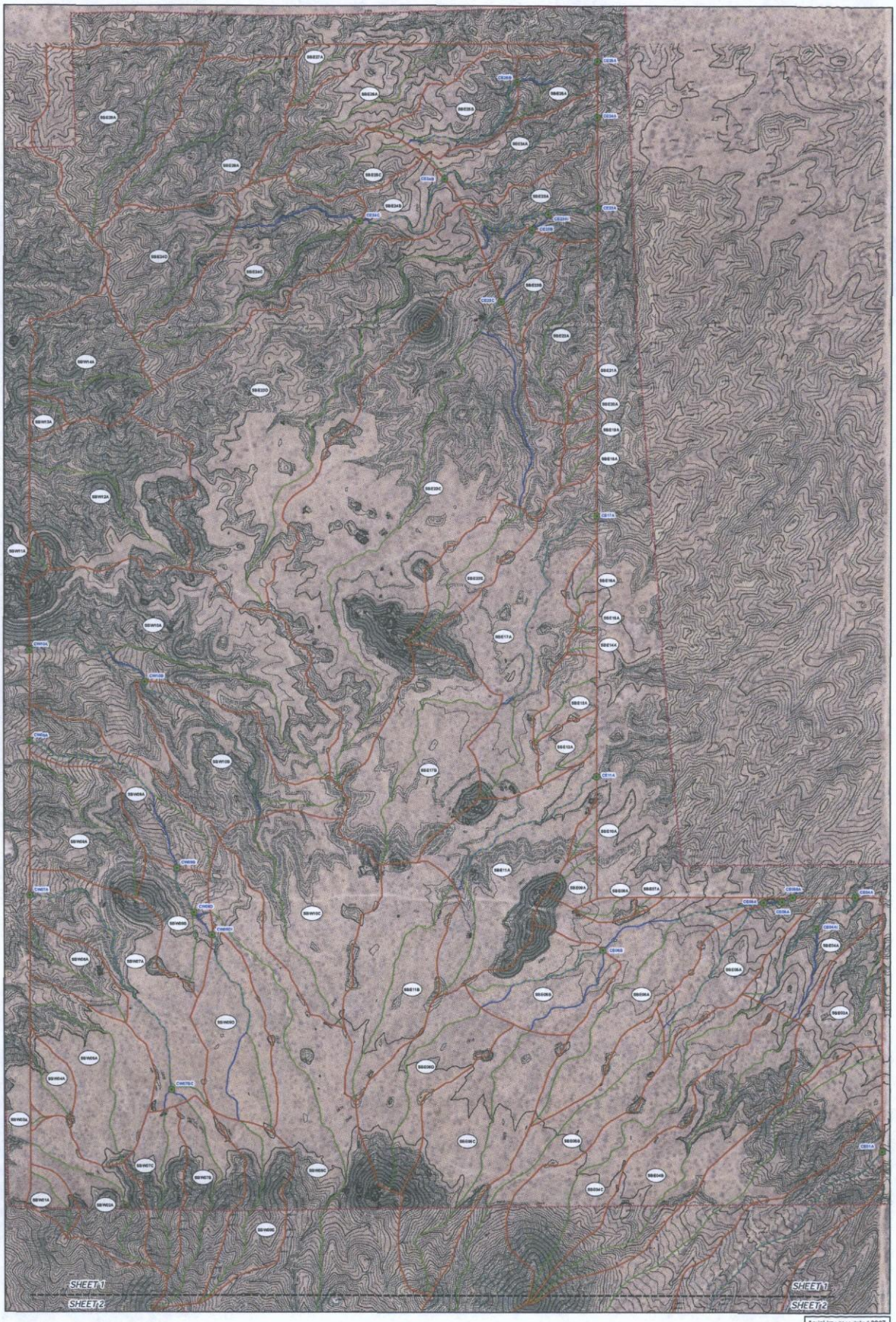
- Concentration Points
- Proposed Floodplains
- Sub-Basins
- Sereno_Canyon_Project_Boundary
- Roads
- Detention Basin

Sub-Basin Flowline Type

- Route
- TC
- TC and Route

Exhibit B-4

Subbasins and Flowpaths



Aerial imagery dated 2007

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200 100 0 200
Feet

Sheet 1 of 2

CITY OF SCOTTSDALE

SERENO CANYON
SUBBASINS AND FLOWPATHS

SCOTTSDALE, ARIZONA

JANUARY 2012

Legend

- Concentration Points
- Sub-Basins
- Matchline

Flowpaths
Type
- Route
- TC
- TC and Route

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200 100 0 200
Feet

Sheet 2 of 2

CITY OF SCOTTSDALE

SERENO CANYON
SUBBASINS AND FLOWPATHS

SCOTTSDALE, ARIZONA

JANUARY 2012

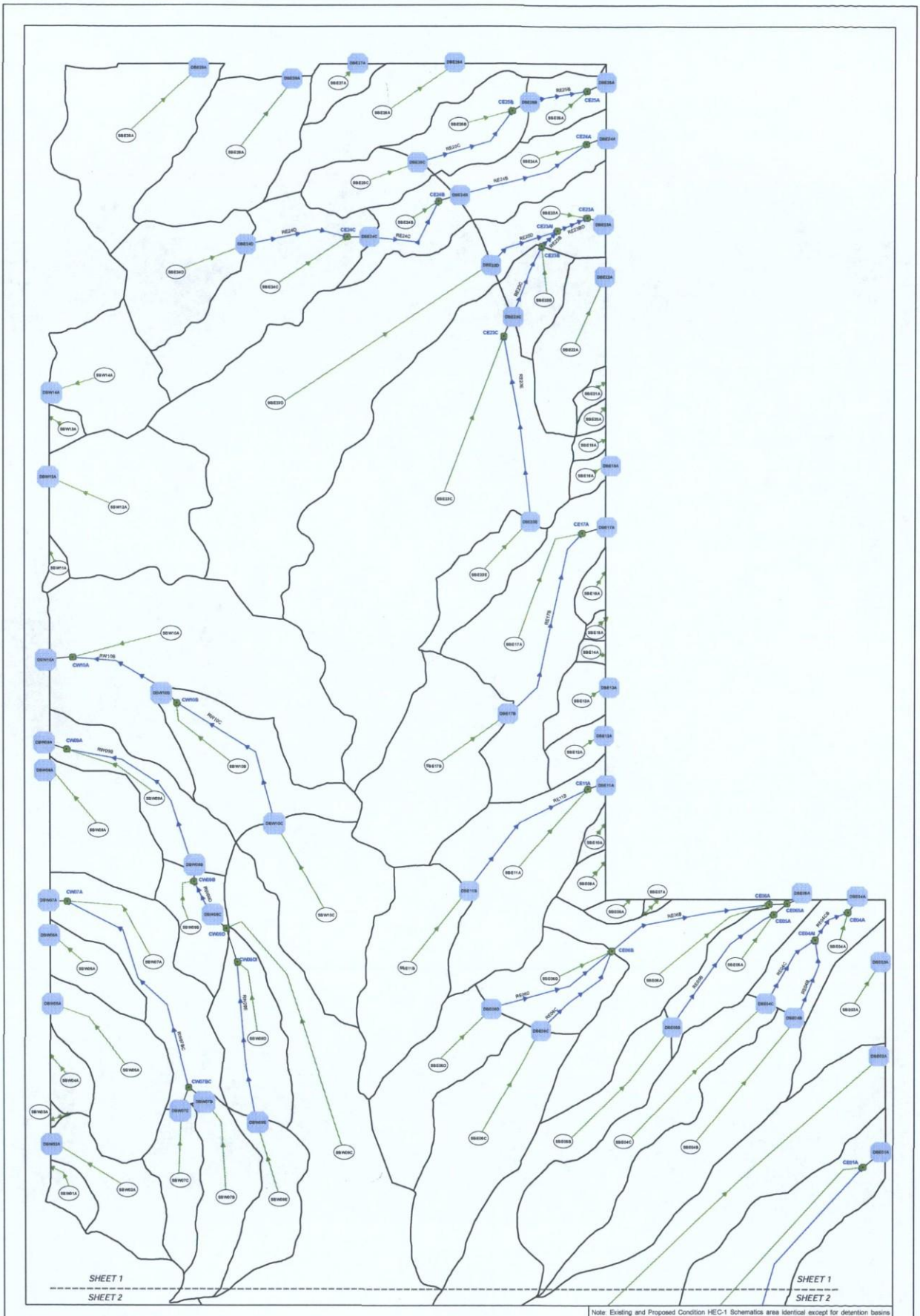
Legend

- Concentration Points
- Sub-Basins
- Matchline

Flowpaths
Type
- Route
- TC
- TC and Route

Exhibit B-5

HEC-1 Schematics



Note: Existing and Proposed Condition HEC-1 Schematics area identical except for detention basins modeled in the propsed condition.

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Sheet 1 of 2

CITY OF SCOTTSDALE

SERENO CANYON
HEC-1 SCHEMATICS

SCOTTSDALE, ARIZONA

JANUARY 2012

Legend

- Concentration_Points
- Matchline

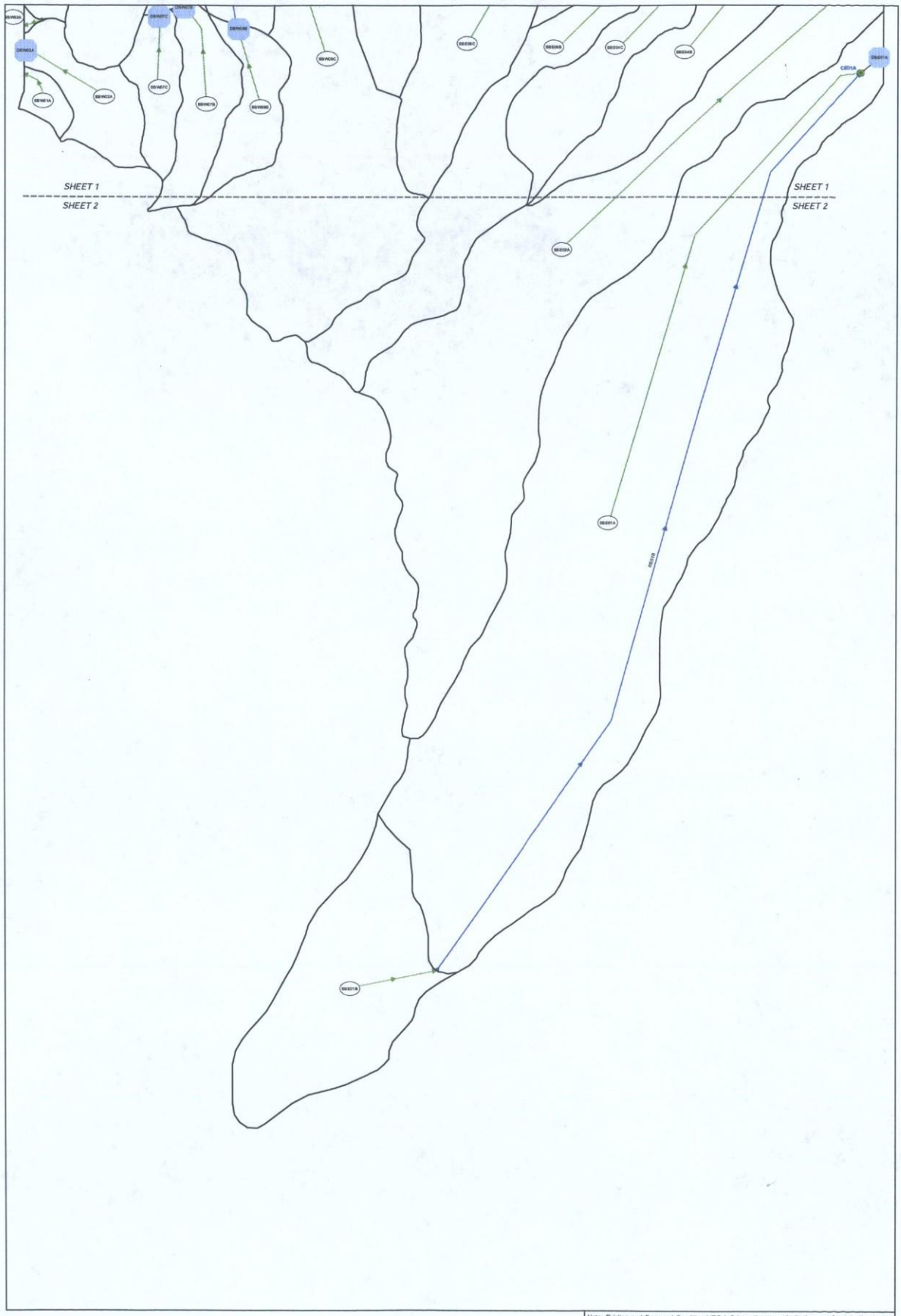
Sub-Basins

- Sub-Basin Boundaries
- Sub-Basins not modeled in HEC-1

Flow Lines

Line Type

- ROUTE
- TC
- Non-Route Connection
- Detention Basin-Developed Condition Only


SHEET 1
SHEET 2
SHEET 1
SHEET 2
DB1W1A
DB1W1B
DB1W1C
DB1W2A
DB1W2B
DB1W2C
DB1W3A
DB1W3B
DB1W3C
DB1W4A
DB1W4B
DB1W4C
DB1W5A
DB1W5B
DB1W5C
DB1W6A
DB1W6B
DB1W6C
DB1W7A
DB1W7B
DB1W7C
DB1W8A
DB1W8B
DB1W8C
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DB1W10B
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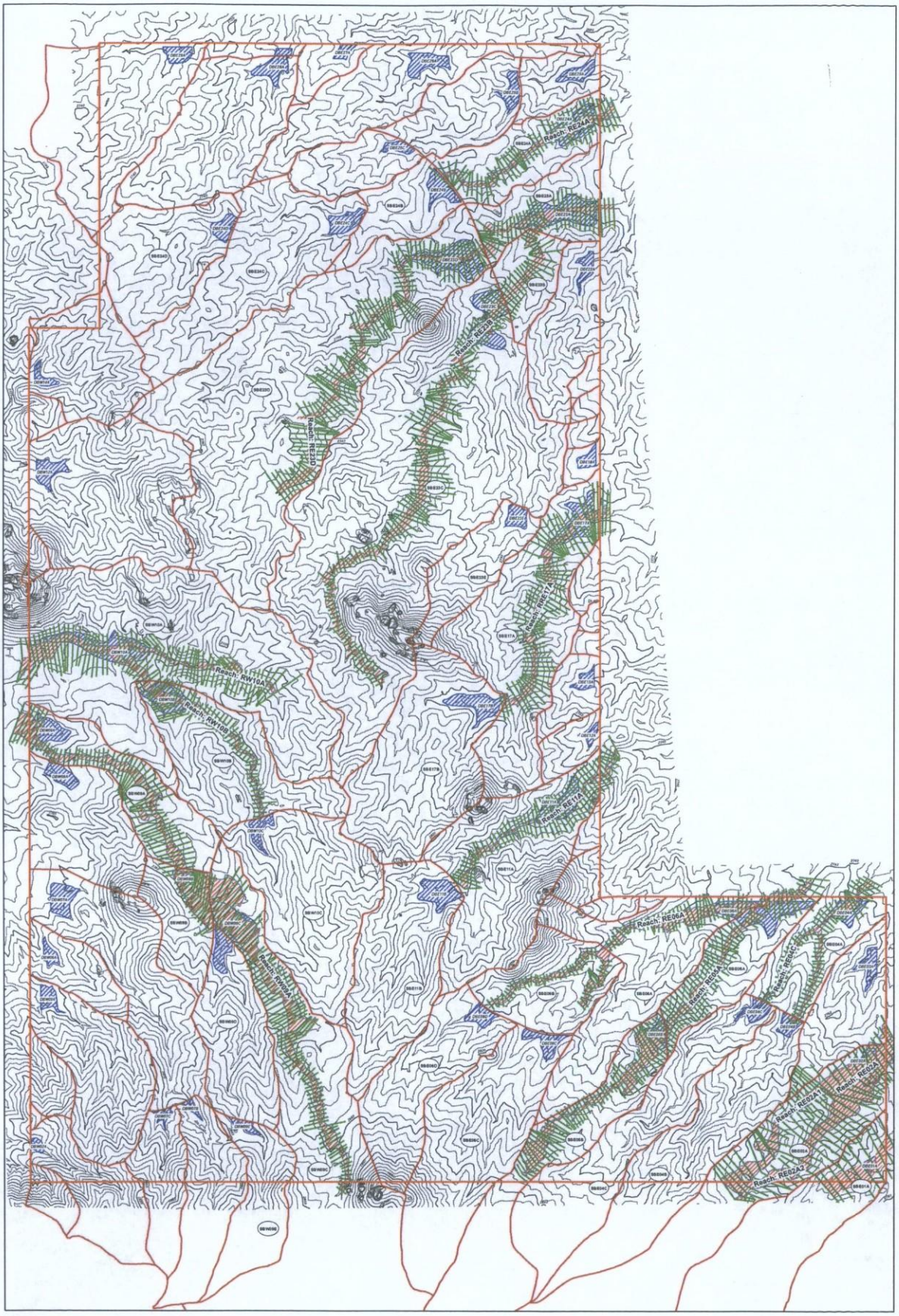
DB1W11A
DB1W11B
DB1W11C
DB1W12A
DB1W12B
DB1W12C
DB1W13A
DB1W13B
DB1W13C

Exhibit B-6

HEC-RAS Modeling Overview



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200 100 0 200
Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
HEC-RAS MODELING OVERVIEW EXHIBIT

SCOTTSDALE, ARIZONA

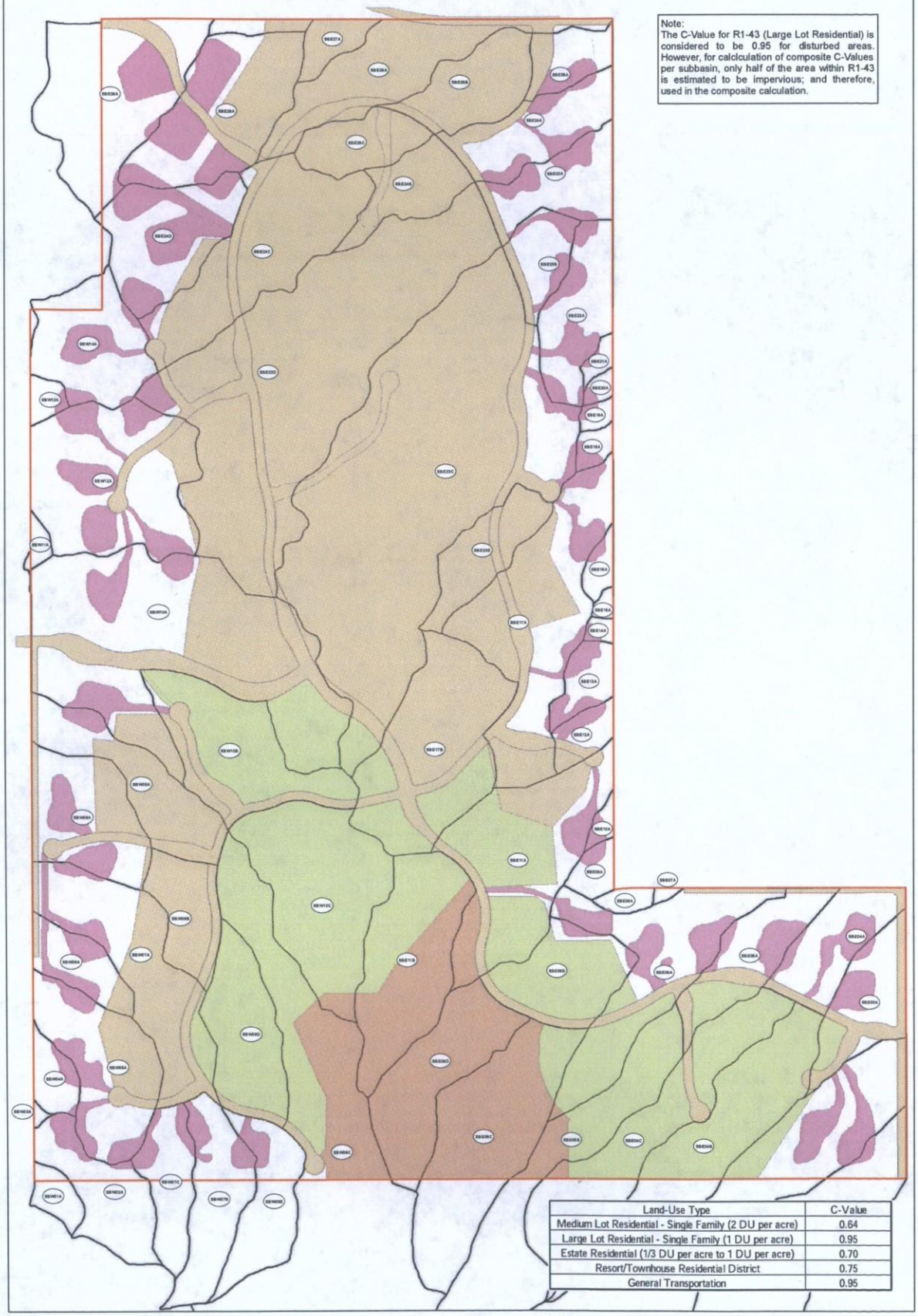
JANUARY 2012

Legend

- Sereno Canyon Project Boundary
- HEC-1 Sub-Basin Boundaries
- HEC-RAS Cross Locations
- Proposed-Condition 100-yr Floodplain
- Detention Basin
- Index Contour
- Inter Contour

Exhibit B-7

Land-Use C-Value Overview



Note:
The C-Value for R1-43 (Large Lot Residential) is considered to be 0.95 for disturbed areas. However, for calclculation of composite C-Values per subbasin, only half of the area within R1-43 is estimated to be impervious; and therefore, used in the composite calculation.

Land-Use Type	C-Value
Medium Lot Residential - Single Family (2 DU per acre)	0.64
Large Lot Residential - Single Family (1 DU per acre)	0.95
Estate Residential (1/3 DU per acre to 1 DU per acre)	0.70
Resort/Townhouse Residential District	0.75
General Transportation	0.95

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Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
LAND USE C-VALUE OVERVIEW

SCOTTSDALE, ARIZONA

JANUARY 2012

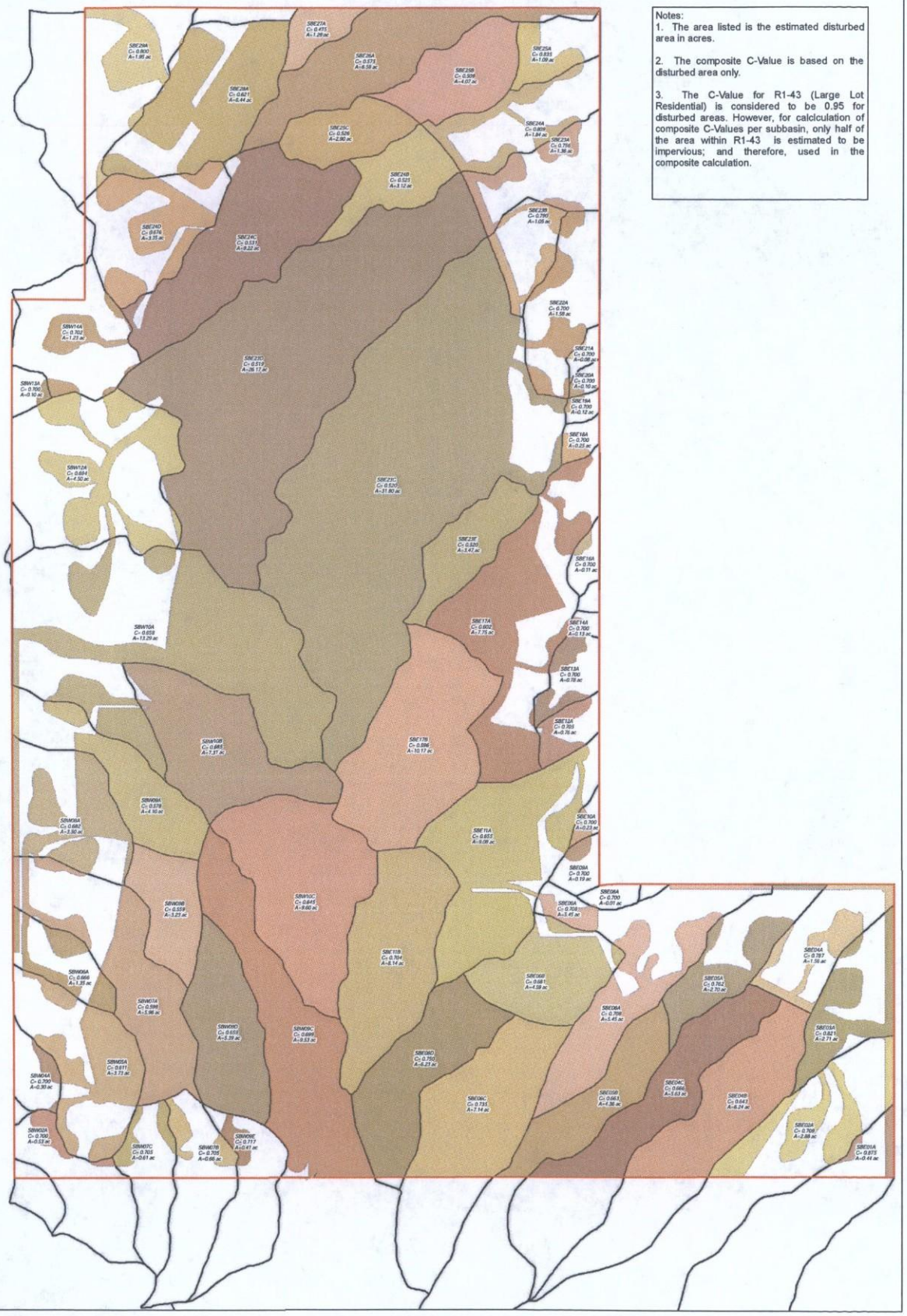
Legend

- Sereno Canyon Project Boundary
- Sub-Basins
- Roads

C-Value Overview
- 0.64
- 0.7
- 0.75
- 0.95

Exhibit B-8

Disturbed Areas Composite C-Values



Notes:
1. The area listed is the estimated disturbed area in acres.

2. The composite C-Value is based on the disturbed area only.

3. The C-Value for R1-43 (Large Lot Residential) is considered to be 0.95 for disturbed areas. However, for calclculation of composite C-Values per subbasin, only half of the area within R1-43 is estimated to be impervious; and therefore, used in the composite calculation.

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Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
DISTURBED AREAS COMPOSITE C-VALUES

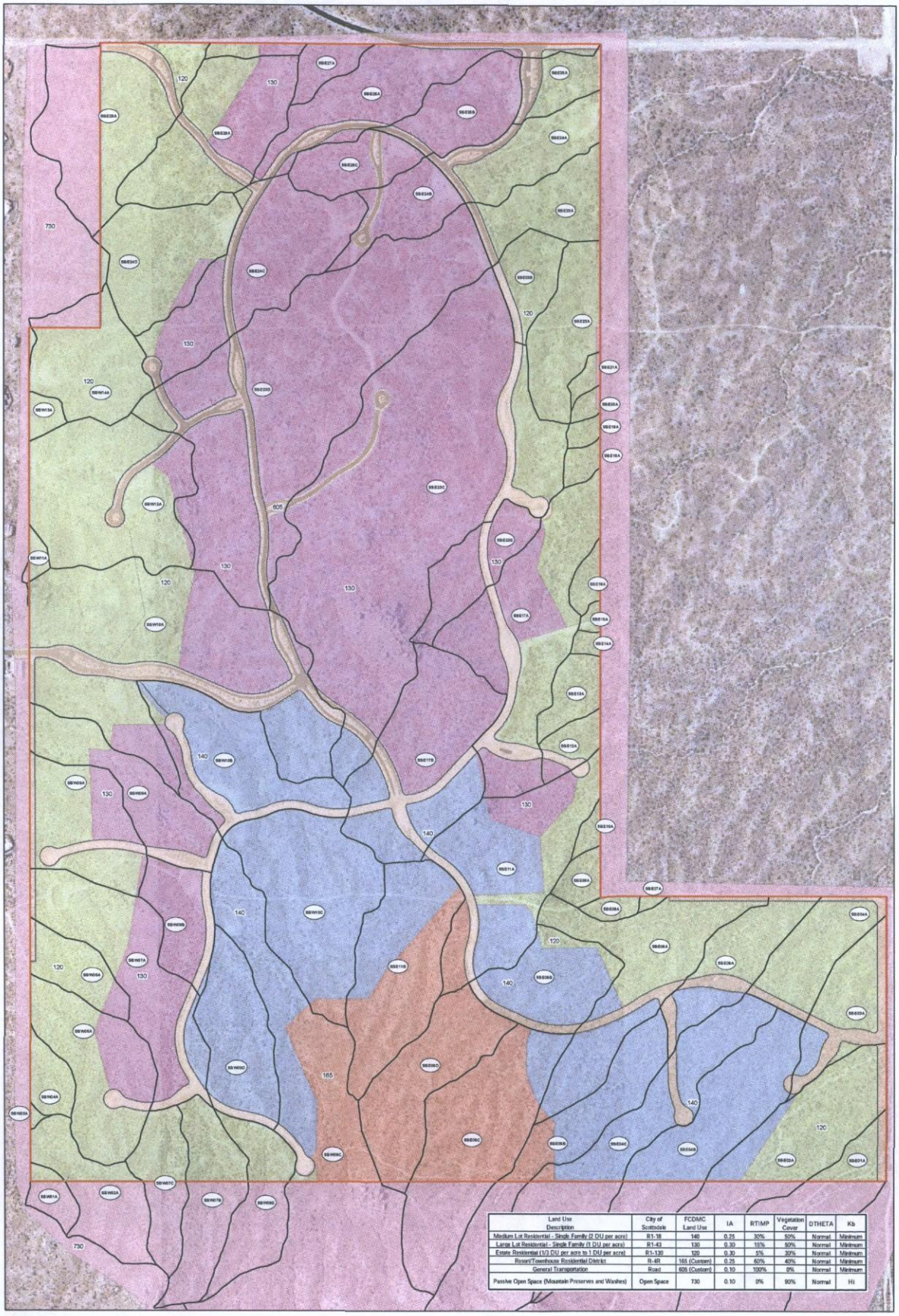
SCOTTSDALE, ARIZONA

JANUARY 2012

Legend
- Sereno Canyon Project Boundary
- Sub-Basins

Exhibit B-9

Proposed Land Use



Land Use Description	City of Scottsdale Land Use	FCDMC Land Use	IA	RTIMP	Vegetation Cover	DTHETA	Kb
Medium Lot Residential - Single Family (2 DU per acre)	R1-18	140	0.25	30%	50%	Normal	Minimum
Large Lot Residential - Single Family (1 DU per acre)	R1-43	130	0.30	15%	50%	Normal	Minimum
Estate Residential (1/3 DU per acre to 1 DU per acre)	R1-130	120	0.30	5%	30%	Normal	Minimum
Resort/Townhouse Residential District	R-4R	165 (Custom)	0.25	60%	40%	Normal	Minimum
General Transportation	Road	605 (Custom)	0.10	100%	0%	Normal	Minimum
Passive Open Space (Mountain Preserves and Washes)	Open Space	730	0.10	0%	90%	Normal	Hi

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200 100 0 200 Feet

Sheet 1 of 1

CITY OF SCOTTSDALE

SERENO CANYON
PROPOSED LAND USE

SCOTTSDALE, ARIZONA

JANUARY 2012

Legend

- Sereno Canyon Project Boundary
- Sub-Basins
- Roads

Proposed Land Use
LU CODE
- 120
- 130
- 140
- 165
- 605
- 730

W0858.3

CONCEPTUAL
MASTER DRAINAGE REPORT
FOR
SERENO CANYON

Accepted in Concept
11/30/06

1st Case Drainage 11/2/06

WOOD/PATEL

CONCEPTUAL
MASTER DRAINAGE REPORT
FOR
SERENO CANYON

November 15, 2006

WP# 042054

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Engineer

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Plate 7	Section 404 Washes
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Plate 10	Post-Development Drainage Site Plan
Plate 11	Post-Development Grading and Drainage Plan

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1.0 INTRODUCTION

1.1 Project Description

Sereno Canyon is a planned 330-acre custom lot residential subdivision located in the northeastern portion of Scottsdale, Arizona. The site is located in Section 11, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian. The site is currently an assemblage of undeveloped parcels bound to the west by the existing Sonoran Crest Development (122nd Street alignment), to the east by the 128th Street alignment, to the north by the Happy Valley Road alignment, and to the south by the McDowell Mountain Sonoran Preserve. Access to the development is planned from the west via the ½-mile section roadway, Alameda Road. Plate 1 provides a vicinity map for the project and surrounding areas.

Sereno Canyon is a proposed custom lot sub-division nestled at the northern base of the McDowell Mountains. Development of the project is planned to occur in four (4) phases. Please refer to Plate 1A for a phasing map of the project. The development includes 122 lots ranging in size from 2 to 3 acres and a clubhouse with amenities such as jacuzzis, pools, water falls, and restaurant facilities. Interpretive trails and scattered pocket parks with water features will also be incorporated into the site plan.

1.2 Type of Report

This report is being prepared as a Conceptual Master Drainage Plan for the proposed Sereno Canyon Project.

1.3 Purpose

This Conceptual Master Drainage Report for the proposed Sereno Canyon project has been prepared to meet the master drainage plan requirements outlined in Chapter 4 of the *City of Scottsdale Design Standards and Policies Manual* (DS&PM) effective September 25, 2006. This report presents description of the hydrological and hydraulic modeling of the proposed drainage systems.

The main purpose of this report is to illustrate the following:

- Compliance with the City of Scottsdale's Drainage Ordinance stormwater storage requirements by providing stormwater storage for 100-year, 2-hour storm event runoff for improved areas computed by Rational Method.
- Reduction of post-development flows to at or below the pre-development flows for 2-year, 10-year and 100-year, 6-hour storm events. Hence, the downstream properties are provided with similar or better flood protection as the pre-development condition.
- Maintenance of the major water courses traversing through the site in their natural location.
- Delineation of the 100-year water surface extents along with determination of the 100-year water surface elevations for the major drainage courses using HEC RAS computer program.

2.0 EXISTING ON-SITE DRAINAGE CONDITIONS AND CHARACTERISTICS

2.1 On-Site Drainage

The proposed project lies in the northern planning section of the City of Scottsdale. The Elevations range from 2,830 feet in the south to 2,675 feet in the northeast. Based on the existing topography of the site, a ridgeline runs through the property from the southern property boundary (approximately at the center) in the northwest direction.

Vegetation is typical Sonoran Desert type with creosote bush, jumping cholla, saguaro cacti, palo verde, ironwood, and mesquite trees. The project site lies within the areas identified as Environmentally Sensitive Lands (ESL) by the City of Scottsdale. The site is further classified as 'Upper Desert' within the ESL areas as shown in Plate 2 – *ESL Classification.*

Plate 3 presents the soils classification (type D) based on the Soil Conservation Service (SCS) Map for the project area. SCS is now referred to as Natural Resource Conservation Service (NRCS). The site photos for the project site are included in Appendix A. The cover type and hydrologic condition were estimated as desert shrub areas with poor hydrologic conditions. From Figure 4-6 of the *City of Scottsdale DS&PM*, a runoff curve number of 88 was used for the corresponding soils group D that occurs within the watershed area.

Currently, the site contains no development and hence an effective impervious area of zero percent was used. The soil characteristics of the site are included in the model in terms of the curve number discussed above. Also, minor rock outcroppings on the site are not considered a factor in computing the percent effective impervious areas as they do not interfere with the drainage pattern and are not hydraulically connected to the sub basin concentration points. This conclusion is made based on the photographs of the site and washes included in Appendix A. Please note that the site will not be mass graded and the outcroppings will be the same in both the existing and proposed conditions and do not impact the pre- and post-development runoff comparison.

There are no washes on the site categorized as a 'Vista Corridor' as the calculated 100-year, 6-hour flow is less than 750 cfs for all washes. The major watercourses traversing the project with a 100-year, 6-hour flow greater than 50 cfs are identified as the site lies within ESL areas. These washes are identified on Plate 9 – *Pre-Development Grading and Drainage Plan.* These washes will be maintained in their natural location and will not be re-aligned.

2.2 Existing On-Site Drainage Network

Existing on-site drainage sub-basin boundaries were identified using aerial mapped 1-foot contours. Please refer to Plate 5 – *Color Topographic Aerial Photograph.* Please refer to Plate 8 – *Pre-Development Drainage Site Plan* for the on-site sub-basins and concentration points.

Runoff generated on-site drains northeasterly or northwesterly from the ridgeline. Washes C1, D1, E1, E2, and F1, with a 100-year, 6-hour flow greater than 50 cfs, traverse the site in the northeast direction and exit at the property boundary. The other minor washes (100-year, 6-hour flow less than 50 cfs) traverse either northeasterly or northwesterly until they exit at the property boundary.

A delineation of water surface extents for washes with 100-year, 6-hour peak flow of 50 cfs or greater has been drawn based on the HEC-RAS analysis. Water surface elevations and top widths for pre-development flows at each cross-section are included on Plate 9 – *Pre-Development Grading and Drainage Plan.* The hydrologic and hydraulic analysis procedures are discussed in Section 5.0. The boundary conditions water surface elevations were determined using normal depth for the given channel slope in HEC RAS.

2.3 Off-Site Watershed

The off-site areas impacting the drainage pattern of the proposed development lie in the northern planning section of the City of Scottsdale. The off-site watershed includes a portion of the 40-acre Sonoran Sky development, an additional 20-acre parcel and mountainous terrain located within the McDowell Sonoran Preserve. Currently, the entire off-site watershed is undeveloped desert land. The aforementioned two properties may be developed in the future. The off-site area impacting the drainage patterns for the proposed

developments are identified on Plate 6 – *Off-Site Watershed Area Map.* Vegetation is typical Sonoran Desert type with creosote bush, jumping cholla, saguaro cacti, palo verde, ironwood, and mesquite trees. The off-site areas lie within the 'Upper Desert' and 'Hillside' (ESL) landform areas.

There are no off-site washes categorized as a 'Vista Corridor' that impact the site, as the calculated 100-year, 6-hour flow is less than 750 cfs. The major watercourses traversing the project with a 100-year, 6-hour flow greater than 50 cfs are identified. These washes will be maintained in their natural location and will not be re-aligned.

Based on the SCS Map, the cover type and hydrologic condition were estimated as desert shrub areas with poor hydrologic conditions. From Figure 4-6 of the *City of Scottsdale's DS&PM*, a runoff curve number of 88 was used for the corresponding soils group D that occurs within the off-site watershed area.

2.4 Existing Off-Site Drainage Network

City of Scottsdale Quarter Section Maps with 2-foot contour interval topography were used to identify the off-site drainage sub-basins impacting the proposed development. Please refer to Plate 6 – *Off-Site Watershed Area Map* for the limits of the drainage sub-basins and concentration points.

Off-site flows enter the site along the southern property boundary along their natural course as overland and concentrated flows. The offsite flows impacting the project traverse the site through washes A1, A2, B1, B2, C, H1, H2, I, J and R. Washes A1, A2, B1, B2, C and R traverse the site in the northeast direction and exit at the east property boundary. Washes H1, H2, I and J traverse the site in the northwest direction until they exit at the west property boundary.

2.5 Existing Drainage Relative to Adjacent Projects

Existing drainage courses exit the site as concentrated flows at various locations on the eastern, western and northern property boundaries. These locations will be maintained with peak flows for the 2-year, 10-year and 100-year, 6-hour storm events at or below pre-developed amounts.

2.6 Flood Insurance Rate Map (FIRM)

The Flood Insurance Rate Maps (FIRM) for Maricopa County, Arizona and incorporated areas, Panel Numbers 04013C1255G and 04013C1260F, effective date September 30, 2005 indicates the site is within Zone "X" (shaded), and Zone "D".

Zone "X" (shaded) is defined by FEMA as follows:

> *Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.*

Zone "D" is defined by FEMA as follows:

> *Areas in which flood hazards are undetermined.*

The location of the parcel relative to the FIRM panels is illustrated on Plate 4 – *Flood Insurance Rate Map (FIRM)* using the FEMA Firmettes.

3.0 PROPOSED MASTER DRAINAGE PLAN

3.1 General Description of Proposed Drainage System

The proposed drainage system will allow existing drainage patterns to be maintained in their natural location and condition where possible. The site is being developed as large custom lots with a minimum lot size of approximately 2 acres. In the event of any future development within the off-site watershed areas, it will be the responsibility of the future developer to attenuate the post-development flows to at or below the pre-development flows.

The off-site runoff impacting the site will traverse the site through natural washes A1, A2, B1, B2, C, H1, H2, I, J and R. Washes A1, A2, B1, B2, C and R traverse though the site in the northeast direction and exit at the east property boundary. Washes H1, H2, I and J traverse the site in the northwest direction until they exit at the west property boundary.

The on-site drainage system will be composed primarily of the existing on-site washes conveying the runoff through the site and exiting at the property boundary at their historic locations. According to the City's Drainage Ordinance, stormwater storage is to be provided for the 100-year, 2-hour storm event for improved areas. Rational Method was used to estimate the required stormwater storage volumes. The procedure is discussed in detail in Section 5.2.4. Detention basins with bleed-off pipes are proposed at strategic locations to provide stormwater storage for the runoff generated during the 100-year, 2-hour storm event. Several existing on-site washes are being utilized as detention basin locations due to the steep slopes encountered within the site. Rock walls will be used to mitigate the need for large constructed slopes to attain ponding areas.

According to the City's Drainage Ordinance, all runoff generated from the developed portion of the site must be managed and the peak discharge from the site reduced to at least pre-development values. With the development being sparse in nature at approximately 0.37 dwelling units per acre and no mass grading being proposed, post-development flows are only slightly higher than pre-development flows. The proposed on-line detention basins along several existing on-site washes will also act to attenuate the post-development peak discharges to at or below the pre-development values. A

detailed description on the design and analysis of these basins is provided in Section 3.5.1.

Roadway runoff will be conveyed along the street up to the capacity of the street within the required stipulations outlined in Figure 4-2 – *Hydraulic Design Criteria* of the *City of Scottsdale DS&PM*. Please refer to Appendix A for a copy of this figure. The additional runoff exceeding the street capacity will be released through curb openings or storm drain system. Curb openings will occur where there is a wash adjacent to the roadway or at culvert crossings.

3.2 Future Conditions

Currently, the off-site areas impacting the site are undeveloped desert lands. The areas proposed to be developed in the future are the 40-acre Sonoran Sky development and the 20-acre parcel at the southern property boundary. Currently no approved drainage reports exist for these two developments. It will be the responsibility of these developments to maintain their post-development flow peaks and volume at or below the pre-development flow peaks and volume when they develop. The proposed drainage systems are designed assuming that there will be no increase in peak flows during the 100-year, 6-hour event upstream of the project site.

The drainage plan for Sereno Canyon proposes to maintain the 2-year, 10-year and 100-year, 6-hour storm event post-development peak discharges at or below the pre-development flows. Also, the drainage courses will be maintained at their historic locations at the property boundary. Thus, no adverse impact is anticipated on the adjacent properties downstream of the project site for the 2-year, 10-year and 100-year, 6-hour storm events.

3.3 Stormwater Storage Requirements

Based on the City of Scottsdale's Drainage Ordinance stormwater storage requirements, on-site stormwater storage is to be provided for runoff generated during the 100-year, 2-hour storm event for improved areas. Rational Method is used to estimate the 100-year, 2-hour stormwater storage volumes. 100-year, 2-hour event stormwater runoff is proposed to be detained on site through detention basins upstream of culvert crossings and at other strategic locations along existing on-site washes. Several of the detention

basins were designed to detain runoff at a depth greater than three feet (3') in order to meet the volume provided requirements within the Environmentally Sensitive Lands Ordinance (ESLO) and Natural Area Open Space (NAOS) constraints. Detention basins were sized at a depth greater than three feet (3'), as grading the detention basins results in large disturbed areas, which are not in accordance with the ESLO intent. Based on the topographical conditions, washes are incised and typically greater than two feet (2') deep. Hence, berms are provided for the detention basins to blend with the natural topography, such that the emergency overflow discharges into the existing wash flow path. During final design when roadway profile and pad elevations have been established, these basins will be reconfigured. The precipitation values for the 100-year, 2-hour storm event were obtained from the NOAA Atlas 2 Volume VIII maps. The equations and the assumptions used to calculate the required and provided stormwater storage volumes are discussed in Section 5.2.4.

Provided below is a summary of the stormwater storage required and provided for each individual drainage basin. Table 3.3, on the following page, indicates that the stormwater storage provided is in excess of the stormwater storage required for the entire site by 2.17 ac-ft. Please refer to Appendix E for detailed stormwater storage calculations.

3.3.1 Dissipation of Stormwater

18-inch bleedoff pipes with removable orifice plates are proposed for the dissipation of the stormwater detained within the stipulated time of 12 to 24 hours per the City of Scottsdale Drainage Ordinance; thus, no dry wells will be required. The orifice plates are preliminarily sized using the orifice equation. A 6-inch diameter orifice plate is proposed to dissipate the detained volume at a rate of not greater than 1.5 cfs. The calculation is included in Appendix F.

Table 3.3
Stormwater Storage

Drainage Boundary	Total Development Area (Acre)	100-yr, 2-hr Required Volume (acre-ft)	100-yr, 2-hr Provided Volume (acre-ft)	Volume Shortage / Excess ± (acre-ft)
A1	3.79	0.53	0.6	0.07
A2	7.17	1.01	1.01	0.00
B	10.94	1.54	1.78	0.24
C	3.65	0.51	0.57	0.06
D	7.73	1.09	1.25	0.16
E1	14.24	2.01	2.01	0.0
E2	13.23	1.87	2.02	0.15
E3	2.19	0.32	0.58	0.26
F1	10.24	1.44	1.99	0.55
F2	3.56	0.5	0.51	0.01
F3	2.93	0.41	0.40	0.0
G	3.7	0.52	0.51	0.0
H1	12.94	1.82	1.98	0.16
H2	8.5	1.2	1.31	0.11
I	4.44	0.63	0.64	0.01
J	4.81	0.68	0.66	0.02
K	2.06	0.29	0.38	0.09
L	1.49	0.21	0.20	0.0
M	1.44	0.2	0.2	0.0
N	2.81	0.4	0.49	0.09
O	0.55	0.08	0.22	0.14
P	1.73	0.24	0.37	0.13
Q	0.52	0.07	0.07	0.00
R	0.18	0.02	0.0	-0.02
Total	**125**	**17.59**	**19.76**	**2.17**

3.4 Pre- and Post- Runoff Characteristics

The U.S. Army Corps of Engineers' HEC-1 computer analysis program was used for hydrologic modeling including routing of flow through storage basins and combining hydrographs. The HEC-1 model was also used to compare the pre- and post-development runoff flows. Based on the site topographic conditions, Kinematic Wave routing technique was used for both the existing and proposed conditions hydrologic modeling. Runoff for each drainage sub-basin was computed and then routed, if required, through downstream drainage sub-basins where the hydrographs were then combined. The parameters were selected per the guidelines provided in the *City of Scottsdale DS&PM.* The parameters selected and the inputs for the HEC-1 models are discussed in Sections 5.1. The parameters changed to model developed conditions are also discussed in Section 5.1.1

Tables 3.4-1, 3.4-2, and 3.4-3 provide the comparative peak flows for the pre- vs. post-developed conditions for 2-year, 10-year, and 100-year, 6-hour events respectively at each concentration point. For the location of these concentration points and corresponding 100-year, 6-hour flow values, please refer to Plates 8 and 9 for existing conditions, and Plates 10 and 11 for developed conditions. The developed conditions HEC-1 model with on-line detention upstream of the culvert road crossings and other strategic locations reduced the post-development flows to below the pre-development flows at each concentration point exiting the site for the 2-year, 10-year, and 100-year, 6-hour storm events.

The HEC-1 input data and output files for the existing and developed conditions are included in Appendices B and C, respectively. The data analysis procedures are discussed in Section 5.0. Hydrographs comparing both pre-development and post-development 100-year, 6-hour event flows at each concentration point exiting the site are included in Appendix D. These hydrographs graphically illustrate that the post-development 100-year, 6-hour flows are at or below the pre-development flows. Further, they also illustrate the time to peak and the duration of the storm event.

Table 3.4-1
2-Year, 6-Hour Flow Summary

Concentration Point	Existing Flow (cfs)	Developed Flow (cfs)	Net Downstream Effect (cfs)
A1	46	39	-7
A2	21	15	-6
COMB B	37	28	-9
C	17	10	-7
D	17	15	-2
COMB E	49	26	-23
E3	6	0	-6
F1	19	13	-6
F2	9	1	-8
F3	8	6	-2
G	7	1	-6
H1	28	7	-21
H2	32	19	-13
I	14	2	-12
J	18	9	-9
K	9	0	-9
L	8	2	-6
M	6	1	-5
N	8	0	-8
O	3	3	0
P	6	6	0
Q	3	3	0
R	94	88	-6

Table 3.4-2
10-Year, 6-Hour Flow Summary

Concentration Point	Existing Flow (cfs)	Developed Flow (cfs)	Net Downstream Effect (cfs)
A1	111	109	-2
A2	52	48	-4
COMB B	93	85	-8
C	43	33	-10
D	43	37	-6
COMB E	126	68	-58
E3	14	4	-10
F1	47	37	-10
F2	21	11	-10
F3	19	18	-1
G	19	9	-10
H1	70	54	-16
H2	79	66	-13
I	35	16	-19
J	43	30	-13
K	19	4	-15
L	17	22	-6
M	14	7	-7
N	18	2	-16
O	6	5	-1
P	13	12	-1
Q	7	5	-2
R	220	209	-11

Table 3.4-3
100-Year, 6-Hour Flow Summary

Concentration Point	Existing Flow (cfs)	Developed Flow (cfs)	Net Downstream Effect (cfs)
A1	235	228	-7
A2	109	108	-1
COMB B	204	198	-6
C	89	80	-9
D	93	79	14
COMB E	275	246	-29
E3	28	16	-12
F1	99	88	-11
F2	43	35	-8
F3	39	38	-1
G	41	31	-10
H1	152	147	-5
H2	172	165	-7
I	73	50	-13
J	83	75	-8
K	35	20	-15
L	32	29	-3
M	28	19	-9
N	35	19	-16
O	11	9	-2
P	24	21	-3
Q	13	10	-3
R	444	411	-33

3.5 Proposed Drainage Structures

3.5.1 On-Site Detention

On-site detention basins are proposed at the upstream end of roadway culvert crossings and at other strategic locations along existing on-site washes to provide stormwater storage as discussed in Section 3.3. Please refer to Appendix E for the 100-year, 2-hour stormwater storage volume calculations for all detention basins.

Stormwater volumes for storm events greater than the 100-year, 2-hour event will overflow over the rock berm. For the 2-year, 10-year, and 100-year, 6-hour storm events, these basins attenuate the post-development flows to at or below the pre-development flows. Peak flows are routed through these basins for the 2-year, 10-year, and 100-year, 6-hour storm events. The peak flow volume during the smaller events (2-year, 6-hour) will not overflow the rock berm and will be drained through the bleed-off pipe. This attenuation is modeled using HEC-1.

Provided in Figure 3.5.1 is a graphical illustration of stormwater routing/storage through a detention basin. Weir walls are proposed at the outlet of the basins. Storage routing curves were developed for the detention basins specific to the outlet structure. Please refer to Appendix F – *Hydraulic Calculations* for weir wall storage routing curves used in the HEC-1 modeling.

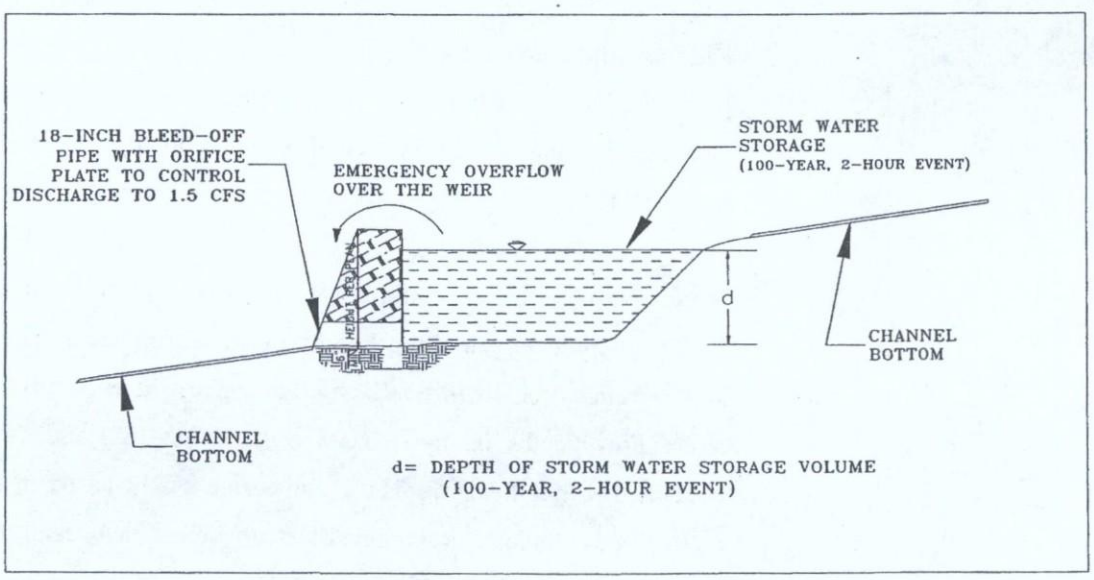

Figure 3.5.1 – Stormwater Routing through a Detention Basin

The bleed-off pipe is sized at 18 inches, based on the minimum pipe size requirements by the City of Scottsdale. As the flows cannot be metered by this bleed-off pipe, an orifice plate is proposed to meter the discharge flows at a rate not greater than 1.5 cfs. The bleed-off pipe with orifice plate drains the water into the natural watercourses downstream of the basin. The proposed orifice plates will be sized such that the detained water is drained at a rate not exceeding 1.5 cfs and the drain time is between 12 to 24 hours.

3.5.2 Roadway Crossing Structures

Culverts will be designed with the final drainage reports, and with the final design of the roadway profiles. The culverts will be designed to convey the 100-year flow downstream of the basin outlet structures, which is less than the existing 100-year flow. Culverts are proposed to be sized such that the headwater behind the culvert does not inundate the building envelopes. Also, the calculated headwater elevation at the culvert is used to define the ponding limits for the 100-year, 6-hour storm event. HY-8 culvert analysis program developed for the Federal Highway Administration will be used for the analysis of the culverts proposed with the improvement plans. The approximate 100-year backwater limits (ponding) will also be incorporated within the proposed floodplain delineations.

Rip rap will be utilized within the channels to dissipate velocities and as erosion protection on the upstream and downstream sides of the proposed culverts. The actual design and rip rap sizing will be based on approved practices and will be completed at the time of improvement plan submittal.

Street runoff conveyance and street capacities will be calculated with the final drainage reports prepared for the improvement plan submittals. Curb openings or storm drain systems will be designed to convey the excess 100-year flow so that street flow depths do not exceed eight inches (8") and the 10-year flow is contained within the curbs. The actual design will be based on approved practices and will be completed at the time of improvement plan submittal.

The drainage system for local residential roadways will be designed consistent with the *City of Scottsdale DS&PM*. The methodology developed by the Federal Highway Administration will be used to calculate, in spreadsheet format, the allowable street cross-section capacities.

3.6 Project Phasing

The project site is proposed to be developed in four phases. For the completion of this project, a drainage report will be prepared for each phase. The drainage structures proposed within each phase will be designed to meet the *City of Scottsdale DS&PM* guidelines. The impact of the phased construction and the required interim condition drainage systems proposed will be discussed in the drainage report for each phase. The development requirements will be met independently for each phase.

4.0 SPECIAL CONDITIONS

4.1 Section 404 Washes

All washes within the project were investigated to identify those that may be deemed jurisdictional. The United States Army Corp of Engineers approved Section 404 Jurisdictional Delineation is presented on Plate 7 – *Section 404 Washes*. This plate provides the approved Section 404 wash locations within the project site. The Section 404 washes are also illustrated on the pre- and post-development grading and drainage plans.

5.0 DATA ANALYSIS METHODS

5.1 Hydrologic Procedures

The U.S. Army Corps of Engineers' HEC-1 hydrologic model is used to compute the 2-year, 10-year and 100-year events, and 6-hour storm events runoff as outlined in Chapter 4 of the *City of Scottsdale DS&PM.* Further, Rational Method is used to compute the 100-year, 2-hour storm event storage volume required. Below is a description of the hydrologic procedures specific to this project.

5.1.1 HEC-1 Procedures

The U.S. Army Corps of Engineers' HEC-1 hydrologic model is used for computing hydrographs, routing the flow through sub-basins, and combining hydrographs. Based on the site topographic conditions the Kinematic Wave routing technique was used for both the existing and proposed conditions hydrologic modeling. The main components for runoff computation are overland flow, collector channel flow and main channel flow. Input data necessary for the computer analysis included definition and measurement of the overland flow characteristics, drainage sub-basins, assignment of soil curve numbers and calculations of the proposed impervious factors. Provided below is a more detailed explanation of the parameter selection and the data inputs for HEC-1 modeling.

5.1.1.1 Rainfall Event

The precipitation amount for the 2-year, 10-year and 100-year events, 6-hour duration period was obtained from NOAA Atlas 2 Volume VIII maps located in the *City of Scottsdale DS&PM.* An illustration of the location of the site on these maps is provided in Appendix A. These values were further analyzed using the Maricopa County Drainage Design Management Systems for Windows (DDMSW) program to determine the precipitation depths for intervals lower than 1 hour, which are input values in the HEC-1 model. The DDMSW report of this analysis is included in Appendix A The total calculated rainfall depths for the 2-year, 10-year, and 100-year, 6-hour storm events are 1.57, 2.29, and 3.37 inches respectively. The drainage sub-basins have also been depicted on the NOAA maps. Based on the size of the drainage area, a

single point rainfall amount without aerial reduction was justified for each storm event analyzed.

5.1.1.2 Soil Curve Numbers

Soil curve numbers are used to account for interception/infiltration losses. Soil curve numbers for the HEC-1 models were calculated based on published guidelines and engineering experience for the type of soils present within the drainage sub-basins. The cover type (less than 30% vegetation cover due to wild fire) and hydrologic condition were estimated as desert shrub areas with poor hydrologic conditions. Plate 3 presents the soils classification (type D) based on the SCS Map for the project area. A runoff curve number of 88 was used for the corresponding soils group D that occurs within the watershed area. Figure 4-6 "Runoff Curve Numbers for Arid and Semi-Arid Rangelands" located in the *City of Scottsdale DS&PM* was used to determine the soil curve number and has been included in Appendix A. Wood/Patel is in agreement with the City's published curve numbers.

5.1.1.3 Impervious Area

Impervious percentages were determined for each sub-basin for the developed conditions HEC-1 model. Currently, the site contains no development and hence a effective impervious area of zero percent was used. The rock outcroppings on the site are not considered a factor in computing the percent impervious as they do not have a pattern that may impact the drainage characteristics and are not hydraulically connected to the basin outlets. Please refer to photographs of the site and washes in Appendix A. For the on-site developed conditions, impervious percentages were calculated utilizing Figure 2.2-16 "Percent of Impervious Area vs. Dwelling Units/Acre", in Chapter 2 of the old *City of Scottsdale DS&PM*. Please refer to Appendix A for a copy of this figure. Based on the lot sizes (Average lot size = 101,500 sq.ft), an impervious percentage of 10 percent was used for the proposed developed areas.

5.1.1.4 Overland Flow Resistance Factor

The resistance factor for overland flow was estimated with guidance from descriptive information and site photographs. Based on the site conditions illustrated by the photographs in Appendix A, the site is considered to most closely resemble the sparse rangeland with Debris-20% cover, as well as the sparse vegetation categories identified in Table 3.5 of the HEC-1 manual. Based on the site photos and field observations, vegetative cover is estimated to be greater than 20%. Thus, a mid-range value from the sparse rangeland with Debris-20% cover category was deemed appropriate. Since a mid-range value from this category corresponded with the upper value of the sparse vegetation category, a value of 0.13 was chosen to best fit both categories with actual site conditions. From Table 3.5 in the HEC-1 manual, a resistance factor for overland flow of 0.13 was chosen. A copy of this table is included in Appendix A.

5.1.1.5 HEC-1 Input Records

This section provides additional description for the input Records used in the HEC-1 modeling for this project. The computation time interval for hydrograph generation used was 2 minutes which is within the range of 1 to 5 minutes specified in the *City of Scottsdale DS & PM*.

BA Record

This record is a direct input for computing runoff. The element of this record is the drainage area in square miles estimated by measuring the area of the drainage boundary.

LS Record

This record is a loss rate data record and computes rainfall losses based on the geological characteristics of the site. The elements on this record are the soil curve numbers and the percent impervious. Both of these data are estimated based on the soil characteristics and site conditions. The derivation of these parameters is discussed in detail in Section 5.1.1.

UK Record

This record defines the characteristics of overland flow. The elements on this record are the overland flow length, slope, resistance factor, and percent of sub-basin area represented. All of the input values are measurements and calculated values except for the resistance factor. The resistance factor for overland flow was estimated based on Table 3.5 in the HEC-1 manual. Based on the site conditions illustrated by the photographs in Appendix A, a resistance factor value of 0.13 was chosen. Further discussion on overland flow resistance factor was provided in Section 5.1.1.4.

RK Record

This record defines the characteristics of the main channel. The elements on this record are the channel length, channel slope, channel roughness, and geometry of the channel. All of the values were measured and calculated values. The channel roughness ('n' value) was chosen based on the site conditions as discussed in Section 5.2. Per the HEC-1 manual, the 'n' value that best represents the channel was chosen. The 'n' value for the channel bottom, 0.032, was chosen to best represent the channel characteristics. Also, this value is conservative as it results in a higher estimate of peak flows. The HEC-1 model was calibrated to the HEC RAS hydraulic model as accurately as possible. However, the HEC-1 model is simplified by using average dimensions of the channel to account for the irregularity in the channel dimensions.

SE Record

This record is used for defining the parameters to facilitate routing of flows through a storage basin. The elements on this record are the elevations corresponding to values in the same field in the SV and SQ Records. These values are obtained from the detention basin elevations and/or head water elevations where storage routing is proposed. Please refer to Appendices F and G for the rating calculations and detention basin calculations respectively. Please note that the elevation values are extrapolated for modeling purposes to determine the headwater elevation over the weir and the limits of inundation.

SV Record

This record is used for defining the storage volumes in the storage routing of flows. These values are obtained from the storage volumes at different elevations of the ponding at the control structures provided as defined by the SE records. These values are calculated and are provided in Appendix G. Please note that the storage volumes are extrapolated to represent the proposed detention volumes.

SQ Record

This record is used to define outflow discharge data for storage routing. Please refer to Appendix F for the rating curves for storage intervals. The elements in this field indicate the discharge at different stages for the proposed structures. Appendix F includes calculations for weir flows.

5.1.2 Parameter Changes for Developed Conditions

The parameter changes depicting the developed conditions are based on the guidelines provided in the *City of Scottsdale DS & PM*. The percent impervious used in the HEC-1 modeling was increased to depict the developed conditions. For the on-site developed conditions, effective impervious percentages were calculated utilizing Figure 2.2-16 "Percent of Impervious Area vs. Dwelling Units/Acre", in Chapter 2 of the old *City of Scottsdale DS&PM*. Please refer to Appendix A for a copy of this figure.

The proposed development includes 122 lots and a clubhouse, which is considered to be an additional lot. The dwelling density is calculated as 0.373 du/acre, for a total of 123 lots and 330 acres. Based on the lot sizes (average lot size = 101,500 sq.ft), and dwelling density of 0.37 du/acre an effective impervious percentage of 10 percent was used for the proposed developed areas in the HEC-1 model. An effective impervious area of 10 percent was used for the developed areas within the project site, while 0 percent was used for the current and proposed undeveloped areas. A weighted percent impervious value was used in HEC-1 model for each drainage basin based on the proposed developed and undeveloped areas.

5.1.3 Rational Method

The Rational Method was used to compute peak discharges for watersheds less than or equal to 160 acres as a comparison with HEC-1 results. Parameters necessary for this procedure are measurement of drainage sub-basin areas, runoff coefficient ("C" values) and calculation of rainfall intensity. Runoff values are calculated using the following 100-year "C" values:

- 0.56 for undeveloped desert land with slopes less than 10% - Hydrologic Soil Group D
- 0.59 for single family residential area R1-130 – Hydrologic Soil Group D

These values are based on Figure 4-5 "Runoff Coefficients for Use with Rational Method" in the *City of Scottsdale DS&PM*. This figure is included in Appendix A. The Maricopa County Flood Control District's Drainage Design Management System (DDMS) software was used to determine the peak discharges by Rational Method.

5.1.4 Stormwater Storage

Based on the City of Scottsdale's Drainage Ordinance stormwater storage requirements, on-site stormwater storage is proposed to be provided for 100-year, 2-hour storm events. The Rational Method is used to estimate the 100-year, 2-hour stormwater storage volumes. The precipitation values for the 100-year, 2-hour storm event were obtained from the NOAA Atlas 2 Volume VIII maps. The equations used to calculate the required and provided stormwater storage volumes are presented below.

5.1.4.1 Required Stormwater Storage Volume

Stormwater storage volume required for the 100-year, 2-hour event is:

$$V_{REQUIRED} = C * \left(\frac{P}{12}\right) * A$$

Where:

- V is the required stormwater storage volume in acre-feet
- C is the weighted "C" coefficient, 0.59 for the proposed developed areas.
- P is the precipitation in inches for the 100-year, 2-hour rainfall, 2.82 inches for the proposed developed areas.
- A is the drainage area in acres

5.1.4.2 Provided Stormwater Storage Volume

Stormwater storage volume provided for the 100-year, 2-hour event is:

$$V_{PROVIDED} = \left[\left(\frac{A_1 + A_2}{2} \right) * (ELEV_2 - ELEV_1) \right]$$

Where:

- V is the provided stormwater storage volume in acre-feet
- A is the contour area in acres
- ELEV is the contour elevation

Section 3.3 of this report describes the stormwater storage provided through proposed detention basins. Assumptions that were made when determining provided volume were maximum side slopes of 4:1. Please refer to Appendix G for 100-year, 2 hour stormwater storage volume calculations.

5.2 Hydraulic Procedures

5.2.1 Hydraulic Analysis of Open Channels

The U.S. Army Corps of Engineers' HEC-RAS computer program was used for the hydraulic analysis of the washes greater than 50 cfs. HEC-RAS was used to determine the 100-year water surface elevations. Cross-sections were placed such that significant variations in the channel cross-sectional geometry are adequately represented. The Manning's 'n' value was estimated using Cowan Method based on the following parameters:

- Channel material
- Degree of irregularity
- Effects of obstruction
- Vegetation
- Variations in channel cross section
- Degree of meandering

The investigation of site photos presented in Appendix A and aerial photos provided on Plate 5, indicated gradual variations in channel cross-sections within the site and a minor degree of meandering. The vegetation on the site was minimal due to the wild fire that occurred recently and is typical of the local desert climate. The channel material was coarse gravel and the degree of irregularity was minor. Based on the above, a 'n' value of 0.032 and 0.045 were

chosen for channel bottom and channel over banks respectively. Site Photos have been included representative of on-site washes that support the "n" value determination. The site photos are included in Appendix A.

Cross-sections were placed such that significant variations in the channel cross-sectional geometry are adequately represented. Due to the steep slopes on the project site, it was not feasible to put enough cross-sections such that the difference in energy grade elevations is less than one foot (1') between cross-sections. The HEC-RAS computer program gives an error message for a difference in energy grade elevation of greater than one foot (1') between cross-sections. Hence, a wash was analyzed at an elevation difference of one foot (1') to demonstrate the impact of additional cross-sections on the HEC-RAS analysis. It was found that increasing the number of cross sections did not impact the flow depths as long as adequate cross-sections representative of the geometry of the channel are included.

5.2.2 Hydraulic Analysis of Culverts

For analysis of culvert roadway crossings the computer program HY-8 will be used during final design. HY-8 is a culvert analysis program that was developed for the Federal Highway Administration. Site characteristics and flow are entered into the program and the resulting flow regime and headwater values are calculated.

6.0 DISCUSSION ON MODELING RESULTS

6.1 Rational Method vs. HEC-1 Flows

100-year, 6-hour peak flows were calculated using both the Rational Method and HEC-1 for the off-site basins for comparison. The rational method results are included in Appendix E - *100-year Rational Method*. Provided below in Table 6.2 is a comparison of the off-site flows using the Rational Method and HEC-1 results for the 100-year 6-hour storm event.

Table 6.2:
Rational Method vs. HEC-1 Flows

Concentration Point	Rational Method Flow (cfs)	HEC-1 Flow (cfs)	Difference Rational – Hec1 (cfs)
A1	238	225	13
A2	112	103	9
B	210	192	18
H2	193	161	32
I	76	70	6
J	86	81	5
R	409	429	-20

The table indicates that for the 100-year 6-hour storm event the flow values determined by Rational Method were similar to flow values determined using the HEC-1 analysis. The flow values determined by Rational Method were higher for smaller basins and the flow values calculated by HEC-1 were higher for larger basins. A HEC-RAS hydraulic analysis was performed to determine the impact of this variation in flow values using the different hydrological methods. The 100-year water surface elevations were determined using these flow values and the results are discussed in the subsequent section.

6.2 100-Year Floodplain Delineation

The U.S. Army Corps of Engineers' HEC-RAS Version 3.1.2 was used to generate the water surface profiles for washes with 100-year flows in excess of 50 cfs. The 100-year floodplain delineation for these washes has been revised to reflect the limits of ponding that occurs because of the proposed detention basins. At this point, the final location of

the roadways has not been finalized and therefore a post-development HEC-RAS model that includes cross sections representative of the culverts has not been prepared. It is anticipated that the 100-year floodplain delineation for post-development conditions will be approximately the same as the pre-development delineation with the exception of some ponding at culvert crossings. Water surface elevations and top widths for each cross section are included on Plate 11 – *Post-Development Grading and Drainage Plan.*

The 100-year water surface elevations were computed using the peak flow values from HEC-1 and Rational Method results. Provided below is a summary of the HEC-1 and Rational Method flows and the corresponding water surface elevations.

Table 6.3:
Variation in WSE for Flows from Rational Method and HEC-1

Concentration Point	100-year flow		Water Surface Elevations		Difference in WSE
	Rational Method Flow (cfs)	HEC-1 Flow (cfs)	Rational Method (ft)	HEC-1 (ft)	Rational Method –HEC-1 (ft)
A1	238	235	2754.31	2754.3	0.03
A2	112	109	2734.62	2734.6	0.04
B	210	204	2747.05	2747.0	0.07
H2	193	172	2731.65	2731.60	0.04
I	76	73	2755.89	2755.89	0.03

The table indicates that the water surface elevations calculated using flows estimated by Rational Method and HEC-1 change by only up to 0.05 feet. Appendix F provides the detailed HEC-RAS results for all the washes.

7.0 DRAINAGE PLAN REQUIREMENTS

7.1 Drainage System Requirements

The existing drainage patterns will be maintained in their natural location and condition where possible. The site is being developed as large custom lots with an average lot size of 101,500 sq.ft. As lots are developed, individual lot engineering will be required to provide drainage documentation to substantiate the development of the lot. In the event of any future development within the off-site watershed areas, it will be the responsibility of the future developer to attenuate the post-development flows and volume to at or below the pre-development values.

7.2 Easement Requirements

Where flows from the 100-year storm event are greater than 50 cfs, drainage easements will be provided. In addition, drainage easements shall be dedicated to the limits of inundation for the 100-year, 2-hour storm event in each detention basin.

7.3 Roadway Crossing Requirements

In all cases the depth of flow over streets will be in accordance with City of Scottsdale Flood Plain and Drainage Ordinance.

7.4 Maintenance

Ongoing maintenance of the designed or recommended drainage systems is required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. It is the responsibility of private developers, homeowner associations, etc. to maintain facilities on private property, within all drainage easements, private streets, and right-of-ways unless accepted by the City for maintenance. A regular maintenance program is required so that drainage systems perform to the level of protection or service as presented in this report and the project's plans and specifications.

7.5 Scour Protection

The need for scour protection will be identified as part of the final drainage reports for each phase of this project. Because of the relatively small peak flow values and incised nature of the on-site washes, development setbacks will most likely be utilized rather than bank protection schemes if required.

7.6 Annual Sediment Yield

Sediment yield is defined as that portion of eroded material that travels through a drainage system to a downstream measuring or control point (*Bureau of Reclamation 1987*). The units used for this study are acre-feet/square mile/year (ac-ft/sq.mi./yr.). The prediction of sediment yields is not an exact science. Many complex variables influence the erosion process and any sediment yields analysis requires considerable engineering judgment. For this reason, two (2) methods were used to arrive at a conservative estimate of the average annual sediment yield rate. The following sections provided a detailed discussion of each method and its results.

Sediment yield was calculated using the Pacific Southwest Inter-Agency Committee (PSIAC) method. This method was obtained from the following source: Pacific Southwest Inter-Agency Committee, *Report of the Water Management Subcommittee on Factors Affecting Sediment Yield in the Pacific Southwest Area and Selection and Evaluation of Measures for Reduction of Erosion and Sediment Yield*, October, 1968.

Nine (9) factors are evaluated in determining the sediment yield classification. These are geology, soils, climate, runoff, topography, ground cover, land use, upland erosion, and channel erosion and sediment transport. Characteristics of each of the nine factors, which give that factor high-, moderate-, or low-sediment yield, are evaluated and the factor is assigned a numerical value representing its significance in the yield rating. The yield rating is the sum of values for the appropriate characteristics for each of the nine factors. For the purpose of avoiding complexity, the factors are generally described as independently influencing the amount of sediment yield. Table 7.6 provides the sediment yield classification based on sediment yield rating.

Table 7.6
Sediment Yield Classification Table

Classification	Rating	Sediment Yield acre-ft/sq. mile
1	> 100	3.0
2	75 – 100	1.0 – 3.0
3	50 – 75	0.5 – 1.0
4	25 – 50	0.2 – 0.5
5	0 – 25	< 0.2

Application of the nine sediment yield factors to the watershed discussed in this report generated a total numerical rating of 77 to 85, the actual rating being dependant upon the interpretation of the guidelines that are used to assign rating values to each factor. Regardless of the actual number, i.e. 77 or 85, both values fall within Classification 2 (75 – 100), which indicates a sediment yield range of 1.0 to 3.0 ac-ft/sq.mi./yr.

7.6.1 Bureau of Reclamation Sediment Surveys

The 1987 edition of *Design of Small Dams* (BuRec) publishes data on sediment measurements from 28 reservoirs in semi-arid regions of the United States. A regression line through these data points produces the following equation:

$$Q_s = 1.84\, A^{-0.24}$$

Where:

Q_s = annual sediment yield (ac-ft/sq.mi./yr.)

A = drainage area (sq.mi.)

Using a drainage area size of 1.95 sq.mi., this equation predicts an annual sediment yield of 1.57 ac-ft/sq.mi./yr. or 4,920 cubic yards.

7.6.2 Recommended Annual Sediment Yield

In consideration of the complex processes under investigation, the two (2) methods used exhibit fairly good agreement. Based on comparison of sediment yield calculations to actual sediment yield measurements, Renard & Stone (1981) concluded that "the PSIAC method appears to give the best results for the amount of work required to make the estimate." Based on the results of the sediment yield equations, a design value of 1.6 ac-ft/sq.mi./yr. was selected.

7.6.3 Short-/Long-Term Aggradation, Degradation, Local Scour, and Deposition

Sediment transport analyses need to distinguish between short-term and long-term changes. Short-term changes are event specific and occur to some extent during each flood hydrograph. Examples of short-term changes would be local scour, general scour, bend scour, bedform troughs, and to some extent low-flow channel incisement. With the exception of low-flow channel incisement, any visual signs of these processes may be difficult to detect after the flow has subsided. Short-term scour processes can usually be quantified with empirical and/or theoretical relationships.

Vertical incisement of the channel bed can occur in response to the following six (6) processes:

1. Long-term degradation,
2. Local scour,
3. General scour,
4. Bend scour,
5. Low-flow channel incisement, and
6. Antidune troughs.

Precise prediction of long-term channel impacts can be much more elusive than their short-term counterparts because of the time span involved and the numerous variables that impact long-term changes. The major drainage corridors within the project site will be designed as protected channels.

7.7 Protective Devices

Roadway crossing culverts will incorporate rip rap at both the inlet and the outlet to dissipate energy and provide flow line scour protection. Detention basins upstream of the roadways will incorporate a protected overflow area (using native rip rap and filter fabric) in the event of overtopping. The bleed-off pipes will also incorporate rip rap protection.

8.0 CONCLUSIONS

8.1 Overall Project

1. The project site is located within FEMA Zone "X" (shaded), and Zone "D" as shown on Plate 2.

2. The major watercourses traversing through the project will be maintained in their natural location and condition, and will not be re-aligned wherever possible.

3. Drainage corridors have been designated for the identified washes in accordance with the appropriate City of Scottsdale ordinance requirements.

4. It is being proposed that online detention on the upstream side of the road culvert crossings and other strategic locations be provided to reduce post-development flows to at or below pre-development levels, and for 100-year, 2-hour stormwater storage. Some of the detention basins are sized at a depth greater than three feet (3'), due to ESLO and NAOS constraints.

5. The post-development peak flows for the 2-year, 10-year and 100-year, 6-hour storm events are reduced to at or below the pre-development flows.

6. The stormwater detained will be drained within 24 hours through bleed-off pipes with orifice plates.

7. The design of hydraulic structures is to be based on generally accepted engineering practices and in accordance with City of Scottsdale requirements.

8. On-going maintenance is required for all drainage systems in order to assure design performance.

9. All finished floor elevations are to be designed to be above the 100-year water surface elevation.

8.2 Project Phasing

The project site is proposed to be developed in four phases. For the completion of the site, a final drainage report will be prepared for each phase of the project. The development requirements will be met independently for each phase.

9.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual Chapter 2 Drainage*, December, 1999.
2. City of Scottsdale, *Design Standards and Policies Manual Chapter 4 Drainage*, June, 2005.
3. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona: Volume I – Hydrology,* revised January 1995.
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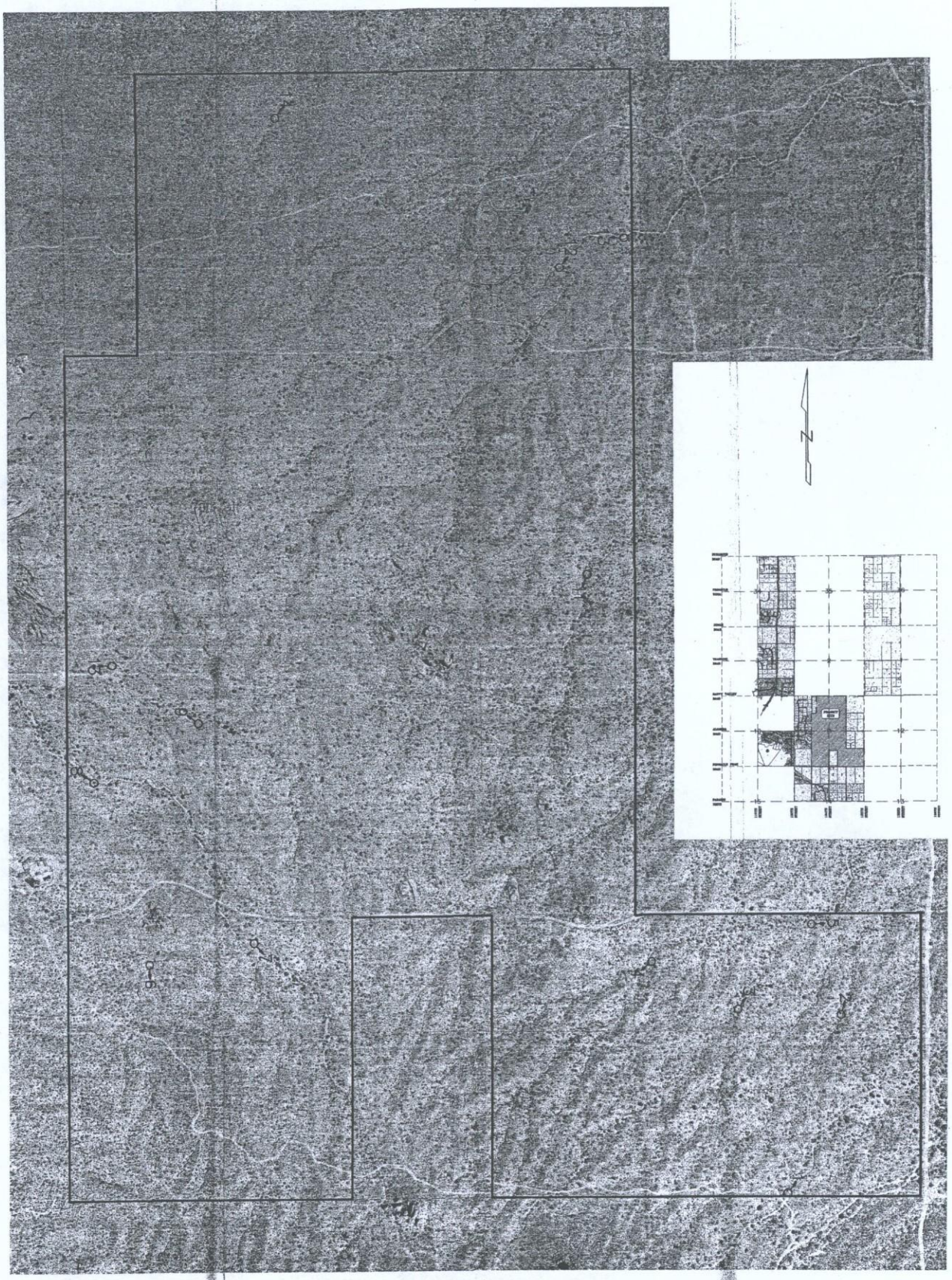
10. Flood Control District of Maricopa County, Drainage Design Management System for Windows.
11. Flood Control District of Maricopa County, Drainage Design Management System.
12. Pacific Southwest Inter-Agency Committee, *Report of the Water Management Subcommittee on Factors Affecting Sediment Yield in the Pacific Southwest Area and Selection and Evaluation of Measures for Reduction of Erosion and Sediment Yield*, October 1968.
13. Design of Small Dams, 1987 Edition.

APPENDIX A

Supporting Information for Parameter Selection

- Site Photo Vicinity Map
- Site Photos
- Soil Survey Data
- FCDMC Rainfall Data
- Precipitation Maps
- Runoff Curve Numbers and Percent Impervious Area Chart
- Resistance Factor for Overland Flow
- Runoff Coefficients for use with Rational Method



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McDOWELL MOUNTAIN BACK BOWL

SITE PHOTO VICINITY MAP

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Fax: (602) 335-8580

DESIGNER	
CAD TECHNICIAN	K. LOPEZ
SCALE (HORIZ)	1" = 200'
SCALE (VERT)	N/A
DATE	02/15/08
JOB NUMBER	042054
SHEET	1 OF 1

Photo 1

Photo 2

WOOD/PATEL
042054

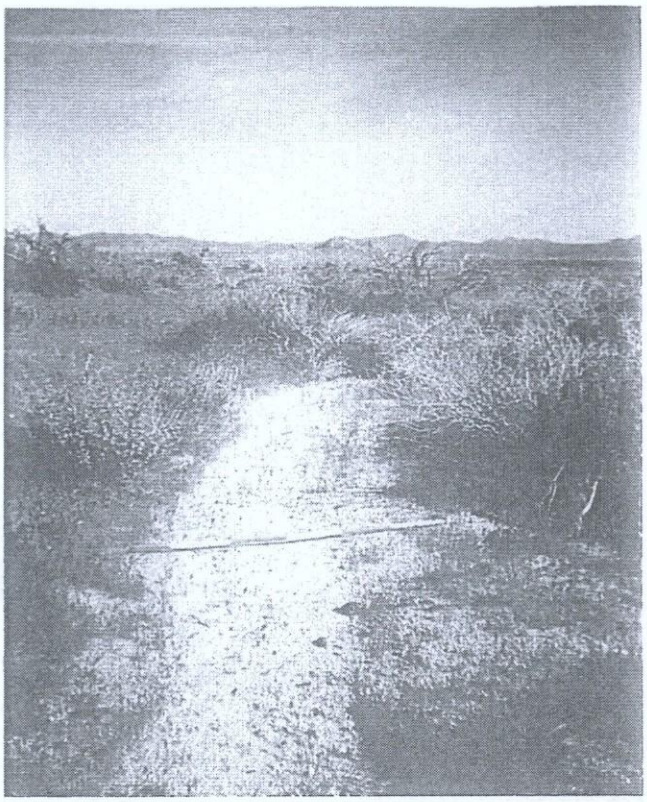


Photo 3

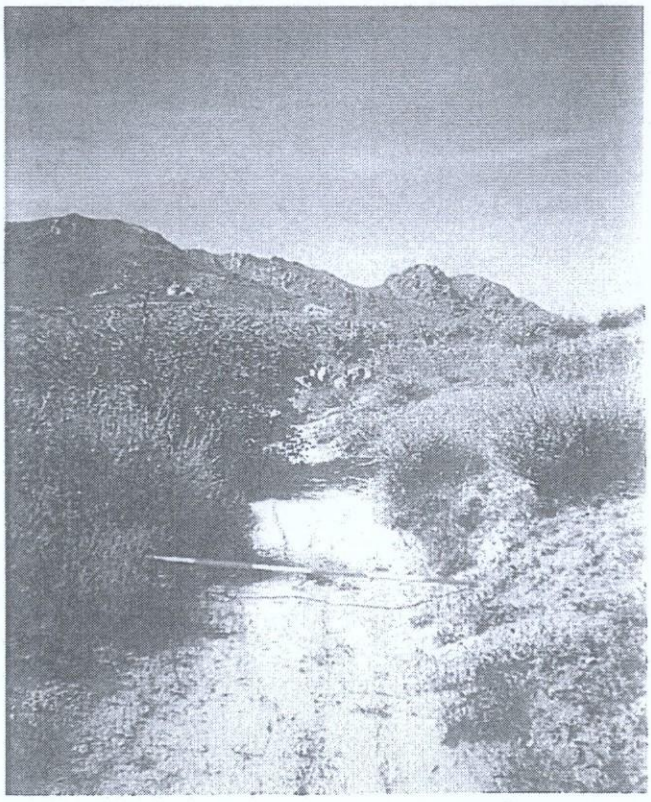


Photo 4

Flood Control District of Maricopa County
042054 - Sereno Canyon

Sub Basin Data - Rational Method

5/11/2006

Sub Basin	Sub Basin Parameters					Return Period (Years)					
	Area (acres)	Length (ft)	Slope (ft/ft)	Kb		2	5	10	25	50	100
A1	57.40	4,754	0.0747	0.056	Q (cfs)	65	96	116	164	205	238
A2	22.70	2,100	0.0833	0.061	Q (cfs)	33	46	55	77	97	112
B	49.40	3,200	0.0469	0.057	Q (cfs)	58	84	102	143	179	210
H2	45.90	3,350	0.0493	0.057	Q (cfs)	54	76	95	133	166	193
I	16.10	2,012	0.0572	0.063	Q (cfs)	22	30	37	52	65	76
J	15.60	920	0.0761	0.064	Q (cfs)	27	37	44	61	75	86
R	97.30	4,300	0.0605	0.053	Q (cfs)	109	162	197	277	347	409

Project: *SERENO CANYON*
Location: *City of Scottsdale*
Date: *09-May-06*
References: *Drainage Design Manual for Maricopa County, Volume I-Hydrology*
City of Scottsdale Engineering & Design Standards

Project Number: *042054*
Project Engineer: *Gordon W. Wark, P.E.*

RATIONAL METHOD CALCULATIONS: OFF-SITE FLOW

* Summary of Rational Method values using Flood Control District of Maricopa County DDMSW Software

Concentration Point	Area		"C" Value	Length of Area	2 - Year			10-Year			100-Year		
	(sq ft)	(ac)		(ft)	T_c (min)	Intensity (in/hr)	Q (cfs)	T_c (min)	Intensity (in/hr)	Q (cfs)	T_c (min)	Intensity (in/hr)	Q (cfs)
A1	2,502,397	57.4	0.56	4,754	16	2.5	65	13	4.5	116	11	7.4	238
A2	989,311	22.7	0.56	2,100	10	3.2	33	8	5.4	55	7	88.0	112
B	2,153,597	49.4	0.56	3,200	15	2.6	58	12	4.6	102	10	7.6	210
H2	1,998,065	45.9	0.56	3,350	15	2.6	54	12	4.6	95	10	7.5	193
I	700,376	16.1	0.56	2,012	11	3.0	22	9	5.1	37	8	8.4	76
J	678,947	15.6	0.56	920	6	3.8	27	5	6.3	44	5	9.9	86
R	4,238,208	97.3	0.56	4,300	16	2.5	109	13	4.5	197	10	7.5	409

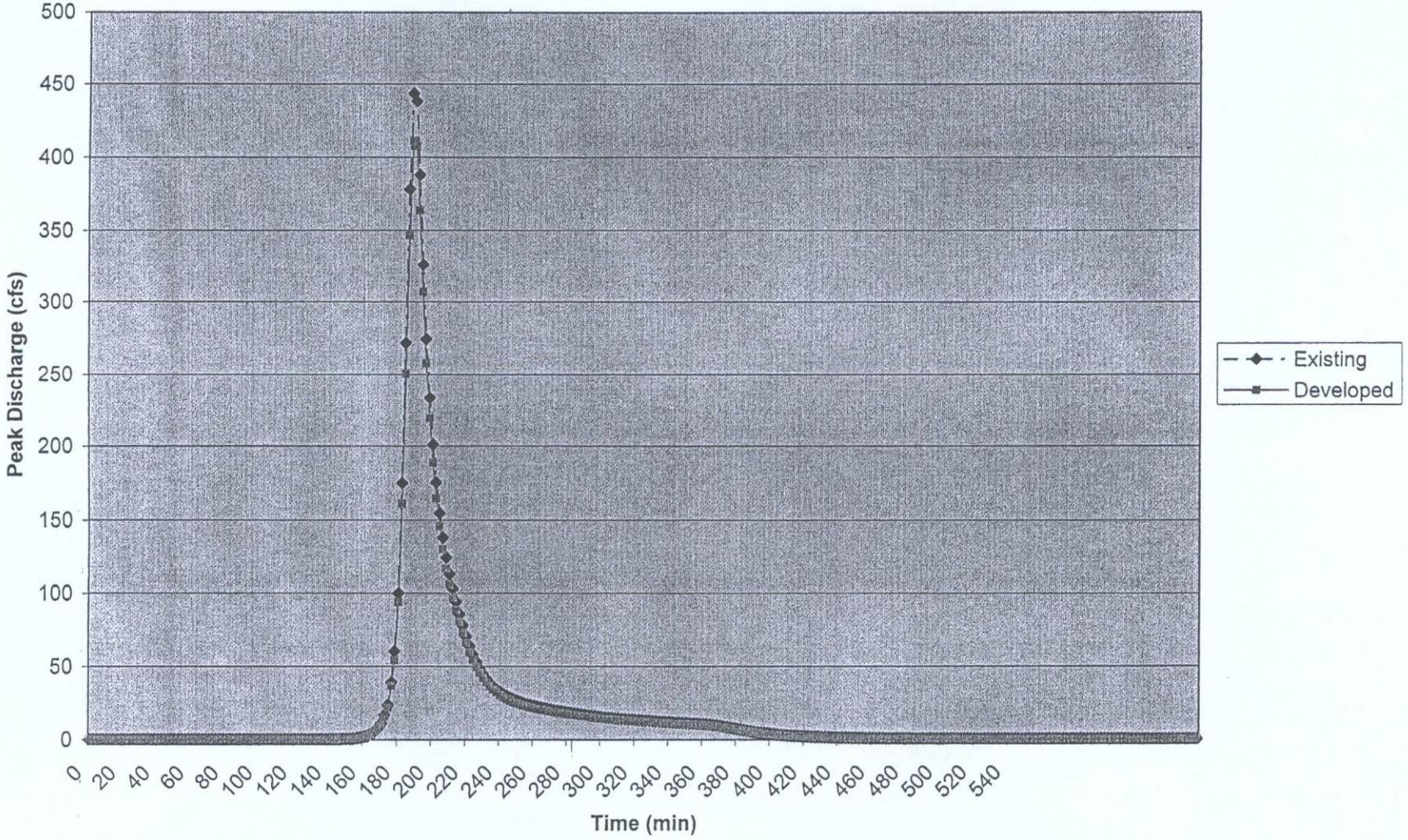
Notes:

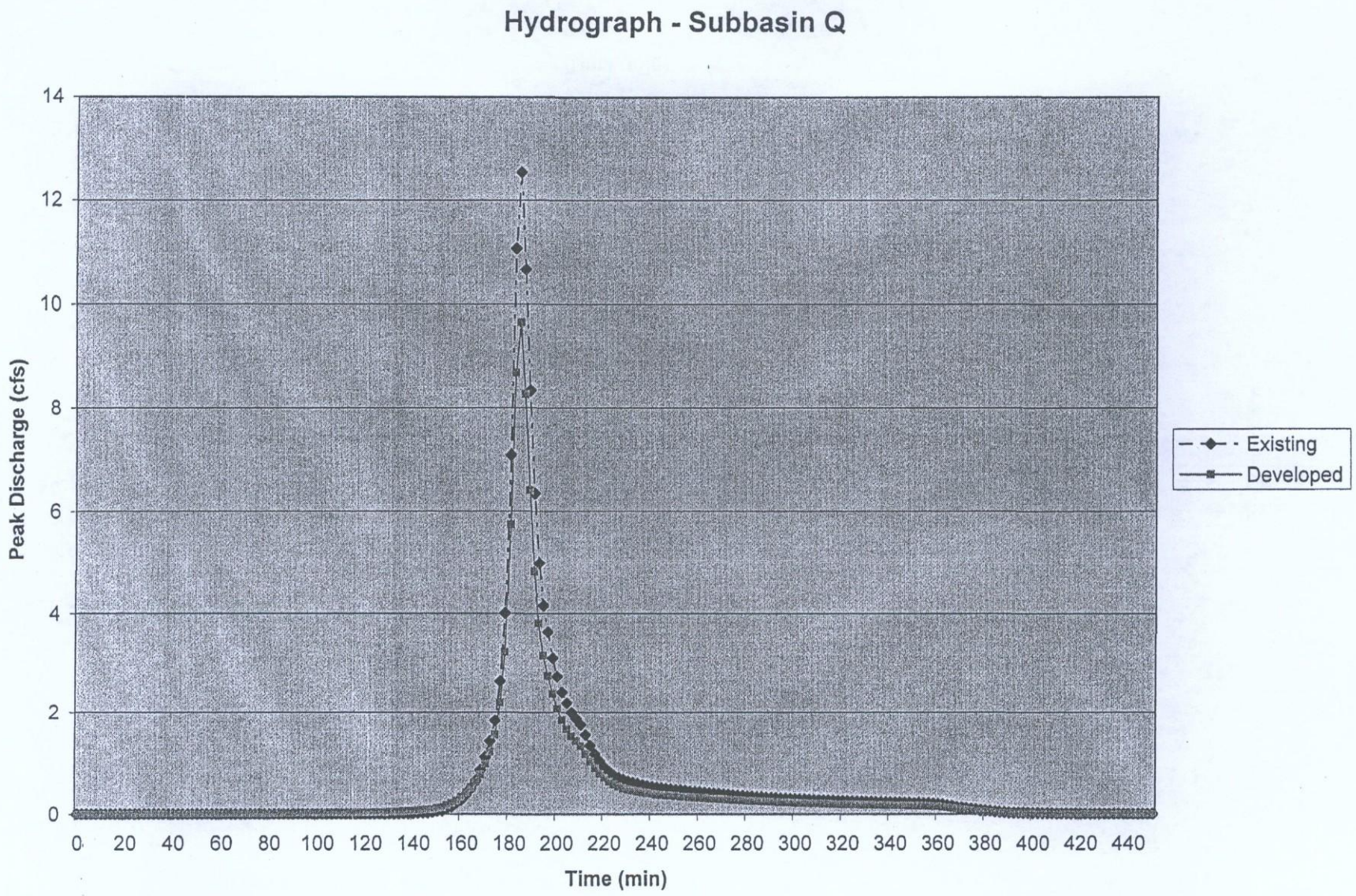
"C" value is based on hydrologic soil group D from Figure 4-5 in the City of Scottsdale DSPM, according to the SCS Classification of Soil #61, Gran Wickenburg.

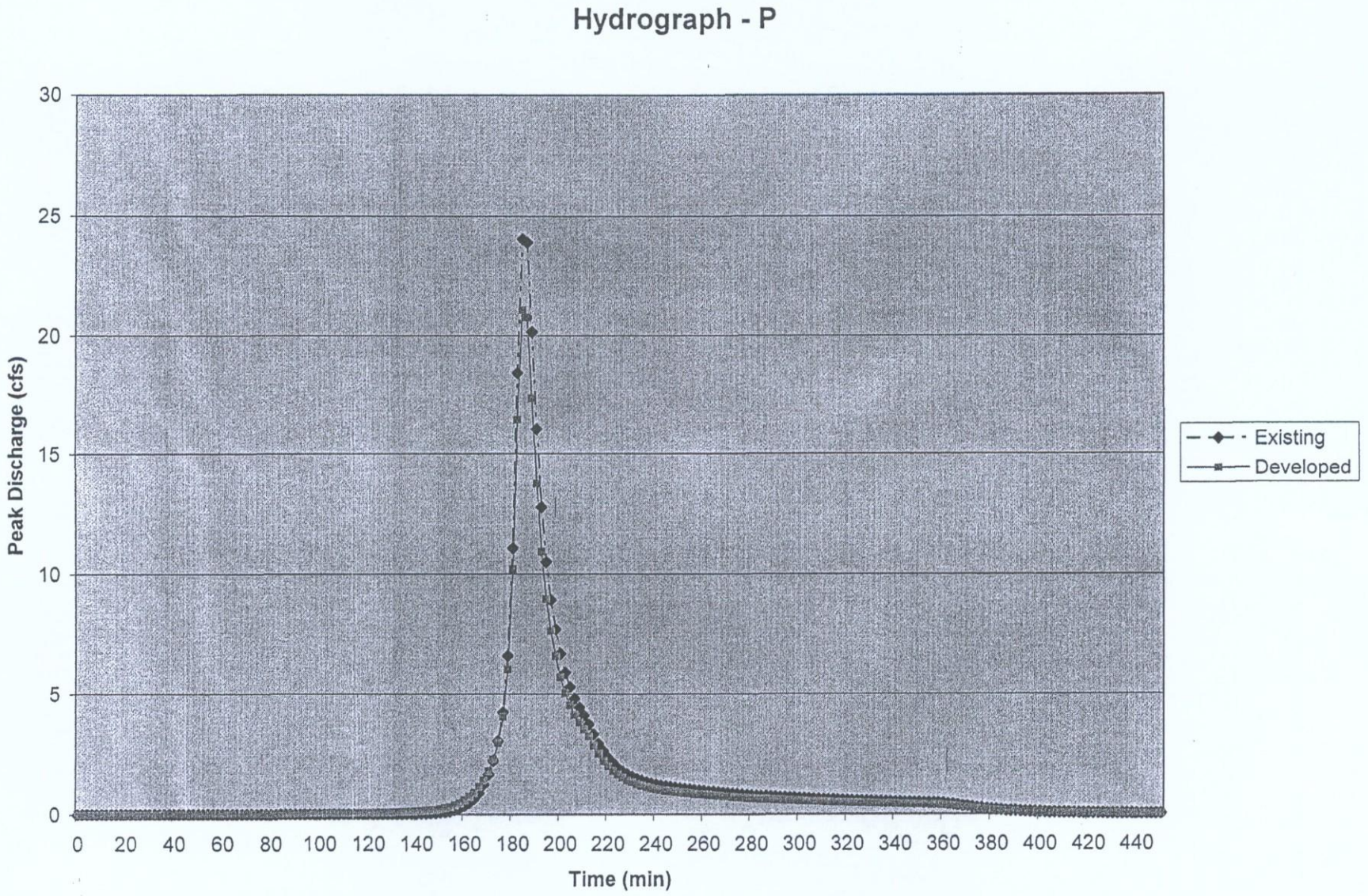
APPENDIX E

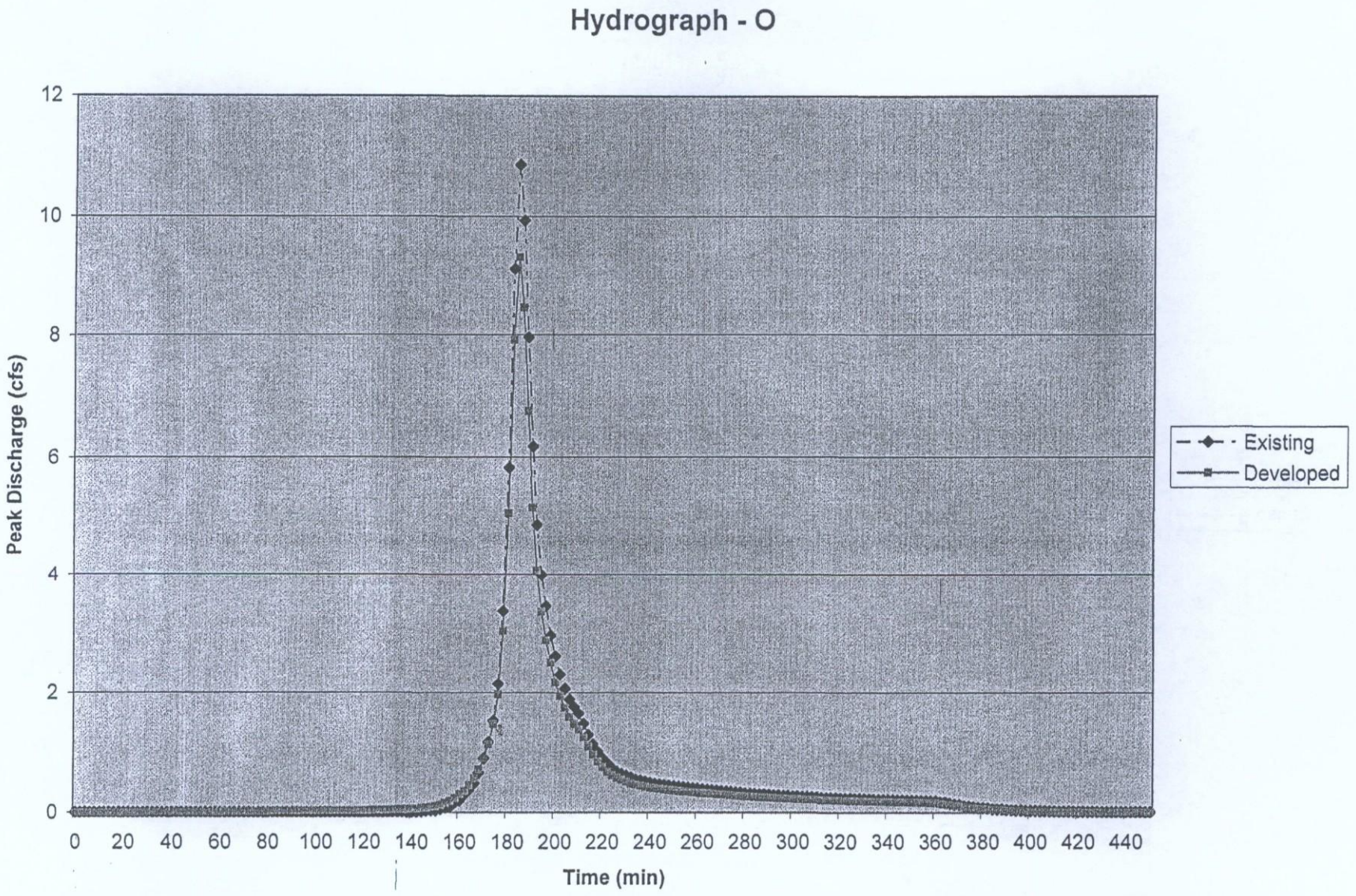
100-year Rational Method

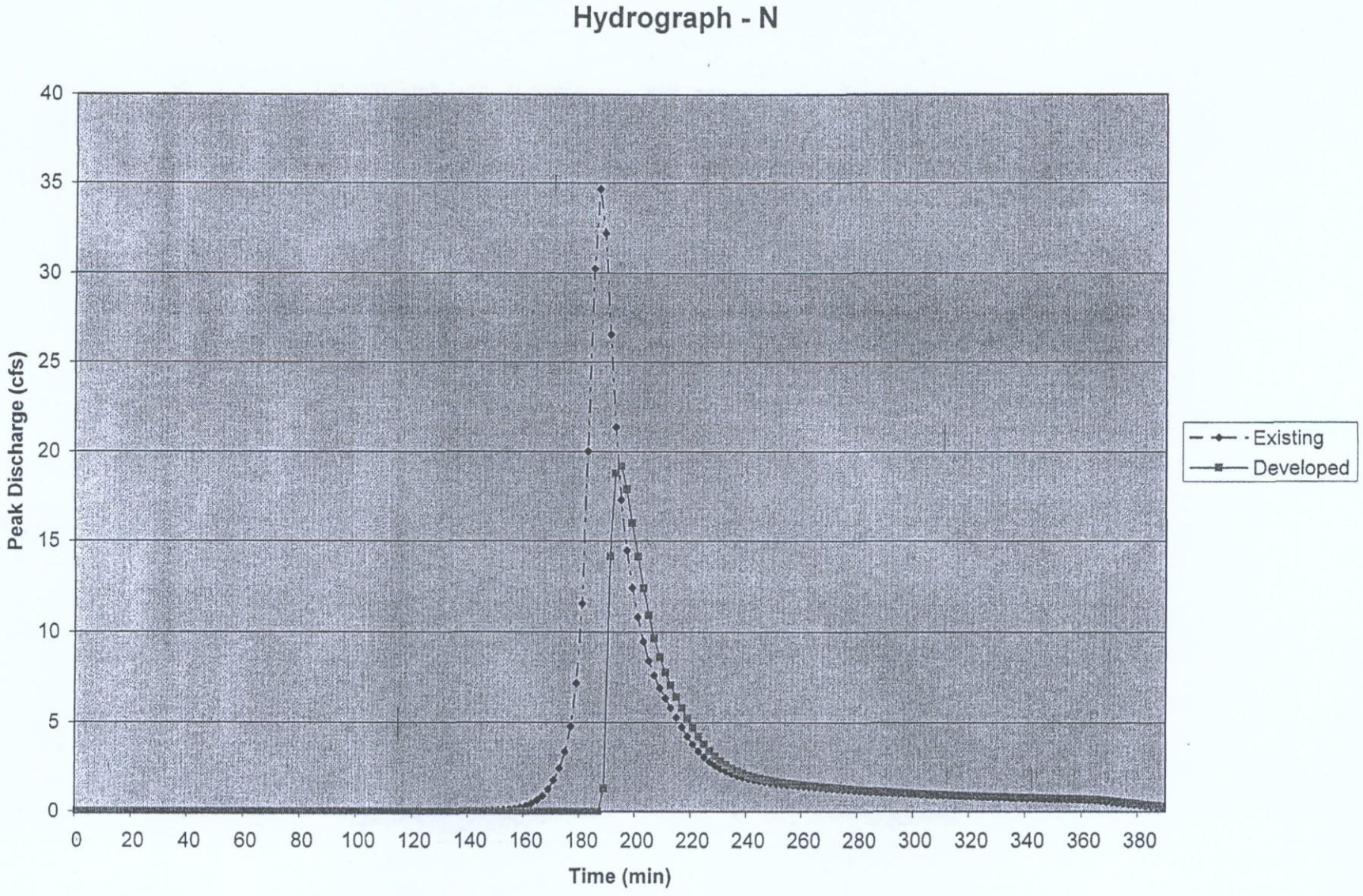
Hydrograph - Subbasin R

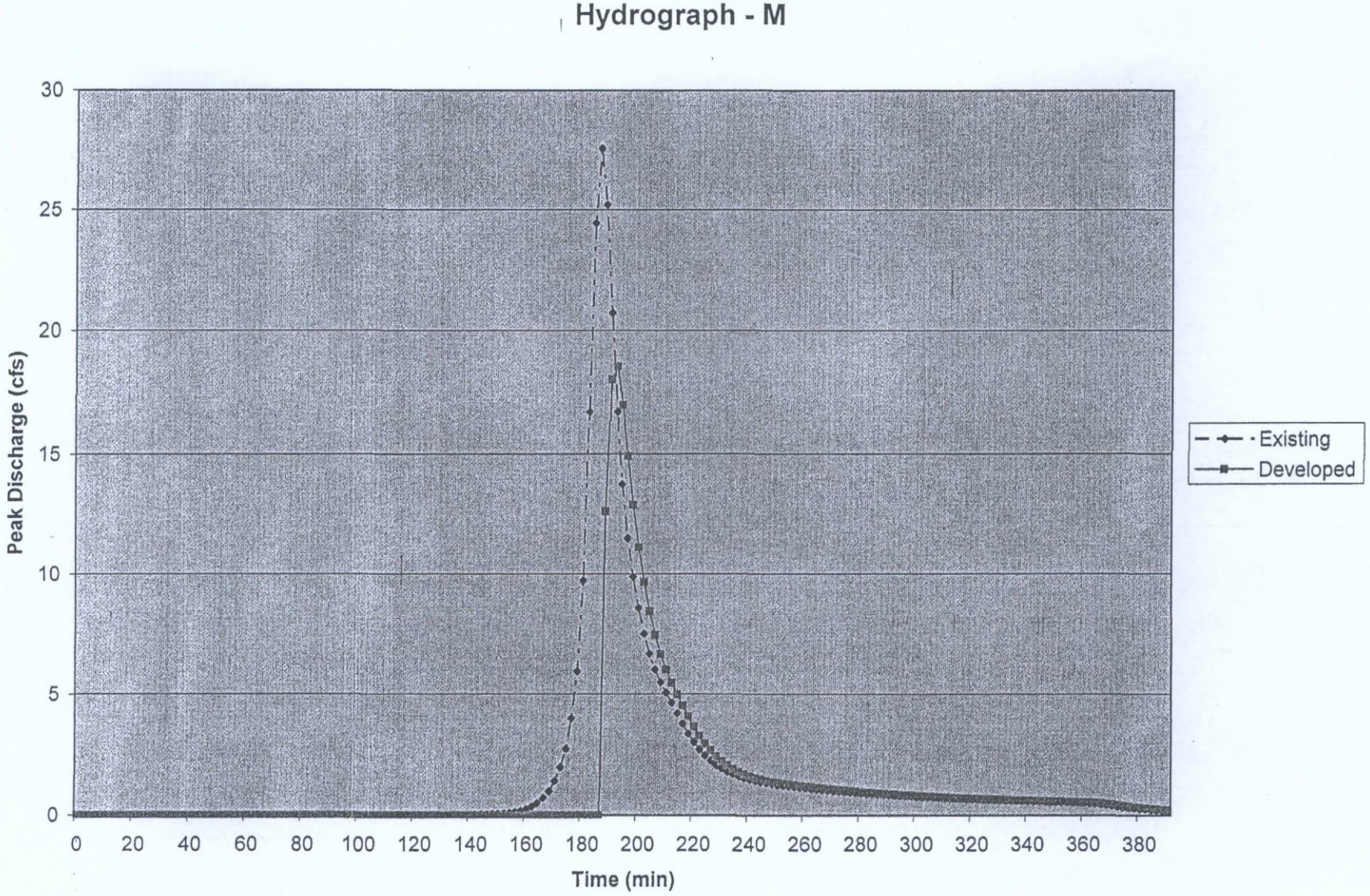


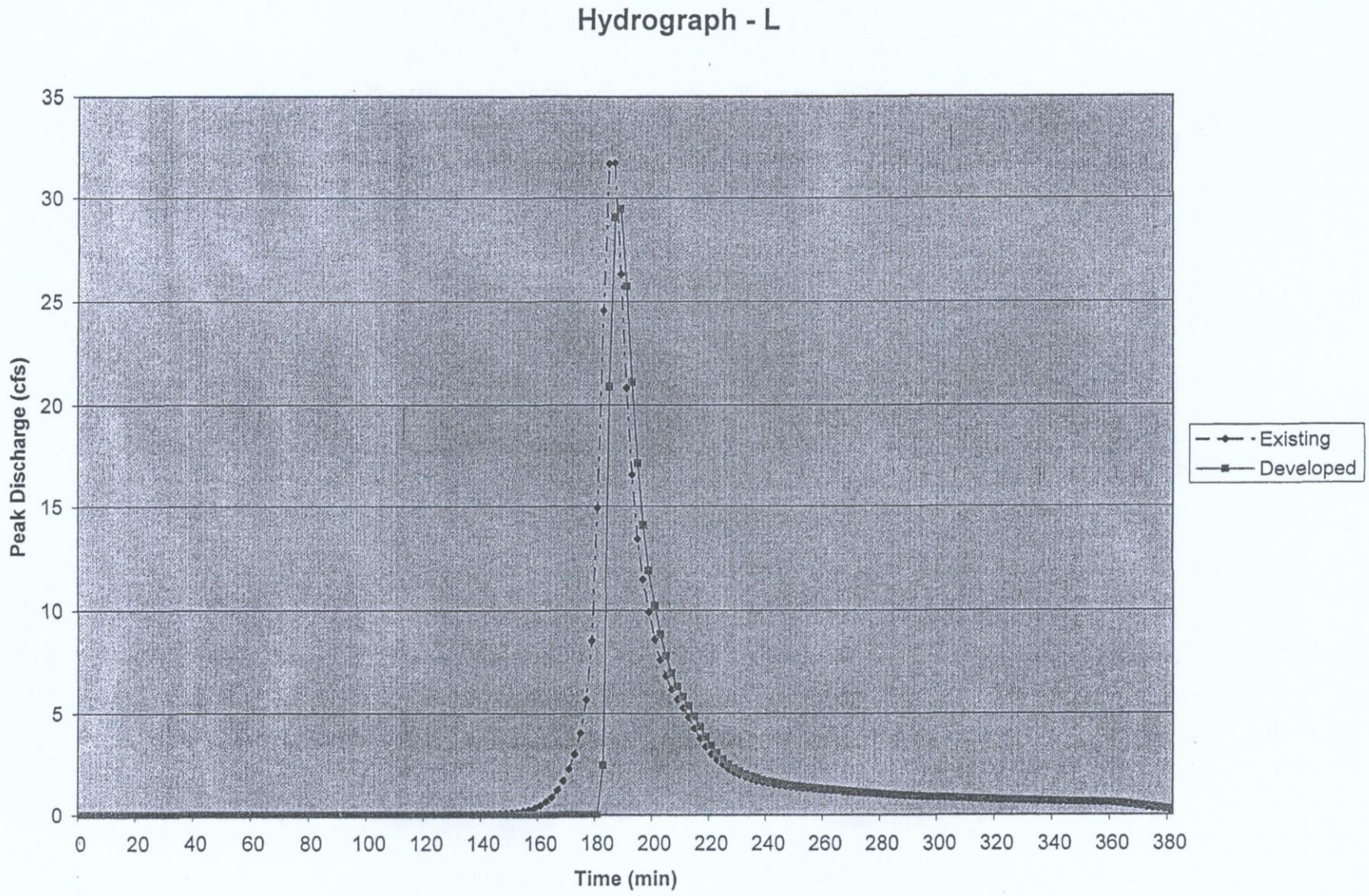

Hydrograph - Subbasin Q
Peak Discharge (cfs)
0
2
4
6
8
10
12
14
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

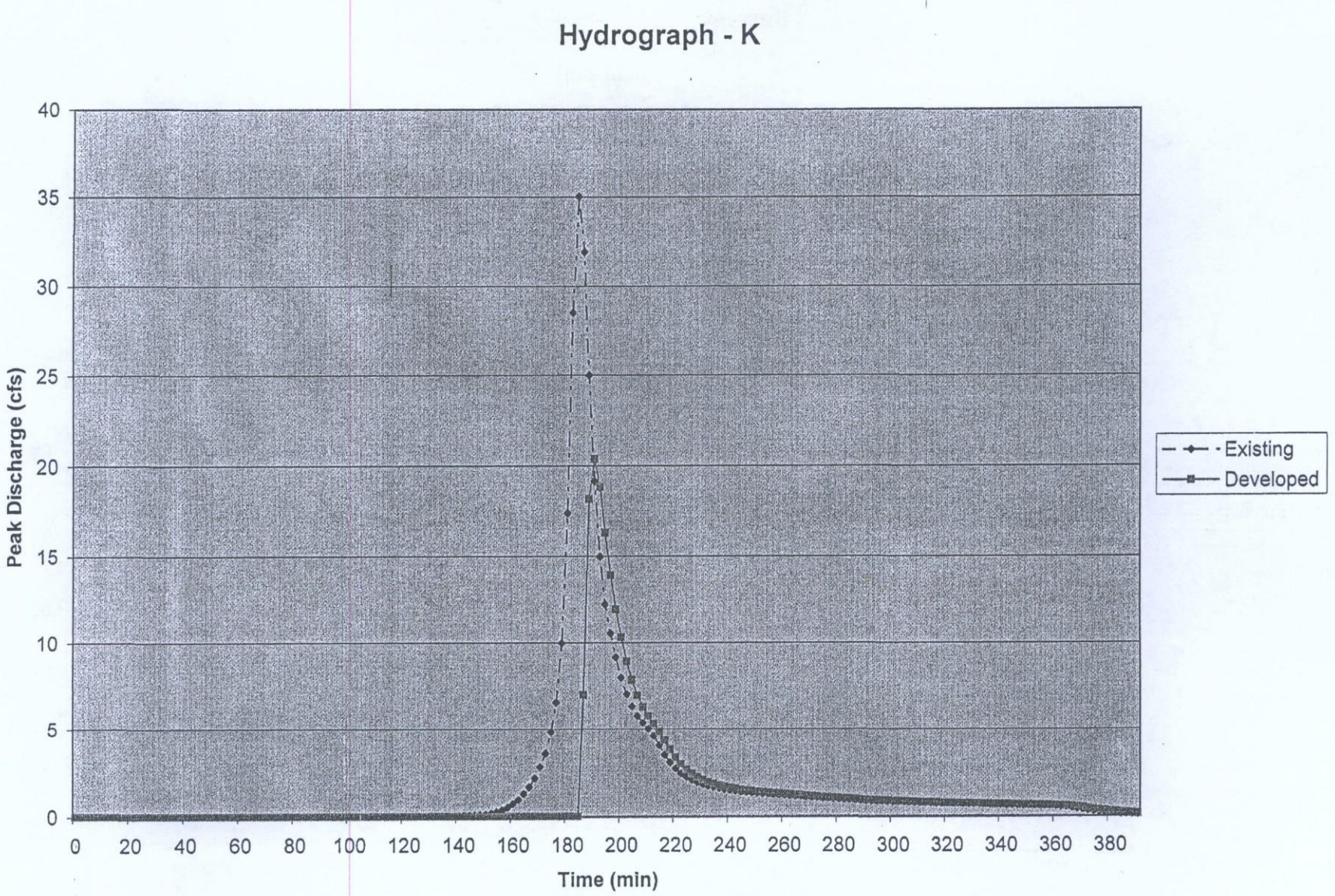

Hydrograph - P
Peak Discharge (cfs)
30
25
20
15
10
5
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed


Hydrograph - O
Peak Discharge (cfs)
12
10
8
6
4
2
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

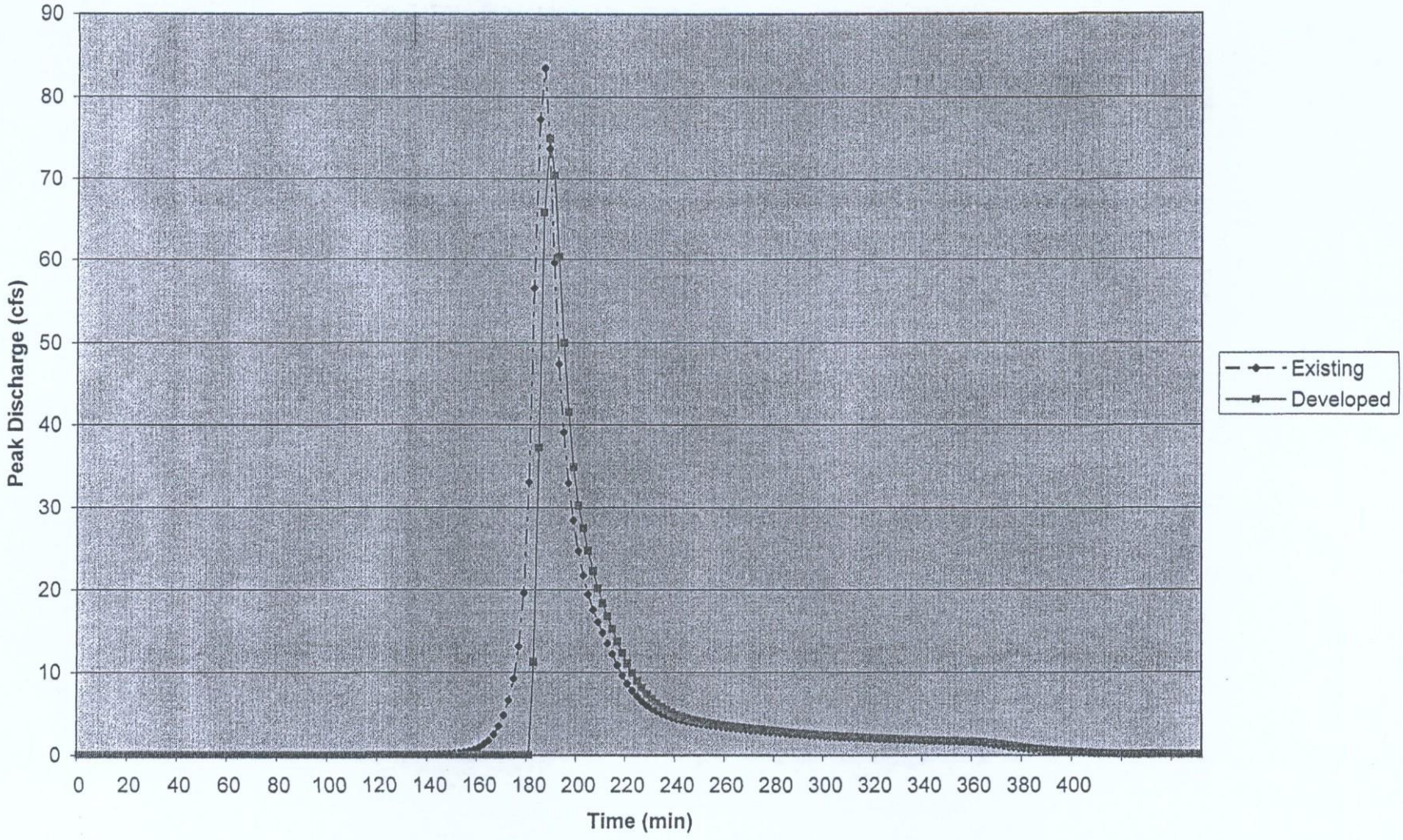

Hydrograph - N
Peak Discharge (cfs)
0
5
10
15
20
25
30
35
40
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
Time (min)
Existing
Developed

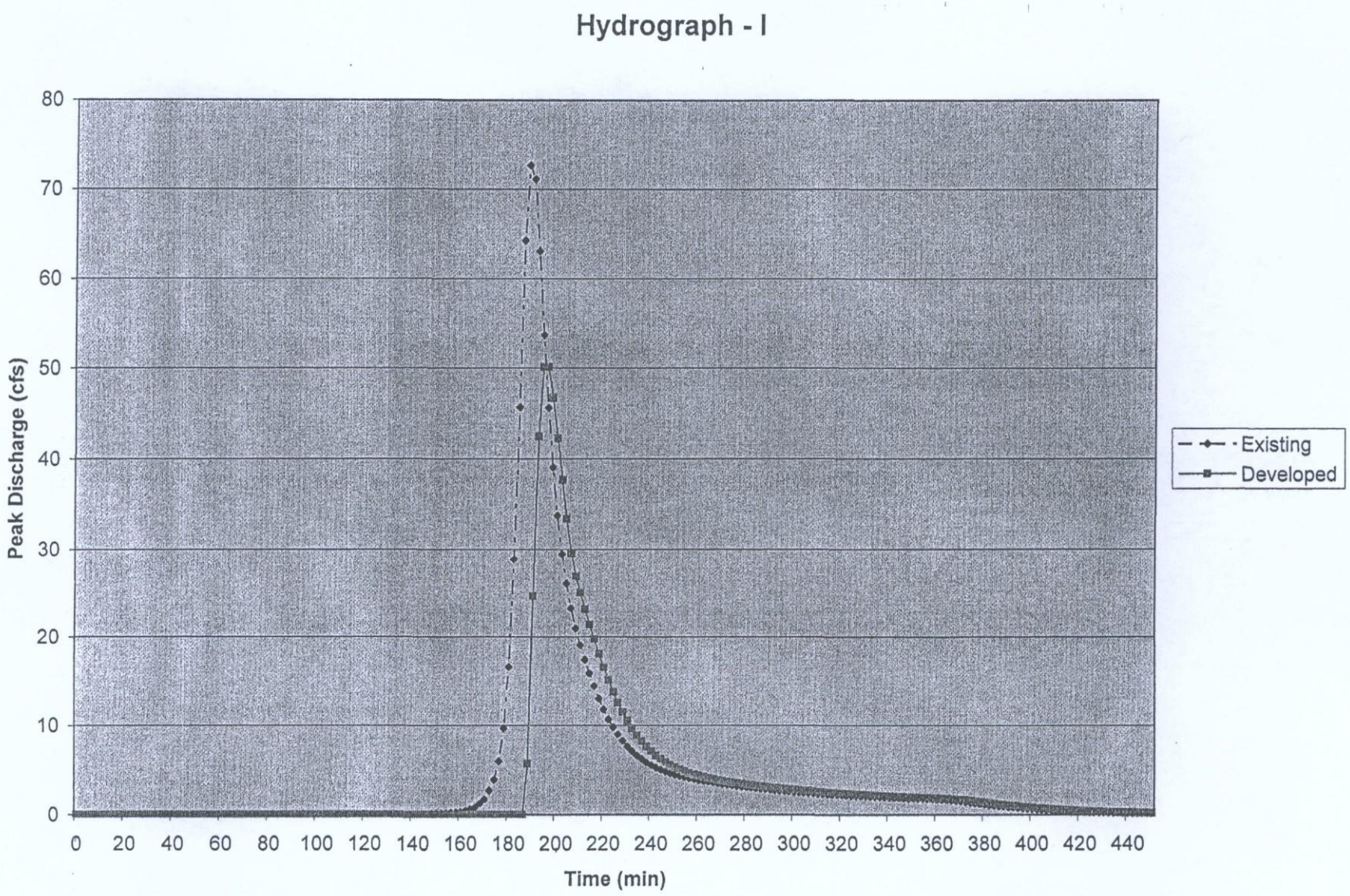

Hydrograph - M
Peak Discharge (cfs)
30
25
20
15
10
5
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380
Time (min)
Existing
Developed

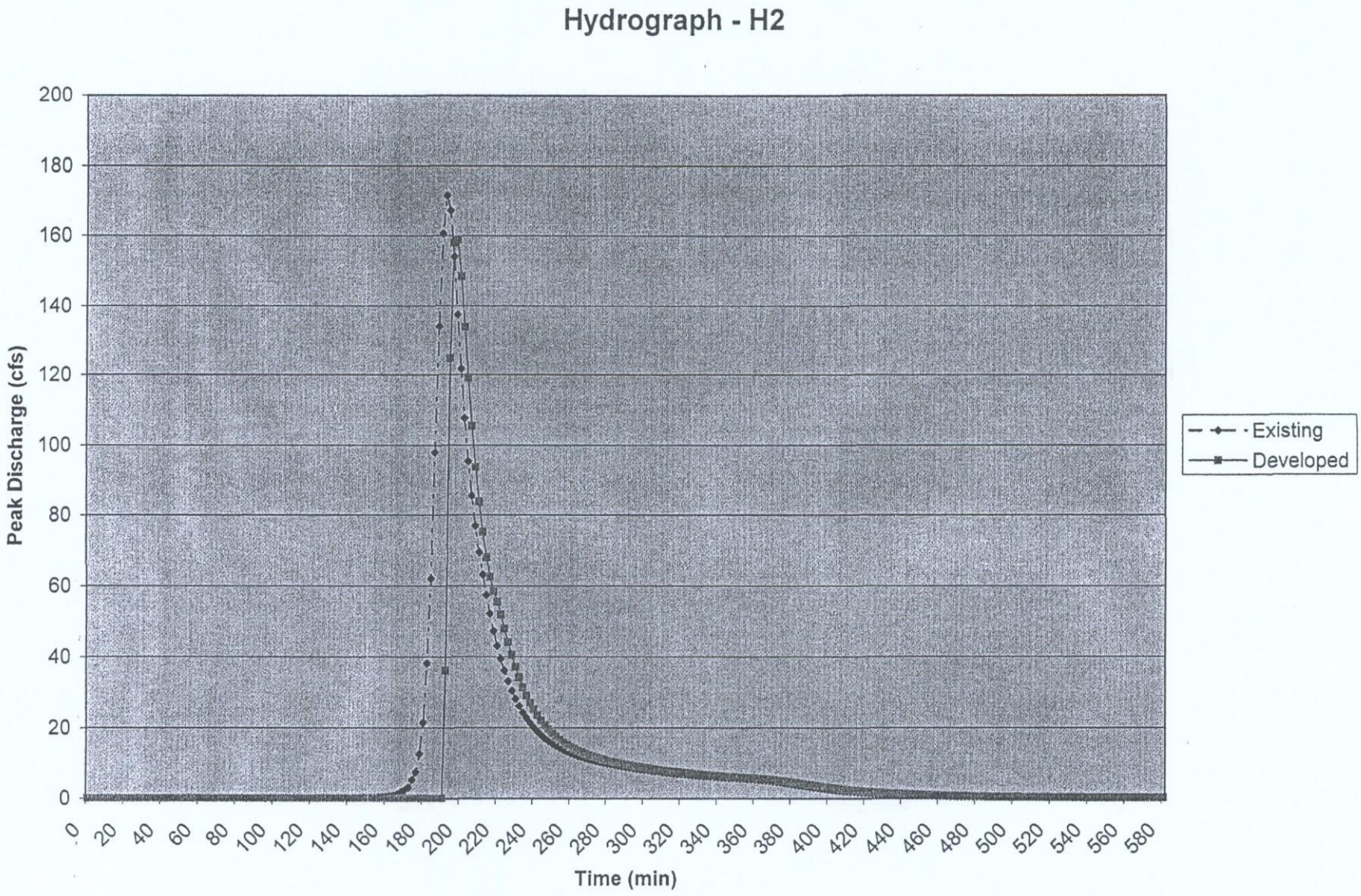

Hydrograph - L
Peak Discharge (cfs)
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
Time (min)
Existing
Developed

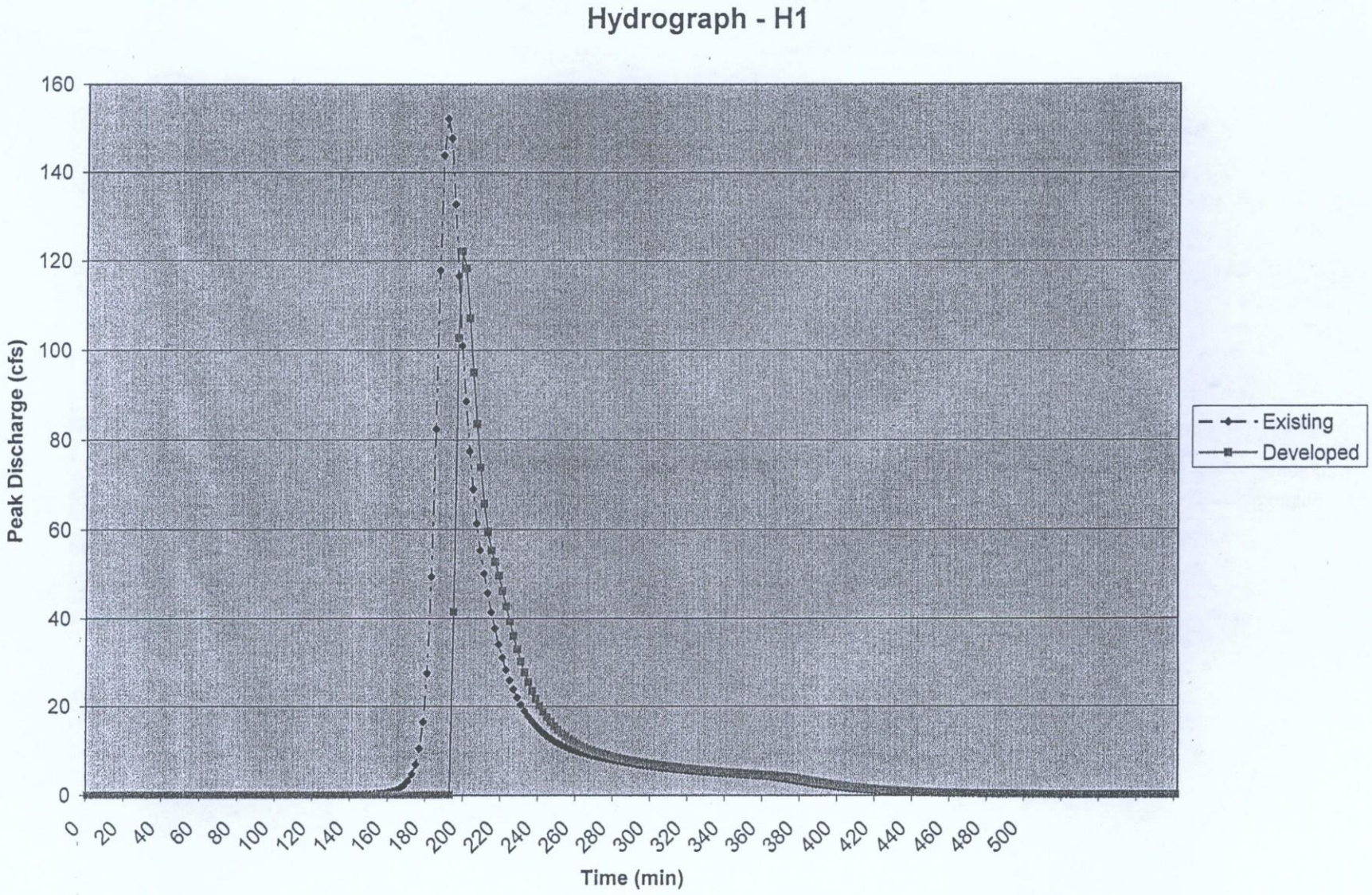

Hydrograph - K
Peak Discharge (cfs)
0
5
10
15
20
25
30
35
40
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
Time (min)
Existing
Developed

Hydrograph - J

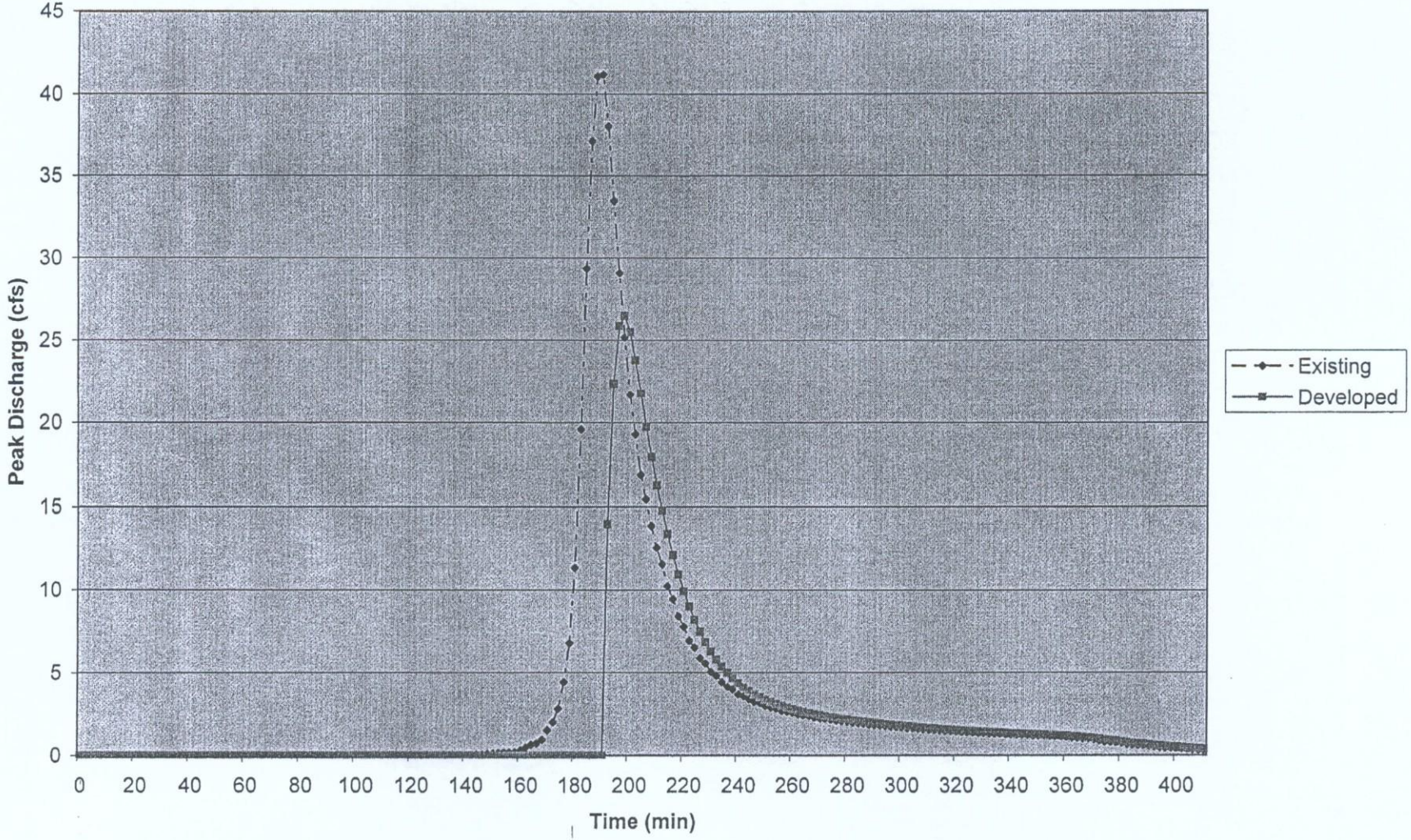



Hydrograph - I
Peak Discharge (cfs)
80
70
60
50
40
30
20
10
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

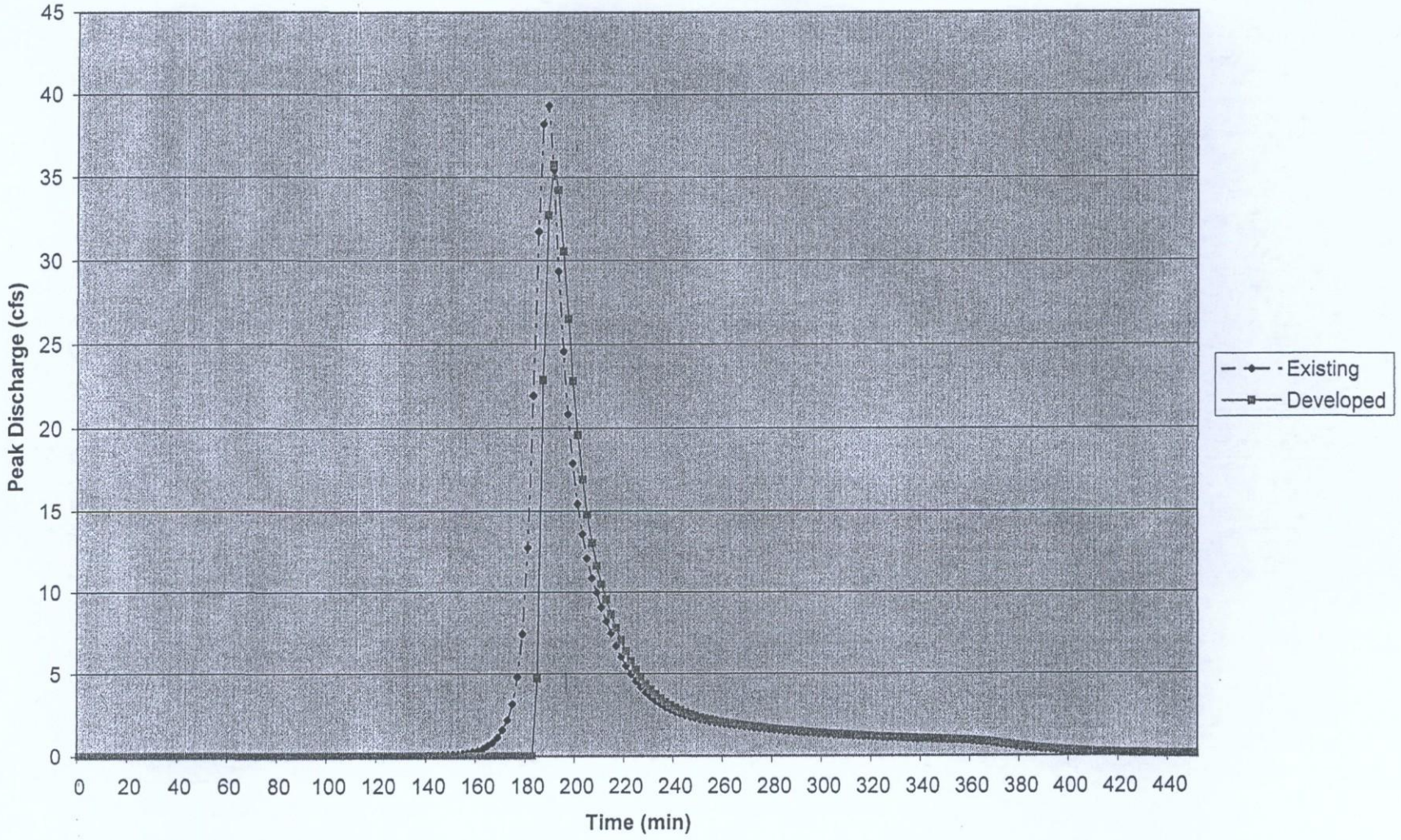

Hydrograph - H2
Peak Discharge (cfs)
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
580
Time (min)
Existing
Developed

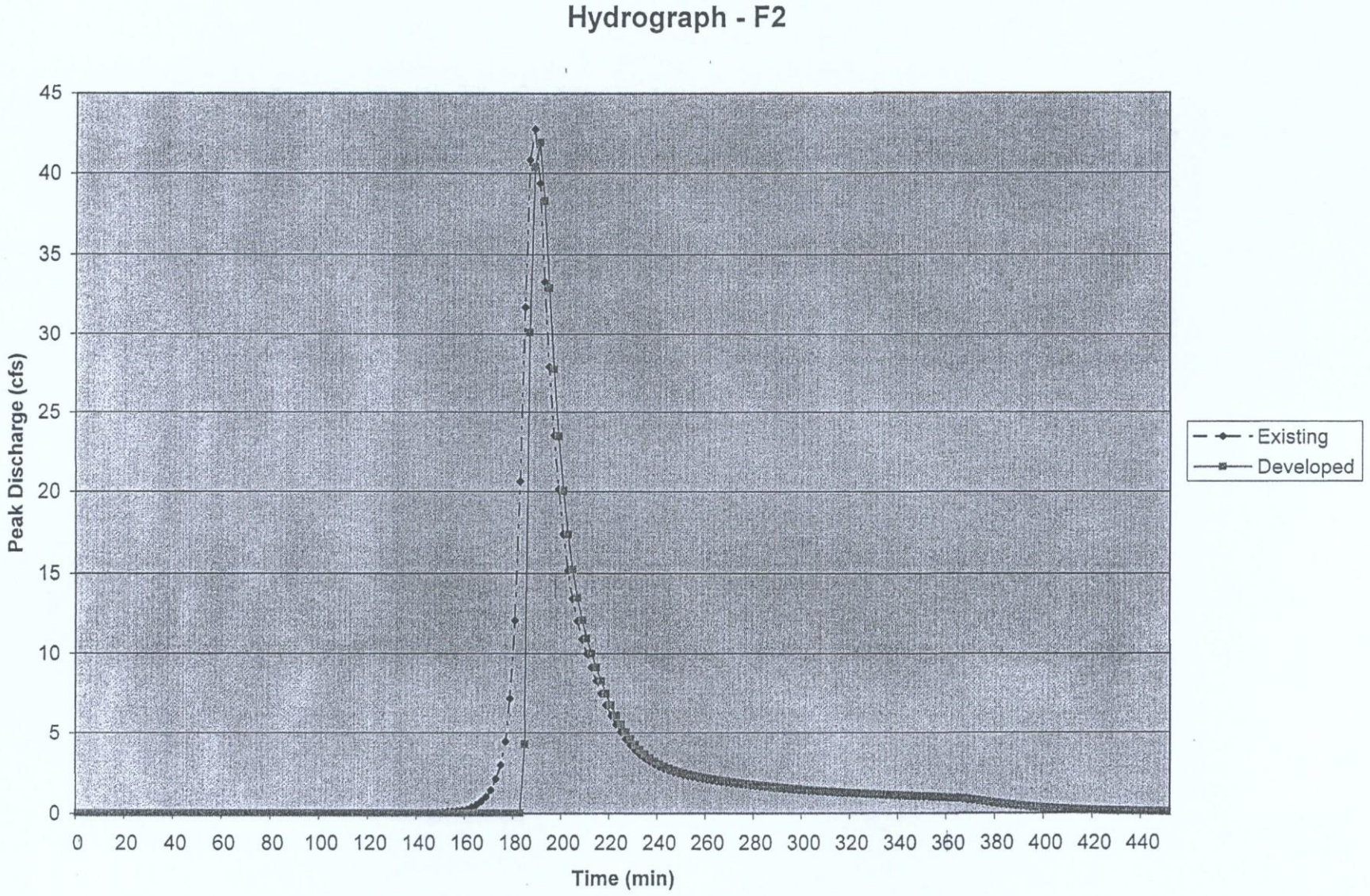

Hydrograph - H1
Peak Discharge (cfs)
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
Time (min)
Existing
Developed

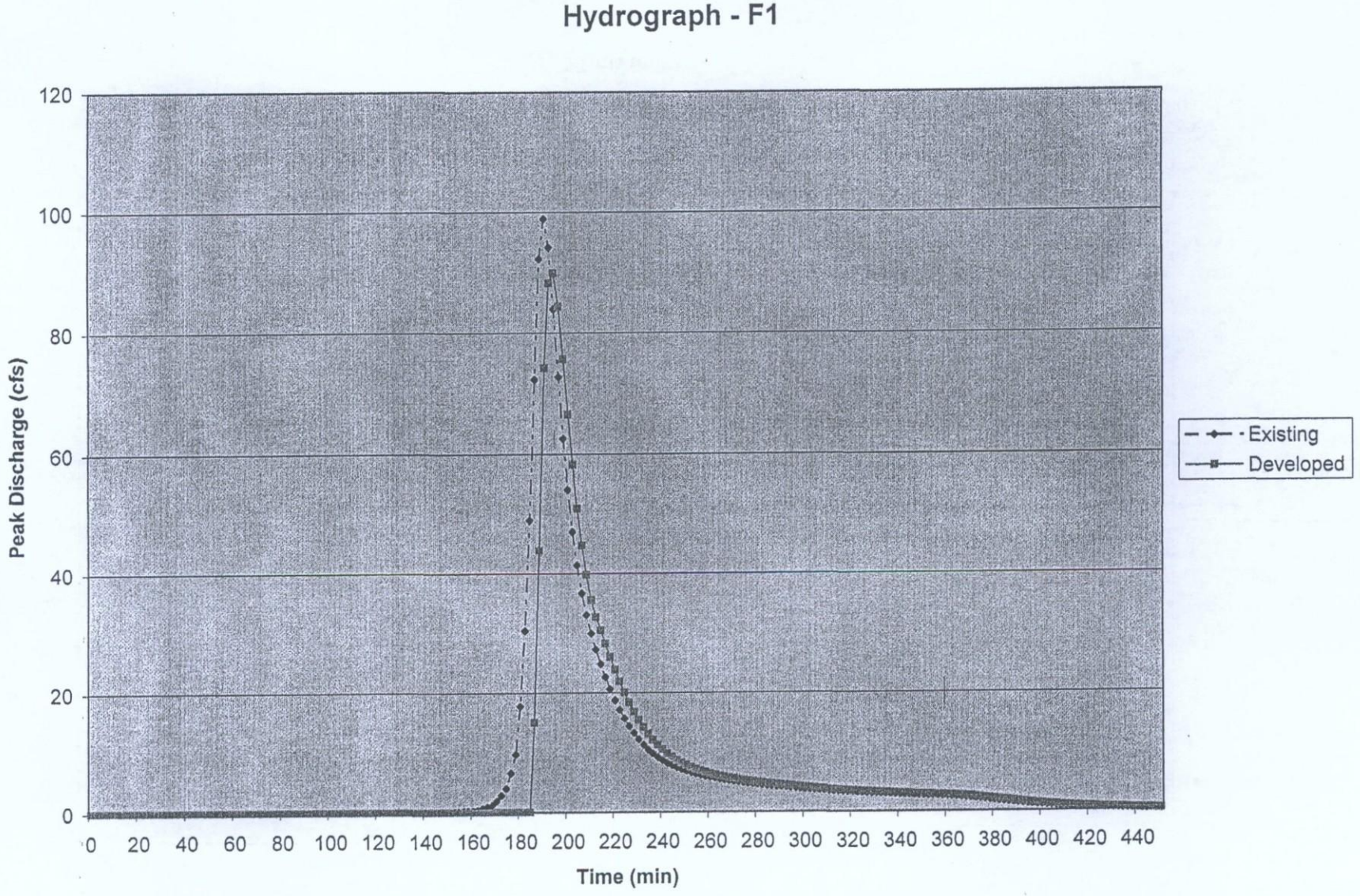
Hydrograph - G

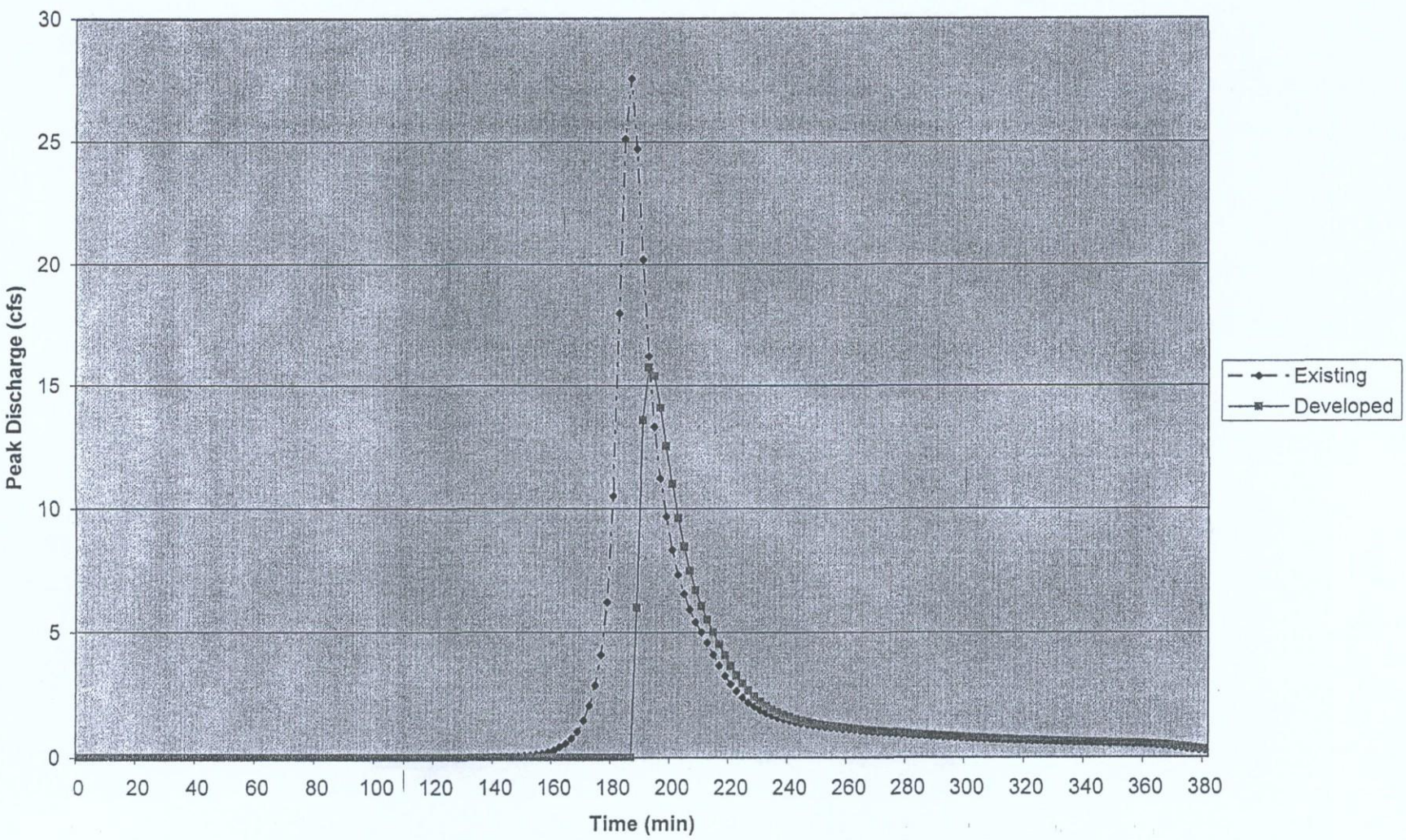


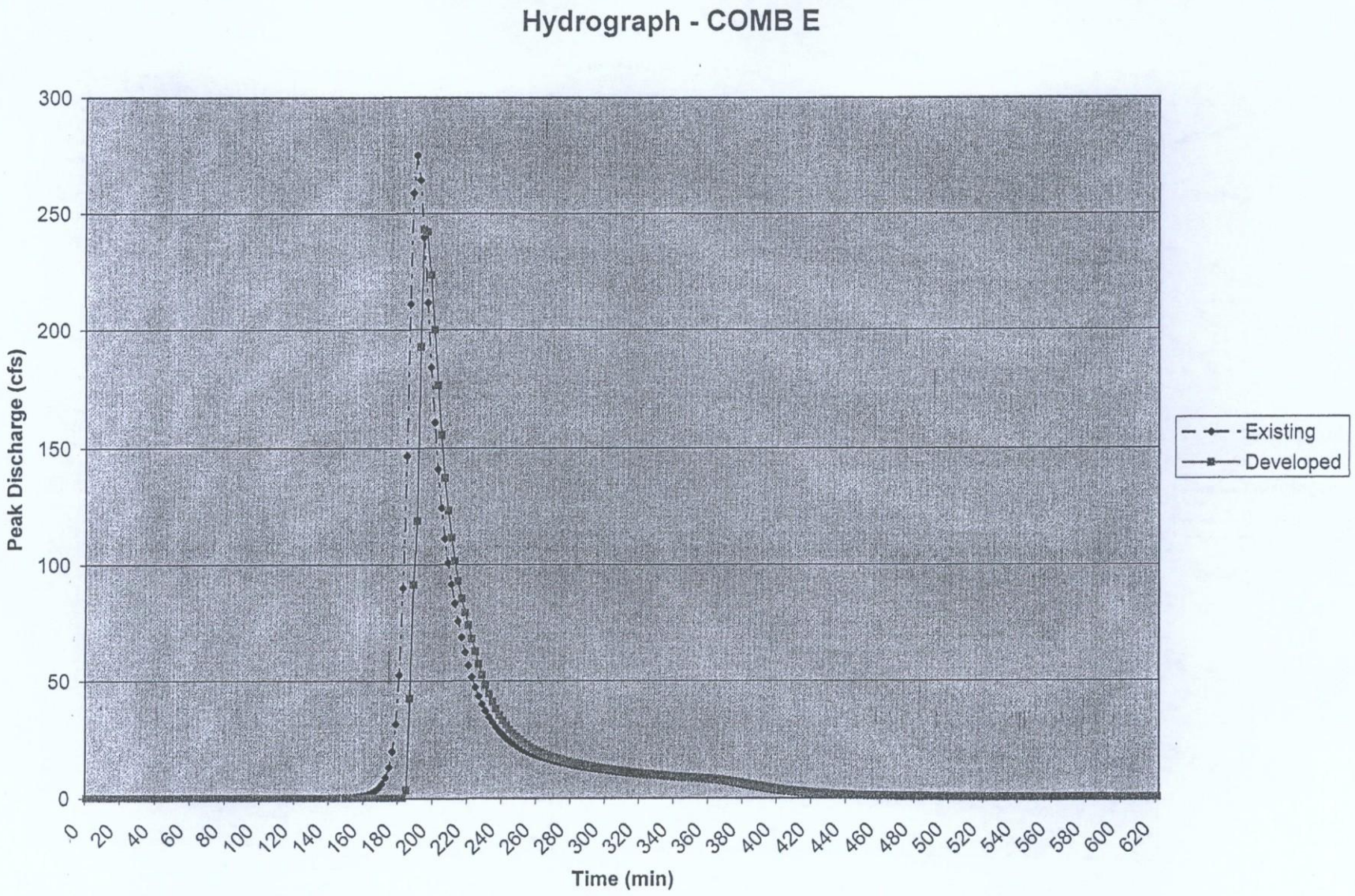
Hydrograph - F3

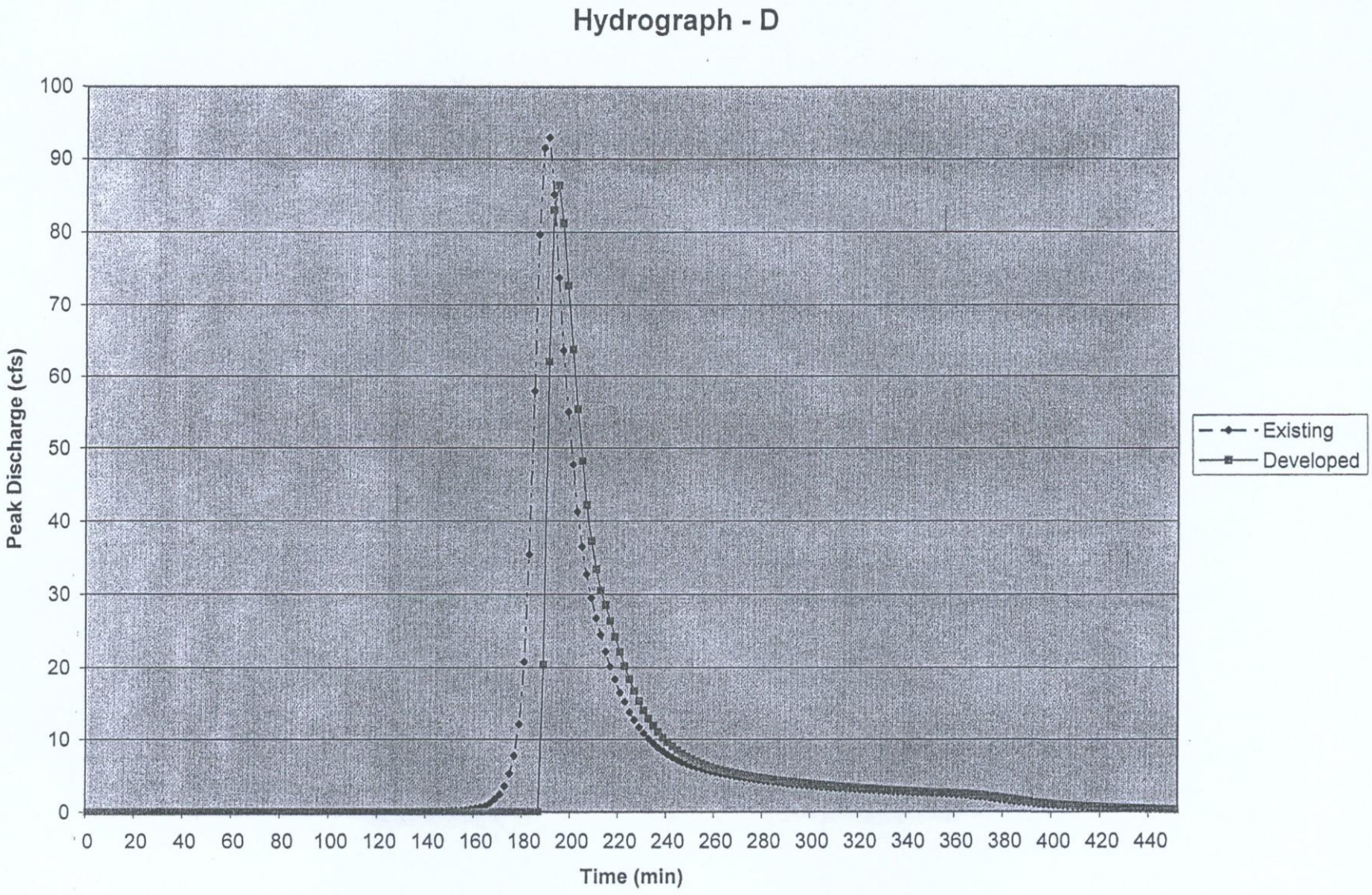


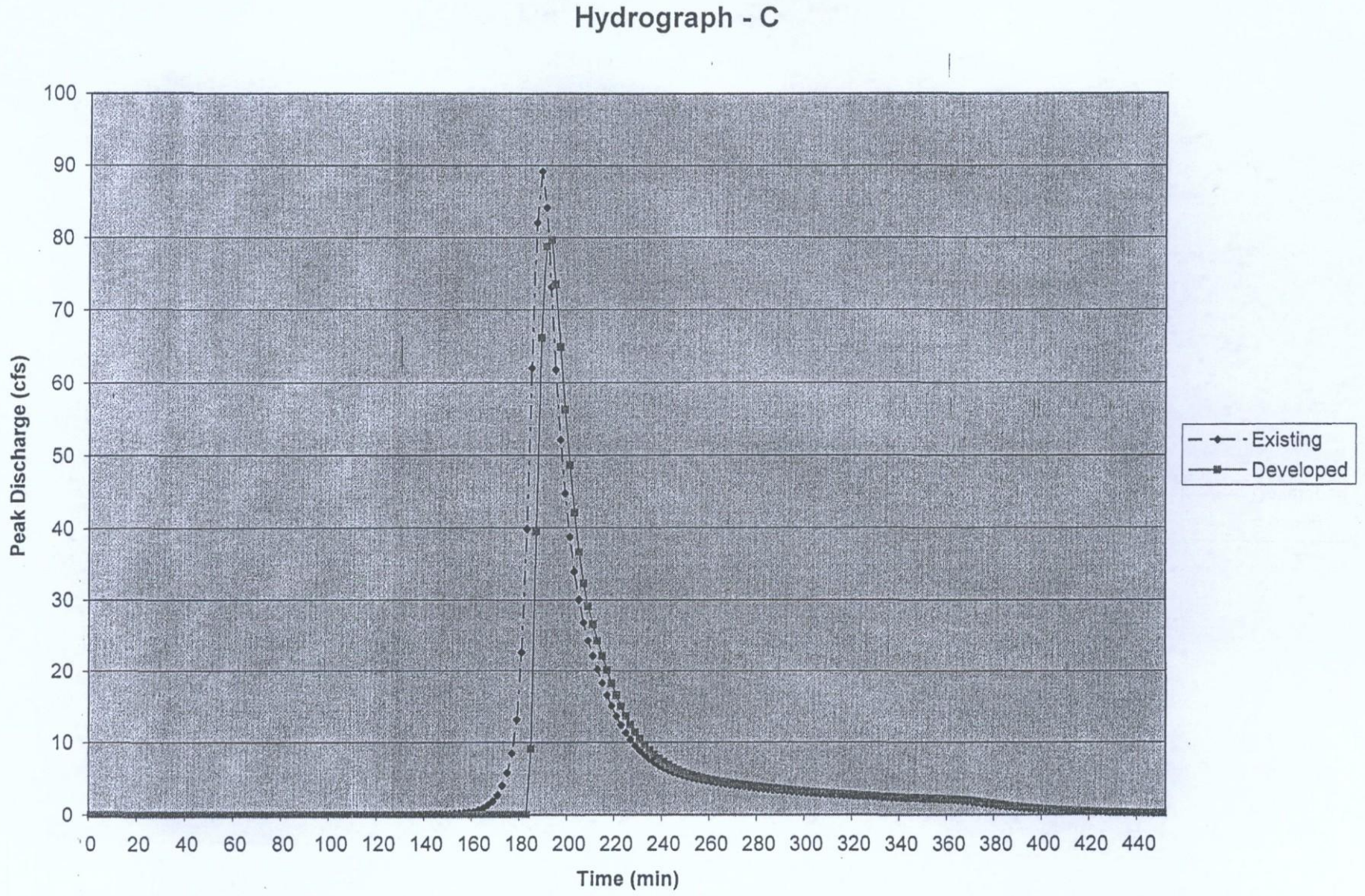

Hydrograph - F2
Peak Discharge (cfs)
45
40
35
30
25
20
15
10
5
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

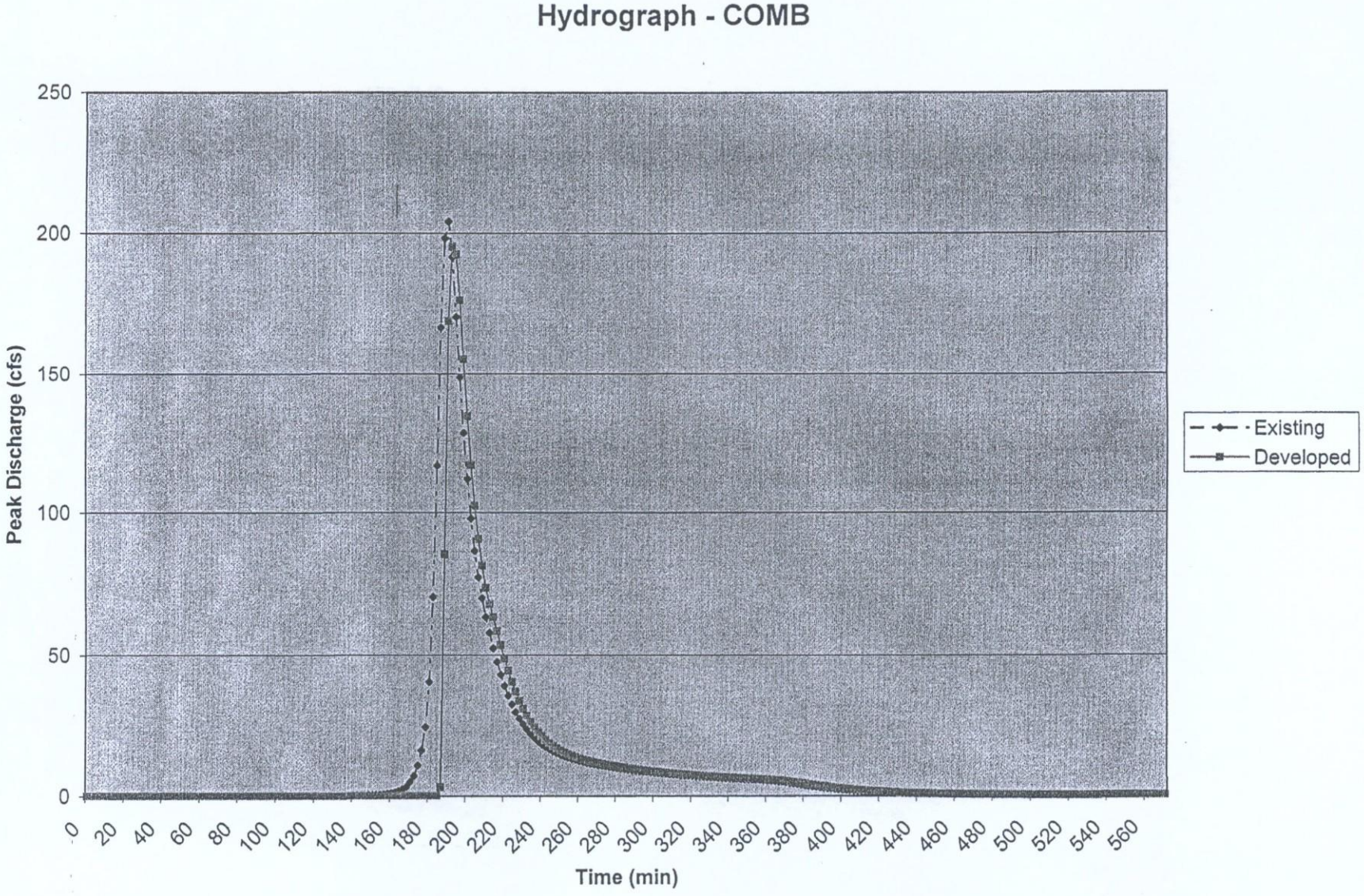

Hydrograph - F1
Peak Discharge (cfs)
120
100
80
60
40
20
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

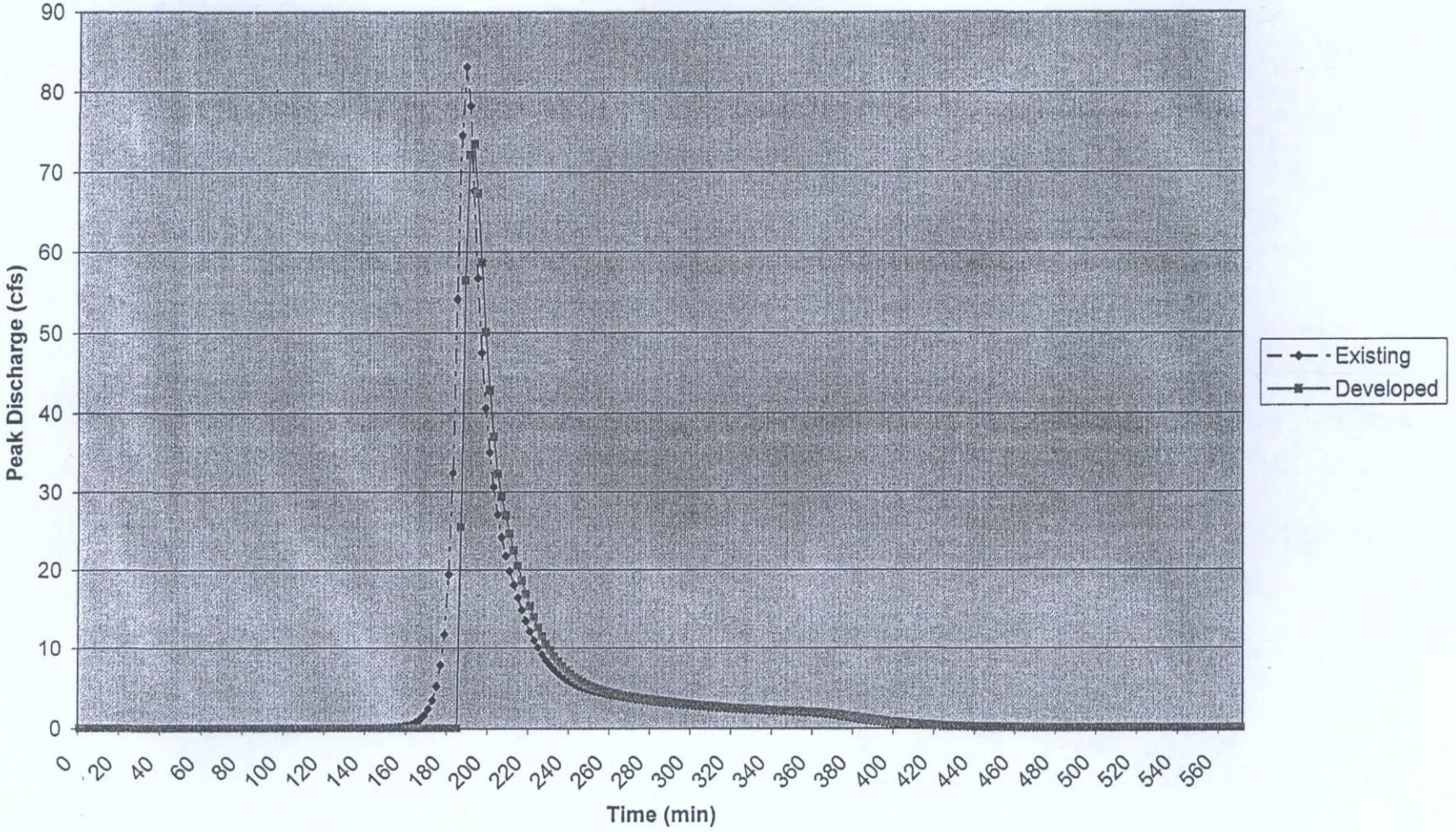

Hydrograph - E3
Peak Discharge (cfs)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
Time (min)
Existing
Developed

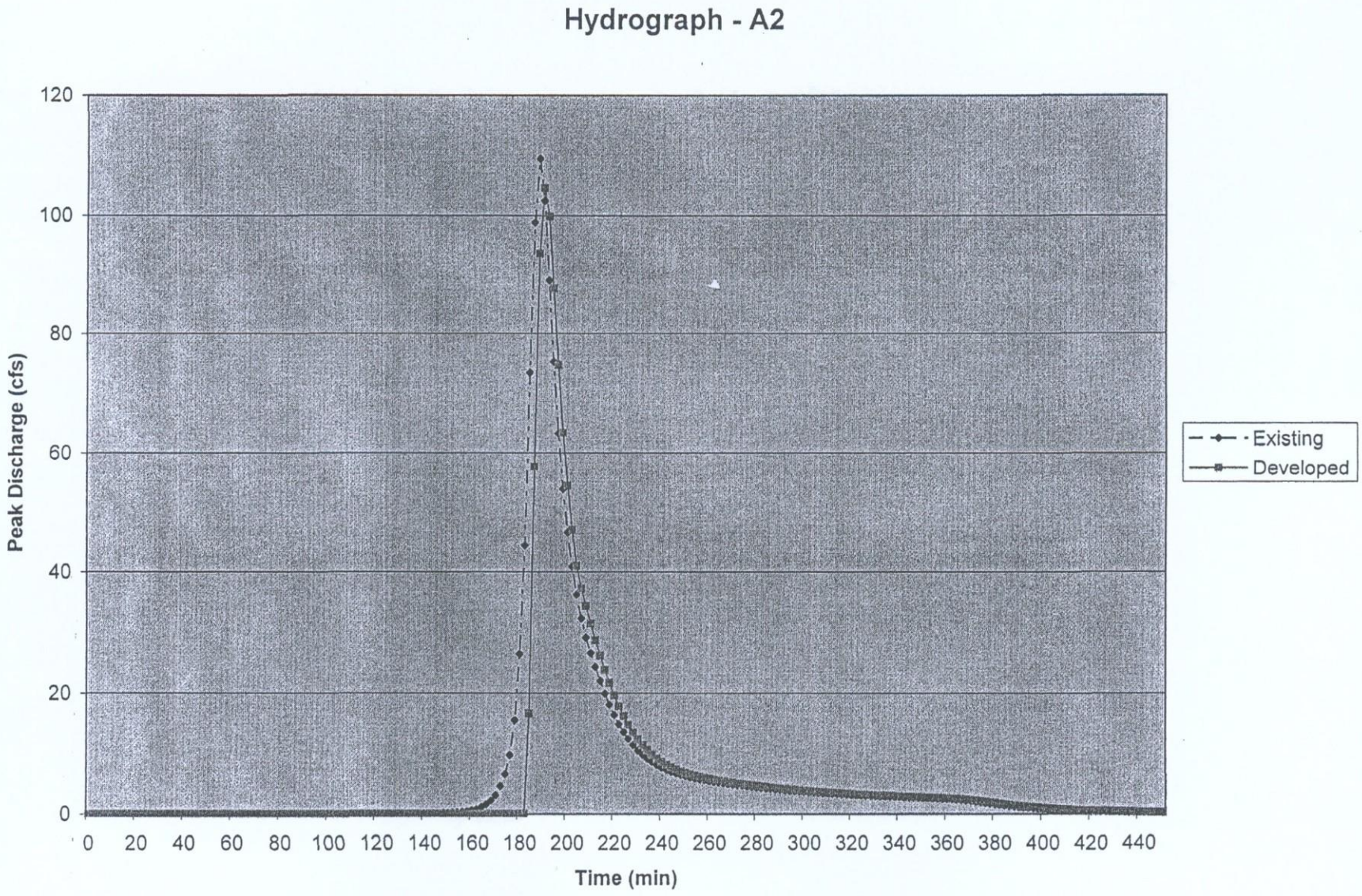

Hydrograph - COMB E
Peak Discharge (cfs)
300
250
200
150
100
50
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 580 600 620
Time (min)
Existing
Developed


Hydrograph - D
Peak Discharge (cfs)
100
90
80
70
60
50
40
30
20
10
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

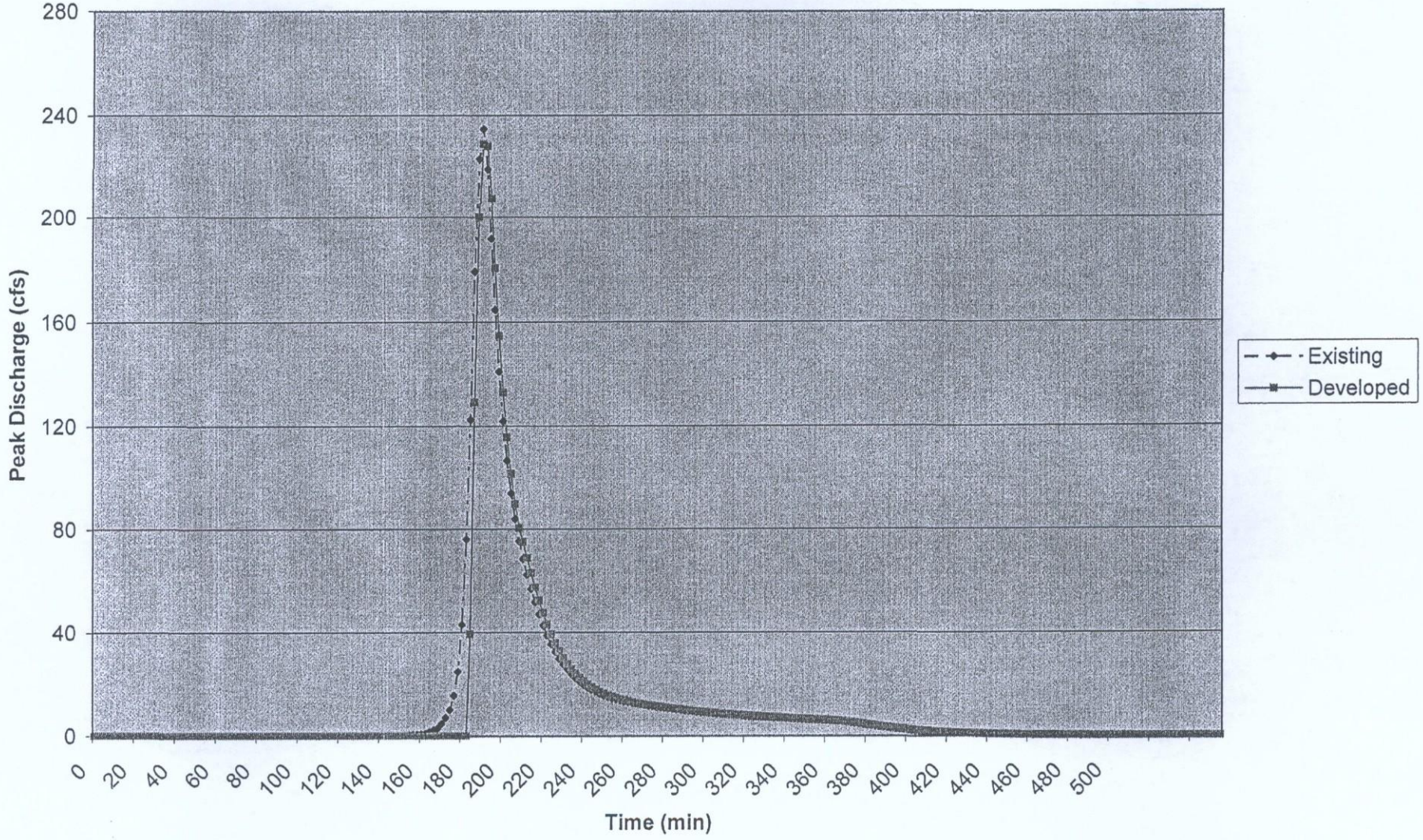

Hydrograph - C
Peak Discharge (cfs)
100
90
80
70
60
50
40
30
20
10
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed


Hydrograph - COMB
Peak Discharge (cfs)
250
200
150
100
50
0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
Time (min)
Existing
Developed


Hydrograph - B1
Peak Discharge (cfs)
0
10
20
30
40
50
60
70
80
90
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
Time (min)
Existing
Developed

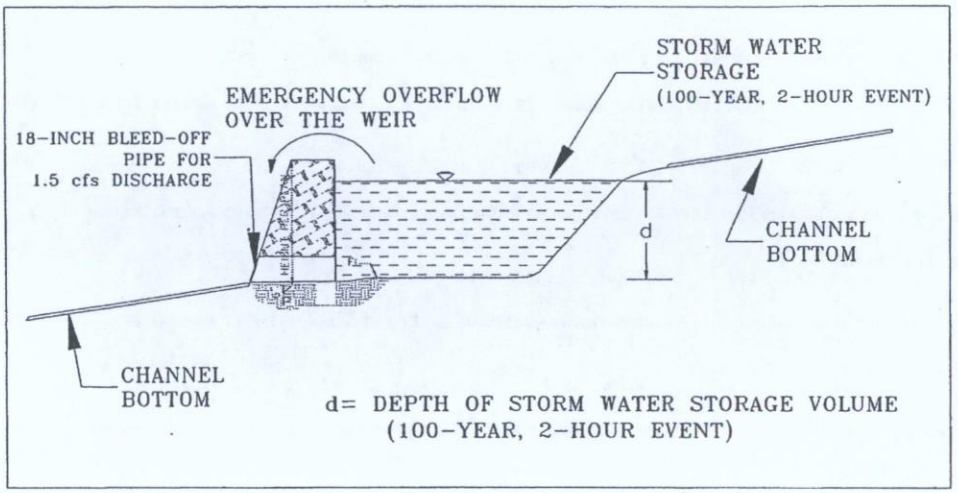

Hydrograph - A2
Peak Discharge (cfs)
120
100
80
60
40
20
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
Time (min)
Existing
Developed

Hydrograph - A1



APPENDIX D

Hydrographs


STORM WATER
STORAGE
(100-YEAR, 2-HOUR EVENT)
EMERGENCY OVERFLOW
OVER THE WEIR
18-INCH BLEED-OFF
PIPE FOR
1.5 cfs DISCHARGE
d
CHANNEL
BOTTOM
CHANNEL
BOTTOM
d= DEPTH OF STORM WATER STORAGE VOLUME
(100-YEAR, 2-HOUR EVENT)

FOR STORM = 1 STORM AREA (SQ MI) = .01

F3	MANE	.68	41.31	186.98	2.27	2.00	40.52	188.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1575E+01 OUTFLOW= .1573E+01 BASIN STORAGE= .1671E-03 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

G	MANE	.69	43.96	189.19	2.27	2.00	43.37	188.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1939E+01 OUTFLOW= .1934E+01 BASIN STORAGE= .3297E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

H1	MANE	1.32	160.19	190.42	2.26	2.00	159.95	190.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7127E+01 OUTFLOW= .7113E+01 BASIN STORAGE= .1335E-02 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

H2	MANE	2.00	176.79	191.31	2.20	2.00	175.93	192.00	2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8481E+01 OUTFLOW= .8448E+01 BASIN STORAGE= .1838E-02 PERCENT ERROR= .4

FOR STORM = 1 STORM AREA (SQ MI) = .01

I	MANE	1.43	76.57	188.46	2.24	2.00	75.65	188.00	2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2987E+01 OUTFLOW= .2981E+01 BASIN STORAGE= .2899E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

J	MANE	.67	86.10	185.83	2.24	2.00	85.63	186.00	2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2876E+01 OUTFLOW= .2873E+01 BASIN STORAGE= .1339E-03 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

K	MANE	.67	36.44	184.23	2.27	2.00	36.31	184.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1091E+01 OUTFLOW= .1091E+01 BASIN STORAGE= .1964E-04 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01

L	MANE	.50	34.08	184.38	2.27	2.00	33.57	184.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1091E+01 OUTFLOW= .1089E+01 BASIN STORAGE= .4161E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

M	MANE	.92	28.71	186.11	2.27	2.00	28.71	186.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9695E+00 OUTFLOW= .9685E+00 BASIN STORAGE= .4774E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

N	MANE	1.07	36.42	185.94	2.27	2.00	36.37	186.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1212E+01 OUTFLOW= .1212E+01 BASIN STORAGE= .4858E-04 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01

O	MANE	.34	9.35	184.29	2.27	2.00	9.30	184.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2908E+00 OUTFLOW= .2905E+00 BASIN STORAGE= .8448E-05 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

P	MANE	.46	21.58	184.91	2.27	2.00	21.09	184.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7029E+00 OUTFLOW= .7020E+00 BASIN STORAGE= .2793E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

Q	MANE	.32	9.68	183.90	2.27	2.00	9.65	184.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2908E+00 OUTFLOW= .2907E+00 BASIN STORAGE= .5883E-05 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

R	MANE	1.96	420.39	189.24	2.15	2.00	411.28	188.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1607E+02 OUTFLOW= .1602E+02 BASIN STORAGE= .1145E-02 PERCENT ERROR= .3

*** NORMAL END OF HEC-1 ***

```
+                          N       36.    3.10          2.          1.          0.        .01
          ROUTED TO
+                       BASN       16.    3.27          1.          0.          0.        .01
+                                                                                    2692.43        3.27
          HYDROGRAPH AT
+                          O        9.    3.07          1.          0.          0.        .00
          HYDROGRAPH AT
+                          P       21.    3.07          1.          0.          0.        .01
          8 COMBINED AT
+                      CLEAR      673.    3.23         61.         15.         12.        .31
          HYDROGRAPH AT
+                          Q       10.    3.07          1.          0.          0.        .00
          HYDROGRAPH AT
+                          R      411.    3.13         32.          8.          6.        .14
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                   (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
     ISTAQ    ELEMENT      DT        PEAK     TIME TO     VOLUME      DT        PEAK     TIME TO      VOLUME
                                                PEAK                                      PEAK
                           (MIN)     (CFS)      (MIN)      (IN)     (MIN)      (CFS)      (MIN)        (IN)
          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               A1  MANE       1.88    239.78    189.45      2.16      2.00     236.42    190.00        2.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9693E+01 OUTFLOW= .9674E+01 BASIN STORAGE= .1217E-02 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               A2  MANE       1.44    112.74    188.42      2.24      2.00     112.13    188.00        2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4302E+01 OUTFLOW= .4291E+01 BASIN STORAGE= .3724E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               B1  MANE       1.70     84.46    188.49      2.19      2.00      83.67    188.00        2.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3161E+01 OUTFLOW= .3155E+01 BASIN STORAGE= .2478E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               B2  MANE       1.43    130.88    189.97      2.22      2.00     130.85    190.00        2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5952E+01 OUTFLOW= .5933E+01 BASIN STORAGE= .1117E-02 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
                C  MANE       1.13     92.24    188.19      2.22      2.00      91.80    188.00        2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3556E+01 OUTFLOW= .3549E+01 BASIN STORAGE= .4105E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
                D  MANE       1.07     98.44    188.54      2.27      2.00      97.55    188.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4120E+01 OUTFLOW= .4113E+01 BASIN STORAGE= .6457E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               E1  MANE       1.46    154.45    191.31      2.27      2.00     153.59    190.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7392E+01 OUTFLOW= .7370E+01 BASIN STORAGE= .1786E-02 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               E2  MANE       1.74    141.10    188.83      2.27      2.00     137.93    188.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5574E+01 OUTFLOW= .5564E+01 BASIN STORAGE= .4962E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               E3  MANE        .61     28.67    185.81      2.27      2.00      28.52    186.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9695E+00 OUTFLOW= .9686E+00 BASIN STORAGE= .5751E-04 PERCENT ERROR=    .1

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               F1  MANE       2.00    102.90    190.64      2.27      2.00     102.36    190.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4363E+01 OUTFLOW= .4352E+01 BASIN STORAGE= .5158E-03 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =      .01
               F2  MANE       1.19     44.77    187.96      2.27      2.00      44.71    188.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1697E+01 OUTFLOW= .1695E+01 BASIN STORAGE= .1539E-03 PERCENT ERROR=    .1
```

+	HYDROGRAPH AT	E2	138.	3.13	11.	3.	2.	.05	
+ +	ROUTED TO	BASE2	101.	3.23	7.	2.	1.	.05	2702.78 3.23
+	2 COMBINED AT	COMBE	246.	3.23	21.	5.	4.	.11	
+	6 COMBINED AT	CLEAR	885.	3.23	78.	19.	16.	.37	
+	HYDROGRAPH AT	E3	29.	3.10	2.	0.	0.	.01	
+ +	ROUTED TO	BASE3	16.	3.20	1.	0.	0.	.01	2714.56 3.20
+	HYDROGRAPH AT	F1	102.	3.17	9.	2.	2.	.04	
+ +	ROUTED TO	BASF1	88.	3.23	8.	2.	2.	.04	2699.89 3.23
+	HYDROGRAPH AT	F2	45.	3.13	3.	1.	1.	.01	
+ +	ROUTED TO	BASF2	35.	3.20	3.	1.	1.	.01	2704.78 3.20
+	HYDROGRAPH AT	F3	41.	3.13	3.	1.	1.	.01	
+ +	ROUTED TO	BASF3	38.	3.17	3.	1.	1.	.01	2707.98 3.17
+	HYDROGRAPH AT	G	43.	3.13	4.	1.	1.	.02	
+ +	ROUTED TO	BASG	31.	3.27	3.	1.	1.	.02	2726.74 3.27
+	HYDROGRAPH AT	H1	160.	3.17	14.	4.	3.	.06	
+ +	ROUTED TO	BASH1	147.	3.20	11.	3.	2.	.06	2745.93 3.20
+	HYDROGRAPH AT	H2	176.	3.20	17.	4.	3.	.07	
+ +	ROUTED TO	BASH2-	172.	3.23	16.	4.	3.	.07	2775.99 3.23
+ +	ROUTED TO	BASH2-	165.	3.27	15.	4.	3.	.07	2788.99 3.27
+	HYDROGRAPH AT	I	76.	3.13	6.	2.	1.	.03	
+ +	ROUTED TO	BASI	50.	3.23	5.	1.	1.	.03	2759.43 3.23
+	8 COMBINED AT	CLEAR	543.	3.23	48.	12.	10.	.24	
+	HYDROGRAPH AT	J	86.	3.10	6.	1.	1.	.02	
+ +	ROUTED TO	BASJ	75.	3.13	5.	1.	1.	.02	2773.79 3.13
+	HYDROGRAPH AT	K	36.	3.07	2.	1.	0.	.01	
+ +	ROUTED TO	BASK	20.	3.17	1.	0.	0.	.01	2740.57 3.17
+	HYDROGRAPH AT	L	34.	3.07	2.	1.	0.	.01	
+ +	ROUTED TO	BASL	28.	3.13	2.	0.	0.	.01	2725.78 3.13
+	HYDROGRAPH AT	M	29.	3.10	2.	0.	0.	.01	
+ +	ROUTED TO	BASM	21.	3.17	2.	0.	0.	.01	2717.03 3.17
	HYDROGRAPH AT								

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                TIMINT        .033  TIME INTERVAL IN HOURS


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          **************
          *            *
329 KK    *          Q *
          *            *
          **************

336 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


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          **************
          *            *
337 KK    *          R *
          *            *
          **************

344 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

1
                                    RUNOFF SUMMARY
                              FLOW IN CUBIC FEET PER SECOND
                          TIME IN HOURS,  AREA IN SQUARE MILES

+                                                PEAK   TIME OF   AVERAGE FLOW FOR MAXIMUM PERIOD     BASIN    MAXIMUM   TIME OF
          OPERATION        STATION                FLOW   PEAK      6-HOUR    24-HOUR    72-HOUR      AREA     STAGE   MAX STAGE
          HYDROGRAPH AT
+                              A1                 236.   3.17        19.        5.         4.         .08
          ROUTED TO
+                            BASA1                228.   3.17        18.        5.         4.         .08
+                                                                                                    2761.99     3.17
          HYDROGRAPH AT
+                              A2                 112.   3.13         9.        2.         2.         .04
          ROUTED TO
+                           BAS A2                108.   3.17         8.        2.         2.         .04
+                                                                                                    2739.95     3.17
          HYDROGRAPH AT
+                              B1                  84.   3.13         6.        2.         1.         .03
          ROUTED TO
+                           BASB-3                 76.   3.17         6.        1.         1.         .03
+                                                                                                    2785.80     3.17
          HYDROGRAPH AT
+                              B2                 131.   3.17        12.        3.         2.         .05
          2 COMBINED AT
+                            COMBB                207.   3.17        18.        4.         4.         .08
          ROUTED TO
+                           BASB-5                198.   3.20        16.        4.         3.         .08
+                                                                                                    2747.00     3.20
          HYDROGRAPH AT
+                               C                  92.   3.13         7.        2.         1.         .03
          ROUTED TO
+                           BASC-1                 80.   3.20         6.        2.         1.         .03
+                                                                                                    2783.88     3.20
          HYDROGRAPH AT
+                               D                  98.   3.13         8.        2.         2.         .03
          ROUTED TO
+                           BASD-2                 79.   3.23         8.        2.         2.         .03
+                                                                                                    2723.85     3.23
          HYDROGRAPH AT
+                              E1                 154.   3.17        15.        4.         3.         .06
          ROUTED TO
+                           BASE1-                145.   3.23        14.        3.         3.         .06
+                                                                                                    2699.95     3.23
```

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
277 KK    *      BASL   *
          *             *
          ***************

283 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


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          ***************
          *             *
290 KK    *      BASM   *
          *             *
          ***************

296 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
303 KK    *      BASN   *
          *             *
          ***************

309 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
310 KK    *          O  *
          *             *
          ***************

317 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
318 KK    *          P  *
          *             *
          ***************

325 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
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          **************
          *            *
202 KK    *     BASH1  *          -1
          *            *
          **************

209 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


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          **************
          *            *
222 KK    *     BASH2-  *          2
          *            *
          **************

228 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


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          **************
          *            *
235 KK    *      BASI  *
          *            *
          **************

241 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
251 KK    *      BASJ  *
          *            *
          **************

257 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
264 KK    *      BASK  *
          *            *
          **************

270 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

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          ***************

143 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
150 KK    *     BASF1   *          -3
          *             *
          ***************

156 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
163 KK    *     BASF2   *          -2
          *             *
          ***************

169 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
176 KK    *     BASF3   *          -1
          *             *
          ***************

182 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
189 KK    *     BASG    *          -1
          *             *
          ***************

195 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

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          **************
          *            *
 90 KK    *   BASD-2   *
          *            *
          **************
```

 96 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

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          **************
          *            *
103 KK    *   BASE1-   *          2
          *            *
          **************
```

109 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          **************
          *            *
116 KK    *    BASE2   *
          *            *
          **************
```

123 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          **************
          *            *
124 KK    *    COMBE   *
          *            *
          **************
```

127 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          **************
          *            *
137 KK    *    BASE3   *         -1
          *            *
```

DEV-100.OHI

.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

*** ***

```
          ***************
          *             *
22 KK     *     BASA1   *
          *             *
          ***************
```

28 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
35 KK     *    BAS A2   *          -3
          *             *
          ***************
```

41 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
48 KK     *    BASB-3   *
          *             *
          ***************
```

54 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
64 KK     *    BASB-5   *
          *             *
          ***************
```

70 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
77 KK     *    BASC-1   *
          *             *
          ***************
```

83 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   14NOV06  TIME  17:50:45   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*         (916) 756-1104                *
*                                       *
*****************************************
```

HEC-1 MODEL FOR SERENO CANYON
100-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
DEVELOPED CONDITIONS
10% IMPERVIOUS AREA USED FOR SITE

PREPARED BY WOOD/PATEL, 1.10.2005
FILE NAME: DEV-100.DAT

13 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0558	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
TOTAL TIME BASE 29.97 HOURS

ENGLISH UNITS

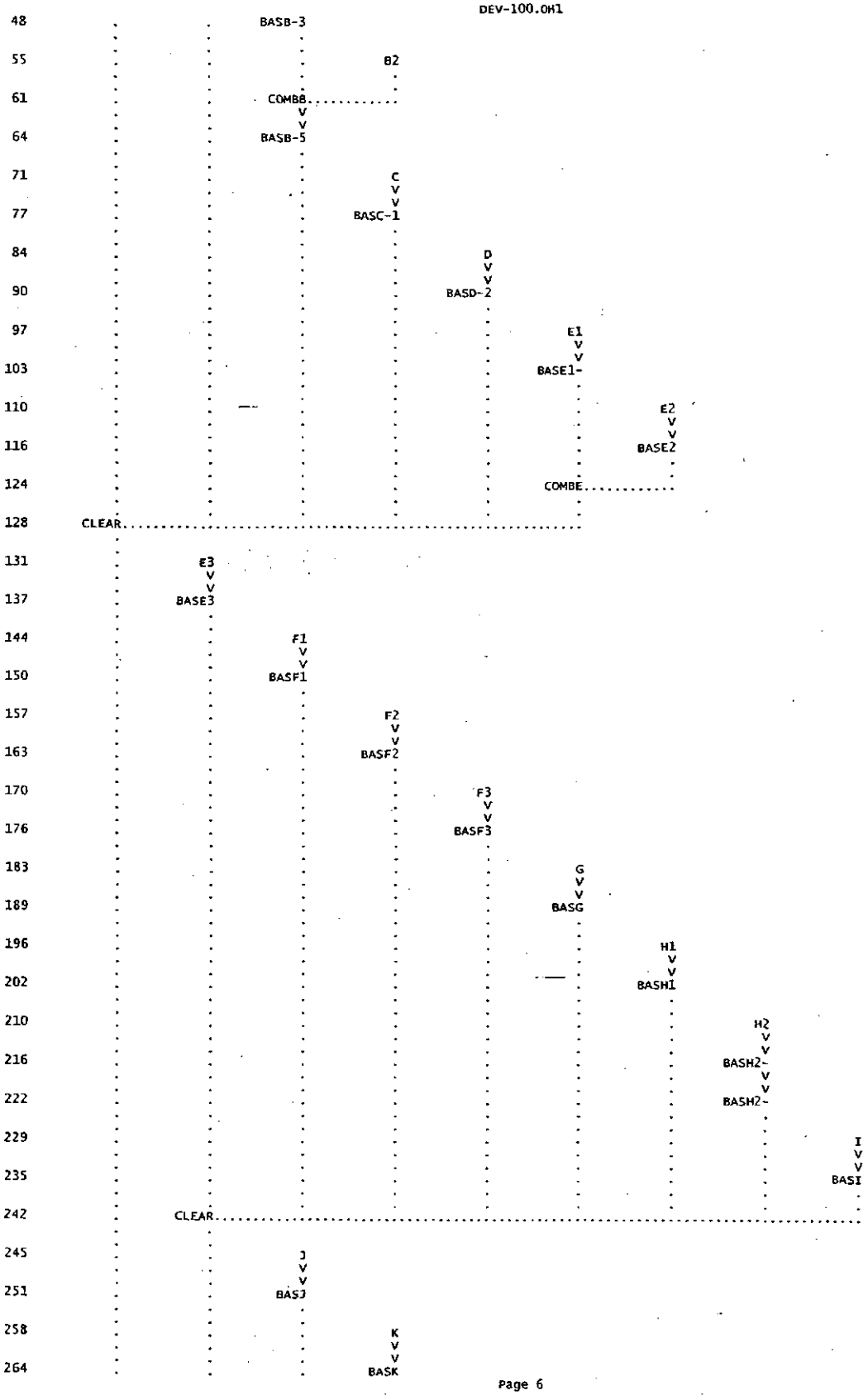
DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

14 JD INDEX STORM NO. 1

STRM	3.37	PRECIPITATION DEPTH
TRDA	.01	TRANSPOSITION DRAINAGE AREA

15 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.03	.03	.03	.03	.03
.04	.04	.04	.06	.06	.07	.09	.12	.17	.29
.29	.24	.15	.11	.07	.07	.06	.05	.04	.04
.04	.03	.03	.03	.03	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01


48
BASB-3
55
B2
61
COMBB
64
BASB-5
71
C
77
BASC-1
84
D
90
BASD-2
97
E1
103
BASE1-
110
E2
116
BASE2
124
COMBE
128
CLEAR
131
E3
137
BASE3
144
F1
150
BASF1
157
F2
163
BASF2
170
F3
176
BASF3
183
G
189
BASG
196
H1
202
BASH1
210
H2
216
BASH2-
222
BASH2-
229
I
235
BASI
242
CLEAR
245
J
251
BASJ
258
K
264
BASK

```
                *
          284   KK       M
          285   KM  RUNOFF FROM SUB-BASIN M
          286   BA    .008
          287   LS              88      10
          288   UK     137    .018    0.13     100
          289   RK     750    .012    .032            TRAP       4       5
                *
1                                        HEC-1 INPUT                                                    PAGE  8
         LINE   ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          290   KK    BASM
          291   KM  7' WEIR
          292   RS       1    STOR       0
          293   SV       0   0.056   0.124   0.205   0.301   0.413
          294   SE    2713    2714    2715    2716    2717    2718
          295   SQ       0       0       0       0      20      55
          296   KO                                     22
                *
          297   KK       N
          298   KM  RUNOFF FROM SUB-BASIN N
          299   BA     .01
          300   LS              88      10
          301   UK     117    .018    0.13     100
          302   RK    1036    .012    .032            TRAP       5       5
                *
          303   KK    BASN
          304   KM  13' WEIR
          305   RS       1    STOR       0
          306   SV       0   0.083   0.191   0.326    0.49   0.686
          307   SE    2688    2689    2690    2691    2692    2693
          308   SQ       0       0       0       0       0      36
          309   KO                                     22
                *
          310   KK       O
          311   KM  RUNOFF FROM SUB-BASIN O
          312   KM  Area of Basin subtrating the area to be retained for 100 year event
          313   BA  0.0024      9
          314   LS              88      10
          315   UK     108     .02    0.13     100
          316   RK     174    .014    .032            TRAP       4       5
          317   KO                                     22

          318   KK       P
          319   KM  RUNOFF FROM SUB-BASIN P
          320   KM  Area of Basin subtrating the area to be retained for 100 year event
          321   BA   .0058
          322   LS              88      10
          323   UK     135     .02    0.13     100
          324   RK     354    .014    .032            TRAP       5       5
          325   KO                                     22

          326   KK   CLEAR
          327   KM  CLEAR HYDROGRAPH STACK
          328   HC       8

          329   KK       Q
          330   KM  RUNOFF FROM SUB-BASIN Q
          331   KM  Area of Basin subtrating the area to be retained for 100 year event
          332   BA   .0024
          333   LS              88      10
          334   UK      86     .02    0.13     100
1                                        HEC-1 INPUT                                                    PAGE  9
         LINE   ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          335   RK     160    .014    .032            TRAP       4       5
          336   KO                                     22

          337   KK       R
          338   KM  RUNOFF FROM SUB-BASIN R
          339   KM  Area of Basin subtrating the area to be retained for 100 year event
          340   BA     .14       8
          341   LS              88     .14
          342   UK     180    .025    0.13     100
          343   RK    4300    .023    .032            TRAP      15       5
          344   KO                                     22
          345   ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    16          A1
                V
                V
    22        BASA1
              .
              .
    29        .         A2
              .         V
              .         V
    35        .      BAS A2
              .         .
              .         .
    42        .         .         B1
              .         .         V
              .         .         V
```

```
208          SQ      0       0       0       0       0       0       0       0       0     170
209          KO                                    22
             *
1                                        HEC-1 INPUT                                    PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

210          KK      H2
211          KM  RUNOFF FROM SUB-BASIN H2
212          BA    .072
213          LS                88    4.78
214          UK     400     .025    0.13     100
215          RK    3480     .019    .032             TRAP      12       5

216          KK  BASH2-        1
217          KM  22' WEIR AT HEADWALL
218          RS        1    STOR        0
219          SV        0    0.15   0.318   0.507   0.718   0.929
220          SE        0    2772    2773    2774    2775    2776
221          SQ        0       0       0       0      62     174

222          KK  BASH2-        2
223          KM  21' WEIR AT HEADWALL
224          RS        1    STOR        0
225          SV        0    .165    .361    .590    .820   1.049
226          SE        0    2785    2786    2787    2788    2789
227          SQ        0       0       0       0      59     166
228          KO                                    22
             *

229          KK        I
230          KM  RUNOFF FROM SUB-BASIN I
231          BA    .025
232          LS                88     7.4
233          UK     225      .02    0.13     100
234          RK    2100     .026    .032             TRAP      10       5
             *

235          KK     BASI
236          KM  10' WEIR
237          RS        1    STOR        0
238          SV        0    .186    .399    .640   0.881   1.122
239          SE     2755    2756    2757    2758    2759    2760
240          SQ        0       0       0       0      28      79
241          KO                                    22
             *

242          KK   CLEAR
243          KM  CLEAR HYDROGRAPH STACK
244          HC        8
             *

245          KK        J
246          KM  RUNOFF FROM SUB-BASIN J
247          BA    .024
248          LS                88     7.9
249          UK     145      .02    0.13     100
250          RK     965     .026    .032             TRAP       5       5
             *
1                                        HEC-1 INPUT                                    PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

251          KK    BASJ
252          KM  11' WEIR
253          RS        1    STOR        0
254          SV        0    .098    .217    .359    .528   0.698
255          SE     2769    2770    2771    2772    2773    2774
256          SQ        0       0       0       0      31      87
257          KO                                    22
             *

258          KK        K
259          KM  RUNOFF FROM SUB-BASIN K
260          BA    .009
261          LS                88      10
262          UK      81     .025    0.13     100
263          RK     715     .022    .032             TRAP       5       5
             *

264          KK    BASK
265          KM  13' WEIR
266          RS        1    STOR        0
267          SV        0    .106    .232    .378   0.525
268          SE     2737    2738    2739    2740    2741
269          SQ        0       0       0       0      36
270          KO                                    22
             *

271          KK        L
272          KM  RUNOFF FROM SUB-BASIN L
273          BA    .009
274          LS                88      10
275          UK      113     .018    0.13     100
276          RK     450      .012    .032             TRAP       5       5
             *

277          KK    BASL
278          KM  13' WEIR
279          RS        1    STOR        0
280          SV        0   0.041   0.106     0.2   0.326
281          SE     2722    2723    2724    2725    2726
282          SQ        0       0       0       0      36
283          KO                                    22
```

```
129          KM  CLEAR HYDROGRAPH STACK
130          HC      6
             *

131          KK      E3
132          KM  RUNOFF FROM SUB-BASIN E3
133          BA    .008
134          LS              88      10
135          UK     175    .025    0.13     100
136          RK     750    .032    .032            TRAP       6       5
             *

137          KK   BASE3      -1
138          KM  10' WEIR AT HEAD WALL
139          RS       1    STOR       0
140          SV       0    .082    .188    .322   0.456
141          SE    2711    2712    2713    2714    2715
142          SQ       0       0       0       0      28
143          KO                                      22
             *

144          KK      F1
145          KM  RUNOFF FROM SUB-BASIN F1
146          BA    .036
147          LS              88      10
148          UK     225    .018    0.13     100
149          RK    2500    .012    .032            TRAP       7       5
             *

150          KK   BASF1      -3
151          KM  12' WEIR AT HEAD WALL
152          RS       1    STOR       0
153          SV       0    0.21   0.443   0.701   0.958
154          SE    2696    2697    2698    2699    2700
155          SQ       0       0       0      34      95
156          KO                                      22
             *

157          KK      F2
158          KM  RUNOFF FROM SUB-BASIN F2
159          BA    .014
160          LS              88      10
161          UK     200    .018    0.13     100
162          RK    1440    .028    .032            TRAP       6       5
             *

163          KK   BASF2      -2
164          KM  16' WEIR AT HEAD WALL
165          RS       1    STOR       0
166          SV       0   0.112   0.243   0.396   0.549
167          SE    2701    2702    2703    2704    2705
168          SQ       0       0       0       0      45
169          KO                                      22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

170          KK      F3
171          KM  RUNOFF FROM SUB-BASIN F3
172          BA    .013
173          LS              88      10
174          UK     225    .018    0.13     100
175          RK     850    .026    .032            TRAP       6       5
             *

176          KK   BASF3      -1
177          KM  14' WEIR AT HEAD WALL
178          RS       1    STOR       0
179          SV       0   0.038   0.095   0.172   0.274
180          SE    2704    2705    2706    2707    2708
181          SQ       0       0       0       0      39
182          KO                                      22
             *

183          KK       G
184          KM  RUNOFF FROM SUB-BASIN G
185          BA   0.016
186          LS              88      10
187          UK     400    .025    0.13     100
188          RK     720    .022    .032            TRAP       4       5
             *

189          KK    BASG      -1
190          KM  15' WEIR
191          RS       1    STOR       0
192          SV       0   0.094   0.209   0.347   0.512    0.71
193          SE    2722    2723    2724    2725    2726    2727
194          SQ       0       0       0       0       0      42
195          KO                                      22
             *

196          KK      H1
197          KM  RUNOFF FROM SUB-BASIN H1
198          BA    .059
199          LS              88     9.4
200          UK     375    .025    0.13     100
201          RK    2210    .019    .032            TRAP       8       5

202          KK   BASH1      -1
203          KM  FLOW ROUTED THROUGH DETENTION BASIN H1-1
204          KM  2-36" PIPE CULVERT
205          RS       1    STOR       0
206          SV       0   0.009   0.046   0.132   0.284    0.51   0.822    1.24   1.497   1.809
207          SE    2738    2739    2740    2741    2742    2743    2744    2745  2745.5    2746
```

```
 55          KK      B2
 56          KM  RUNOFF FROM SUB-BASIN B2
 57          BA    .050
 58          LS              88      6.7
 59          UK     400     .025     0.13      100
 60          RK    2340     .024     .032             TRAP        8        5
             *

 61          KK   COMB8
 62          KM  COMBINE SECTIONS B1 AND B2
 63          HC       2
             *

 64          KK  BASB-5
 65          KM  25' WEIR
 66          RS       1     STOR        0
 67          SV       0    0.146    0.333    0.565    0.843    1.121
 68          SE    2742     2743     2744     2745     2746     2747
 69          SQ       0        0        0        0       70      198
 70          KO                                          22
             *

 71          KK       C
 72          KM  RUNOFF FROM SUB-BASIN C
 73          BA     .03
 74          LS              88      5.9
 75          UK     250     .023     0.13      100
 76          RK    1570     .017     .032             TRAP        5        5
             *

 77          KK  BASC-1
 78          KM  11' WEIR
 79          RS       1     STOR        0
 80          SV       0     .107     .236     .388    0.566    0.745
 81          SE    2779     2780     2781     2782     2783     2784
 82          SQ       0        0        0        0       31       87
 83          KO                                          22
             *

 84          KK       D
 85          KM  RUNOFF FROM SUB-BASIN D
 86          BA    .034
 87          LS              88       10
 88          UK     300      .02     0.13      100
 89          RK    1425     .014     .032             TRAP        6        5
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 90          KK  BASD-2
 91          KM  11' WEIR AT HEAD WALL
 92          RS       1     STOR        0
 93          SV       0    0.039     0.13     0.29    0.541    0.898
 94          SE    2719     2720     2721     2722     2723     2724
 95          SQ       0        0        0        0       31       87
 96          KO                                          22
             *

 97          KK      E1
 98          KM  RUNOFF FROM SUB-BASIN E1
 99          BA    .061
100          LS              88       10
101          UK     400      .02     0.13      100
102          RK    2050     .013     .032             TRAP        7        5

103          KK  BASE1-       2
104          KM  19' WEIR AT HEAD WALL
105          RS       1     STOR        0
106          SV       0    0.147    0.334     0.56    0.826    1.135
107          SE    2695     2696     2697     2698     2699     2700
108          SQ       0        0        0        0       53      150
109          KO                                          22
             *

110          KK      E2
111          KM  RUNOFF FROM SUB-BASIN E2
112          BA    .046
113          LS              88       10
114          UK     200      .02     0.13      100
115          RK    2370     .013     .032             TRAP       10        5
             *

116          KK   BASE2
117          KM  FLOW ROUTED THROUGH DETENTION BASIN E2-1
118          KM  2-42" PIPE CULVERT
119          RS       1     STOR        0
120          SV       0    0.094    0.211    0.379    0.641    1.026    1.546    1.861     2.22
121          SE    2696     2697     2698     2699     2700     2701     2702   2702.5     2703
122          SQ       0        0        0        0        0        0        0        0      180
123          KO                                          22
             *

124          KK   COMBE
125          KM  COMBINE SECTIONS E1 AND E2
126          HC       2
127          KO                                          22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

128          KK   CLEAR
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   14NOV06  TIME  17:50:45   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X              X       X X
XXXXXXX  XXXX           X      X  X
X     X  X              X     XXXXXX
X     X  X              X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        100-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        DEVELOPED CONDITIONS
   7          ID        10% IMPERVIOUS AREA USED FOR SITE
   8          ID
   9          ID        PREPARED BY WOOD/PATEL, 1.10.2005
  10          ID        FILE NAME:  DEV-100.DAT
  11          ID
              *DIAGRAM
  12          IT      2                   900
  13          IO      5
  14          JD              .01
  15          PH                      .73    1.43    2.42    2.74    2.96    3.37

  16          KK      A1
  17          KM       RUNOFF FROM SUB-BASIN A1
  18          BA   0.084
  19          LS               88     1.1
  20          UK     260    .025    0.13     100
  21          RK    3520    .023    .032            TRAP      12       5
              *
  22          KK   BASA1
  23          KM  29' WIER  AT HEADWALL
  24          RS       1    STOR       0
  25          SV       0   0.108   0.242   0.404     0.6   0.841   1.081
  26          SE    2756    2757    2758    2759    2760    2761    2762
  27          SQ       0       0       0       0       0      81     230
  28          KO                                     22

  29          KK      A2
  30          KM  RUNOFF FROM SUB-BASIN A2
  31          BA    .036
  32          LS               88     7.4
  33          UK     235    .025    0.13     100
  34          RK    2000     .02    .032            TRAP       8       5

  35          KK  BAS A2      -3
  36          KM  14' WEIR AT OUTLET
  37          RS       1    STOR       0
  38          SV       0   0.059   0.135   0.228    0.34   0.474   0.608   0.742
  39          SE    2733    2734    2735    2736    2737    2738    2739    2740
  40          SQ       0       0       0       0       0       0      39     111
  41          KO                                     22
              *

  42          KK      B1
  43          KM  RUNOFF FROM SUB-BASIN B1
  44          BA    .027
  45          LS               88     3.7
  46          UK     200    .025    0.13     100
  47          RK    2500    .028    .032            TRAP       8       5
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  48          KK  BASB-3
  49          KM  11' WEIR AT HEADWALL
  50          RS       1    STOR       0
  51          SV       0    .089     0.2    .338    0.49   0.643
  52          SE    2781    2782    2783    2784    2785    2786
  53          SQ       0       0       0       0      31      87
  54          KO                                     22
              *
```

FOR STORM = 1 STORM AREA (SQ MI) = .01

F3	MANE	.78	20.87	189.80	1.30	2.00	20.72	190.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9098E+00 OUTFLOW= .9034E+00 BASIN STORAGE= .1756E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

G	MANE	.84	20.91	191.73	1.30	2.00	20.91	192.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1120E+01 OUTFLOW= .1113E+01 BASIN STORAGE= .3816E-03 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

H1	MANE	2.73	77.78	193.87	1.30	2.00	77.56	194.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4108E+01 OUTFLOW= .4096E+01 BASIN STORAGE= .1136E-02 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

H2	MANE	2.01	84.00	195.55	1.25	2.00	83.97	196.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4821E+01 OUTFLOW= .4796E+01 BASIN STORAGE= .1696E-02 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

I	MANE	1.85	38.26	191.32	1.28	2.00	37.58	192.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1712E+01 OUTFLOW= .1705E+01 BASIN STORAGE= .3085E-03 PERCENT ERROR= .4

FOR STORM = 1 STORM AREA (SQ MI) = .01

J	MANE	.84	45.84	186.87	1.29	2.00	45.03	188.00	1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1650E+01 OUTFLOW= .1648E+01 BASIN STORAGE= .1536E-03 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

K	MANE	.81	20.79	184.71	1.31	2.00	20.13	186.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6298E+00 OUTFLOW= .6293E+00 BASIN STORAGE= .1887E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

L	MANE	.69	18.68	185.87	1.31	2.00	18.66	186.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6298E+00 OUTFLOW= .6292E+00 BASIN STORAGE= .4243E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

M	MANE	.98	15.38	187.16	1.31	2.00	15.23	188.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5598E+00 OUTFLOW= .5583E+00 BASIN STORAGE= .4692E-04 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

N	MANE	1.38	19.77	187.36	1.31	2.00	19.48	188.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6998E+00 OUTFLOW= .6992E+00 BASIN STORAGE= .5151E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

O	MANE	.39	5.21	185.54	1.31	2.00	5.10	186.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1680E+00 OUTFLOW= .1676E+00 BASIN STORAGE= .8995E-05 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

P	MANE	.58	11.76	186.23	1.31	2.00	11.73	186.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4059E+00 OUTFLOW= .4052E+00 BASIN STORAGE= .3030E-04 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

Q	MANE	.25	5.51	184.71	1.31	2.00	5.42	184.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1680E+00 OUTFLOW= .1676E+00 BASIN STORAGE= .6537E-05 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

R	MANE	1.84	210.47	191.74	1.20	2.00	208.88	192.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8998E+01 OUTFLOW= .8958E+01 BASIN STORAGE= .1237E-02 PERCENT ERROR= .4

*** NORMAL END OF HEC-1 ***

```
+                          N       19.    3.13          1.          0.          0.        .01
          ROUTED TO
+                       BASN        2.    3.70          0.          0.          0.        .01
+                                                                                    2692.06        3.70
          HYDROGRAPH AT
+                          O        5.    3.10          0.          0.          0.        .00
          HYDROGRAPH AT
+                          P       12.    3.10          1.          0.          0.        .01
          8 COMBINED AT
+                      CLEAR      229.    3.40         29.          7.          6.        .31
          HYDROGRAPH AT
+                          Q        5.    3.07          0.          0.          0.        .00
          HYDROGRAPH AT
+                          R      209.    3.20         18.          5.          4.        .14
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                   (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
     ISTAQ    ELEMENT      DT        PEAK     TIME TO PEAK     VOLUME       DT        PEAK     TIME TO PEAK     VOLUME
                           (MIN)      (CFS)       (MIN)         (IN)      (MIN)      (CFS)       (MIN)          (IN)
   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        A1  MANE          2.00      115.18      193.37         1.21       2.00     113.02      194.00          1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5445E+01 OUTFLOW= .5413E+01 BASIN STORAGE= .1061E-02 PERCENT ERROR=    .6

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        A2  MANE          1.68       57.43      190.51         1.28       2.00      56.73      190.00          1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2465E+01 OUTFLOW= .2458E+01 BASIN STORAGE= .3728E-03 PERCENT ERROR=    .3

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        B1  MANE          1.87       42.57      190.13         1.24       2.00      42.28      190.00          1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1791E+01 OUTFLOW= .1781E+01 BASIN STORAGE= .2570E-03 PERCENT ERROR=    .6

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        B2  MANE          1.70       62.30      195.09         1.27       2.00      62.22      194.00          1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3403E+01 OUTFLOW= .3386E+01 BASIN STORAGE= .1074E-02 PERCENT ERROR=    .5

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
         C  MANE          1.43       45.89      190.10         1.26       2.00      45.76      190.00          1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2028E+01 OUTFLOW= .2021E+01 BASIN STORAGE= .3612E-03 PERCENT ERROR=    .4

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
         D  MANE          1.39       48.14      191.54         1.31       2.00      48.10      192.00          1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2379E+01 OUTFLOW= .2369E+01 BASIN STORAGE= .6044E-03 PERCENT ERROR=    .4

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        E1  MANE          1.75       74.37      195.04         1.31       2.00      73.87      196.00          1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4269E+01 OUTFLOW= .4253E+01 BASIN STORAGE= .1659E-02 PERCENT ERROR=    .3

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        E2  MANE          2.00       72.17      190.70         1.30       2.00      70.61      192.00          1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3219E+01 OUTFLOW= .3199E+01 BASIN STORAGE= .5220E-03 PERCENT ERROR=    .6

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        E3  MANE           .72       15.34      187.59         1.31       2.00      15.08      188.00          1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5598E+00 OUTFLOW= .5589E+00 BASIN STORAGE= .5716E-04 PERCENT ERROR=    .2

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        F1  MANE          1.91       52.45      192.51         1.30       2.00      51.64      192.00          1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2519E+01 OUTFLOW= .2500E+01 BASIN STORAGE= .5312E-03 PERCENT ERROR=    .8

   FOR STORM = 1  STORM AREA (SQ MI) =          .01
        F2  MANE          1.30       23.06      189.57         1.31       2.00      22.91      190.00          1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9797E+00 OUTFLOW= .9755E+00 BASIN STORAGE= .1414E-03 PERCENT ERROR=    .4
```

+	HYDROGRAPH AT	E2	71.	3.20	6.	2.	1.	.05	
+	ROUTED TO	BASE2	21.	3.57	3.	1.	1.	.05	2702.56 3.57
+	2 COMBINED AT	COMBE	68.	3.33	10.	3.	2.	.11	
+	6 COMBINED AT	CLEAR	364.	3.30	40.	10.	8.	.37	
+	HYDROGRAPH AT	E3	15.	3.13	1.	0.	0.	.01	
+	ROUTED TO	BASE3	4.	3.47	0.	0.	0.	.01	2714.13 3.47
+	HYDROGRAPH AT	F1	52.	3.20	5.	1.	1.	.04	
+	ROUTED TO	BASF1	37.	3.33	4.	1.	1.	.04	2699.05 3.33
+	HYDROGRAPH AT	F2	23.	3.17	2.	0.	0.	.01	
+	ROUTED TO	BASF2	11.	3.33	1.	0.	0.	.01	2704.25 3.33
+	HYDROGRAPH AT	F3	21.	3.17	2.	0.	0.	.01	
+	ROUTED TO	BASF3	18.	3.20	1.	0.	0.	.01	2707.47 3.20
+	HYDROGRAPH AT	G	21.	3.20	2.	1.	0.	.02	
+	ROUTED TO	BASG	9.	3.47	1.	0.	0.	.02	2726.22 3.47
+	HYDROGRAPH AT	H1	78.	3.23	8.	2.	2.	.06	
+	ROUTED TO	BASH1	54.	3.37	5.	1.	1.	.06	2745.66 3.37
+	HYDROGRAPH AT	H2	84.	3.27	10.	2.	2.	.07	
+	ROUTED TO	BASH2-	81.	3.30	9.	2.	2.	.07	2775.17 3.30
+	ROUTED TO	BASH2-	66.	3.43	7.	2.	1.	.07	2788.06 3.43
+	HYDROGRAPH AT	I	38.	3.20	3.	1.	1.	.03	
+	ROUTED TO	BASI	16.	3.43	2.	1.	0.	.03	2758.57 3.43
+	8 COMBINED AT	CLEAR	193.	3.40	23.	6.	5.	.24	
+	HYDROGRAPH AT	J	45.	3.13	3.	1.	1.	.02	
+	ROUTED TO	BASJ	30.	3.20	3.	1.	1.	.02	2772.96 3.20
+	HYDROGRAPH AT	K	20.	3.10	1.	0.	0.	.01	
+	ROUTED TO	BASK	4.	3.40	1.	0.	0.	.01	2740.11 3.40
+	HYDROGRAPH AT	L	19.	3.10	1.	0.	0.	.01	
+	ROUTED TO	BASL	11.	3.20	1.	0.	0.	.01	2725.31 3.20
+	HYDROGRAPH AT	M	15.	3.13	1.	0.	0.	.01	
+	ROUTED TO	BASM	7.	3.30	1.	0.	0.	.01	2716.36 3.30
	HYDROGRAPH AT								

```
          TIMINT        .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
329 KK    *          Q *
          *            *
          **************

336 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
337 KK    *          R *
          *            *
          **************

344 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

1
                                    RUNOFF SUMMARY
                              FLOW IN CUBIC FEET PER SECOND
                          TIME IN HOURS,  AREA IN SQUARE MILES

+                                                PEAK   TIME OF   AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN   MAXIMUM   TIME OF
          OPERATION        STATION                FLOW   PEAK     6-HOUR    24-HOUR    72-HOUR       AREA   STAGE     MAX STAGE
+
          HYDROGRAPH AT
+                             A1                  113.   3.23       11.        3.         2.          .08
          ROUTED TO
+                           BASA1                 109.   3.27       10.        2.         2.          .08
+                                                                                                    2761.19     3.27
          HYDROGRAPH AT
+                             A2                   57.   3.17        5.        1.         1.          .04
          ROUTED TO
+                          BAS A2                 48.   3.23        4.        1.         1.          .04
+                                                                                                    2739.13     3.23
          HYDROGRAPH AT
+                             B1                   42.   3.17        4.        1.         1.          .03
          ROUTED TO
+                          BASB-3                 31.   3.27        3.        1.         1.          .03
+                                                                                                    2784.99     3.27
          HYDROGRAPH AT
+                             B2                   62.   3.23        7.        2.         1.          .05
          2 COMBINED AT
+                           COMBB                  92.   3.27       10.        2.         2.          .08
          ROUTED TO
+                          BASB-5                 85.   3.30        9.        2.         2.          .08
+                                                                                                    2746.12     3.30
          HYDROGRAPH AT
+                             C                    46.   3.17        4.        1.         1.          .03
          ROUTED TO
+                          BASC-1                 33.   3.30        3.        1.         1.          .03
+                                                                                                    2783.04     3.30
          HYDROGRAPH AT
+                             D                    48.   3.20        5.        1.         1.          .03
          ROUTED TO
+                          BASD-2                 37.   3.30        4.        1.         1.          .03
+                                                                                                    2723.11     3.30
          HYDROGRAPH AT
+                             E1                   74.   3.27        8.        2.         2.          .06
          ROUTED TO
+                          BASE1-                 68.   3.33        7.        2.         1.          .06
+                                                                                                    2699.15     3.33
```

*** ***

```
          **************
          *            *
277 KK    *      BASL  *
          *            *
          **************

283 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
290 KK    *      BASM  *
          *            *
          **************

296 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
303 KK    *      BASN  *
          *            *
          **************

309 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
310 KK    *          O *
          *            *
          **************

317 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
318 KK    *          P *
          *            *
          **************

325 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
```

```
          **************
          *            *
202 KK    *     BASH1  *          -1
          *            *
          **************

209 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
222 KK    *    BASH2-  *          2
          *            *
          **************

228 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
235 KK    *      BASI  *
          *            *
          **************

241 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
251 KK    *      BASJ  *
          *            *
          **************

257 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
264 KK    *      BASK  *
          *            *
          **************

270 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

```
          **************

143 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
150 KK    *     BASF1  *          -3
          *            *
          **************

156 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
163 KK    *     BASF2  *          -2
          *            *
          **************

169 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
176 KK    *     BASF3  *          -1
          *            *
          **************

182 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
189 KK    *      BASG  *          -1
          *            *
          **************

195 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 90 KK    *    BASD-2  *
          *            *
          **************

 96 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
103 KK    *    BASE1-  *          2
          *            *
          **************

109 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
116 KK    *     BASE2  *
          *            *
          **************

123 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
124 KK    *     COMBE  *
          *            *
          **************

127 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
137 KK    *     BASE3  *         -1
          *            *
```

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

*** ***

```
          **************
          *            *
22 KK     *     BASA1  *
          *            *
          **************

28 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL        0.  HYDROGRAPH PLOT SCALE
                    IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                     IOUT        22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2       900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT      .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
35 KK     *    BAS A2  *          -3
          *            *
          **************

41 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL        0.  HYDROGRAPH PLOT SCALE
                    IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                     IOUT        22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2       900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT      .033  TIME INTERVAL IN HOURS
```

*** ***

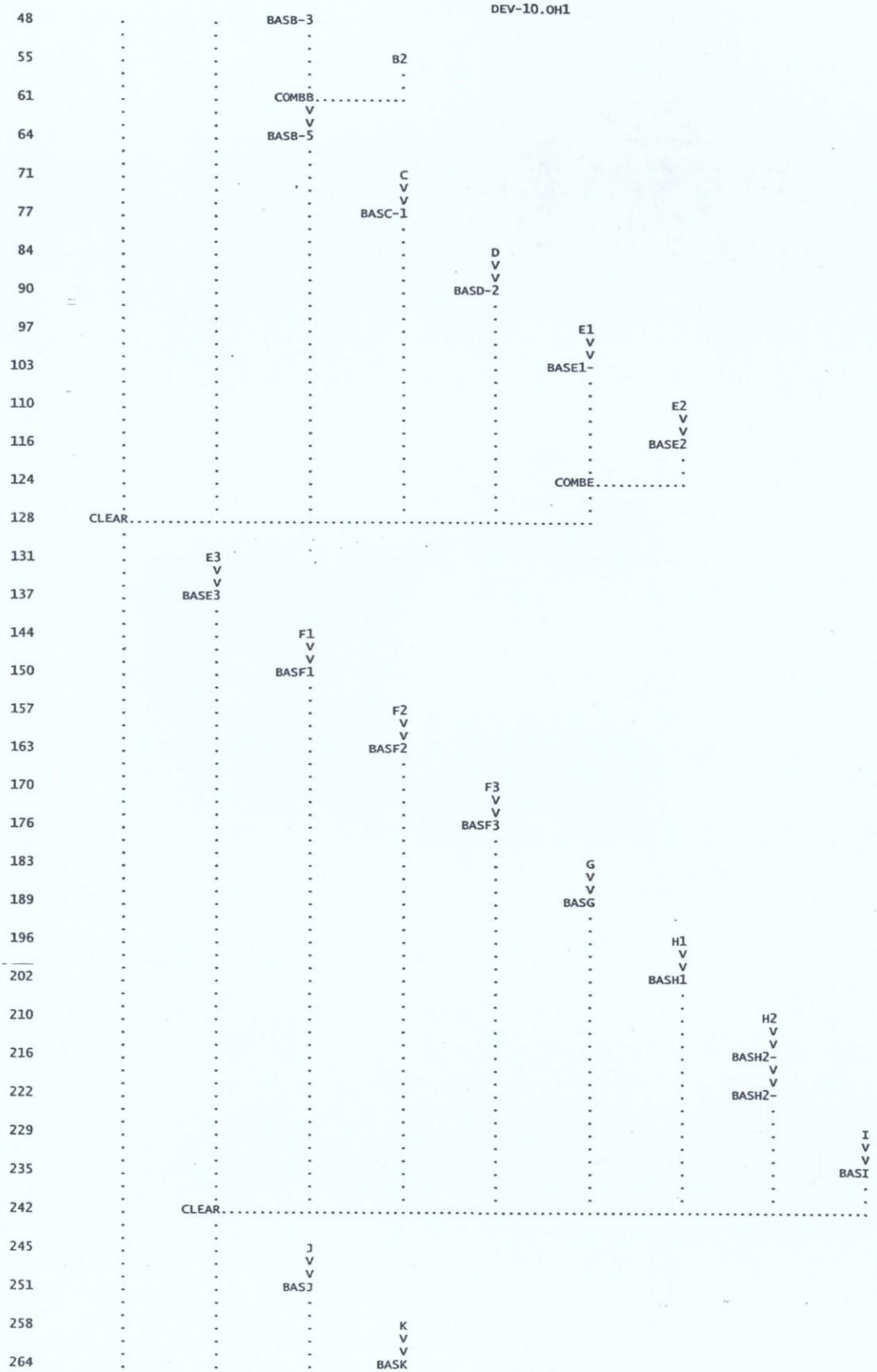
```
          **************
          *            *
48 KK     *    BASB-3  *
          *            *
          **************

54 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL        0.  HYDROGRAPH PLOT SCALE
                    IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                     IOUT        22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2       900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT      .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
64 KK     *    BASB-5  *
          *            *
          **************

70 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL        0.  HYDROGRAPH PLOT SCALE
                    IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                     IOUT        22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2       900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT      .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
77 KK     *    BASC-1  *
          *            *
          **************

83 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
```


48
BASB-3
55
B2
61
COMBB
64
BASB-5
71
C
77
BASC-1
84
D
90
BASD-2
97
E1
103
BASE1-
110
E2
116
BASE2
124
COMBE
128
CLEAR
131
E3
137
BASE3
144
F1
150
BASF1
157
F2
163
BASF2
170
F3
176
BASF3
183
G
189
BASG
196
H1
202
BASH1
210
H2
216
BASH2-
222
BASH2-
229
I
235
BASI
242
CLEAR
245
J
251
BASJ
258
K
264
BASK

```
                *
          284   KK       M
          285   KM  RUNOFF FROM SUB-BASIN M
          286   BA    .008
          287   LS                88      10
          288   UK     137     .018    0.13     100
          289   RK     750     .012    .032            TRAP       4       5
                *
1                                        HEC-1 INPUT                                                    PAGE  8

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          290   KK    BASN
          291   KM  7' WEIR
          292   RS       1    STOR       0
          293   SV       0   0.056   0.124   0.205   0.301   0.413
          294   SE    2713    2714    2715    2716    2717    2718
          295   SQ       0       0       0       0      20      55
          296   KO                                      22
                *
          297   KK       N
          298   KM  RUNOFF FROM SUB-BASIN N
          299   BA     .01
          300   LS                88      10
          301   UK     117     .018    0.13     100
          302   RK    1036     .012    .032            TRAP       5       5
                *
          303   KK    BASN
          304   KM  13' WEIR
          305   RS       1    STOR       0
          306   SV       0   0.083   0.191   0.326    0.49   0.686
          307   SE    2688    2689    2690    2691    2692    2693
          308   SQ       0       0       0       0       0      36
          309   KO                                      22
                *
          310   KK       O
          311   KM  RUNOFF FROM SUB-BASIN O
          312   KM  Area of Basin subtrating the area to be retained for 100 year event
          313   BA  0.0024       9
          314   LS                88      10
          315   UK     108      .02    0.13     100
          316   RK     174     .014    .032            TRAP       4       5
          317   KO                                      22

          318   KK       P
          319   KM  RUNOFF FROM SUB-BASIN P
          320   KM  Area of Basin subtrating the area to be retained for 100 year event
          321   BA   .0058
          322   LS                88      10
          323   UK     135      .02    0.13     100
          324   RK     354     .014    .032            TRAP       5       5
          325   KO                                      22

          326   KK   CLEAR
          327   KM  CLEAR HYDROGRAPH STACK
          328   HC       8

          329   KK       Q
          330   KM  RUNOFF FROM SUB-BASIN Q
          331   KM  Area of Basin subtrating the area to be retained for 100 year event
          332   BA   .0024
          333   LS                88      10
          334   UK      86      .02    0.13     100
1                                        HEC-1 INPUT                                                    PAGE  9

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          335   RK     160     .014    .032            TRAP       4       5
          336   KO                                      22

          337   KK       R
          338   KM  RUNOFF FROM SUB-BASIN R
          339   KM  Area of Basin subtrating the area to be retained for 100 year event
          340   BA     .14       8
          341   LS                88     .14
          342   UK     180     .025    0.13     100
          343   RK    4300     .023    .032            TRAP      15       5
          344   KO                                      22
          345   ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

        INPUT
         LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

          NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

           16          A1
                        V
                        V
           22        BASA1
                       .
                       .
           29          .         A2
                       .          V
                       .          V
           35          .      BAS A2
                       .          .
                       .          .
           42          .          .          B1
                       .          .          V
                       .          .          V
```

```
208          SQ      0       0       0       0       0       0       0       0       0     170
209          KO                                     22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

210          KK      H2
211          KM  RUNOFF FROM SUB-BASIN H2
212          BA    .072
213          LS                 88    4.78
214          UK     400    .025    0.13     100
215          RK    3480    .019    .032             TRAP      12       5

216          KK  BASH2-       1
217          KM  22' WEIR AT HEADWALL
218          RS       1    STOR       0
219          SV       0    0.15   0.318   0.507   0.718   0.929
220          SE       0    2772    2773    2774    2775    2776
221          SQ       0       0       0       0      62     174

222          KK  BASH2-       2
223          KM  21' WEIR AT HEADWALL
224          RS       1    STOR       0
225          SV       0    .165    .361    .590    .820   1.049
226          SE       0    2785    2786    2787    2788    2789
227          SQ       0       0       0       0      59     166
228          KO                                     22
             *

229          KK       I
230          KM  RUNOFF FROM SUB-BASIN I
231          BA    .025
232          LS                 88     7.4
233          UK     225     .02    0.13     100
234          RK    2100    .026    .032             TRAP      10       5
             *

235          KK    BASI
236          KM  10' WEIR
237          RS       1    STOR       0
238          SV       0    .186    .399    .640   0.881   1.122
239          SE    2755    2756    2757    2758    2759    2760
240          SQ       0       0       0       0      28      79
241          KO                                     22
             *

242          KK   CLEAR
243          KM  CLEAR HYDROGRAPH STACK
244          HC       8
             *

245          KK       J
246          KM  RUNOFF FROM SUB-BASIN J
247          BA    .024
248          LS                 88     7.9
249          UK     145     .02    0.13     100
250          RK     965    .026    .032             TRAP       5       5
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

251          KK    BASJ
252          KM  11' WEIR
253          RS       1    STOR       0
254          SV       0    .098    .217    .359    .528   0.698
255          SE    2769    2770    2771    2772    2773    2774
256          SQ       0       0       0       0      31      87
257          KO                                     22
             *

258          KK       K
259          KM  RUNOFF FROM SUB-BASIN K
260          BA    .009
261          LS                 88      10
262          UK      81    .025    0.13     100
263          RK     715    .022    .032             TRAP       5       5
             *

264          KK    BASK
265          KM  13' WEIR
266          RS       1    STOR       0
267          SV       0    .106    .232    .378   0.525
268          SE    2737    2738    2739    2740    2741
269          SQ       0       0       0       0      36
270          KO                                     22
             *

271          KK       L
272          KM  RUNOFF FROM SUB-BASIN L
273          BA    .009
274          LS                 88      10
275          UK     113    .018    0.13     100
276          RK     450    .012    .032             TRAP       5       5
             *

277          KK    BASL
278          KM  13' WEIR
279          RS       1    STOR       0
280          SV       0   0.041   0.106     0.2   0.326
281          SE    2722    2723    2724    2725    2726
282          SQ       0       0       0       0      36
283          KO                                     22
```

```
129          KM  CLEAR HYDROGRAPH STACK
130          HC       6
             *

131          KK      E3
132          KM  RUNOFF FROM SUB-BASIN E3
133          BA    .008
134          LS                88       10
135          UK     175     .025     0.13      100
136          RK     750     .032     .032             TRAP       6        5
             *

137          KK   BASE3       -1
138          KM  10' WEIR AT HEAD WALL
139          RS       1     STOR        0
140          SV       0     .082     .188     .322    0.456
141          SE    2711     2712     2713     2714     2715
142          SQ       0        0        0        0       28
143          KO                                          22
             *

144          KK      F1
145          KM  RUNOFF FROM SUB-BASIN F1
146          BA    .036
147          LS                88       10
148          UK     225     .018     0.13      100
149          RK    2500     .012     .032             TRAP       7        5
             *

150          KK   BASF1       -3
151          KM  12' WEIR AT HEAD WALL
152          RS       1     STOR        0
153          SV       0     0.21    0.443    0.701    0.958
154          SE    2696     2697     2698     2699     2700
155          SQ       0        0        0       34       95
156          KO                                          22
             *

157          KK      F2
158          KM  RUNOFF FROM SUB-BASIN F2
159          BA    .014
160          LS                88       10
161          UK     200     .018     0.13      100
162          RK    1440     .028     .032             TRAP       6        5
             *

163          KK   BASF2       -2
164          KM  16' WEIR AT HEAD WALL
165          RS       1     STOR        0
166          SV       0    0.112    0.243    0.396    0.549
167          SE    2701     2702     2703     2704     2705
168          SQ       0        0        0        0       45
169          KO                                          22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

170          KK      F3
171          KM  RUNOFF FROM SUB-BASIN F3
172          BA    .013
173          LS                88       10
174          UK     225     .018     0.13      100
175          RK     850     .026     .032             TRAP       6        5
             *

176          KK   BASF3       -1
177          KM  14' WEIR AT HEAD WALL
178          RS       1     STOR        0
179          SV       0    0.038    0.095    0.172    0.274
180          SE    2704     2705     2706     2707     2708
181          SQ       0        0        0        0       39
182          KO                                          22
             *

183          KK       G
184          KM  RUNOFF FROM SUB-BASIN G
185          BA   0.016
186          LS                88       10
187          UK     400     .025     0.13      100
188          RK     720     .022     .032             TRAP       4        5
             *

189          KK    BASG       -1
190          KM  15' WEIR
191          RS       1     STOR        0
192          SV       0    0.094    0.209    0.347    0.512     0.71
193          SE    2722     2723     2724     2725     2726     2727
194          SQ       0        0        0        0        0       42
195          KO                                          22
             *

196          KK      H1
197          KM  RUNOFF FROM SUB-BASIN H1
198          BA    .059
199          LS                88      9.4
200          UK     375     .025     0.13      100
201          RK    2210     .019     .032             TRAP       8        5

202          KK   BASH1       -1
203          KM  FLOW ROUTED THROUGH DETENTION BASIN H1-1
204          KM  2-36" PIPE CULVERT
205          RS       1     STOR        0
206          SV       0    0.009    0.046    0.132    0.284     0.51    0.822     1.24    1.497    1.809
207          SE    2738     2739     2740     2741     2742     2743     2744     2745   2745.5     2746
```

```
 55          KK      B2
 56          KM  RUNOFF FROM SUB-BASIN B2
 57          BA    .050
 58          LS              88      6.7
 59          UK     400     .025     0.13      100
 60          RK    2340     .024     .032              TRAP        8        5
             *

 61          KK   COMBB
 62          KM  COMBINE SECTIONS B1 AND B2
 63          HC       2
             *

 64          KK  BASB-5
 65          KM  25' WEIR
 66          RS       1     STOR        0
 67          SV       0    0.146    0.333    0.565    0.843    1.121
 68          SE    2742     2743     2744     2745     2746     2747
 69          SQ       0        0        0        0       70      198
 70          KO                                          22
             *

 71          KK       C
 72          KM  RUNOFF FROM SUB-BASIN C
 73          BA     .03
 74          LS              88      5.9
 75          UK     250     .023     0.13      100
 76          RK    1570     .017     .032              TRAP        5        5
             *

 77          KK  BASC-1
 78          KM  11' WEIR
 79          RS       1     STOR        0
 80          SV       0     .107     .236     .388    0.566    0.745
 81          SE    2779     2780     2781     2782     2783     2784
 82          SQ       0        0        0        0       31       87
 83          KO                                          22
             *

 84          KK       D
 85          KM  RUNOFF FROM SUB-BASIN D
 86          BA    .034
 87          LS              88       10
 88          UK     300      .02     0.13      100
 89          RK    1425     .014     .032              TRAP        6        5
             *
```

1 HEC-1 INPUT PAGE 3

```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 90          KK  BASD-2
 91          KM  11' WEIR AT HEAD WALL
 92          RS       1     STOR        0
 93          SV       0    0.039     0.13     0.29    0.541    0.898
 94          SE    2719     2720     2721     2722     2723     2724
 95          SQ       0        0        0        0       31       87
 96          KO                                          22
             *

 97          KK      E1
 98          KM  RUNOFF FROM SUB-BASIN E1
 99          BA    .061
100          LS              88       10
101          UK     400      .02     0.13      100
102          RK    2050     .013     .032              TRAP        7        5

103          KK  BASE1-       2
104          KM  19' WEIR AT HEAD WALL
105          RS       1     STOR        0
106          SV       0    0.147    0.334     0.56    0.826    1.135
107          SE    2695     2696     2697     2698     2699     2700
108          SQ       0        0        0        0       53      150
109          KO                                          22
             *

110          KK      E2
111          KM  RUNOFF FROM SUB-BASIN E2
112          BA    .046
113          LS              88       10
114          UK     200      .02     0.13      100
115          RK    2370     .013     .032              TRAP       10        5
             *

116          KK   BASE2
117          KM  FLOW ROUTED THROUGH DETENTION BASIN E2-1
118          KM  2-42" PIPE CULVERT
119          RS       1     STOR        0
120          SV       0    0.094    0.211    0.379    0.641    1.026    1.546   1.861    2.22
121          SE    2696     2697     2698     2699     2700     2701     2702  2702.5    2703
122          SQ       0        0        0        0        0        0        0       0     180
123          KO                                          22
             *

124          KK   COMBE
125          KM  COMBINE SECTIONS E1 AND E2
126          HC       2
127          KO                                      22
             *
```

1 HEC-1 INPUT PAGE 4

```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

128          KK   CLEAR
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   14NOV06  TIME  17:51:27   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1  ID   HEC-1 MODEL FOR SERENO CANYON
   2  ID   10-YEAR, 6-HOUR STORM
   3  ID   RAINFALL FROM NOAA ATLAS
   4  ID   SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5  ID   KINEMATIC WAVE HYDROGRAPH ROUTING
   6  ID   DEVELOPED CONDITIONS
   7  ID   10% IMPERVIOUS AREA USED FOR SITE
   8  ID
   9  ID   PREPARED BY WOOD/PATEL, 1.10.2005
  10  ID   FILE NAME:  DEV-10.DAT
  11  ID
      *DIAGRAM
  12  IT       2                   900
  13  IO       5
  14  JD              .01
  15  PH                    0.52    0.99    1.64    1.87    2.01    2.29

  16  KK      A1
  17  KM       RUNOFF FROM SUB-BASIN A1
  18  BA   0.084
  19  LS                88     1.1
  20  UK     260    .025    0.13     100
  21  RK    3520    .023    .032            TRAP      12       5
      *

  22  KK   BASA1
  23  KM  29' WIER  AT HEADWALL
  24  RS       1    STOR       0
  25  SV       0   0.108   0.242   0.404     0.6   0.841   1.081
  26  SE    2756    2757    2758    2759    2760    2761    2762
  27  SQ       0       0       0       0       0      81     230
  28  KO                                      22

  29  KK      A2
  30  KM  RUNOFF FROM SUB-BASIN A2
  31  BA    .036
  32  LS                88     7.4
  33  UK     235    .025    0.13     100
  34  RK    2000     .02    .032            TRAP       8       5

  35  KK  BAS A2      -3
  36  KM  14' WEIR AT OUTLET
  37  RS       1    STOR       0
  38  SV       0   0.059   0.135   0.228    0.34   0.474   0.608   0.742
  39  SE    2733    2734    2735    2736    2737    2738    2739    2740
  40  SQ       0       0       0       0       0       0      39     111
  41  KO                                      22
      *

  42  KK      B1
  43  KM  RUNOFF FROM SUB-BASIN B1
  44  BA    .027
  45  LS                88     3.7
  46  UK     200    .025    0.13     100
  47  RK    2500    .028    .032            TRAP       8       5
```

1 HEC-1 INPUT PAGE 2

```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  48  KK  BASB-3
  49  KM  11' WEIR AT HEADWALL
  50  RS       1    STOR       0
  51  SV       0    .089     0.2    .338    0.49   0.643
  52  SE    2781    2782    2783    2784    2785    2786
  53  SQ       0       0       0       0      31      87
  54  KO                                      22
      *
```

```
          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               F3  MANE          1.03      9.22    193.01       .72      2.00      9.21    194.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5035E+00 OUTFLOW= .5017E+00 BASIN STORAGE= .1687E-03 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               G  MANE           .86      9.19    198.87       .72      2.00      9.13    198.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6196E+00 OUTFLOW= .6177E+00 BASIN STORAGE= .3650E-03 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               H1  MANE          2.00     33.69    199.70       .72      2.00     33.56    200.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2267E+01 OUTFLOW= .2254E+01 BASIN STORAGE= .1203E-02 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               H2  MANE          2.16     35.31    204.39       .67      2.00     35.24    204.00       .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2600E+01 OUTFLOW= .2584E+01 BASIN STORAGE= .1757E-02 PERCENT ERROR=    .6

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               I  MANE           2.00     16.55    195.48       .70      2.00     16.48    196.00       .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9357E+00 OUTFLOW= .9298E+00 BASIN STORAGE= .2830E-03 PERCENT ERROR=    .6

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               J  MANE           .97      21.46    190.09       .70      2.00     21.44    190.00       .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9043E+00 OUTFLOW= .9018E+00 BASIN STORAGE= .1448E-03 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               K  MANE           .92      10.75    186.30       .72      2.00     10.58    186.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3485E+00 OUTFLOW= .3479E+00 BASIN STORAGE= .1758E-04 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               L  MANE           .70       9.15    188.53       .72      2.00      9.13    188.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3485E+00 OUTFLOW= .3477E+00 BASIN STORAGE= .4296E-04 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               M  MANE          1.28       7.32    189.98       .72      2.00      7.32    190.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3098E+00 OUTFLOW= .3087E+00 BASIN STORAGE= .5202E-04 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               N  MANE          1.55       9.31    190.77       .72      2.00      9.23    190.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3873E+00 OUTFLOW= .3863E+00 BASIN STORAGE= .4529E-04 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               O  MANE           .46       2.56    187.54       .72      2.00      2.53    188.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9295E-01 OUTFLOW= .9274E-01 BASIN STORAGE= .9717E-05 PERCENT ERROR=    .2

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               P  MANE           .65       5.59    188.96       .72      2.00      5.52    188.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2246E+00 OUTFLOW= .2239E+00 BASIN STORAGE= .3152E-04 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               Q  MANE           .37       2.78    186.06       .72      2.00      2.78    186.00       .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9295E-01 OUTFLOW= .9268E-01 BASIN STORAGE= .6752E-05 PERCENT ERROR=    .3

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
               R  MANE          1.97      88.00    197.39       .63      2.00     87.79    196.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4732E+01 OUTFLOW= .4696E+01 BASIN STORAGE= .1127E-02 PERCENT ERROR=    .7


*** NORMAL END OF HEC-1 ***
```

```
+                          N        9.    3.17        1.        0.        0.       .01
+       ROUTED TO
+                          BASN     0.     .00        0.        0.        0.       .01
+                                                                                          2691.37    26.53
+       HYDROGRAPH AT
+                          O        3.    3.13        0.        0.        0.       .00
+       HYDROGRAPH AT
+                          P        6.    3.13        0.        0.        0.       .01
+       8 COMBINED AT
+                          CLEAR   37.    3.73       10.        3.        2.       .31
+       HYDROGRAPH AT
+                          Q        3.    3.10        0.        0.        0.       .00
+       HYDROGRAPH AT
+                          R       88.    3.27        9.        2.        2.       .14
1
                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
  ISTAQ   ELEMENT      DT        PEAK     TIME TO PEAK   VOLUME     DT        PEAK     TIME TO PEAK   VOLUME
                       (MIN)     (CFS)      (MIN)        (IN)     (MIN)     (CFS)      (MIN)          (IN)
 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      A1  MANE          2.00     47.04     198.45        .64      2.00     46.72     198.00          .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2879E+01 OUTFLOW= .2857E+01 BASIN STORAGE= .1235E-02 PERCENT ERROR=    .7

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      A2  MANE          2.04     25.25     194.06        .70      2.00     25.20     194.00          .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1347E+01 OUTFLOW= .1341E+01 BASIN STORAGE= .3797E-03 PERCENT ERROR=    .5

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      B1  MANE          1.92     18.63     195.16        .66      2.00     18.43     194.00          .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9606E+00 OUTFLOW= .9551E+00 BASIN STORAGE= .2359E-03 PERCENT ERROR=    .5

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      B2  MANE          2.00     26.14     201.02        .69      2.00     26.01     202.00          .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1854E+01 OUTFLOW= .1842E+01 BASIN STORAGE= .1126E-02 PERCENT ERROR=    .6

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      C   MANE          1.75     19.66     195.10        .68      2.00     19.65     196.00          .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1100E+01 OUTFLOW= .1093E+01 BASIN STORAGE= .3456E-03 PERCENT ERROR=    .6

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      D   MANE          1.62     21.12     196.56        .72      2.00     21.07     198.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1317E+01 OUTFLOW= .1311E+01 BASIN STORAGE= .6177E-03 PERCENT ERROR=    .4

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      E1  MANE          2.27     31.91     202.20        .72      2.00     31.86     202.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2362E+01 OUTFLOW= .2349E+01 BASIN STORAGE= .1516E-02 PERCENT ERROR=    .5

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      E2  MANE          2.00     33.11     195.30        .72      2.00     32.69     196.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1781E+01 OUTFLOW= .1774E+01 BASIN STORAGE= .4574E-03 PERCENT ERROR=    .4

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      E3  MANE           .86      7.09     190.52        .72      2.00      7.08     190.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3098E+00 OUTFLOW= .3086E+00 BASIN STORAGE= .4967E-04 PERCENT ERROR=    .4

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      F1  MANE          1.89     23.39     198.26        .72      2.00     23.38     198.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1394E+01 OUTFLOW= .1388E+01 BASIN STORAGE= .5221E-03 PERCENT ERROR=    .4

 FOR STORM = 1  STORM AREA (SQ MI) =        .01
      F2  MANE          1.59     10.47     193.53        .72      2.00     10.40     194.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5422E+00 OUTFLOW= .5395E+00 BASIN STORAGE= .1396E-03 PERCENT ERROR=    .5
```

+	HYDROGRAPH AT	E2	33.	3.27	4.	1.	1.	.05	
+	ROUTED TO	BASE2	0.	.00	0.	0.	0.	.05	2702.36 26.43
+	2 COMBINED AT	COMBE	26.	3.50	4.	1.	1.	.11	
+	6 COMBINED AT	CLEAR	127.	3.47	17.	4.	3.	.37	
+	HYDROGRAPH AT	E3	7.	3.17	1.	0.	0.	.01	
+	ROUTED TO	BASE3	0.	.00	0.	0.	0.	.01	2713.90 24.67
+	HYDROGRAPH AT	F1	23.	3.30	3.	1.	1.	.04	
+	ROUTED TO	BASF1	13.	3.53	2.	0.	0.	.04	2698.39 3.53
+	HYDROGRAPH AT	F2	10.	3.23	1.	0.	0.	.01	
+	ROUTED TO	BASF2	1.	4.13	0.	0.	0.	.01	2704.03 4.13
+	HYDROGRAPH AT	F3	9.	3.23	1.	0.	0.	.01	
+	ROUTED TO	BASF3	6.	3.37	1.	0.	0.	.01	2707.16 3.37
+	HYDROGRAPH AT	G	9.	3.30	1.	0.	0.	.02	
+	ROUTED TO	BASG	1.	5.00	0.	0.	0.	.02	2726.02 5.00
+	HYDROGRAPH AT	H1	34.	3.33	4.	1.	1.	.06	
+	ROUTED TO	BASH1	7.	4.03	1.	0.	0.	.06	2745.52 4.03
+	HYDROGRAPH AT	H2	35.	3.40	5.	1.	1.	.07	
+	ROUTED TO	BASH2-	32.	3.50	4.	1.	1.	.07	2774.51 3.50
+	ROUTED TO	BASH2-	19.	3.77	3.	1.	1.	.07	2787.32 3.77
+	HYDROGRAPH AT	I	16.	3.27	2.	0.	0.	.03	
+	ROUTED TO	BASI	2.	4.17	1.	0.	0.	.03	2758.08 4.17
+	8 COMBINED AT	CLEAR	30.	3.73	8.	2.	2.	.24	
+	HYDROGRAPH AT	J	21.	3.17	2.	0.	0.	.02	
+	ROUTED TO	BASJ	9.	3.40	1.	0.	0.	.02	2772.29 3.40
+	HYDROGRAPH AT	K	11.	3.10	1.	0.	0.	.01	
+	ROUTED TO	BASK	0.	.00	0.	0.	0.	.01	2739.79 27.97
+	HYDROGRAPH AT	L	9.	3.13	1.	0.	0.	.01	
+	ROUTED TO	BASL	2.	3.50	0.	0.	0.	.01	2725.06 3.50
+	HYDROGRAPH AT	M	7.	3.17	1.	0.	0.	.01	
+	ROUTED TO	BASM	1.	3.77	0.	0.	0.	.01	2716.05 3.77
	HYDROGRAPH AT								

TIMINT .033 TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
329 KK    *       Q     *
          *             *
          ***************
```

336 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
337 KK    *       R     *
          *             *
          ***************
```

344 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	A1	47.	3.30	6.	1.	1.	.08		
+	ROUTED TO	BASA1	39.	3.43	5.	1.	1.	.08	2760.48	3.40
+	HYDROGRAPH AT	A2	25.	3.23	3.	1.	1.	.04		
+	ROUTED TO	BAS A2	15.	3.43	2.	0.	0.	.04	2738.38	3.43
+	HYDROGRAPH AT	B1	18.	3.23	2.	0.	0.	.03		
+	ROUTED TO	BASB-3	10.	3.47	1.	0.	0.	.03	2784.31	3.47
+	HYDROGRAPH AT	B2	26.	3.37	4.	1.	1.	.05		
+	2 COMBINED AT	COMBB	33.	3.43	5.	1.	1.	.08		
+	ROUTED TO	BASB-5	28.	3.53	4.	1.	1.	.08	2745.40	3.53
+	HYDROGRAPH AT	C	20.	3.27	2.	1.	0.	.03		
+	ROUTED TO	BASC-1	10.	3.50	1.	0.	0.	.03	2782.34	3.50
+	HYDROGRAPH AT	D	21.	3.30	3.	1.	1.	.03		
+	ROUTED TO	BASD-2	15.	3.43	2.	1.	0.	.03	2722.48	3.43
+	HYDROGRAPH AT	E1	32.	3.37	5.	1.	1.	.06		
+	ROUTED TO	BASE1-	26.	3.50	4.	1.	1.	.06	2698.50	3.50

*** ***

```
          ***************
          *             *
277 KK    *      BASL   *
          *             *
          ***************

283 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
290 KK    *      BASM   *
          *             *
          ***************

296 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
303 KK    *      BASN   *
          *             *
          ***************

309 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
310 KK    *          O  *
          *             *
          ***************

317 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
318 KK    *          P  *
          *             *
          ***************

325 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
```

```
          ***************
          *             *
202 KK    *     BASH1   *          -1
          *             *
          ***************

209 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
222 KK    *    BASH2-   *          2
          *             *
          ***************

228 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
235 KK    *      BASI   *
          *             *
          ***************

241 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
251 KK    *      BASJ   *
          *             *
          ***************

257 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
264 KK    *      BASK   *
          *             *
          ***************

270 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

```
          **************
143 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
150 KK    *     BASF1  *          -3
          *            *
          **************

156 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
163 KK    *     BASF2  *          -2
          *            *
          **************

169 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
176 KK    *     BASF3  *          -1
          *            *
          **************

182 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
189 KK    *      BASG  *          -1
          *            *
          **************

195 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 90 KK    *    BASD-2  *
          *            *
          **************

 96 KO          OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
103 KK    *    BASE1-  *          2
          *            *
          **************

109 KO          OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
116 KK    *     BASE2  *
          *            *
          **************

123 KO          OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
124 KK    *     COMBE  *
          *            *
          **************

127 KO          OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE
                IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                 IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
137 KK    *     BASE3  *         -1
          *            *
```

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

*** ***

```
          **************
          *            *
22 KK     *    BASA1   *
          *            *
          **************
```

```
28 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
35 KK     *   BAS A2   *          -3
          *            *
          **************
```

```
41 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
48 KK     *   BASB-3   *
          *            *
          **************
```

```
54 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

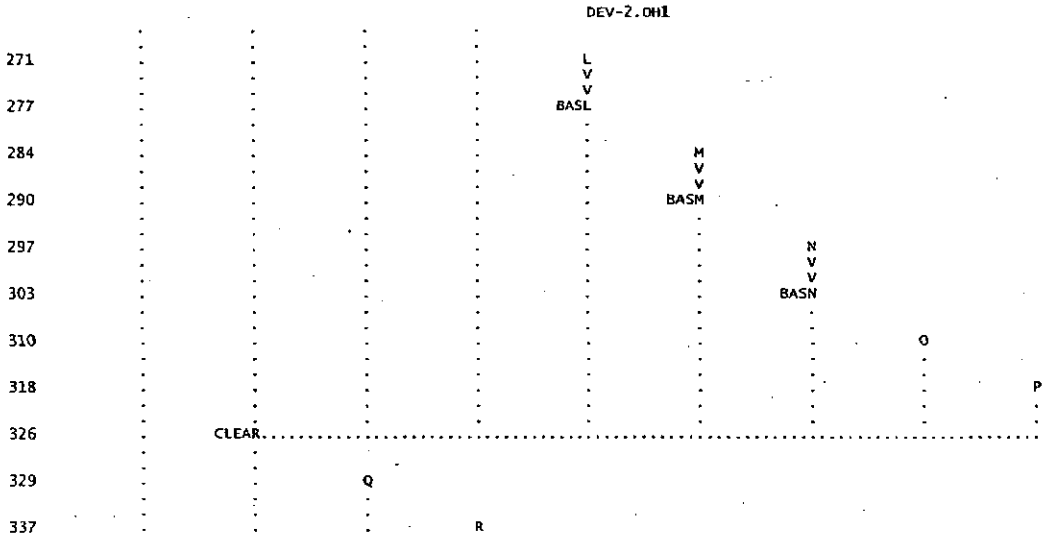
```
          **************
          *            *
64 KK     *   BASB-5   *
          *            *
          **************
```

```
70 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
77 KK     *   BASC-1   *
          *            *
          **************
```

```
83 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   14NOV06  TIME  17:51:49   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

HEC-1 MODEL FOR SEREND CANYON
2-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
DEVELOPED CONDITIONS
10% IMPERVIOUS AREA USED FOR SITE

PREPARED BY WOOD/PATEL, 1.10.2005
FILE NAME: DEV-2.DAT

13 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0558	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
TOTAL TIME BASE 29.97 HOURS

ENGLISH UNITS

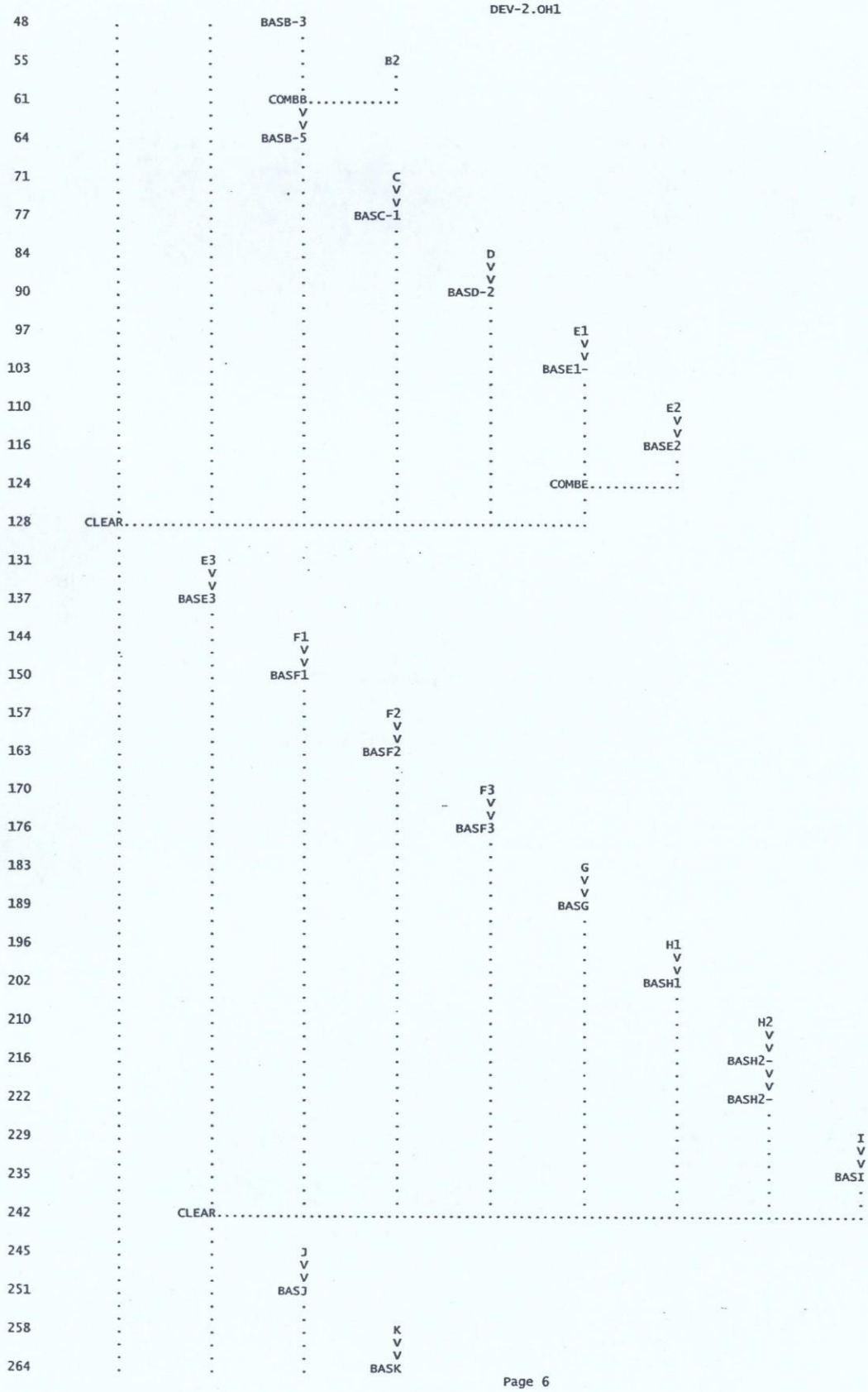
DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

14 JD INDEX STORM NO. 1

STRM	1.57	PRECIPITATION DEPTH
TRDA	.01	TRANSPOSITION DRAINAGE AREA

15 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.02	.02	.02	.02	.03	.03	.04	.06	.08	.15
.15	.12	.07	.05	.03	.03	.03	.02	.02	.02
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00


48
BASB-3
55
B2
61
COMBB
64
BASB-5
71
C
77
BASC-1
84
D
90
BASD-2
97
E1
103
BASE1-
110
E2
116
BASE2
124
COMBE
128
CLEAR
131
E3
137
BASE3
144
F1
150
BASF1
157
F2
163
BASF2
170
F3
176
BASF3
183
G
189
BASG
196
H1
202
BASH1
210
H2
216
BASH2-
222
BASH2-
229
I
235
BASI
242
CLEAR
245
J
251
BASJ
258
K
264
BASK

```
                *
          284   KK       M
          285   KM  RUNOFF FROM SUB-BASIN M
          286   BA    .008
          287   LS              88      10
          288   UK     137     .018    0.13     100
          289   RK     750     .012    .032             TRAP       4       5
                *
1                                        HEC-1 INPUT                                                    PAGE  8

         LINE     ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          290   KK    BASN
          291   KM  7' WEIR
          292   RS       1     STOR       0
          293   SV       0    0.056   0.124   0.205   0.301   0.413
          294   SE    2713     2714    2715    2716    2717    2718
          295   SQ       0        0       0       0      20      55
          296   KO                                      22
                *
          297   KK       N
          298   KM  RUNOFF FROM SUB-BASIN N
          299   BA     .01
          300   LS              88      10
          301   UK     117     .018    0.13     100
          302   RK    1036     .012    .032             TRAP       5       5
                *
          303   KK    BASN
          304   KM  13' WEIR
          305   RS       1     STOR       0
          306   SV       0    0.083   0.191   0.326    0.49   0.686
          307   SE    2688     2689    2690    2691    2692    2693
          308   SQ       0        0       0       0       0      36
          309   KO                                      22
                *
          310   KK       O
          311   KM  RUNOFF FROM SUB-BASIN O
          312   KM  Area of Basin subtrating the area to be retained for 100 year event
          313   BA  0.0024       .9
          314   LS              88      10
          315   UK     108      .02    0.13     100
          316   RK     174     .014    .032             TRAP       4       5
          317   KO                                      22

          318   KK       P
          319   KM  RUNOFF FROM SUB-BASIN P
          320   KM  Area of Basin subtrating the area to be retained for 100 year event
          321   BA   .0058
          322   LS              88      10
          323   UK     135      .02    0.13     100
          324   RK     354     .014    .032             TRAP       5       5
          325   KO                                      22

          326   KK   CLEAR
          327   KM  CLEAR HYDROGRAPH STACK
          328   HC       8

          329   KK       Q
          330   KM  RUNOFF FROM SUB-BASIN Q
          331   KM  Area of Basin subtrating the area to be retained for 100 year event
          332   BA    .0024
          333   LS              88      10
          334   UK      86      .02    0.13     100
1                                        HEC-1 INPUT                                                    PAGE  9

         LINE     ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          335   RK     160     .014    .032             TRAP       4       5
          336   KO                                      22

          337   KK       R
          338   KM  RUNOFF FROM SUB-BASIN R
          339   KM  Area of Basin subtrating the area to be retained for 100 year event
          340   BA     .14        8
          341   LS              88     .14
          342   UK     180     .025    0.13     100
          343   RK    4300     .023    .032             TRAP      15       5
          344   KO                                      22
          345   ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          .(--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    16          A1
                 V
                 V
    22        BASA1
                 .
                 .
    29           .          A2
                 .           V
                 .           V
    35           .       BAS A2
                 .           .
                 .           .
    42           .           .          B1
                 .           .           V
                 .           .           V
```

```
208          SQ      0       0       0       0       0       0       0       0       0     170
209          KO                                      22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

210          KK      H2
211          KM  RUNOFF FROM SUB-BASIN H2
212          BA    .072
213          LS              88    4.78
214          UK     400    .025    0.13     100
215          RK    3480    .019    .032             TRAP      12       5

216          KK  BASH2-       1
217          KM  22' WEIR AT HEADWALL
218          RS        1    STOR       0
219          SV        0    0.15   0.318   0.507   0.718   0.929
220          SE        0    2772    2773    2774    2775    2776
221          SQ        0       0       0       0      62     174

222          KK  BASH2-       2
223          KM  21' WEIR AT HEADWALL
224          RS        1    STOR       0
225          SV        0    .165    .361    .590    .820   1.049
226          SE        0    2785    2786    2787    2788    2789
227          SQ        0       0       0       0      59     166
228          KO                                      22
             *

229          KK       I
230          KM  RUNOFF FROM SUB-BASIN I
231          BA    .025
232          LS              88     7.4
233          UK     225     .02    0.13     100
234          RK    2100    .026    .032             TRAP      10       5
             *

235          KK    BASI
236          KM  10' WEIR
237          RS        1    STOR       0
238          SV        0    .186    .399    .640   0.881   1.122
239          SE     2755    2756    2757    2758    2759    2760
240          SQ        0       0       0       0      28      79
241          KO                                      22
             *

242          KK   CLEAR
243          KM  CLEAR HYDROGRAPH STACK
244          HC        8
             *

245          KK       J
246          KM  RUNOFF FROM SUB-BASIN J
247          BA    .024
248          LS              88     7.9
249          UK     145     .02    0.13     100
250          RK     965    .026    .032             TRAP       5       5
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

251          KK    BASJ
252          KM  11' WEIR
253          RS        1    STOR       0
254          SV        0    .098    .217    .359    .528   0.698
255          SE     2769    2770    2771    2772    2773    2774
256          SQ        0       0       0       0      31      87
257          KO                                      22
             *

258          KK       K
259          KM  RUNOFF FROM SUB-BASIN K
260          BA    .009
261          LS              88      10
262          UK      81    .025    0.13     100
263          RK     715    .022    .032             TRAP       5       5
             *

264          KK    BASK
265          KM  13' WEIR
266          RS        1    STOR       0
267          SV        0    .106    .232    .378   0.525
268          SE     2737    2738    2739    2740    2741
269          SQ        0       0       0       0      36
270          KO                                      22
             *

271          KK       L
272          KM  RUNOFF FROM SUB-BASIN L
273          BA    .009
274          LS              88      10
275          UK     113    .018    0.13     100
276          RK     450    .012    .032             TRAP       5       5
             *

277          KK    BASL
278          KM  13' WEIR
279          RS        1    STOR       0
280          SV        0   0.041   0.106     0.2   0.326
281          SE     2722    2723    2724    2725    2726
282          SQ        0       0       0       0      36
283          KO                                      22
```

```
129          KM  CLEAR HYDROGRAPH STACK
130          HC       6
             *

131          KK      E3
132          KM  RUNOFF FROM SUB-BASIN E3
133          BA    .008
134          LS                88      10
135          UK     175     .025    0.13     100
136          RK     750     .032    .032             TRAP       6       5
             *

137          KK   BASE3       -1
138          KM  10' WEIR AT HEAD WALL
139          RS       1     STOR        0
140          SV       0     .082    .188     .322   0.456
141          SE    2711     2712    2713     2714    2715
142          SQ       0        0       0        0      28
143          KO                                       22
             *

144          KK      F1
145          KM  RUNOFF FROM SUB-BASIN F1
146          BA    .036
147          LS                88      10
148          UK     225     .018    0.13     100
149          RK    2500     .012    .032             TRAP       7       5
             *

150          KK   BASF1       -3
151          KM  12' WEIR AT HEAD WALL
152          RS       1     STOR        0
153          SV       0     0.21   0.443    0.701   0.958
154          SE    2696     2697    2698     2699    2700
155          SQ       0        0       0       34      95
156          KO                                       22
             *

157          KK      F2
158          KM  RUNOFF FROM SUB-BASIN F2
159          BA    .014
160          LS                88      10
161          UK     200     .018    0.13     100
162          RK    1440     .028    .032             TRAP       6       5
             *

163          KK   BASF2       -2
164          KM  16' WEIR AT HEAD WALL
165          RS       1     STOR        0
166          SV       0    0.112   0.243    0.396   0.549
167          SE    2701     2702    2703     2704    2705
168          SQ       0        0       0        0      45
169          KO                                       22
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

170          KK      F3
171          KM  RUNOFF FROM SUB-BASIN F3
172          BA    .013
173          LS                88      10
174          UK     225     .018    0.13     100
175          RK     850     .026    .032             TRAP       6       5
             *

176          KK   BASF3       -1
177          KM  14' WEIR AT HEAD WALL
178          RS       1     STOR        0
179          SV       0    0.038   0.095    0.172   0.274
180          SE    2704     2705    2706     2707    2708
181          SQ       0        0       0        0      39
182          KO                                       22
             *

183          KK       G
184          KM  RUNOFF FROM SUB-BASIN G
185          BA   0.016
186          LS                88      10
187          UK     400     .025    0.13     100
188          RK     720     .022    .032             TRAP       4       5
             *

189          KK    BASG       -1
190          KM  15' WEIR
191          RS       1     STOR        0
192          SV       0    0.094   0.209    0.347   0.512    0.71
193          SE    2722     2723    2724     2725    2726    2727
194          SQ       0        0       0        0       0      42
195          KO                                       22
             *

196          KK      H1
197          KM  RUNOFF FROM SUB-BASIN H1
198          BA    .059
199          LS                88     9.4
200          UK     375     .025    0.13     100
201          RK    2210     .019    .032             TRAP       8       5

202          KK   BASH1       -1
203          KM  FLOW ROUTED THROUGH DETENTION BASIN H1-1
204          KM  2-36" PIPE CULVERT
205          RS       1     STOR        0
206          SV       0    0.009   0.046    0.132   0.284    0.51   0.822    1.24   1.497   1.809
207          SE    2738     2739    2740     2741    2742    2743    2744    2745  2745.5    2746
```

```
 55          KK      B2
 56          KM  RUNOFF FROM SUB-BASIN B2
 57          BA    .050
 58          LS              88      6.7
 59          UK     400     .025     0.13      100
 60          RK    2340     .024     .032             TRAP        8        5
             *

 61          KK   COMBB
 62          KM  COMBINE SECTIONS B1 AND B2
 63          HC       2
             *

 64          KK  BASB-5
 65          KM  25' WEIR
 66          RS       1     STOR        0
 67          SV       0    0.146    0.333    0.565    0.843    1.121
 68          SE    2742     2743     2744     2745     2746     2747
 69          SQ       0        0        0        0       70      198
 70          KO                                          22
             *

 71          KK       C
 72          KM  RUNOFF FROM SUB-BASIN C
 73          BA     .03
 74          LS              88      5.9
 75          UK     250     .023     0.13      100
 76          RK    1570     .017     .032             TRAP        5        5
             *

 77          KK  BASC-1
 78          KM  11' WEIR
 79          RS       1     STOR        0
 80          SV       0     .107     .236     .388    0.566    0.745
 81          SE    2779     2780     2781     2782     2783     2784
 82          SQ       0        0        0        0       31       87
 83          KO                                          22
             *

 84          KK       D
 85          KM  RUNOFF FROM SUB-BASIN D
 86          BA    .034
 87          LS              88       10
 88          UK     300      .02     0.13      100
 89          RK    1425     .014     .032             TRAP        6        5
             *
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 90          KK  BASD-2
 91          KM  11' WEIR AT HEAD WALL
 92          RS       1     STOR        0
 93          SV       0    0.039     0.13     0.29    0.541    0.898
 94          SE    2719     2720     2721     2722     2723     2724
 95          SQ       0        0        0        0       31       87
 96          KO                                          22
             *

 97          KK      E1
 98          KM  RUNOFF FROM SUB-BASIN E1
 99          BA    .061
100          LS              88       10
101          UK     400      .02     0.13      100
102          RK    2050     .013     .032             TRAP        7        5

103          KK  BASE1-       2
104          KM  19' WEIR AT HEAD WALL
105          RS       1     STOR        0
106          SV       0    0.147    0.334     0.56    0.826    1.135
107          SE    2695     2696     2697     2698     2699     2700
108          SQ       0        0        0        0       53      150
109          KO                                          22
             *

110          KK      E2
111          KM  RUNOFF FROM SUB-BASIN E2
112          BA    .046
113          LS              88       10
114          UK     200      .02     0.13      100
115          RK    2370     .013     .032             TRAP       10        5
             *

116          KK   BASE2
117          KM  FLOW ROUTED THROUGH DETENTION BASIN E2-1
118          KM  2-42" PIPE CULVERT
119          RS       1     STOR        0
120          SV       0    0.094    0.211    0.379    0.641    1.026    1.546    1.861     2.22
121          SE    2696     2697     2698     2699     2700     2701     2702   2702.5     2703
122          SQ       0        0        0        0        0        0        0        0      180
123          KO                                          22
             *

124          KK   COMBE
125          KM  COMBINE SECTIONS E1 AND E2
126          HC       2
127          KO                                          22
             *
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

128          KK   CLEAR
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         JUN  1998                     *
*       VERSION 4.1                     *
*                                       *
*  RUN DATE   14NOV06  TIME  17:51:49   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        2-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        DEVELOPED CONDITIONS
   7          ID        10% IMPERVIOUS AREA USED FOR SITE
   8          ID
   9          ID        PREPARED BY WOOD/PATEL, 1.10.2005
  10          ID        FILE NAME:  DEV-2.DAT
  11          ID
              *DIAGRAM
  12          IT      2                   900
  13          IO      5
  14          JD              .01
  15          PH                    0.38     0.7    1.12    1.27    1.38    1.57

  16          KK      A1
  17          KM       RUNOFF FROM SUB-BASIN A1
  18          BA   0.084
  19          LS                 88     1.1
  20          UK     260    .025    0.13     100
  21          RK    3520    .023    .032            TRAP      12       5
              *
  22          KK   BASA1
  23          KM  29' WIER  AT HEADWALL
  24          RS       1    STOR       0
  25          SV       0   0.108   0.242   0.404     0.6   0.841   1.081
  26          SE    2756    2757    2758    2759    2760    2761    2762
  27          SQ       0       0       0       0       0      81     230
  28          KO                                      22

  29          KK      A2
  30          KM  RUNOFF FROM SUB-BASIN A2
  31          BA    .036
  32          LS                 88     7.4
  33          UK     235    .025    0.13     100
  34          RK    2000     .02    .032            TRAP       8       5

  35          KK  BAS A2      -3
  36          KM  14' WEIR AT OUTLET
  37          RS       1    STOR       0
  38          SV       0   0.059   0.135   0.228    0.34   0.474   0.608   0.742
  39          SE    2733    2734    2735    2736    2737    2738    2739    2740
  40          SQ       0       0       0       0       0       0      39     111
  41          KO                                      22
              *

  42          KK      B1
  43          KM  RUNOFF FROM SUB-BASIN B1
  44          BA    .027
  45          LS                 88     3.7
  46          UK     200    .025    0.13     100
  47          RK    2500    .028    .032            TRAP       8       5
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  48          KK  BASB-3
  49          KM  11' WEIR AT HEADWALL
  50          RS       1    STOR       0
  51          SV       0    .089     0.2    .338    0.49   0.643
  52          SE    2781    2782    2783    2784    2785    2786
  53          SQ       0       0       0       0      31      87
  54          KO                                      22
              *
```

APPENDIX C

Proposed Condition Hydrologic Calculations

- 2-year HEC-1 Model
- 10-year HEC-1 Model
- 100-year HEC-1 Model

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1032E+01 OUTFLOW= .1031E+01 BASIN STORAGE= .3573E-04 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

M	MANE	.83	27.65	185.81	2.15	2.00	27.57	186.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9174E+00 OUTFLOW= .9164E+00 BASIN STORAGE= .4951E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

N	MANE	1.23	35.08	186.42	2.15	2.00	34.66	186.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1147E+01 OUTFLOW= .1146E+01 BASIN STORAGE= .4527E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

O	MANE	.37	10.92	184.32	2.15	2.00	10.86	184.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3326E+00 OUTFLOW= .3323E+00 BASIN STORAGE= .1057E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

P	MANE	.42	24.72	185.07	2.15	2.00	24.05	184.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7913E+00 OUTFLOW= .7899E+00 BASIN STORAGE= .3787E-04 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

Q	MANE	.28	12.54	183.97	2.15	2.00	12.53	184.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3670E+00 OUTFLOW= .3666E+00 BASIN STORAGE= .8886E-05 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

R	MANE	1.93	455.07	188.88	2.14	2.00	443.55	188.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1720E+02 OUTFLOW= .1715E+02 BASIN STORAGE= .1227E-02 PERCENT ERROR= .3

*** NORMAL END OF HEC-1 ***

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5734E+01 OUTFLOW= .5714E+01 BASIN STORAGE= .1075E-02 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

C MANE	1.21	89.27	188.60	2.14	2.00	89.14	188.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3440E+01 OUTFLOW= .3431E+01 BASIN STORAGE= .3398E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

D MANE	1.09	93.69	189.80	2.14	2.00	93.00	190.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3899E+01 OUTFLOW= .3887E+01 BASIN STORAGE= .5549E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

E1 MANE	1.50	146.93	191.32	2.14	2.00	145.90	192.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6996E+01 OUTFLOW= .6964E+01 BASIN STORAGE= .1588E-02 PERCENT ERROR= .4

FOR STORM = 1 STORM AREA (SQ MI) = .01

E2 MANE	1.80	135.47	188.91	2.14	2.00	131.38	188.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5275E+01 OUTFLOW= .5261E+01 BASIN STORAGE= .4665E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

E3 MANE	.59	27.61	185.93	2.15	2.00	27.58	186.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9174E+00 OUTFLOW= .9163E+00 BASIN STORAGE= .5292E-04 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

F1 MANE	2.00	99.30	190.12	2.14	2.00	98.91	190.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4129E+01 OUTFLOW= .4114E+01 BASIN STORAGE= .4961E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

F2 MANE	1.05	42.99	186.95	2.15	2.00	42.74	188.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1606E+01 OUTFLOW= .1603E+01 BASIN STORAGE= .1464E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

F3 MANE	.79	39.63	187.38	2.15	2.00	39.33	188.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1491E+01 OUTFLOW= .1487E+01 BASIN STORAGE= .1603E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

G MANE	.64	41.98	189.23	2.14	2.00	41.19	190.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1835E+01 OUTFLOW= .1829E+01 BASIN STORAGE= .3183E-03 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

H1 MANE	1.38	152.54	190.65	2.14	2.00	152.20	190.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6766E+01 OUTFLOW= .6742E+01 BASIN STORAGE= .1371E-02 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

H2 MANE	2.00	172.46	193.00	2.14	2.00	171.53	192.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8257E+01 OUTFLOW= .8222E+01 BASIN STORAGE= .1669E-02 PERCENT ERROR= .4

FOR STORM = 1 STORM AREA (SQ MI) = .01

I MANE	1.43	73.88	189.00	2.14	2.00	72.74	188.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2867E+01 OUTFLOW= .2860E+01 BASIN STORAGE= .3037E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

J MANE	.72	84.27	185.42	2.15	2.00	83.48	186.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2752E+01 OUTFLOW= .2749E+01 BASIN STORAGE= .1338E-03 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

K MANE	.72	35.23	184.51	2.15	2.00	35.04	184.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1032E+01 OUTFLOW= .1032E+01 BASIN STORAGE= .1840E-04 PERCENT ERROR= .0

FOR STORM = 1 STORM AREA (SQ MI) = .01

L MANE	.48	33.06	185.01	2.15	2.00	31.77	186.00	2.15

+		C	89.	3.13	7.	2.	1.	.03
+	HYDROGRAPH AT	D	93.	3.17	8.	2.	2.	.03
+	HYDROGRAPH AT	E1	146.	3.20	14.	4.	3.	.06
+	HYDROGRAPH AT	E2	131.	3.13	11.	3.	2.	.05
+	2 COMBINED AT	COMBE	275.	3.17	25.	6.	5.	.11
+	6 COMBINED AT	CLEAR	994.	3.17	84.	21.	17.	.37
+	HYDROGRAPH AT	E3	28.	3.10	2.	0.	0.	.01
+	HYDROGRAPH AT	F1	99.	3.17	8.	2.	2.	.04
+	HYDROGRAPH AT	F2	43.	3.13	3.	1.	1.	.01
+	HYDROGRAPH AT	F3	39.	3.13	3.	1.	1.	.01
+	HYDROGRAPH AT	G	41.	3.17	4.	1.	1.	.02
+	HYDROGRAPH AT	H1	152.	3.17	14.	3.	3.	.06
+	HYDROGRAPH AT	H2	172.	3.20	16.	4.	3.	.07
+	HYDROGRAPH AT	I	73.	3.13	6.	1.	1.	.03
+	8 COMBINED AT	CLEAR	619.	3.17	56.	14.	11.	.24
+	HYDROGRAPH AT	J	83.	3.10	6.	1.	1.	.02
+	HYDROGRAPH AT	K	35.	3.07	2.	1.	0.	.01
+	HYDROGRAPH AT	L	32.	3.10	2.	1.	0.	.01
+	HYDROGRAPH AT	M	28.	3.10	2.	0.	0.	.01
+	HYDROGRAPH AT	N	35.	3.10	2.	1.	0.	.01
+	HYDROGRAPH AT	O	11.	3.07	1.	0.	0.	.00
+	HYDROGRAPH AT	P	24.	3.07	2.	0.	0.	.01
+	8 COMBINED AT	CLEAR	801.	3.13	72.	18.	14.	.31
+	HYDROGRAPH AT	Q	13.	3.07	1.	0.	0.	.00
+	HYDROGRAPH AT	R	444.	3.13	34.	9.	7.	.15

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR STORM = 1 STORM AREA (SQ MI) = .01									
A1	MANE	1.93	236.19	188.91	2.14	2.00	234.69	190.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9633E+01 OUTFLOW= .9599E+01 BASIN STORAGE= .1058E-02 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01									
A2	MANE	1.40	109.51	187.98	2.15	2.00	109.47	188.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4129E+01 OUTFLOW= .4119E+01 BASIN STORAGE= .3972E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01									
B1	MANE	1.65	83.67	187.47	2.15	2.00	83.24	188.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3096E+01 OUTFLOW= .3090E+01 BASIN STORAGE= .2639E-03 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01									
B2	MANE	1.47	126.47	191.43	2.14	2.00	125.94	190.00	2.14

```
          *          *
175 KK    *     O    *
          *          *
          ***********
```

```
181 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***********
          *          *
182 KK    *     P    *
          *          *
          ***********
```

```
188 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***********
          *          *
192 KK    *     Q    *
          *          *
          ***********
```

```
198 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***********
          *          *
199 KK    *     R    *
          *          *
          ***********
```

```
205 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	A1	235.	3.17	19.	5.	4.	.08		
+	HYDROGRAPH AT	A2	109.	3.13	8.	2.	2.	.04		
+	HYDROGRAPH AT	B1	83.	3.13	6.	2.	1.	.03		
+	HYDROGRAPH AT	B2	126.	3.17	11.	3.	2.	.05		
+	2 COMBINED AT	COMBB	204.	3.17	18.	4.	4.	.08		
	HYDROGRAPH AT									

```
146 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
147 KK    *         K   *
          *             *
          ***************

153 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
154 KK    *         L   *
          *             *
          ***************

160 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
161 KK    *         M   *
          *             *
          ***************

167 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
168 KK    *         N   *
          *             *
          ***************

174 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
```

QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
109 KK    *         G   *
          *             *
          ***************
```

115 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
116 KK    *         H1  *
          *             *
          ***************
```

122 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
123 KK    *         H2  *
          *             *
          ***************
```

129 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
130 KK    *          I  *
          *             *
          ***************
```

136 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
140 KK    *          J  *
          *             *
          ***************
```

```
                ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT         .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 74 KK    *     COMBE   *
          *             *
          ***************

 77 KO          OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 81 KK    *        E3   *
          *             *
          ***************

 87 KO          OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 88 KK    *        F1   *
          *             *
          ***************

 94 KO          OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 95 KK    *        F2   *
          *             *
          ***************

101 KO          OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
102 KK    *        F3   *
          *             *
          ***************

108 KO          OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
```

*** ***

```
          ***************
          *             *
 42 KK    *     COMBB   *
          *             *
          ***************

 45 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0,  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
 46 KK    *         C   *
          *             *
          ***************

 52 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
 53 KK    *         D   *
          *             *
          ***************

 59 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

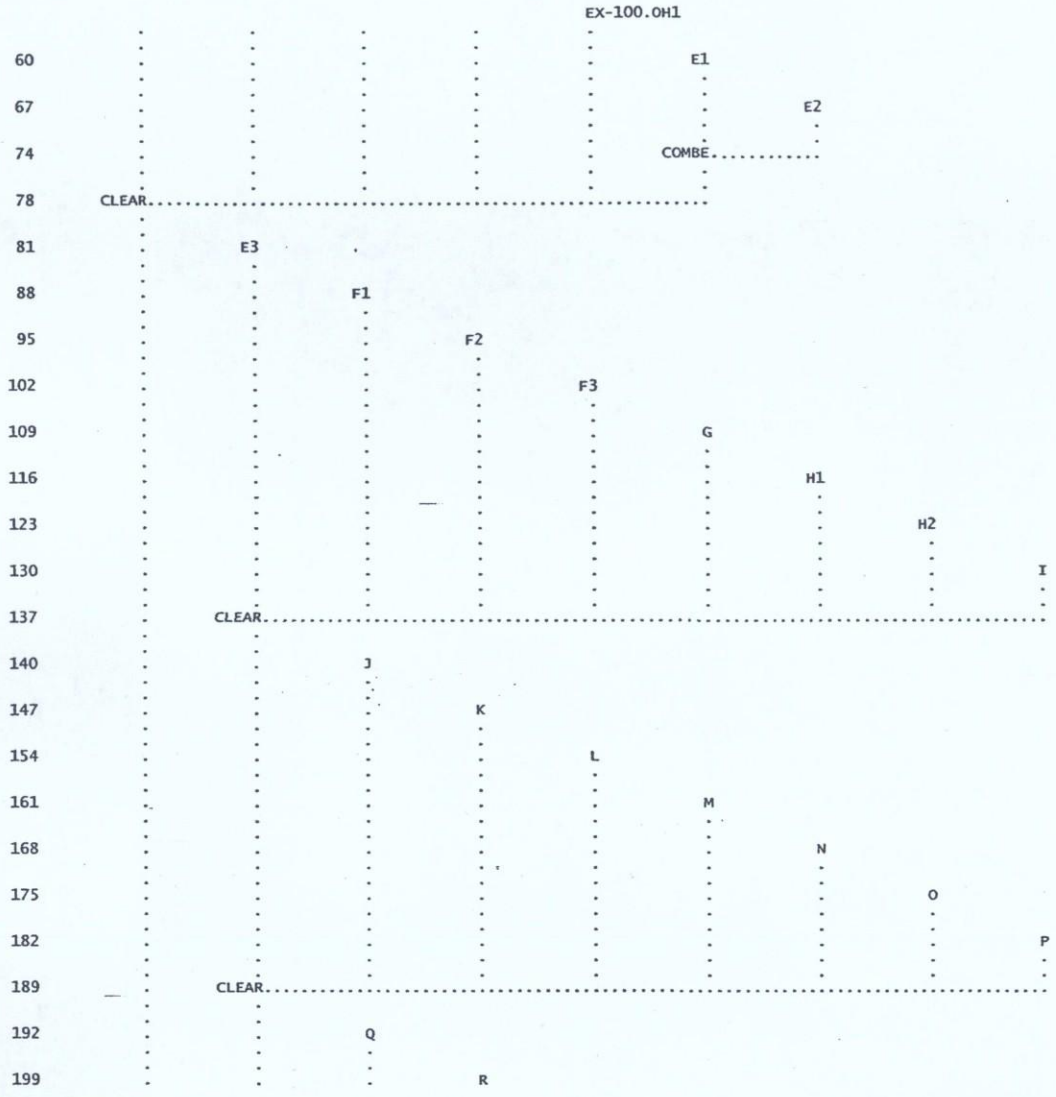
*** ***

```
          ***************
          *             *
 60 KK    *        E1   *
          *             *
          ***************

 66 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          ***************
          *             *
 67 KK    *        E2   *
          *             *
          ***************

 73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
```

```
                NDDATE      2    0  ENDING DATE
                NDTIME         0558  ENDING TIME
                ICENT            19  CENTURY MARK

             COMPUTATION INTERVAL      .03 HOURS
                 TOTAL TIME BASE    29.97 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

 13 JD         INDEX STORM NO. 1
                     STRM          3.37  PRECIPITATION DEPTH
                     TRDA           .01  TRANSPOSITION DRAINAGE AREA

 14 PI           PRECIPITATION PATTERN
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00
                    .00    .00     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .03     .03     .03     .03     .03
                    .04    .04     .04     .06     .06     .07     .09     .12     .17     .29
                    .29    .24     .15     .11     .07     .07     .06     .05     .04     .04
                    .04    .03     .03     .03     .03     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .01     .01
                    .01    .01     .01     .01     .01     .01     .01     .01     .00     .00
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00
                    .00    .00     .00     .00     .00     .00     .00     .00     .00     .00

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 15 KK      *       A1    *
            *             *
            ***************

 21 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 22 KK      *       A2    *
            *             *
            ***************

 28 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 29 KK      *       B1    *
            *             *
            ***************

 35 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   31OCT06  TIME  11:12:07   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

HEC-1 MODEL FOR SERENO CANYON
100-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
EXISTING CONDITIONS

PREPARED BY WOOD/PATEL, 8.4.2004
FILE NAME: EX-100.DAT

12 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES

```
140          KK        J
141          KM  RUNOFF FROM SUB-BASIN J
142          BA   .024
143          LS              88       0
144          UK     145     .02    0.13     100
145          RK     965    .026    .032             TRAP       5       5
146          KO                                      22

147          KK        K
148          KM  RUNOFF FROM SUB-BASIN K
149          BA   .009
150          LS              88       0
151          UK      81    .025    0.13     100
152          RK     715    .022    .032             TRAP       5       5
153          KO                                      22

154          KK        L
155          KM  RUNOFF FROM SUB-BASIN L
156          BA   .009
157          LS              88       0
158          UK     113    .018    0.13     100
159          RK     450    .012    .032             TRAP       5       5
160          KO                                      22

161          KK        M
162          KM  RUNOFF FROM SUB-BASIN M
163          BA   .008
164          LS              88       0
165          UK     137    .018    0.13     100
166          RK     750    .012    .032             TRAP       4       5
167          KO                                      22

168          KK        N
169          KM  RUNOFF FROM SUB-BASIN N
170          BA    .01
171          LS              88       0
172          UK     117    .018    0.13     100
173          RK    1036    .012    .032             TRAP       5       5
174          KO                                      22

175          KK        O
176          KM  RUNOFF FROM SUB-BASIN O
177          BA   .0029
178          LS              88       0
179          UK     108     .02    0.13     100
180          RK     174    .014    .032             TRAP       4       5
181          KO                                      22
```



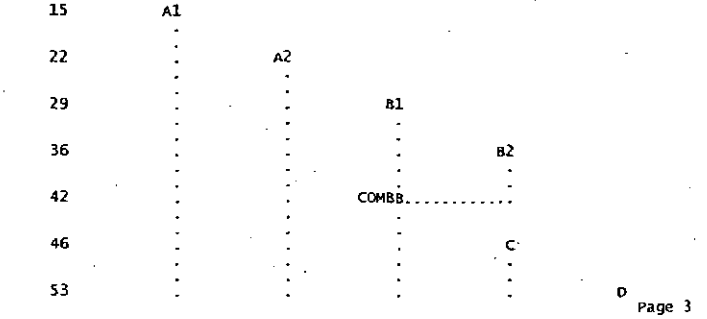
```
LINE         ID.....I.....2.....3.....4.....5.....6.....7.....8.....9.....10

182          KK        P
183          KM  RUNOFF FROM SUB-BASIN P
184          BA   .0069
185          LS              88       0
186          UK     135     .02    0.13     100
187          RK     354    .014    .032             TRAP       5       5
188          KO                                      22

189          KK   CLEAR
190          KM  CLEAR HYDROGRAPH STACK
191          HC       8

192          KK        Q
193          KM  RUNOFF FROM SUB-BASIN Q
194          BA   .0032
195          LS              88       0
196          UK      86     .02    0.13     100
197          RK     160    .014    .032             TRAP       4       5
198          KO                                      22

199          KK        R
200          KM  RUNOFF FROM SUB-BASIN R
201          BA    .15
202          LS              88
203          UK     180    .025    0.13     100
204          RK    4300    .023    .032             TRAP      15       5
205          KO                                      22
206          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
 57          UK     300     .02     0.13     100
 58          RK    1425    .014     .032             TRAP       6       5
 59          KO                                       22

 60          KK      E1
 61          KM  RUNOFF FROM SUB-BASIN E1
 62          BA    .061
 63          LS              88
 64          UK     400     .02     0.13     100
 65          RK    2050    .013     .032             TRAP       7       5
 66          KO                                       22

 67          KK      E2
 68          KM  RUNOFF FROM SUB-BASIN E2
 69          BA    .046
 70          LS              88
 71          UK     200     .02     0.13     100
 72          RK    2370    .013     .032             TRAP      10       5
 73          KO                                       22

 74          KK   COMBE
 75          KM  COMBINE SECTIONS E1 AND E2
 76          HC       2
 77          KO                                       22

 78          KK   CLEAR
 79          KM  CLEAR HYDROGRAPH STACK
 80          HC     . 6
             *

 81          KK      E3
 82          KM  RUNOFF FROM SUB-BASIN E3
 83          BA    .008
 84          LS              88
 85          UK     175    .025     0.13     100
 86          RK     750    .032     .032             TRAP       6       5
 87          KO                                       22
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 88          KK      F1
 89          KM  RUNOFF FROM SUB-BASIN F1
 90          BA    .036
 91          LS              88
 92          UK     225    .018     0.13     100
 93          RK    2500    .012     .032             TRAP       7       5
 94          KO                                       22

 95          KK      F2
 96          KM  RUNOFF FROM SUB-BASIN F2
 97          BA    .014
 98          LS              88
 99          UK     200    .018     0.13     100
100          RK    1440    .028     .032             TRAP       6       5
101          KO                                       22

102          KK      F3
103          KM  RUNOFF FROM SUB-BASIN F3
104          BA    .013
105          LS              88
106          UK     225    .018     0.13     100
107          RK     850    .026     .032             TRAP       6       5
108          KO                                       22

109          KK       G
110          KM  RUNOFF FROM SUB-BASIN G
111          BA   0.016
112          LS              88
113          UK     400    .025     0.13     100
114          RK     720    .022     .032             TRAP       4       5
115          KO                                       22

116          KK      H1
117          KM  RUNOFF FROM SUB-BASIN H1
118          BA    .059
119          LS              88
120          UK     375    .025     0.13     100
121          RK    2210    .019     .032             TRAP       8       5
122          KO                                       22

123          KK      H2
124          KM  RUNOFF FROM SUB-BASIN H2
125          BA    .072
126          LS              88
127          UK     400    .025     0.13     100
128          RK    3480    .019     .032             TRAP      12       5
129          KO                                       22

130          KK       I
131          KM  RUNOFF FROM SUB-BASIN I
132          BA    .025
133          LS              88
134          UK     225     .02     0.13     100
135          RK    2100    .026     .032             TRAP      10       5
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

136          KO                                       22

137          KK   CLEAR
138          KM  CLEAR HYDROGRAPH STACK
139          HC       8
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   31OCT06  TIME  11:12:07   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        100-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        EXISTING CONDITIONS
   7          ID
   8          ID        PREPARED BY WOOD/PATEL, 8.4.2004
   9          ID        FILE NAME:  EX-100.DAT
  10          ID
              *DIAGRAM
  11          IT       2                    900
  12          IO       5
  13          JD              .01
  14          PH                      .73    1.43    2.42    2.74    2.96    3.37

  15          KK       A1
  16          KM        RUNOFF FROM SUB-BASIN A1
  17          BA     .084
  18          LS                88
  19          UK      260    .025    0.13     100
  20          RK     3520    .023    .032             TRAP      12       5
  21          KO                                       22

  22          KK       A2
  23          KM   RUNOFF FROM SUB-BASIN A2
  24          BA     .036
  25          LS                88
  26          UK      235    .025    0.13     100
  27          RK     2000     .02    .032             TRAP       8       5
  28          KO                                       22

  29          KK       B1
  30          KM   RUNOFF FROM SUB-BASIN B1
  31          BA     .027
  32          LS                88
  33          UK      200    .025    0.13     100
  34          RK     2500    .028    .032             TRAP       8       5
  35          KO                                       22

  36          KK       B2
  37          KM   RUNOFF FROM SUB-BASIN B2
  38          BA     .050
  39          LS                88
  40          UK      400    .025    0.13     100
  41          RK     2340    .024    .032             TRAP       8       5

  42          KK    COMBB
  43          KM   COMBINE SECTIONS B1 AND B2
  44          HC        2
  45          KO                                       22
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  46          KK        C
  47          KM   RUNOFF FROM SUB-BASIN C
  48          BA      .03
  49          LS                88
  50          UK      250    .023    0.13     100
  51          RK     1570    .017    .032             TRAP       5       5
  52          KO                                       22

  53          KK        D
  54          KM   RUNOFF FROM SUB-BASIN D
  55          BA     .034
  56          LS                88
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5777E+00 OUTFLOW= .5764E+00 BASIN STORAGE= .4197E-04 PERCENT ERROR= .2

FOR STORM = 1 STORM AREA (SQ MI) = .01

M	MANE	1.10	14.36	187.63	1.20	2.00	14.28	188.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5135E+00 OUTFLOW= .5119E+00 BASIN STORAGE= .4761E-04 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

N	MANE	1.44	18.20	187.71	1.20	2.00	18.08	188.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6419E+00 OUTFLOW= .6400E+00 BASIN STORAGE= .5152E-04 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

O	MANE	.35	5.86	185.68	1.20	2.00	5.79	186.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1861E+00 OUTFLOW= .1856E+00 BASIN STORAGE= .1133E-04 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

P	MANE	.48	12.94	186.82	1.20	2.00	12.84	186.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4429E+00 OUTFLOW= .4414E+00 BASIN STORAGE= .3229E-04 PERCENT ERROR= .3

FOR STORM = 1 STORM AREA (SQ MI) = .01

Q	MANE	.35	6.82	184.66	1.20	2.00	6.64	184.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2054E+00 OUTFLOW= .2051E+00 BASIN STORAGE= .8253E-05 PERCENT ERROR= .1

FOR STORM = 1 STORM AREA (SQ MI) = .01

R	MANE	2.00	224.79	190.71	1.20	2.00	220.38	192.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9628E+01 OUTFLOW= .9574E+01 BASIN STORAGE= .1305E-02 PERCENT ERROR= .5

*** NORMAL END OF HEC-1 ***

+		C	43.	3.20	4.	1.	1.	.03
+	HYDROGRAPH AT	D	43.	3.20	4.	1.	1.	.03
+	HYDROGRAPH AT	E1	67.	3.27	8.	2.	2.	.06
+	HYDROGRAPH AT	E2	65.	3.20	6.	1.	1.	.05
+	2 COMBINED AT	COMBE	126.	3.23	14.	3.	3.	.11
+	6 COMBINED AT	CLEAR	463.	3.20	47.	12.	9.	.37
+	HYDROGRAPH AT	E3	14.	3.13	1.	0.	0.	.01
+	HYDROGRAPH AT	F1	47.	3.23	5.	1.	1.	.04
+	HYDROGRAPH AT	F2	21.	3.17	2.	0.	0.	.01
+	HYDROGRAPH AT	F3	19.	3.17	2.	0.	0.	.01
+	HYDROGRAPH AT	G	19.	3.23	2.	1.	0.	.02
+	HYDROGRAPH AT	H1	70.	3.23	8.	2.	2.	.06
+	HYDROGRAPH AT	H2	79.	3.30	9.	2.	2.	.07
+	HYDROGRAPH AT	I	35.	3.20	3.	1.	1.	.03
+	8 COMBINED AT	CLEAR	285.	3.23	31.	8.	6.	.24
+	HYDROGRAPH AT	J	43.	3.13	3.	1.	1.	.02
+	HYDROGRAPH AT	K	19.	3.10	1.	0.	0.	.01
+	HYDROGRAPH AT	L	17.	3.10	1.	0.	0.	.01
+	HYDROGRAPH AT	M	14.	3.13	1.	0.	0.	.01
+	HYDROGRAPH AT	N	18.	3.13	1.	0.	0.	.01
+	HYDROGRAPH AT	O	6.	3.10	0.	0.	0.	.00
+	HYDROGRAPH AT	P	13.	3.10	1.	0.	0.	.01
+	8 COMBINED AT	CLEAR	364.	3.20	40.	10.	8.	.31
+	HYDROGRAPH AT	Q	7.	3.07	0.	0.	0.	.00
+	HYDROGRAPH AT	R	220.	3.20	19.	5.	4.	.15

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR STORM = 1 STORM AREA (SQ MI) = .01									
A1	MANE	2.00	113.23	193.02	1.20	2.00	110.67	194.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5392E+01 OUTFLOW= .5360E+01 BASIN STORAGE= .1203E-02 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01									
A2	MANE	1.72	53.31	191.26	1.20	2.00	52.34	192.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2311E+01 OUTFLOW= .2300E+01 BASIN STORAGE= .4152E-03 PERCENT ERROR= .4

FOR STORM = 1 STORM AREA (SQ MI) = .01									
B1	MANE	1.97	41.51	190.99	1.20	2.00	40.35	190.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1733E+01 OUTFLOW= .1725E+01 BASIN STORAGE= .2299E-03 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01									
B2	MANE	1.73	57.59	194.86	1.20	2.00	57.02	196.00	1.20

```
          *           *
175 KK    *         O *
          *           *
          ***************

181 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *           *
182 KK    *         P *
          *           *
          ***************

188 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *           *
192 KK    *         Q *
          *           *
          ***************

198 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *           *
199 KK    *         R *
          *           *
          ***************

205 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

1
                                        RUNOFF SUMMARY
                                  FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                    PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM    TIME OF
          OPERATION      STATION    FLOW    PEAK      6-HOUR      24-HOUR     72-HOUR       AREA      STAGE     MAX STAGE
+
          HYDROGRAPH AT
+                          A1        111.    3.23        11.          3.          2.         .08
          HYDROGRAPH AT
+                          A2         52.    3.20         5.          1.          1.         .04
          HYDROGRAPH AT
+                          B1         40.    3.17         3.          1.          1.         .03
          HYDROGRAPH AT
+                          B2         57.    3.27         6.          2.          1.         .05
          2 COMBINED AT
+                        COMBB        93.    3.23        10.          2.          2.         .08
          HYDROGRAPH AT
```

```
                QSCAL          0.  HYDROGRAPH PLOT SCALE
                IPNCH          0   PUNCH COMPUTED HYDROGRAPH
                 IOUT         22   SAVE HYDROGRAPH ON THIS UNIT
                ISAV1          1   FIRST ORDINATE PUNCHED OR SAVED
                ISAV2        900   LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033   TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
109 KK    *         G   *
          *             *
          ***************

115 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5   PRINT CONTROL
                     IPLOT          0   PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0   PUNCH COMPUTED HYDROGRAPH
                      IOUT         22   SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1   FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900   LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033   TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
116 KK    *         H1  *
          *             *
          ***************

122 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5   PRINT CONTROL
                     IPLOT          0   PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0   PUNCH COMPUTED HYDROGRAPH
                      IOUT         22   SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1   FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900   LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033   TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
123 KK    *         H2  *
          *             *
          ***************

129 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5   PRINT CONTROL
                     IPLOT          0   PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0   PUNCH COMPUTED HYDROGRAPH
                      IOUT         22   SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1   FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900   LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033   TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
130 KK    *          I  *
          *             *
          ***************

136 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5   PRINT CONTROL
                     IPLOT          0   PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0   PUNCH COMPUTED HYDROGRAPH
                      IOUT         22   SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1   FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900   LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033   TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
140 KK    *          J  *
          *             *
          ***************
```

```
                ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 74 KK    *     COMBE   *
          *             *
          ***************

 77 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 81 KK    *        E3   *
          *             *
          ***************

 87 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 88 KK    *        F1   *
          *             *
          ***************

 94 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 95 KK    *        F2   *
          *             *
          ***************

101 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
102 KK    *        F3   *
          *             *
          ***************

108 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
```

*** ***

```
          **************
          *            *
 42 KK    *     COMBB  *
          *            *
          **************

 45 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 46 KK    *          C *
          *            *
          **************

 52 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 53 KK    *          D *
          *            *
          **************

 59 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

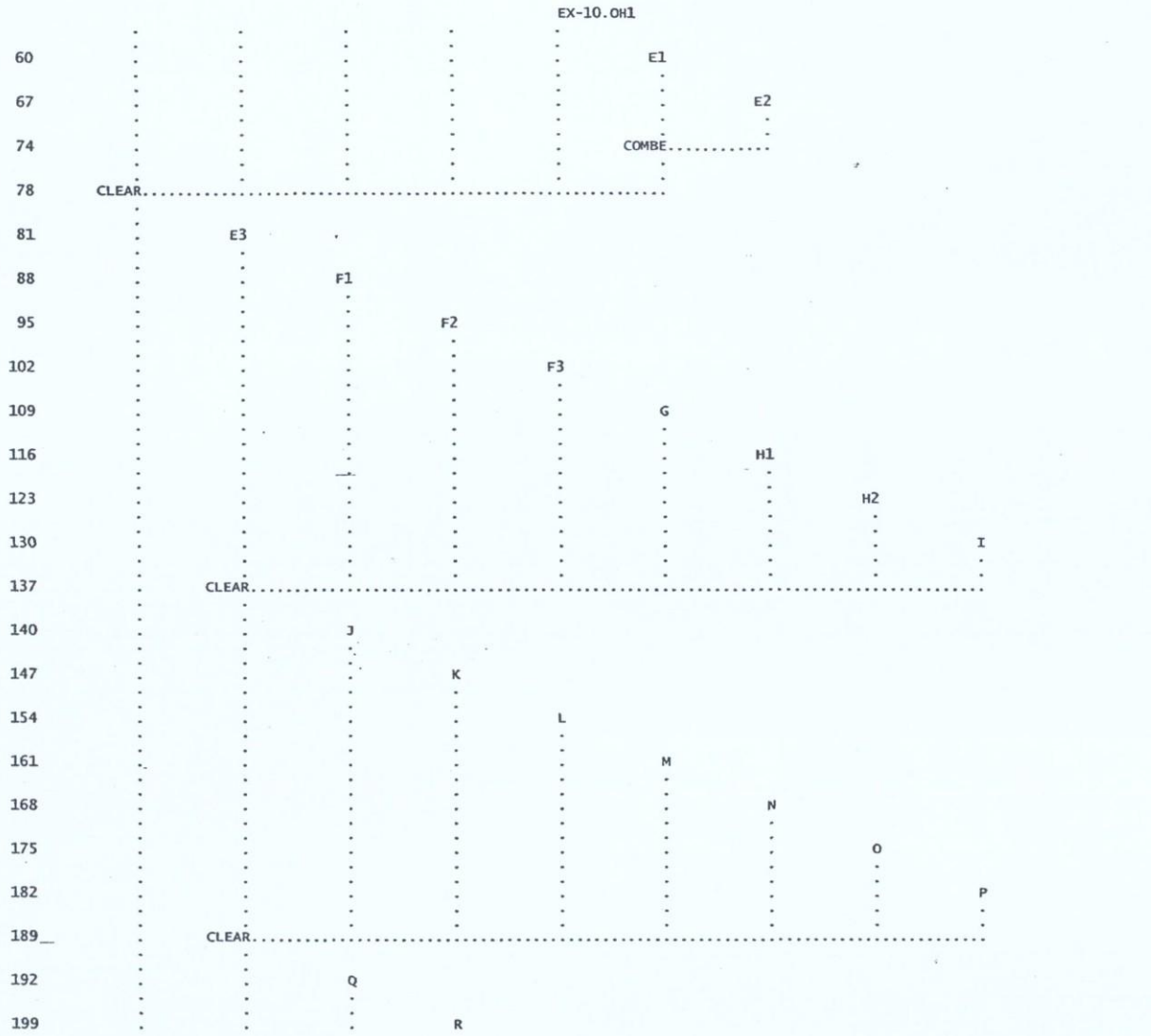
*** ***

```
          **************
          *            *
 60 KK    *         E1 *
          *            *
          **************

 66 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 67 KK    *         E2 *
          *            *
          **************

 73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
```

```
                NDDATE      2    0  ENDING DATE
                NDTIME         0558  ENDING TIME
                ICENT            19  CENTURY MARK

              COMPUTATION INTERVAL      .03 HOURS
                  TOTAL TIME BASE    29.97 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

13 JD          INDEX STORM NO. 1
                     STRM        2.29  PRECIPITATION DEPTH
                     TRDA         .01  TRANSPOSITION DRAINAGE AREA

14 PI           PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                   .02       .03       .03       .04       .04       .05       .06       .08       .11       .21
                   .21       .17       .10       .08       .05       .04       .04       .04       .03       .02
                   .02       .02       .02       .02       .02       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
15 KK          *      A1     *
               *             *
               ***************

21 KO           OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
22 KK          *      A2     *
               *             *
               ***************

28 KO           OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
29 KK          *      B1     *
               *             *
               ***************

35 KO           OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   07NOV06  TIME  09:46:54   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

HEC-1 MODEL FOR SERENO CANYON
10-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
EXISTING CONDITIONS

PREPARED BY WOOD/PATEL, 8.4.2004
FILE NAME: EX-10.DAT

12 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES

```
140          KK       J
141          KM  RUNOFF FROM SUB-BASIN J
142          BA    .024
143          LS                88        0
144          UK     145     .02    0.13     100
145          RK     965    .026    .032             TRAP       5       5
146          KO                                      22

147          KK       K
148          KM  RUNOFF FROM SUB-BASIN K
149          BA    .009
150          LS                88        0
151          UK      81    .025    0.13     100
152          RK     715    .022    .032             TRAP       5       5
153          KO                                      22

154          KK       L
155          KM  RUNOFF FROM SUB-BASIN L
156          BA    .009
157          LS                88        0
158          UK     113    .018    0.13     100
159          RK     450    .012    .032             TRAP       5       5
160          KO                                      22

161          KK       M
162          KM  RUNOFF FROM SUB-BASIN M
163          BA    .008
164          LS                88        0
165          UK     137    .018    0.13     100
166          RK     750    .012    .032             TRAP       4       5
167          KO                                      22

168          KK       N
169          KM  RUNOFF FROM SUB-BASIN N
170          BA     .01
171          LS                88        0
172          UK     117    .018    0.13     100
173          RK    1036    .012    .032             TRAP       5       5
174          KO                                      22

175          KK       O
176          KM  RUNOFF FROM SUB-BASIN O
177          BA   .0029
178          LS                88        0
179          UK     108     .02    0.13     100
180          RK     174    .014    .032             TRAP       4       5
181          KO                                      22
1                                        HEC-1 INPUT                                    PAGE  5

        LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

182          KK       P
183          KM  RUNOFF FROM SUB-BASIN P
184          BA   .0069
185          LS                88        0
186          UK     135     .02    0.13     100
187          RK     354    .014    .032             TRAP       5       5
188          KO                                      22

189          KK   CLEAR
190          KM  CLEAR HYDROGRAPH STACK
191          HC       8

192          KK       Q
193          KM  RUNOFF FROM SUB-BASIN Q
194          BA   .0032
195          LS                88        0
196          UK      86     .02    0.13     100
197          RK     160    .014    .032             TRAP       4       5
198          KO                                      22

199          KK       R
200          KM  RUNOFF FROM SUB-BASIN R
201          BA     .15
202          LS                88
203          UK     180    .025    0.13     100
204          RK    4300    .023    .032             TRAP      15       5
205          KO                                      22
206          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
 LINE        (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.        (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15          A1
               .
               .
   22          .          A2
               .           .
               .           .
   29          .           .          B1
               .           .           .
               .           .           .
   36          .           .           .          B2
               .           .           .           .
               .           .           .           .
   42          .           .       COMBB...........
               .           .           .
               .           .           .
   46          .           .           .           C
               .           .           .           .
               .           .           .           .
   53          .           .           .           .          D
```

```
 57          UK    300     .02    0.13     100
 58          RK   1425    .014    .032             TRAP       6       5
 59          KO                                     22

 60          KK      E1
 61          KM  RUNOFF FROM SUB-BASIN E1
 62          BA    .061
 63          LS              88
 64          UK    400     .02    0.13     100
 65          RK   2050    .013    .032             TRAP       7       5
 66          KO                                     22

 67          KK      E2
 68          KM  RUNOFF FROM SUB-BASIN E2
 69          BA    .046
 70          LS              88
 71          UK    200     .02    0.13     100
 72          RK   2370    .013    .032             TRAP      10       5
 73          KO                                     22

 74          KK   COMBE
 75          KM  COMBINE SECTIONS E1 AND E2
 76          HC       2
 77          KO                                     22

 78          KK   CLEAR
 79          KM  CLEAR HYDROGRAPH STACK
 80          HC     . 6
             *

 81          KK      E3
 82          KM  RUNOFF FROM SUB-BASIN E3
 83          BA    .008
 84          LS              88
 85          UK    175    .025    0.13     100
 86          RK    750    .032    .032             TRAP       6       5
 87          KO                                     22
1                                   HEC-1 INPUT                                    PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 88          KK      F1
 89          KM  RUNOFF FROM SUB-BASIN F1
 90          BA    .036
 91          LS              88
 92          UK    225    .018    0.13     100
 93          RK   2500    .012    .032             TRAP       7       5
 94          KO                                     22

 95          KK      F2
 96          KM  RUNOFF FROM SUB-BASIN F2
 97          BA    .014
 98          LS              88
 99          UK    200    .018    0.13     100
100          RK   1440    .028    .032             TRAP       6       5
101          KO                                     22

102          KK      F3
103          KM  RUNOFF FROM SUB-BASIN F3
104          BA    .013
105          LS              88
106          UK    225    .018    0.13     100
107          RK    850    .026    .032             TRAP       6       5
108          KO                                     22

109          KK       G
110          KM  RUNOFF FROM SUB-BASIN G
111          BA   0.016
112          LS              88
113          UK    400    .025    0.13     100
114          RK    720    .022    .032             TRAP       4       5
115          KO                                     22

116          KK      H1
117          KM  RUNOFF FROM SUB-BASIN H1
118          BA    .059
119          LS              88
120          UK    375    .025    0.13     100
121          RK   2210    .019    .032             TRAP       8       5
122          KO                                     22

123          KK      H2
124          KM  RUNOFF FROM SUB-BASIN H2
125          BA    .072
126          LS              88
127          UK    400    .025    0.13     100
128          RK   3480    .019    .032             TRAP      12       5
129          KO                                     22

130          KK       I
131          KM  RUNOFF FROM SUB-BASIN I
132          BA    .025
133          LS              88
134          UK    225     .02    0.13     100
135          RK   2100    .026    .032             TRAP      10       5
1                                   HEC-1 INPUT                                    PAGE  4

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

136          KO                                     22

137          KK   CLEAR
138          KM  CLEAR HYDROGRAPH STACK
139          HC       8
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   07NOV06  TIME  09:46:54   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX  XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X        XXXXX X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX  XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        10-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        EXISTING CONDITIONS
   7          ID
   8          ID        PREPARED BY WOOD/PATEL, 8.4.2004
   9          ID        FILE NAME:  EX-10.DAT
  10          ID
              *DIAGRAM
  11          IT       2                   900
  12          IO       5
  13          JD              .01
  14          PH                    0.52    0.99    1.64    1.87    2.01    2.29

  15          KK      A1
  16          KM       RUNOFF FROM SUB-BASIN A1
  17          BA    .084
  18          LS              88
  19          UK     260    .025    0.13     100
  20          RK    3520    .023    .032             TRAP      12       5
  21          KO                                      22

  22          KK      A2
  23          KM  RUNOFF FROM SUB-BASIN A2
  24          BA    .036
  25          LS              88
  26          UK     235    .025    0.13     100
  27          RK    2000     .02    .032             TRAP       8       5
  28          KO                                      22

  29          KK      B1
  30          KM  RUNOFF FROM SUB-BASIN B1
  31          BA    .027
  32          LS              88
  33          UK     200    .025    0.13     100
  34          RK    2500    .028    .032             TRAP       8       5
  35          KO                                      22

  36          KK      B2
  37          KM  RUNOFF FROM SUB-BASIN B2
  38          BA    .050
  39          LS              88
  40          UK     400    .025    0.13     100
  41          RK    2340    .024    .032             TRAP       8       5

  42          KK   COMBB
  43          KM  COMBINE SECTIONS B1 AND B2
  44          HC       2
  45          KO                                      22
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46          KK       C
  47          KM  RUNOFF FROM SUB-BASIN C
  48          BA     .03
  49          LS              88
  50          UK     250    .023    0.13     100
  51          RK    1570    .017    .032             TRAP       5       5
  52          KO                                      22

  53          KK       D
  54          KM  RUNOFF FROM SUB-BASIN D
  55          BA    .034
  56          LS              88
```

```
          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                L  MANE          .75      7.78    189.63       .63      2.00      7.66    190.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3035E+00 OUTFLOW= .3020E+00 BASIN STORAGE= .3530E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                M  MANE         1.26      6.15    191.67       .63      2.00      6.09    192.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2698E+00 OUTFLOW= .2683E+00 BASIN STORAGE= .5108E-04 PERCENT ERROR=    .6

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                N  MANE         1.73      7.98    191.88       .63      2.00      7.94    192.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3373E+00 OUTFLOW= .3355E+00 BASIN STORAGE= .5160E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                O  MANE          .47      2.67    188.19       .63      2.00      2.65    188.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9781E-01 OUTFLOW= .9736E-01 BASIN STORAGE= .1145E-04 PERCENT ERROR=    .4

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                P  MANE          .68      5.61    189.50       .63      2.00      5.60    190.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2327E+00 OUTFLOW= .2314E+00 BASIN STORAGE= .3947E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                Q  MANE          .37      3.22    187.49       .63      2.00      3.19    186.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1079E+00 OUTFLOW= .1075E+00 BASIN STORAGE= .8190E-05 PERCENT ERROR=    .4

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                R  MANE         2.00     94.22    195.52       .63      2.00     93.94    196.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5059E+01 OUTFLOW= .5020E+01 BASIN STORAGE= .1201E-02 PERCENT ERROR=    .7


*** NORMAL END OF HEC-1 ***
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9106E+00 OUTFLOW= .9045E+00 BASIN STORAGE= .2559E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

B2	MANE	2.00	22.90	203.78	.63	2.00	22.84	204.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1686E+01 OUTFLOW= .1674E+01 BASIN STORAGE= .1114E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

C	MANE	1.85	17.26	197.14	.63	2.00	17.16	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1012E+01 OUTFLOW= .1005E+01 BASIN STORAGE= .3633E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

D	MANE	1.82	17.39	199.15	.63	2.00	17.32	200.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1147E+01 OUTFLOW= .1139E+01 BASIN STORAGE= .5591E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

E1	MANE	1.85	25.97	206.70	.63	2.00	25.95	206.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2057E+01 OUTFLOW= .2042E+01 BASIN STORAGE= .1681E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

E2	MANE	2.00	27.30	196.30	.63	2.00	27.05	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1551E+01 OUTFLOW= .1541E+01 BASIN STORAGE= .5151E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

E3	MANE	1.00	5.96	191.22	.63	2.00	5.94	192.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2698E+00 OUTFLOW= .2685E+00 BASIN STORAGE= .5610E-04 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

F1	MANE	1.98	19.30	199.10	.63	2.00	19.19	200.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1214E+01 OUTFLOW= .1204E+01 BASIN STORAGE= .5067E-03 PERCENT ERROR= .8

FOR STORM = 1 STORM AREA (SQ MI) = .01

F2	MANE	1.71	8.55	195.83	.63	2.00	8.53	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4722E+00 OUTFLOW= .4686E+00 BASIN STORAGE= .1519E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

F3	MANE	1.06	7.64	196.27	.63	2.00	7.63	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4385E+00 OUTFLOW= .4352E+00 BASIN STORAGE= .1636E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

G	MANE	1.01	7.50	201.08	.63	2.00	7.49	202.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5396E+00 OUTFLOW= .5361E+00 BASIN STORAGE= .3341E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

H1	MANE	2.00	27.81	202.87	.63	2.00	27.65	202.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1990E+01 OUTFLOW= .1974E+01 BASIN STORAGE= .1180E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

H2	MANE	2.00	31.67	205.47	.63	2.00	31.56	206.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2428E+01 OUTFLOW= .2411E+01 BASIN STORAGE= .1729E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

I	MANE	1.74	14.44	197.94	.63	2.00	14.42	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8432E+00 OUTFLOW= .8362E+00 BASIN STORAGE= .3168E-03 PERCENT ERROR= .8

FOR STORM = 1 STORM AREA (SQ MI) = .01

J	MANE	.89	18.64	191.55	.63	2.00	18.28	190.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8095E+00 OUTFLOW= .8050E+00 BASIN STORAGE= .1481E-03 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

K	MANE	.94	9.41	187.34	.63	2.00	9.14	188.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3035E+00 OUTFLOW= .3025E+00 BASIN STORAGE= .1753E-04 PERCENT ERROR= .3

+	2 COMBINED AT	COMBB	37.	3.30	5.	1.	1.	.08
+	HYDROGRAPH AT	C	17.	3.27	2.	1.	0.	.03
+	HYDROGRAPH AT	D	17.	3.33	2.	1.	0.	.03
+	HYDROGRAPH AT	E1	26.	3.43	4.	1.	1.	.06
+	HYDROGRAPH AT	E2	27.	3.30	3.	1.	1.	.05
+	2 COMBINED AT	COMBE	49.	3.33	7.	2.	1.	.11
+	6 COMBINED AT	CLEAR	186.	3.30	25.	6.	5.	.37
+	HYDROGRAPH AT	E3	6.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	F1	19.	3.33	2.	1.	0.	.04
+	HYDROGRAPH AT	F2	9.	3.27	1.	0.	0.	.01
+	HYDROGRAPH AT	F3	8.	3.27	1.	0.	0.	.01
+	HYDROGRAPH AT	G	7.	3.37	1.	0.	0.	.02
+	HYDROGRAPH AT	H1	28.	3.37	4.	1.	1.	.06
+	HYDROGRAPH AT	H2	32.	3.43	5.	1.	1.	.07
+	HYDROGRAPH AT	I	14.	3.30	2.	0.	0.	.03
+	8 COMBINED AT	CLEAR	113.	3.33	16.	4.	3.	.24
+	HYDROGRAPH AT	J	18.	3.17	2.	0.	0.	.02
+	HYDROGRAPH AT	K	9.	3.13	1.	0.	0.	.01
+	HYDROGRAPH AT	L	8.	3.17	1.	0.	0.	.01
+	HYDROGRAPH AT	M	6.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	N	8.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	O	3.	3.13	0.	0.	0.	.00
+	HYDROGRAPH AT	P	6.	3.17	0.	0.	0.	.01
+	8 COMBINED AT	CLEAR	144.	3.30	21.	5.	4.	.31
+	HYDROGRAPH AT	Q	3.	3.10	0.	0.	0.	.00
+	HYDROGRAPH AT	R	94.	3.27	10.	3.	2.	.15

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR STORM = 1 STORM AREA (SQ MI) =		.01							
A1	MANE	2.00	45.60	197.96	.63	2.00	45.59	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2833E+01 OUTFLOW= .2811E+01 BASIN STORAGE= .1146E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) =		.01							
A2	MANE	2.00	21.65	196.72	.63	2.00	21.49	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1214E+01 OUTFLOW= .1203E+01 BASIN STORAGE= .4066E-03 PERCENT ERROR= .9

FOR STORM = 1 STORM AREA (SQ MI) =		.01							
B1	MANE	1.82	17.27	195.49	.63	2.00	17.14	196.00	.63

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          **************
          *            *
175 KK    *          O *
          *            *
          **************

181 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


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          **************
          *            *
182 KK    *          P *
          *            *
          **************

188 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


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          **************
          *            *
192 KK    *          Q *
          *            *
          **************

198 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


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          **************
          *            *
199 KK    *          R *
          *            *
          **************

205 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

1
                                        RUNOFF SUMMARY
                                    FLOW IN CUBIC FEET PER SECOND
                                  TIME IN HOURS,  AREA IN SQUARE MILES

                                                                  AVERAGE FLOW FOR MAXIMUM PERIOD
          OPERATION        STATION      PEAK FLOW   TIME OF PEAK    6-HOUR      24-HOUR      72-HOUR     BASIN AREA   MAXIMUM STAGE   TIME OF MAX STAGE
+
          HYDROGRAPH AT
+                            A1            46.         3.30          6.           1.           1.          .08
          HYDROGRAPH AT
+                            A2            21.         3.27          2.           1.           0.          .04
          HYDROGRAPH AT
+                            B1            17.         3.27          2.           0.           0.          .03
          HYDROGRAPH AT
+                            B2            23.         3.40          3.           1.           1.          .05
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          **************
          *            *
140 KK    *         J  *
          *            *
          **************

146 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


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          **************
          *            *
147 KK    *         K  *
          *            *
          **************

153 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
154 KK    *         L  *
          *            *
          **************

160 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
161 KK    *         M  *
          *            *
          **************

167 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
168 KK    *         N  *
          *            *
          **************

174 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
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          **************

108 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
109 KK    *        G   *
          *            *
          **************

115 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

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          *            *
116 KK    *        H1  *
          *            *
          **************

122 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
123 KK    *        H2  *
          *            *
          **************

129 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
130 KK    *        I   *
          *            *
          **************

136 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 74 KK    *     COMBE   *
          *             *
          ***************

 77 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 81 KK    *        E3   *
          *             *
          ***************

 87 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 88 KK    *        F1   *
          *             *
          ***************

 94 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

       *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
 95 KK    *        F2   *
          *             *
          ***************

101 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
102 KK    *        F3   *
          *             *
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*** *** *** *

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                NDDATE      2    0  ENDING DATE
                NDTIME           0558  ENDING TIME
                ICENT              19  CENTURY MARK

              COMPUTATION INTERVAL     .03 HOURS
                  TOTAL TIME BASE   29.97 HOURS

       ENGLISH UNITS
            DRAINAGE AREA         SQUARE MILES
            PRECIPITATION DEPTH   INCHES
            LENGTH, ELEVATION     FEET
            FLOW                  CUBIC FEET PER SECOND
            STORAGE VOLUME        ACRE-FEET
            SURFACE AREA          ACRES
            TEMPERATURE           DEGREES FAHRENHEIT

 13 JD        INDEX STORM NO. 1
                    STRM        1.57  PRECIPITATION DEPTH
                    TRDA         .01  TRANSPOSITION DRAINAGE AREA

 14 PI          PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .02       .02       .02       .02       .03       .03       .04       .06       .08       .15
                   .15       .12       .07       .05       .03       .03       .03       .02       .02       .02
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

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            ***************
            *             *
 15 KK      *       A1    *
            *             *
            ***************

 21 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

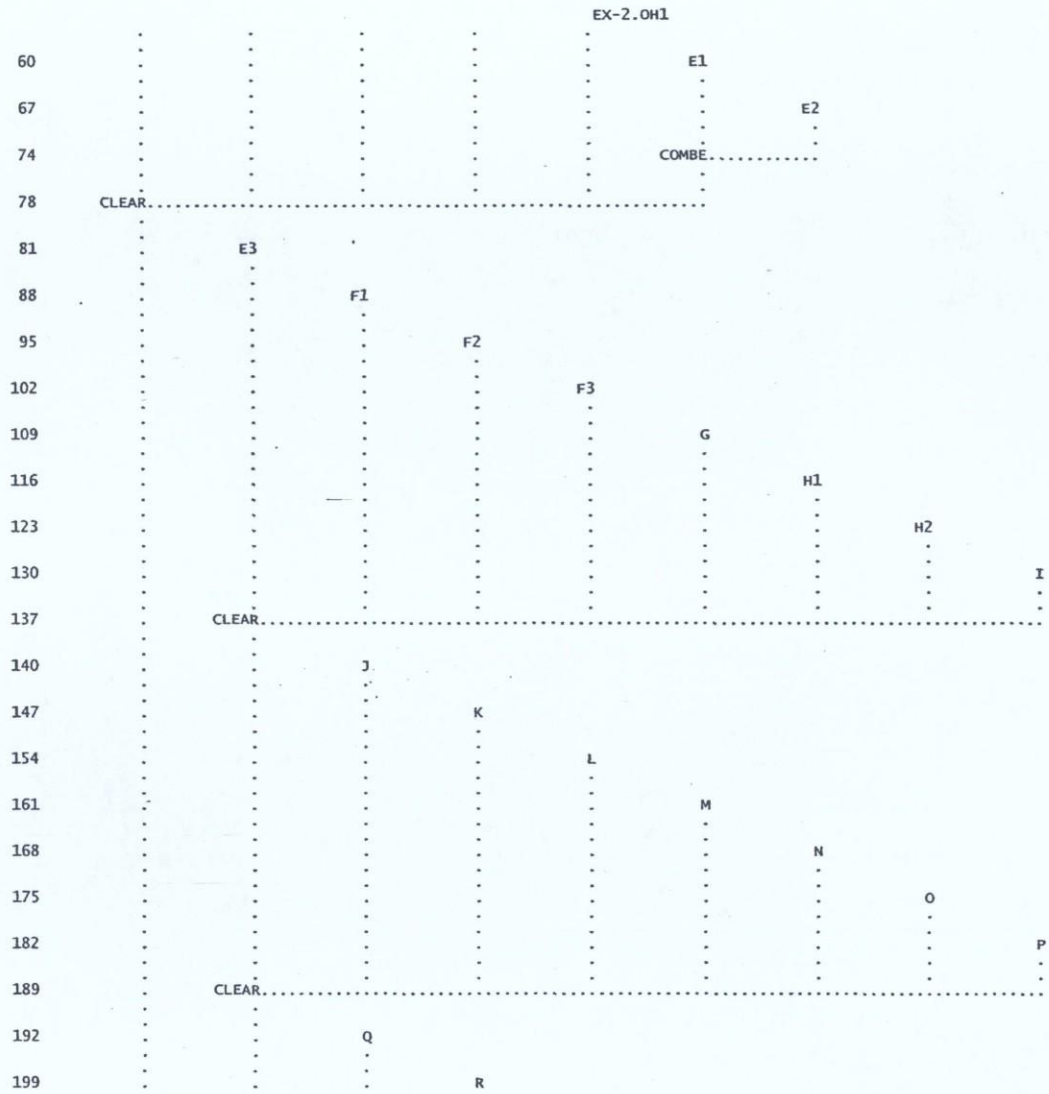
            ***************
            *             *
 22 KK      *       A2    *
            *             *
            ***************

 28 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 29 KK      *       B1    *
            *             *
            ***************

 35 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             JUN  1998                      *
*          VERSION 4.1                       *
*                                            *
*  RUN DATE   07NOV06  TIME  09:27:06        *
*                                            *
**********************************************
```

```
**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 756-1104           *
*                                    *
**************************************
```

HEC-1 MODEL FOR SERENO CANYON
2-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
EXISTING CONDITIONS

PREPARED BY WOOD/PATEL, 8.4.2004
FILE NAME: EX-100.DAT

12 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES

```
140          KK       J
141          KM  RUNOFF FROM SUB-BASIN J
142          BA    .024
143          LS                88        0
144          UK     145      .02     0.13      100
145          RK     965     .026     .032              TRAP        5        5
146          KO                                          22

147          KK       K
148          KM  RUNOFF FROM SUB-BASIN K
149          BA    .009
150          LS                88        0
151          UK      81     .025     0.13      100
152          RK     715     .022     .032              TRAP        5        5
153          KO                                          22

154          KK       L
155          KM  RUNOFF FROM SUB-BASIN L
156          BA    .009
157          LS                88        0
158          UK     113     .018     0.13      100
159          RK     450     .012     .032              TRAP        5        5
160          KO                                          22

161          KK       M
162          KM  RUNOFF FROM SUB-BASIN M
163          BA    .008
164          LS                88        0
165          UK     137     .018     0.13      100
166          RK     750     .012     .032              TRAP        4        5
167          KO                                          22

168          KK       N
169          KM  RUNOFF FROM SUB-BASIN N
170          BA     .01
171          LS                88        0
172          UK     117     .018     0.13      100
173          RK    1036     .012     .032              TRAP        5        5
174          KO                                          22

175          KK       O
176          KM  RUNOFF FROM SUB-BASIN O
177          BA   .0029
178          LS                88        0
179          UK     108      .02     0.13      100
180          RK     174     .014     .032              TRAP        4        5
181          KO                                          22
```



```
          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

182          KK       P
183          KM  RUNOFF FROM SUB-BASIN P
184          BA   .0069
185          LS                88        0
186          UK     135      .02     0.13      100
187          RK     354     .014     .032              TRAP        5        5
188          KO                                          22

189          KK   CLEAR
190          KM  CLEAR HYDROGRAPH STACK
191          HC       8

192          KK       Q
193          KM  RUNOFF FROM SUB-BASIN Q
194          BA   .0032
195          LS                88        0
196          UK      86      .02     0.13      100
197          RK     160     .014     .032              TRAP        4        5
198          KO                                          22

199          KK       R
200          KM  RUNOFF FROM SUB-BASIN R
201          BA     .15
202          LS                88
203          UK     180     .025     0.13      100
204          RK    4300     .023     .032              TRAP       15        5
205          KO                                          22
206          ZZ
```

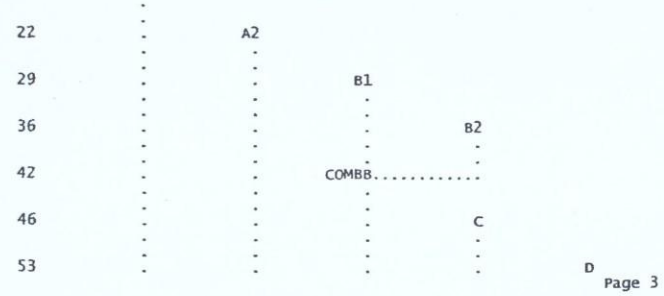
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
 57          UK     300     .02    0.13     100
 58          RK    1425    .014    .032            TRAP       6       5
 59          KO                                      22

 60          KK      E1
 61          KM  RUNOFF FROM SUB-BASIN E1
 62          BA    .061
 63          LS              88
 64          UK     400     .02    0.13     100
 65          RK    2050    .013    .032            TRAP       7       5
 66          KO                                      22

 67          KK      E2
 68          KM  RUNOFF FROM SUB-BASIN E2
 69          BA    .046
 70          LS              88
 71          UK     200     .02    0.13     100
 72          RK    2370    .013    .032            TRAP      10       5
 73          KO                                      22

 74          KK   COMBE
 75          KM  COMBINE SECTIONS E1 AND E2
 76          HC       2
 77          KO                                      22

 78          KK   CLEAR
 79          KM  CLEAR HYDROGRAPH STACK
 80          HC       6
             *

 81          KK      E3
 82          KM  RUNOFF FROM SUB-BASIN E3
 83          BA    .008
 84          LS              88
 85          UK     175    .025    0.13     100
 86          RK     750    .032    .032            TRAP       6       5
 87          KO                                      22
1                                    HEC-1 INPUT                                    PAGE  3
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 88          KK      F1
 89          KM  RUNOFF FROM SUB-BASIN F1
 90          BA    .036
 91          LS              88
 92          UK     225    .018    0.13     100
 93          RK    2500    .012    .032            TRAP       7       5
 94          KO                                      22

 95          KK      F2
 96          KM  RUNOFF FROM SUB-BASIN F2
 97          BA    .014
 98          LS              88
 99          UK     200    .018    0.13     100
100          RK    1440    .028    .032            TRAP       6       5
101          KO                                      22

102          KK      F3
103          KM  RUNOFF FROM SUB-BASIN F3
104          BA    .013
105          LS              88
106          UK     225    .018    0.13     100
107          RK     850    .026    .032            TRAP       6       5
108          KO                                      22

109          KK       G
110          KM  RUNOFF FROM SUB-BASIN G
111          BA   0.016
112          LS              88
113          UK     400    .025    0.13     100
114          RK     720    .022    .032            TRAP       4       5
115          KO                                      22

116          KK      H1
117          KM  RUNOFF FROM SUB-BASIN H1
118          BA    .059
119          LS              88
120          UK     375    .025    0.13     100
121          RK    2210    .019    .032            TRAP       8       5
122          KO                                      22

123          KK      H2
124          KM  RUNOFF FROM SUB-BASIN H2
125          BA    .072
126          LS              88
127          UK     400    .025    0.13     100
128          RK    3480    .019    .032            TRAP      12       5
129          KO                                      22

130          KK       I
131          KM  RUNOFF FROM SUB-BASIN I
132          BA    .025
133          LS              88
134          UK     225     .02    0.13     100
135          RK    2100    .026    .032            TRAP      10       5
1                                    HEC-1 INPUT                                    PAGE  4
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

136          KO                                      22

137          KK   CLEAR
138          KM  CLEAR HYDROGRAPH STACK
139          HC       8
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   07NOV06  TIME  09:27:06   *
*                                       *
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X    X  XXXXXXX  XXXXX          X
X    X  X       X     X        XX
X    X  X       X              X
XXXXXXX  XXXX   X        XXXXX  X
X    X  X       X              X
X    X  X       X     X        X
X    X  XXXXXXX  XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        2-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        EXISTING CONDITIONS
   7          ID
   8          ID        PREPARED BY WOOD/PATEL, 8.4.2004
   9          ID        FILE NAME:  EX-100.DAT
  10          ID
              *DIAGRAM
  11          IT       2                    900
  12          IO       5
  13          JD              .01
  14          PH                    .38     0.7    1.12    1.27    1.38    1.57

  15          KK      A1
  16          KM       RUNOFF FROM SUB-BASIN A1
  17          BA     .084
  18          LS               88
  19          UK      260    .025    0.13     100
  20          RK     3520    .023    .032             TRAP      12       5
  21          KO                                       22

  22          KK      A2
  23          KM  RUNOFF FROM SUB-BASIN A2
  24          BA     .036
  25          LS               88
  26          UK      235    .025    0.13     100
  27          RK     2000     .02    .032             TRAP       8       5
  28          KO                                       22

  29          KK      B1
  30          KM  RUNOFF FROM SUB-BASIN B1
  31          BA     .027
  32          LS               88
  33          UK      200    .025    0.13     100
  34          RK     2500    .028    .032             TRAP       8       5
  35          KO                                       22

  36          KK      B2
  37          KM  RUNOFF FROM SUB-BASIN B2
  38          BA     .050
  39          LS               88
  40          UK      400    .025    0.13     100
  41          RK     2340    .024    .032             TRAP       8       5

  42          KK   COMBB
  43          KM  COMBINE SECTIONS B1 AND B2
  44          HC       2
  45          KO                                       22
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46          KK       C
  47          KM  RUNOFF FROM SUB-BASIN C
  48          BA     .03
  49          LS               88
  50          UK      250    .023    0.13     100
  51          RK     1570    .017    .032             TRAP       5       5
  52          KO                                       22

  53          KK       D
  54          KM  RUNOFF FROM SUB-BASIN D
  55          BA     .034
  56          LS               88
```

APPENDIX B

Existing Condition Hydrologic Calculations

- 2-year HEC-1 Model
- 10-year HEC-1 Model
- 100-year HEC-1 Model

LAND USE Composite Area-wide Values	Hydrologic Soil Group		
	B	C	D
Commercial & Industrial Areas	0.90		
Residential Areas-Single Family (av. lot size)			
R1-1-1901	0.33	0.50	0.58
R1-130	0.35	0.51	0.59
R1-70	0.37	0.52	0.60
R1-43	0.38	0.55	0.61
R1-35 (35,000 sq. ft./lot)	0.40	0.56	0.62
R1-18 (18,000 sq. ft./lot)	0.43	0.58	0.64
R1-10 (10,000 sq. ft./lot)	0.47	0.62	0.67
R1-7 (7,000 sq. ft./lot)	0.51	0.64	0.70
Townhouses (R-2, R-4)	0.63	0.74	0.78
Apartments & Condominiums (R-3, R-5)	0.76	0.83	0.87
Specific Surface Type Values			
Paved streets, parking lots (concrete or asphalt), roofs, & driveways, etc.	0.95		
Lawns, golf courses, & parks (grassed areas)	0.33	0.56	0.66
Undisturbed natural desert or desert landscaping (no impervious weed barrier)	0.31	0.48	0.56
Desert landscaping (with impervious weed barrier)	0.83	0.83	0.83
Mountain terrain – slopes greater than 10%	0.70	0.70	0.70
Agricultural areas (flood-irrigated fields)	0.20	0.20	0.20

FIGURE 4-5. RUNOFF COEFFICIENTS FOR USE WITH RATIONAL METHOD

D. The Army Corps of Engineer's HEC-1 Computer Model

HEC-1 procedures are applicable for any watershed area over 160 acres and up to 100 square miles in size. HEC-1 is required for analyzing drainage areas over 160 acres in size. **HEC-HMS is not an acceptable substitute for HEC-1**. Minimum required submittals when using HEC-1 are:

- A printout of the input data
- A schematic (routing) diagram of the stream network
- The runoff summary output table
- Electronic input file(s), on CD or floppy
- Supporting Documentation and Source Material for parameter selection

1. Precipitation

Precipitation values for HEC-1 modeling shall be determined using the Flood Control Manual, specifically PD and JD records for point rainfall and area reduction factors. Capital Projects shall use the ADOT manual and methodology when specified. Precipitation values are to be obtained from the Isopluvial maps for the specific frequency desired (see Appendix 4-D).

3.4.4 Element Application

(1) **Overland Flow.** The overland flow element is a wide rectangular channel of unit width; so, referring to Figure 3.6, $\alpha = 1.486S^{\frac{1}{2}}/N$ and $m = 5/3$. Notice that Manning's n has been replaced by an overland flow roughness factor, N. Typical values of N are shown in Table 3.5. When applying Equations (3.43) and (3.46) to an overland flow element, the lateral inflow is rainfall excess (previously computed using methods described in Section 3.2) and the outflow is a flow per unit width.

An overland flow element is described by four parameters: a typical overland flow length, L, slope and roughness factor which are used to compute α, and the percent of the subbasin area represented by this element.

Two overland flow elements may be used for each subbasin. The total discharge, Q, from each element is computed as

$$Q = q * \frac{AREA}{L} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.70)$$

Table 3.5

Resistance Factor for Overland Flow

Surface	N value	Source
Asphalt/Concrete*	0.05 - 0.15	a
Bare Packed Soil Free of Stone	0.10	c
Fallow - No Residue	0.008 - 0.012	b
Convential Tillage - No Residue	0.06 - 0.12	b
Convential Tillage - With Residue	0.16 - 0.22	b
Chisel Plow - No Residue	0.06 - 0.12	b
Chisel Plow - With Residue	0.10 - 0.16	b
Fall Disking - With Residue	0.30 - 0.50	b
No Till - No Residue	0.04 - 0.10	b
No Till (20-40 percent residue cover)	0.07 - 0.17	b
No Till (60-100 percent residue cover)	0.17 - 0.47	b
Sparse Rangeland with Debris:		
0 Percent Cover	0.09 - 0.34	b
20 Percent Cover	0.05 - 0.25	b
Sparse Vegetation	0.053 - 0.13	f
Short Grass Prairie	0.10 - 0.20	f
Poor Grass Cover On Moderately Rough	0.30	c
Bare Surface		
Light Turf	0.20	a
Average Grass Cover	0.4	c
Dense Turf	0.17 - 0.80	a,c,e,f
Dense Grass	0.17 - 0.30	d
Bermuda Grass	0.30 - 0.48	d
Dense Shrubbery and Forest Litter	0.4	a

Legend: a) Harley (1975), b) Engman (1986), c) Hathaway (1945), d) Palmer (1946), e) Ragan and Duru (1972), f) Woolhiser (1975). (See Hjemfelt, 1986)

*Asphalt/Concrete n value for open channel flow 0.01 - 0.016

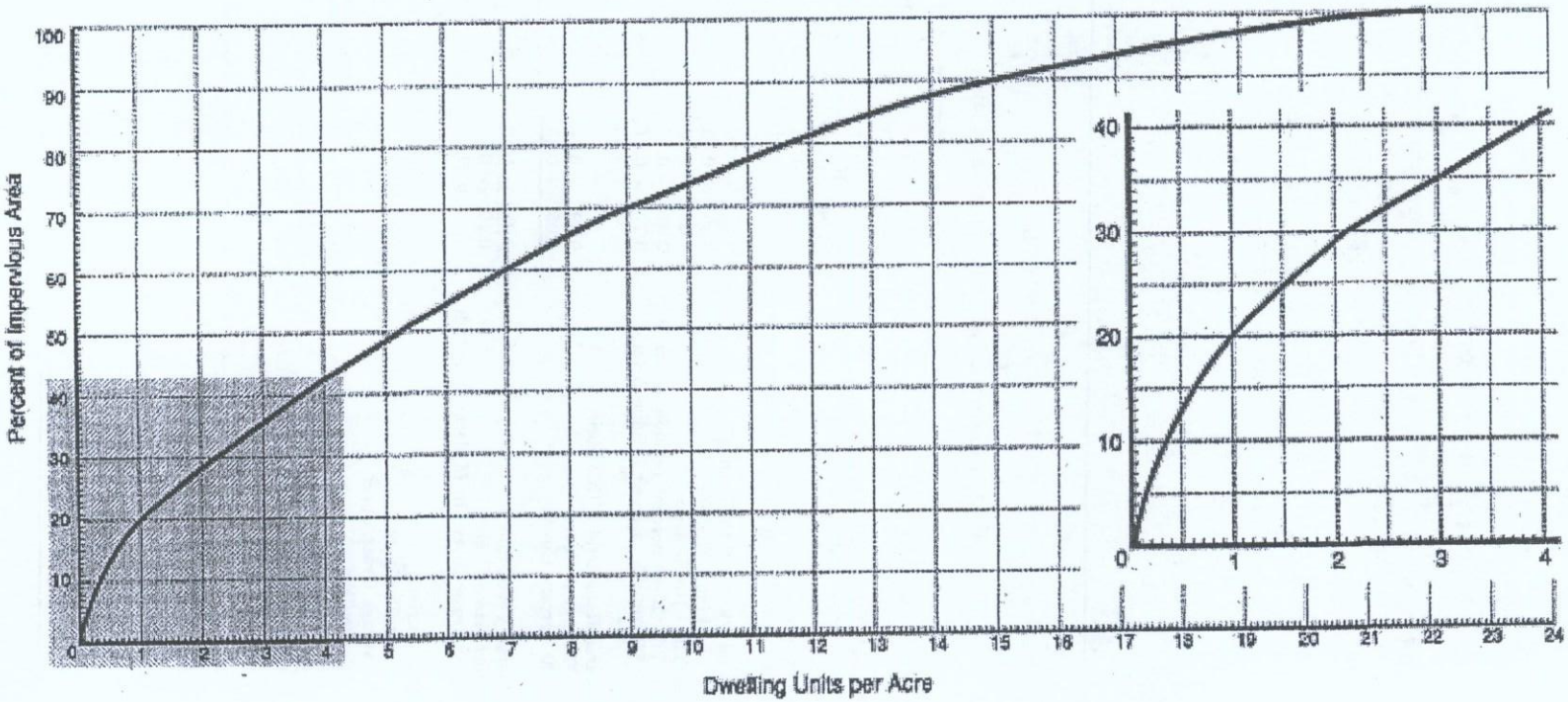


FIGURE 2.2-16

Percent of Impervious Area vs. Dwelling Density

Developed by Water Resources Associates, Inc. from data in Table 2.2a of TR-55, Urban Hydrology For Small Watersheds, and from discussions with Scottsdale city staff.

2. Infiltration

Infiltration or soil losses will be determined using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the most recent published SCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures. Use USDA Natural Resources Conservation Services (previously the Soil Conservation Services) maps, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, or the Soil Survey of Eastern Maricopa and Northern Pinal Counties, Arizona; depending on what part of the city you are located.

3. Runoff Curve Numbers

Where detailed mapping is not available from the SCS or other sources, the use of curve numbers is acceptable. When using runoff curve numbers (ROCN) within Scottsdale:

1. Assume poor hydrologic condition and desert shrub cover type for natural undisturbed desert conditions in Figure 4-6.
2. For lawns, golf courses, and other grassed open space areas, assume good condition in Figure 4-7 to determine the ROCN, then adjust the ROCN to antecedent moisture condition III (use Figure 4-8).
3. For developed conditions, increase the percent impervious on the LS card without changing the ROCN (except in the case of grassed areas, in which the curve number should be adjusted up according to the above). Use the actual or estimated percent impervious; a minimum of 85 percent for commercial and 72 percent industrial.

RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS[1]

Cover Type and Hydrologic Condition	Hydrologic Condition[2]	Curve Numbers for Hydrologic Soil Group			
		A[3]	B	C	D
Herbaceous: mixture of grass, weeds, and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen: mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper: pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub: major plants include saltbush, greasewood, creosote bush, blackbrush, bursage, Palo Verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1] Average Runoff Condition, and $I_a = 0.2S$.

[2] Poor: < 30% ground cover (litter, grass, and brush overstory)
Fair: 30 to 70% ground cover (not applicable in Scottsdale)
Good: >70% ground cover (not applicable in Scottsdale)

[3] Curve Numbers for Group A have been developed only for desert shrub

FIGURE 4-6. RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS

2. Infiltration

Infiltration or soil losses will be determined using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the most recent published SCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures. Use USDA Natural Resources Conservation Services (previously the Soil Conservation Services) maps, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, or the Soil Survey of Eastern Maricopa and Northern Pinal Counties, Arizona; depending on what part of the city you are located.

3. Runoff Curve Numbers

Where detailed mapping is not available from the SCS or other sources, the use of curve numbers is acceptable. When using runoff curve numbers (ROCN) within Scottsdale:

1. Assume poor hydrologic condition and desert shrub cover type for natural undisturbed desert conditions in Figure 4-6.
2. For lawns, golf courses, and other grassed open space areas, assume good condition in Figure 4-7 to determine the ROCN, then adjust the ROCN to antecedent moisture condition III (use Figure 4-8).
3. For developed conditions, increase the percent impervious on the LS card without changing the ROCN (except in the case of grassed areas, in which the curve number should be adjusted up according to the above). Use the actual or estimated percent impervious; a minimum of 85 percent for commercial and 72 percent industrial.

RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS[1]

Cover Type and Hydrologic Condition	Hydrologic Condition[2]	Curve Numbers for Hydrologic Soil Group			
		A[3]	B	C	D
Herbaceous: mixture of grass, weeds, and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen: mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper: pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub: major plants include saltbush, greasewood, creosote bush, blackbrush, bursage, Palo Verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1] Average Runoff Condition, and $I_a = 0.2S$.

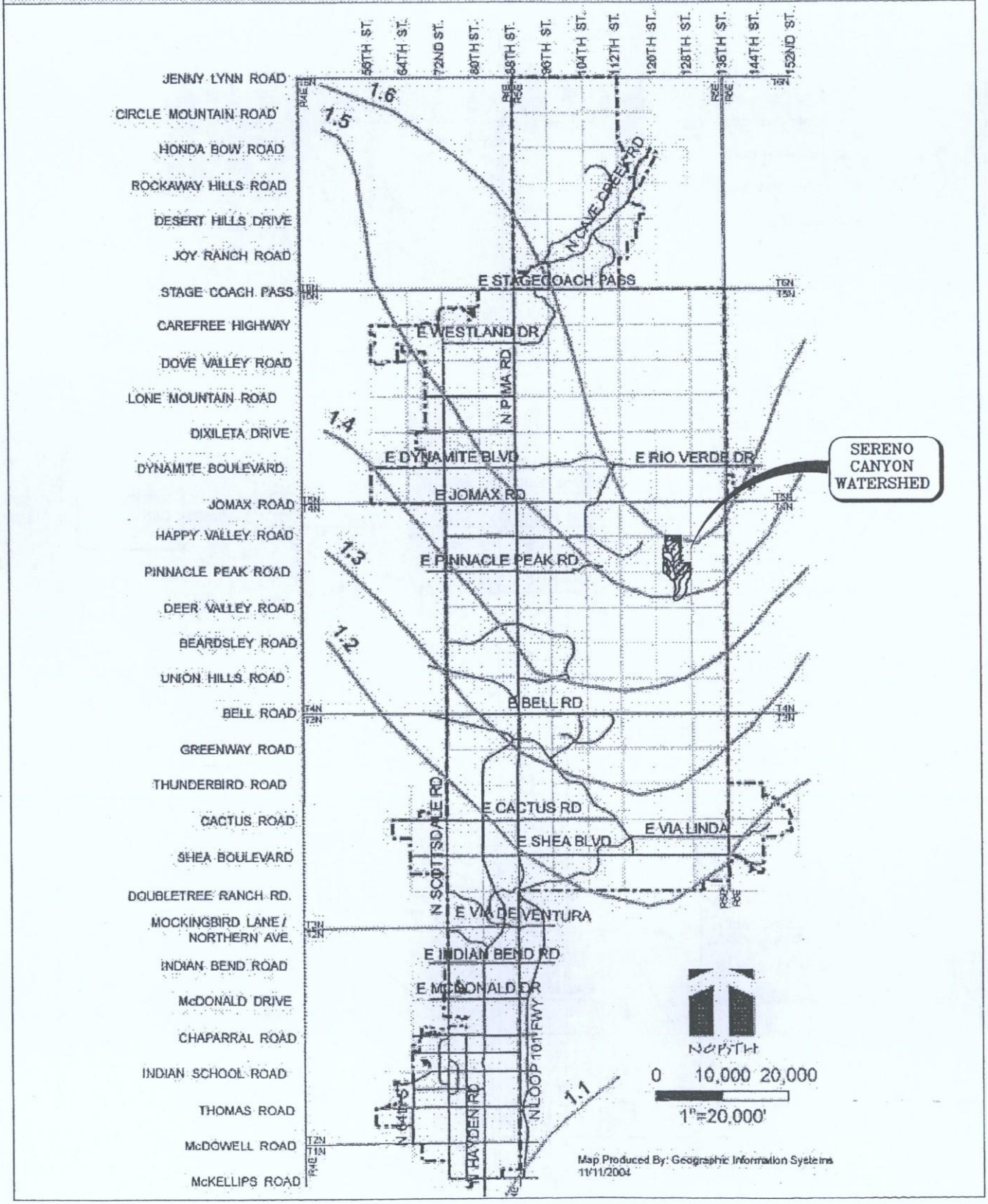
[2] Poor: < 30% ground cover (litter, grass, and brush overstory)
Fair: 30 to 70% ground cover (not applicable in Scottsdale)
Good: >70% ground cover (not applicable in Scottsdale)

[3] Curve Numbers for Group A have been developed only for desert shrub

FIGURE 4-6. RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS

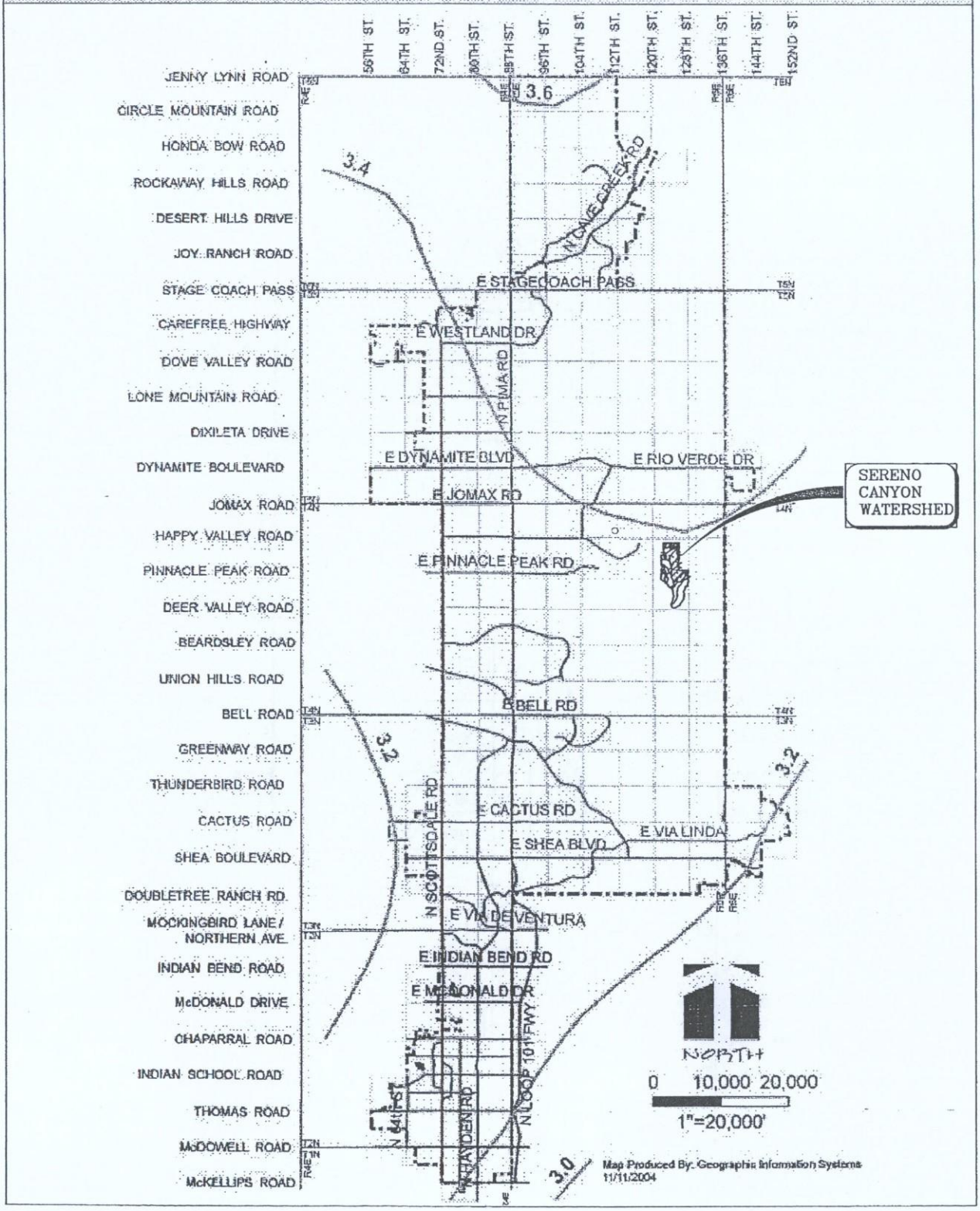
ISOPLUVIALS

2 Year 6 Hour Precipitation in Inches



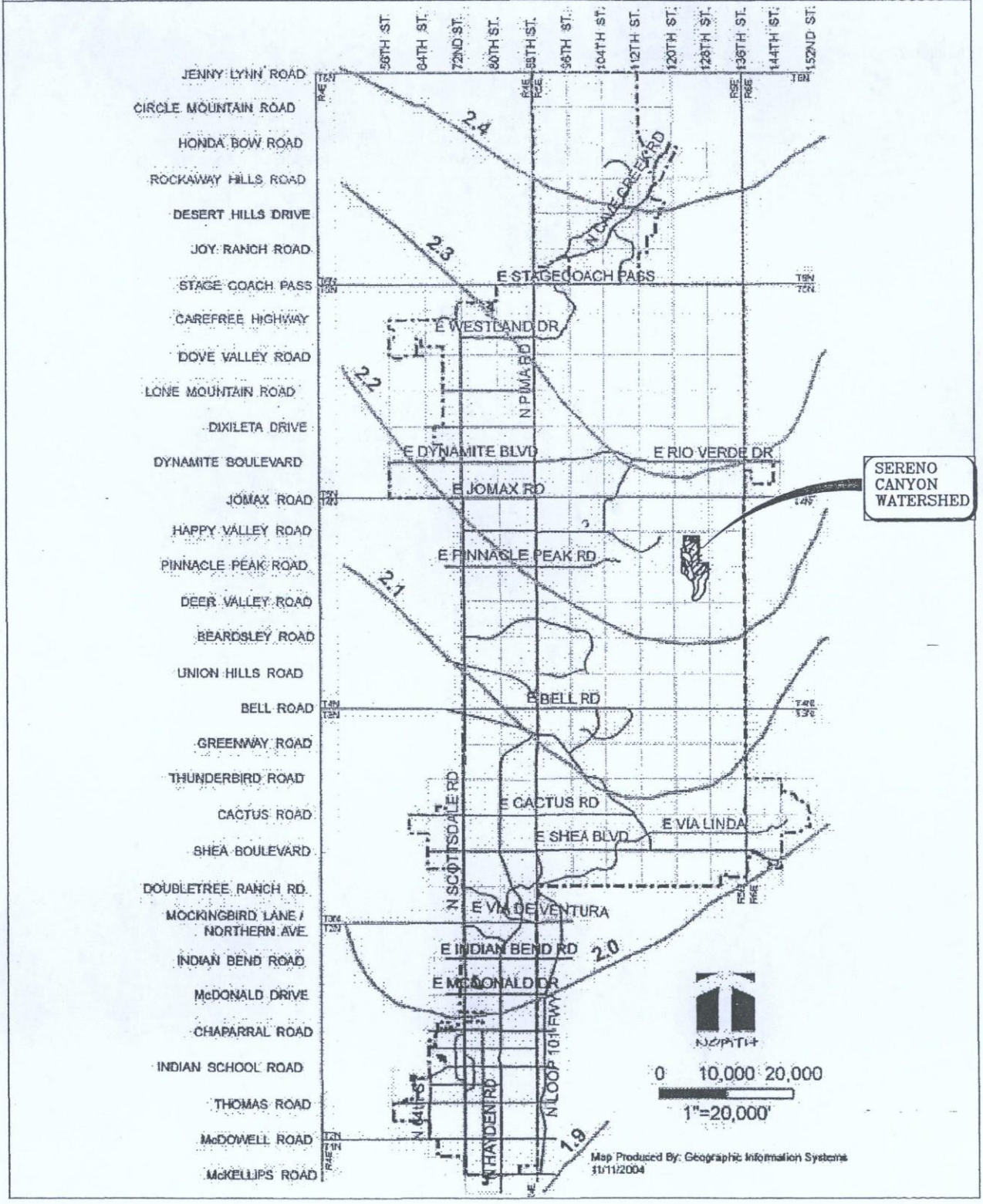
ISOPLUVIALS

100 Year 6 Hour Precipitation in Inches



ISOPLUVIALS

10 Year 6 Hour Precipitation in Inches



Flood Control District of Maricopa County

Rainfall Data

Primary Zone Number: 7 Latitude: 0.0 Elevation: 0

Short Duration Zone Number: 8 Longitude: 0.0

	Point Values (in)					
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
5 MIN	0.38	0.46	0.52	0.60	0.66	0.73
10 MIN	0.57	0.70	0.78	0.91	1.01	1.11
15 MIN	0.70	0.87	0.99	1.16	1.29	1.43
30 MIN	0.92	1.16	1.33	1.56	1.75	1.94
1 HOUR	1.12	1.43	1.64	1.95	2.19	2.42
2 HOUR	1.27	1.62	1.87	2.21	2.48	2.74
3 HOUR	1.38	1.75	2.01	2.38	2.67	2.96
6 HOUR	1.57	2.00	2.29	2.71	3.04	3.37
12 HOUR	1.81	2.31	2.66	3.15	3.53	3.91
24 HOUR	2.05	2.62	3.02	3.58	4.02	4.45

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
5 ,59*: nure	B	None	---	---	>60	---	---	---	High	Low.
60*: enbar, noncalcareous	B	Rare	---	---	>60	---	---	---	High	Low.
lenbar, Calcareous	B	Rare	---	---	>60	---	---	---	High	Low.
5 , 62*: an	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
6 , 64*: an	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
ck outcrop.										
65*: Greyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
ntinental	C	None	---	---	>60	---	---	---	High	Low.
Nickel	B	None	---	---	>60	---	---	---	High	Low.
6 : eyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
Suncity Variant	D	None	---	---	>60	---	5-20	Thick	High	Low.
6 est	D	Rare	---	---	>60	---	---	---	High	Low.
68*, 69*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
priano	D	None	---	---	>60	---	5-20	Thick	High	Low.
70*, 71*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
llito	B	None	---	---	>60	---	---	---	High	Low.
72*, 73*: Lehmans	D	None	---	---	6-20	Hard	---	---	High	Low.
ck outcrop.										
74*: Luke	C	None	---	---	>60	---	20-40	Thick	High	Low.
priano	D	None	---	---	>60	---	4-20	Thick	High	Low.
75, 76, 77, 78, 79 hall	B	None	---	---	>60	---	---	---	High	Low.
8 81*: Mohall	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

Photo 13

Photo 14

Photo 11

Photo 12

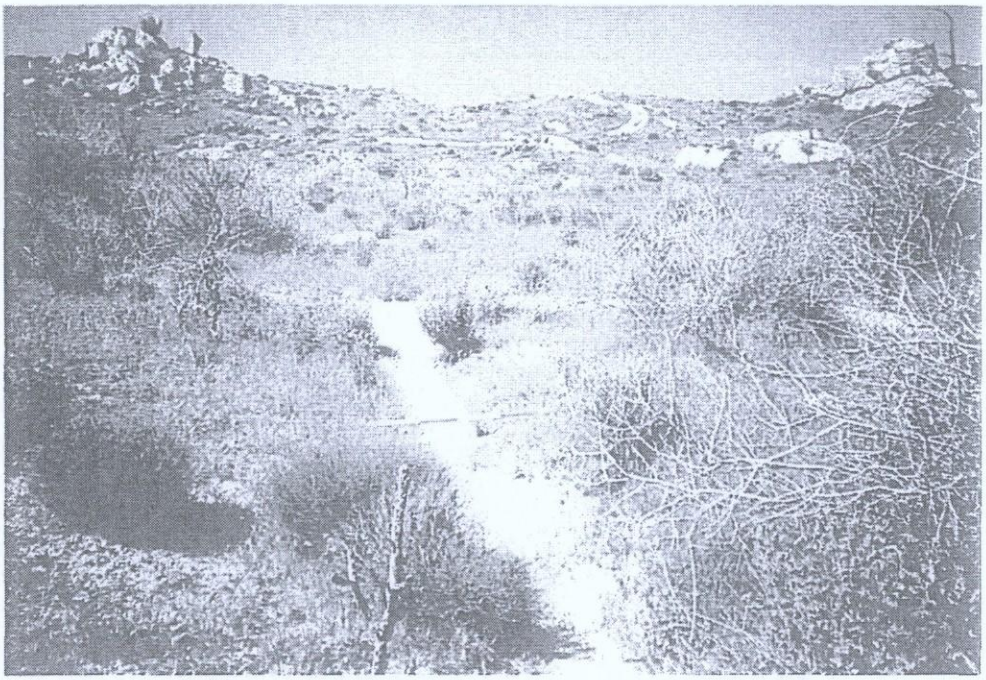


Photo 9

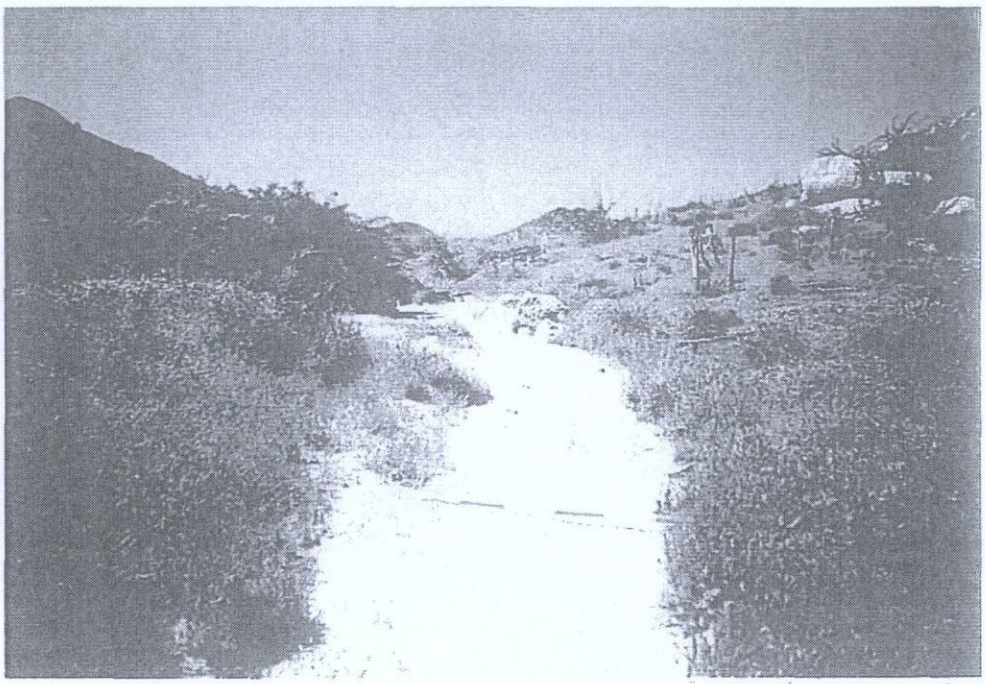


Photo 10

Photo 7

Photo 8

Photo 5

Photo 6

APPENDIX F

Hydraulic Calculations

- Storage Rating Curves
- HEC-RAS Output Files
- Orifice Plate Calculation

Culvert Rating Curves for Stage-Storage Intervals

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: *Sereno Canyon*
Location: *City of Scottsdale*
Reference: *Rectangular Weir Equation*

W/P#: *042054*
Date: *5/11/2006*

$$Q = CLH^{3/2}$$

Where:

C = Weir Coefficient =	2.80	
L = Length of Weir =	10.00	ft
H = Head above Weir =	1.50	ft
Q = Weir Flow =	51.44	cfs

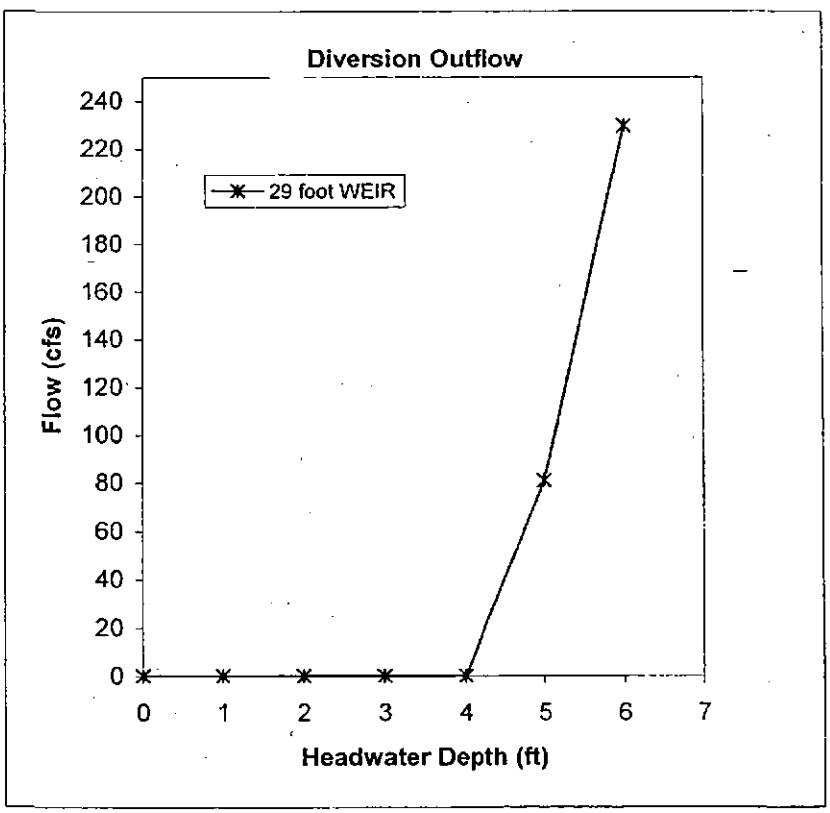
* The above equation is used to determine the rating curves for weir flow

Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BASA1

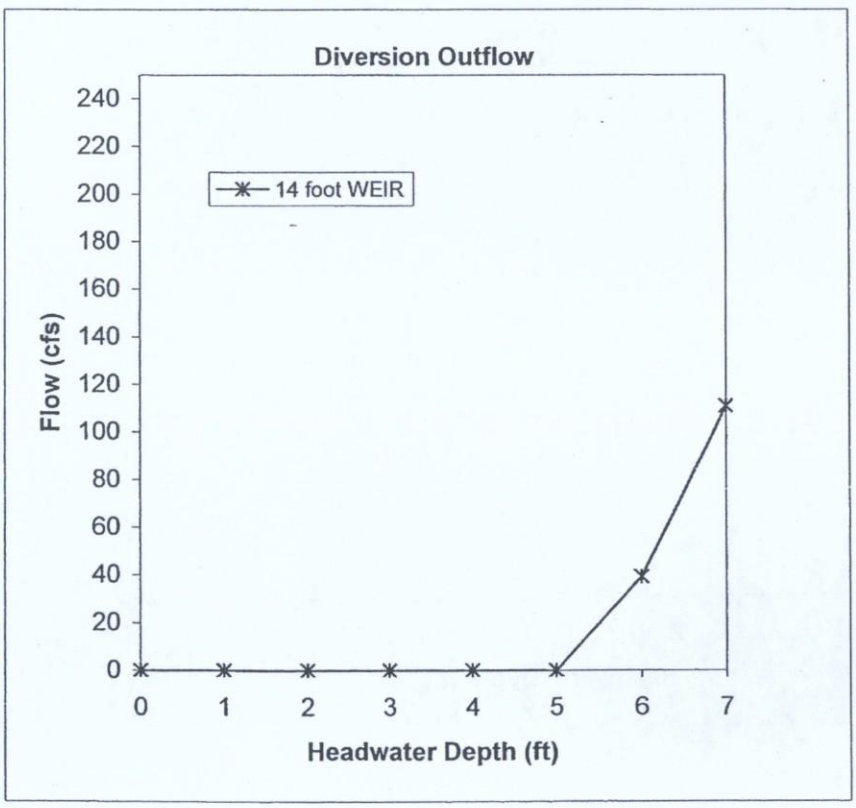
29	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	81
6	230



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS A2-3

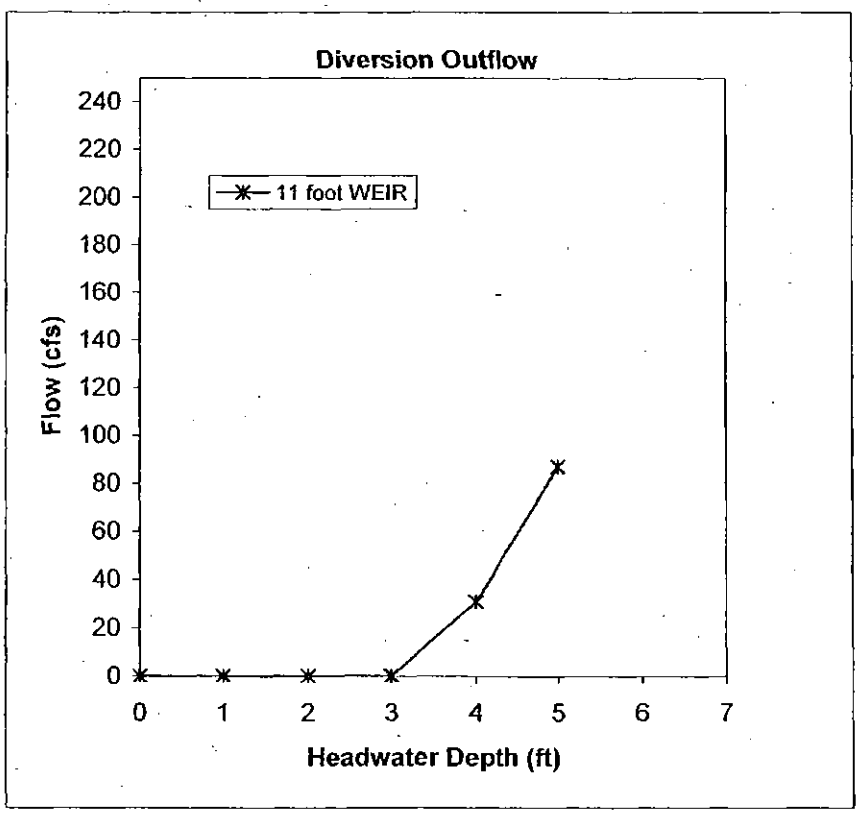
14	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	0
6	39
7	111



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS B-3

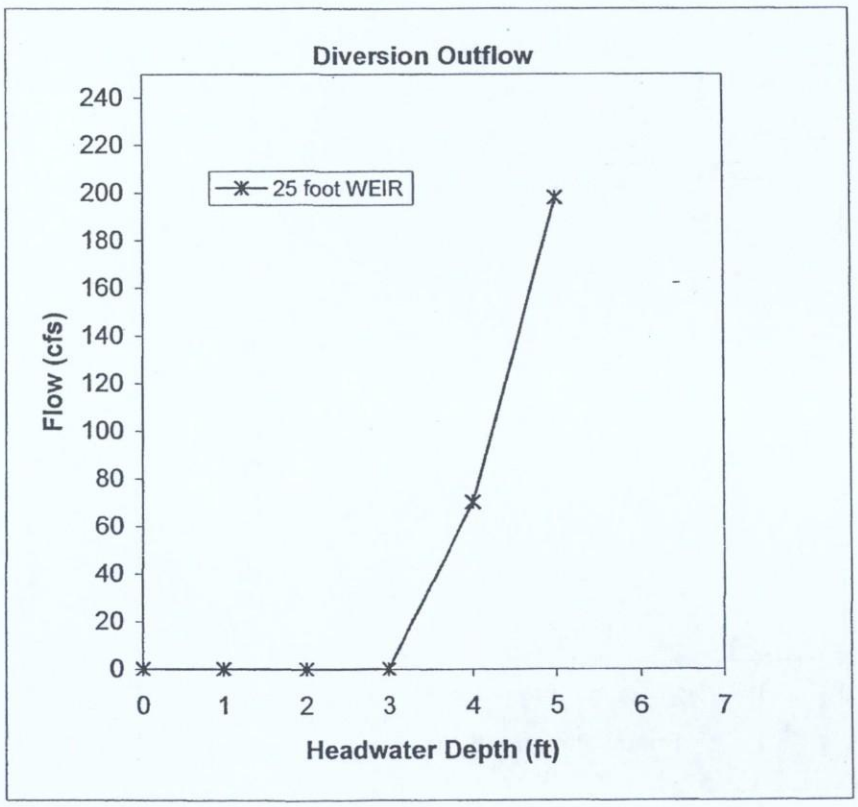
11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS B-4

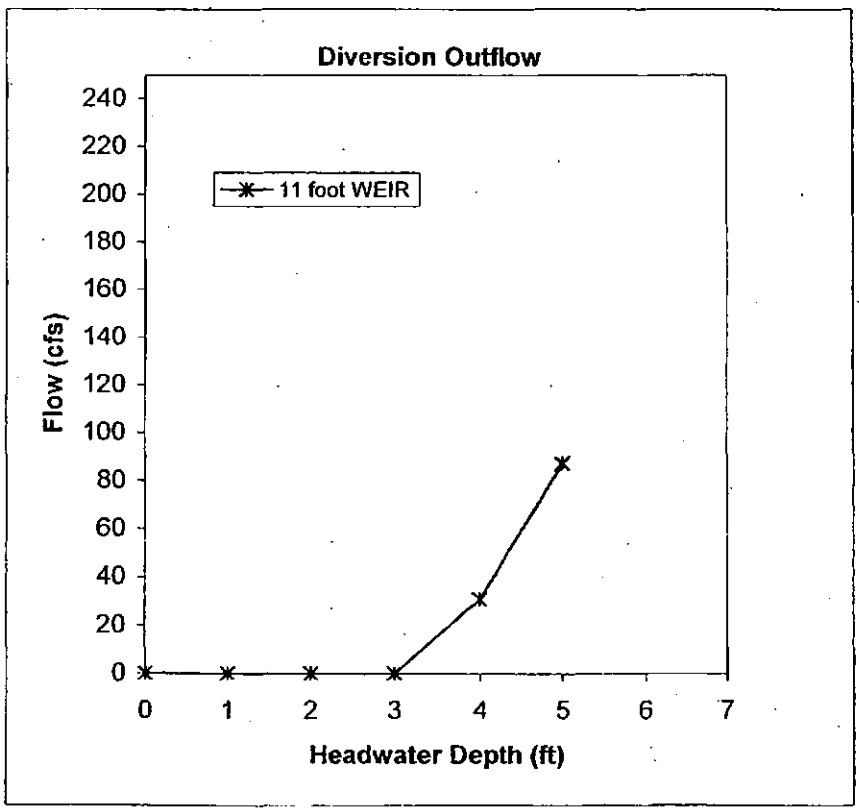
25	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	70
5	198



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS C-1

11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87

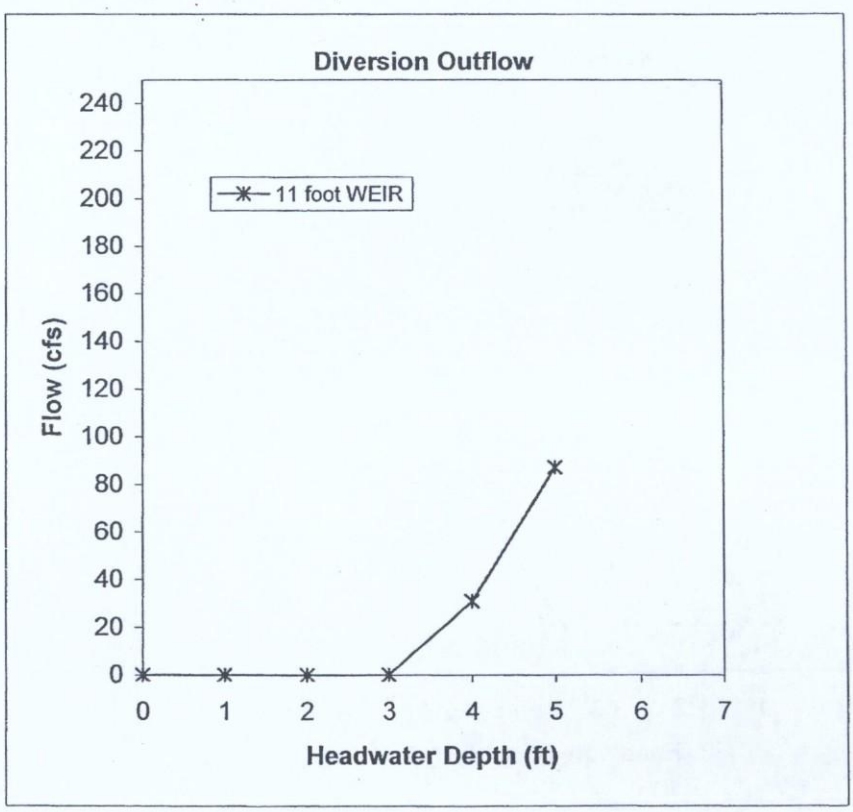


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS D-1

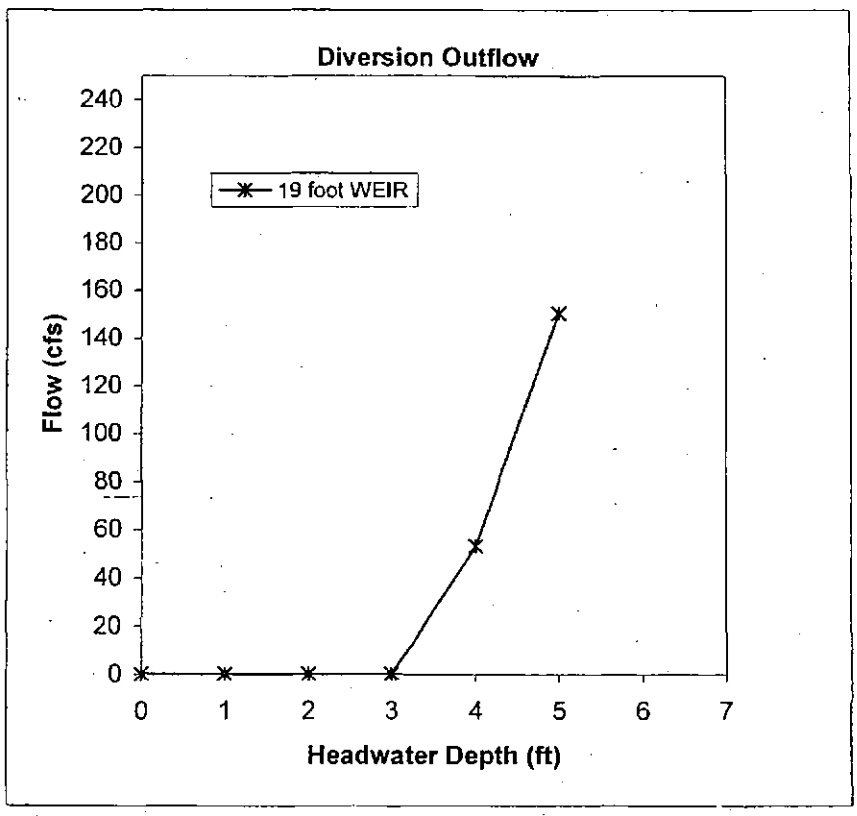
11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87



Project: *Sereno Canyon* **WIP#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E1-2

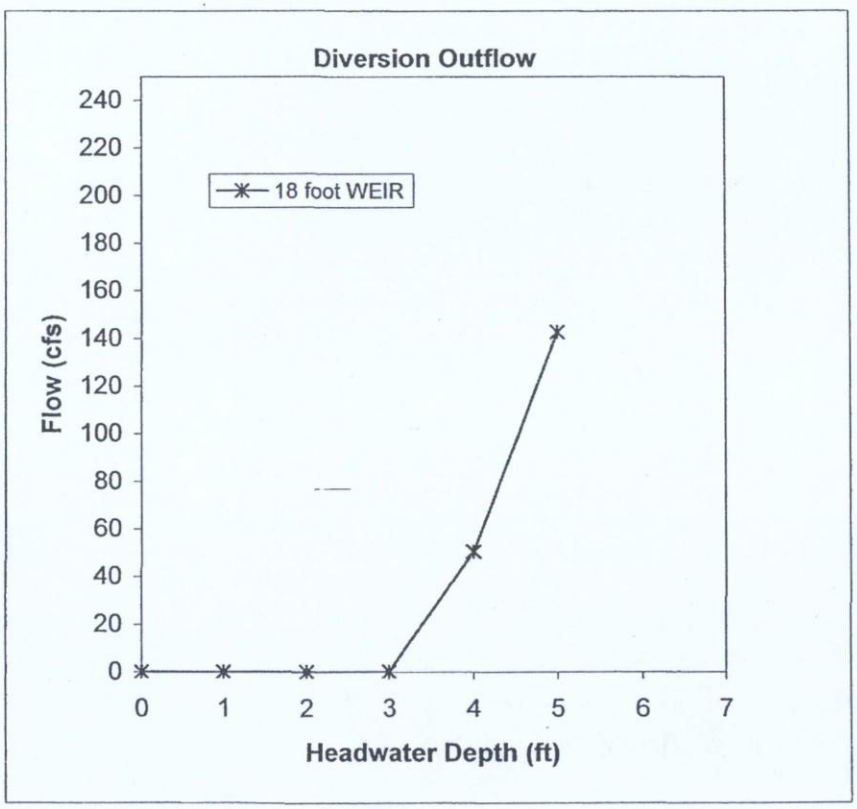
19	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	53
5	150



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E2-1

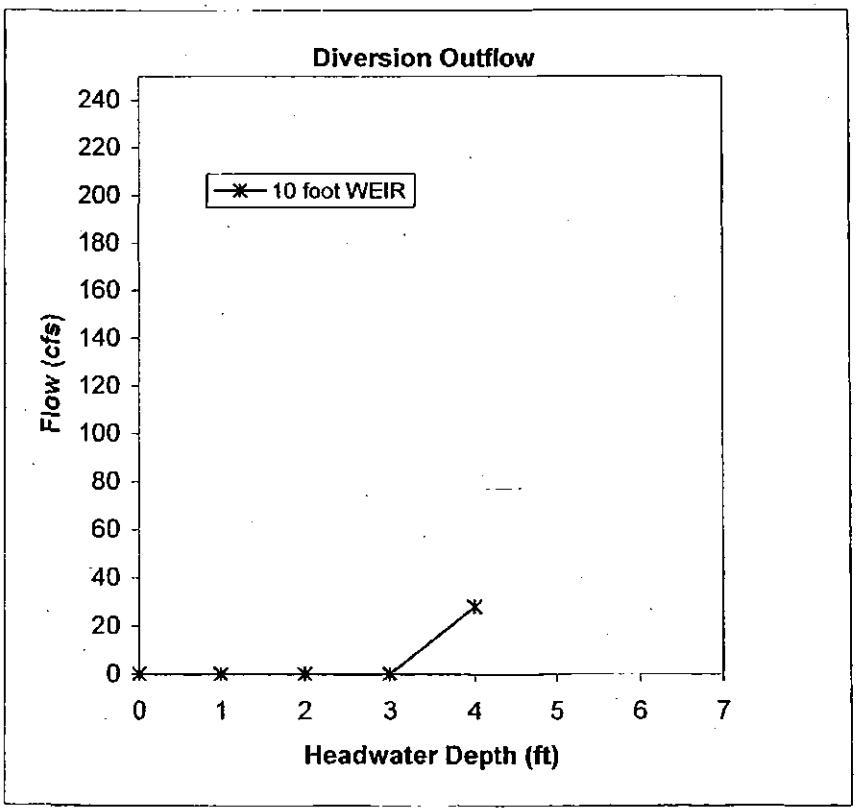
18	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	50
5	143



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E3-1

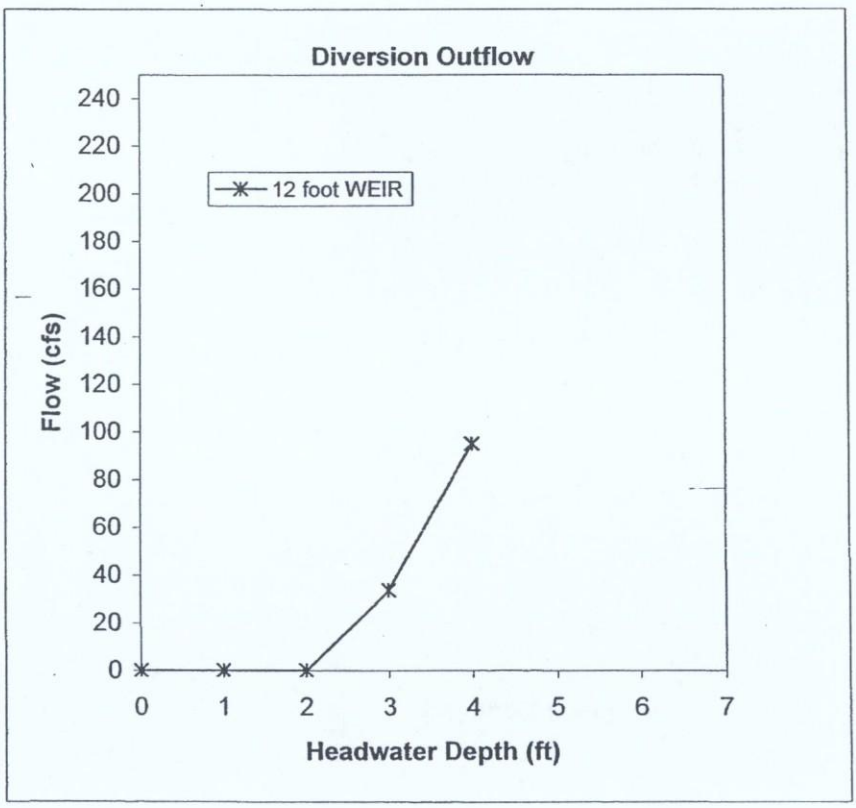
10	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	28



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F1-3

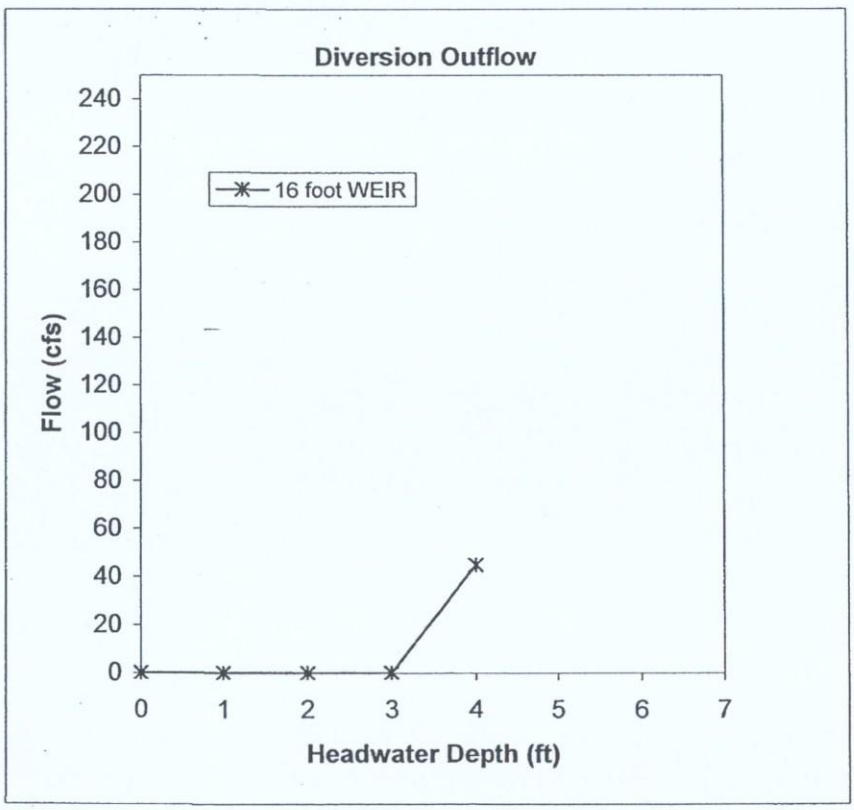
12	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	34
4	95



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F2-2

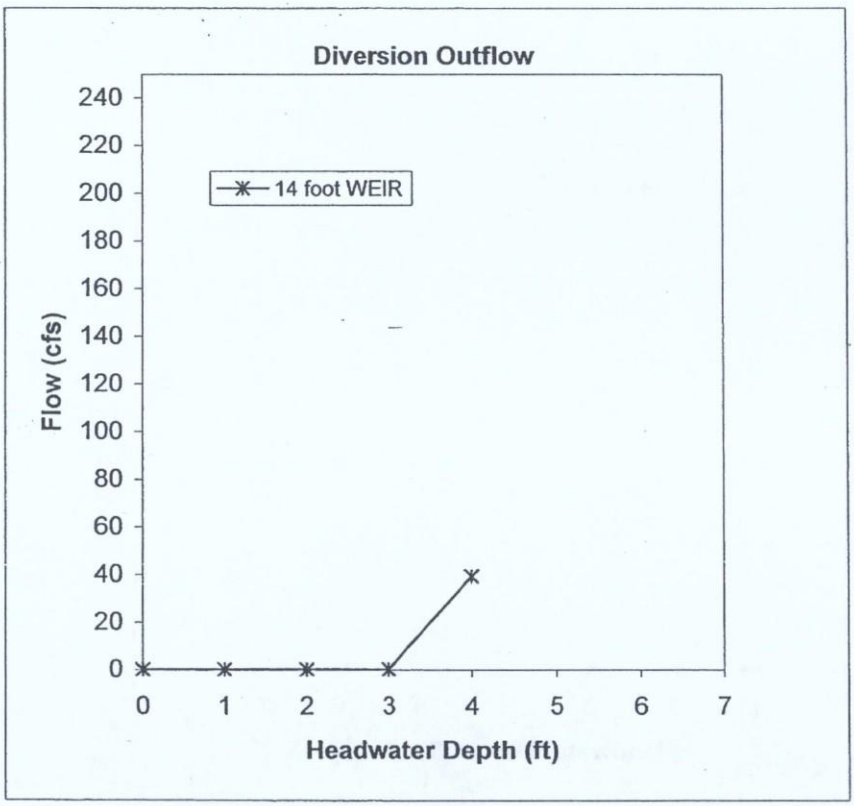
16	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	45



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F3-1

14	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	39

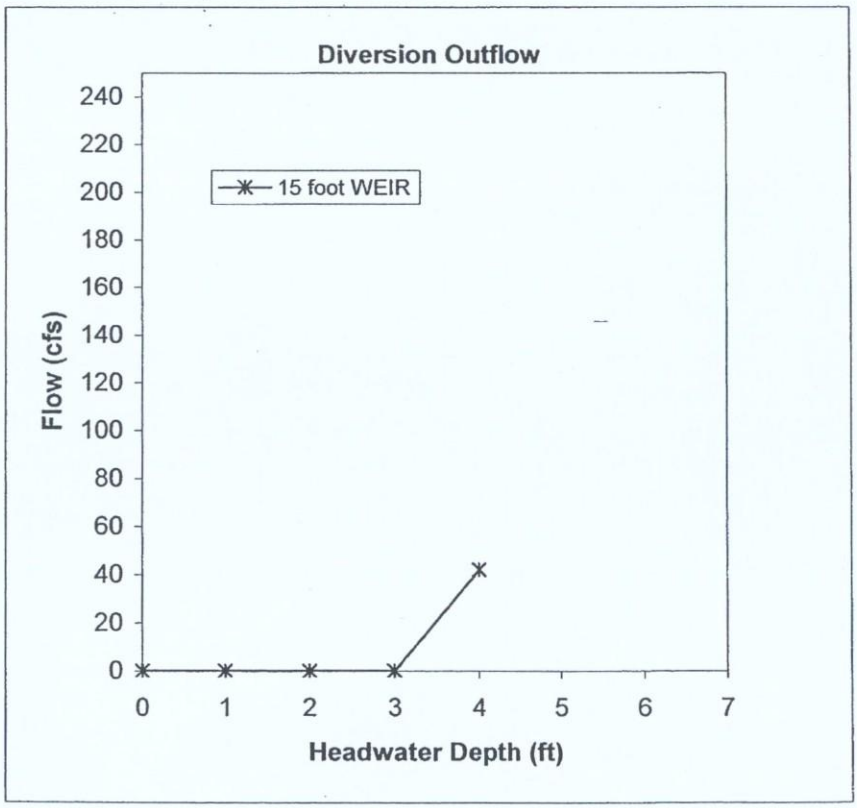


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS G

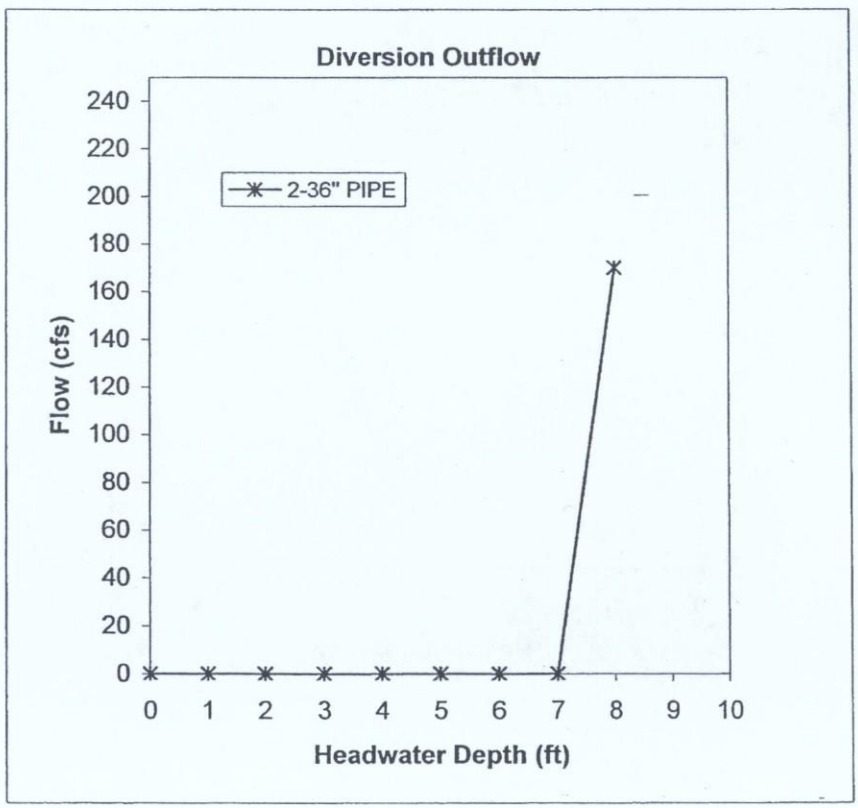
15	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	42



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H1-1

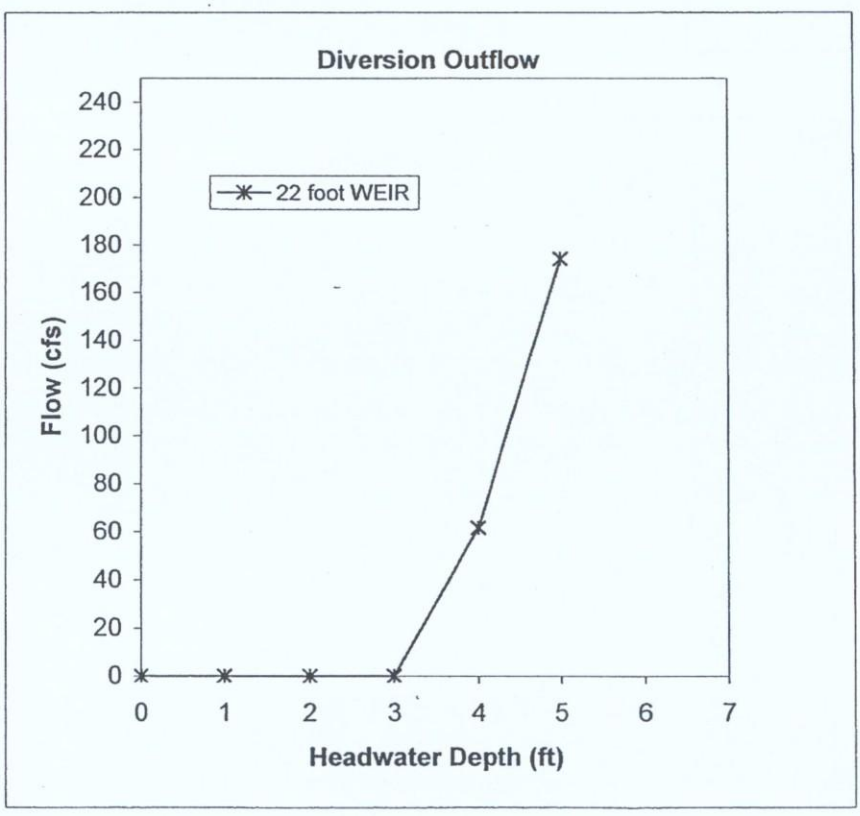
2-36" PIPE	
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	170



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H2-1

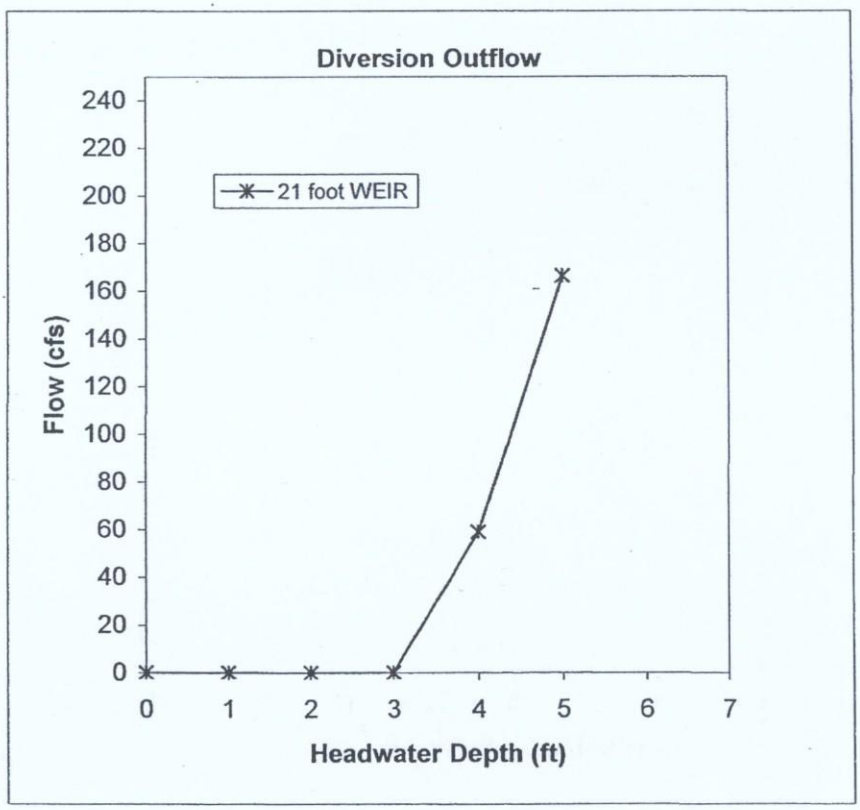
22	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	62
5	174



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H2-2

21	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	59
5	166

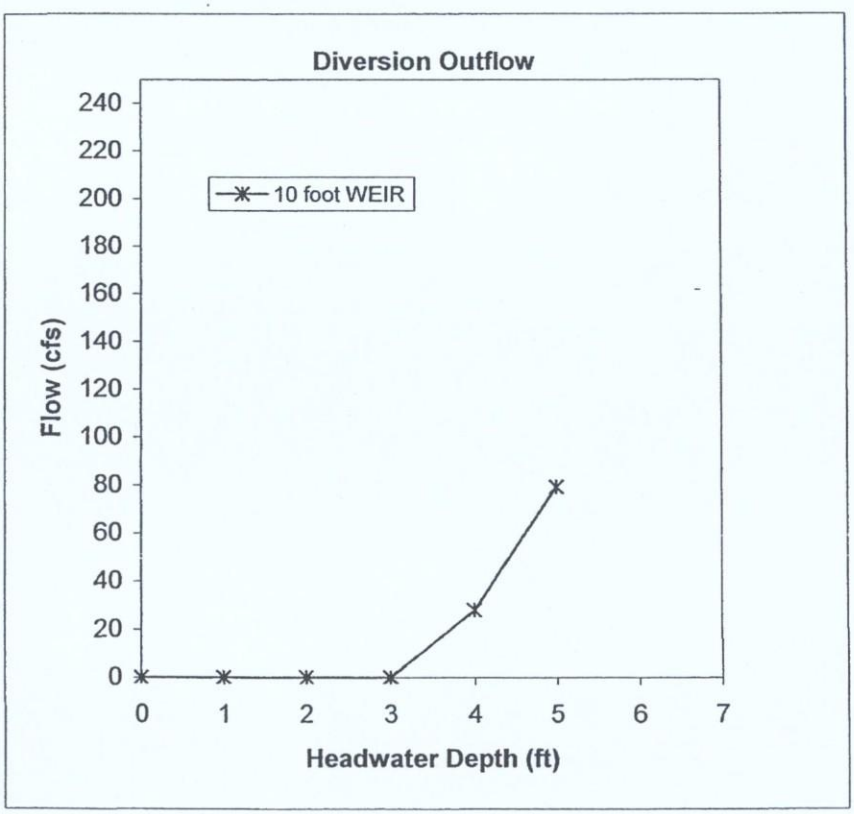


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS I

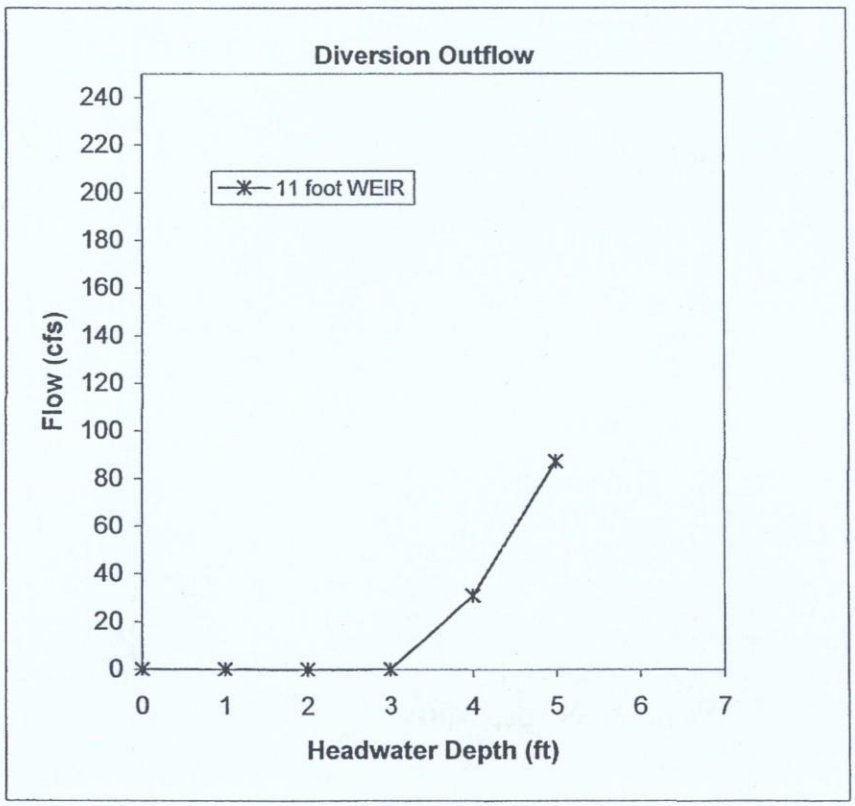
10	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	28
5	79



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS J

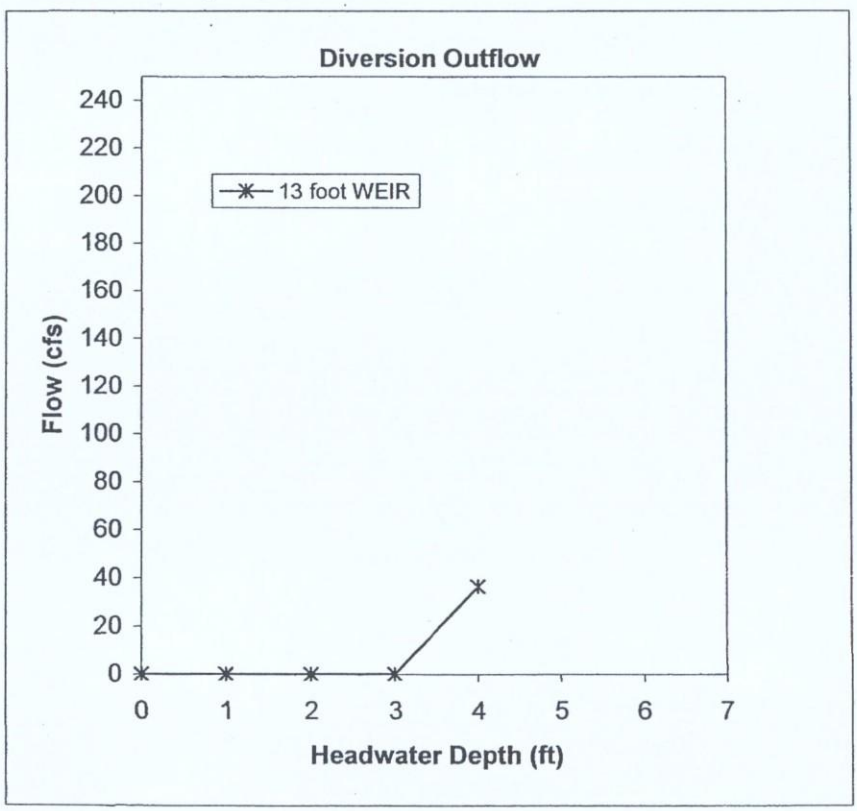
11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS K

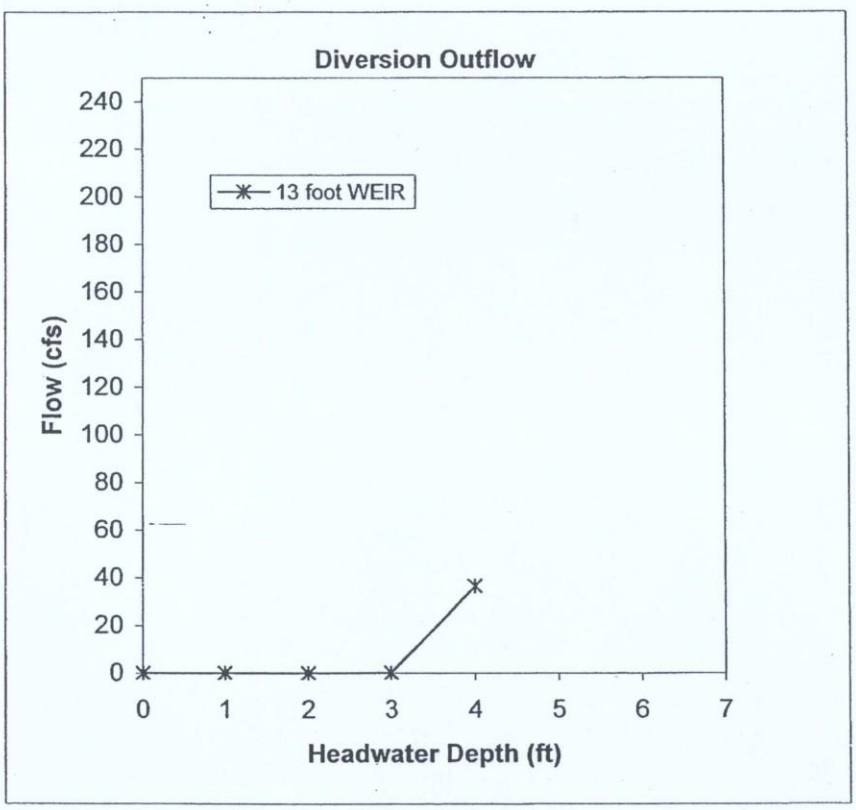
13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	36



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS L

13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	36

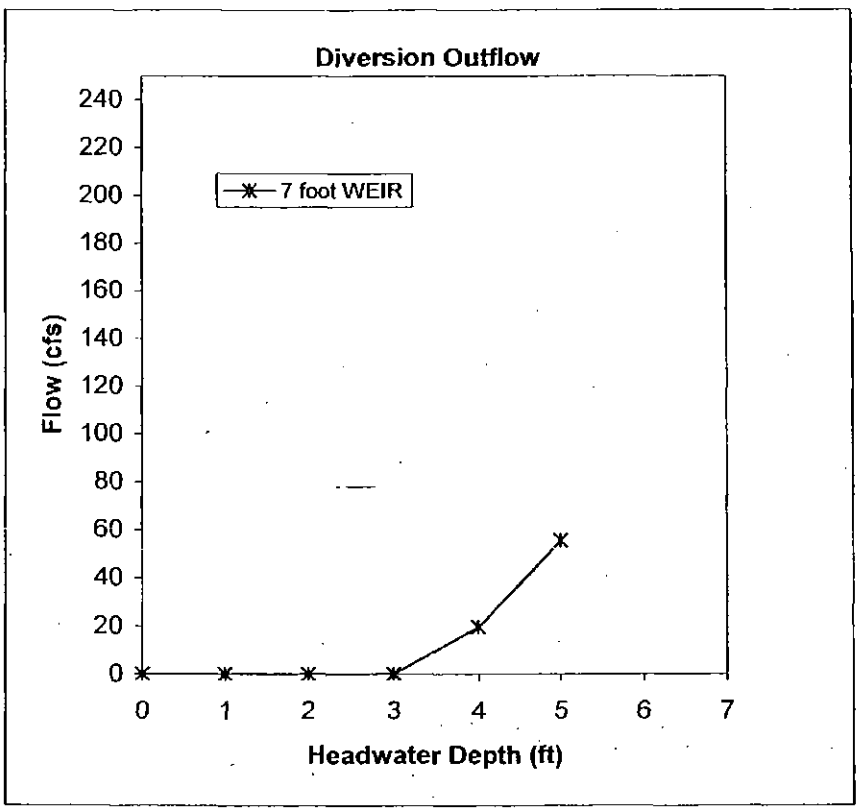


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS M

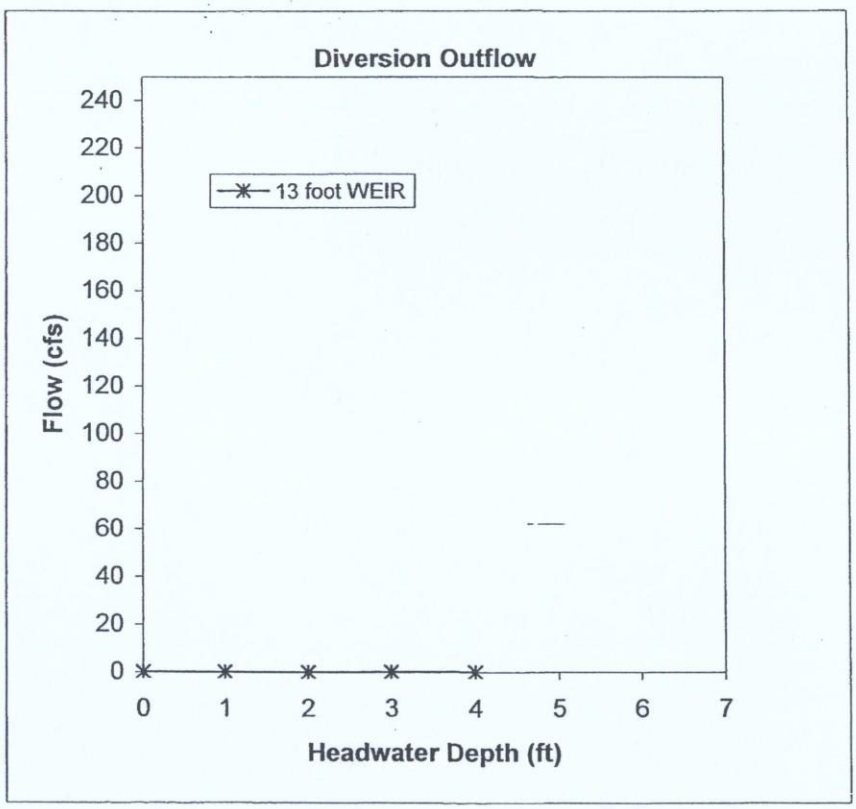
7	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	20
5	55



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS N

13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	36

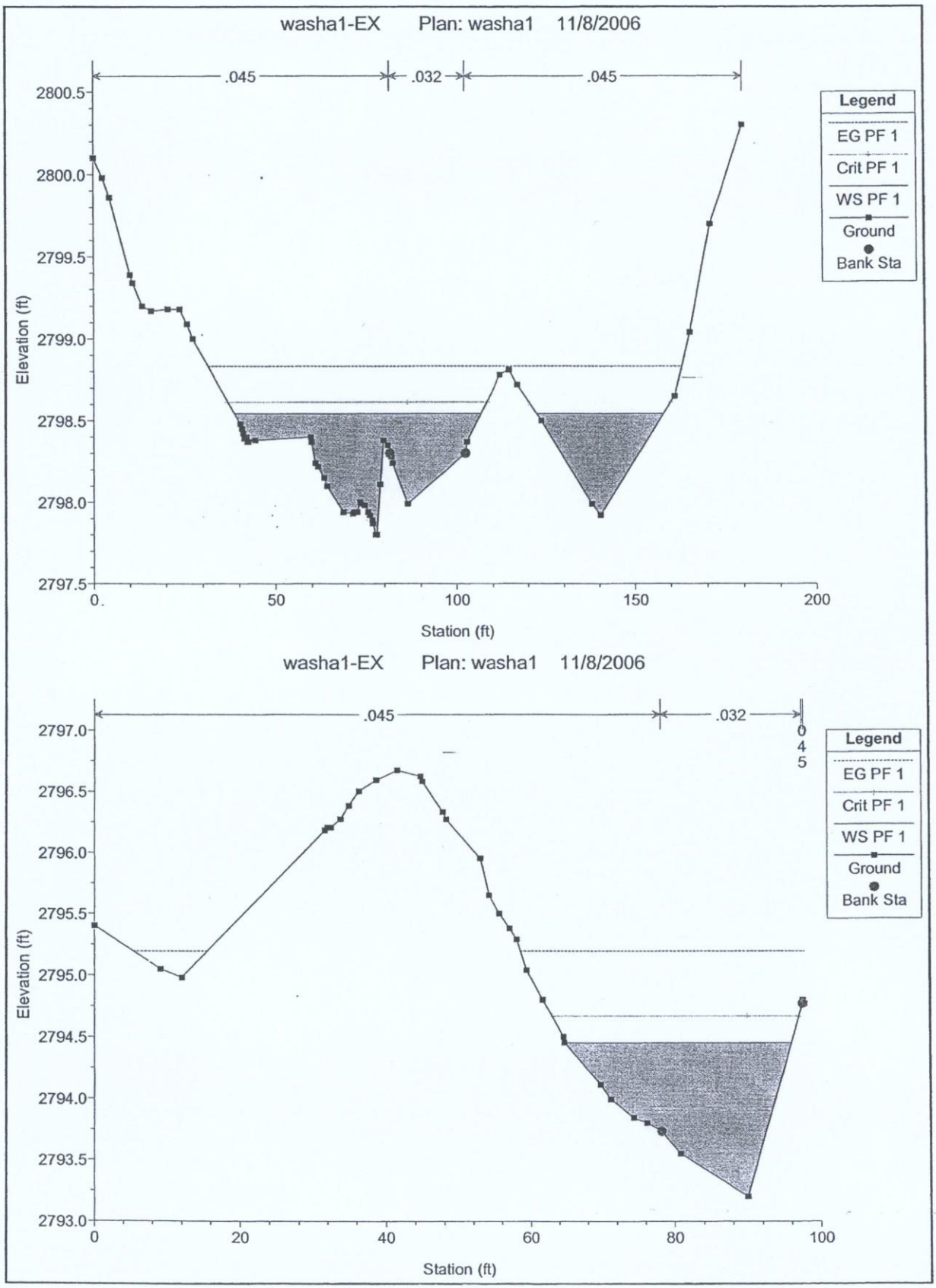


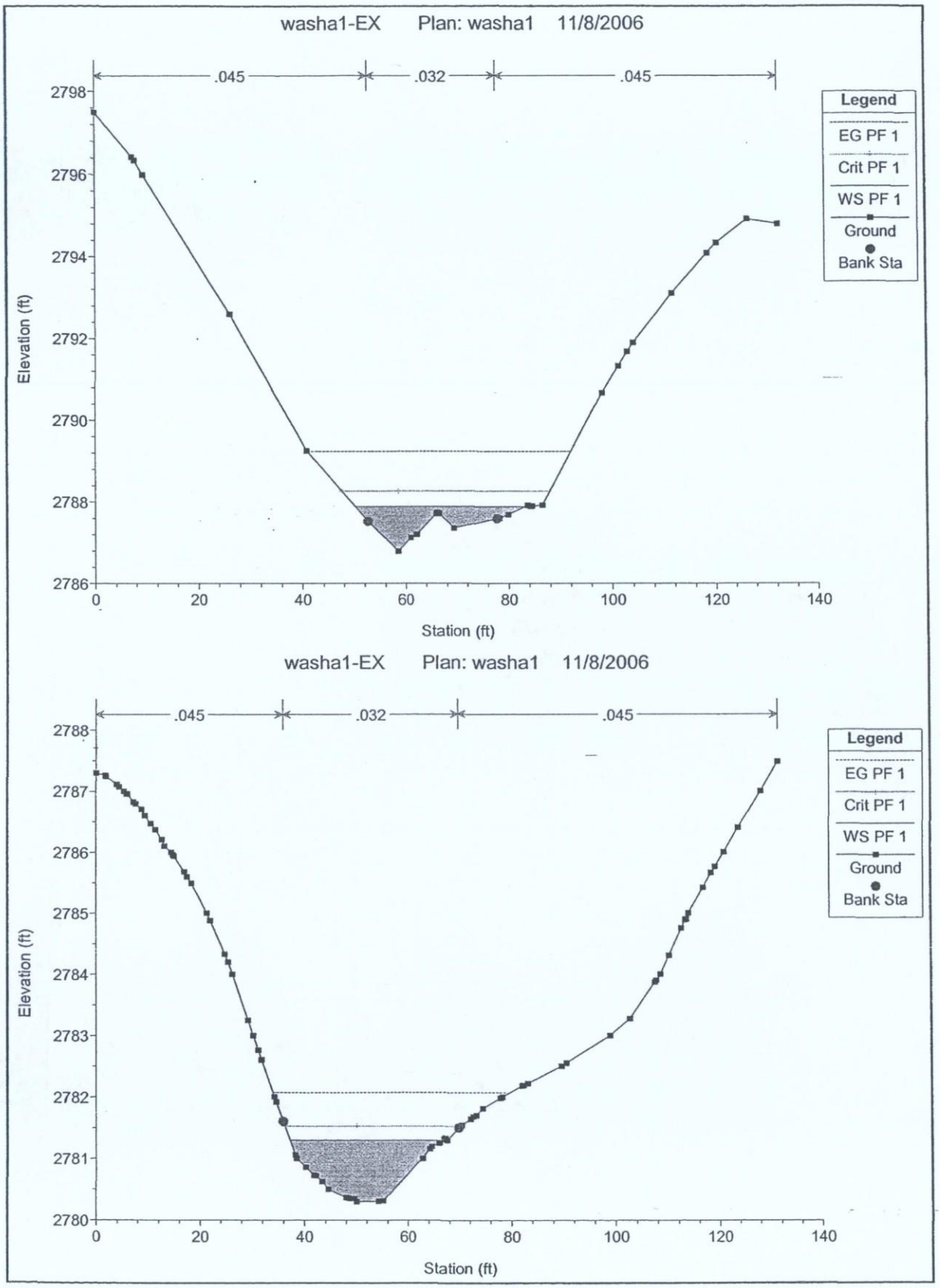
HEC-RAS Output Files

WASH A1

HEC-RAS Plan: wasa1 River: RIVER-1 Reach: Reach-1 Profile: PF 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	6	PF 1	133.00	2797.99	2798.54	2798.61	2798.83	0.050016	5.63	33.66	103.73	1.57
Reach-1	5	PF 1	133.00	2793.20	2794.45	2794.67	2795.20	0.029978	7.35	21.29	31.22	1.38
Reach-1	4	PF 1	133.00	2786.79	2787.89	2788.26	2789.23	0.093236	9.42	15.00	33.03	2.25
Reach-1	3.5	PF 1	133.00	2780.30	2781.30	2781.53	2782.07	0.042079	7.04	18.89	29.62	1.55
Reach-1	3	PF 1	133.00	2777.01	2778.00	2778.20	2778.73	0.041792	7.60	22.37	42.27	1.58
Reach-1	2.5	PF 1	133.00	2772.00	2772.83	2773.19	2773.87	0.067610	8.23	16.36	31.78	1.93
Reach-1	2	PF 1	235.00	2761.68	2763.52	2764.13	2765.42	0.052499	12.11	25.99	37.79	1.92
Reach-1	1.5	PF 1	235.00	2759.00	2760.14	2760.27	2760.65	0.033817	5.69	41.27	75.65	1.36
Reach-1	1	PF 1	235.00	2753.00	2754.30	2754.63	2755.50	0.047422	9.88	33.13	58.31	1.77


washa1-EX Plan: washa1 11/8/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2800.5
2800.0
2799.5
2799.0
2798.5
2798.0
2797.5
0
50
100
150
200
Station (ft)
washa1-EX Plan: washa1 11/8/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2797.0
2796.5
2796.0
2795.5
2795.0
2794.5
2794.0
2793.5
2793.0
0
20
40
60
80
100
Station (ft)


washa1-EX Plan: washa1 11/8/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-EX Plan: washa1 11/8/2006
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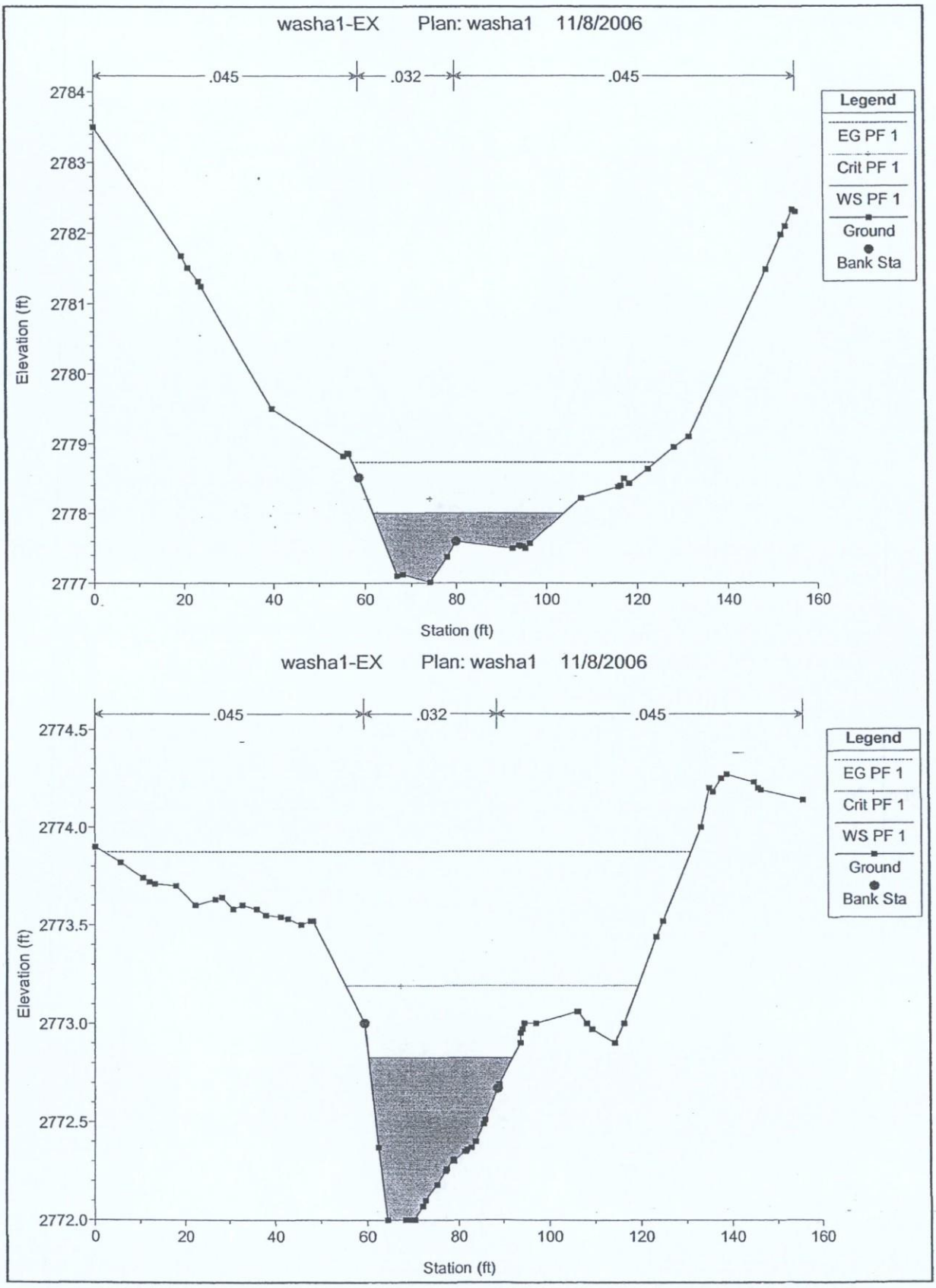
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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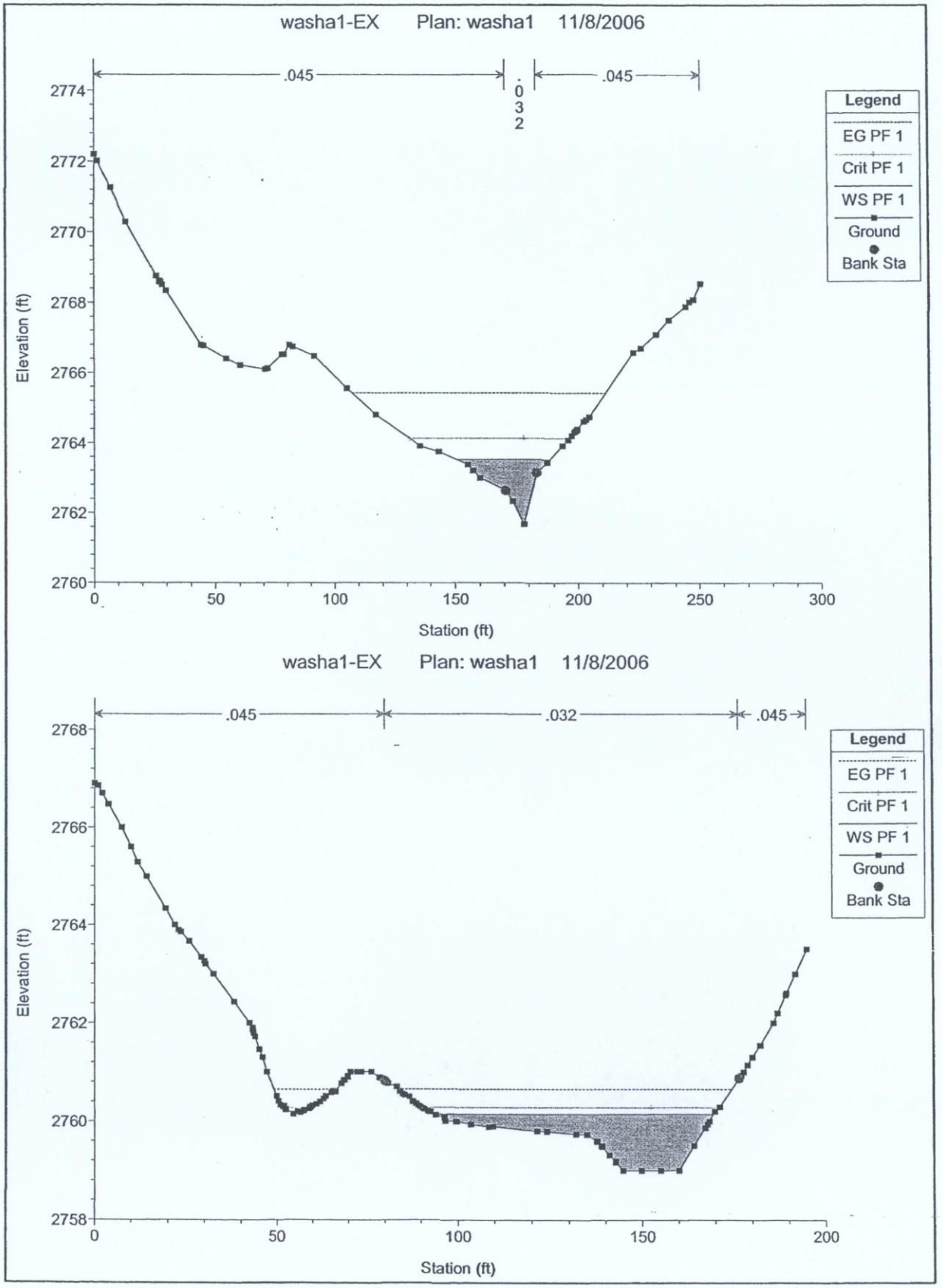
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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100
150
200
250
300
washa1-EX Plan: washa1 11/8/2006
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.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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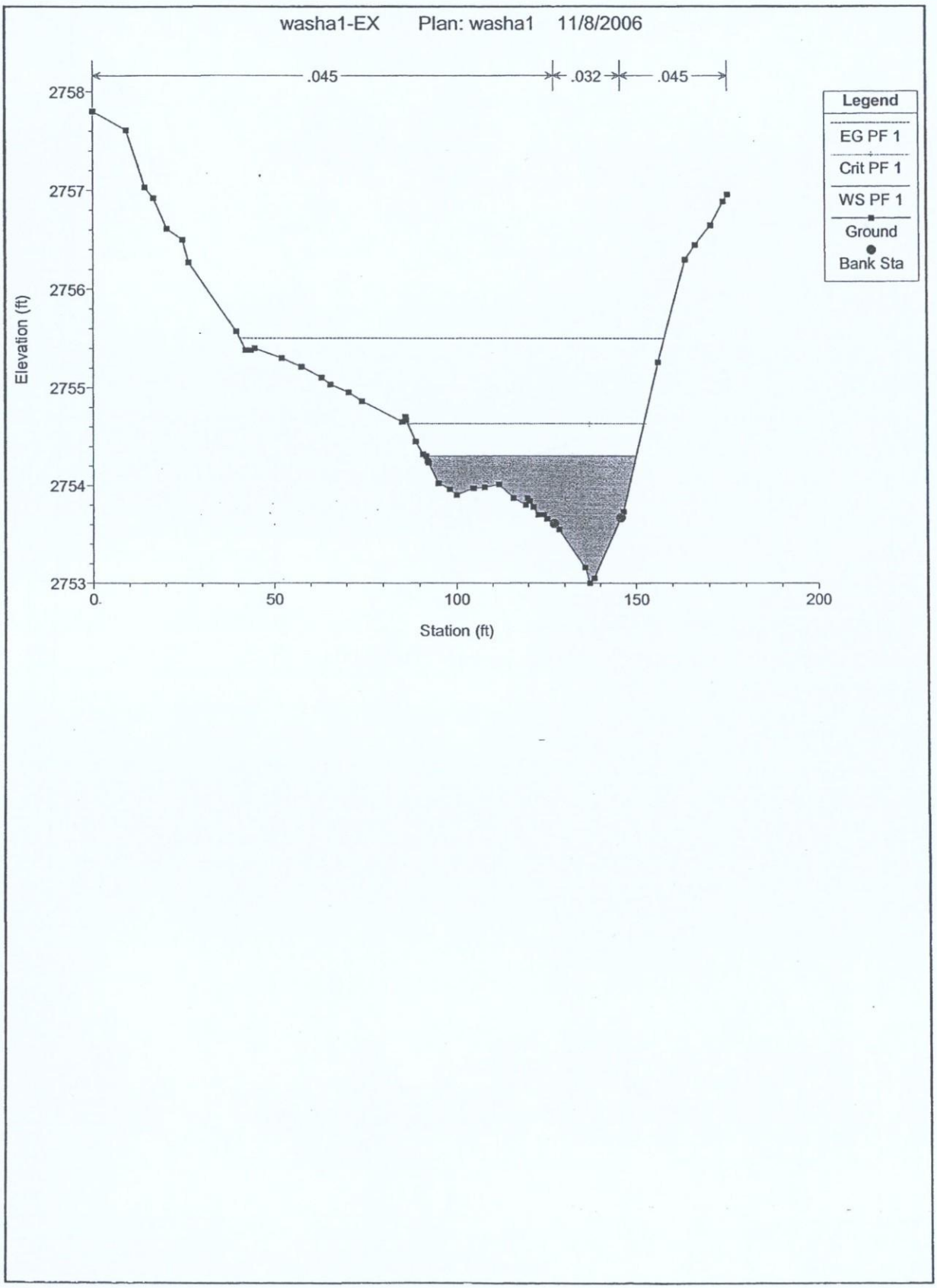
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Elevation (ft)
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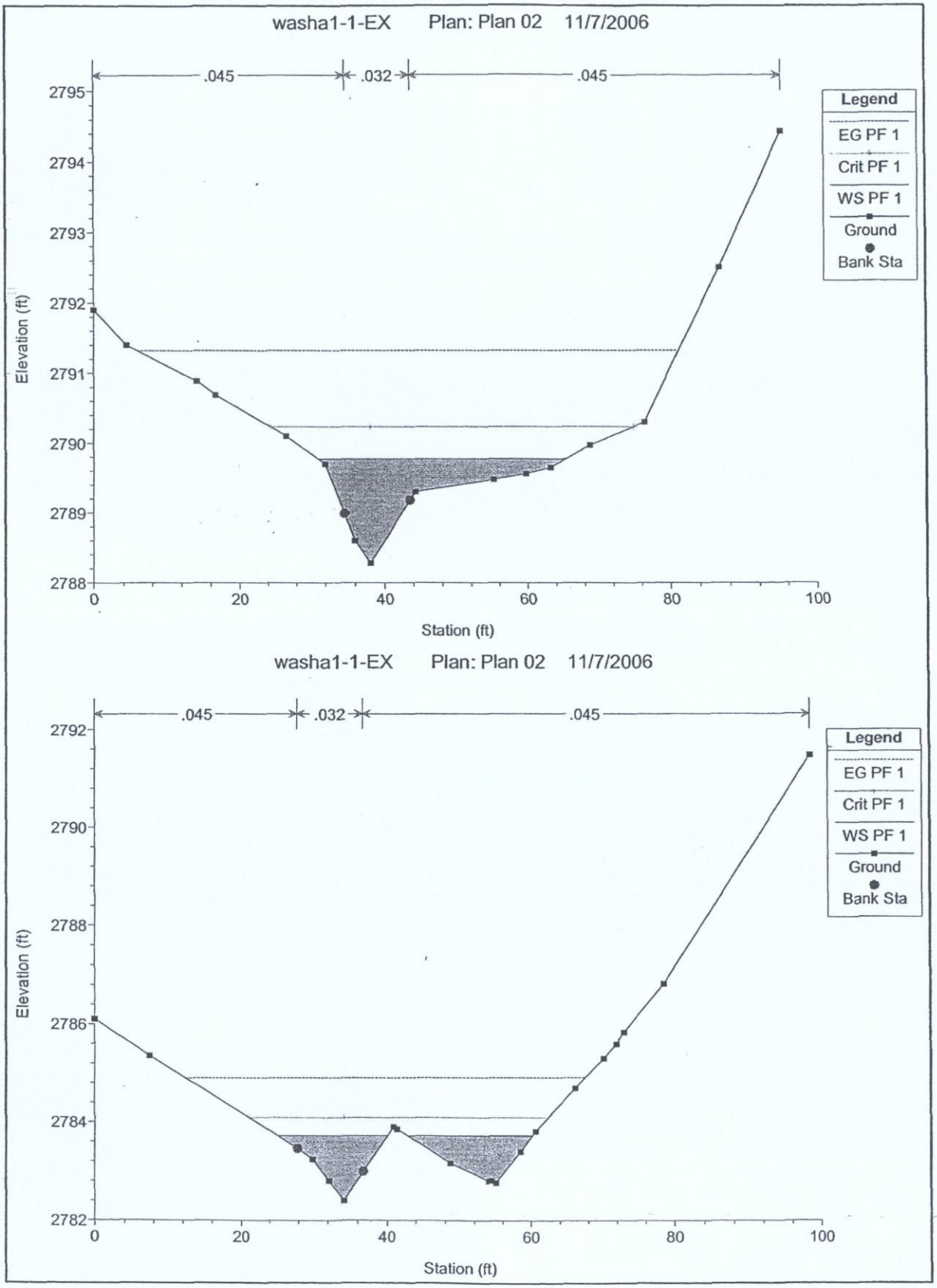
100
150
200
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH A1-1

HEC-RAS Plan: Plan 02 River: RIVER-1 Reach: Reach-1 Profile: PF 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	6	PF 1	133.00	2788.28	2789.77	2790.23	2791.32	0.050087	10.97	17.44	34.33	1.84
Reach-1	5	PF 1	133.00	2782.40	2783.72	2784.08	2784.89	0.068076	10.46	17.98	32.56	2.04
Reach-1	4	PF 1	133.00	2775.92	2777.33	2777.66	2778.36	0.045547	9.75	21.33	41.25	1.72
Reach-1	3	PF 1	133.00	2769.16	2770.48	2771.05	2772.19	0.061709	10.66	13.50	19.67	1.98
Reach-1	2.5	PF 1	133.00	2766.00	2767.19	2767.51	2768.15	0.057608	7.85	16.99	29.16	1.79
Reach-1	2	PF 1	133.00	2761.84	2763.45	2763.69	2764.23	0.028466	7.15	19.39	28.35	1.34
Reach-1	1.5	PF 1	133.00	2759.00	2759.88	2760.03	2760.39	0.048351	5.71	23.31	55.71	1.55
Reach-1	1	PF 1	235.00	2753.00	2754.37	2754.64	2755.33	0.035550	9.07	37.36	60.40	1.55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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-1-EX Plan: Plan 02 11/7/2006
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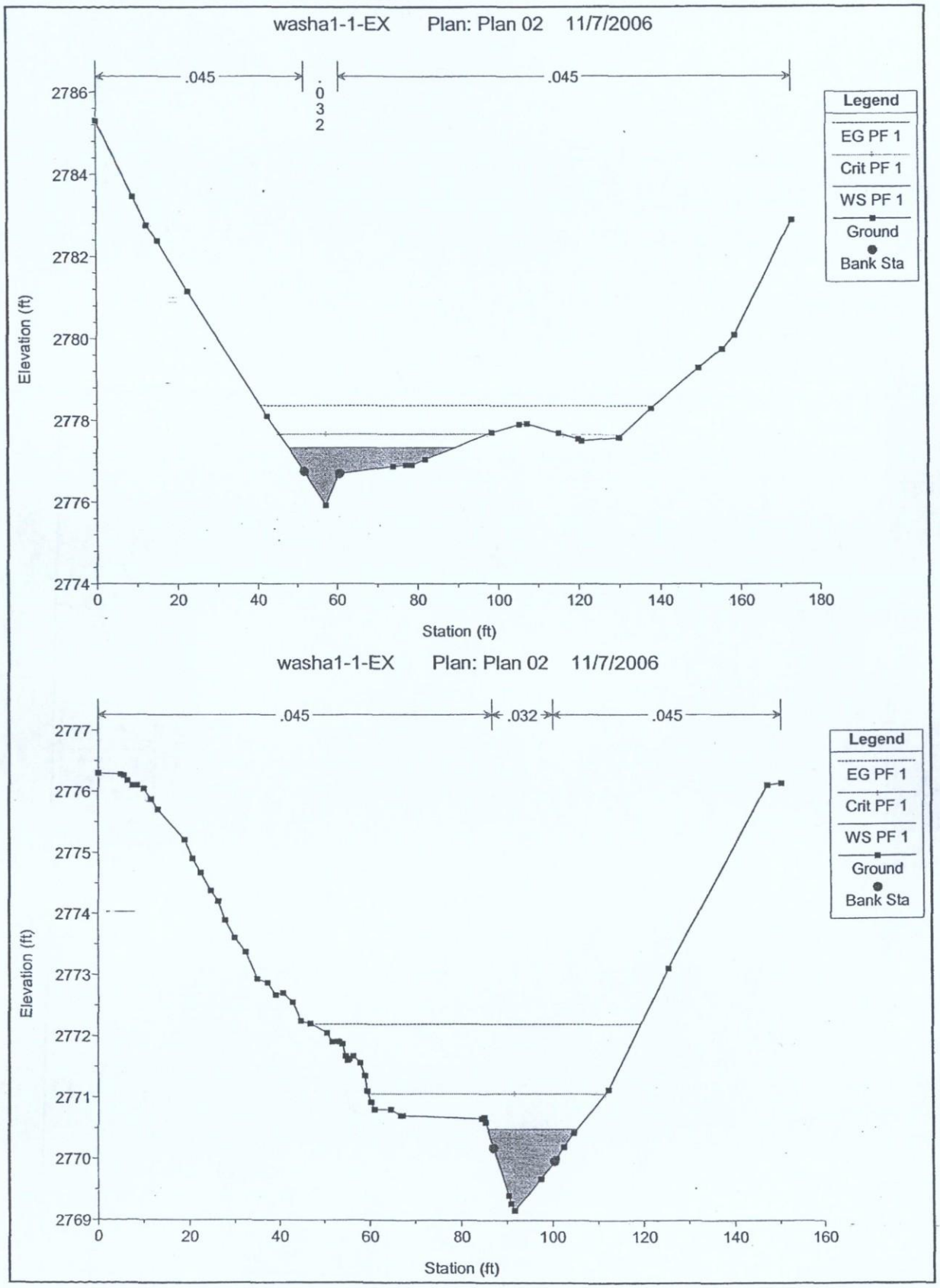
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2784
2782
2780
2778
2776
2774
0
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40
60
80
100
120
140
160
180
washa1-1-EX Plan: Plan 02 11/7/2006
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.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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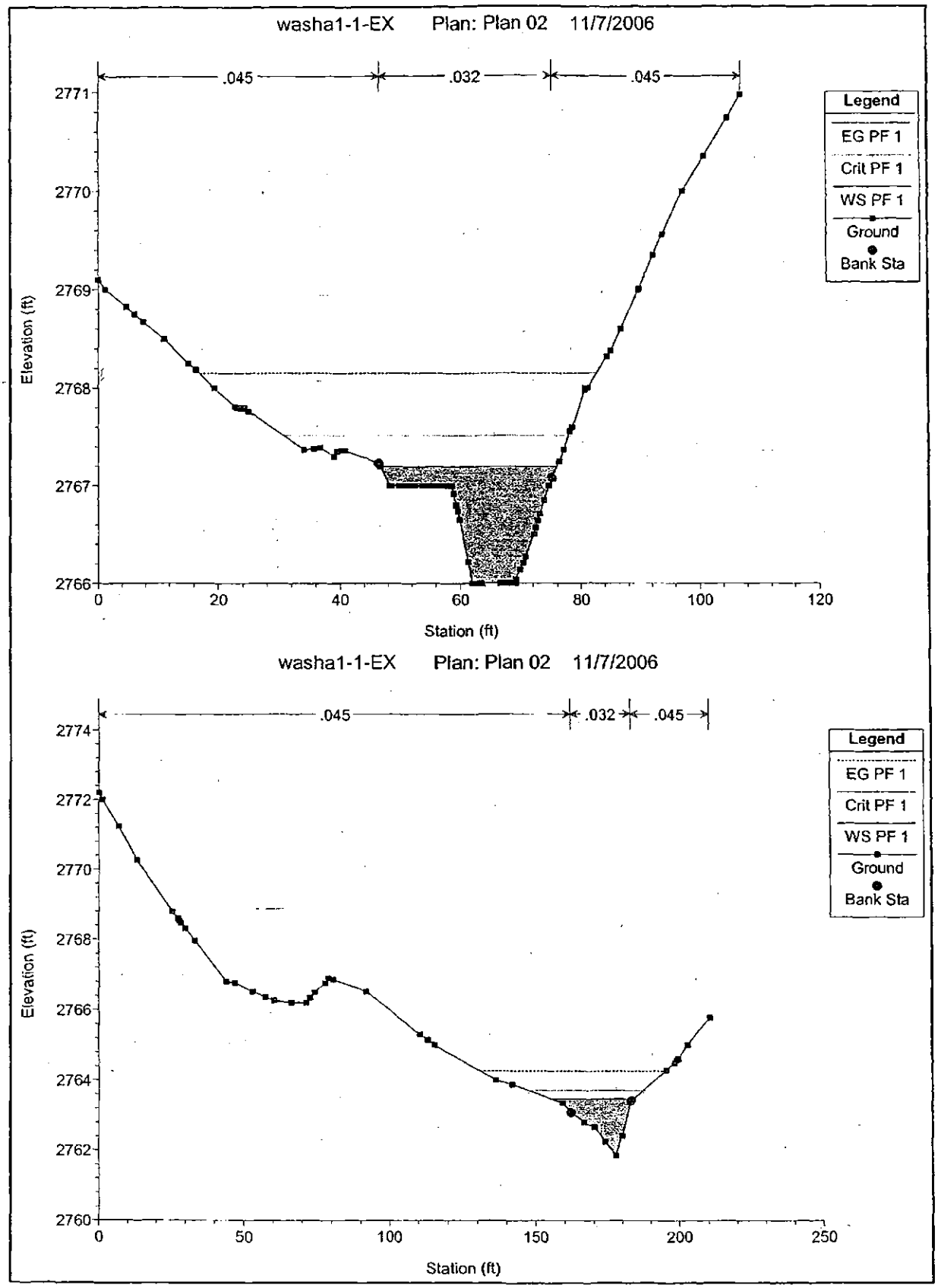
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Legend
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Crit PF 1
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Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-1-EX Plan: Plan 02 11/7/2006
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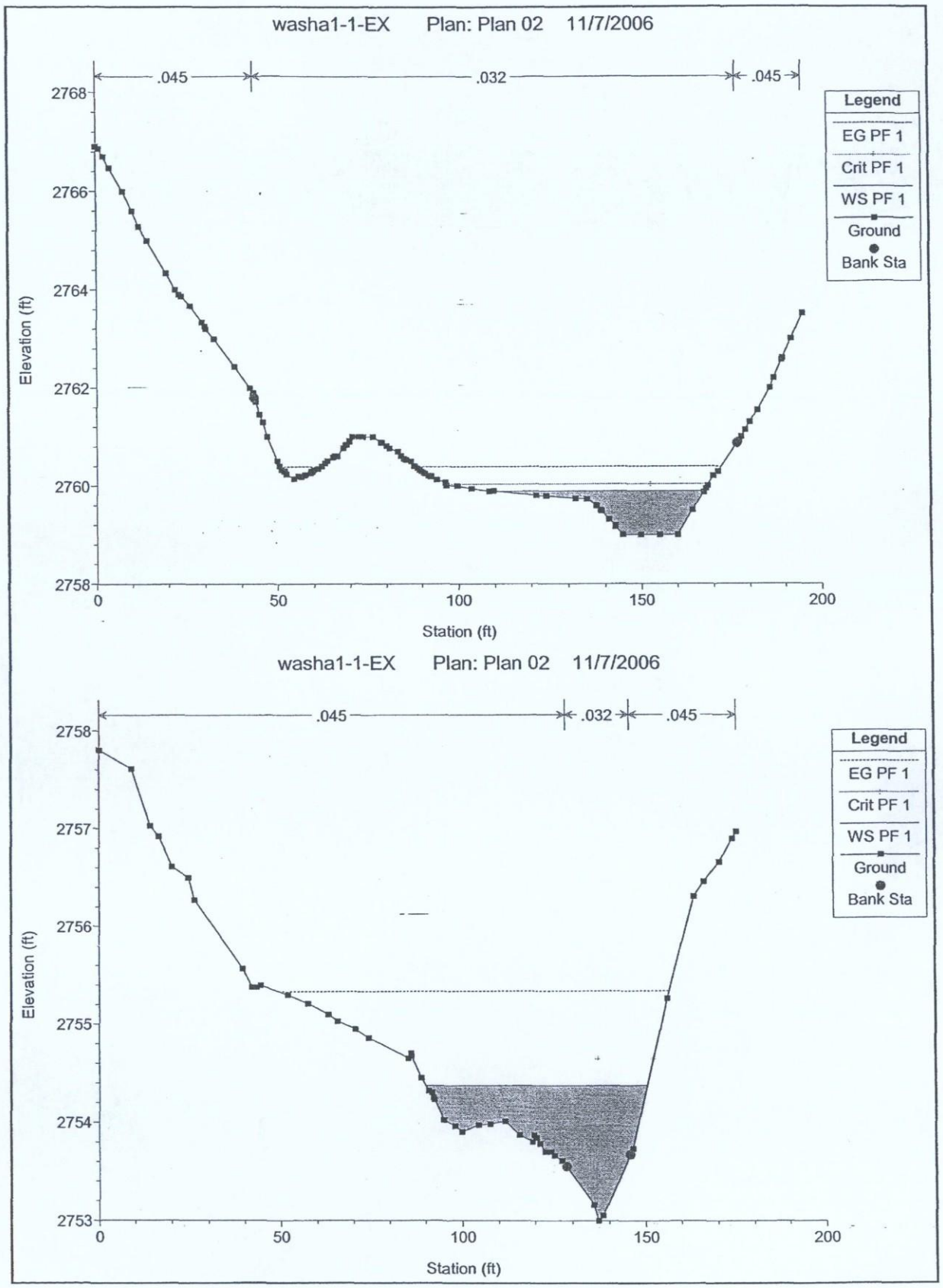
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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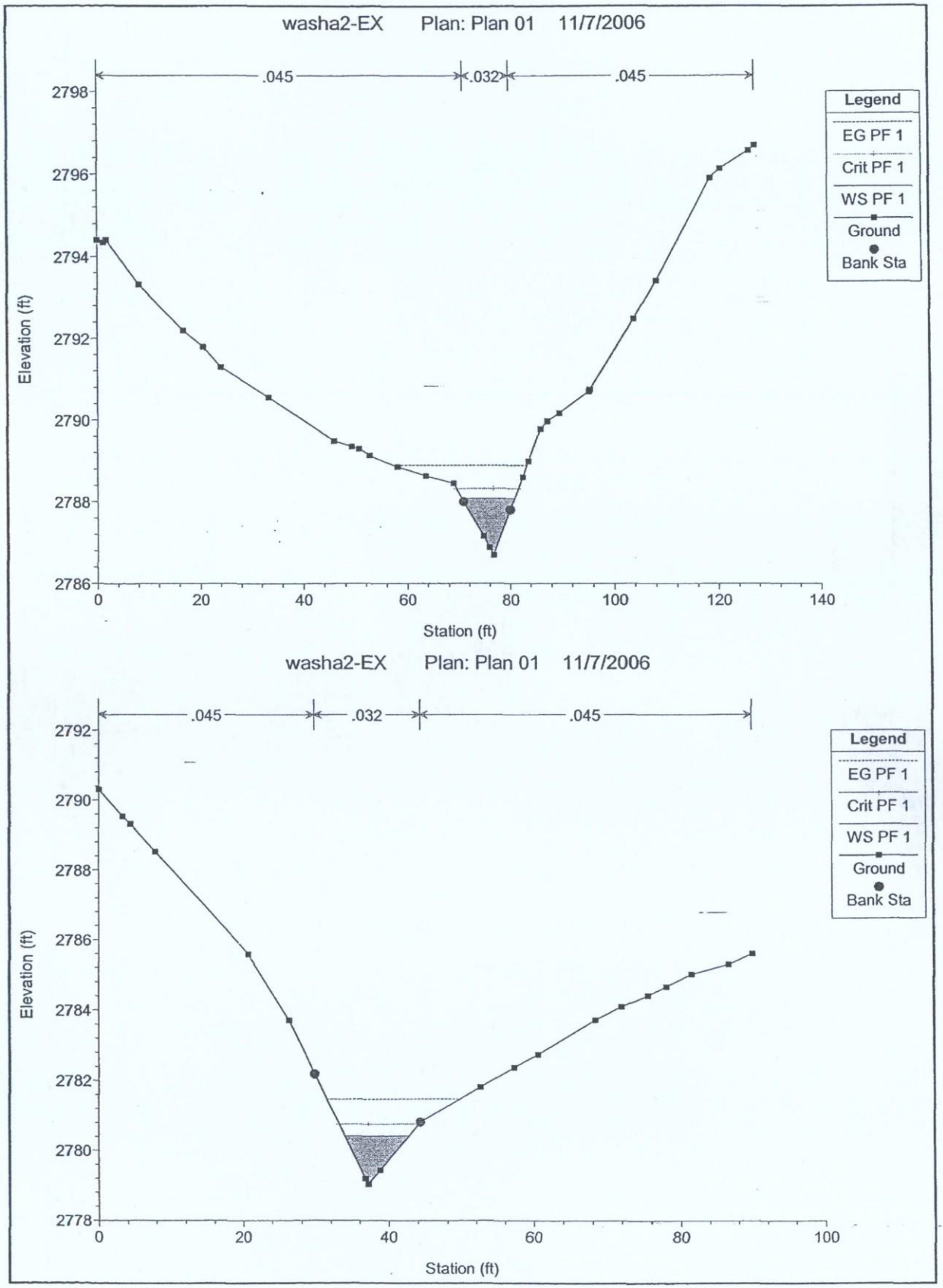
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2768
2766
2764
2762
2760
2758
0
50
100
150
200
washa1-1-EX Plan: Plan 02 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2758
2757
2756
2755
2754
2753
0
50
100
150
200

WASH A2

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1

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	8	PF 1	50.00	2786.70	2788.08	2788.32	2788.89	0.037052	7.25	7.00	10.29	1.47
Reach-1	7	PF 1	50.00	2779.03	2780.41	2780.75	2781.45	0.054930	8.20	6.09	8.86	1.74
Reach-1	6.5	PF 1	50.00	2774.00	2775.12	2775.56	2776.49	0.053771	9.50	5.51	7.56	1.78
Reach-1	6	PF 1	50.00	2769.58	2771.38	2771.63	2772.27	0.035829	7.60	6.58	7.35	1.41
Reach-1	5.5	PF 1	50.00	2766.00	2767.37	2767.82	2768.78	0.045155	9.98	5.95	8.05	1.70
Reach-1	5	PF 1	65.00	2760.85	2762.45	2762.98	2764.14	0.060416	10.47	6.36	7.80	1.89
Reach-1	4	PF 1	65.00	2754.30	2756.01	2756.26	2756.93	0.034820	7.73	8.44	9.82	1.44
Reach-1	3	PF 1	65.00	2749.02	2750.53	2750.80	2751.42	0.041151	7.55	8.61	11.61	1.55
Reach-1	2	PF 1	109.00	2742.10	2743.52	2743.88	2744.58	0.039966	8.35	13.80	21.60	1.58
Reach-1	1.5	PF 1	109.00	2739.00	2740.27	2740.51	2741.01	0.023936	7.10	18.25	35.03	1.29
Reach-1	1	PF 1	109.00	2733.30	2734.60	2735.10	2736.05	0.078453	9.68	11.58	21.73	2.12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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa2-EX Plan: Plan 01 11/7/2006
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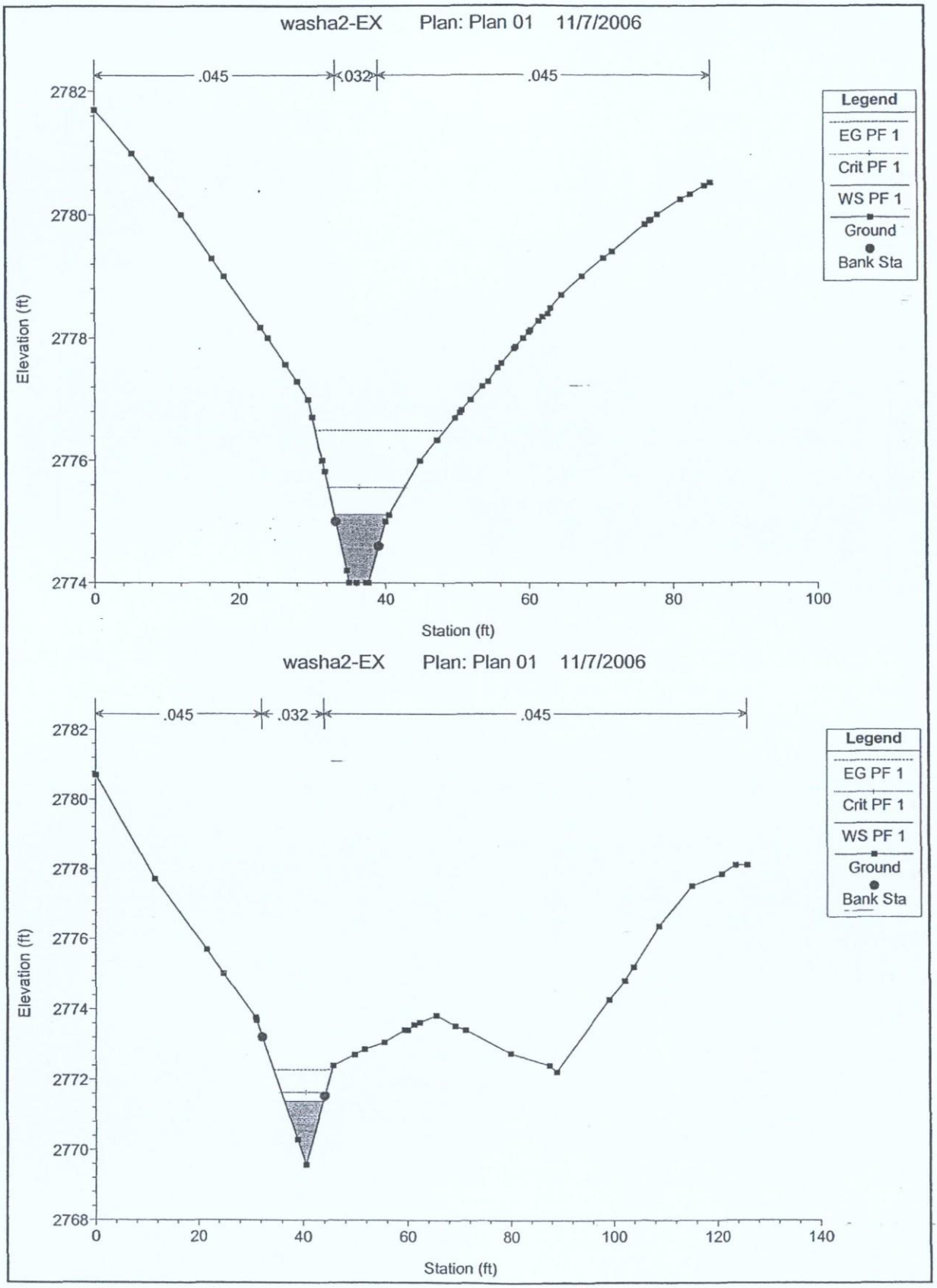
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Elevation (ft)
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80
100
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washa2-EX Plan: Plan 01 11/7/2006
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.032
.045
2782
2780
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2774
2772
2770
2768
Elevation (ft)
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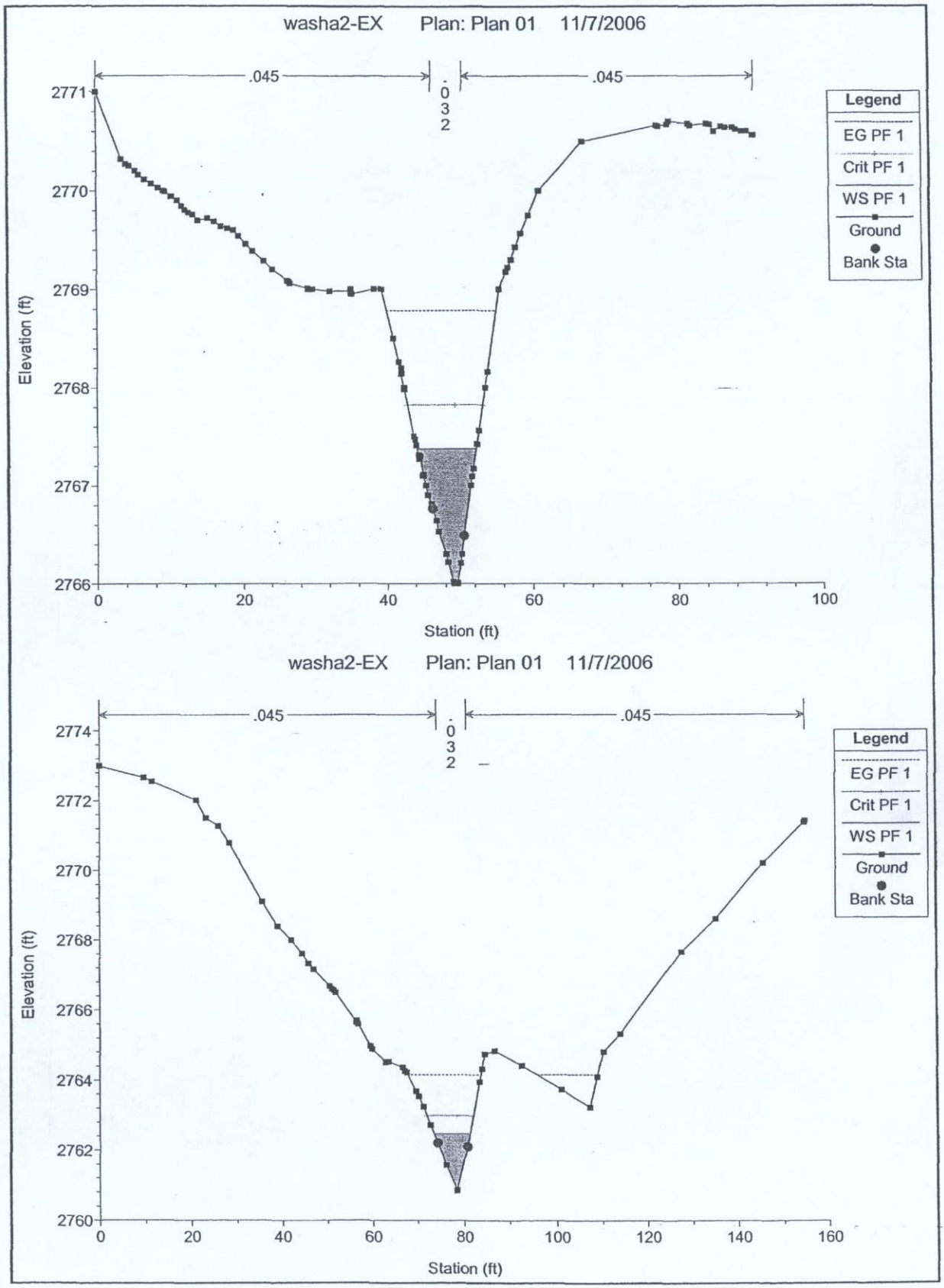
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Crit PF 1
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Ground
Bank Sta
Elevation (ft)
Station (ft)
washa2-EX Plan: Plan 01 11/7/2006
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Crit PF 1
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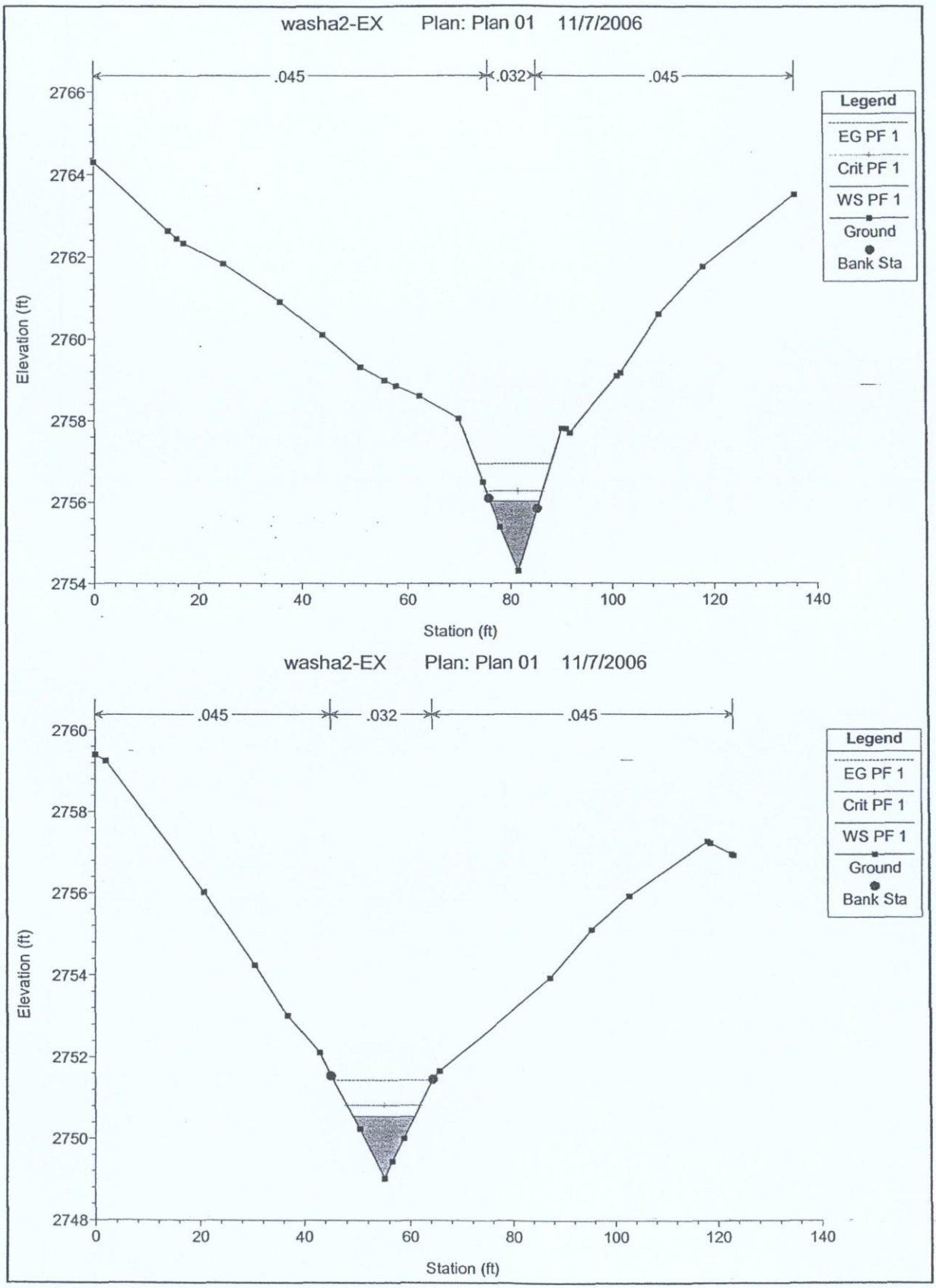
Ground
Bank Sta
Elevation (ft)
Station (ft)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Ground
Bank Sta
Elevation (ft)
Station (ft)
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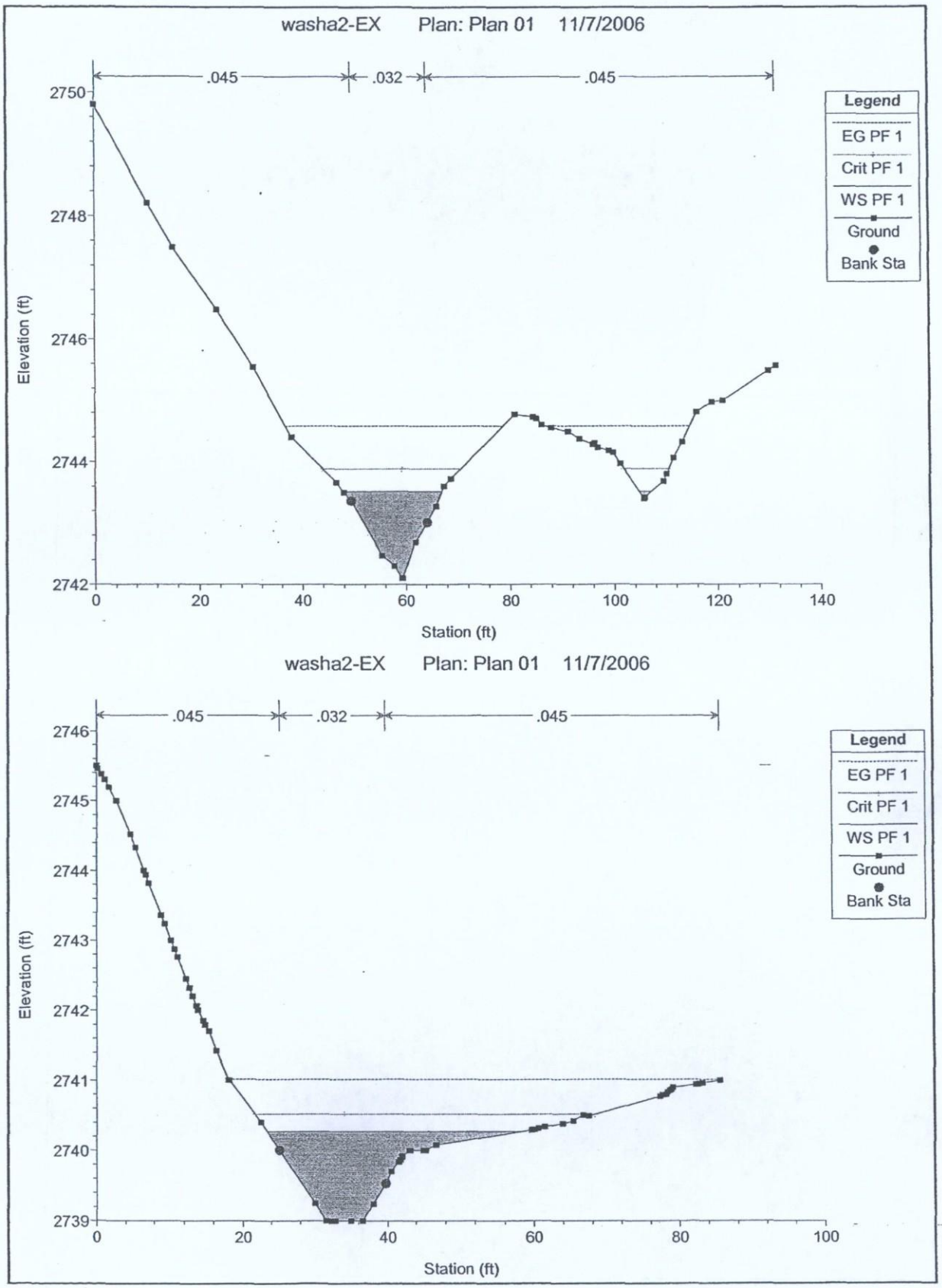
Elevation (ft)
Station (ft)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Elevation (ft)
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120
140
Station (ft)
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
washa2-EX Plan: Plan 01 11/7/2006
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2746
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2740
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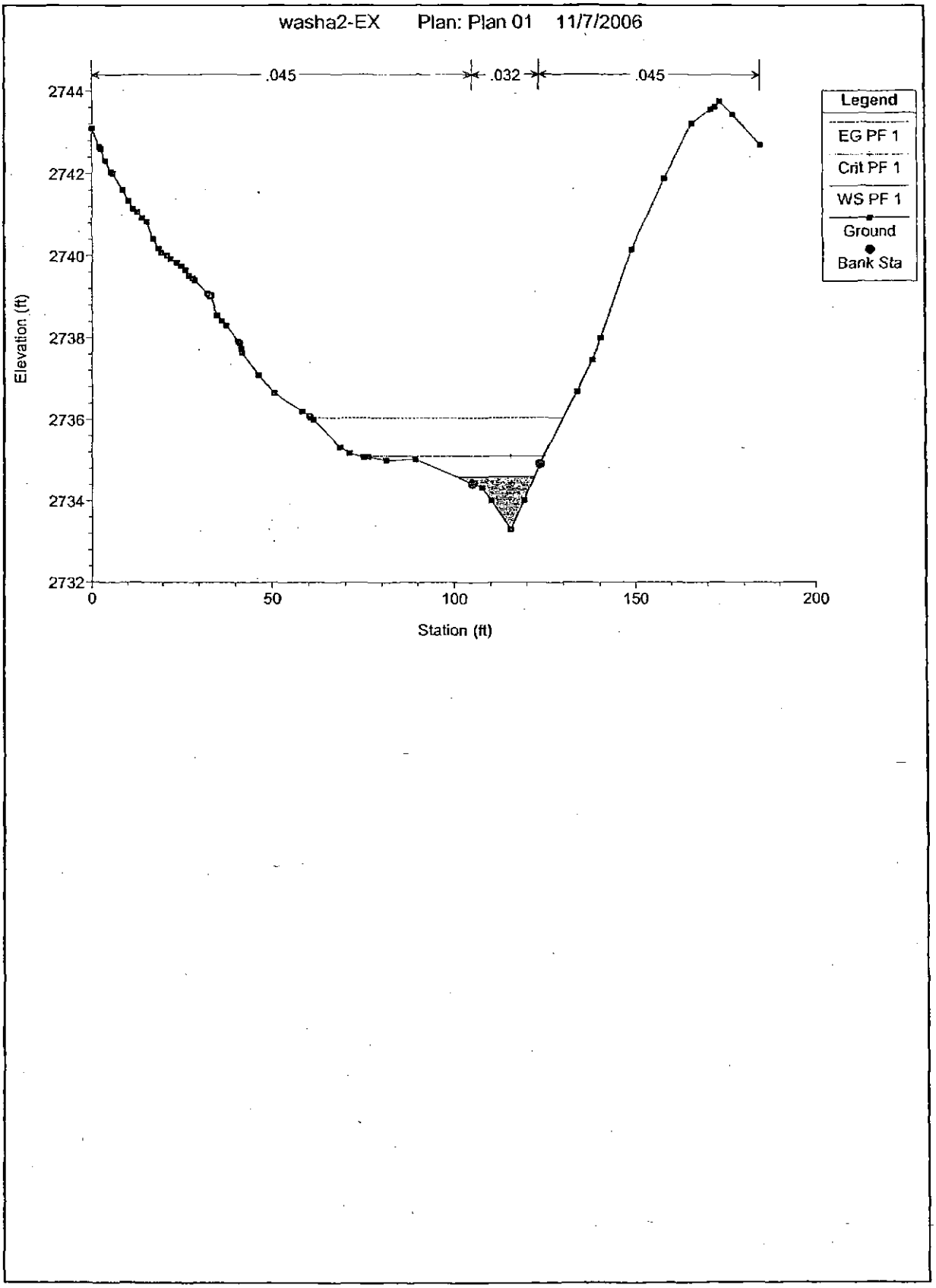
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Legend
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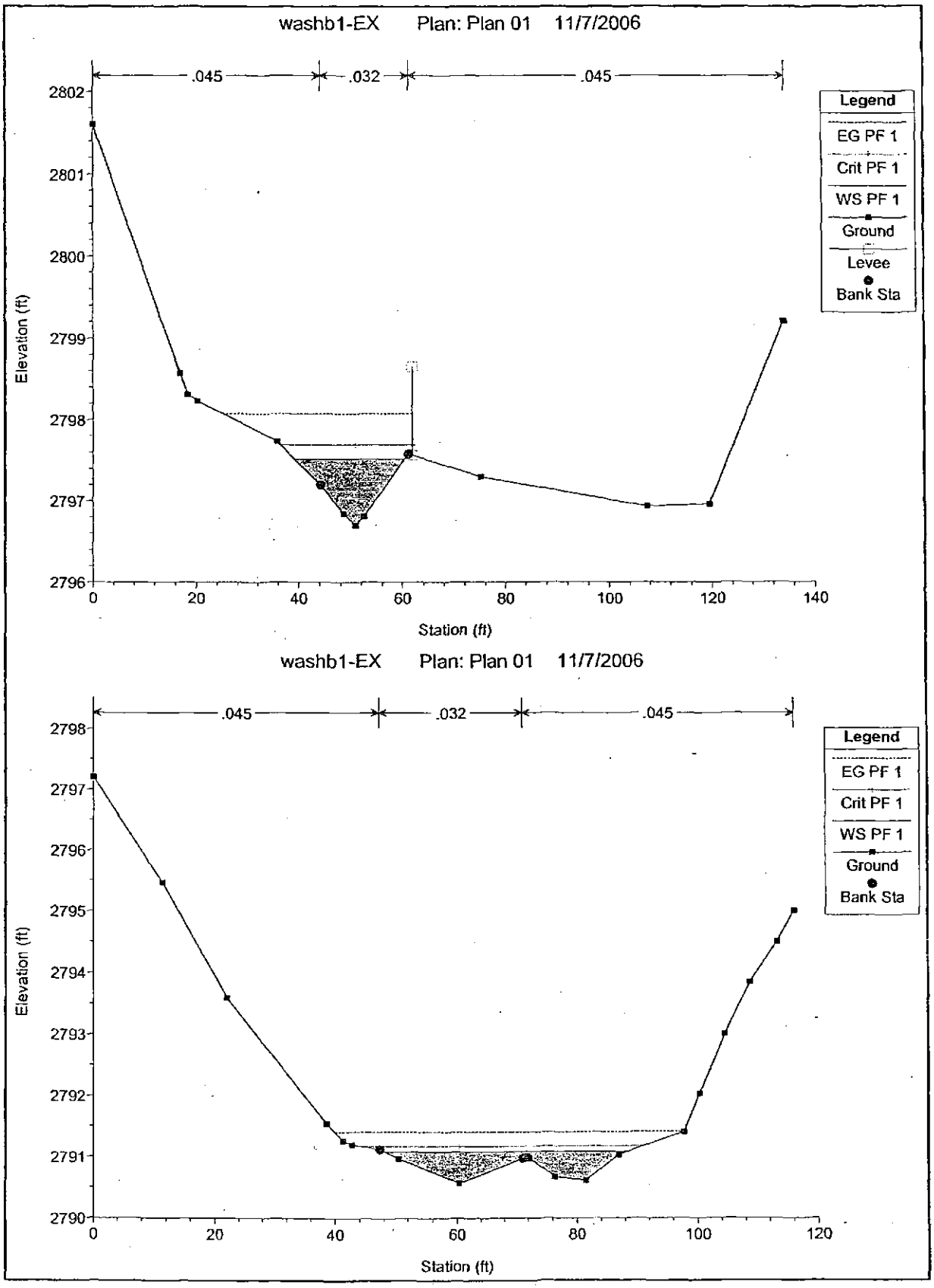
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2744
2742
2740
2738
2736
2734
2732
0
50
100
150
200
Station (ft)

WASH B1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1

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	9	PF 1	50.00	2796.70	2797.52	2797.69	2798.08	0.045030	6.09	8.74	21.32	1.54
Reach-1	8	PF 1	50.00	2790.57	2791.08	2791.17	2791.40	0.059767	4.94	11.57	40.41	1.62
Reach-1	7	PF 1	50.00	2785.37	2786.03	2786.15	2786.38	0.048169	4.80	10.80	39.56	1.49
Reach-1	6.5	PF 1	50.00	2780.43	2780.99	2781.13	2781.43	0.065773	5.37	9.31	30.67	1.72
Reach-1	6	PF 1	50.00	2776.08	2776.54	2776.59	2776.81	0.033697	4.19	11.94	34.58	1.26
Reach-1	5	PF 1	65.00	2771.10	2771.91	2772.14	2772.65	0.053926	7.02	10.88	49.99	1.70
Reach-1	4.5	PF 1	65.00	2768.38	2768.90	2769.02	2769.32	0.046654	5.18	12.54	33.73	1.50
Reach-1	4	PF 1	65.00	2764.68	2765.43	2765.61	2766.02	0.043096	7.04	12.39	29.28	1.57
Reach-1	3	PF 1	65.00	2759.60	2760.51	2760.70	2761.15	0.041337	6.54	10.57	22.11	1.52
Reach-1	2	PF 1	83.00	2754.10	2754.86	2755.04	2755.46	0.046948	6.27	13.96	33.71	1.57
Reach-1	1	PF 1	204.00	2745.67	2747.01	2747.17	2747.53	0.048666	7.85	40.82	87.83	1.67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Legend
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Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
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Legend
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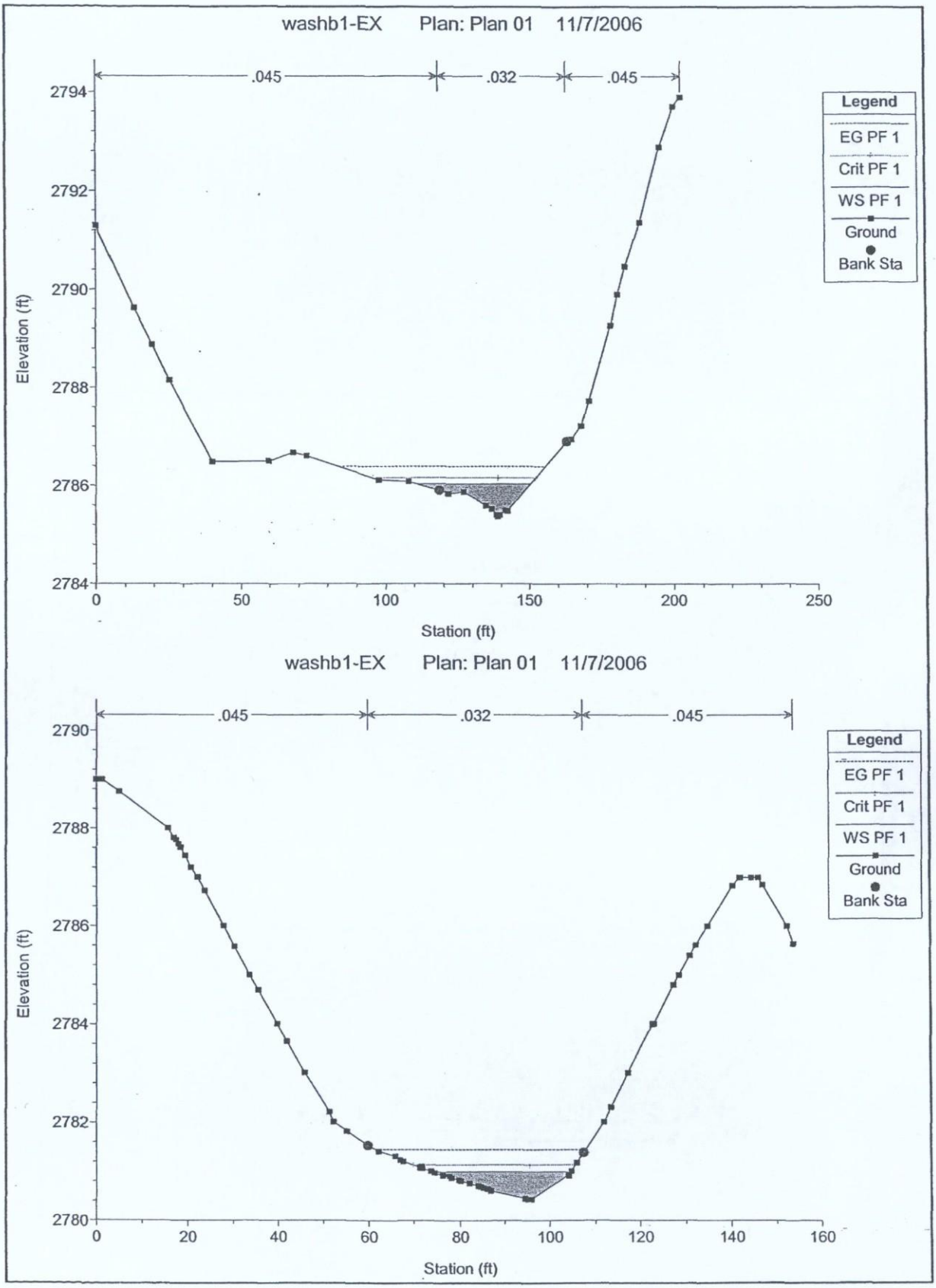
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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2784
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100
150
200
250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washb1-EX Plan: Plan 01 11/7/2006
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.032
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2790
2788
2786
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2782
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Elevation (ft)
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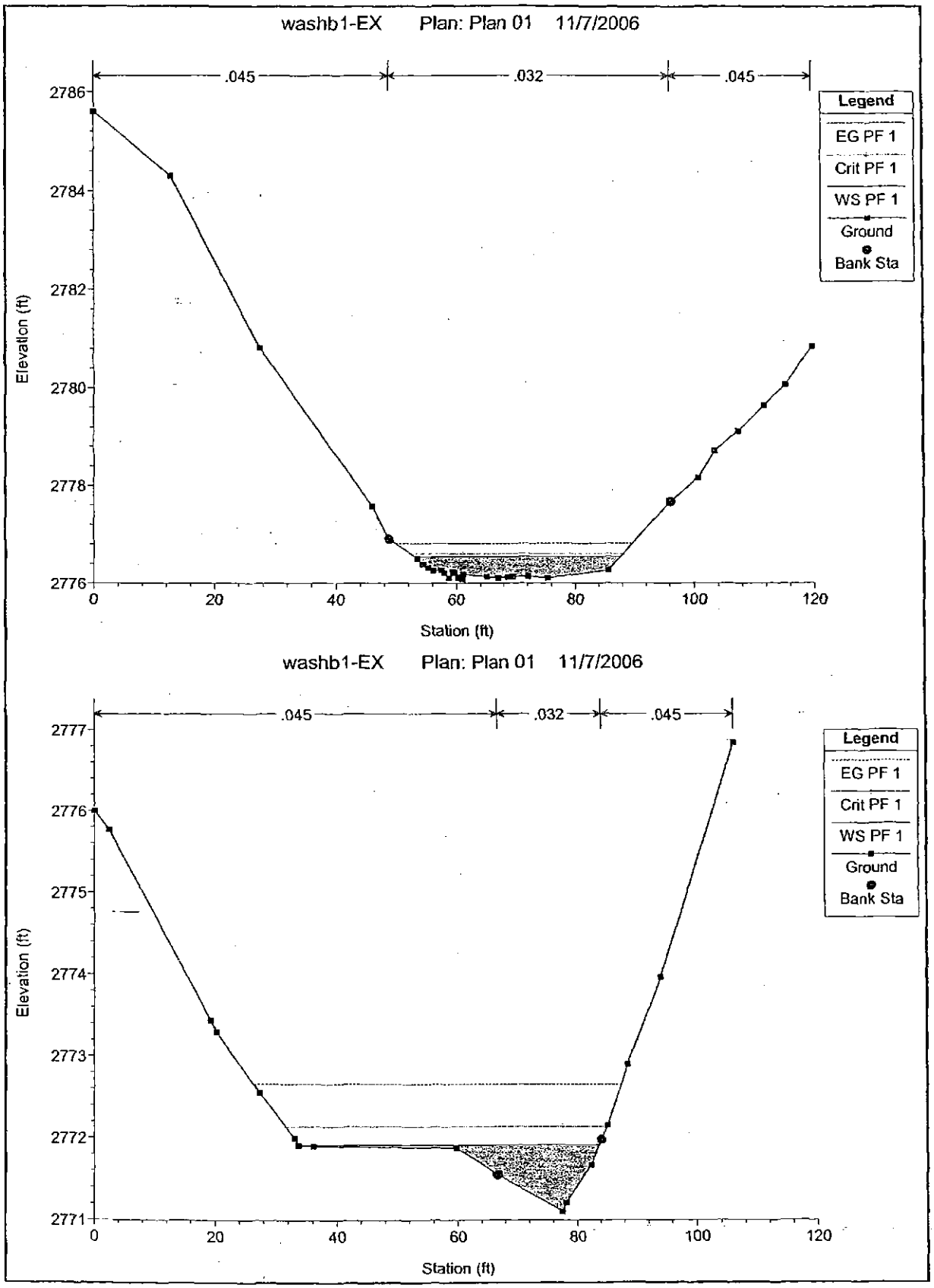
100
120
140
160
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Ground
Bank Sta
Elevation (ft)
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2782
2780
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2776
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20
40
60
80
100
120
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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20
40
60
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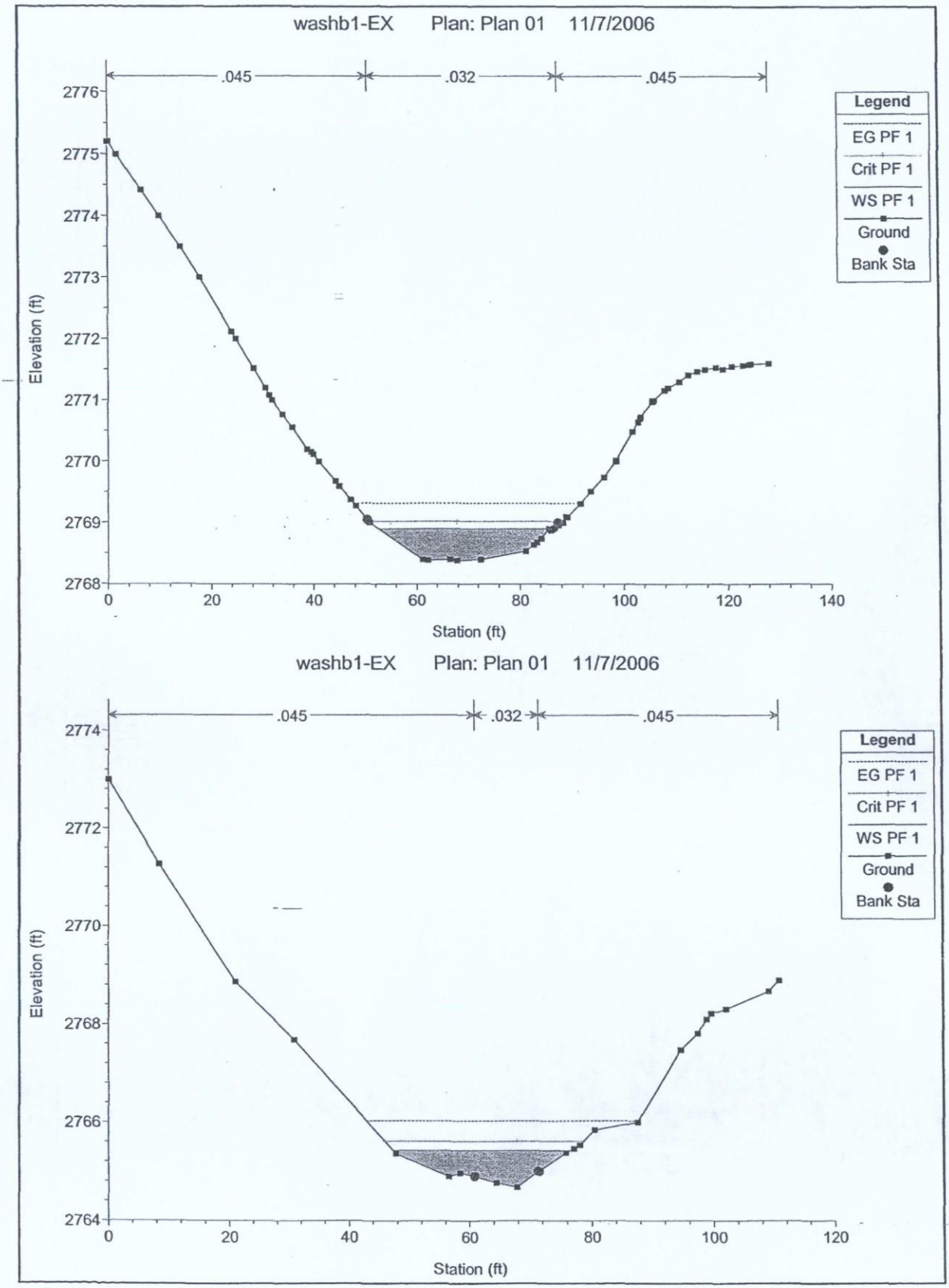
100
120
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
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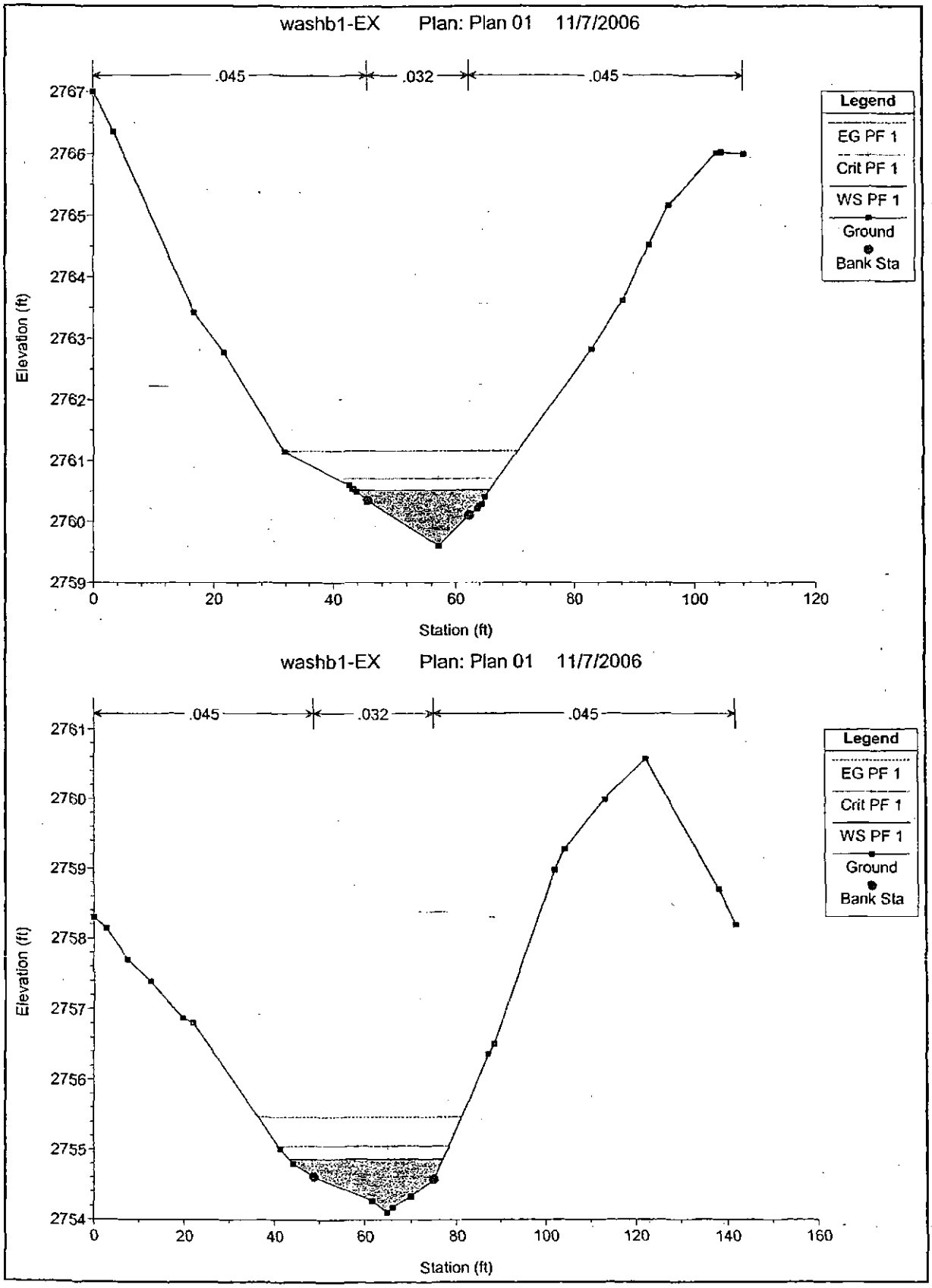
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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Ground
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
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Legend
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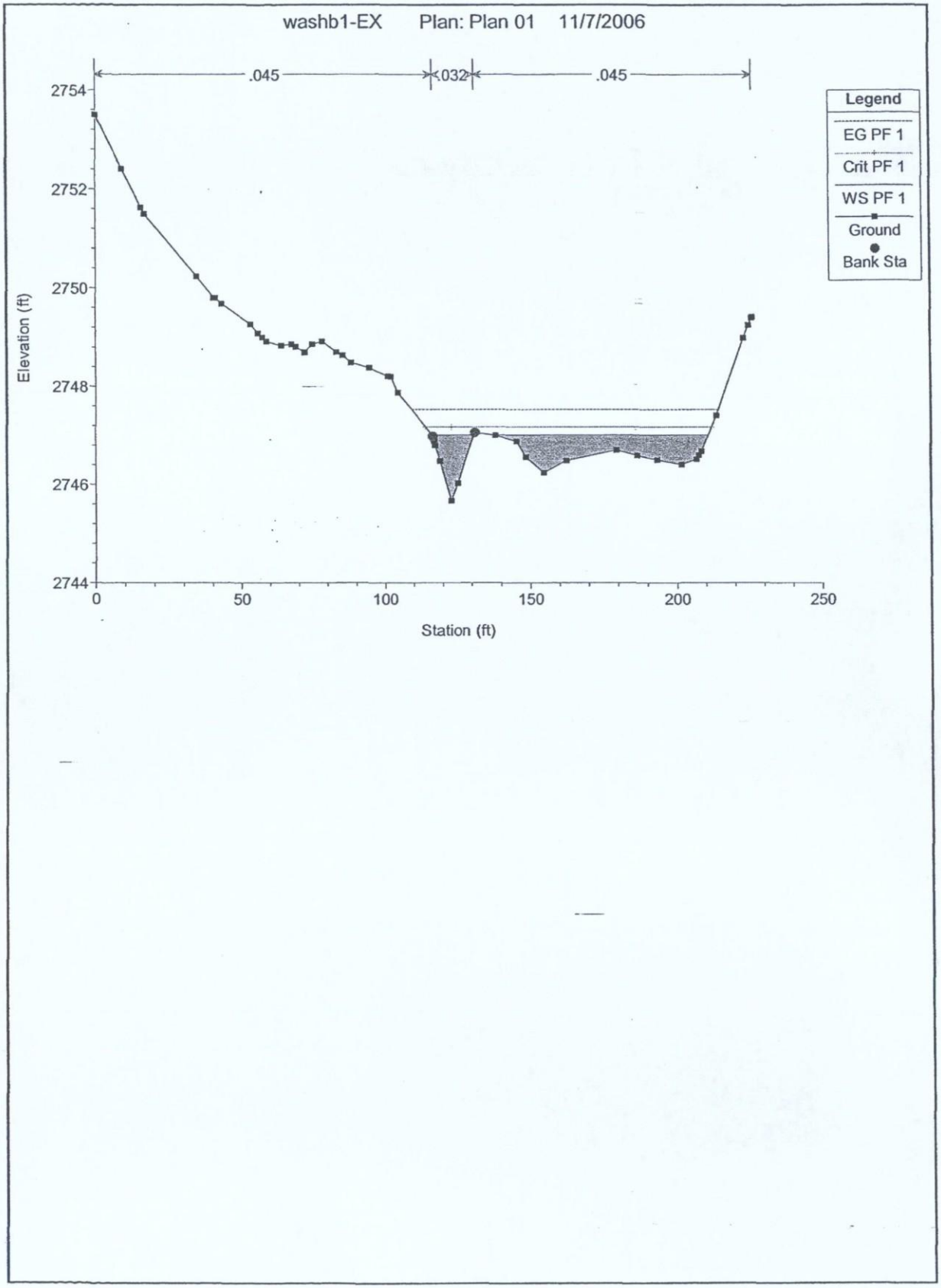
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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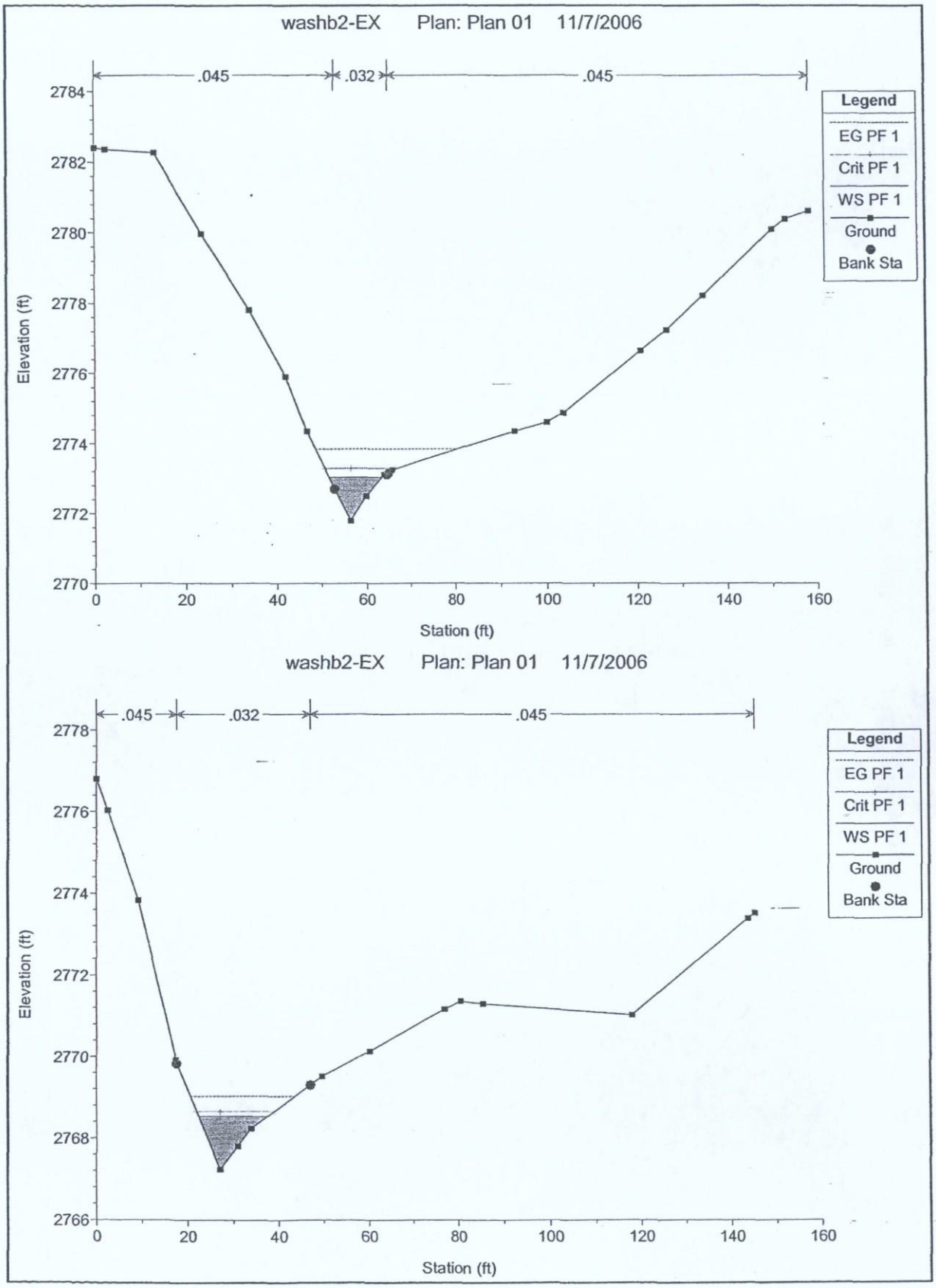
2754
2752
2750
2748
2746
2744
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH B2

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	5	PF 1	50.00	2771.78	2773.02	2773.28	2773.84	0.045021	7.27	7.03	11.78	1.59
Reach-1	4	PF 1	50.00	2767.23	2768.51	2768.64	2769.01	0.030968	5.67	8.82	15.02	1.30
Reach-1	3.5	PF 1	50.00	2765.00	2765.78	2765.88	2766.22	0.029393	5.31	9.41	17.14	1.26
Reach-1	3	PF 1	126.00	2762.00	2762.76	2762.84	2763.13	0.035706	4.66	25.91	62.70	1.33
Reach-1	2.5	PF 1	126.00	2759.70	2760.27	2760.30	2760.53	0.024149	4.17	31.63	79.13	1.11
Reach-1	2	PF 1	126.00	2755.39	2756.77	2757.08	2757.69	0.044435	7.69	16.51	26.88	1.68
Reach-1	1.5	PF 1	126.00	2753.00	2754.56	2754.82	2755.36	0.022867	8.53	24.06	38.24	1.29
Reach-1	1	PF 1	204.00	2745.67	2747.03	2747.17	2747.50	0.043743	7.55	42.67	90.73	1.59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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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.032
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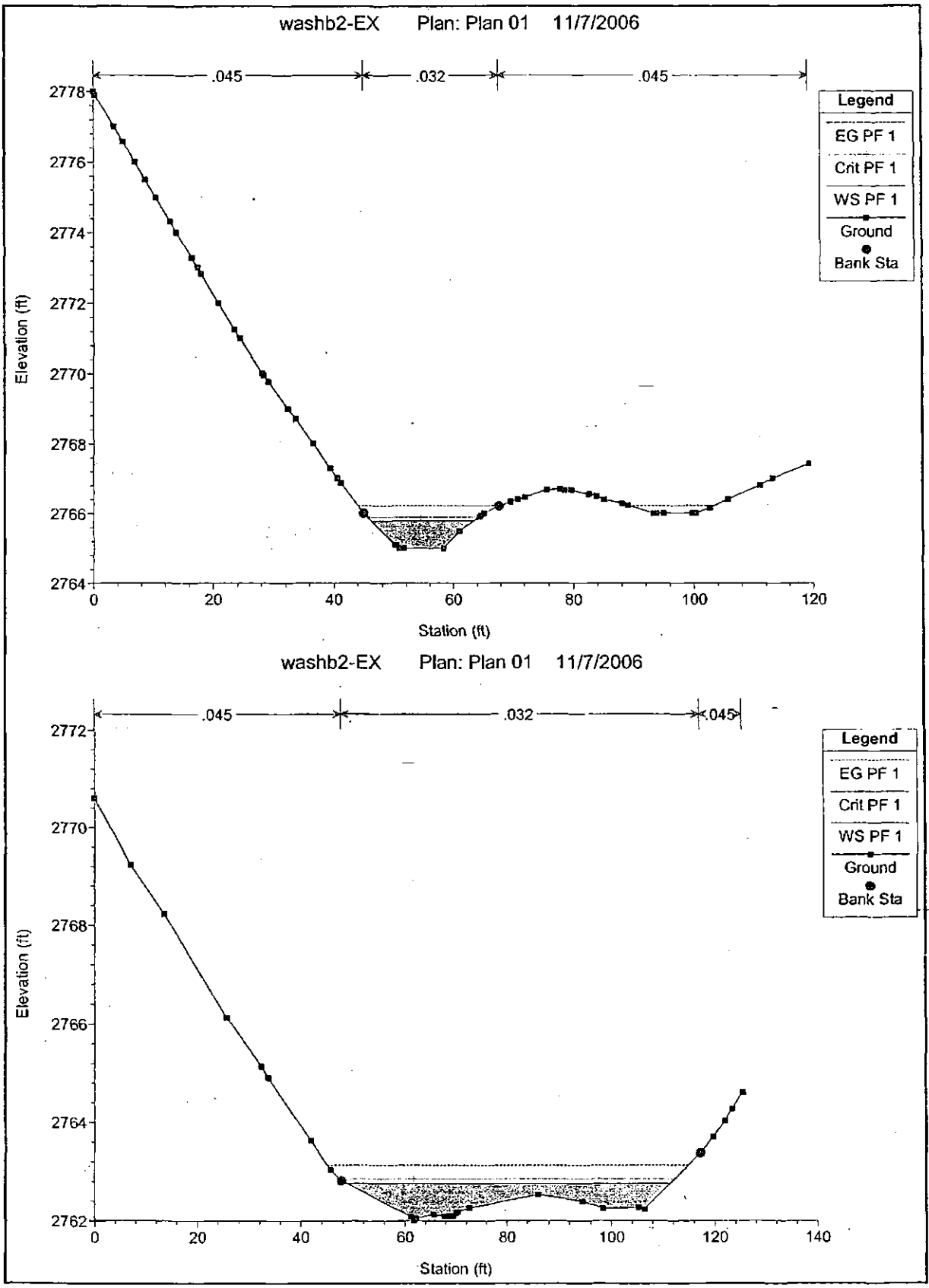
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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Legend
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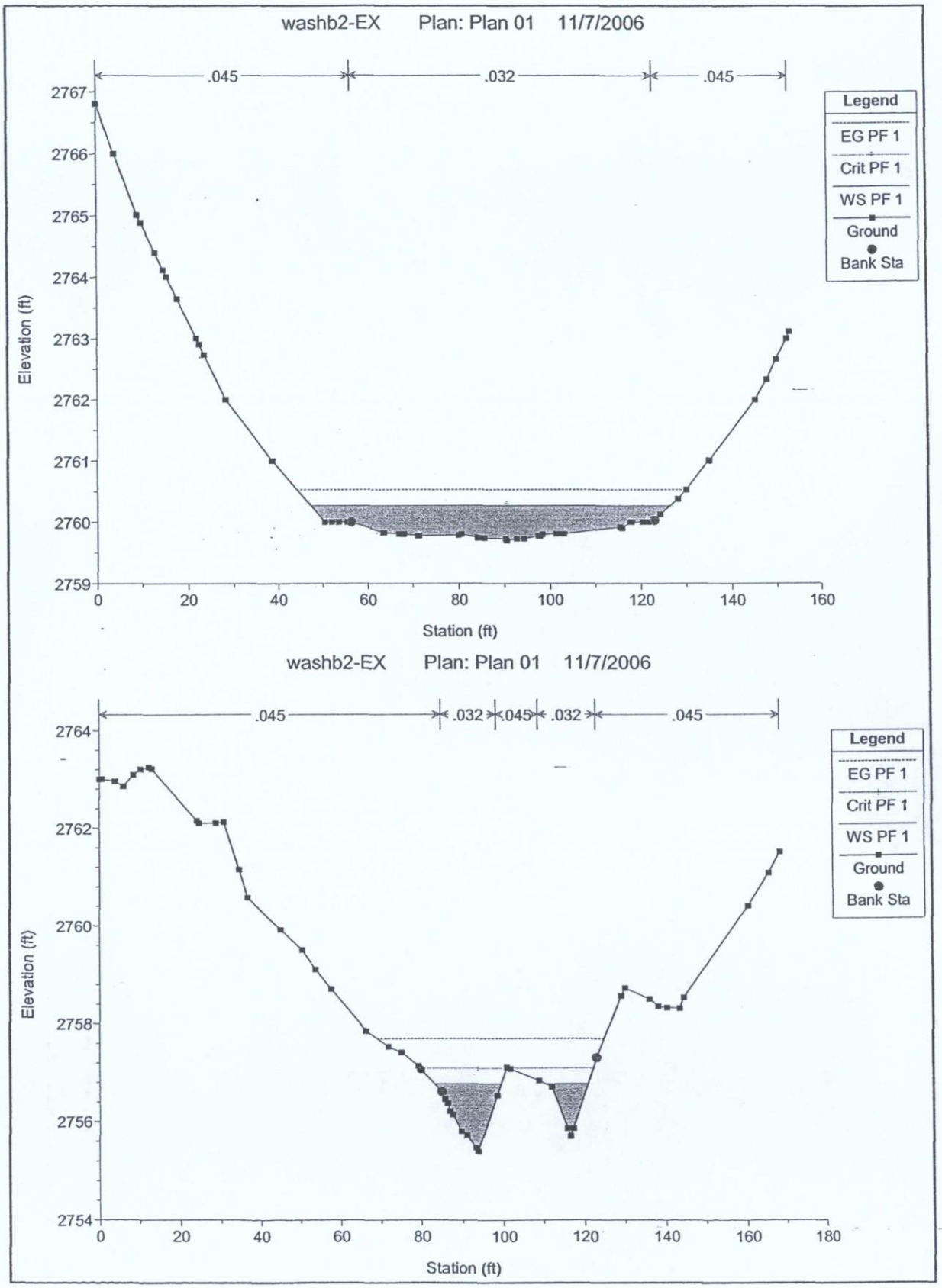
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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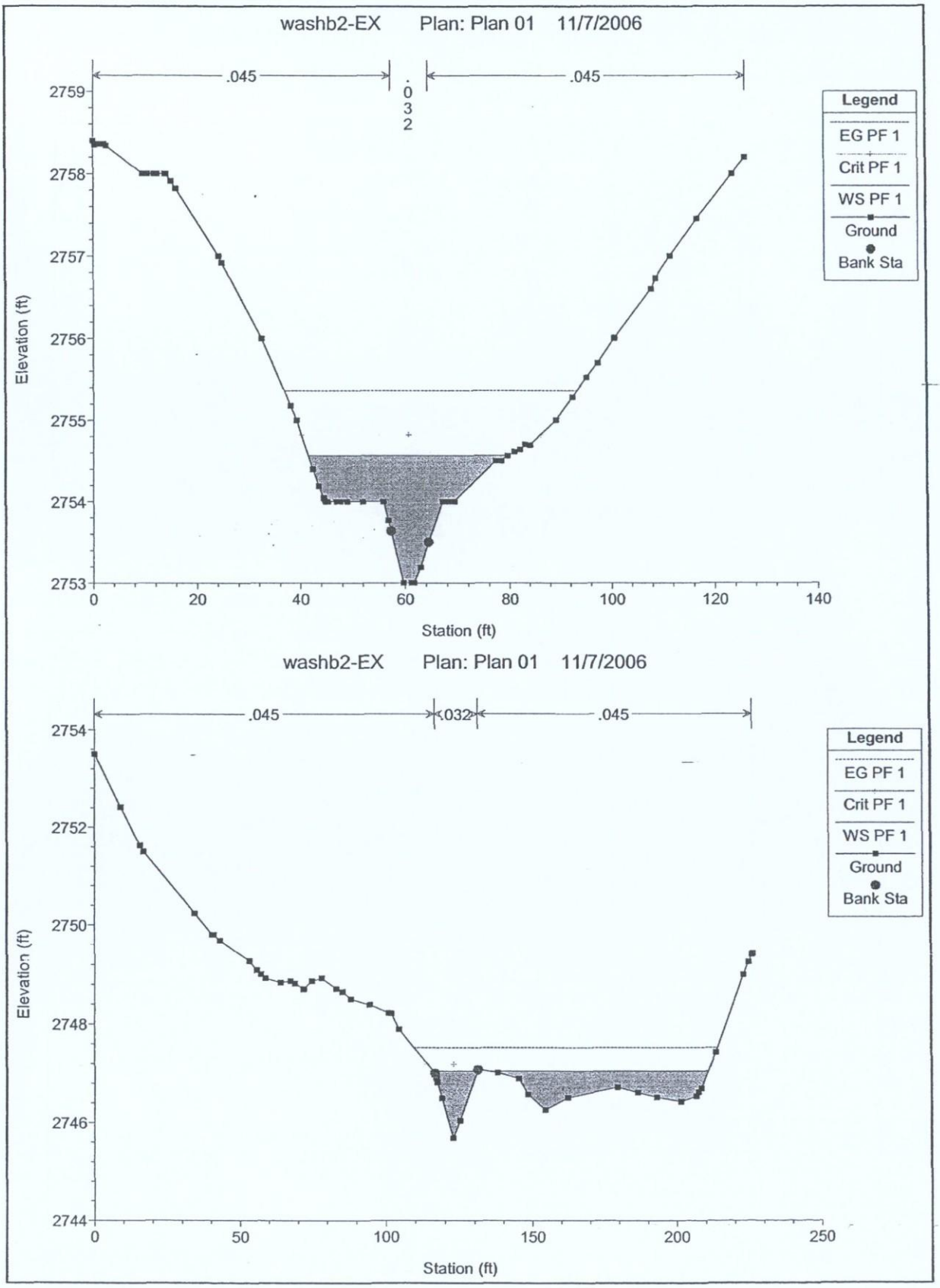
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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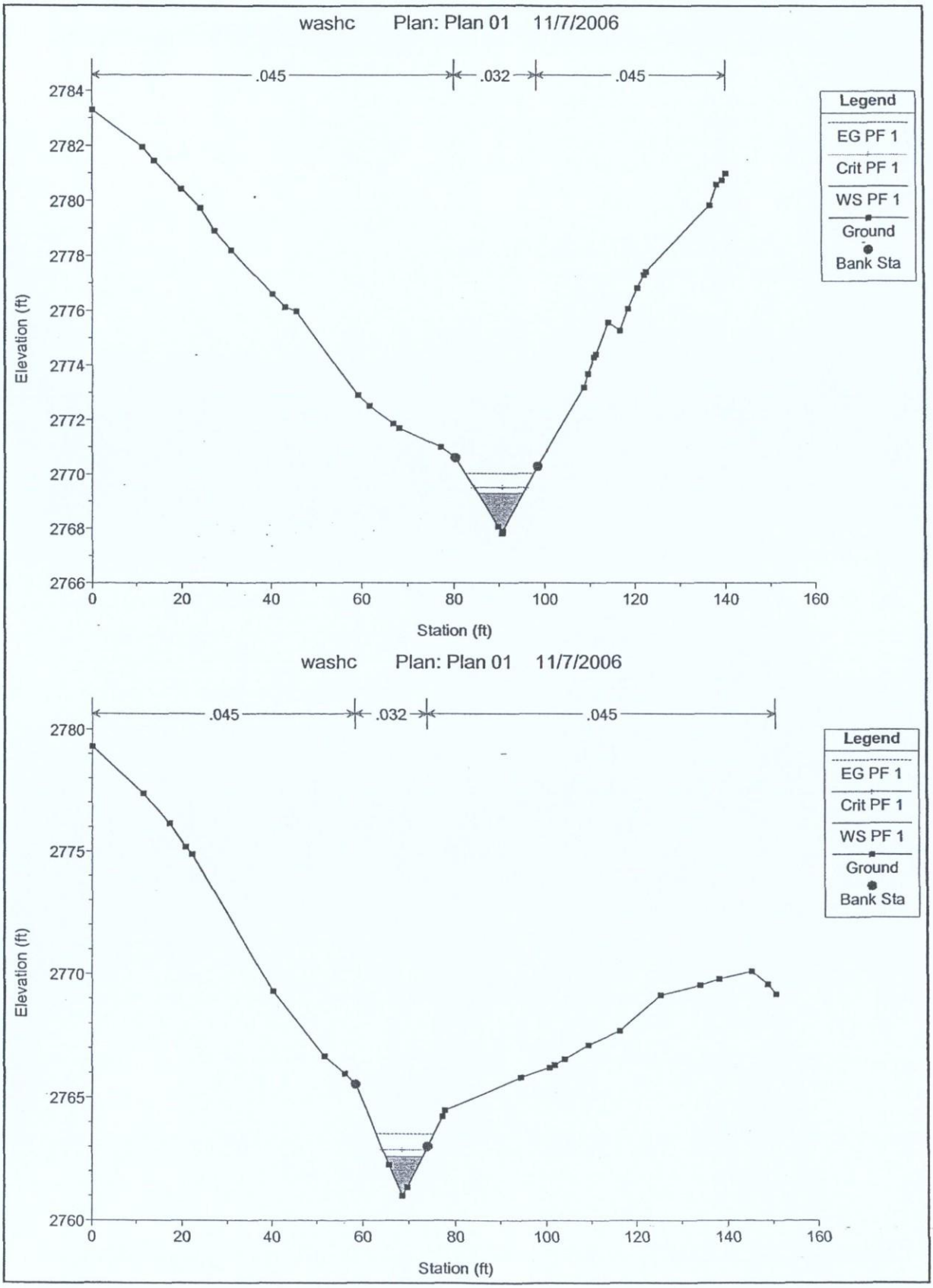
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2759
2758
2757
2756
2755
2754
2753
0
20
40
60
80
100
120
140
washb2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2754
2752
2750
2748
2746
2744
0
50
100
150
200
250

WASH C

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	5	PF 1	50.00	2767.82	2769.29	2769.50	2770.03	0.036028	6.90	7.25	10.04	1.43
Reach-1	4	PF 1	50.00	2761.00	2762.59	2762.87	2763.50	0.039393	7.65	6.54	8.03	1.49
Reach-1	3.5	PF 1	50.00	2758.90	2760.30	2760.39	2760.92	0.019976	6.32	8.08	9.29	1.11
Reach-1	3	PF 1	70.00	2755.68	2757.09	2757.46	2758.24	0.055674	8.59	8.20	12.65	1.79
Reach-1	2	PF 1	70.00	2749.90	2751.87	2751.94	2752.48	0.020383	6.28	11.14	11.37	1.12
Reach-1	1.5	PF 1	70.00	2748.00	2749.00	2749.31	2749.98	0.056453	7.93	8.83	14.26	1.78
Reach-1	1	PF 1	89.00	2743.99	2745.64	2745.83	2746.38	0.026449	6.92	12.98	16.20	1.29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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2784
2782
2780
2778
2776
2774
2772
2770
2768
2766
0
20
40
60
80
100
120
140
160
washc Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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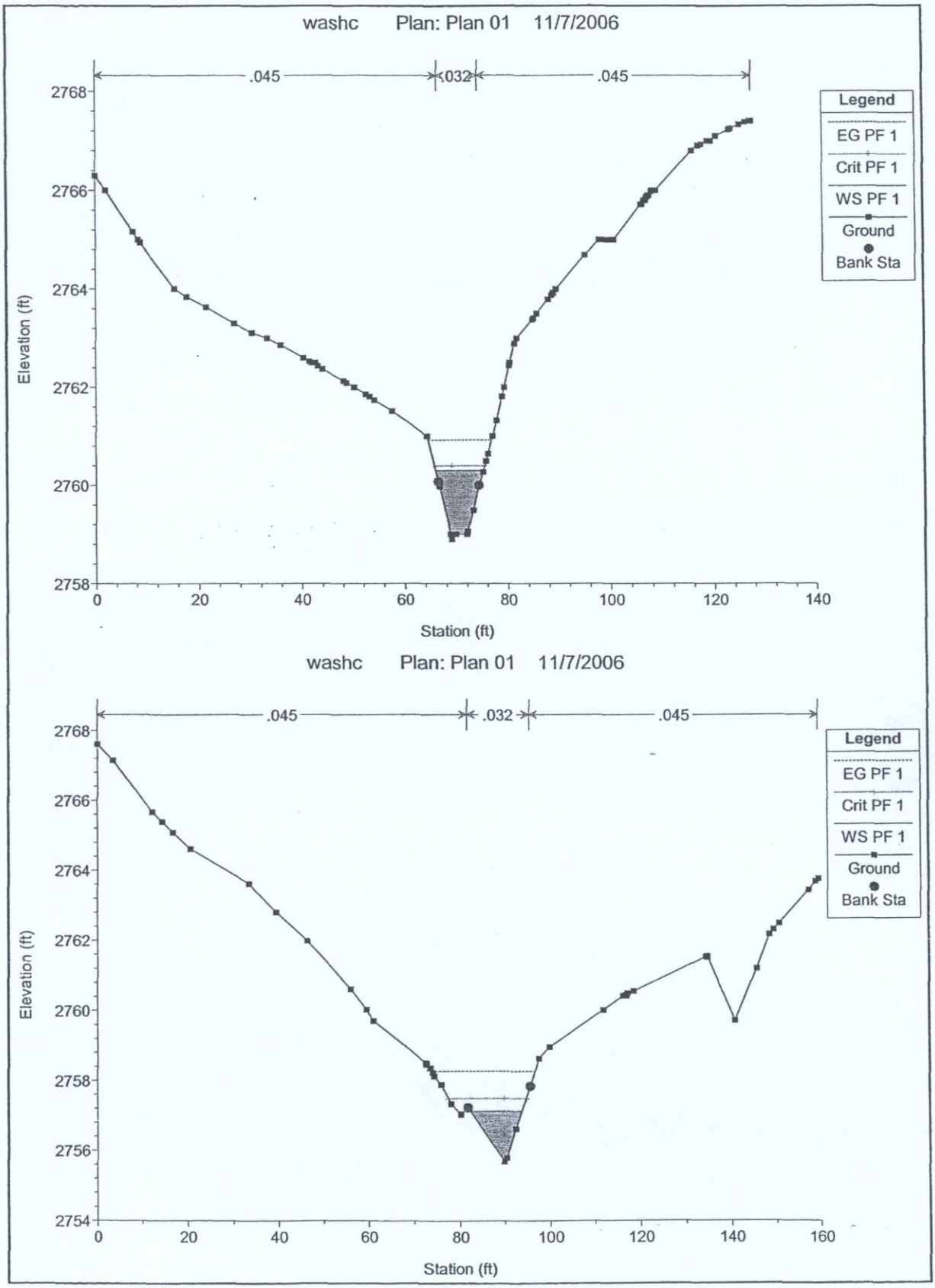
2775
2770
2765
2760
0
20
40
60
80
100
120
140
160


washc Plan: Plan 01 11/7/2006
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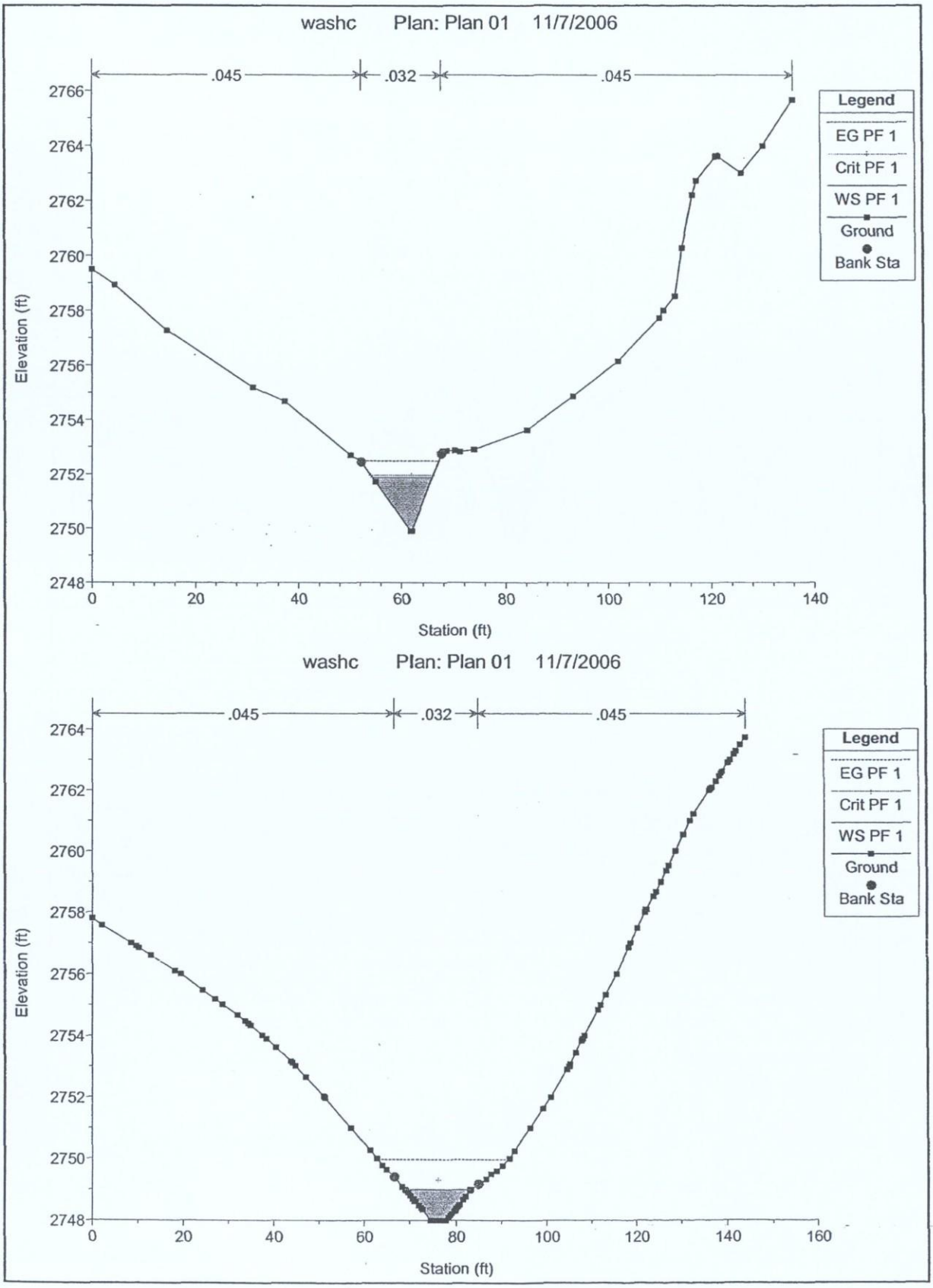
.032
.045
2768
2766
2764
2762
2760
2758
Elevation (ft)
0
20
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washc Plan: Plan 01 11/7/2006
.045
.032
.045
2768
2766
2764
2762
2760
2758
2756
2754
Elevation (ft)
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washc Plan: Plan 01 11/7/2006
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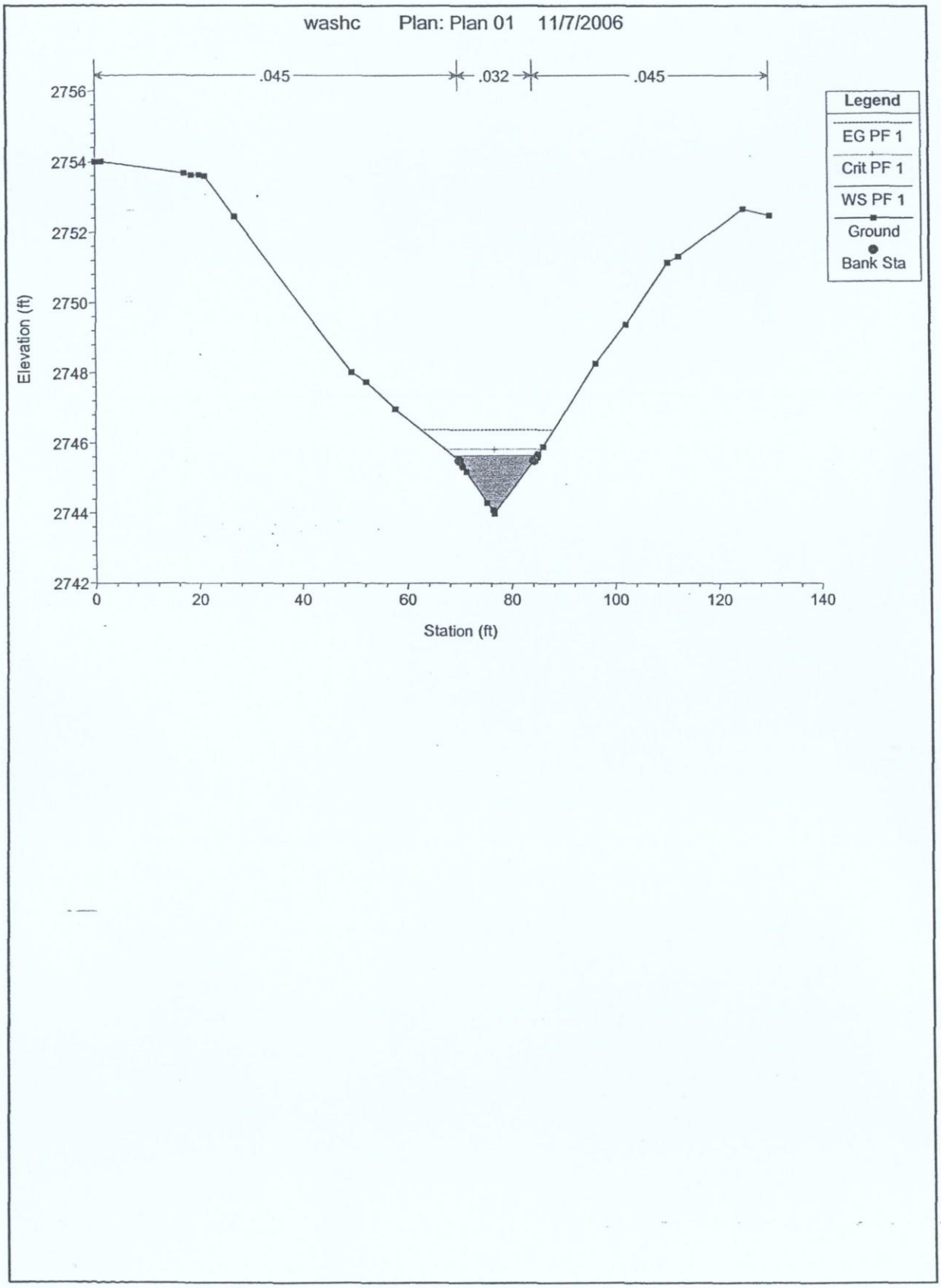
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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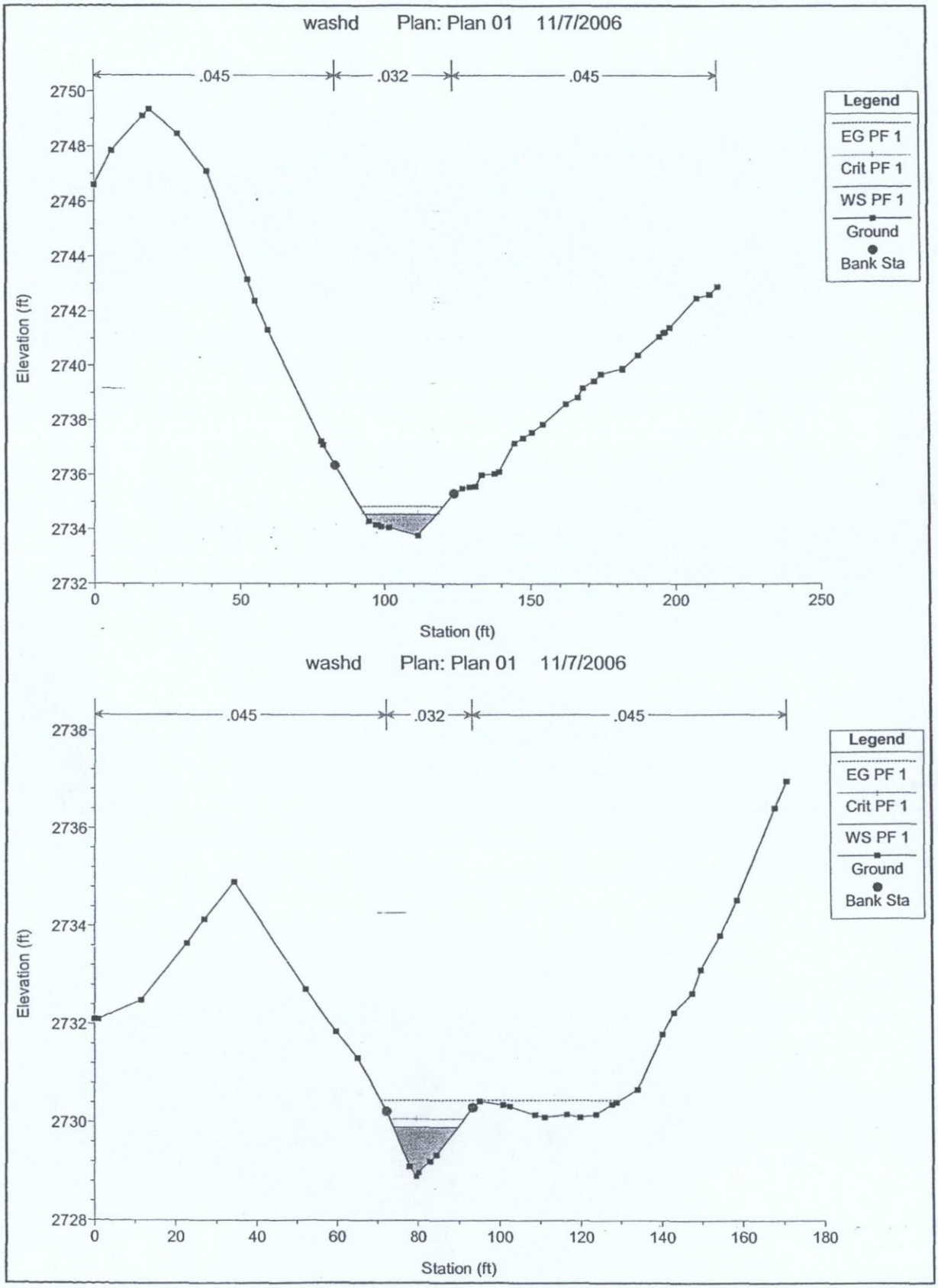
2756
2754
2752
2750
2748
2746
2744
2742
Elevation (ft)
0
20
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH D

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	4	PF 1	50.00	2733.77	2734.54	2734.58	2734.84	0.025006	4.39	11.38	24.53	1.14
Reach-1	3	PF 1	50.00	2728.90	2729.90	2730.06	2730.45	0.038474	5.94	8.42	15.86	1.44
Reach-1	2.5	PF 1	50.00	2727.51	2728.11	2728.12	2728.28	0.023407	3.32	15.16	49.07	1.03
Reach-1	2	PF 1	93.00	2723.41	2724.56	2724.78	2725.31	0.029370	7.14	14.78	24.24	1.36
Reach-1	1	PF 1	93.00	2718.95	2719.84	2719.88	2720.16	0.023707	4.50	20.86	44.50	1.12


washd Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2750
2748
2746
2744
2742
2740
2738
2736
2734
2732
0
50
100
150
200
250
washd Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2734
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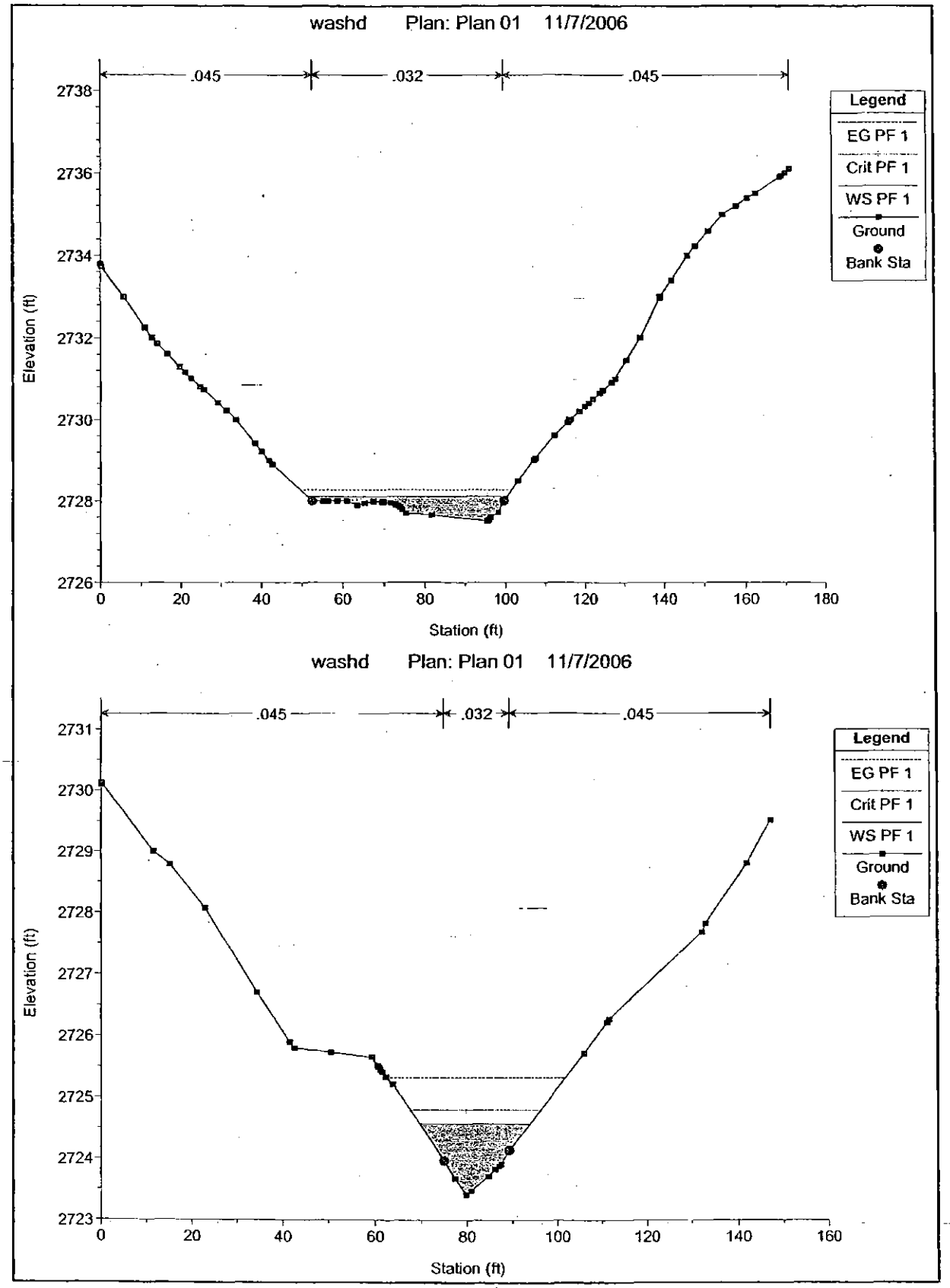
2730
2728
0
20
40
60
80
100
120
140
160
180


washd Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washd Plan: Plan 01 11/7/2006
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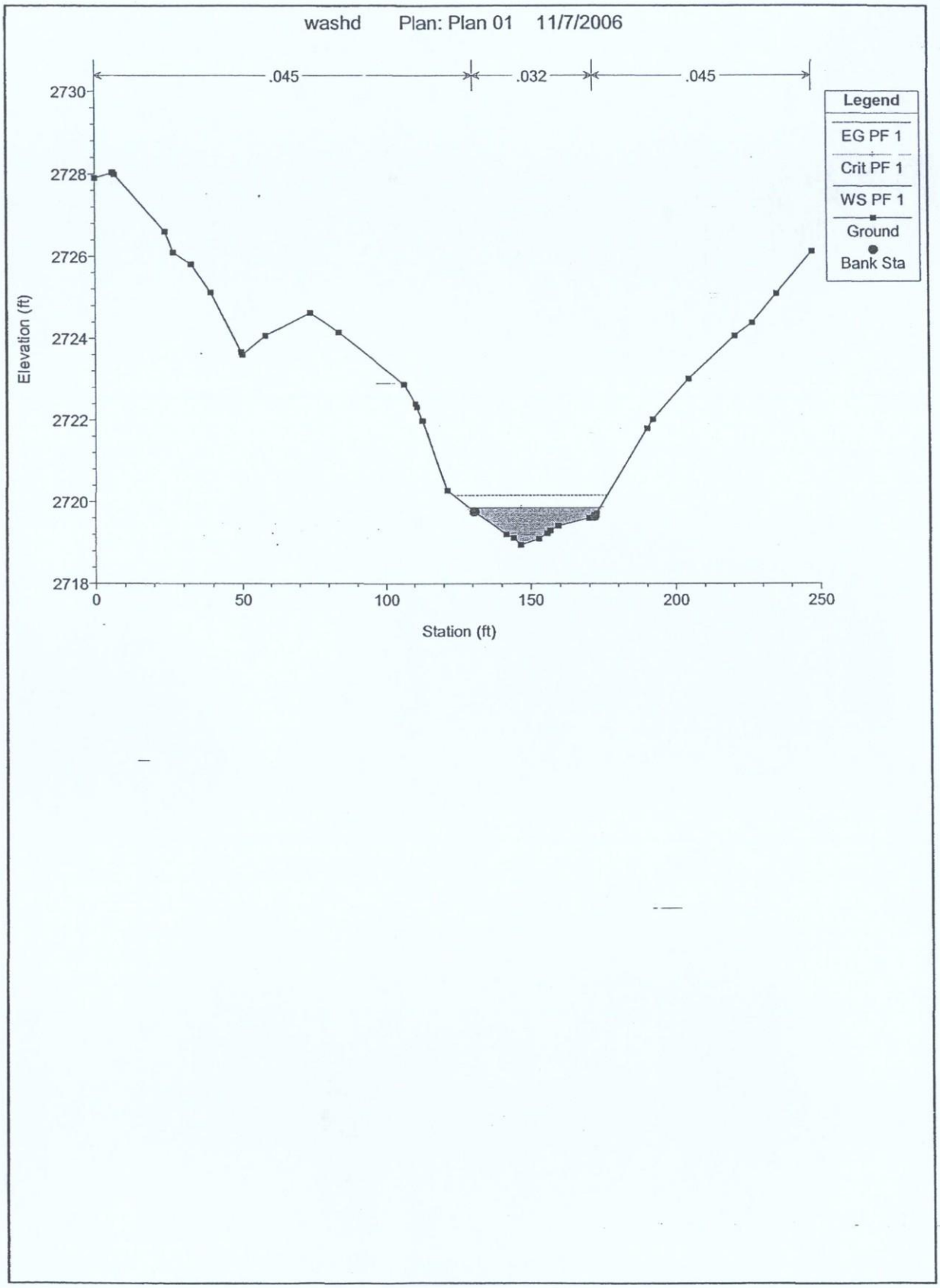
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washd Plan: Plan 01 11/7/2006
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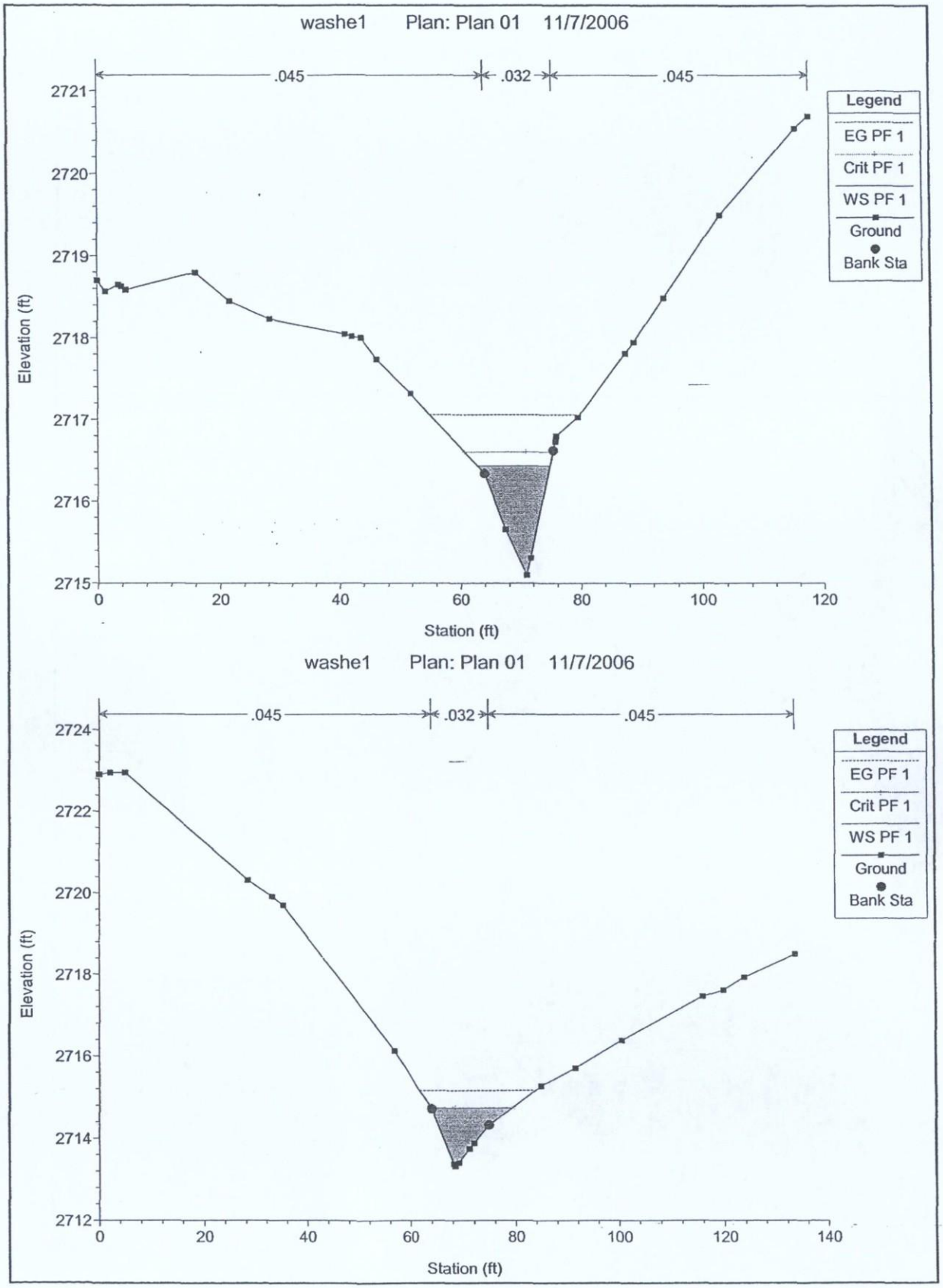
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2730
2728
2726
2724
2722
2720
2718
0
50
100
150
200
250
Station (ft)

WASH E 1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	13	PF 1	50.00	2715.10	2716.43	2716.60	2717.06	0.030018	6.34	7.93	12.10	1.32
Reach-1	12	PF 1	50.00	2713.32	2714.73	2714.77	2715.16	0.017142	5.31	10.05	15.35	1.02
Reach-1	11	PF 1	50.00	2711.10	2712.13	2712.36	2712.87	0.045013	6.89	7.38	13.63	1.58
Reach-1	10	PF 1	50.00	2708.30	2709.94	2710.07	2710.51	0.018336	6.16	9.08	14.42	1.07
Reach-1	9	PF 1	50.00	2706.40	2707.58	2707.84	2708.40	0.040012	7.29	7.00	11.58	1.52
Reach-1	8	PF 1	50.00	2703.40	2704.77	2705.10	2705.82	0.045780	8.23	6.21	9.25	1.65
Reach-1	7	PF 1	50.00	2701.44	2702.70	2702.85	2703.29	0.030785	6.17	8.11	12.04	1.32
Reach-1	6	PF 1	50.00	2700.00	2701.35	2701.35	2701.71	0.016870	4.84	10.45	15.48	1.00
Reach-1	5	PF 1	110.00	2696.59	2698.23	2698.33	2698.83	0.023198	6.20	17.84	22.36	1.20
Reach-1	4	PF 1	110.00	2692.81	2694.53	2694.74	2695.31	0.024021	7.14	16.08	20.48	1.25
Reach-1	3.5	PF 1	110.00	2692.00	2692.91	2692.96	2693.32	0.017181	5.30	23.38	38.13	1.04
Reach-1	3	PF 1	146.00	2689.21	2690.98	2691.23	2691.71	0.019310	7.16	25.54	49.17	1.16
Reach-1	2	PF 1	275.00	2679.83	2681.81	2682.35	2683.49	0.037223	10.45	27.53	27.33	1.63
Reach-1	1	PF 1	275.00	2677.00	2679.36	2679.56	2680.25	0.015675	8.37	43.76	40.47	1.10


washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
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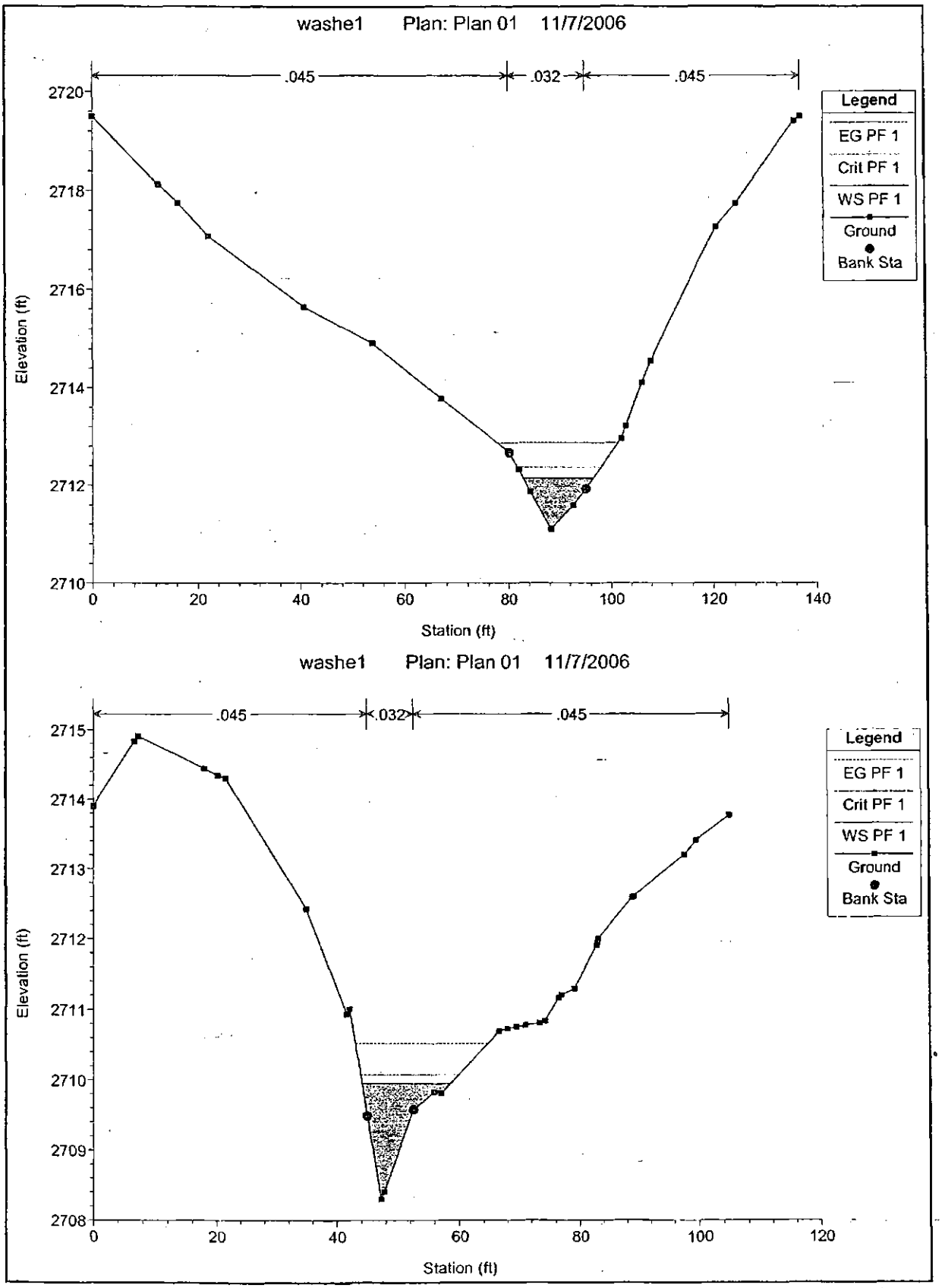
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
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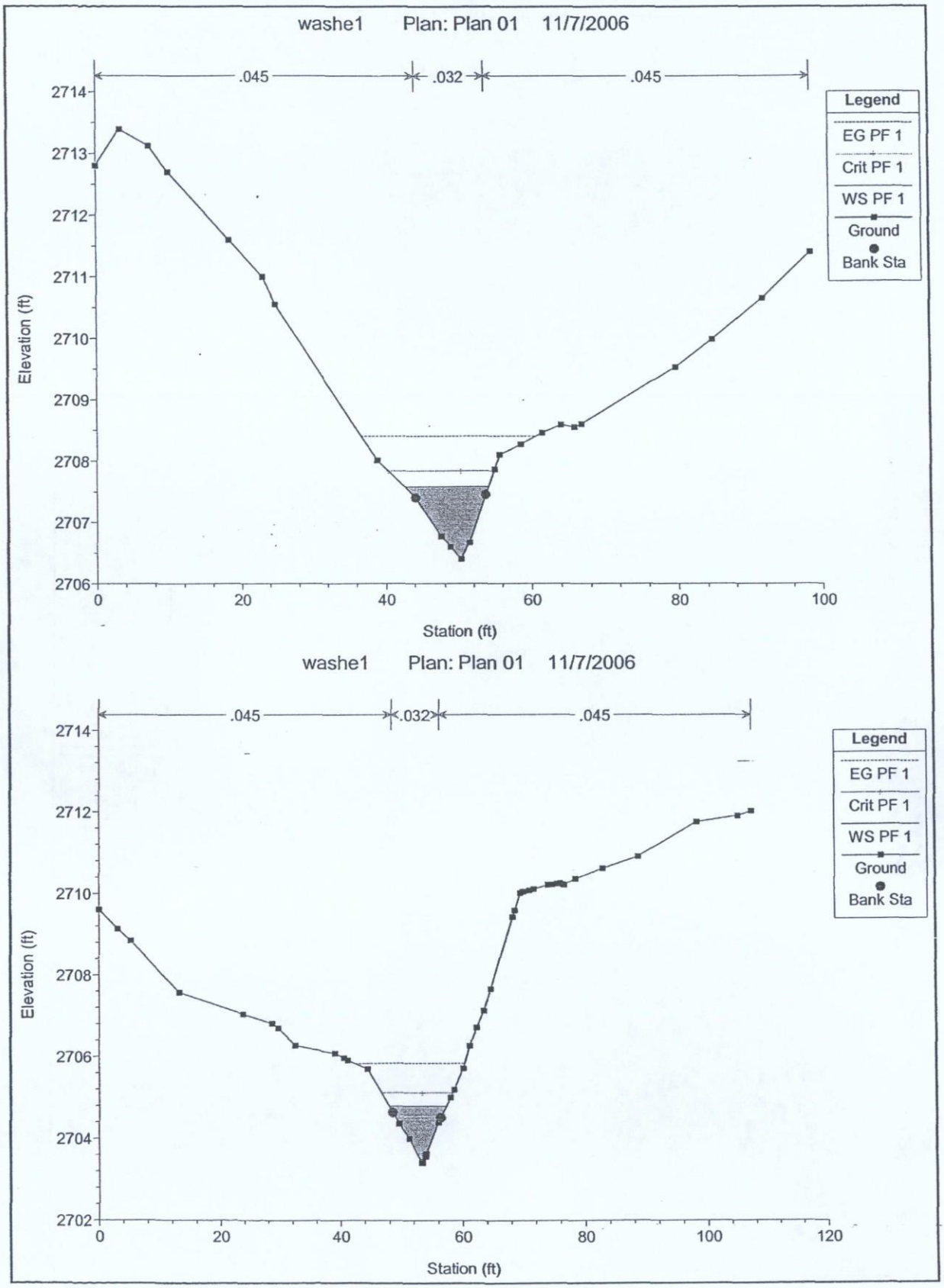
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2714
2713
2712
2711
2710
2709
2708
2707
2706
0
20
40
60
80
100
washe1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2712
2710
2708
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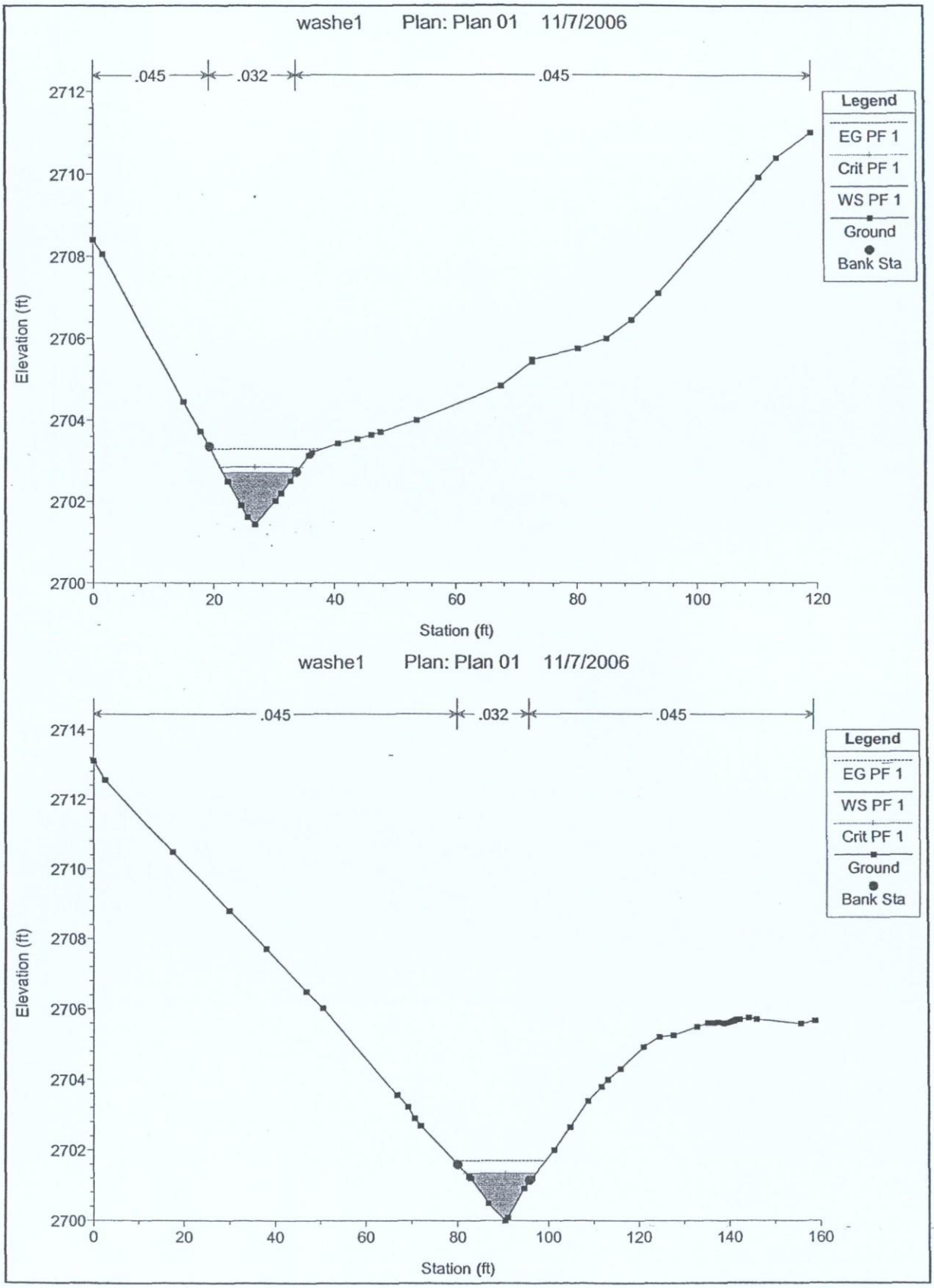
2704
2702
0
20
40
60
80
100
120


washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
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.032
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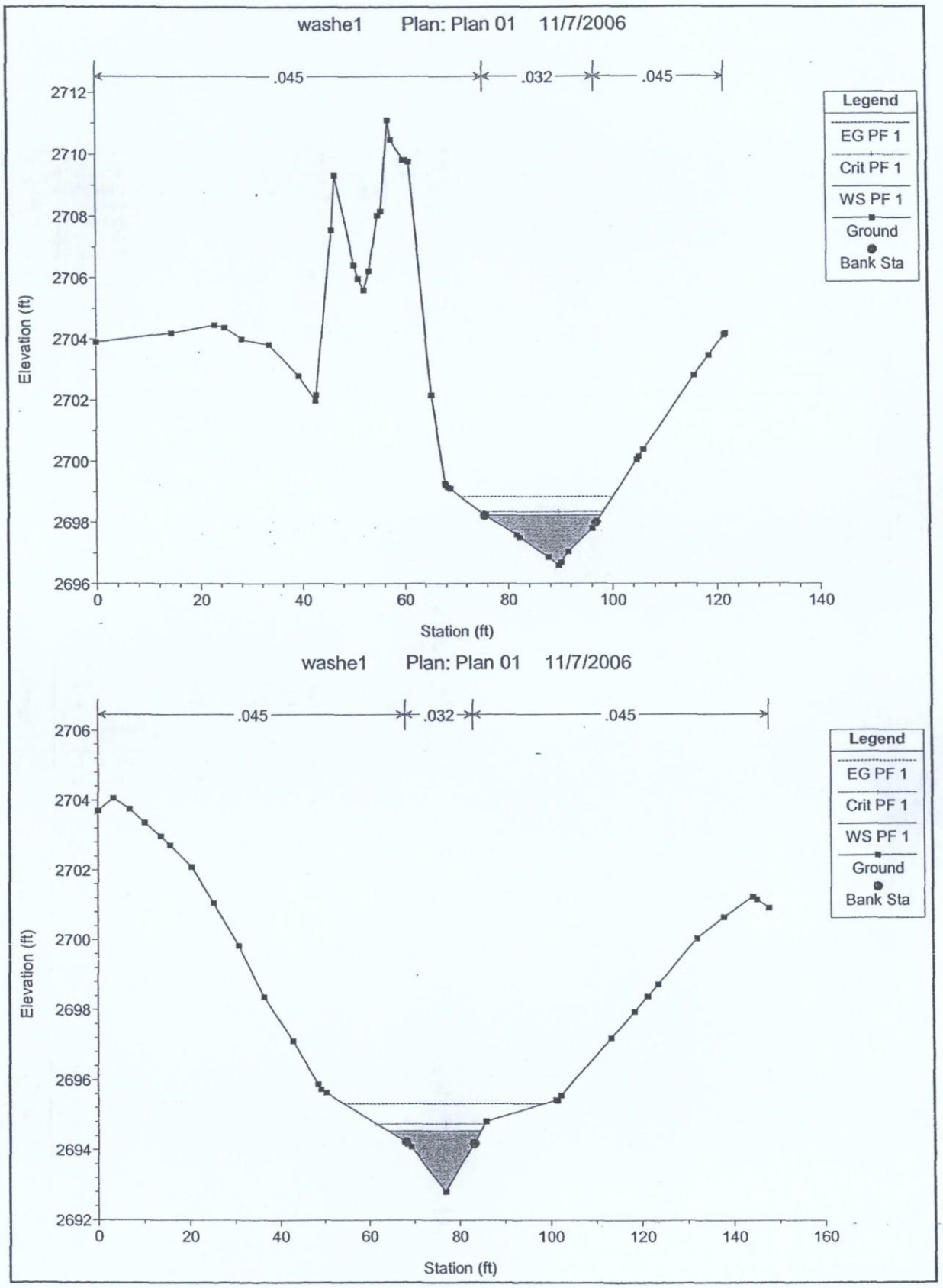
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
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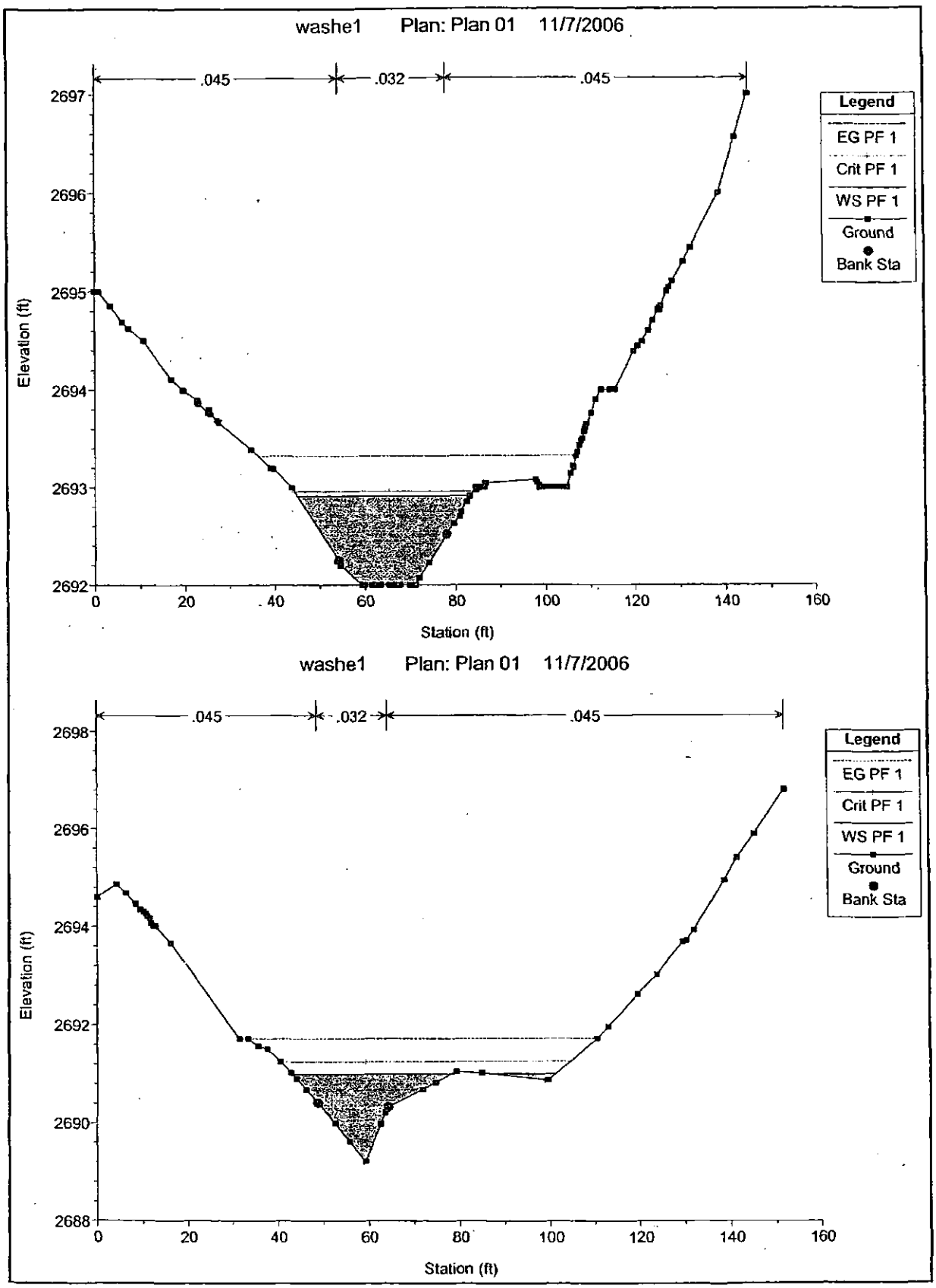
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
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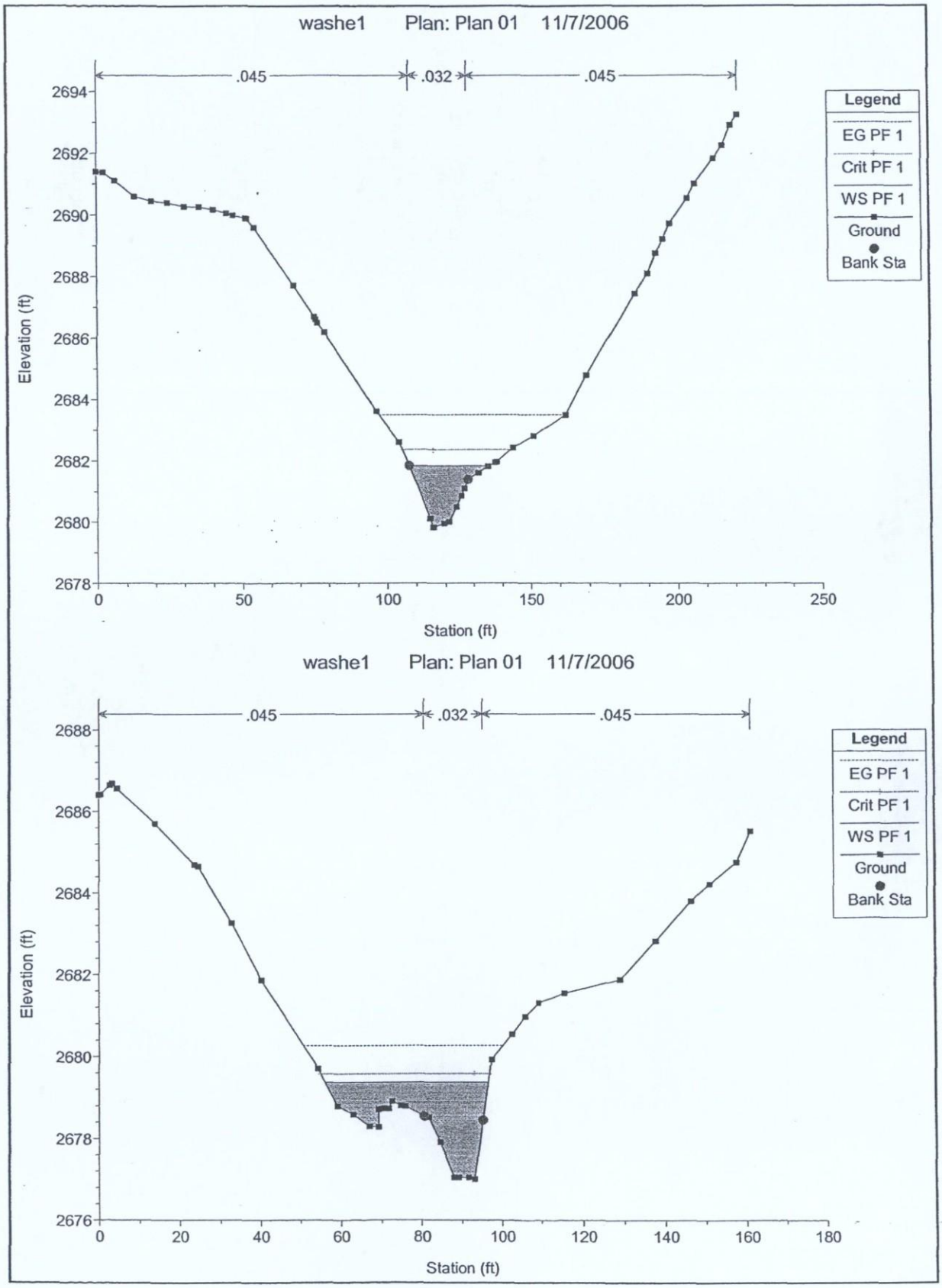
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washe1 Plan: Plan 01 11/7/2006
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.032
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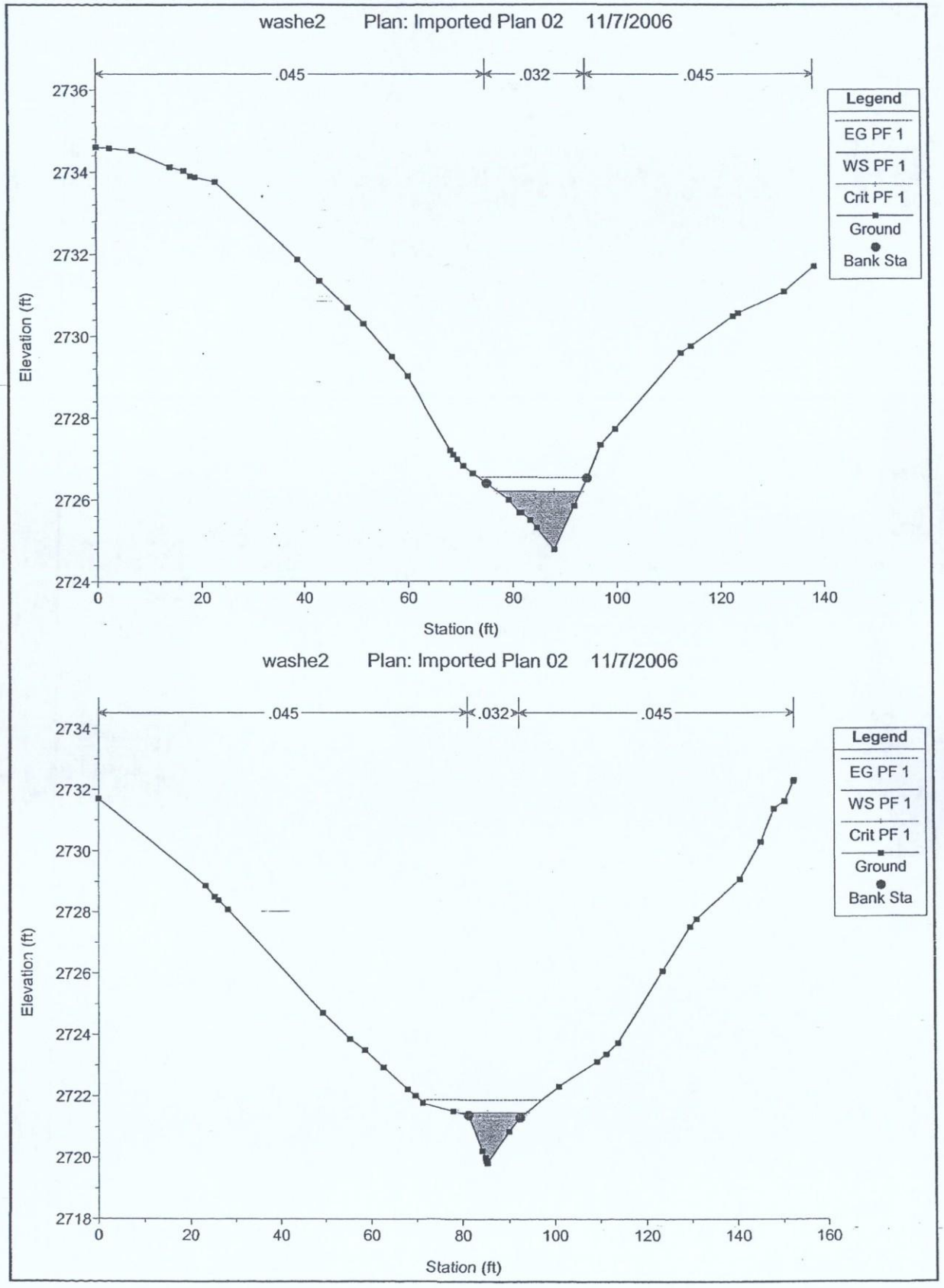
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

WASH E2

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 Profile: PF 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	11	PF 1	50.00	2724.80	2726.21	2726.21	2726.55	0.018084	4.69	10.67	16.13	1.02
Reach-1	10	PF 1	50.00	2719.82	2721.45	2721.45	2721.87	0.015739	5.17	9.85	14.80	0.98
Reach-1	9	PF 1	50.00	2715.71	2717.28	2717.28	2717.71	0.013081	5.64	10.87	14.46	0.94
Reach-1	8	PF 1	75.00	2709.10	2711.09	2711.09	2711.55	0.010257	5.57	16.18	22.55	0.85
Reach-1	7.5	PF 1	75.00	2708.00	2709.19	2709.19	2709.62	0.013563	5.49	15.49	19.83	0.95
Reach-1	7	PF 1	75.00	2705.46	2706.94	2706.94	2707.36	0.015127	5.18	14.90	20.27	0.98
Reach-1	6	PF 1	75.00	2701.53	2703.58	2703.58	2704.11	0.014543	5.84	13.21	14.90	0.97
Reach-1	5	PF 1	75.00	2697.79	2699.88	2699.88	2700.43	0.010621	6.48	15.38	16.38	0.89
Reach-1	4.5	PF 1	75.00	2697.00	2698.52	2698.52	2699.00	0.012220	5.77	14.89	17.87	0.92
Reach-1	4	PF 1	75.00	2694.91	2696.38	2696.38	2696.78	0.016000	5.09	14.92	21.12	0.99
Reach-1	3	PF 1	131.00	2687.45	2689.81	2689.81	2690.44	0.012785	6.41	21.80	21.14	0.95
Reach-1	2	PF 1	275.00	2679.83	2682.39	2682.39	2683.11	0.009982	7.12	46.76	38.39	0.90
Reach-1	1	PF 1	275.00	2677.00	2679.55	2679.55	2680.11	0.016423	7.02	51.48	41.70	0.83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WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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Crit PF 1
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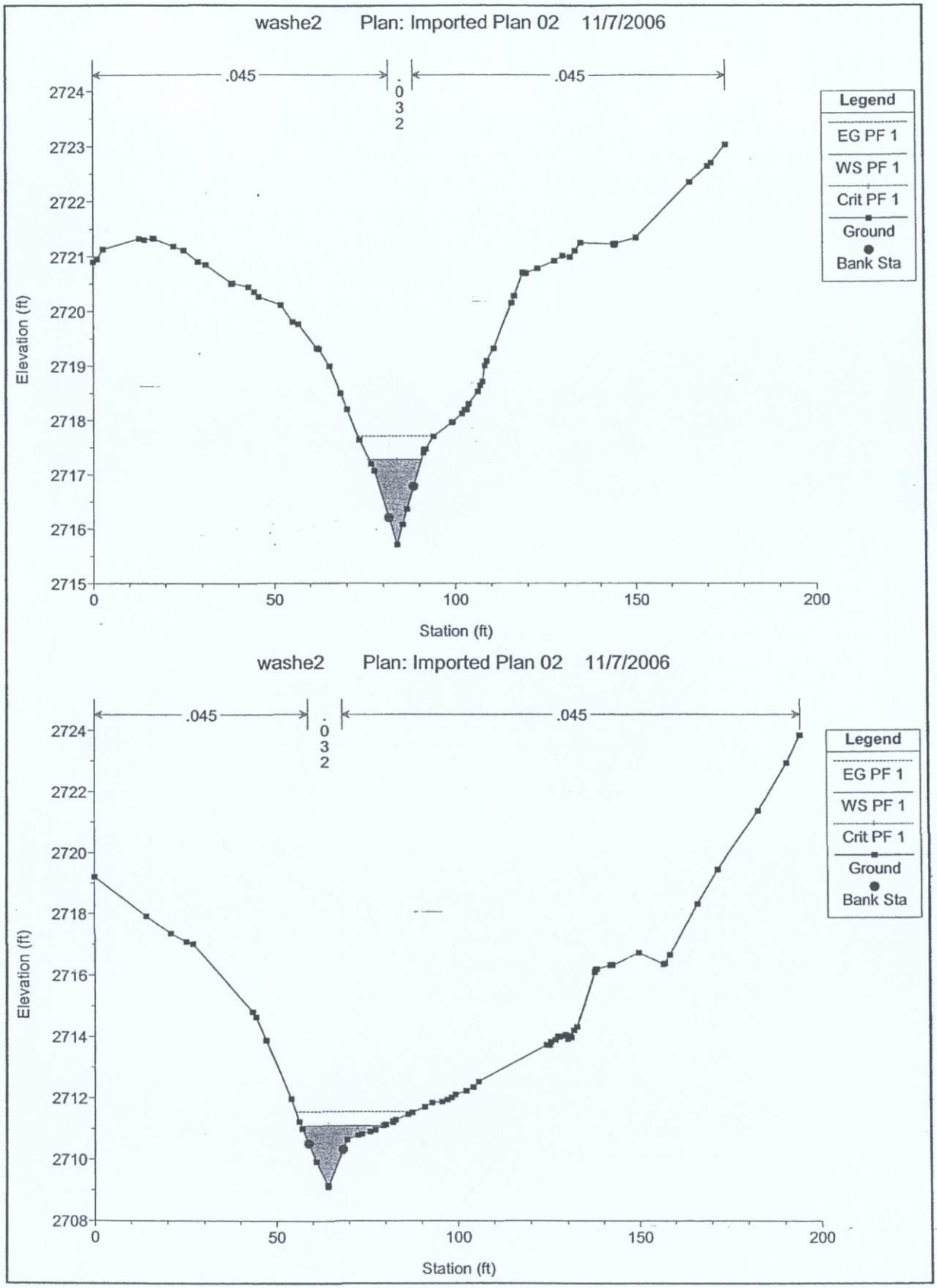
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
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Station (ft)
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2722
2721
2720
2719
2718
2717
2716
2715
0
50
100
150
200
washe2 Plan: Imported Plan 02 11/7/2006
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.032
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2720
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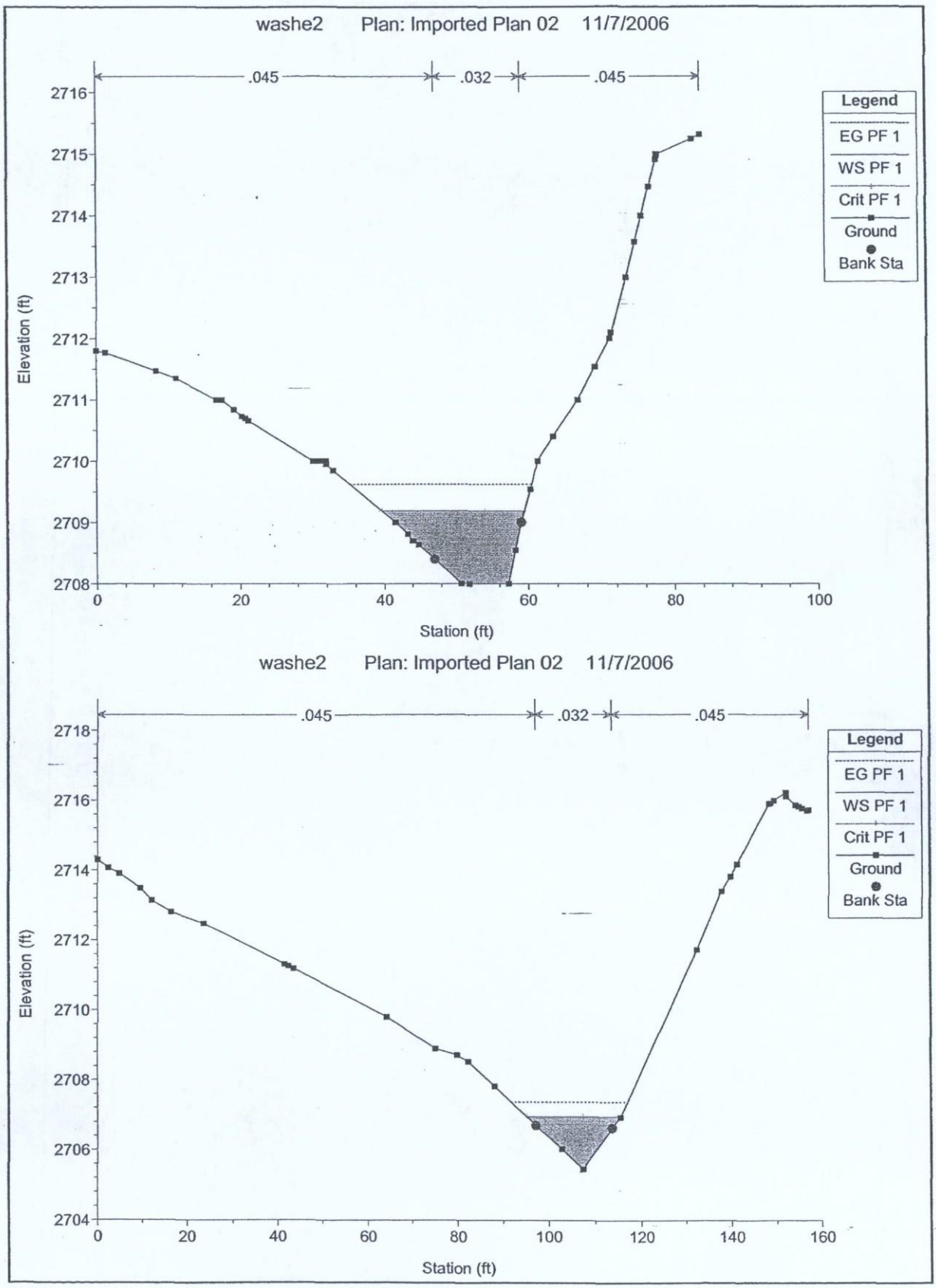
100
150
200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Station (ft)
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Legend
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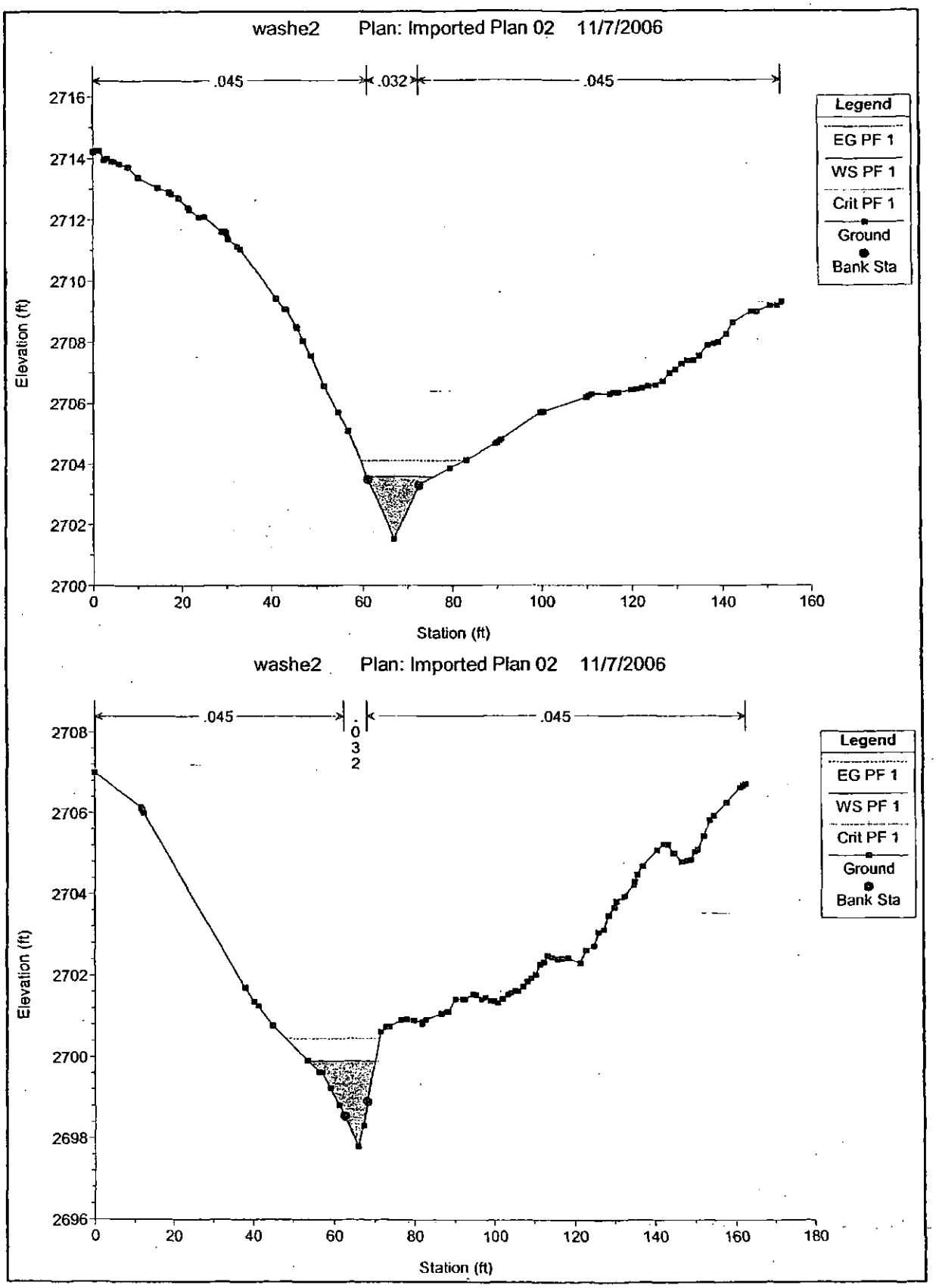
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Ground
Bank Sta
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Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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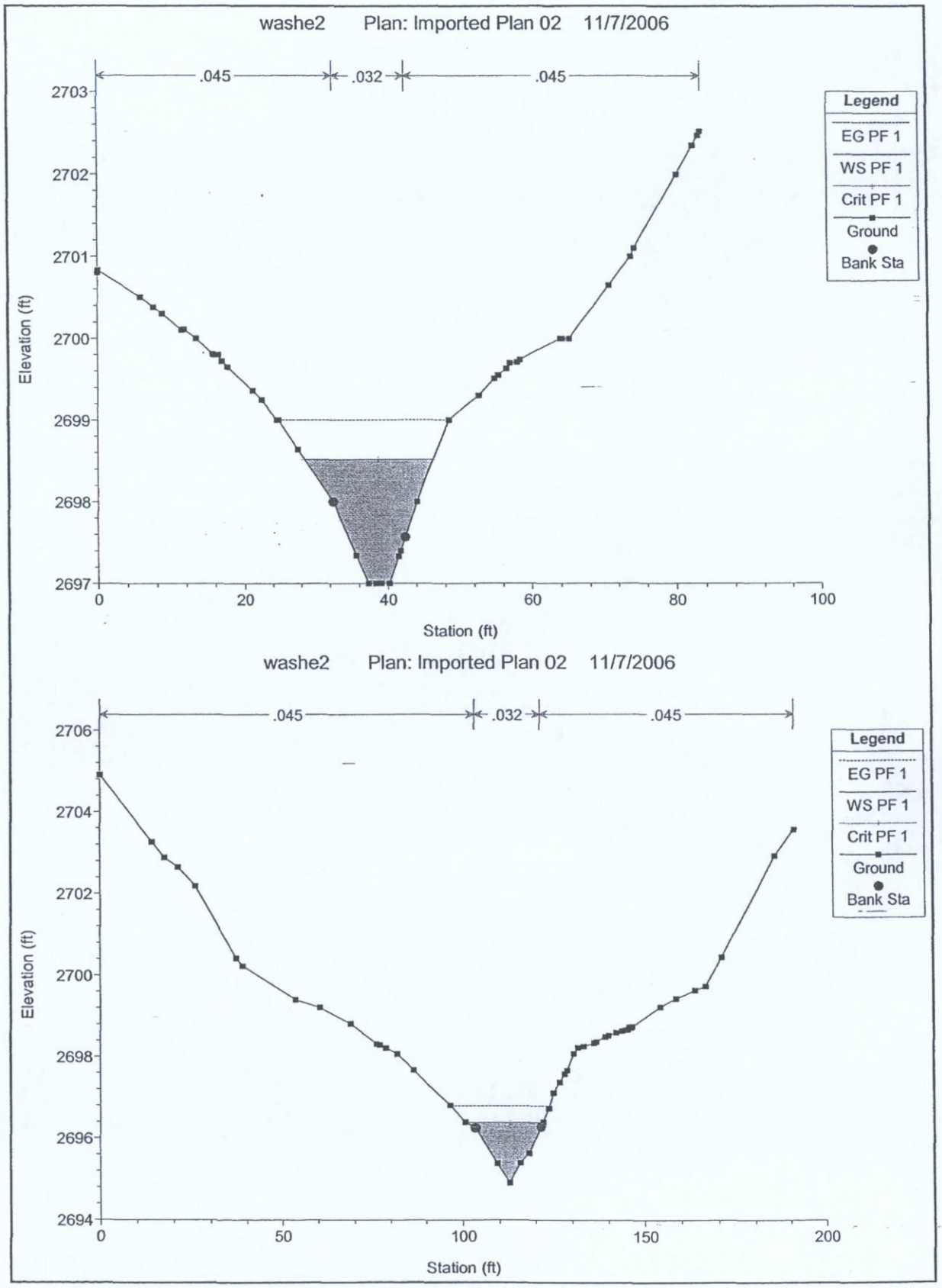
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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2700
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Elevation (ft)
0
20
40
60
80
100
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
washe2 Plan: Imported Plan 02 11/7/2006
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.032
.045
2706
2704
2702
2700
2698
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Elevation (ft)
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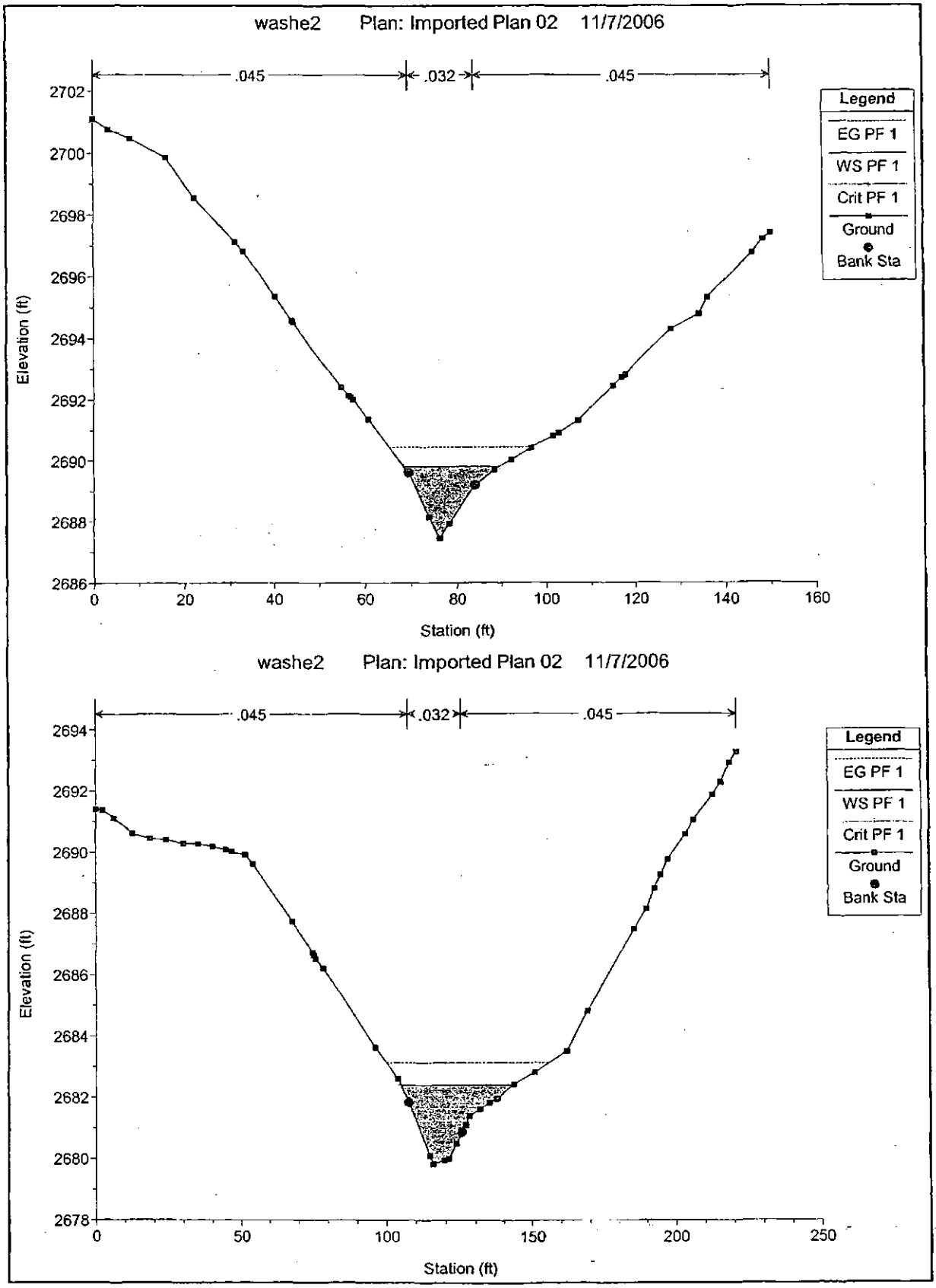
200
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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Bank Sta
Elevation (ft)
Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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Legend
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Crit PF 1
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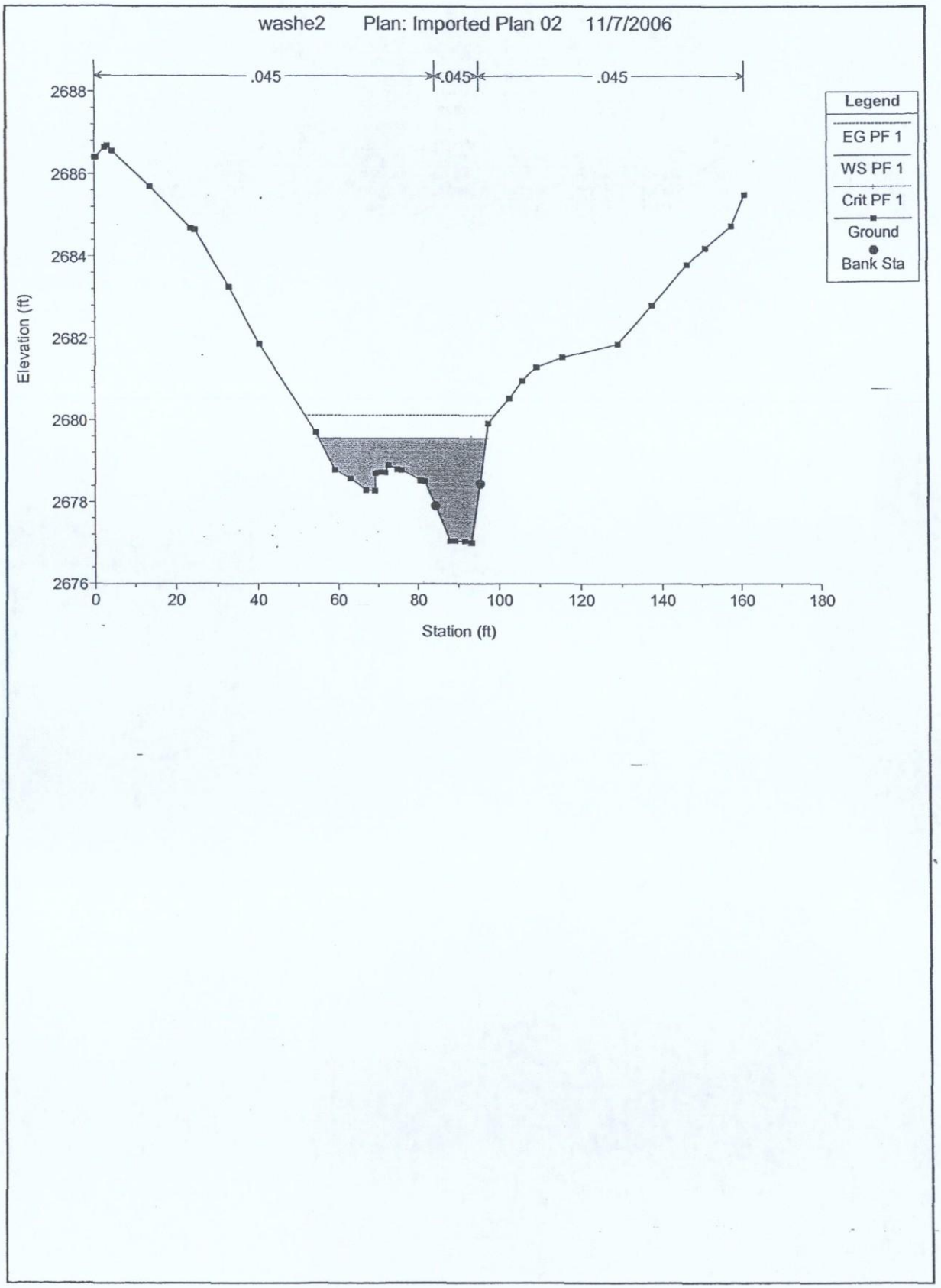
Bank Sta
Elevation (ft)
Station (ft)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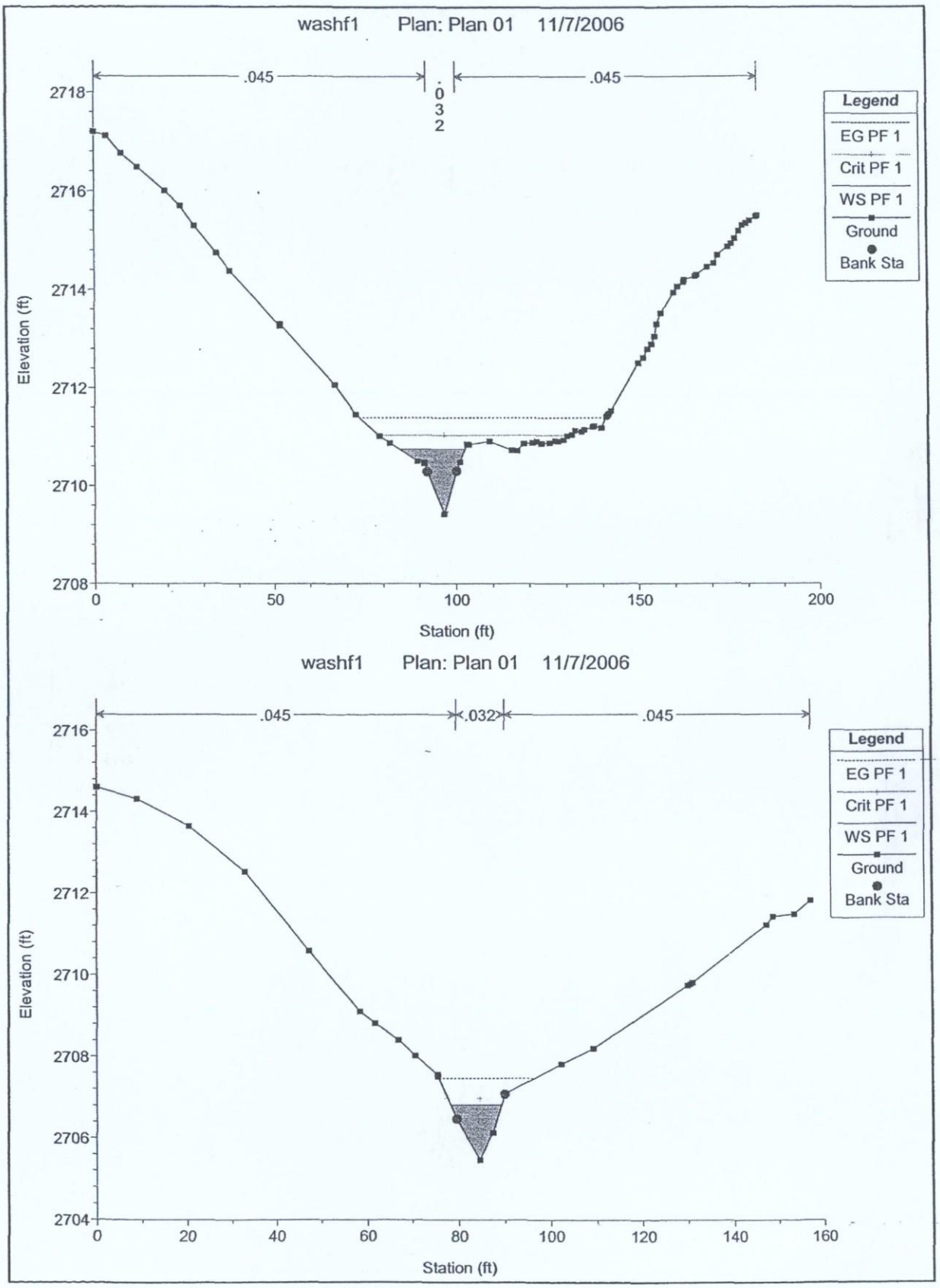
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2688
2686
2684
2682
2680
2678
2676
0
20
40
60
80
100
120
140
160
180
Station (ft)

WASH F1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	8	PF 1	50.00	2709.42	2710.74	2711.03	2711.38	0.025021	6.65	8.95	20.46	1.25
Reach-1	7	PF 1	50.00	2705.46	2706.81	2706.97	2707.46	0.027912	6.49	7.87	11.03	1.29
Reach-1	6	PF 1	50.00	2700.54	2701.76	2702.06	2702.68	0.039439	7.86	7.10	12.34	1.54
Reach-1	5	PF 1	50.00	2698.48	2699.81	2699.89	2700.28	0.022728	5.49	9.24	14.33	1.15
Reach-1	4.5	PF 1	50.00	2697.00	2697.81	2697.96	2698.38	0.028656	6.06	8.42	13.96	1.29
Reach-1	4	PF 1	76.00	2692.65	2693.93	2694.09	2694.58	0.029509	6.47	11.91	17.84	1.33
Reach-1	3.5	PF 1	76.00	2689.00	2690.62	2690.62	2691.05	0.011337	5.57	16.92	22.78	0.89
Reach-1	3	PF 1	76.00	2686.57	2687.81	2688.10	2688.70	0.034574	7.61	10.42	15.66	1.46
Reach-1	2	PF 1	76.00	2681.90	2683.33	2683.35	2683.65	0.017537	4.63	18.17	36.25	1.00
Reach-1	1	PF 1	99.00	2677.60	2678.80	2679.01	2679.50	0.034655	7.02	18.30	54.08	1.44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2714
2712
2710
2708
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
2716
2714
2712
2710
2708
2706
2704
Elevation (ft)
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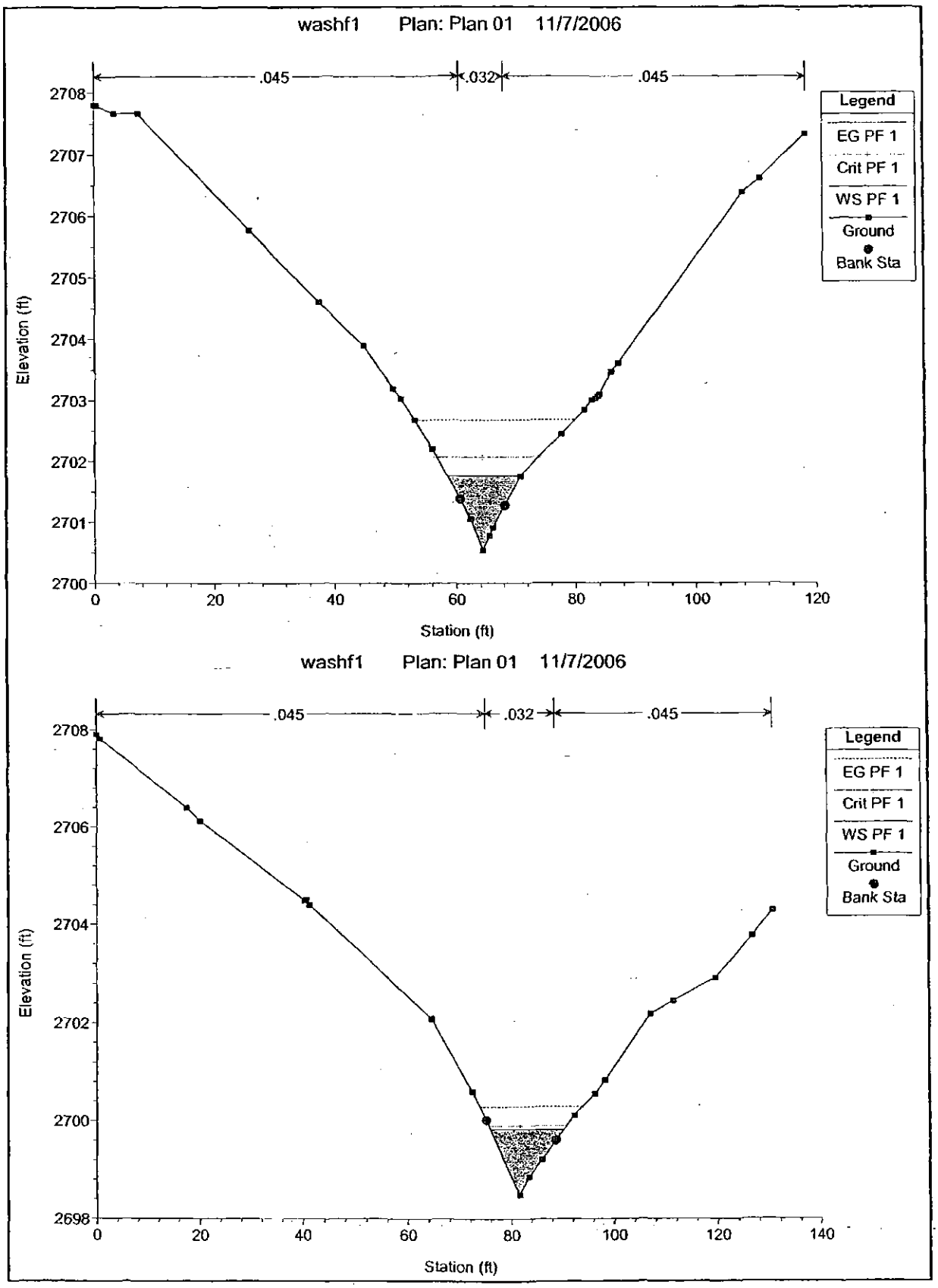
80
100
120
140
160
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2708
2707
2706
2705
2704
2703
2702
2701
2700
0
20
40
60
80
100
120
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2700
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0
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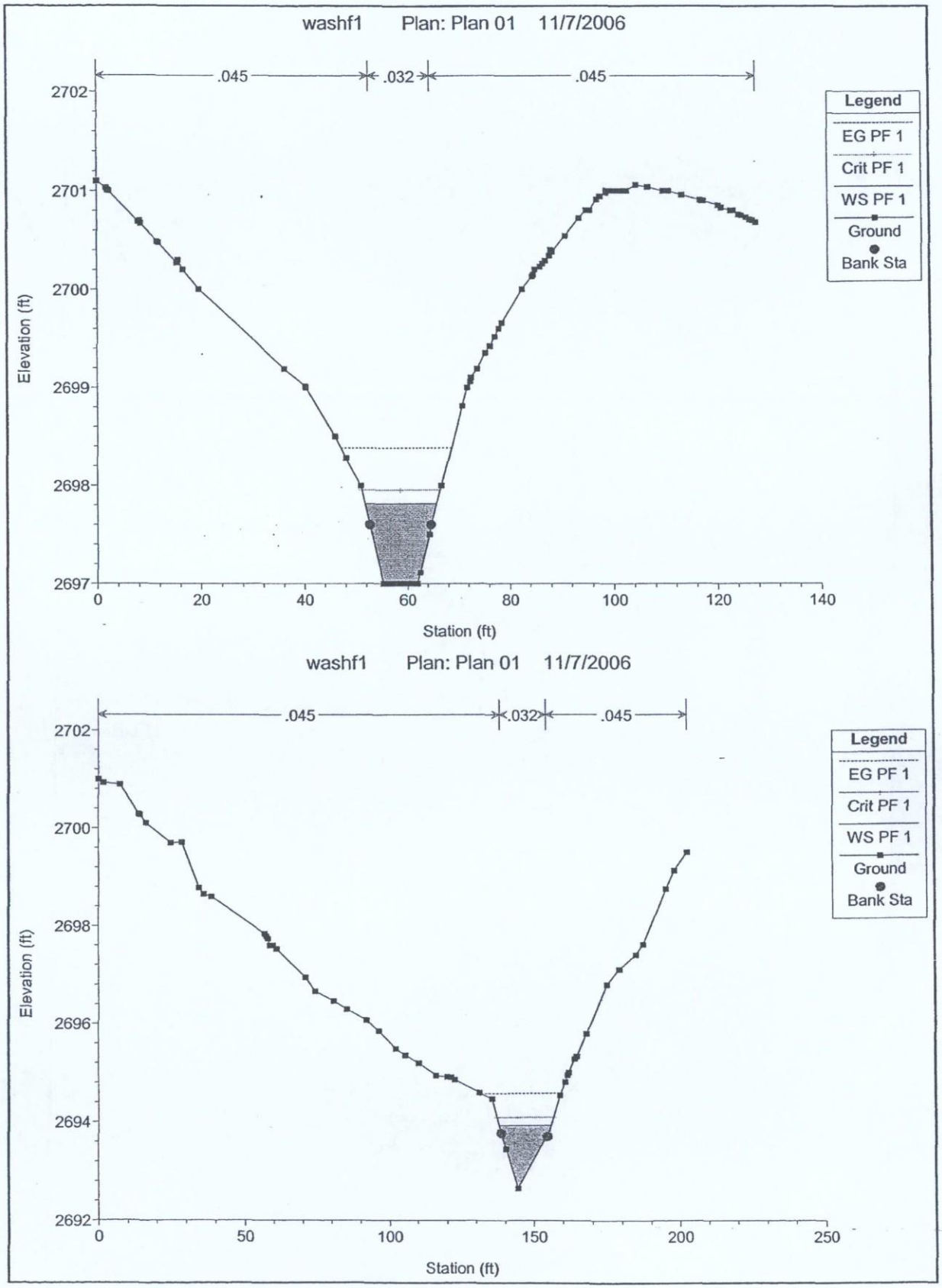
40
60
80
100
120
140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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2702
2701
2700
2699
2698
2697
0
20
40
60
80
100
120
140
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2702
2700
2698
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2692
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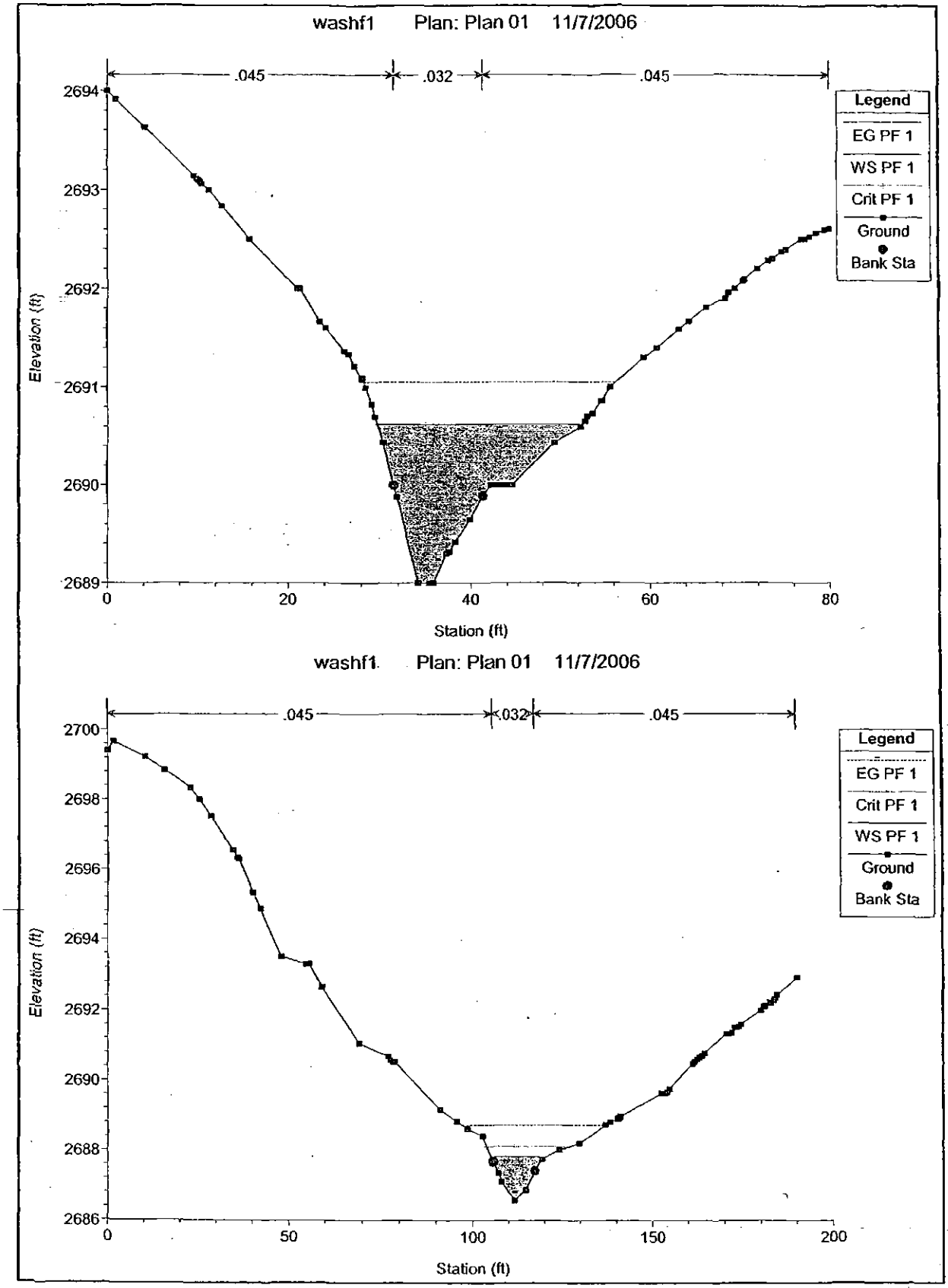
150
200
250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WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washf1 Plan: Plan 01 11/7/2006
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Legend
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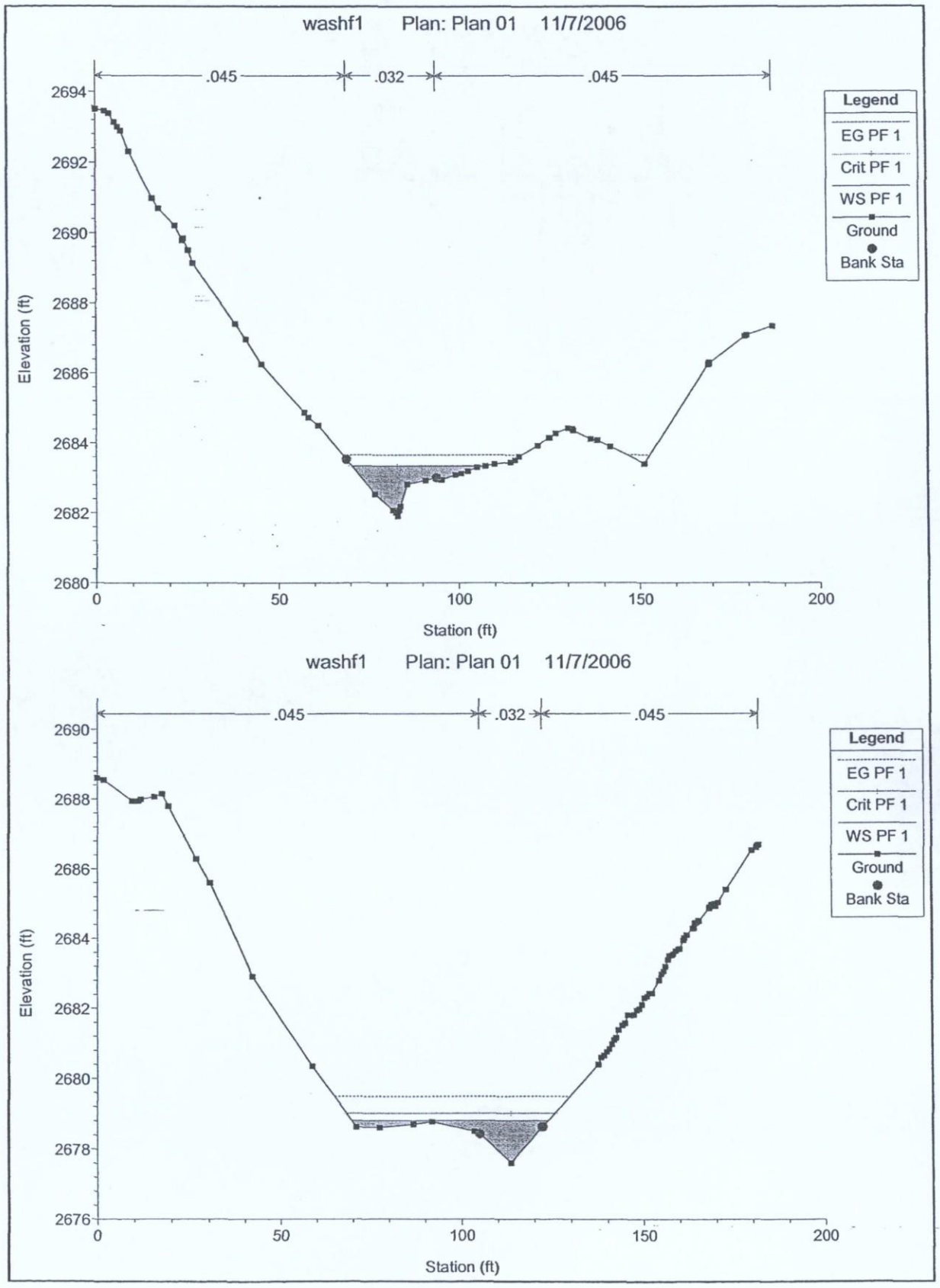
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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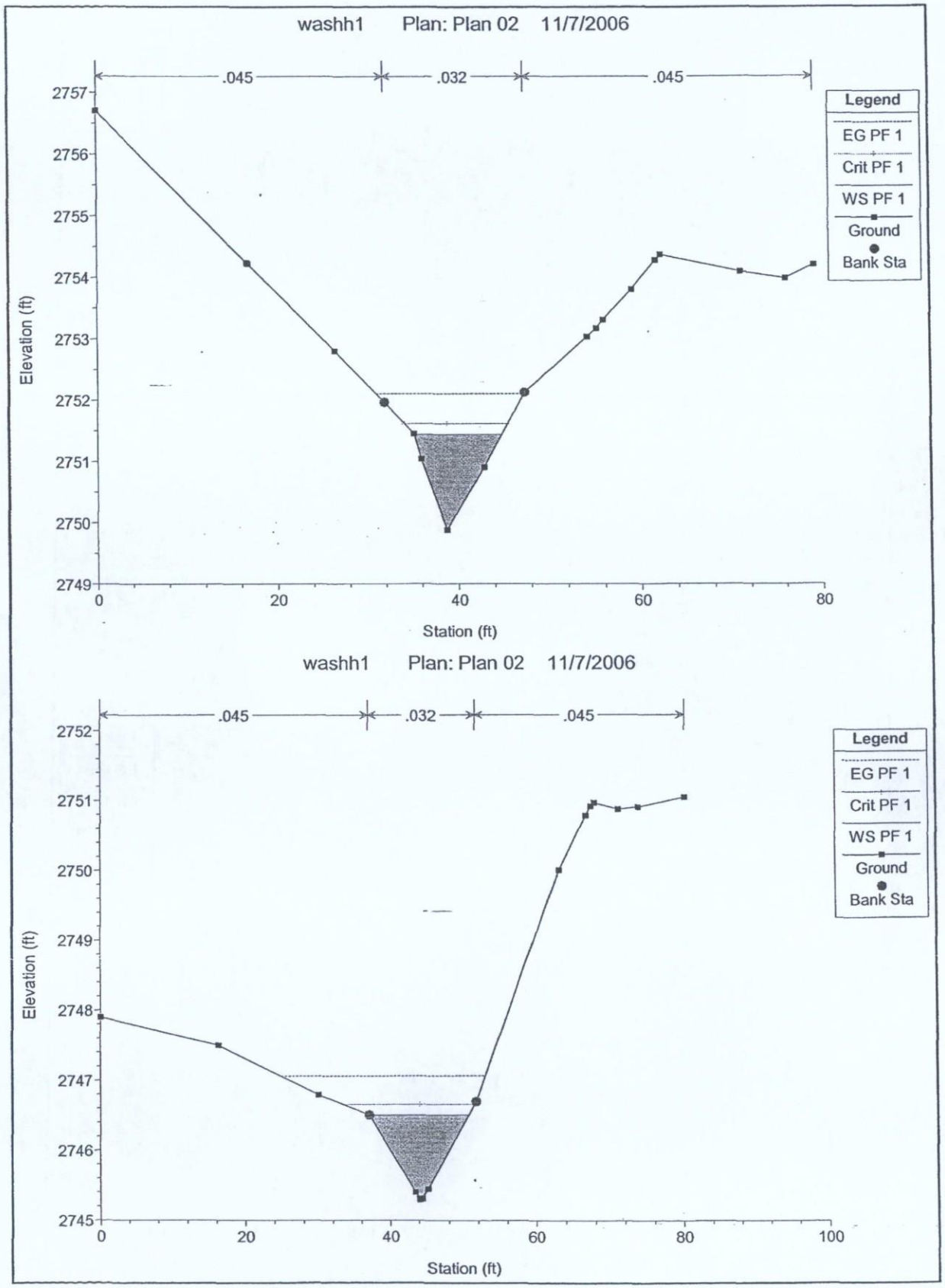
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2694
2692
2690
2688
2686
2684
2682
2680
0
50
100
150
200
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2690
2688
2686
2684
2682
2680
2678
2676
0
50
100
150
200

WASH H1

HEC-RAS Plan: Plan 02 River: RIVER-1 Reach: Reach-1 Profile: PF 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	6	PF 1	50.00	2749.88	2751.43	2751.61	2752.10	0.028975	6.55	7.63	9.59	1.29
Reach-1	5	PF 1	50.00	2745.29	2746.49	2746.65	2747.06	0.033087	6.02	8.30	13.57	1.36
Reach-1	4.5	PF 1	50.00	2741.00	2741.71	2741.89	2742.19	0.040197	5.61	9.42	27.11	1.44
Reach-1	4	PF 1	110.00	2737.70	2739.10	2739.19	2739.51	0.028653	5.14	21.65	43.74	1.24
Reach-1	3	PF 1	110.00	2732.24	2733.50	2733.77	2734.27	0.032757	7.19	17.98	48.55	1.42
Reach-1	2	PF 1	152.00	2725.11	2726.80	2726.97	2727.47	0.035951	6.57	23.25	37.04	1.44
Reach-1	1.5	PF 1	152.00	2723.00	2724.16	2724.25	2724.68	0.017807	5.94	28.69	41.89	1.08
Reach-1	1	PF 1	152.00	2720.27	2721.00	2720.98	2721.22	0.028998	4.37	40.92	87.59	1.20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Crit PF 1
WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
washh1 Plan: Plan 02 11/7/2006
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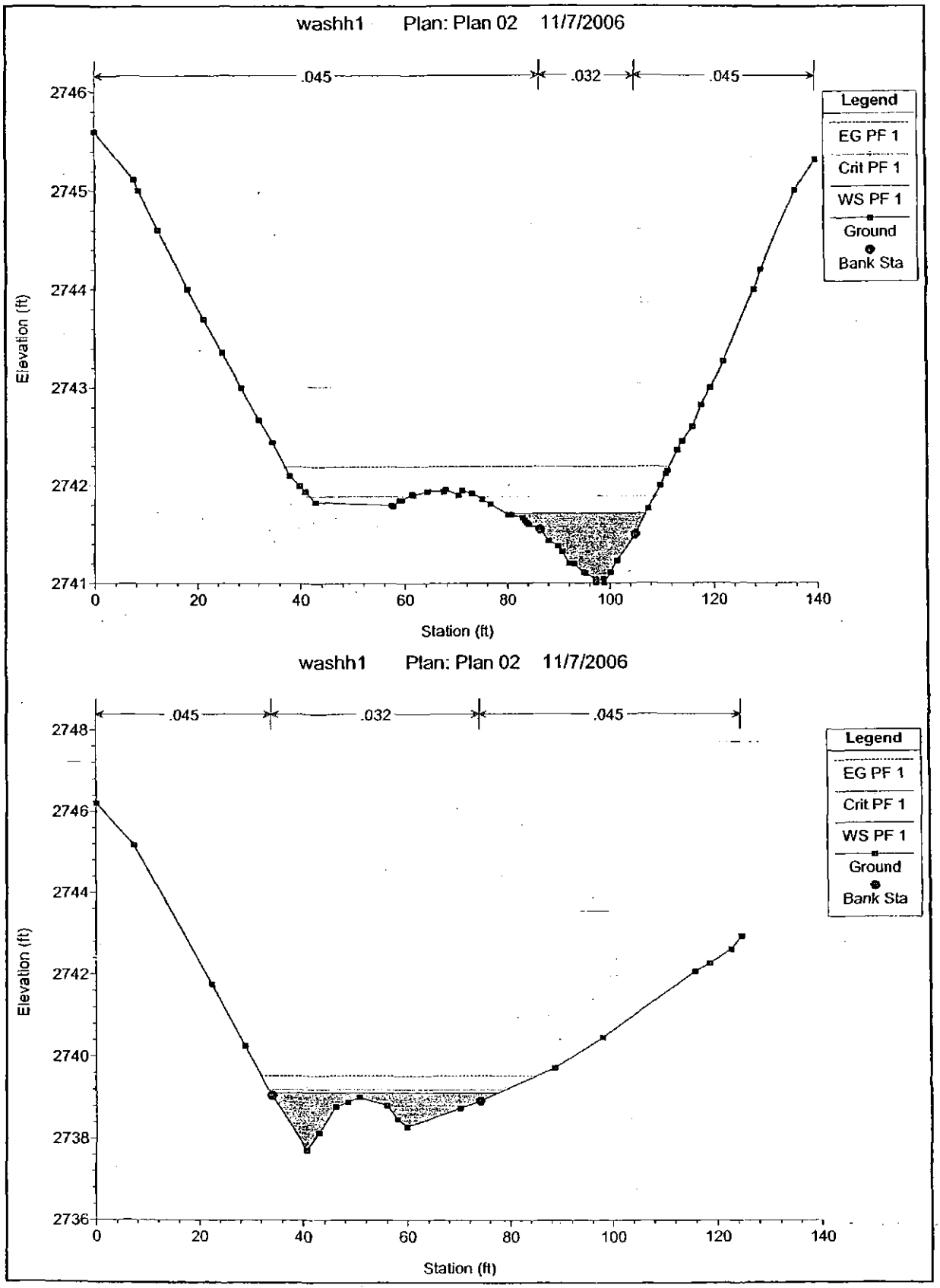
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2745
2744
2743
2742
2741
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20
40
60
80
100
120
140
washh1 Plan: Plan 02 11/7/2006
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.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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120
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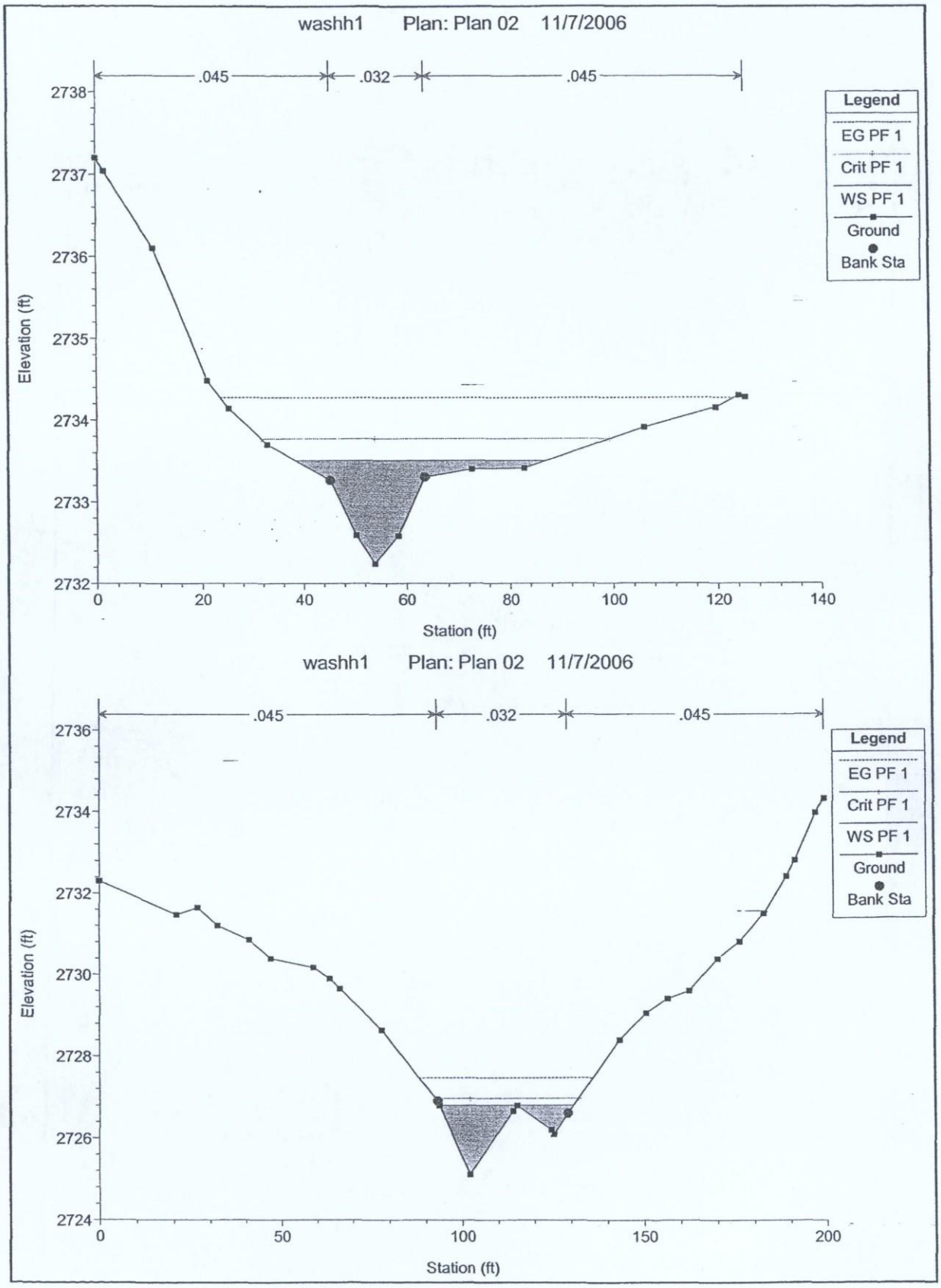
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Crit PF 1
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Bank Sta
Elevation (ft)
Station (ft)
washh1 Plan: Plan 02 11/7/2006
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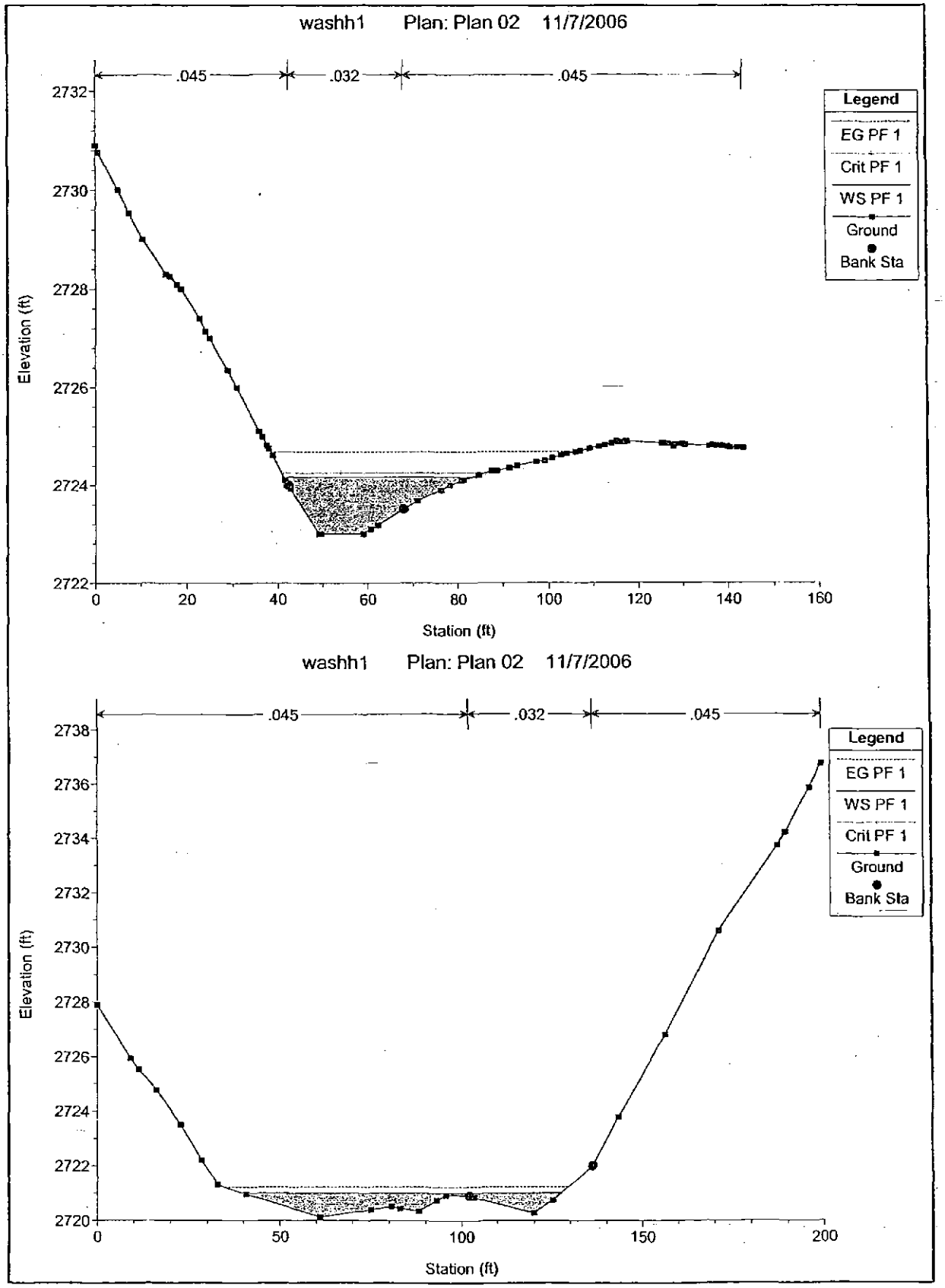
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washh1 Plan: Plan 02 11/7/2006
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Legend
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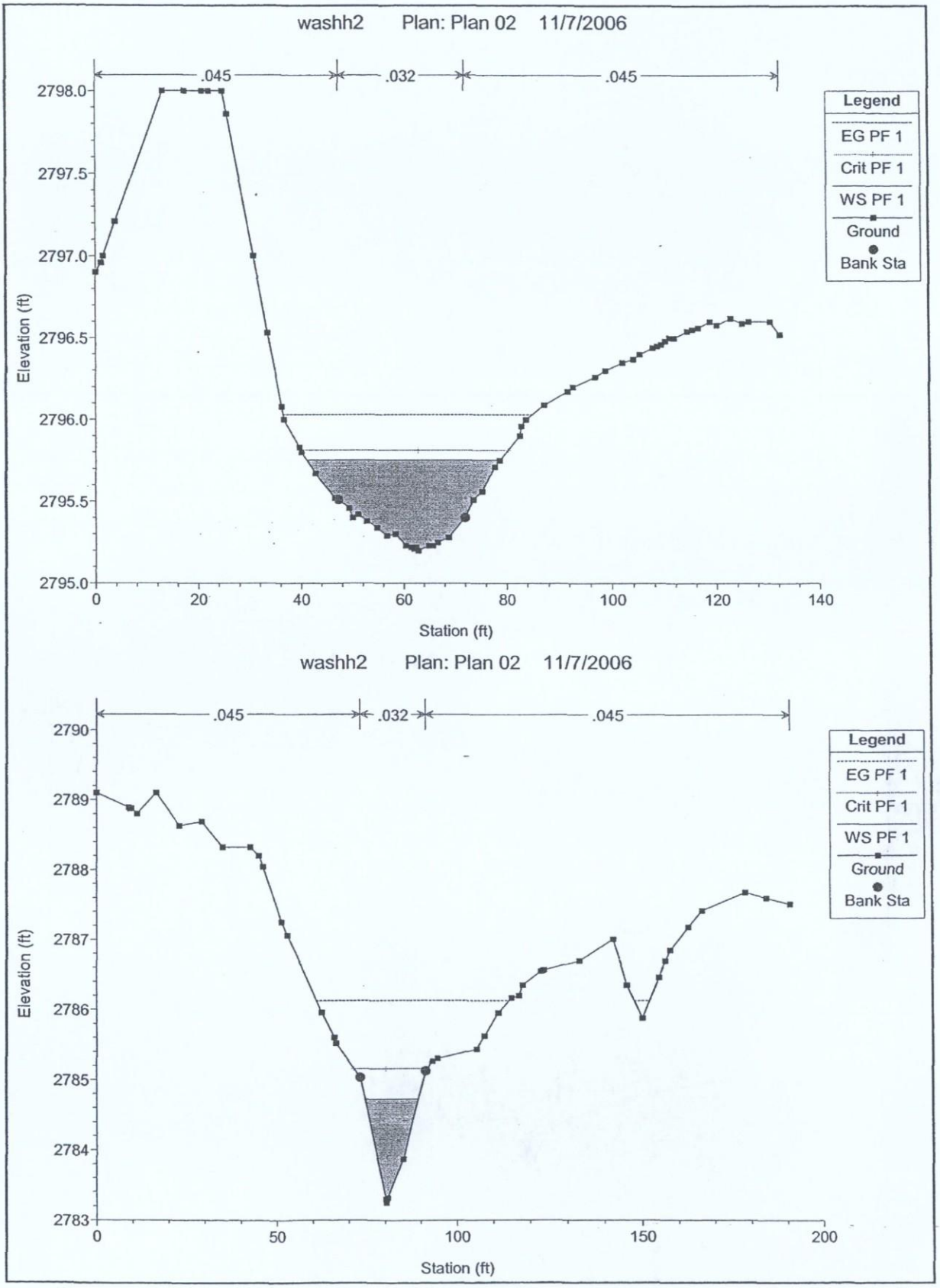
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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2796.5
2796.0
2795.5
2795.0
Elevation (ft)
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40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
.045
.032
.045
2790
2789
2788
2787
2786
2785
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Elevation (ft)
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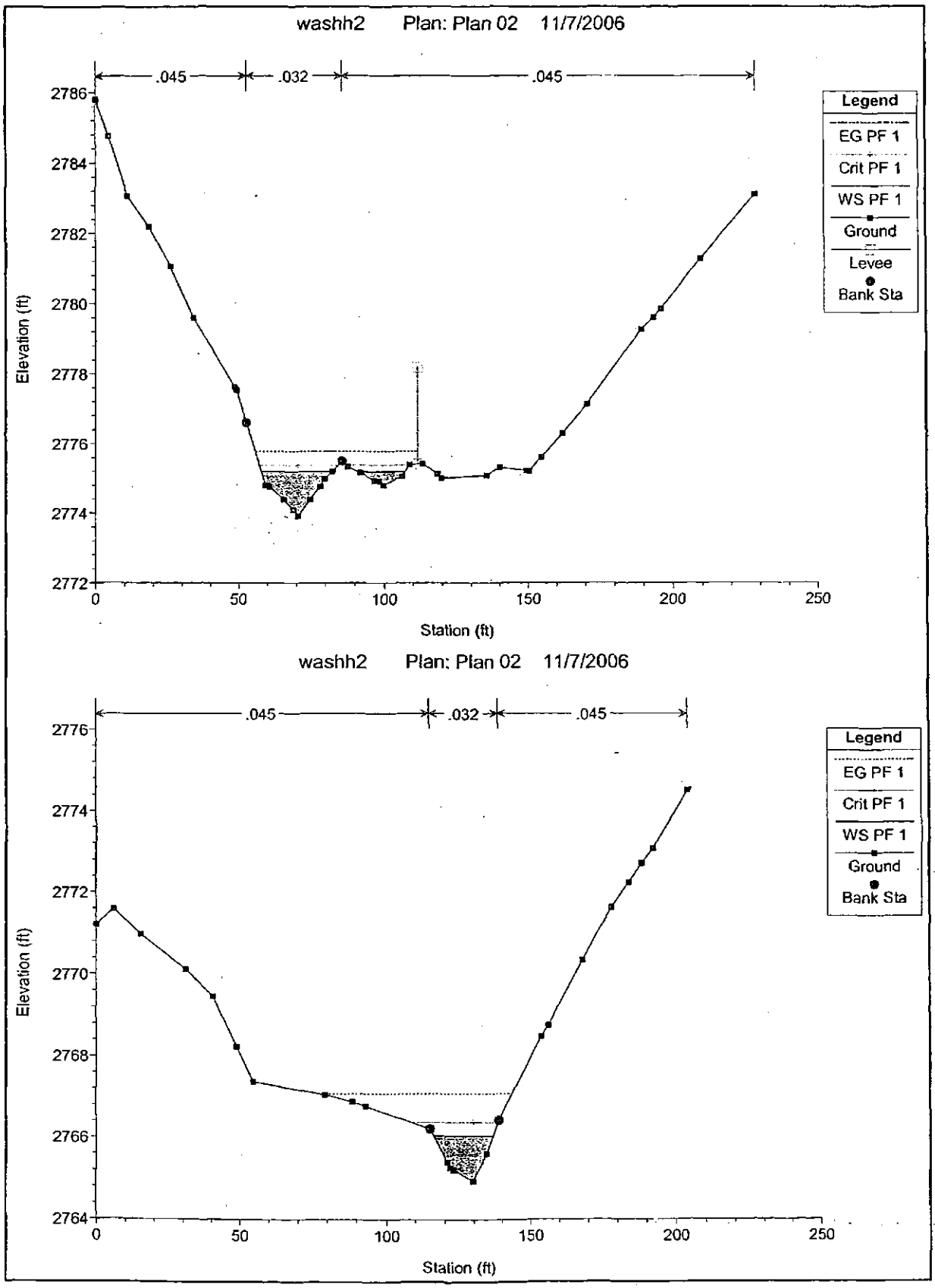
100
150
200
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Elevation (ft)
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100
150
200
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Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
washh2 Plan: Plan 02 11/7/2006
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.032
.045
2776
2774
2772
2770
2768
2766
2764
Elevation (ft)
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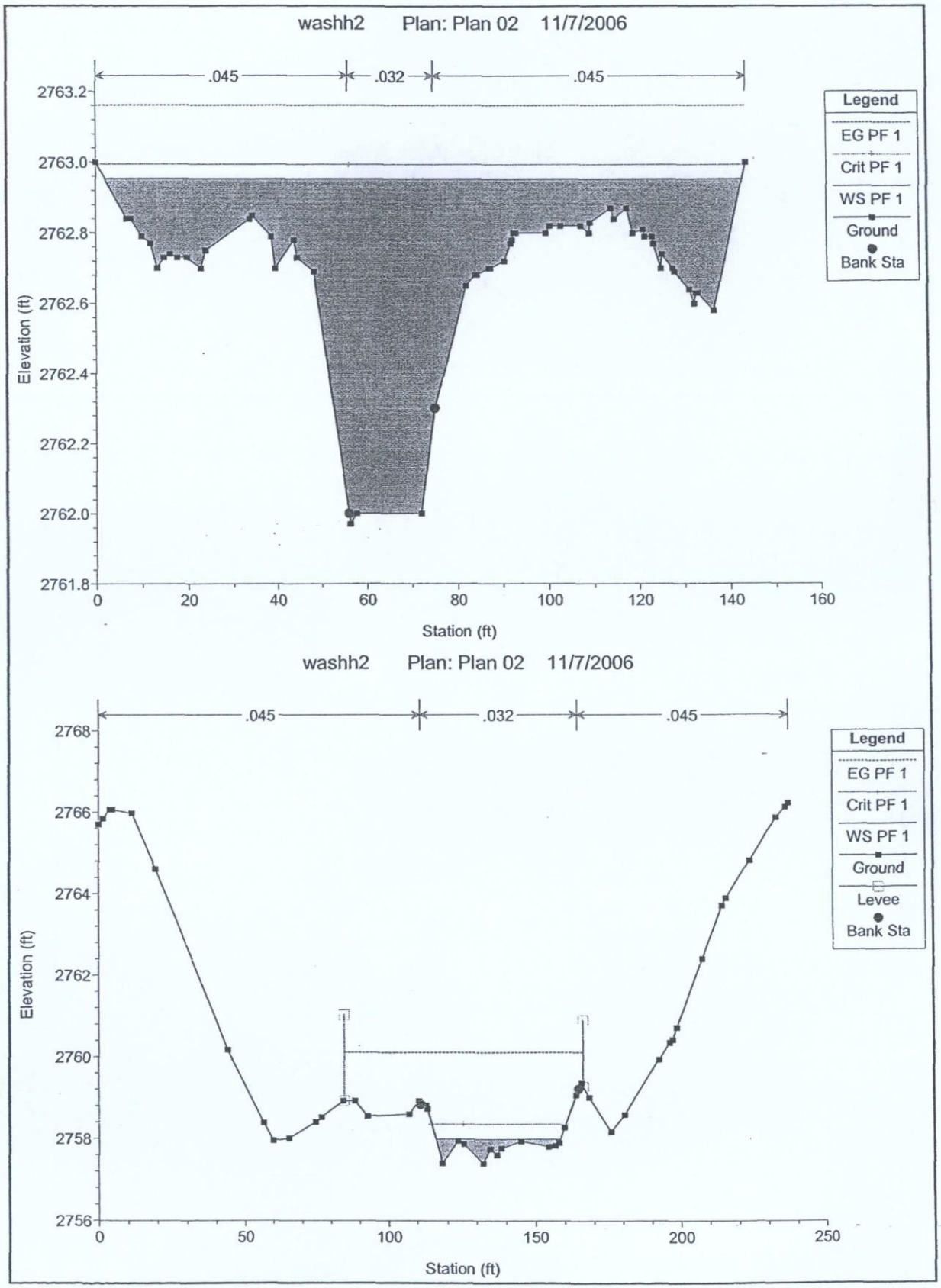
100
150
200
250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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2762.8
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2762.4
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2762.0
2761.8
Elevation (ft)
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
.045
.032
.045
2768
2766
2764
2762
2760
2758
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Elevation (ft)
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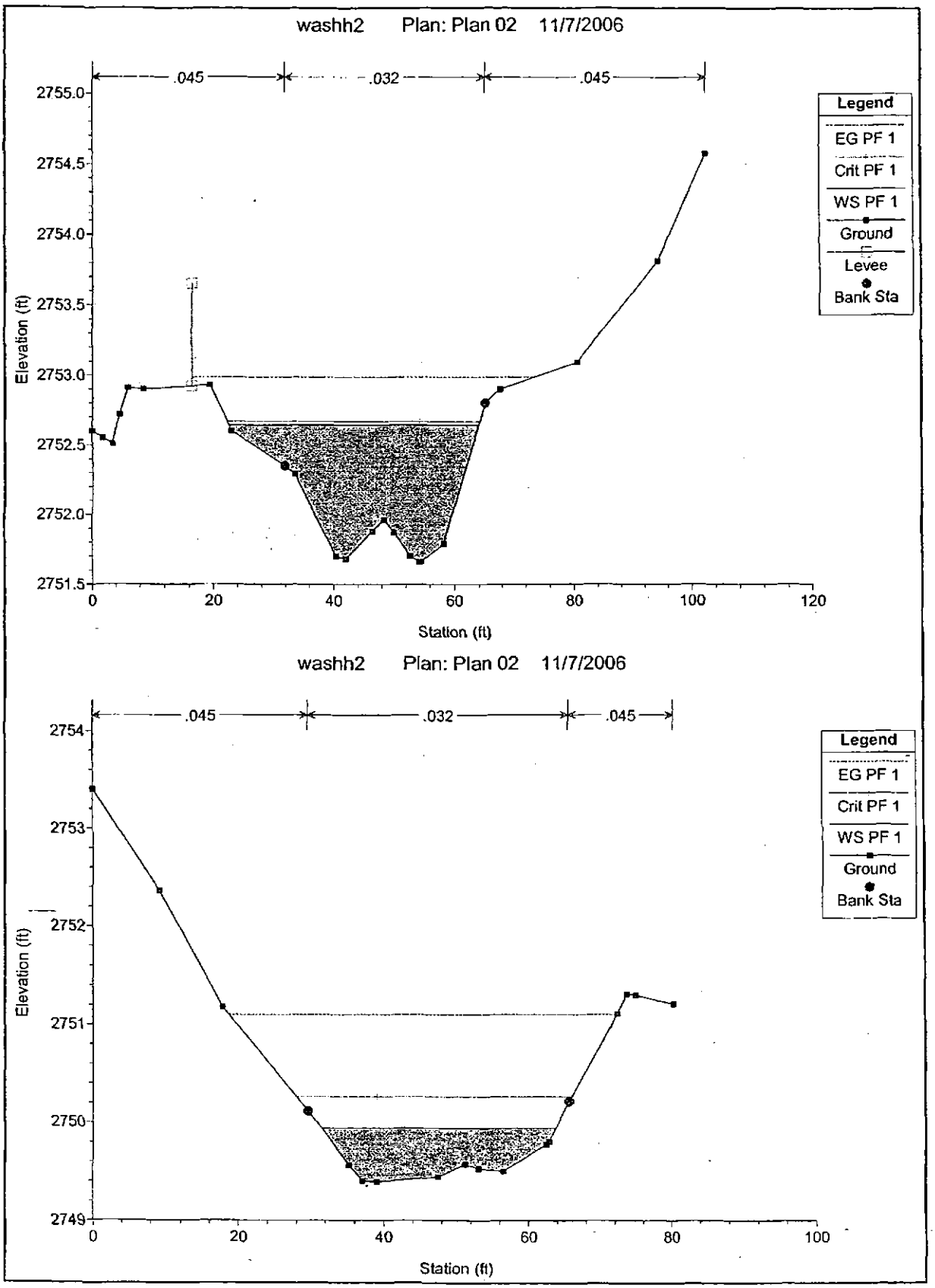
Levee
Bank Sta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WS PF 1
Ground
Levee
Bank Sta
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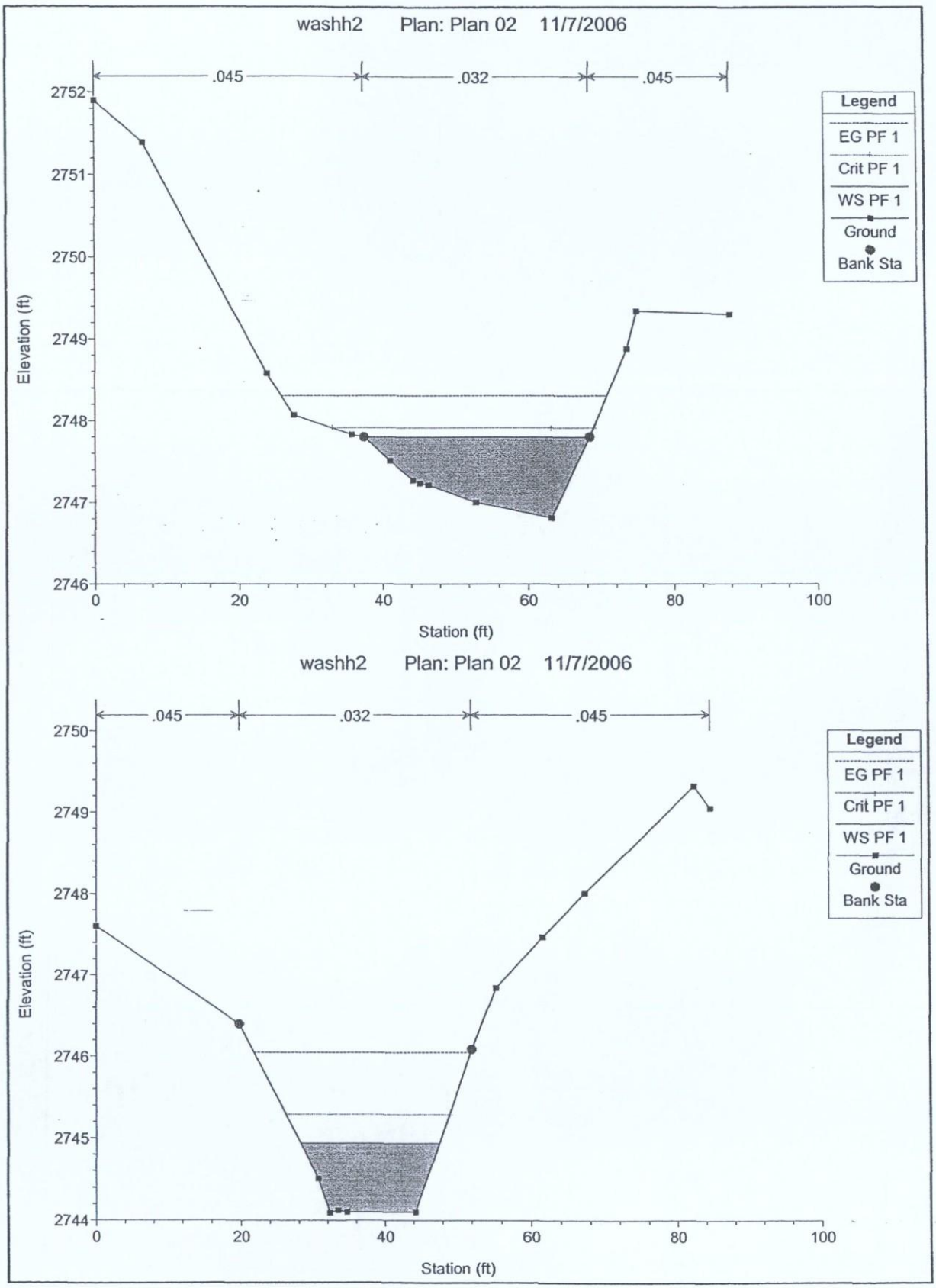
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WS PF 1
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Bank Sta
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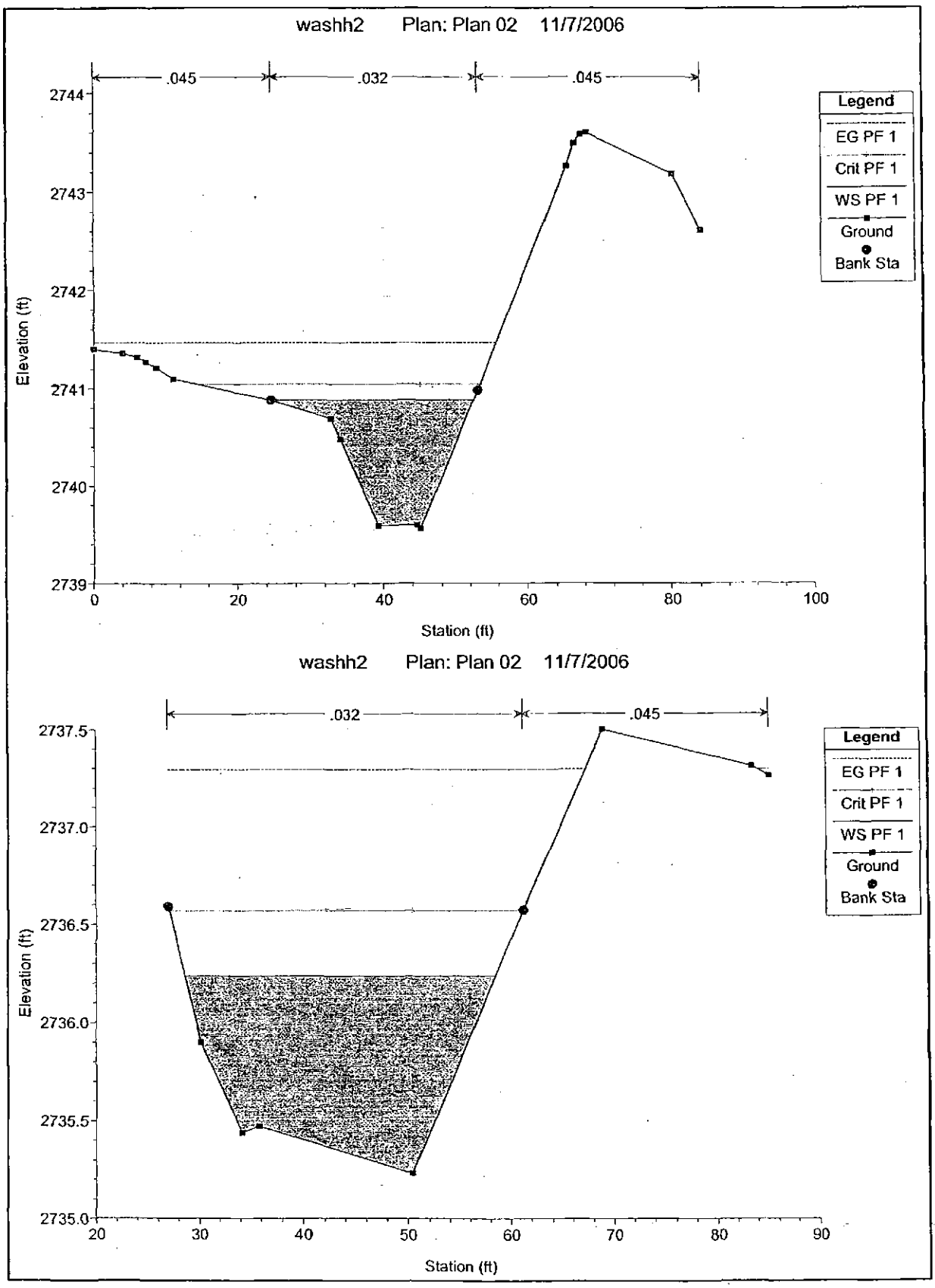
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Station (ft)
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Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
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EG PF 1
Crit PF 1
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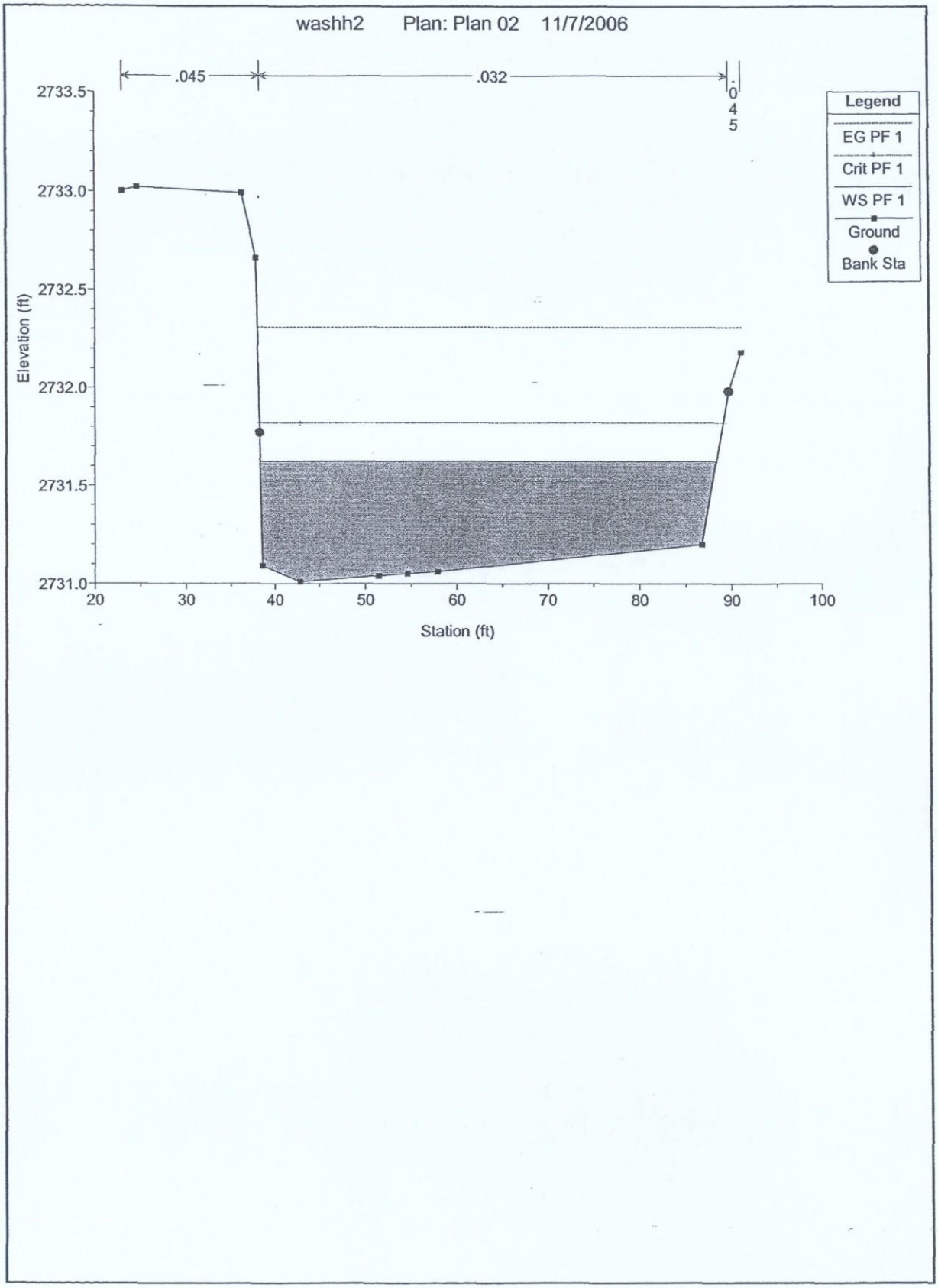
Bank Sta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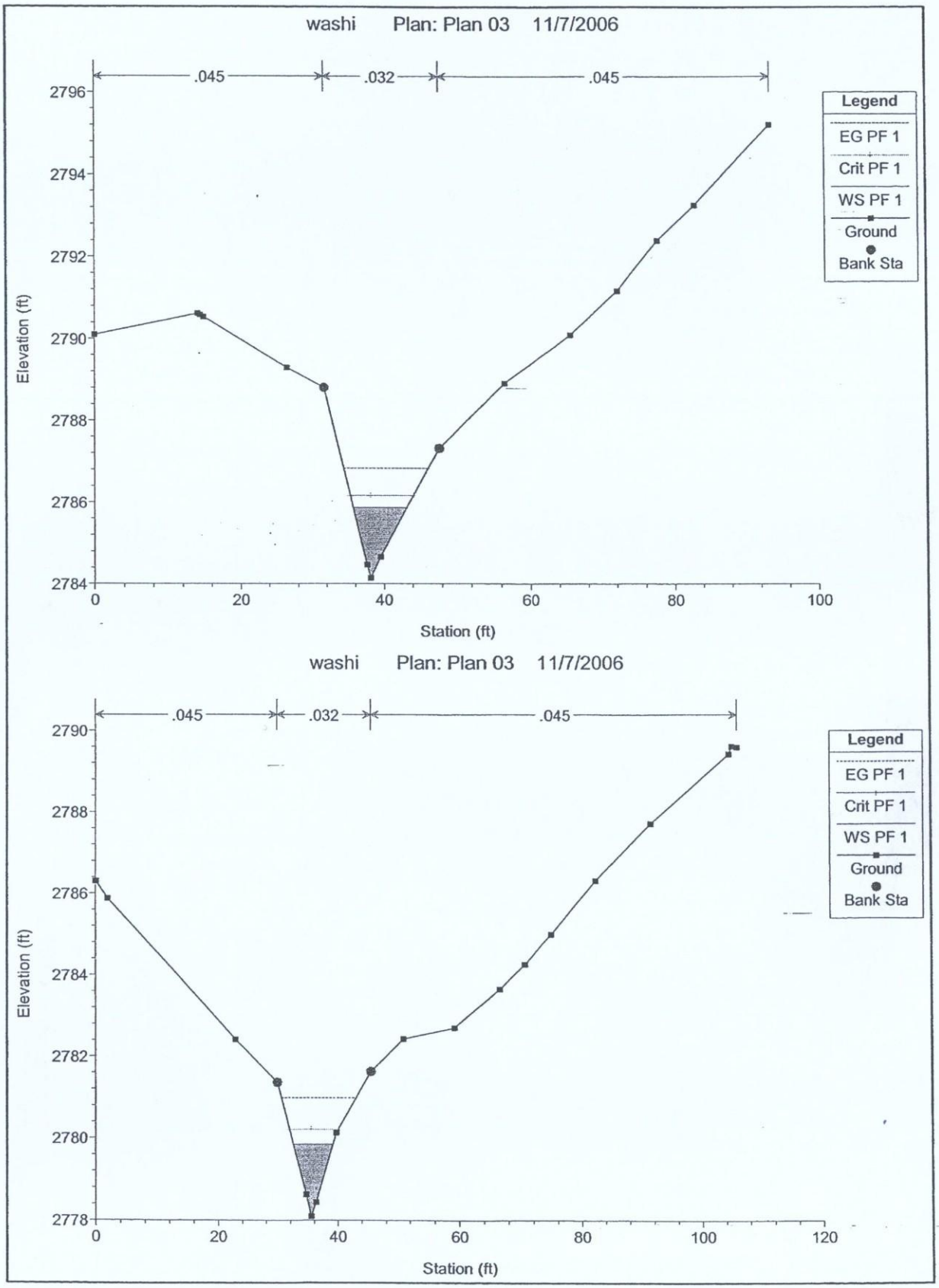
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH I

HEC-RAS Plan: Plan 03 River: RIVER-1 Reach: Reach-1 Profile: PF 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	7	PF 1	50.00	2784.14	2785.86	2786.15	2786.82	0.041077	7.86	6.36	7.51	1.50
Reach-1	6	PF 1	50.00	2778.10	2779.85	2780.22	2780.99	0.047685	8.57	5.84	6.64	1.61
Reach-1	5	PF 1	50.00	2772.66	2773.89	2774.14	2774.70	0.043982	7.22	6.92	10.54	1.57
Reach-1	4	PF 1	50.00	2768.37	2769.92	2770.18	2770.77	0.038173	7.42	6.74	8.58	1.47
Reach-1	3	PF 1	51.00	2764.31	2765.70	2766.03	2766.69	0.049526	7.97	6.40	9.02	1.67
Reach-1	2	PF 1	51.00	2760.53	2761.93	2762.26	2762.86	0.049033	7.75	6.58	9.66	1.65
Reach-1	1.5	PF 1	51.00	2757.88	2758.42	2758.54	2758.75	0.058439	4.61	11.07	42.05	1.58
Reach-1	1	PF 1	73.00	2754.90	2755.88	2755.98	2756.24	0.034060	4.84	15.07	35.24	1.30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Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washi Plan: Plan 03 11/7/2006
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Elevation (ft)
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Station (ft)
Legend
EG PF 1
Crit PF 1
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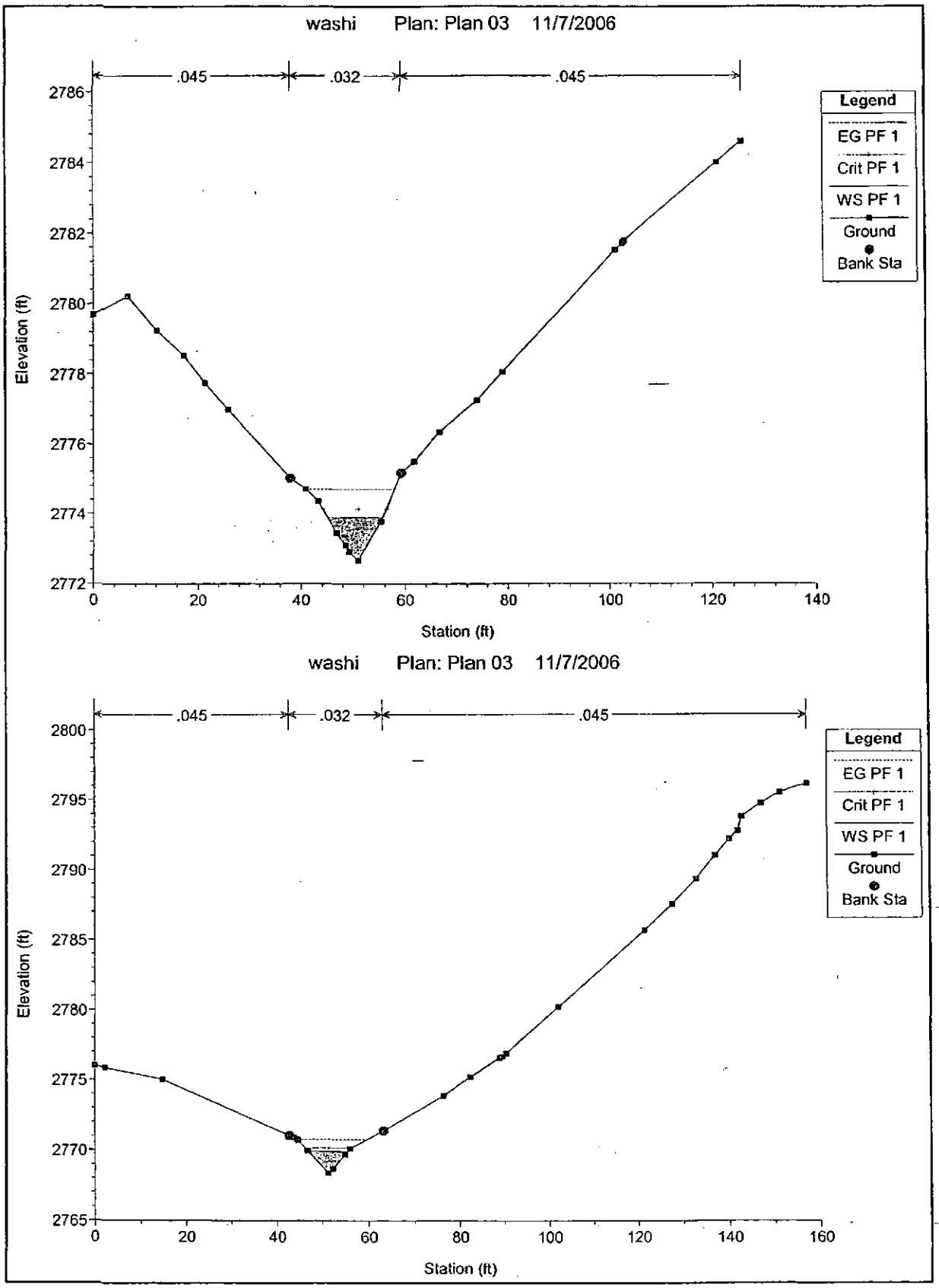
Bank Sta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Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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2776
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120
140
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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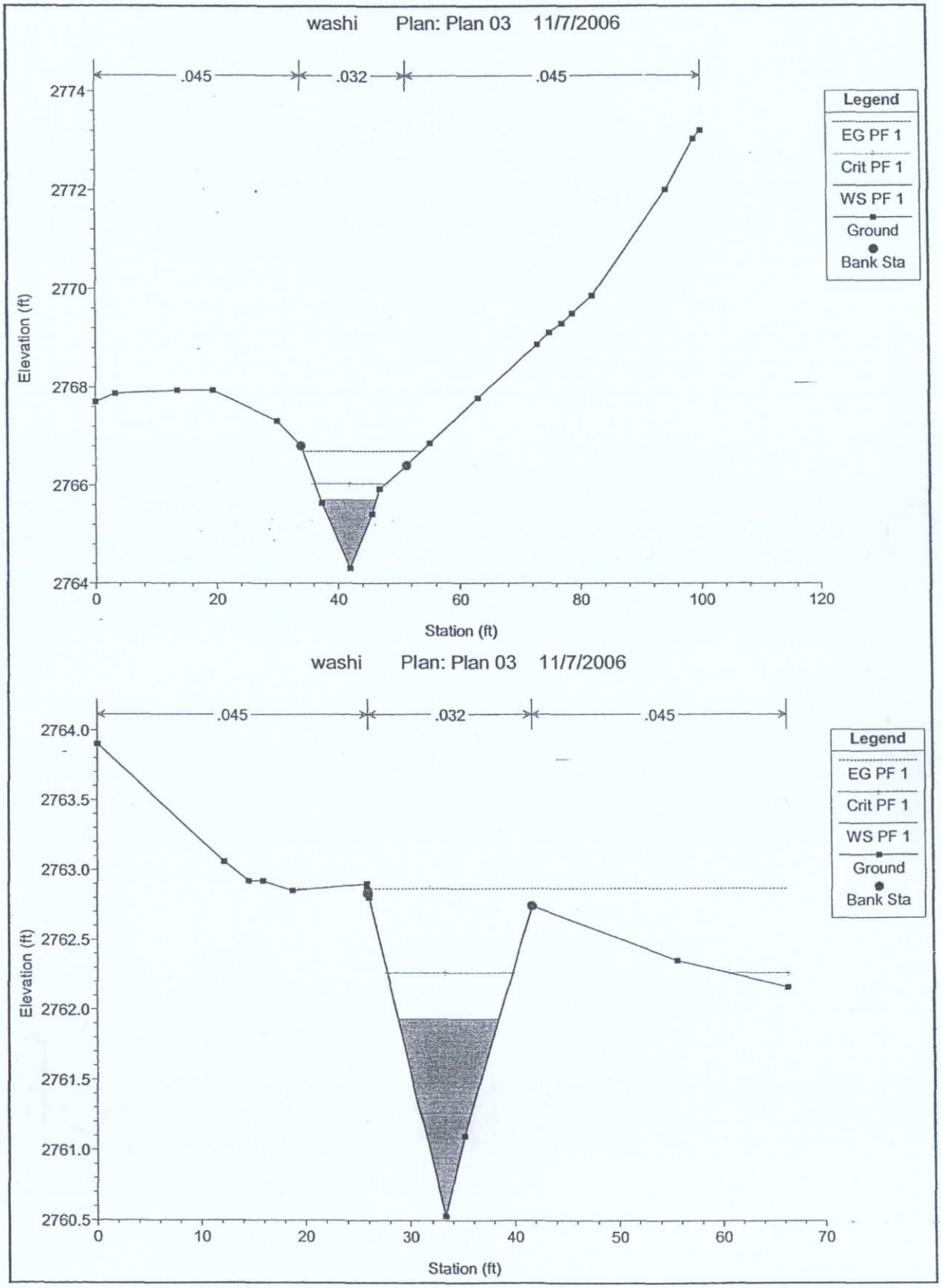
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100
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Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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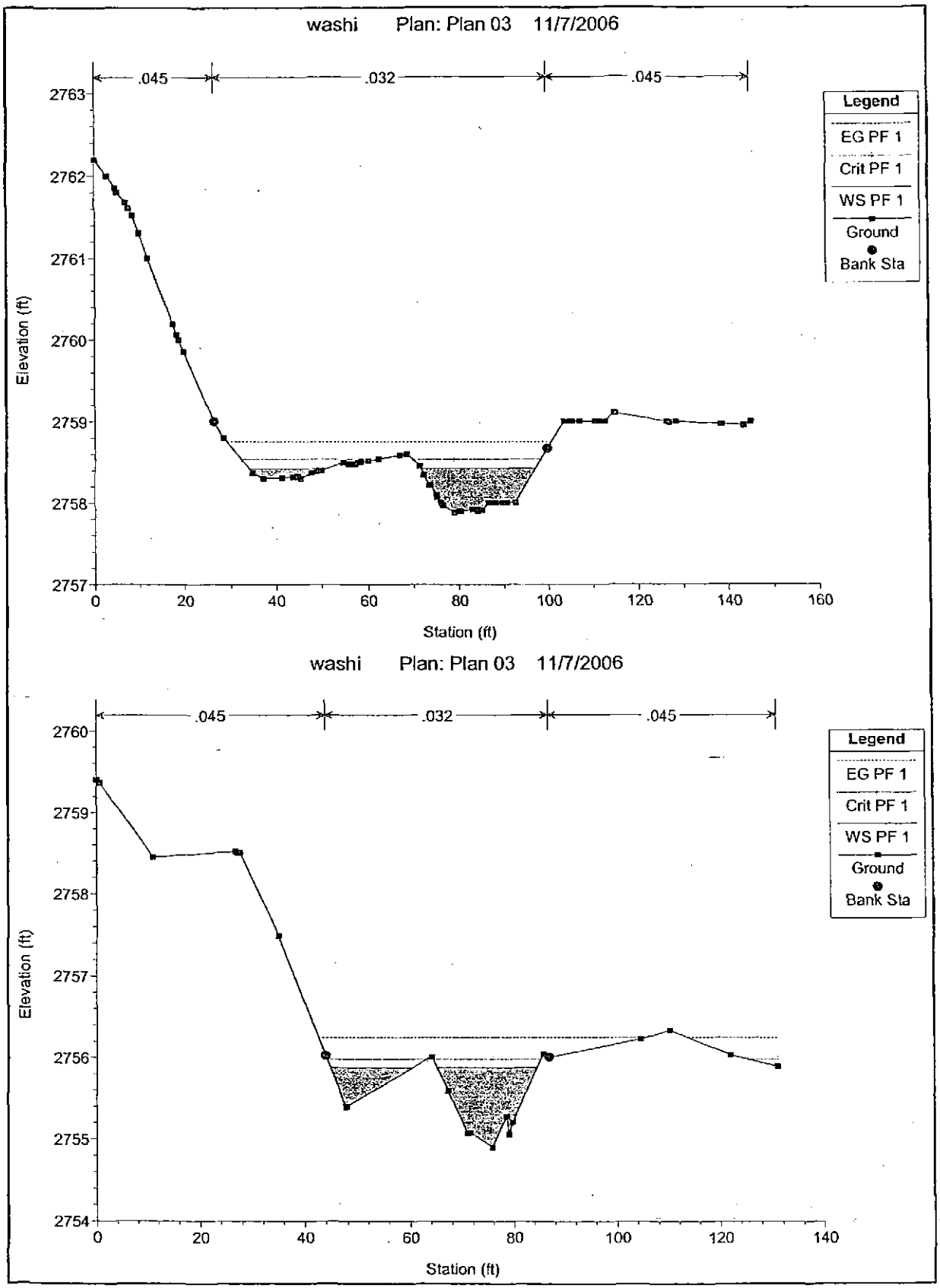
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Legend
EG PF 1
Crit PF 1
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Ground
Bank Sta
Elevation (ft)
Station (ft)
washi Plan: Plan 03 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

Orifice Plate Calculation

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: *Sereno Canyon*
Location: *City of Scottsdale*
Reference: *Orifice Equation*

W/P#: *042054*
Date: *11/15/2006*

$$Q = CA\sqrt{2gh}$$

Where:

C = Orifice Coefficient =	0.60	
d = Diamter of Orfice =	6.00	in
A = Cross-sectional area of orifice =	0.20	Sq.ft
H = Depth above Orifice =	1.50	ft
Q = Orifice Flow =	1.16	cfs
Time to Drain 2 ac-ft =	20.9	hours

A 6 inch diameter orifice plate will bleed at a rate of 1.16 cfs.

APPENDIX G

Storm Water Storage Volume Calculations

Summary of 100-yr, 2-hr Storm Water Storage Calculations

Drainage Basin	Total Development Area (Acre)	100yr-2 hr. Required Volume (acre-ft)	Provided Volume (acre-ft)	Volume Excess / Shortage ± (acre-ft)
A1	3.79	0.53	0.60	0.07
A2	7.17	1.01	1.01	0.00
B	10.94	1.54	1.78	0.24
C	3.65	0.51	0.57	0.06
D	7.73	1.09	1.25	0.16
E1	14.24	2.01	2.01	0.00
E2	13.23	1.87	2.02	0.15
E3	2.19	0.32	0.58	0.26
F1	10.24	1.44	1.99	0.55
F2	3.56	0.5	0.51	0.01
F3	2.93	0.41	0.40	-0.01
G	3.7	0.52	0.51	-0.01
H1	12.94	1.82	1.98	0.16
H2	8.5	1.2	1.31	0.11
I	4.44	0.63	0.64	0.01
J	4.81	0.68	0.66	-0.02
K	2.06	0.29	0.38	0.09
L	1.49	0.21	0.20	-0.01
M	1.44	0.2	0.21	0.01
N	2.81	0.4	0.49	0.09
O	0.55	0.08	0.22	0.14
P	1.73	0.24	0.37	0.13
Q	0.52	0.07	0.07	0.00
R	0.18	0.02	0.00	-0.02
Total	125	17.59	19.76	2.17

Project: *Sereno Canyon*
Location: *City of Scottsdale*
Date: *15-Nov-06*

Project Number: *062654*
Project Engineer: *Geoff Brownell, P.E.*

100-yr, 2-hr Storm Water Storage Calculations

BASIN A1-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2756	4193.3	0.096	0.000	0.000
2757	5251	0.121	0.108	0.108
2758	6404	0.147	0.134	0.242
2759	7655	0.176	0.161	0.404
2760	9474.23	0.217	0.197	0.600
2762	11468.06	0.263	0.481	1.081

TOTAL PROVIDED VOLUME: **0.600**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. Provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
A1	A1-1	0.1757	0.600		
	TOTAL	0.1757	0.600	0.53	0.070

BASIN A2-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2760	492	0.011	0.000	0.000
2761	1062	0.024	0.018	0.018
2762	1981	0.045	0.035	0.053
2763	3373	0.077	0.061	0.114
2764	4971	0.114	0.096	0.210
2765	7030	0.161	0.138	0.348

TOTAL PROVIDED VOLUME: **0.348**

BASIN A2-2

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2759	200	0.005	0.000	0.000
2760	446	0.010	0.007	0.007
2761	816	0.019	0.014	0.022
2762	1277	0.029	0.024	0.046
2763	1932	0.044	0.037	0.083
2764	2937	0.067	0.056	0.139

TOTAL PROVIDED VOLUME: **0.139**

BASIN A2-3

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2733	2268	0.052	0.000	0.000
2734	2913	0.067	0.059	0.059
2735	3632	0.083	0.075	0.135
2736	4486	0.103	0.093	0.228
2737	5369	0.123	0.113	0.340
2738	6297	0.145	0.134	0.474

TOTAL PROVIDED VOLUME: **0.474**

BASIN A2-4

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2792	168	0.004	0.000	0.000
2793	425	0.010	0.007	0.007
2794	866	0.020	0.015	0.022
2795	1638	0.038	0.029	0.050

TOTAL PROVIDED VOLUME: **0.050**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. Provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
A2	A2-1	0.1614	0.348		
	A2-2	0.0674	0.139		
	A2-3	0.1446	0.474		
	A2-4	0.0376	0.050		
	TOTAL	0.4110	1.011	1.01	0.00

BASIN B-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2798	809	0.019	0.000	0.000
2799	1241	0.028	0.024	0.024
2800	1804	0.041	0.035	0.058
2801	2456	0.056	0.049	0.107

TOTAL PROVIDED VOLUME: **0.107**

BASIN B-2

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2798	2378	0.055	0.000	0.000
2799	3095	0.071	0.063	0.063
2800	3952	0.091	0.081	0.144
2801	4986	0.114	0.103	0.246

TOTAL PROVIDED VOLUME: **0.246**

BASIN B-3

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2781	3419	0.078	0.000	0.000
2782	4333	0.099	0.089	0.089
2783	5371	0.123	0.111	0.200

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. Provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
B	B-1	0.0564	0.107		
	B-2	0.1145	0.246		
	B-3	0.1523	0.338		
	B-4	0.1144	0.241		
	B-5	0.2549	0.843		
	TOTAL	0.6924	1.776	1.54	0.236

2784	6633	0.152	0.138	0.338
2785	7269	0.167	0.160	0.498

TOTAL PROVIDED VOLUME: **0.338**

BASIN - B-4

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2768	2154	0.049	0.000	0.000
2769	2990	0.069	0.059	0.059
2770	3950	0.091	0.080	0.139
2771	4983	0.114	0.103	0.241

TOTAL PROVIDED VOLUME: **0.241**

BASIN - B-5

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2742	5494	0.126	0.000	0.000
2743	7220	0.166	0.146	0.146
2744	9089.9	0.209	0.187	0.333
2745	11105	0.255	0.232	0.565
2746	13101	0.301	0.278	0.843

TOTAL PROVIDED VOLUME: **0.843**

BASIN - C-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2779	4198	0.096	0.000	0.000
2780	5112	0.117	0.107	0.107
2781	6102	0.140	0.129	0.236
2782	7169	0.165	0.152	0.388
2783	8375	0.192	0.178	0.566

TOTAL PROVIDED VOLUME: **0.566**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
C	C-1	0.1923	0.566		
	TOTAL	0.1923	0.566	0.51	0.056

BASIN - D-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2749	2054	0.047	0.000	0.000
2750	2819	0.065	0.056	0.056
2751	3699	0.085	0.075	0.131
2752	4712	0.108	0.097	0.227
2753	5928	0.136	0.122	0.349

TOTAL PROVIDED VOLUME: **0.349**

BASIN - D-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2719	732.75	0.017	0.000	0.000
2720	2673.44	0.061	0.039	0.039
2721	5208.95	0.120	0.090	0.130
2722	8803	0.202	0.161	0.290
2723	13007	0.299	0.250	0.541
2724	18123.75	0.416	0.357	0.898

TOTAL PROVIDED VOLUME: **0.898**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
D	D-1	0.1361	0.349		
	D-2	0.2021	0.898		
	TOTAL	0.3382	1.248	1.09	0.158

BASIN - E1-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2723	5198	0.119	0.000	0.000
2724	6100	0.140	0.130	0.130
2725	7068	0.162	0.151	0.281
2726	8098	0.186	0.174	0.455
2727	9189	0.211	0.198	0.653
2728	10351	0.238	0.224	0.878

TOTAL PROVIDED VOLUME: **0.878**

BASIN - E1-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2695	5427	0.125	0.000	0.000
2696	7366	0.169	0.147	0.147
2697	8975	0.206	0.188	0.334
2698	10686	0.245	0.226	0.560
2699	12497	0.287	0.266	0.826
2700	14406	0.331	0.309	1.135

TOTAL PROVIDED VOLUME: **1.135**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E1	E1-1	0.1859	0.878		
	E1-2	0.3307	1.135		
	TOTAL	0.5166	2.013	2.010	0.003

BASIN - E2-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2693	13886	0.319	0.000	0.000

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E2	E2-1	0.4963	2.020	1.87	

2694	15293	0.351	0.335	0.335
2695	16761	0.385	0.368	0.703
2696	18290	0.420	0.402	1.105
2697	19880	0.456	0.438	1.543
2698	21620	0.496	0.476	2.020

TOTAL PROVIDED VOLUME: **2.020**

TOTAL	0.4963	2.020	1.870	0.150	

BASIN E3-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2711	3064	0.070	0.000	0.000
2712	4065	0.093	0.082	0.082
2713	5197	0.119	0.106	0.188
2714	6456	0.148	0.134	0.322

TOTAL PROVIDED VOLUME: **0.322**

BASIN E3-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2683	65.87	0.002	0.000	0.000
2684	317.95	0.007	0.004	0.004
2685	1008.73	0.023	0.015	0.020
2686	2251.36	0.052	0.037	0.057
2687	4199.64	0.096	0.074	0.131
2688	6780.55	0.156	0.126	0.257

TOTAL PROVIDED VOLUME: **0.257**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E3	E3-1	0.1482	0.322		
	E3-2	0.1557	0.257		
	TOTAL	0.3039	0.579	0.32	0.259

BASIN F1-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2725	5323.24	0.122	0.000	0.000
2726	5822.09	0.134	0.128	0.128
2727	6327.79	0.145	0.139	0.267
2728	6840.34	0.157	0.151	0.419

TOTAL PROVIDED VOLUME: **0.419**

BASIN F1-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2708	6246.38	0.143	0.000	0.000
2709	7252.9	0.167	0.155	0.155
2710	8307.83	0.191	0.179	0.334
2711	9411.15	0.216	0.203	0.537

TOTAL PROVIDED VOLUME: **0.537**

BASIN F1-3

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2696	8712.31	0.200	0.000	0.000
2697	9621.58	0.221	0.210	0.210
2698	10649.01	0.244	0.233	0.443
2699	11791.2	0.271	0.258	0.701

TOTAL PROVIDED VOLUME: **0.701**

BASIN F1-4

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2676	3139.86	0.072	0.000	0.000
2677	4162.11	0.096	0.084	0.084
2678	5460.19	0.125	0.110	0.194
2679	7098.73	0.163	0.144	0.338

TOTAL PROVIDED VOLUME: **0.338**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F1	F1-1	0.1570	0.419		
	F1-2	0.2161	0.537		
	F1-3	0.2707	0.701		
	F1-4	0.1630	0.338		
	TOTAL	0.8067	1.995	1.44	0.555

BASIN F2-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2700	765	0.018	0.000	0.000
2701	1324	0.030	0.024	0.024
2702	1953.89	0.045	0.038	0.062
2703	2662.39	0.061	0.053	0.115

TOTAL PROVIDED VOLUME: **0.115**

BASIN F2-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2681	4470.86	0.103	0.000	0.000
2682	5282.49	0.121	0.112	0.112
2683	6174.37	0.142	0.132	0.243
2684	7130.31	0.164	0.153	0.396

TOTAL PROVIDED VOLUME: **0.396**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F2	F2-1	0.0611	0.115		
	F2-2	0.1637	0.396		
	TOTAL	0.2248	0.511	0.5	0.011

BASIN F3-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2704	1240	0.028	0.000	0.000
2705	2048.96	0.047	0.038	0.038
2706	2915.75	0.067	0.057	0.095
2707	3851.96	0.088	0.078	0.172
2708	4957.71	0.114	0.101	0.274
2709	6277.08	0.144	0.129	0.403

TOTAL PROVIDED VOLUME: **0.403**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F3	F3-1	0.0884	0.403		
	TOTAL	0.0884	0.403	0.41	-0.007

BASIN G-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2722	3720	0.085	0.000	0.000
2723	4513	0.104	0.095	0.095
2724	5460	0.125	0.114	0.209
2725	6561	0.151	0.138	0.347
2726	7817	0.179	0.165	0.512
2727	9484	0.218	0.199	0.711

TOTAL PROVIDED VOLUME: **0.512**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
G	G-1	0.0000	0.512		
	TOTAL	0.0000	0.512	0.520	-0.008

BASIN H1-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2738	36.36	0.001	0.000	0.000
2739	715.37	0.016	0.009	0.009
2740	2504.5	0.057	0.037	0.046
2741	5064.58	0.116	0.087	0.132
2742	8155.31	0.187	0.152	0.284
2743	11514.5	0.264	0.226	0.510
2744	15653.69	0.359	0.312	0.822
2745	20773.56	0.477	0.418	1.240
2745.5	24068.465	0.553	0.257	1.497
2746	27363.37	0.628	0.988	1.809

TOTAL PROVIDED VOLUME: **1.497**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
H1	H1-1	0.5525	1.497		
	H1-2	0.2491	0.484		
	TOTAL	0.8016	1.98	1.82	0.2

BASIN H1-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2721	49.02	0.001	0.000	0.000
2722	1008	0.023	0.012	0.012
2723	2630	0.060	0.042	0.054
2724	4585	0.108	0.084	0.138
2725	7311	0.168	0.138	0.276
2726	10849	0.249	0.208	0.484

TOTAL PROVIDED VOLUME: **0.484**

BASIN H2-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2772	6103	0.140	0.000	0.000
2773	6926	0.159	0.150	0.150
2774	7774	0.178	0.169	0.318
2775	8675	0.199	0.189	0.507
2776	9692	0.222	0.211	0.718

TOTAL PROVIDED VOLUME: **0.718**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
H2	H2-1	0.2225	0.718		
	H2-2	0.2463	0.590		
	TOTAL	0.4688	1.308	1.2	0.108

BASIN H2-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2785	6526	0.150	0.000	0.000
2786	7846	0.180	0.165	0.165
2787	9247	0.212	0.196	0.361
2788	10730	0.246	0.229	0.590

TOTAL PROVIDED VOLUME: **0.590**

BASIN I-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2755	7532	0.173	0.000	0.000
2756	8664	0.199	0.186	0.186
2757	9863	0.226	0.213	0.399
2758	11132	0.256	0.241	0.640

TOTAL PROVIDED VOLUME: **0.640**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
I	I-1	0.2556	0.640		
	TOTAL	0.2556	0.640	0.63	0.010

BASIN J-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC	CUM

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±

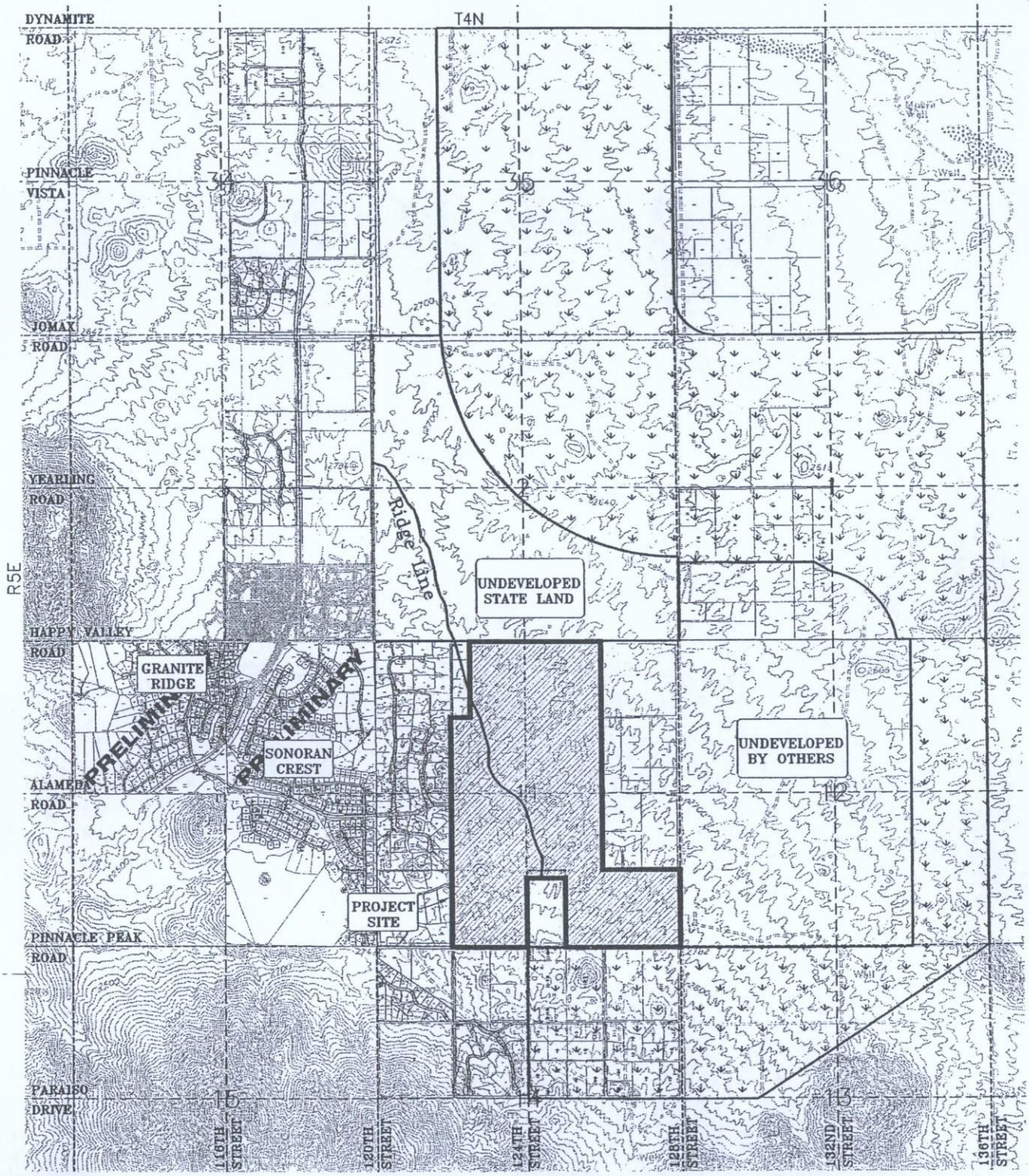
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2774	2722	0.062	0.000	0.000
2775	3568	0.082	0.072	0.072

TOTAL PROVIDED VOLUME: **0.072**

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
Q	Q-1	0.0819	0.072		
	TOTAL	0.0819	0.072	0.07	0.002

PLATE 1

Vicinity Map



CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

SERENO CANYON

Plate 1
"Vicinity Map"

WOOD/PATEL
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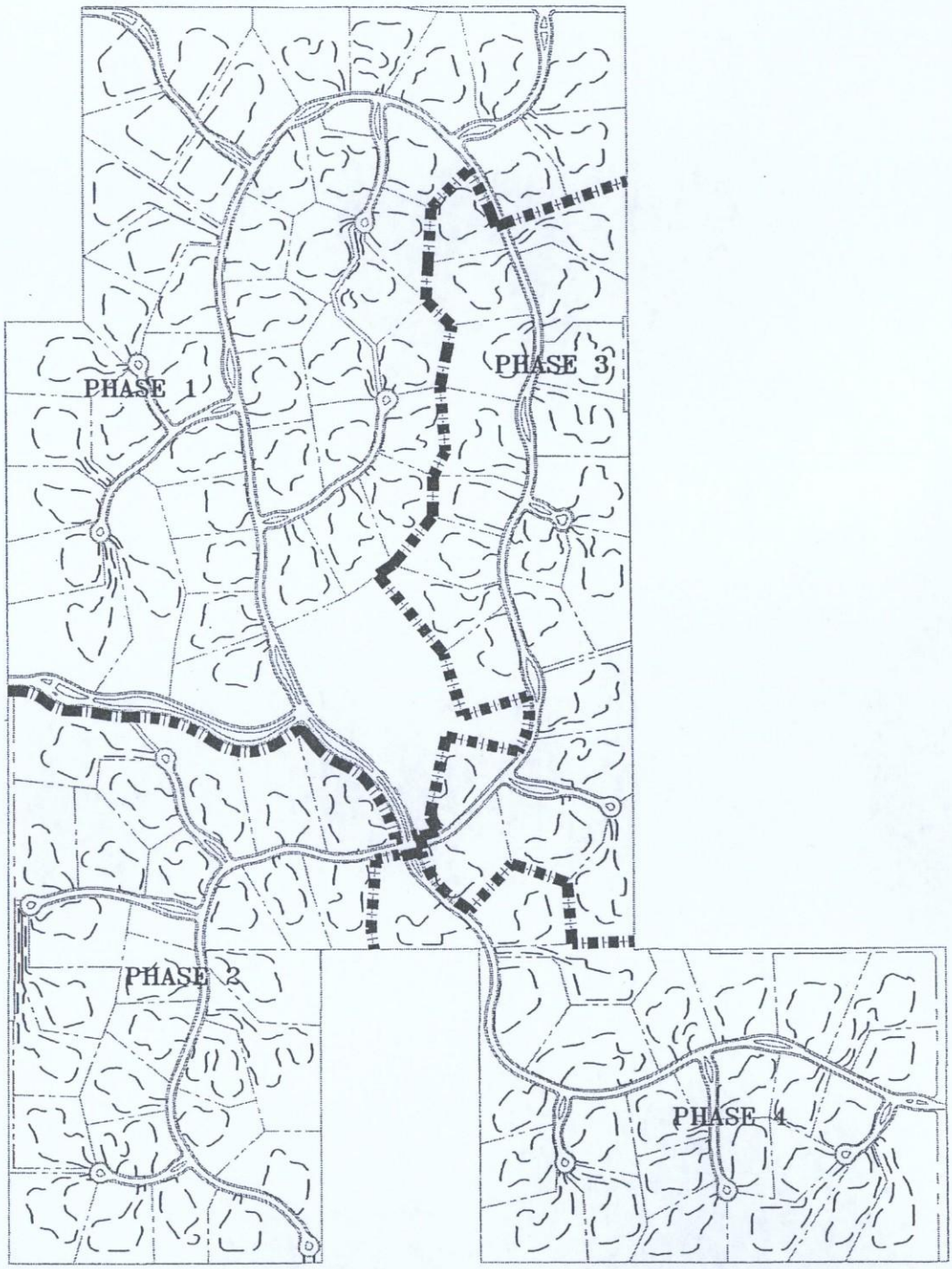
N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 01-VICINITYMAP.dwg - Feb 22,2006

PLATE 1A

Phasing Map



700 0 350 700

1 inch = 700 ft.

CROWN
COMMUNITY DEVELOPMENT
A Hasing Crown Company

SERENO CANYON

Plate 1A

"Phasing Map"

WOOD/PATEL

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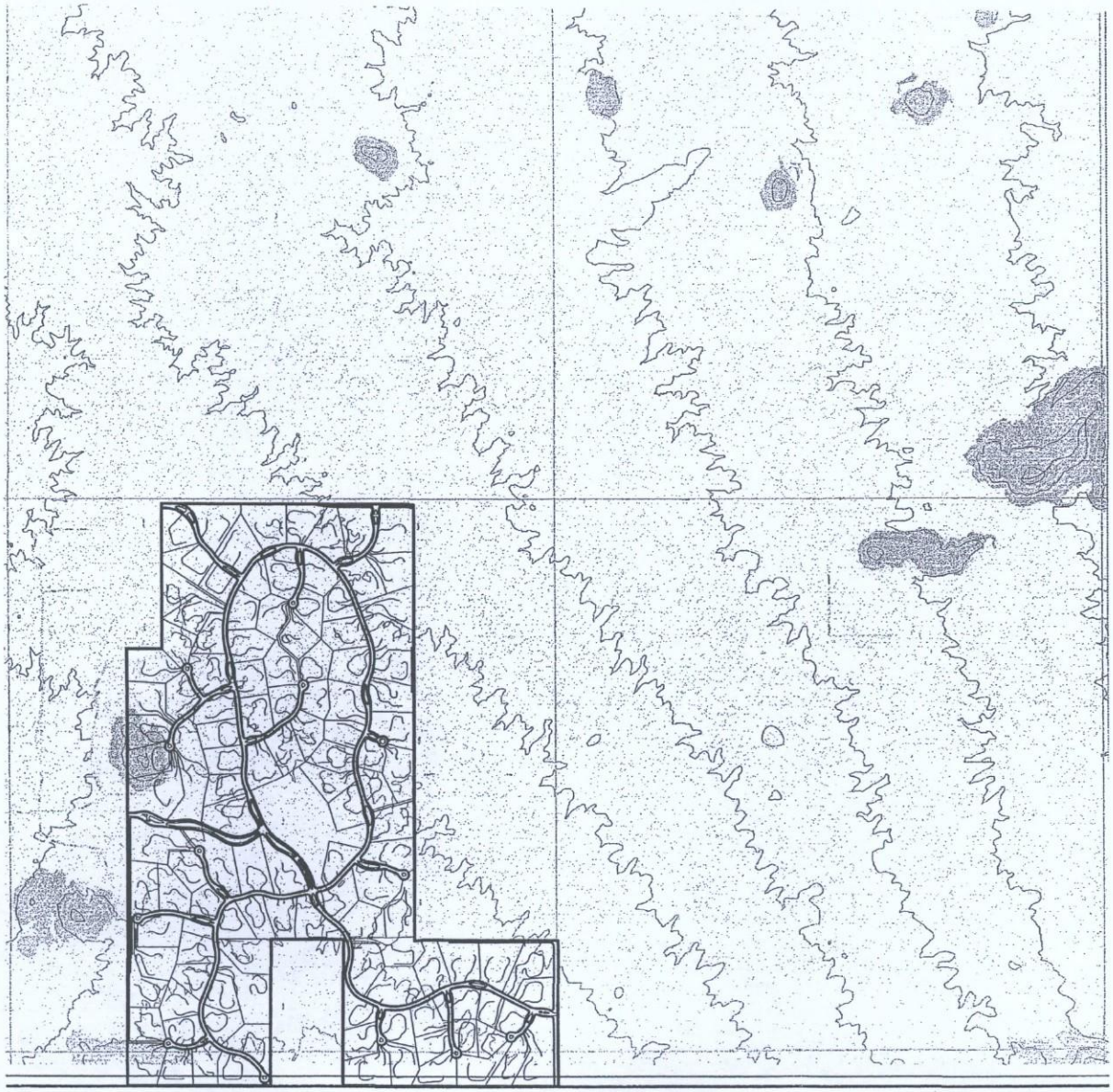
N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 01A-Phasing Map.dwg - Feb 13,2006

PLATE 2

ESL Classification



ESL Landforms and Protected Peaks and Ridges

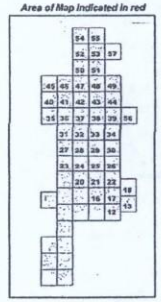
City Limits
Section Boundary
Streets

Landforms
- Lower Desert
- Upper Desert
- Hillside

Elevation
- 50' Contour
- 20' Contour

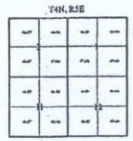
Protected Peaks and Ridges
- Peak or Ridge Line

Area of Map Indicated in red



Official Detail Map

Map 34



Data Source: City of Scottsdale

1000 0 500 1000

Horz. 1 in. = 1000 ft.

PLATE 2
ESL CLASSIFICATION

CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

WOOD/PATEL
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TRANSPORTATION/TRAFFIC
WATER / WASTEWATER + SURVEYING
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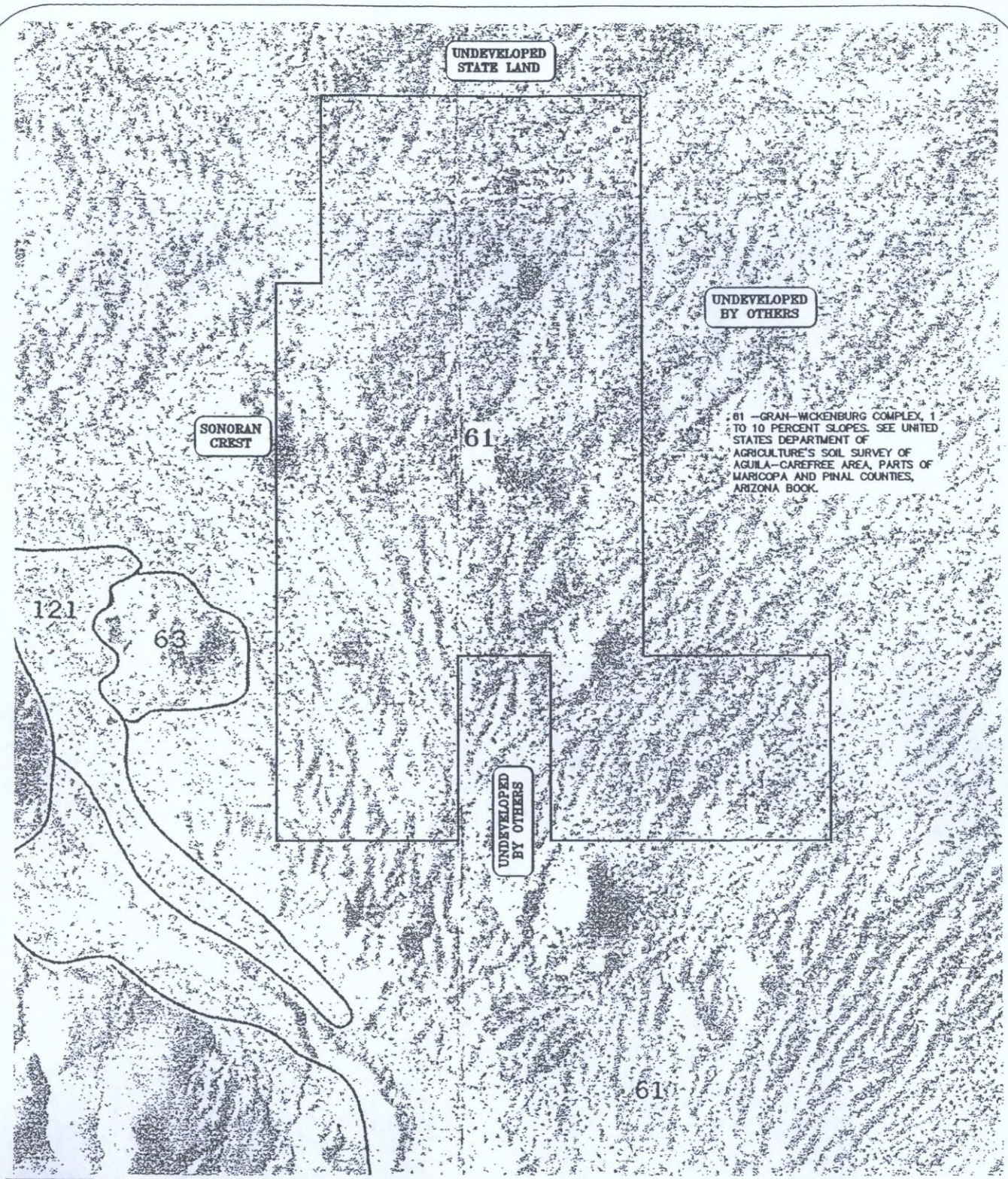
PHOENIX + MESA + TUCSON

PLATE 3

Soils Classification Map



1000 0 500 1000

Horz. 1 in. = 1000 ft.

CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

SERENO CANYON

Plate 3
"Soils Classification"

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TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
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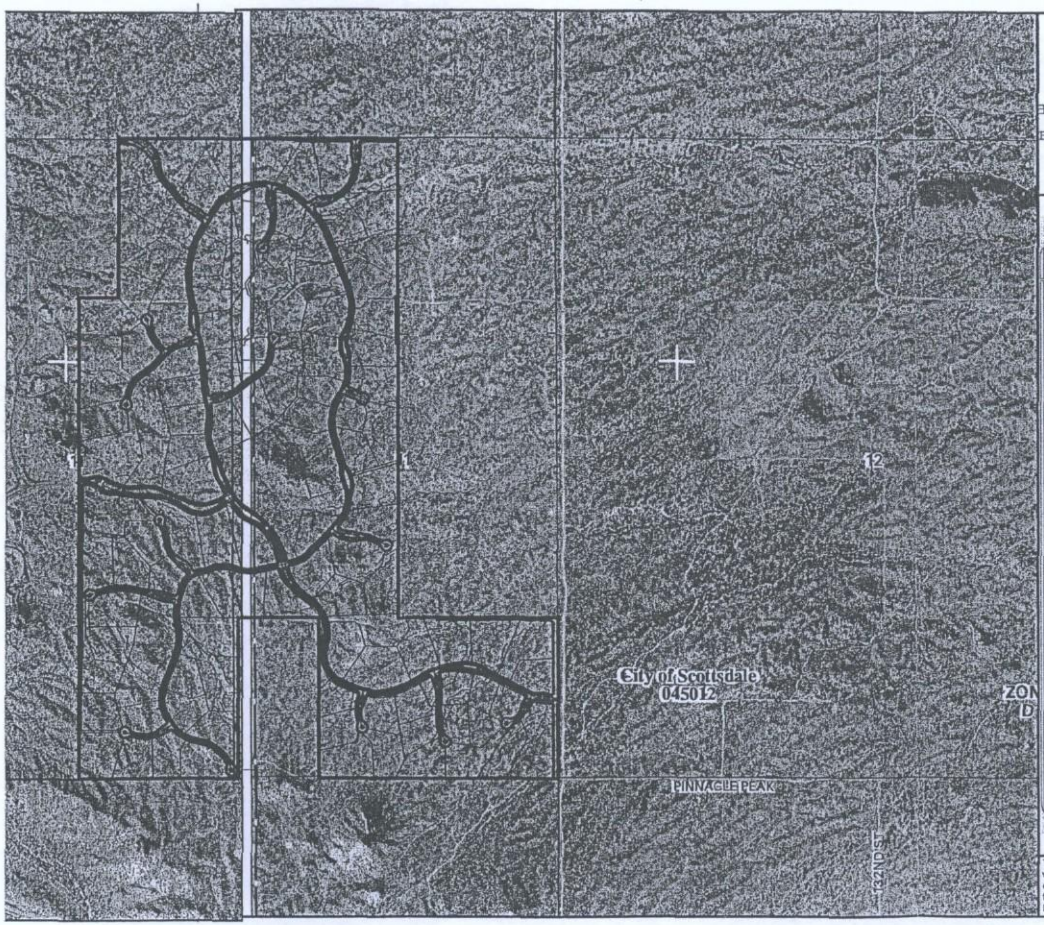
N:\2004\042054\Dwg\Exhibits\Soils Exhibit.dwg

PLATE 4

Flood Insurance Rate Map (FIRM)



MAP SCALE 1" = 1000'

0 1000 2000 FEET

0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1260F

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1260 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1260	F
SCOTTSDALE, CITY OF	045012	1260	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C1260F

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

MAP SCALE 1" = 1000'

0 1000 2000 FEET

0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1255G

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1255 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SCOTTSDALE, CITY OF	045012	1255	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C1255G

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

PLATE 5

Color Topographic Aerial Photograph

300 0 150 300
Horz. 1 in. = 300 ft.

CROWN
COMMUNITY DEVELOPMENT
A Henry Crown Company

SERENO CANYON
Plate 5
"Topographic Aerial"

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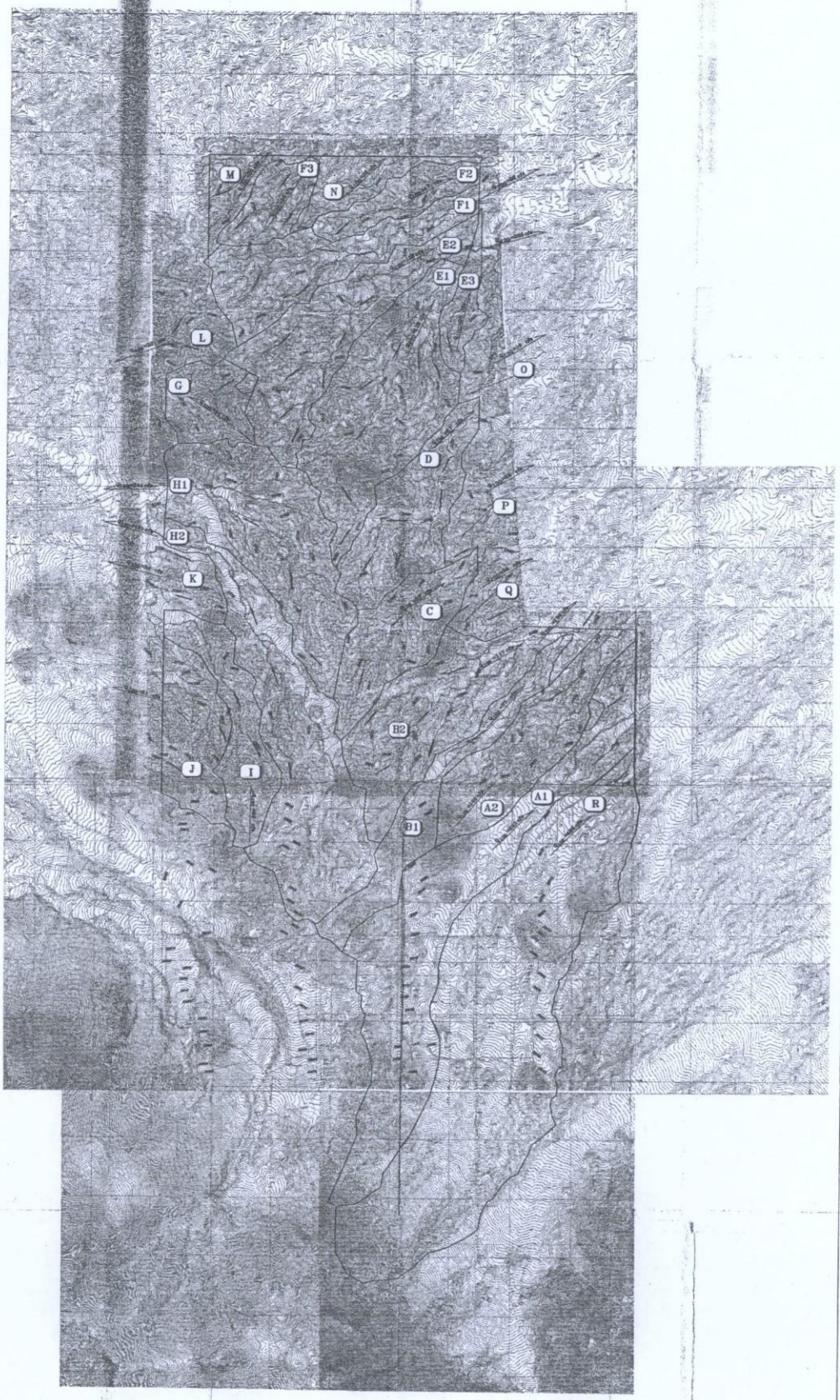
PLATE 6

Off-Site Watershed Area Map



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SERENO CANYON

Plate 6

"Off-Site Watershed Area Map"

CROWN
COMMUNITY DEVELOPMENT
A Shea Homes Company

LEGEND

- H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT
- SUB-BASIN BOUNDARY
- FLOWLINE
- PRE-DEVELOPMENT PEAK FLOW
- PROJECT BOUNDARY
- 2796 — EXISTING CONTOUR LABELS
- FLOW ARROW

400 0 200 400

1 inch = 400 ft.

N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 06-OFFSITE-WATERSHED.DWG - Feb 23,2006

PLATE 7

Section 404 Washes

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SERENO CANYON

Plate 7

"404 Washes"

CROWN COMMUNITY DEVELOPMENT

A Pulte Homes Company

250 0 125 250

1 inch = 250 ft.

LEGEND

PRELIMINARY SECTION 404 JURISDICTIONAL DELINEATION. A REQUEST FOR VERIFICATION HAS BEEN SUBMITTED TO THE A.C.O.E. FOR REVIEW AND APPROVAL.

N:\2004\042054\Project Support\Hydro\Exhibits\PDR\ PLATE 07-404.DWG - Feb 22,2006

PLATE 8

Pre-Development Drainage Site Plan

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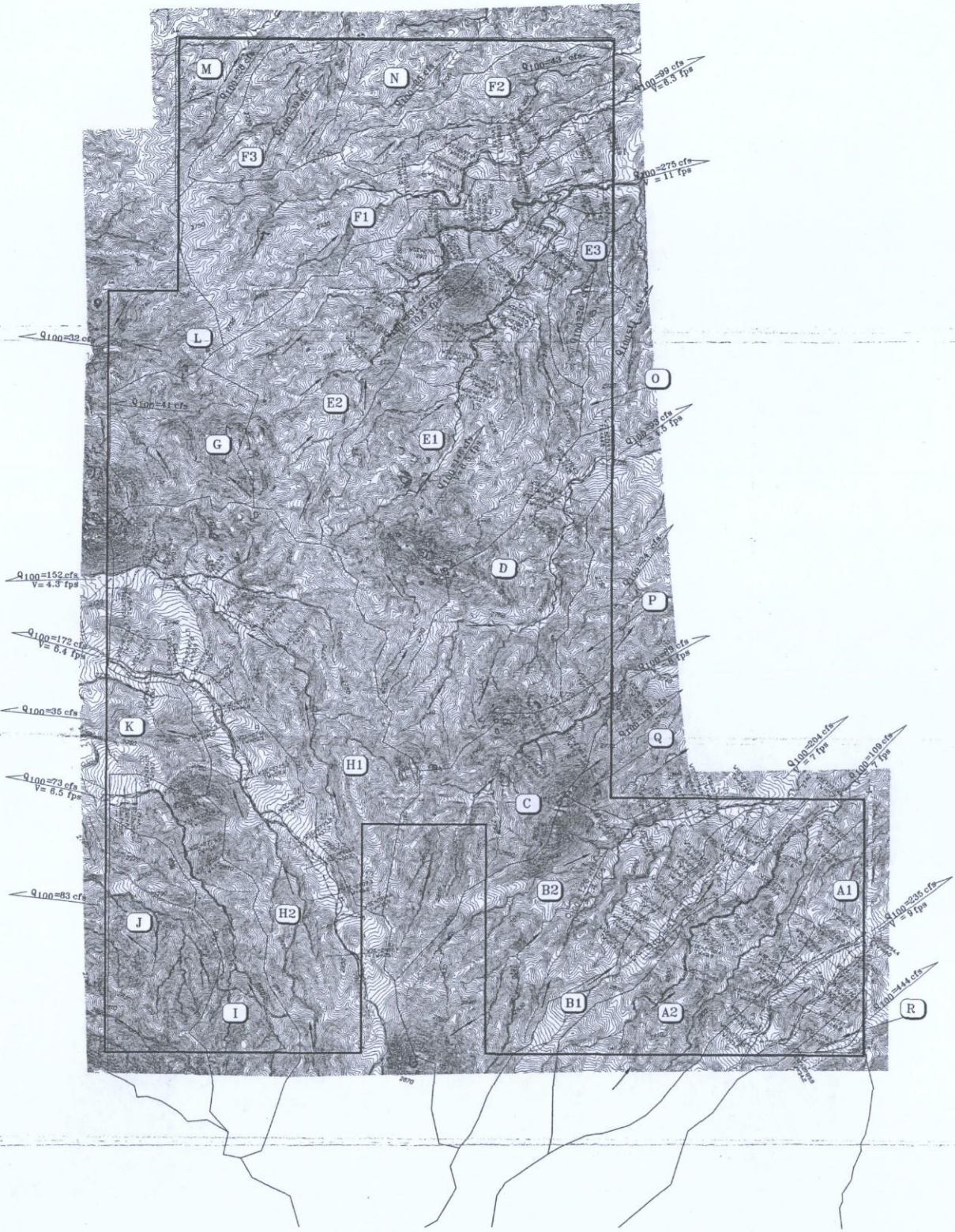
SERENO CANYON
Plate 8
"Pre-Development Drainage Site Plan"

CROWN
COMMUNITY DEVELOPMENT
A Pinnacle Financial Company

PLATE 9

Pre-Development Grading and Drainage Plan



LEGEND

- H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT
- SUB-BASIN BOUNDARY
- FLOWLINE
- FLOODPLAIN BOUNDARY
- 404 WASH
- Q_{100}=41 cfs V=5 fps — PRE-DEVELOPMENT PEAK FLOW AND CORRESPONDING VELOCITY
- PROJECT BOUNDARY
- 2790 — EXISTING 1 FOOT CONTOUR LABEL
- FLOW ARROW
- 3 WSE=2762.70 TW=6110 — HEC-RAS CROSS SECTION WITH RIVER STATION, WATER SURFACE ELEVATION AND TOP WIDTH

200 0 100 200
1 in. = 200 ft.

SERENO CANYON
Plate 9
"Pre-Development Grading and Drainage Site Plan"

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TRANSPORTATION/TRAFFIC
WATER & WASTEWATER SYSTEMS
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CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

PLATE 10

Post-Development Drainage Site Plan

WOOD/PATEL

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WATER/WASTEWATER • SURVEYING
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SERENO CANYON

Plate 10

"Post-Development Drainage Site Plan"

CROWN COMMUNITY DEVELOPMENT

N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 10-POST-DEVELOPMENT-11-08-06.DWG - Nov 14,2006

PLATE 11

Post-Development Grading and Drainage Plan

LEGEND

- H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT
- SUB-BASIN BOUNDARY
- FLOWLINE
- FLOODPLAIN BOUNDARY
- 404 WASH
- Q100=41 cfs — POST-DEVELOPMENT PEAK FLOW
- PROPOSED STORM DRAIN LOCATION
- PROJECT BOUNDARY
- 2799 — EXISTING 1 FOOT CONTOUR LABEL
- FLOW ARROW
- 3 WSE=2762.70 Tw=6110 — HEC-RAS CROSS SECTION WITH RIVER STATION, WATER SURFACE ELEVATION AND TOP WIDTH
- RIP RAP

200 0 100 200
1 in. = 200 ft.

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 335-8500

SERENO CANYON
Plate II
"Post-Development Grading and Drainage Site Plan"

CROWN COMMUNITY DEVELOPMENT
A Kenny Crown Company

N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE II-POST-GRADING-DRAINAGE_II-08-06.DWG - Nov 14,2006

```
                ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
               TIMINT         .033  TIME INTERVAL IN HYDROGRAPH

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
 74 KK         *     COMBE   *
               *             *
               ***************

 77 KO               OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HYDROGRAPH

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
 81 KK         *        E3   *
               *             *
               ***************

 87 KO               OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HYDROGRAPH

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
 88 KK         *        F1   *
               *             *
               ***************

 94 KO               OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HYDROGRAPH

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
 95 KK         *        F2   *
               *             *
               ***************

101 KO               OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
                     IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                      IOUT           22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2          900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT         .033  TIME INTERVAL IN HYDROGRAPH

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

               ***************
               *             *
102 KK         *        F3   *
               *             *
               ***************

108 KO               OUTPUT CONTROL VARIABLES
                     IPRNT            5  PRINT CONTROL
                     IPLOT            0  PLOT CONTROL
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 42 KK    *     COMBB  *
          *            *
          **************

 45 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 46 KK    *          C *
          *            *
          **************

 52 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 53 KK    *          D *
          *            *
          **************

 59 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 60 KK    *         E1 *
          *            *
          **************

 66 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 67 KK    *         E2 *
          *            *
          **************

 73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
```

```
                NDDATE      2    0  ENDING DATE
                NDTIME         0558  ENDING TIME
                ICENT            19  CENTURY MARK

             COMPUTATION INTERVAL      .03 HOURS
                TOTAL TIME BASE    29.97 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT

13 JD        INDEX STORM NO. 1
                   STRM      2.29  PRECIPITATION DEPTH
                   TRDA       .01  TRANSPOSITION DRAINAGE AREA

14 PI          PRECIPITATION PATTERN
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                  .02       .03       .03       .04       .04       .05       .06       .08       .11       .21
                  .21       .17       .10       .08       .05       .04       .04       .04       .03       .02
                  .02       .02       .02       .02       .02       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                  .01       .01       .01       .01       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                  .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

           ***************
           *             *
15 KK      *       A1    *
           *             *
           ***************

21 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

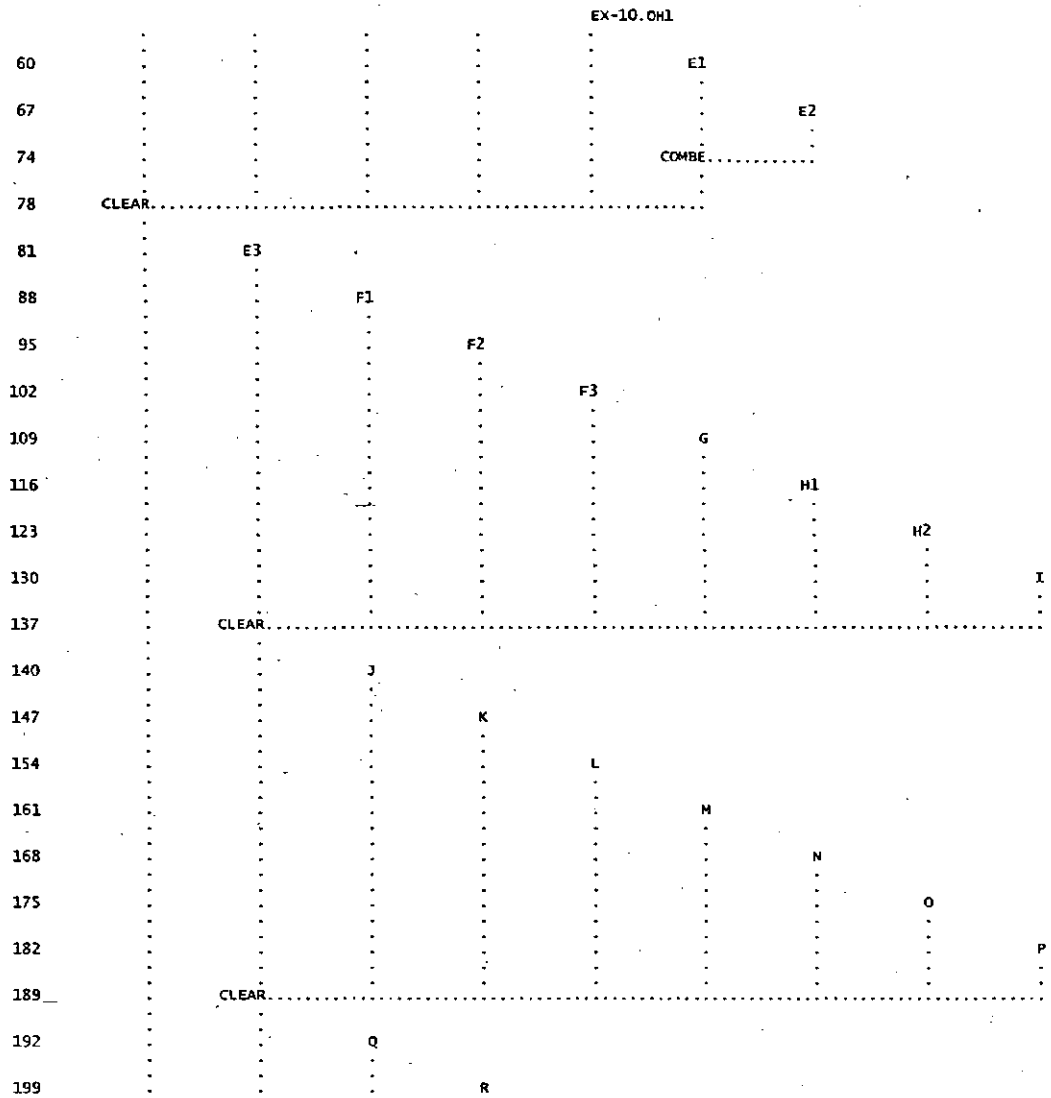
           ***************
           *             *
22 KK      *       A2    *
           *             *
           ***************

28 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

           ***************
           *             *
29 KK      *       B1    *
           *             *
           ***************

35 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             JUN  1998                      *
*          VERSION 4.1                       *
*                                            *
*  RUN DATE   07NOV06  TIME  09:46:54        *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*   U.S. ARMY CORPS OF ENGINEERS             *
*   HYDROLOGIC ENGINEERING CENTER            *
*        609 SECOND STREET                   *
*     DAVIS, CALIFORNIA 95616                *
*         (916) 756-1104                     *
*                                            *
**********************************************
```

HEC-1 MODEL FOR SERENO CANYON
10-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
EXISTING CONDITIONS

PREPARED BY WOOD/PATEL, 8.4.2004
FILE NAME: EX-10.DAT

12 IO	OUTPUT CONTROL VARIABLES			
	IPRNT		5	PRINT CONTROL
	IPLOT		0	PLOT CONTROL
	QSCAL		0.	HYDROGRAPH PLOT SCALE
IT	HYDROGRAPH TIME DATA			
	NMIN		2	MINUTES IN COMPUTATION INTERVAL
	IDATE	1	0	STARTING DATE
	ITIME		0000	STARTING TIME
	NQ		900	NUMBER OF HYDROGRAPH ORDINATES

```
140          KK       J
141          KM  RUNOFF FROM SUB-BASIN J
142          BA    .024
143          LS              88       0
144          UK     145     .02    0.13     100
145          RK     965    .026    .032            TRAP       5       5
146          KO                                      22

147          KK       K
148          KM  RUNOFF FROM SUB-BASIN K
149          BA    .009
150          LS              88       0
151          UK      81    .025    0.13     100
152          RK     715    .022    .032            TRAP       5       5
153          KO                                      22

154          KK       L
155          KM  RUNOFF FROM SUB-BASIN L
156          BA    .009
157          LS              88       0
158          UK     113    .018    0.13     100
159          RK     450    .012    .032            TRAP       5       5
160          KO                                      22

161          KK       M
162          KM  RUNOFF FROM SUB-BASIN M
163          BA    .008
164          LS              88       0
165          UK     137    .018    0.13     100
166          RK     750    .012    .032            TRAP       4       5
167          KO                                      22

168          KK       N
169          KM  RUNOFF FROM SUB-BASIN N
170          BA     .01
171          LS              88       0
172          UK     117    .018    0.13     100
173          RK    1036    .012    .032            TRAP       5       5
174          KO                                      22

175          KK       O
176          KM  RUNOFF FROM SUB-BASIN O
177          BA   .0029
178          LS              88       0
179          UK     108     .02    0.13     100
180          RK     174    .014    .032            TRAP       4       5
181          KO                                      22
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

182          KK       P
183          KM  RUNOFF FROM SUB-BASIN P
184          BA   .0069
185          LS              88       0
186          UK     135     .02    0.13     100
187          RK     354    .014    .032            TRAP       5       5
188          KO                                      22

189          KK   CLEAR
190          KM  CLEAR HYDROGRAPH STACK
191          HC       8

192          KK       Q
193          KM  RUNOFF FROM SUB-BASIN Q
194          BA   .0032
195          LS              88       0
196          UK      86     .02    0.13     100
197          RK     160    .014    .032            TRAP       4       5
198          KO                                      22

199          KK       R
200          KM  RUNOFF FROM SUB-BASIN R
201          BA     .15
202          LS              88
203          UK     180    .025    0.13     100
204          RK    4300    .023    .032            TRAP      15       5
205          KO                                      22
206          ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15          A1
               .
               .
   22          .          A2
               .           .
               .           .
   29          .           .          B1
               .           .           .
               .           .           .
   36          .           .           .          B2
               .           .           .           .
               .           .           .           .
   42          .           .       COMBB...........
               .           .           .
               .           .           .
   46          .           .           .           C
               .           .           .           .
               .           .           .           .
   53          .           .           .           .          D
```

```
 57          UK     300      .02     0.13     100
 58          RK    1425     .014     .032             TRAP        6        5
 59          KO                                       22

 60          KK       E1
 61          KM  RUNOFF FROM SUB-BASIN E1
 62          BA     .061
 63          LS                88
 64          UK     400      .02     0.13     100
 65          RK    2050     .013     .032             TRAP        7        5
 66          KO                                       22

 67          KK       E2
 68          KM  RUNOFF FROM SUB-BASIN E2
 69          BA     .046
 70          LS                88
 71          UK     200      .02     0.13     100
 72          RK    2370     .013     .032             TRAP       10        5
 73          KO                                       22

 74          KK    COMBE
 75          KM  COMBINE SECTIONS E1 AND E2
 76          HC        2
 77          KO                                       22

 78          KK    CLEAR
 79          KM  CLEAR HYDROGRAPH STACK
 80          HC        6
             *

 81          KK       E3
 82          KM  RUNOFF FROM SUB-BASIN E3
 83          BA     .008
 84          LS                88
 85          UK     175     .025     0.13     100
 86          RK     750     .032     .032             TRAP        6        5
 87          KO                                       22
1                                   HEC-1 INPUT                                    PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 88          KK       F1
 89          KM  RUNOFF FROM SUB-BASIN F1
 90          BA     .036
 91          LS                88
 92          UK     225     .018     0.13     100
 93          RK    2500     .012     .032             TRAP        7        5
 94          KO                                       22

 95          KK       F2
 96          KM  RUNOFF FROM SUB-BASIN F2
 97          BA     .014
 98          LS                88
 99          UK     200     .018     0.13     100
100          RK    1440     .028     .032             TRAP        6        5
101          KO                                       22

102          KK       F3
103          KM  RUNOFF FROM SUB-BASIN F3
104          BA     .013
105          LS                88
106          UK     225     .018     0.13     100
107          RK     850     .026     .032             TRAP        6        5
108          KO                                       22

109          KK        G
110          KM  RUNOFF FROM SUB-BASIN G
111          BA   0.016
112          LS                88
113          UK     400     .025     0.13     100
114          RK     720     .022     .032             TRAP        4        5
115          KO                                       22

116          KK       H1
117          KM  RUNOFF FROM SUB-BASIN H1
118          BA     .059
119          LS                88
120          UK     375     .025     0.13     100
121          RK    2210     .019     .032             TRAP        8        5
122          KO                                       22

123          KK       H2
124          KM  RUNOFF FROM SUB-BASIN H2
125          BA     .072
126          LS                88
127          UK     400     .025     0.13     100
128          RK    3480     .019     .032             TRAP       12        5
129          KO                                       22

130          KK        I
131          KM  RUNOFF FROM SUB-BASIN I
132          BA     .025
133          LS                88
134          UK     225      .02     0.13     100
135          RK    2100     .026     .032             TRAP       10        5
1                                   HEC-1 INPUT                                    PAGE  4

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

136          KO                                       22

137          KK    CLEAR
138          KM  CLEAR HYDROGRAPH STACK
139          HC        8
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   07NOV06  TIME  09:46:54   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X       XX
X     X  X        X             X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X             X
X     X  X        X     X       X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        10-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        EXISTING CONDITIONS
   7          ID
   8          ID        PREPARED BY WOOD/PATEL, 8.4.2004
   9          ID        FILE NAME:  EX-10.DAT
  10          ID
              *DIAGRAM
  11          IT      2                   900
  12          IO      5
  13          JD              .01
  14          PH                      0.52    0.99    1.64    1.87    2.01    2.29

  15          KK      A1
  16          KM       RUNOFF FROM SUB-BASIN A1
  17          BA    .084
  18          LS              88
  19          UK     260    .025    0.13     100
  20          RK    3520    .023    .032             TRAP      12       5
  21          KO                                      22

  22          KK      A2
  23          KM   RUNOFF FROM SUB-BASIN A2
  24          BA    .036
  25          LS              88
  26          UK     235    .025    0.13     100
  27          RK    2000     .02    .032             TRAP       8       5
  28          KO                                      22

  29          KK      B1
  30          KM   RUNOFF FROM SUB-BASIN B1
  31          BA    .027
  32          LS              88
  33          UK     200    .025    0.13     100
  34          RK    2500    .028    .032             TRAP       8       5
  35          KO                                      22

  36          KK      B2
  37          KM   RUNOFF FROM SUB-BASIN B2
  38          BA    .050
  39          LS              88
  40          UK     400    .025    0.13     100
  41          RK    2340    .024    .032             TRAP       8       5

  42          KK   COMBB
  43          KM   COMBINE SECTIONS B1 AND B2
  44          HC      2
  45          KO                                      22
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  46          KK      C
  47          KM   RUNOFF FROM SUB-BASIN C
  48          BA     .03
  49          LS              88
  50          UK     250    .023    0.13     100
  51          RK    1570    .017    .032             TRAP       5       5
  52          KO                                      22

  53          KK      D
  54          KM   RUNOFF FROM SUB-BASIN D
  55          BA    .034
  56          LS              88
```

```
          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                L  MANE          .75      7.78    189.63       .63      2.00      7.66    190.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3035E+00 OUTFLOW= .3020E+00 BASIN STORAGE= .3530E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                M  MANE         1.26      6.15    191.67       .63      2.00      6.09    192.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2698E+00 OUTFLOW= .2683E+00 BASIN STORAGE= .5108E-04 PERCENT ERROR=    .6

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                N  MANE         1.73      7.98    191.88       .63      2.00      7.94    192.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3373E+00 OUTFLOW= .3355E+00 BASIN STORAGE= .5160E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                O  MANE          .47      2.67    188.19       .63      2.00      2.65    188.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9781E-01 OUTFLOW= .9736E-01 BASIN STORAGE= .1145E-04 PERCENT ERROR=    .4

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                P  MANE          .68      5.61    189.50       .63      2.00      5.60    190.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2327E+00 OUTFLOW= .2314E+00 BASIN STORAGE= .3947E-04 PERCENT ERROR=    .5

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                Q  MANE          .37      3.22    187.49       .63      2.00      3.19    186.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1079E+00 OUTFLOW= .1075E+00 BASIN STORAGE= .8190E-05 PERCENT ERROR=    .4

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
                R  MANE         2.00     94.22    195.52       .63      2.00     93.94    196.00       .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5059E+01 OUTFLOW= .5020E+01 BASIN STORAGE= .1201E-02 PERCENT ERROR=    .7


*** NORMAL END OF HEC-1 ***
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9106E+00 OUTFLOW= .9045E+00 BASIN STORAGE= .2559E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

B2	MANE	2.00	22.90	203.78	.63	2.00	22.84	204.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1686E+01 OUTFLOW= .1674E+01 BASIN STORAGE= .1114E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

C	MANE	1.85	17.26	197.14	.63	2.00	17.16	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1012E+01 OUTFLOW= .1005E+01 BASIN STORAGE= .3633E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

D	MANE	1.82	17.39	199.15	.63	2.00	17.32	200.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1147E+01 OUTFLOW= .1139E+01 BASIN STORAGE= .5591E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

E1	MANE	1.85	25.97	206.70	.63	2.00	25.95	206.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2057E+01 OUTFLOW= .2042E+01 BASIN STORAGE= .1681E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

E2	MANE	2.00	27.30	196.30	.63	2.00	27.05	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1551E+01 OUTFLOW= .1541E+01 BASIN STORAGE= .5151E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

E3	MANE	1.00	5.96	191.22	.63	2.00	5.94	192.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2698E+00 OUTFLOW= .2685E+00 BASIN STORAGE= .5610E-04 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

F1	MANE	1.98	19.30	199.10	.63	2.00	19.19	200.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1214E+01 OUTFLOW= .1204E+01 BASIN STORAGE= .5067E-03 PERCENT ERROR= .8

FOR STORM = 1 STORM AREA (SQ MI) = .01

F2	MANE	1.71	8.55	195.83	.63	2.00	8.53	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4722E+00 OUTFLOW= .4686E+00 BASIN STORAGE= .1519E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

F3	MANE	1.06	7.64	196.27	.63	2.00	7.63	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4385E+00 OUTFLOW= .4352E+00 BASIN STORAGE= .1636E-03 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

G	MANE	1.01	7.50	201.08	.63	2.00	7.49	202.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5396E+00 OUTFLOW= .5361E+00 BASIN STORAGE= .3341E-03 PERCENT ERROR= .6

FOR STORM = 1 STORM AREA (SQ MI) = .01

H1	MANE	2.00	27.81	202.87	.63	2.00	27.65	202.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1990E+01 OUTFLOW= .1974E+01 BASIN STORAGE= .1180E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

H2	MANE	2.00	31.67	205.47	.63	2.00	31.56	206.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2428E+01 OUTFLOW= .2411E+01 BASIN STORAGE= .1729E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) = .01

I	MANE	1.74	14.44	197.94	.63	2.00	14.42	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8432E+00 OUTFLOW= .8362E+00 BASIN STORAGE= .3168E-03 PERCENT ERROR= .8

FOR STORM = 1 STORM AREA (SQ MI) = .01

J	MANE	.89	18.64	191.55	.63	2.00	18.28	190.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8095E+00 OUTFLOW= .8050E+00 BASIN STORAGE= .1481E-03 PERCENT ERROR= .5

FOR STORM = 1 STORM AREA (SQ MI) = .01

K	MANE	.94	9.41	187.34	.63	2.00	9.14	188.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3035E+00 OUTFLOW= .3025E+00 BASIN STORAGE= .1753E-04 PERCENT ERROR= .3

+	2 COMBINED AT	COMBB	37.	3.30	5.	1.	1.	.08
+	HYDROGRAPH AT	C	17.	3.27	2.	1.	0.	.03
+	HYDROGRAPH AT	D	17.	3.33	2.	1.	0.	.03
+	HYDROGRAPH AT	E1	26.	3.43	4.	1.	1.	.06
+	HYDROGRAPH AT	E2	27.	3.30	3.	1.	1.	.05
+	2 COMBINED AT	COMBE	49.	3.33	7.	2.	1.	.11
+	6 COMBINED AT	CLEAR	186.	3.30	25.	6.	5.	.37
+	HYDROGRAPH AT	E3	6.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	F1	19.	3.33	2.	1.	0.	.04
+	HYDROGRAPH AT	F2	9.	3.27	1.	0.	0.	.01
+	HYDROGRAPH AT	F3	8.	3.27	1.	0.	0.	.01
+	HYDROGRAPH AT	G	7.	3.37	1.	0.	0.	.02
+	HYDROGRAPH AT	H1	28.	3.37	4.	1.	1.	.06
+	HYDROGRAPH AT	H2	32.	3.43	5.	1.	1.	.07
+	HYDROGRAPH AT	I	14.	3.30	2.	0.	0.	.03
+	8 COMBINED AT	CLEAR	113.	3.33	16.	4.	3.	.24
+	HYDROGRAPH AT	J	18.	3.17	2.	0.	0.	.02
+	HYDROGRAPH AT	K	9.	3.13	1.	0.	0.	.01
+	HYDROGRAPH AT	L	8.	3.17	1.	0.	0.	.01
+	HYDROGRAPH AT	M	6.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	N	8.	3.20	1.	0.	0.	.01
+	HYDROGRAPH AT	O	3.	3.13	0.	0.	0.	.00
+	HYDROGRAPH AT	P	6.	3.17	0.	0.	0.	.01
+	8 COMBINED AT	CLEAR	144.	3.30	21.	5.	4.	.31
+	HYDROGRAPH AT	Q	3.	3.10	0.	0.	0.	.00
+	HYDROGRAPH AT	R	94.	3.27	10.	3.	2.	.15

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR STORM = 1 STORM AREA (SQ MI) =				.01					
A1	MANE	2.00	45.60	197.96	.63	2.00	45.59	198.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2833E+01 OUTFLOW= .2811E+01 BASIN STORAGE= .1146E-02 PERCENT ERROR= .7

FOR STORM = 1 STORM AREA (SQ MI) =				.01					
A2	MANE	2.00	21.65	196.72	.63	2.00	21.49	196.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1214E+01 OUTFLOW= .1203E+01 BASIN STORAGE= .4066E-03 PERCENT ERROR= .9

FOR STORM = 1 STORM AREA (SQ MI) =				.01					
B1	MANE	1.82	17.27	195.49	.63	2.00	17.14	196.00	.63

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
175 KK    *          O *
          *            *
          **************

181 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
182 KK    *          P *
          *            *
          **************

188 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
192 KK    *          Q *
          *            *
          **************

198 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
199 KK    *          R *
          *            *
          **************

205 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

1
                                                RUNOFF SUMMARY
                                          FLOW IN CUBIC FEET PER SECOND
                                       TIME IN HOURS,  AREA IN SQUARE MILES

                                                                PEAK     TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
          OPERATION        STATION                             FLOW      PEAK        6-HOUR      24-HOUR      72-HOUR     AREA      STAGE     MAX STAGE
+
          HYDROGRAPH AT
+                              A1                              46.      3.30          6.           1.           1.        .08
          HYDROGRAPH AT
+                              A2                              21.      3.27          2.           1.           0.        .04
          HYDROGRAPH AT
+                              B1                              17.      3.27          2.           0.           0.        .03
          HYDROGRAPH AT
+                              B2                              23.      3.40          3.           1.           1.        .05
```

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          **************
          *             *
140 KK    *          J  *
          *             *
          **************

146 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
147 KK    *          K  *
          *             *
          ***************

153 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
154 KK    *          L  *
          *             *
          ***************

160 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
161 KK    *          M  *
          *             *
          ***************

167 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          ***************
          *             *
168 KK    *          N  *
          *             *
          ***************

174 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS
```

```
          **************

108 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
109 KK    *          G *
          *            *
          **************

115 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
116 KK    *         H1 *
          *            *
          **************

122 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
123 KK    *         H2 *
          *            *
          **************

129 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
130 KK    *          I *
          *            *
          **************

136 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
 74 KK    *     COMBE   *
          *             *
          ***************
```

 77 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
 81 KK    *        E3   *
          *             *
          ***************
```

 87 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
 88 KK    *        F1   *
          *             *
          ***************
```

 94 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED-POINT ITERATION USED - ITERATION= 1

*** ***

```
          ***************
          *             *
 95 KK    *        F2   *
          *             *
          ***************
```

101 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	22	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	900	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

*** ***

```
          ***************
          *             *
102 KK    *        F3   *
          *             *
```

*** ***

```
          **************
          *            *
 42 KK    *     COMBB  *
          *            *
          **************

 45 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 46 KK    *          C *
          *            *
          **************

 52 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 53 KK    *          D *
          *            *
          **************

 59 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 60 KK    *         E1 *
          *            *
          **************

 66 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS
```

*** ***

```
          **************
          *            *
 67 KK    *         E2 *
          *            *
          **************

 73 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
```

```
                NODATE      2    0  ENDING DATE
                NOTIME           0558  ENDING TIME
                ICENT              19  CENTURY MARK

              COMPUTATION INTERVAL       .03 HOURS
                  TOTAL TIME BASE     29.97 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

 13 JD         INDEX STORM NO. 1
                     STRM        1.57  PRECIPITATION DEPTH
                     TRDA         .01  TRANSPOSITION DRAINAGE AREA

 14 PI           PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .02       .02       .02       .02       .03       .03       .04       .06       .08       .15
                    .15       .12       .07       .05       .03       .03       .03       .02       .02       .02
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

*** *** *** *** *** *** *** *** ***.*** *** *** *** ***.*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 15 KK      *       A1    *
            *             *
            ***************

 21 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 22 KK      *       A2    *
            *             *
            ***************

 28 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            ***************
            *             *
 29 KK      *       B1    *
            *             *
            ***************

 35 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                     IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                      IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       .033  TIME INTERVAL IN HOURS
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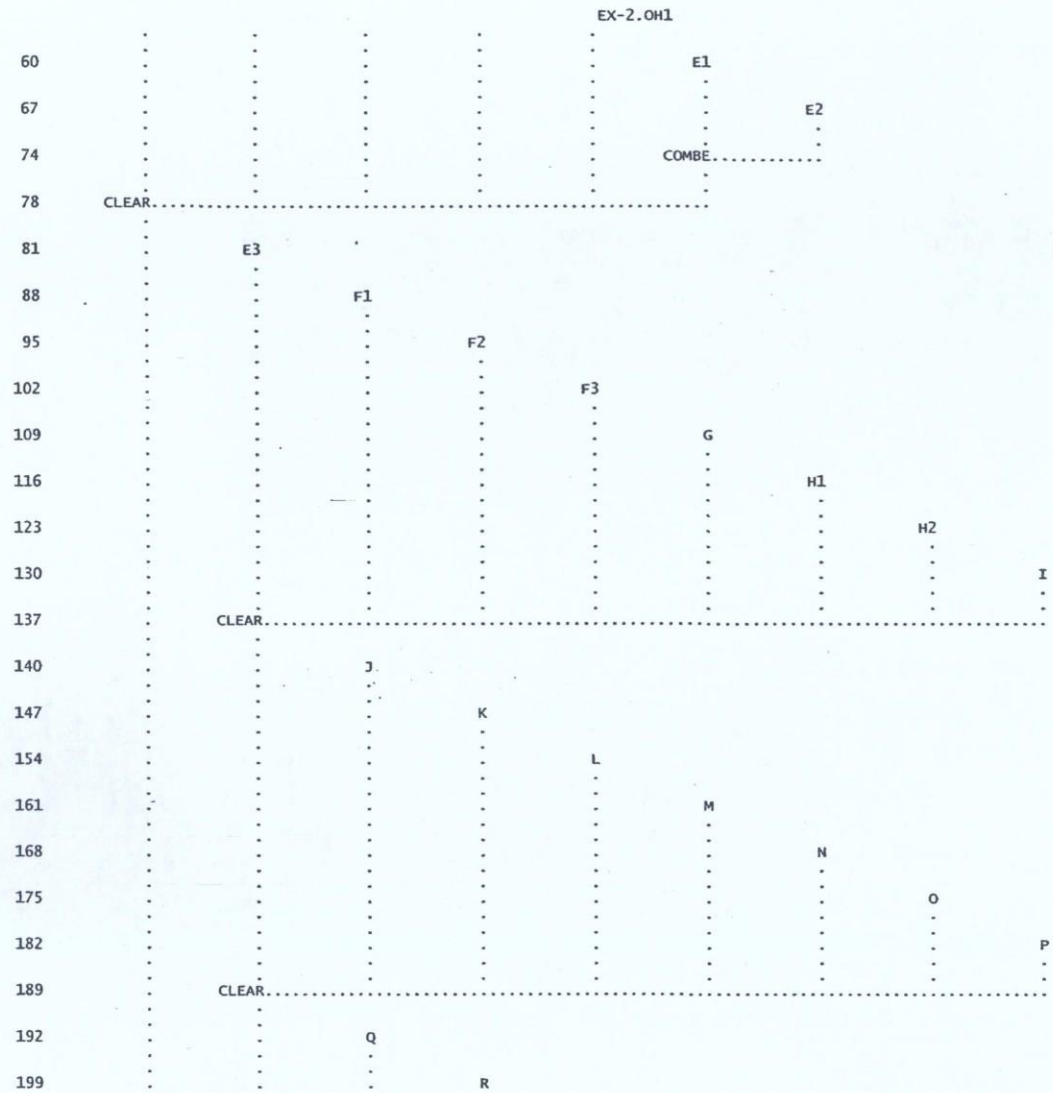

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   07NOV06  TIME  09:27:06   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

HEC-1 MODEL FOR SERENO CANYON
2-YEAR, 6-HOUR STORM
RAINFALL FROM NOAA ATLAS
SCS CURVE NUMBER SOIL LOSS PARAMETERS
KINEMATIC WAVE HYDROGRAPH ROUTING
EXISTING CONDITIONS

PREPARED BY WOOD/PATEL, 8.4.2004
FILE NAME: EX-100.DAT

12 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	900	NUMBER OF HYDROGRAPH ORDINATES

```
140          KK       J
141          KM  RUNOFF FROM SUB-BASIN J
142          BA    .024
143          LS              88       0
144          UK     145     .02    0.13     100
145          RK     965    .026    .032             TRAP       5       5
146          KO                                      22

147          KK       K
148          KM  RUNOFF FROM SUB-BASIN K
149          BA    .009
150          LS              88       0
151          UK      81    .025    0.13     100
152          RK     715    .022    .032             TRAP       5       5
153          KO                                      22

154          KK       L
155          KM  RUNOFF FROM SUB-BASIN L
156          BA    .009
157          LS              88       0
158          UK     113    .018    0.13     100
159          RK     450    .012    .032             TRAP       5       5
160          KO                                      22

161          KK       M
162          KM  RUNOFF FROM SUB-BASIN M
163          BA    .008
164          LS              88       0
165          UK     137    .018    0.13     100
166          RK     750    .012    .032             TRAP       4       5
167          KO                                      22

168          KK       N
169          KM  RUNOFF FROM SUB-BASIN N
170          BA     .01
171          LS              88       0
172          UK     117    .018    0.13     100
173          RK    1036    .012    .032             TRAP       5       5
174          KO                                      22

175          KK       O
176          KM  RUNOFF FROM SUB-BASIN O
177          BA   .0029
178          LS              88       0
179          UK     108     .02    0.13     100
180          RK     174    .014    .032             TRAP       4       5
181          KO                                      22
```



```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

182          KK       P
183          KM  RUNOFF FROM SUB-BASIN P
184          BA   .0069
185          LS              88       0
186          UK     135     .02    0.13     100
187          RK     354    .014    .032             TRAP       5       5
188          KO                                      22

189          KK   CLEAR
190          KM  CLEAR HYDROGRAPH STACK
191          HC       8

192          KK       Q
193          KM  RUNOFF FROM SUB-BASIN Q
194          BA   .0032
195          LS              88       0
196          UK      86     .02    0.13     100
197          RK     160    .014    .032             TRAP       4       5
198          KO                                      22

199          KK       R
200          KM  RUNOFF FROM SUB-BASIN R
201          BA     .15
202          LS              88
203          UK     180    .025    0.13     100
204          RK    4300    .023    .032             TRAP      15       5
205          KO                                      22
206          ZZ
```

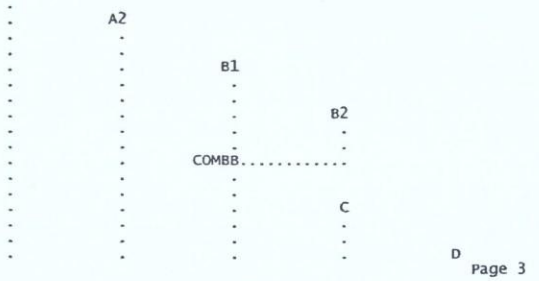
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
 57          UK     300     .02    0.13     100
 58          RK    1425    .014    .032            TRAP       6       5
 59          KO                                      22

 60          KK      E1
 61          KM  RUNOFF FROM SUB-BASIN E1
 62          BA    .061
 63          LS              88
 64          UK     400     .02    0.13     100
 65          RK    2050    .013    .032            TRAP       7       5
 66          KO                                      22

 67          KK      E2
 68          KM  RUNOFF FROM SUB-BASIN E2
 69          BA    .046
 70          LS              88
 71          UK     200     .02    0.13     100
 72          RK    2370    .013    .032            TRAP      10       5
 73          KO                                      22

 74          KK   COMBE
 75          KM  COMBINE SECTIONS E1 AND E2
 76          HC       2
 77          KO                                      22

 78          KK   CLEAR
 79          KM  CLEAR HYDROGRAPH STACK
 80          HC       6
             *

 81          KK      E3
 82          KM  RUNOFF FROM SUB-BASIN E3
 83          BA    .008
 84          LS              88
 85          UK     175    .025    0.13     100
 86          RK     750    .032    .032            TRAP       6       5
 87          KO                                      22
1                                    HEC-1 INPUT                                    PAGE  3
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 88          KK      F1
 89          KM  RUNOFF FROM SUB-BASIN F1
 90          BA    .036
 91          LS              88
 92          UK     225    .018    0.13     100
 93          RK    2500    .012    .032            TRAP       7       5
 94          KO                                      22

 95          KK      F2
 96          KM  RUNOFF FROM SUB-BASIN F2
 97          BA    .014
 98          LS              88
 99          UK     200    .018    0.13     100
100          RK    1440    .028    .032            TRAP       6       5
101          KO                                      22

102          KK      F3
103          KM  RUNOFF FROM SUB-BASIN F3
104          BA    .013
105          LS              88
106          UK     225    .018    0.13     100
107          RK     850    .026    .032            TRAP       6       5
108          KO                                      22

109          KK       G
110          KM  RUNOFF FROM SUB-BASIN G
111          BA   0.016
112          LS              88
113          UK     400    .025    0.13     100
114          RK     720    .022    .032            TRAP       4       5
115          KO                                      22

116          KK      H1
117          KM  RUNOFF FROM SUB-BASIN H1
118          BA    .059
119          LS              88
120          UK     375    .025    0.13     100
121          RK    2210    .019    .032            TRAP       8       5
122          KO                                      22

123          KK      H2
124          KM  RUNOFF FROM SUB-BASIN H2
125          BA    .072
126          LS              88
127          UK     400    .025    0.13     100
128          RK    3480    .019    .032            TRAP      12       5
129          KO                                      22

130          KK       I
131          KM  RUNOFF FROM SUB-BASIN I
132          BA    .025
133          LS              88
134          UK     225     .02    0.13     100
135          RK    2100    .026    .032            TRAP      10       5
1                                    HEC-1 INPUT                                    PAGE  4
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

136          KO                                      22

137          KK   CLEAR
138          KM  CLEAR HYDROGRAPH STACK
139          HC       8
```

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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
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*                                     *
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*         609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616       *
*           (916) 756-1104            *
*                                     *
***************************************
```

```
X    X  XXXXXXX   XXXXX          X
X    X  X        X     X        XX
X    X  X        X              X
XXXXXXX  XXXX    X        XXXXX  X
X    X  X        X              X
X    X  X        X     X        X
X    X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID        HEC-1 MODEL FOR SERENO CANYON
   2          ID        2-YEAR, 6-HOUR STORM
   3          ID        RAINFALL FROM NOAA ATLAS
   4          ID        SCS CURVE NUMBER SOIL LOSS PARAMETERS
   5          ID        KINEMATIC WAVE HYDROGRAPH ROUTING
   6          ID        EXISTING CONDITIONS
   7          ID
   8          ID        PREPARED BY WOOD/PATEL, 8.4.2004
   9          ID        FILE NAME:  EX-100.DAT
  10          ID
              *DIAGRAM
  11          IT       2                    900
  12          IO       5
  13          JD              .01
  14          PH                    .38     0.7    1.12    1.27    1.38    1.57

  15          KK      A1
  16          KM       RUNOFF FROM SUB-BASIN A1
  17          BA    .084
  18          LS              88
  19          UK     260    .025    0.13     100
  20          RK    3520    .023    .032            TRAP      12       5
  21          KO                                      22

  22          KK      A2
  23          KM  RUNOFF FROM SUB-BASIN A2
  24          BA    .036
  25          LS              88
  26          UK     235    .025    0.13     100
  27          RK    2000     .02    .032            TRAP       8       5
  28          KO                                      22

  29          KK      B1
  30          KM  RUNOFF FROM SUB-BASIN B1
  31          BA    .027
  32          LS              88
  33          UK     200    .025    0.13     100
  34          RK    2500    .028    .032            TRAP       8       5
  35          KO                                      22

  36          KK      B2
  37          KM  RUNOFF FROM SUB-BASIN B2
  38          BA    .050
  39          LS              88
  40          UK     400    .025    0.13     100
  41          RK    2340    .024    .032            TRAP       8       5

  42          KK   COMBB
  43          KM  COMBINE SECTIONS B1 AND B2
  44          HC       2
  45          KO                                      22
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46          KK       C
  47          KM  RUNOFF FROM SUB-BASIN C
  48          BA     .03
  49          LS              88
  50          UK     250    .023    0.13     100
  51          RK    1570    .017    .032            TRAP       5       5
  52          KO                                      22

  53          KK       D
  54          KM  RUNOFF FROM SUB-BASIN D
  55          BA    .034
  56          LS              88
```

APPENDIX B

Existing Condition Hydrologic Calculations

- 2-year HEC-1 Model
- 10-year HEC-1 Model
- 100-year HEC-1 Model

LAND USE Composite Area-wide Values	Hydrologic Soil Group		
	B	C	D
Commercial & Industrial Areas	0.90		
Residential Areas-Single Family (av. lot size)			
R1-1-1901	0.33	0.50	0.58
R1-130	0.35	0.51	0.59
R1-70	0.37	0.52	0.60
R1-43	0.38	0.55	0.61
R1-35 (35,000 sq. ft./lot)	0.40	0.56	0.62
R1-18 (18,000 sq. ft./lot)	0.43	0.58	0.64
R1-10 (10,000 sq. ft./lot)	0.47	0.62	0.67
R1-7 (7,000 sq. ft./lot)	0.51	0.64	0.70
Townhouses (R-2, R-4)	0.63	0.74	0.78
Apartments & Condominiums (R-3, R-5)	0.76	0.83	0.87
Specific Surface Type Values			
Paved streets, parking lots (concrete or asphalt), roofs, & driveways, etc.	0.95		
Lawns, golf courses, & parks (grassed areas)	0.33	0.56	0.66
Undisturbed natural desert or desert landscaping (no impervious weed barrier)	0.31	0.48	0.56
Desert landscaping (with impervious weed barrier)	0.83	0.83	0.83
Mountain terrain – slopes greater than 10%	0.70	0.70	0.70
Agricultural areas (flood-irrigated fields)	0.20	0.20	0.20

FIGURE 4-5. RUNOFF COEFFICIENTS FOR USE WITH RATIONAL METHOD

D. The Army Corps of Engineer's HEC-1 Computer Model

HEC-1 procedures are applicable for any watershed area over 160 acres and up to 100 square miles in size. HEC-1 is required for analyzing drainage areas over 160 acres in size. **HEC-HMS is not an acceptable substitute for HEC-1**. Minimum required submittals when using HEC-1 are:

- A printout of the input data
- A schematic (routing) diagram of the stream network
- The runoff summary output table
- Electronic input file(s), on CD or floppy
- Supporting Documentation and Source Material for parameter selection

1. Precipitation

Precipitation values for HEC-1 modeling shall be determined using the Flood Control Manual, specifically PD and JD records for point rainfall and area reduction factors. Capital Projects shall use the ADOT manual and methodology when specified. Precipitation values are to be obtained from the Isopluvial maps for the specific frequency desired (see Appendix 4-D).

3.4.4 Element Application

(1) **Overland Flow.** The overland flow element is a wide rectangular channel of unit width; so, referring to Figure 3.6, $\alpha = 1.486S^{\frac{1}{2}}/N$ and $m = 5/3$. Notice that Manning's n has been replaced by an overland flow roughness factor, N. Typical values of N are shown in Table 3.5. When applying Equations (3.43) and (3.46) to an overland flow element, the lateral inflow is rainfall excess (previously computed using methods described in Section 3.2) and the outflow is a flow per unit width.

An overland flow element is described by four parameters: a typical overland flow length, L, slope and roughness factor which are used to compute α, and the percent of the subbasin area represented by this element.

Two overland flow elements may be used for each subbasin. The total discharge, Q, from each element is computed as

$$Q = q * \frac{AREA}{L} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.70)$$

Table 3.5

Resistance Factor for Overland Flow

Surface	N value	Source
Asphalt/Concrete*	0.05 - 0.15	a
Bare Packed Soil Free of Stone	0.10	c
Fallow - No Residue	0.008 - 0.012	b
Convential Tillage - No Residue	0.06 - 0.12	b
Convential Tillage - With Residue	0.16 - 0.22	b
Chisel Plow - No Residue	0.06 - 0.12	b
Chisel Plow - With Residue	0.10 - 0.16	b
Fall Disking - With Residue	0.30 - 0.50	b
No Till - No Residue	0.04 - 0.10	b
No Till (20-40 percent residue cover)	0.07 - 0.17	b
No Till (60-100 percent residue cover)	0.17 - 0.47	b
Sparse Rangeland with Debris:		
0 Percent Cover	0.09 - 0.34	b
20 Percent Cover	0.05 - 0.25	b
Sparse Vegetation	0.053 - 0.13	f
Short Grass Prairie	0.10 - 0.20	f
Poor Grass Cover On Moderately Rough	0.30	c
Bare Surface		
Light Turf	0.20	a
Average Grass Cover	0.4	c
Dense Turf	0.17 - 0.80	a,c,e,f
Dense Grass	0.17 - 0.30	d
Bermuda Grass	0.30 - 0.48	d
Dense Shrubbery and Forest Litter	0.4	a

Legend: a) Harley (1975), b) Engman (1986), c) Hathaway (1945), d) Palmer (1946), e) Ragan and Duru (1972), f) Woolhiser (1975). (See Hjemfelt, 1986)

*Asphalt/Concrete n value for open channel flow 0.01 - 0.016

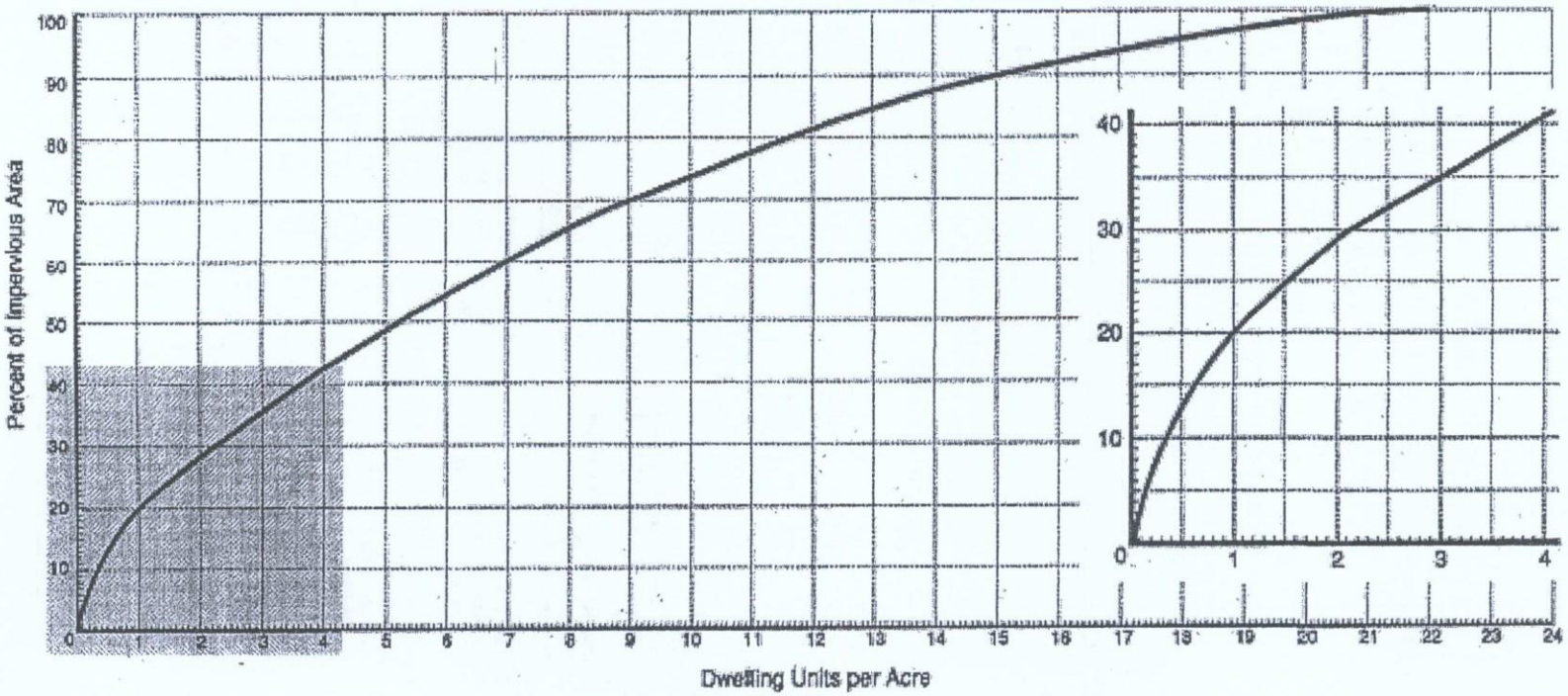

FIGURE 2.2-16

Percent of Impervious Area vs. Dwelling Density

Developed by Water Resources Associates, Inc. from data in Table 2.2a of TR-55, Urban Hydrology For Small Watersheds, and from discussions with Scottsdale city staff.

2. Infiltration

Infiltration or soil losses will be determined using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the most recent published SCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures. Use USDA Natural Resources Conservation Services (previously the Soil Conservation Services) maps, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, or the Soil Survey of Eastern Maricopa and Northern Pinal Counties, Arizona; depending on what part of the city you are located.

3. Runoff Curve Numbers

Where detailed mapping is not available from the SCS or other sources, the use of curve numbers is acceptable. When using runoff curve numbers (ROCN) within Scottsdale:

1. Assume poor hydrologic condition and desert shrub cover type for natural undisturbed desert conditions in Figure 4-6.
2. For lawns, golf courses, and other grassed open space areas, assume good condition in Figure 4-7 to determine the ROCN, then adjust the ROCN to antecedent moisture condition III (use Figure 4-8).
3. For developed conditions, increase the percent impervious on the LS card without changing the ROCN (except in the case of grassed areas, in which the curve number should be adjusted up according to the above). Use the actual or estimated percent impervious; a minimum of 85 percent for commercial and 72 percent industrial.

RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS[1]

Cover Type and Hydrologic Condition	Hydrologic Condition[2]	Curve Numbers for Hydrologic Soil Group			
		A[3]	B	C	D
Herbaceous: mixture of grass, weeds, and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen: mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper: pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub: major plants include saltbush, greasewood, creosote bush, blackbrush, bursage, Palo Verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1] Average Runoff Condition, and $I_a = 0.2S$.

[2] Poor: < 30% ground cover (litter, grass, and brush overstory)
Fair: 30 to 70% ground cover (not applicable in Scottsdale)
Good: >70% ground cover (not applicable in Scottsdale)

[3] Curve Numbers for Group A have been developed only for desert shrub

FIGURE 4-6. RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS

2. Infiltration

Infiltration or soil losses will be determined using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the most recent published SCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures. Use USDA Natural Resources Conservation Services (previously the Soil Conservation Services) maps, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, or the Soil Survey of Eastern Maricopa and Northern Pinal Counties, Arizona; depending on what part of the city you are located.

3. Runoff Curve Numbers

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1. Assume poor hydrologic condition and desert shrub cover type for natural undisturbed desert conditions in Figure 4-6.
2. For lawns, golf courses, and other grassed open space areas, assume good condition in Figure 4-7 to determine the ROCN, then adjust the ROCN to antecedent moisture condition III (use Figure 4-8).
3. For developed conditions, increase the percent impervious on the LS card without changing the ROCN (except in the case of grassed areas, in which the curve number should be adjusted up according to the above). Use the actual or estimated percent impervious; a minimum of 85 percent for commercial and 72 percent industrial.

RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS[1]

Cover Type and Hydrologic Condition	Hydrologic Condition[2]	Curve Numbers for Hydrologic Soil Group			
		A[3]	B	C	D
Herbaceous: mixture of grass, weeds, and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen: mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper: pinyon, juniper, or both; grass understory	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub: major plants include saltbush, greasewood, creosote bush, blackbrush, bursage, Palo Verde, mesquite, and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1] Average Runoff Condition, and $I_a = 0.2S$.

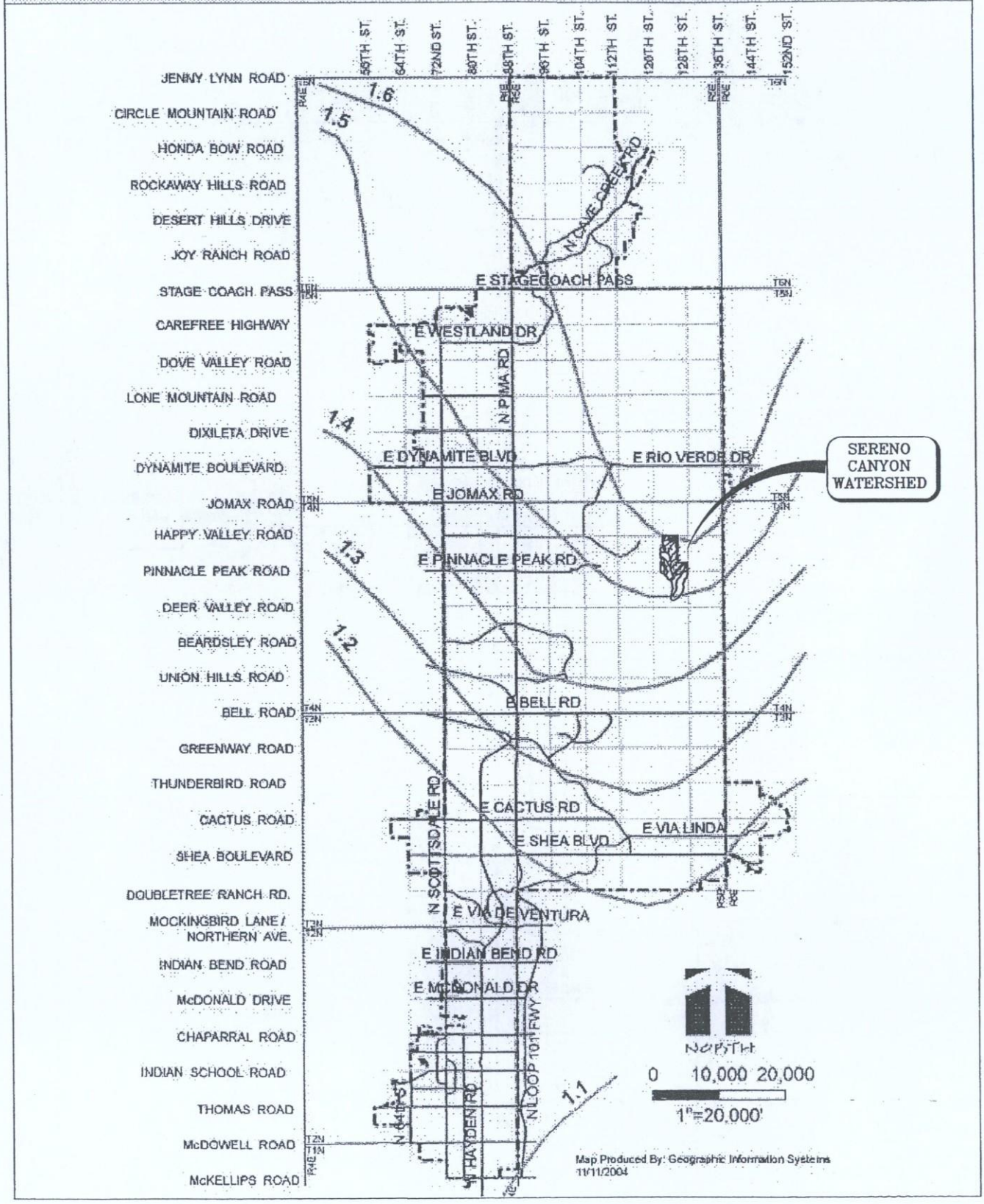
[2] Poor: < 30% ground cover (litter, grass, and brush overstory)
Fair: 30 to 70% ground cover (not applicable in Scottsdale)
Good: >70% ground cover (not applicable in Scottsdale)

[3] Curve Numbers for Group A have been developed only for desert shrub

FIGURE 4-6. RUNOFF CURVE NUMBERS FOR ARID & SEMIARID RANGELANDS

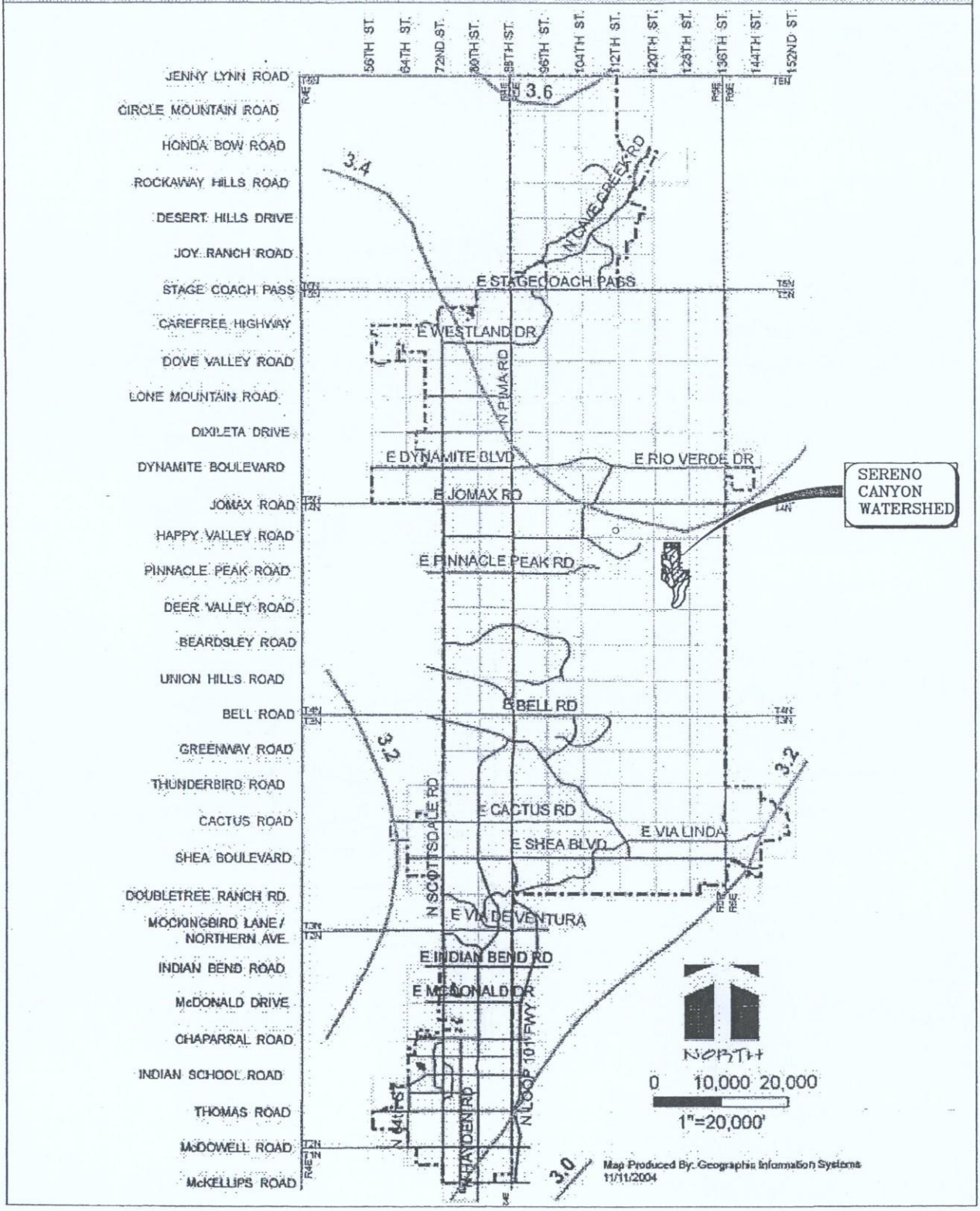
ISOPLUVIALS

2 Year 6 Hour Precipitation in Inches



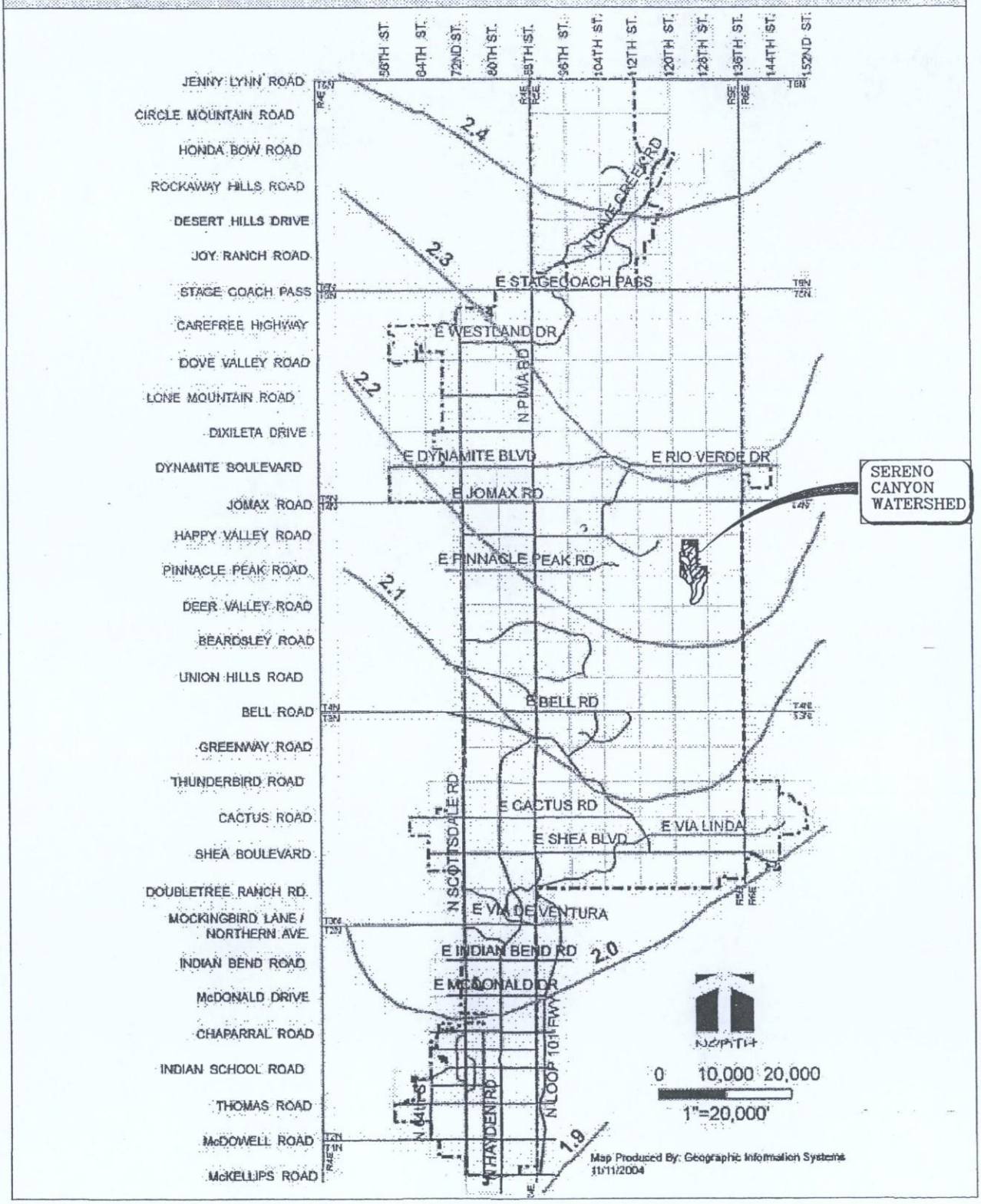
ISOPLUVIALS

100 Year 6 Hour Precipitation in Inches



ISOPLUVIALS

10 Year 6 Hour Precipitation in Inches



Rainfall Data

Primary Zone Number: 7 Latitude: 0.0 Elevation: 0

Short Duration Zone Number: 8 Longitude: 0.0

	Point Values (in)					
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
5 MIN	0.38	0.46	0.52	0.60	0.66	0.73
10 MIN	0.57	0.70	0.78	0.91	1.01	1.11
15 MIN	0.70	0.87	0.99	1.16	1.29	1.43
30 MIN	0.92	1.16	1.33	1.56	1.75	1.94
1 HOUR	1.12	1.43	1.64	1.95	2.19	2.42
2 HOUR	1.27	1.62	1.87	2.21	2.48	2.74
3 HOUR	1.38	1.75	2.01	2.38	2.67	2.96
6 HOUR	1.57	2.00	2.29	2.71	3.04	3.37
12 HOUR	1.81	2.31	2.66	3.15	3.53	3.91
24 HOUR	2.05	2.62	3.02	3.58	4.02	4.45

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					In		In			
5 ,59*: nure	B	None	---	---	>60	---	---	---	High	Low.
60*: enbar, noncalcareous	B	Rare	---	---	>60	---	---	---	High	Low.
Glenbar, Calcareous	B	Rare	---	---	>60	---	---	---	High	Low.
5 , 62*: an	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
6 , 64*: an	D	None	---	---	20-40	Hard	---	---	High	Low.
Wickenburg	D	None	---	---	3-20	Soft	---	---	High	Low.
ck outcrop.										
65*: Greyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
ntinental	C	None	---	---	>60	---	---	---	High	Low.
Nickel	B	None	---	---	>60	---	---	---	High	Low.
6 : eyeagle	D	None	---	---	>60	---	4-20	Thick	High	Low.
Suncity Variant	D	None	---	---	>60	---	5-20	Thick	High	Low.
6 est	D	Rare	---	---	>60	---	---	---	High	Low.
68*, 69*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
priano	D	None	---	---	>60	---	5-20	Thick	High	Low.
70*, 71*: Gunsight	B	None	---	---	>60	---	---	---	High	Low.
llito	B	None	---	---	>60	---	---	---	High	Low.
72*, 73*: Lehmans	D	None	---	---	6-20	Hard	---	---	High	Low.
ck outcrop.										
74*: Luke	C	None	---	---	>60	---	20-40	Thick	High	Low.
priano	D	None	---	---	>60	---	4-20	Thick	High	Low.
75, 76, 77, 78, 79 hall	B	None	---	---	>60	---	---	---	High	Low.
8 81*: Mohall	B	None	---	---	>60	---	---	---	High	Low.

See footnote at end of table.

Photo 13

Photo 14

Photo 11

Photo 12

Photo 9

Photo 10

Photo 7

Photo 8

Photo 5

Photo 6

APPENDIX F

Hydraulic Calculations

- Storage Rating Curves
- HEC-RAS Output Files
- Orifice Plate Calculation

Culvert Rating Curves for Stage-Storage Intervals

Project: *Sereno Canyon*
Location: *City of Scottsdale*
Reference: *Rectangular Weir Equation*

W/P#: *042054*
Date: *5/11/2006*

$$Q = CLH^{3/2}$$

Where:

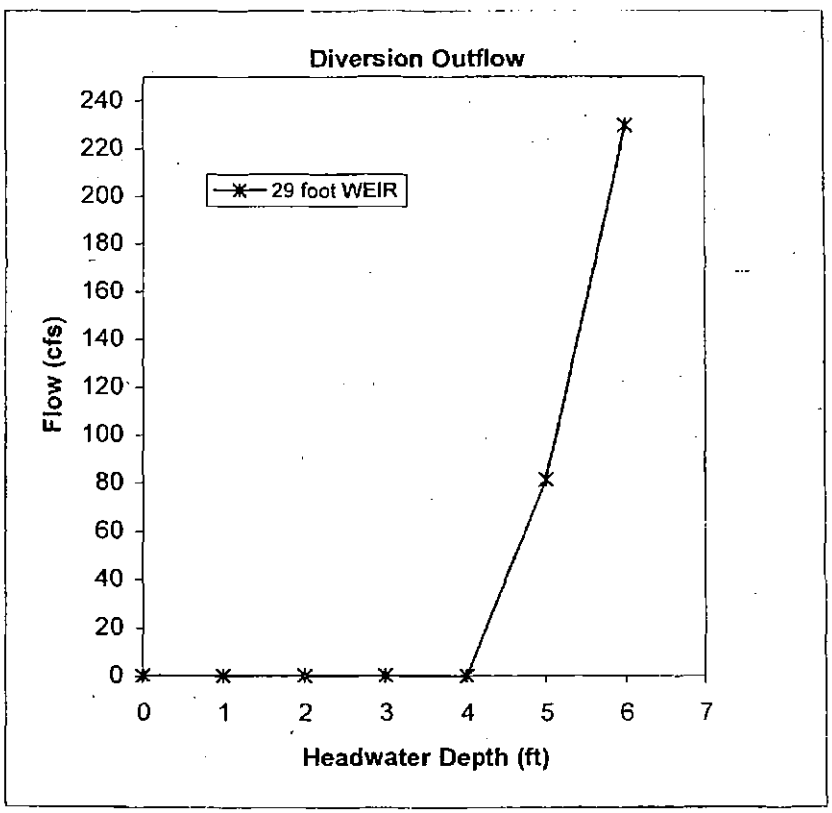
C = Weir Coefficient =	2.80	
L = Length of Weir =	10.00	ft
H = Head above Weir =	1.50	ft
Q = Weir Flow =	51.44	cfs

* The above equation is used to determine the rating curves for weir flow

Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BASA1

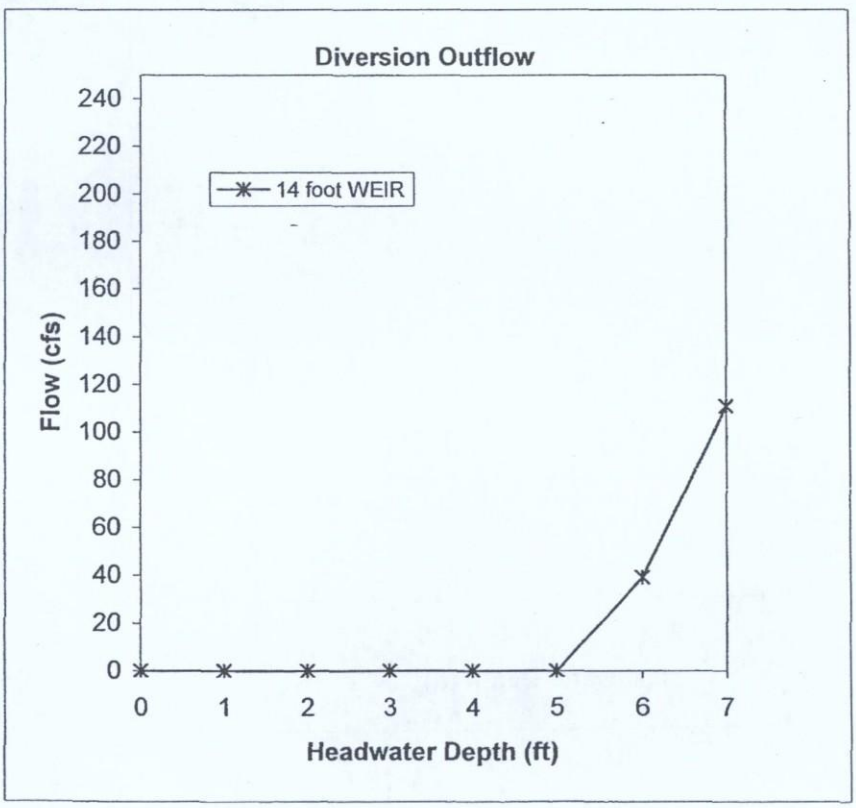
29	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	81
6	230



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS A2-3

14	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	0
6	39
7	111

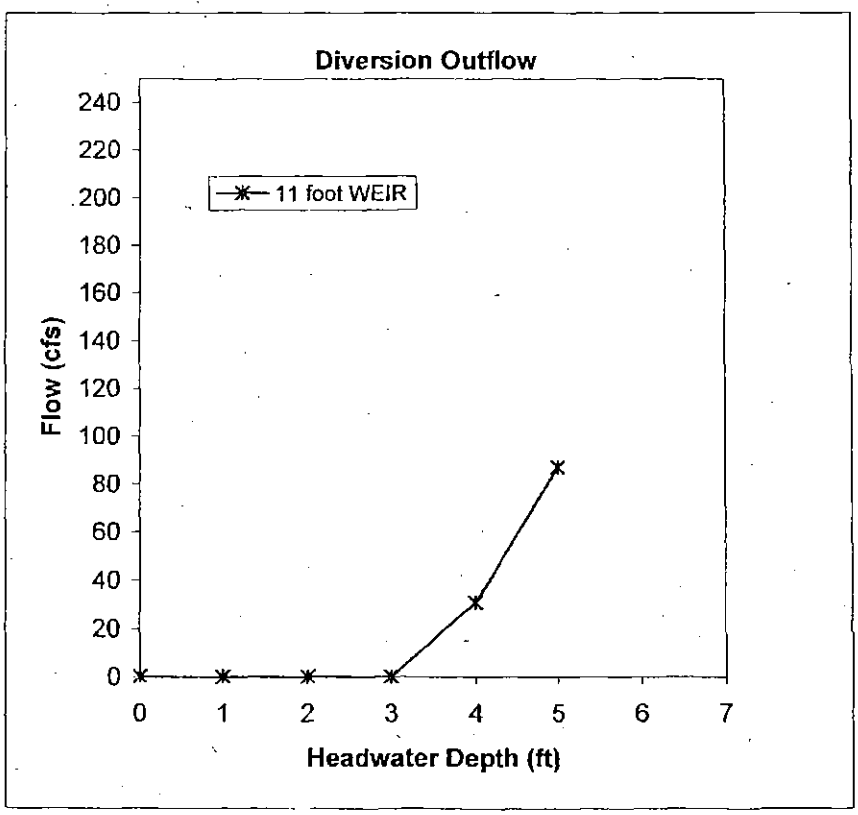


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS B-3

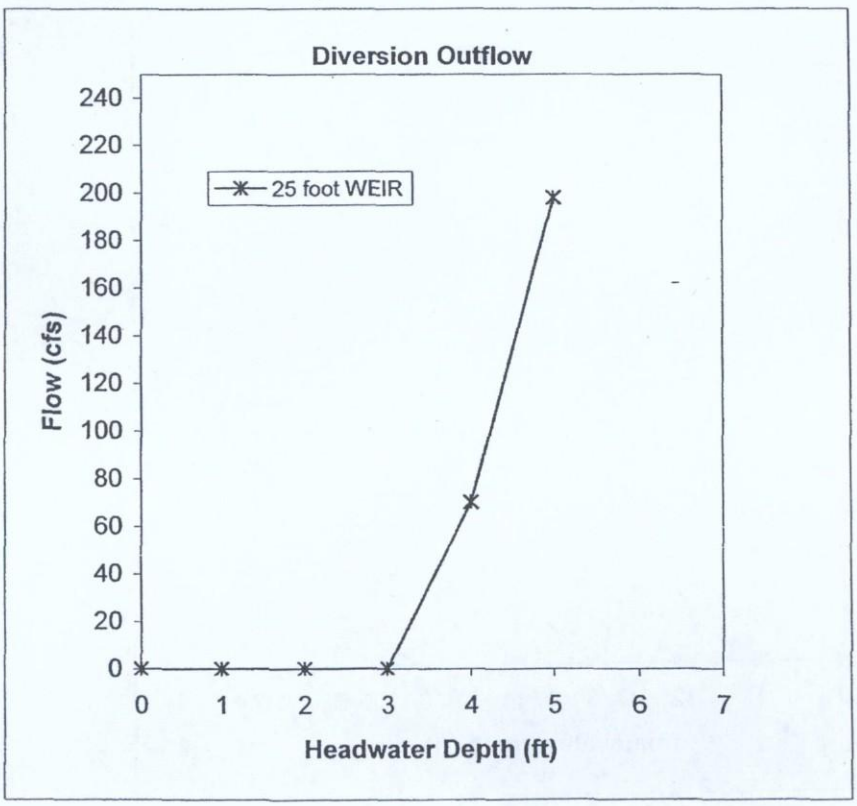
11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS B-4

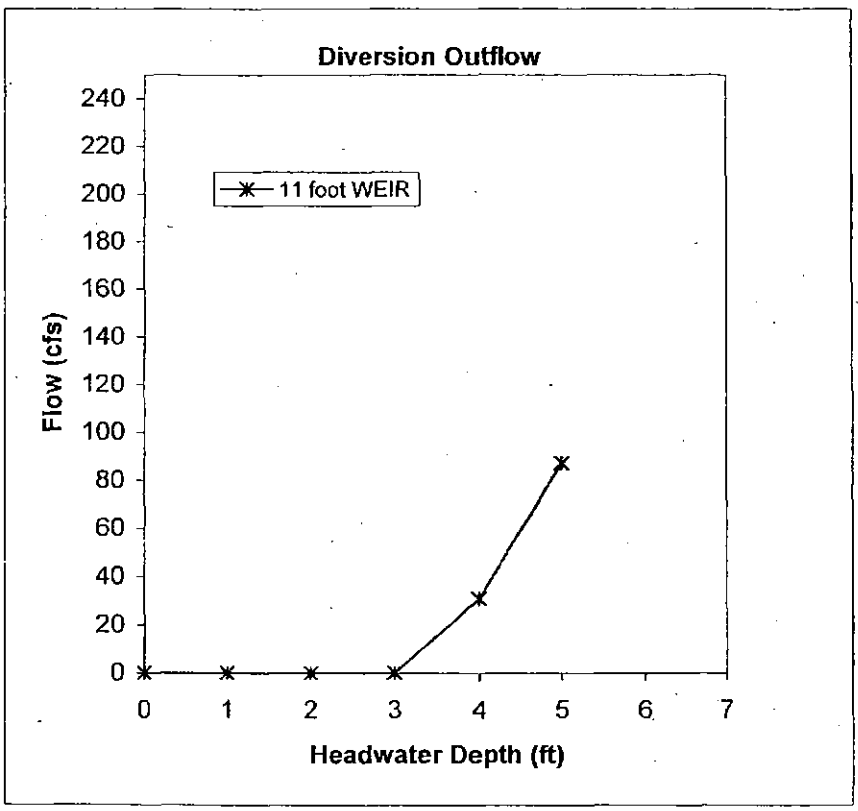
25	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	70
5	198



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS C-1

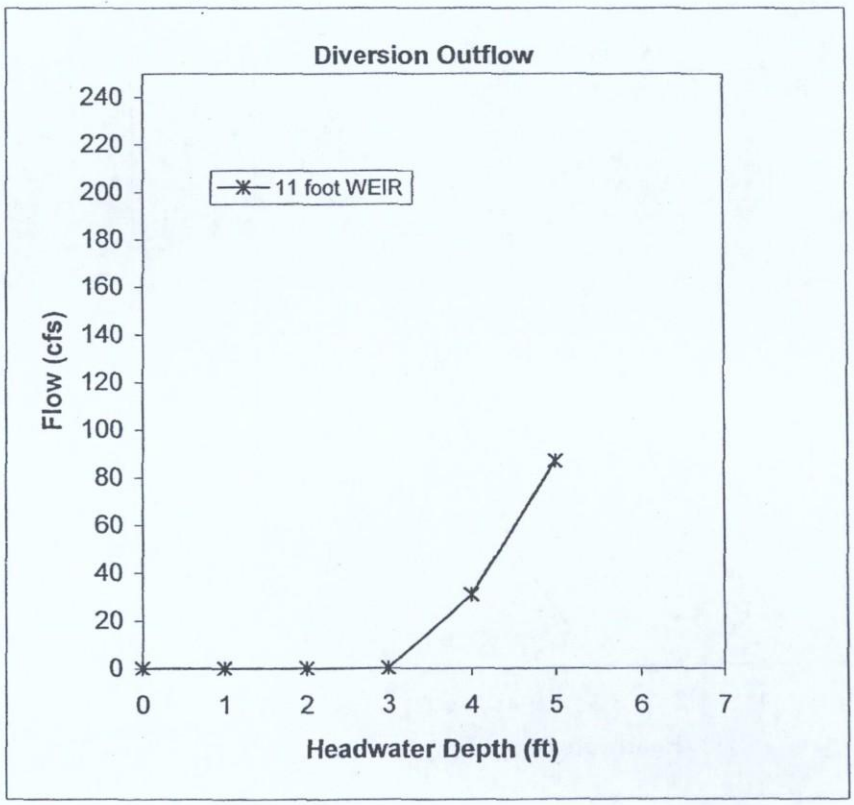
11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS D-1

11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87

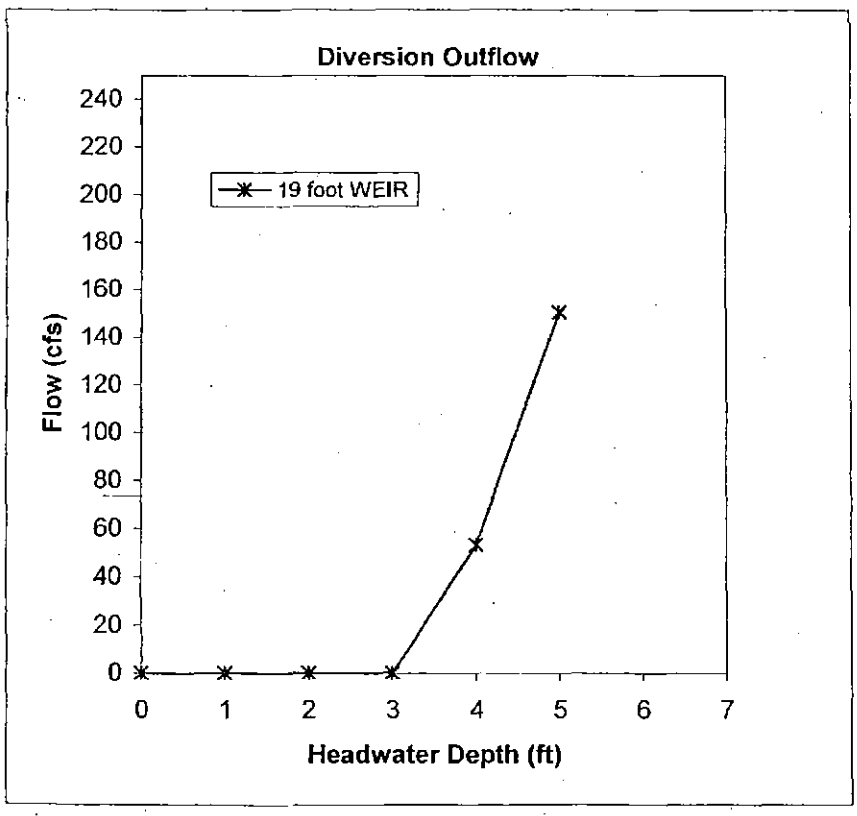


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E1-2

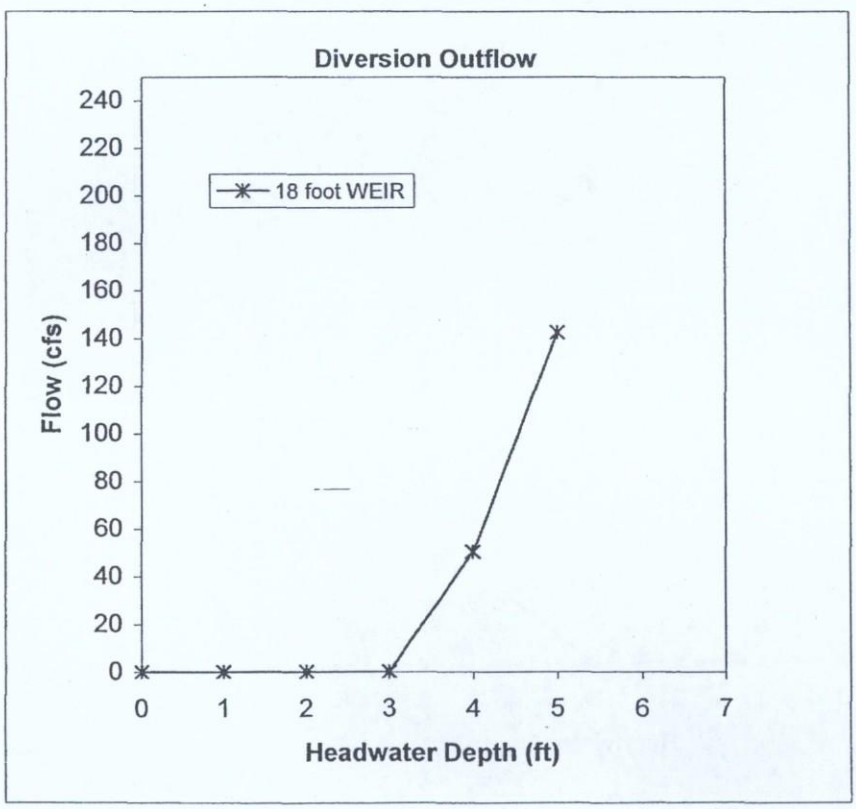
19	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	53
5	150



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E2-1

18	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	50
5	143

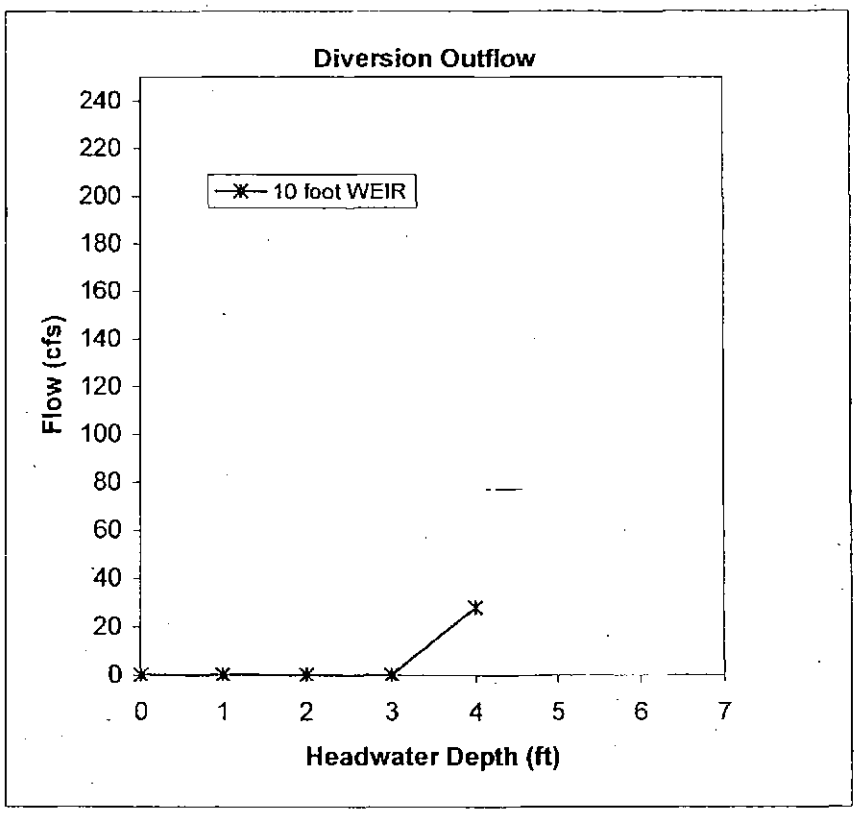


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS E3-1

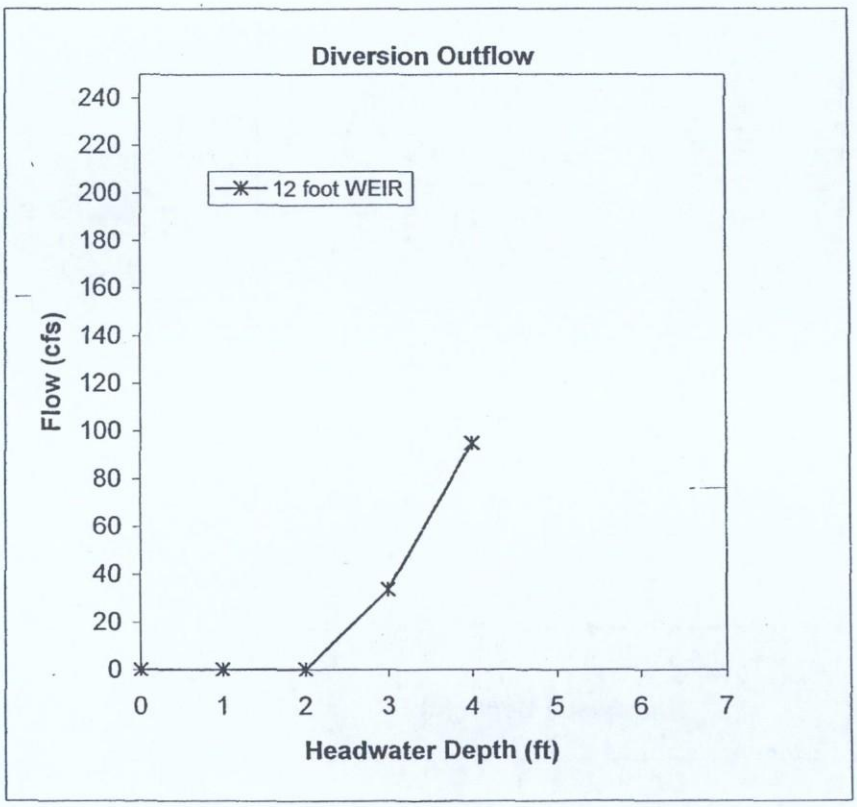
10	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	28



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F1-3

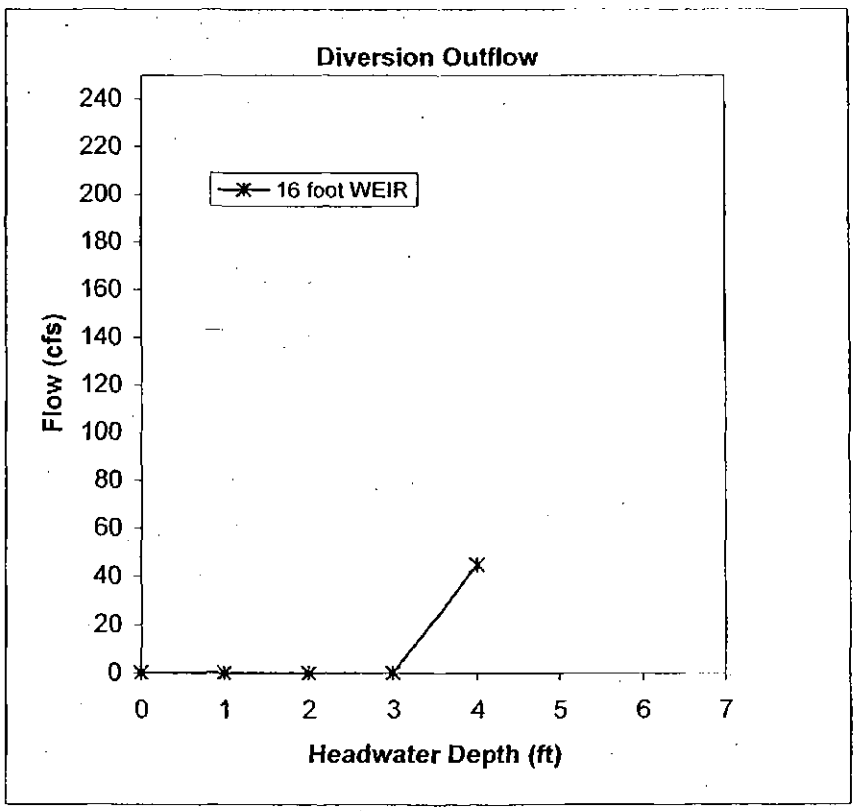
12	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	34
4	95



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F2-2

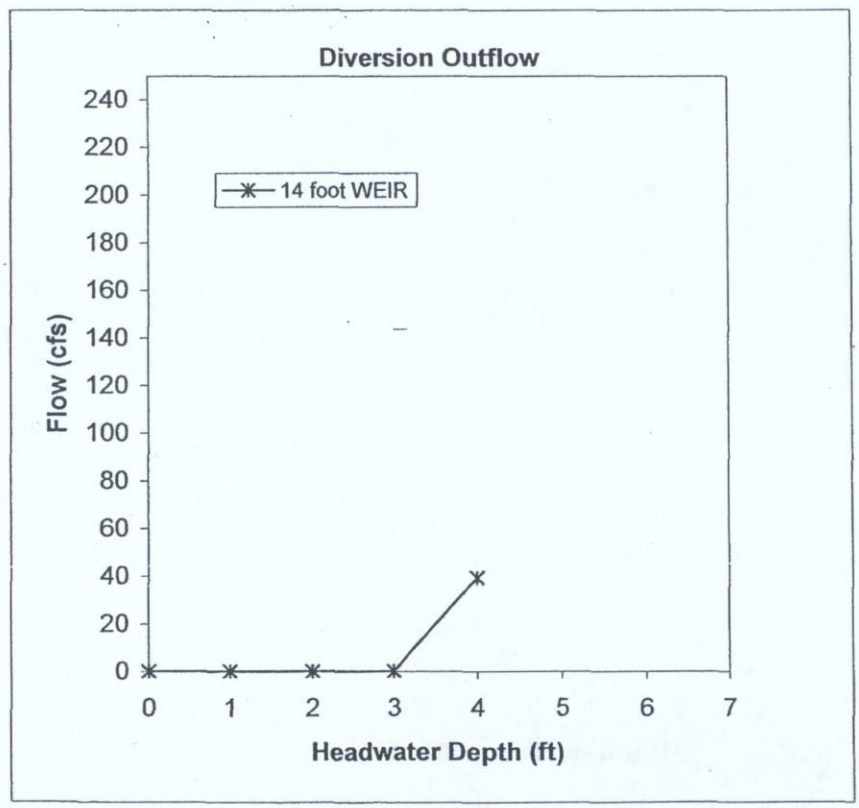
16	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	45



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS F3-1

14	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	39

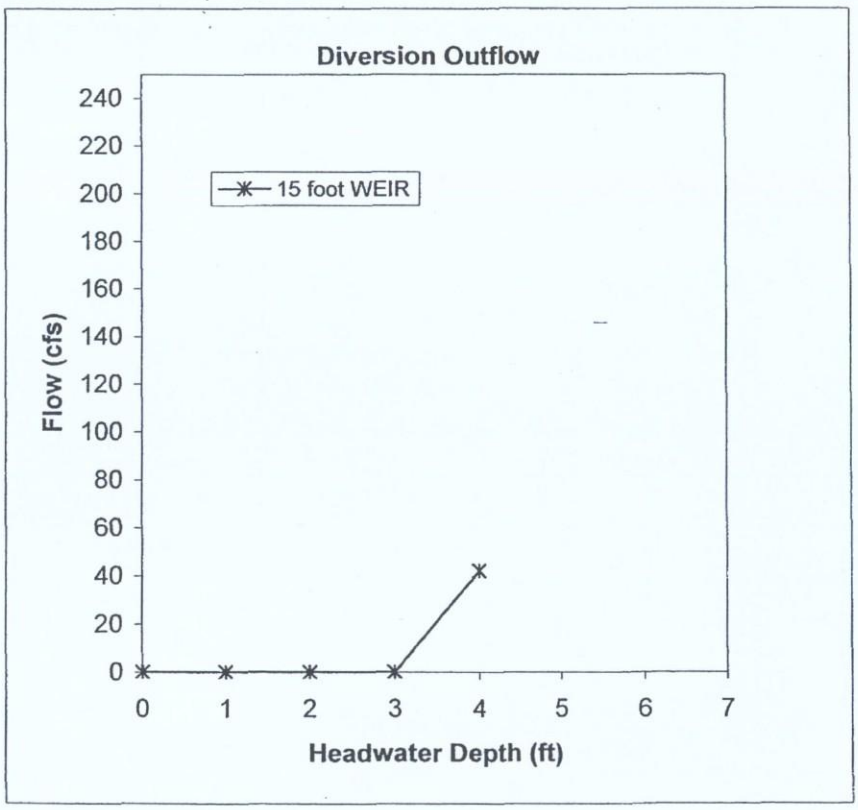


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS G

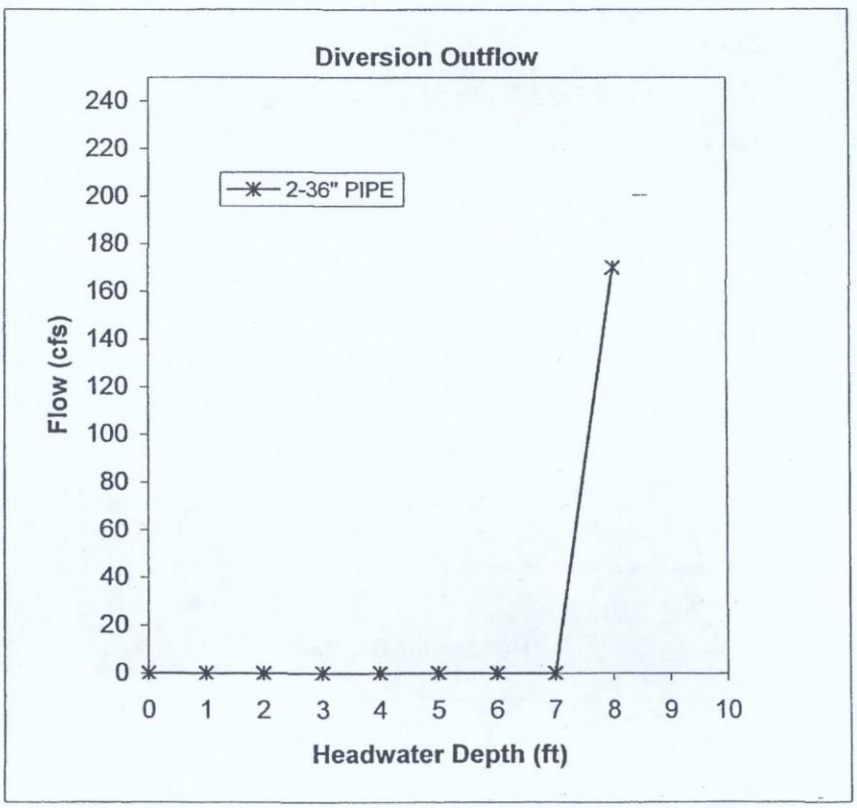
15	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	42



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H1-1

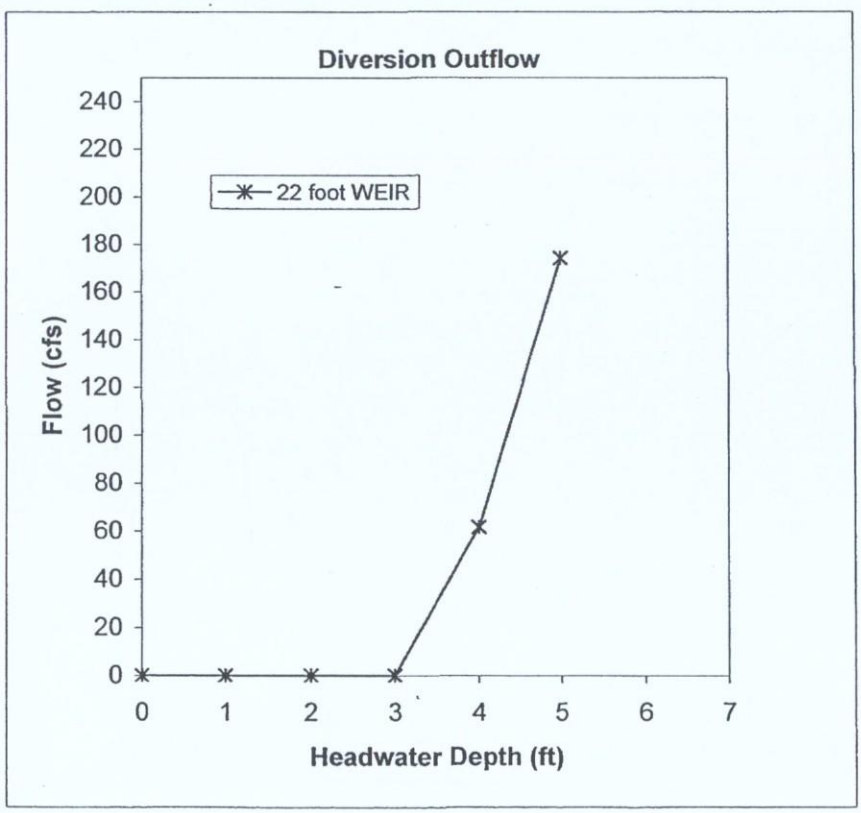
2-36" PIPE	
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	170



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H2-1

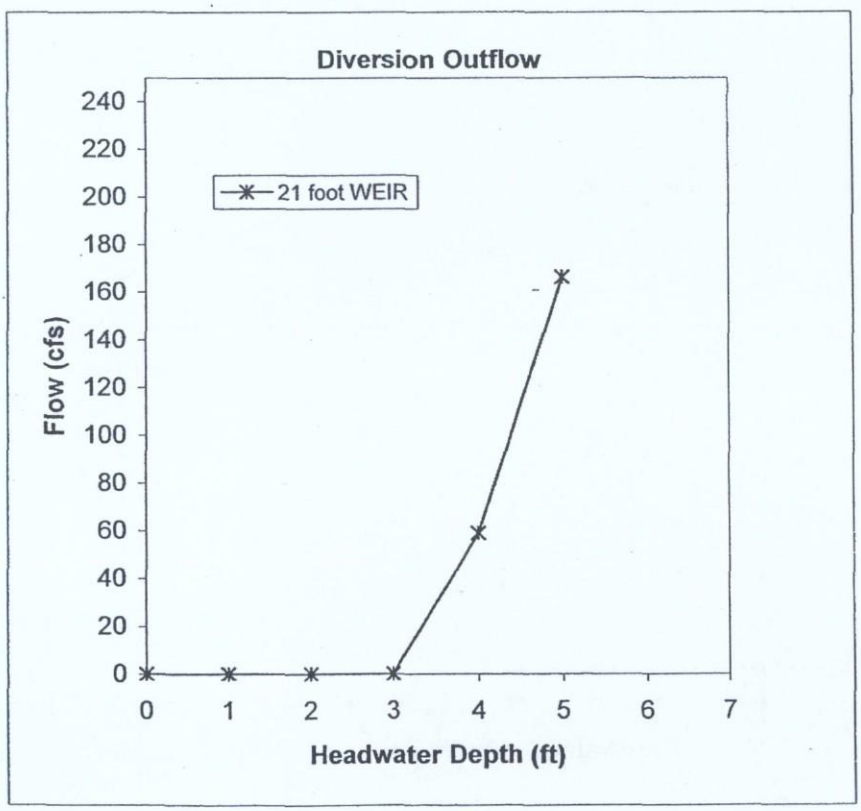
22	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	62
5	174



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS H2-2

21	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	59
5	166

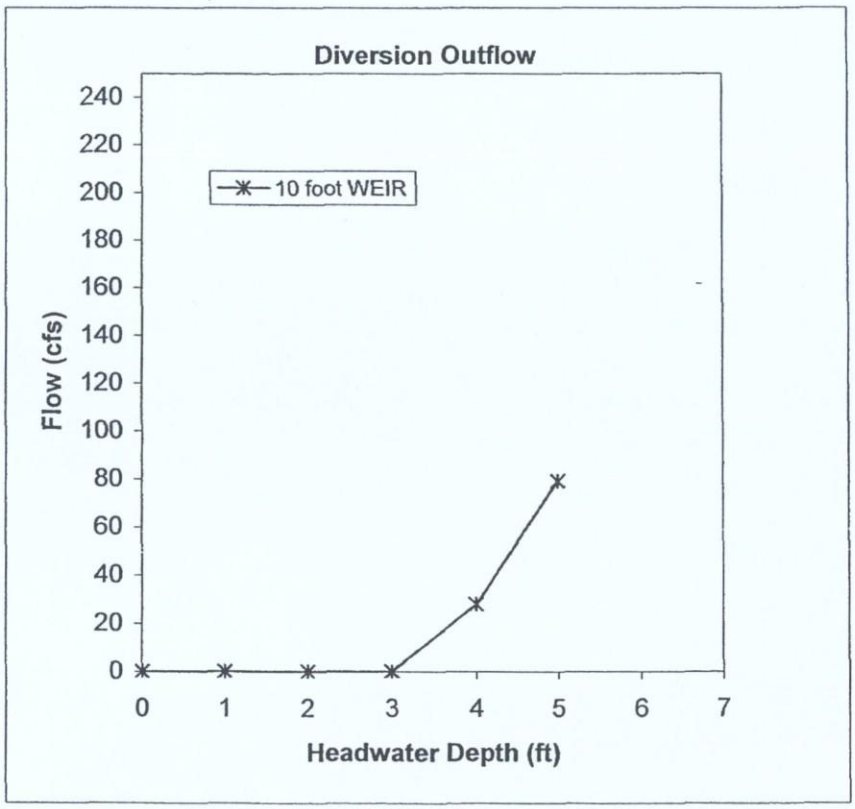


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS I

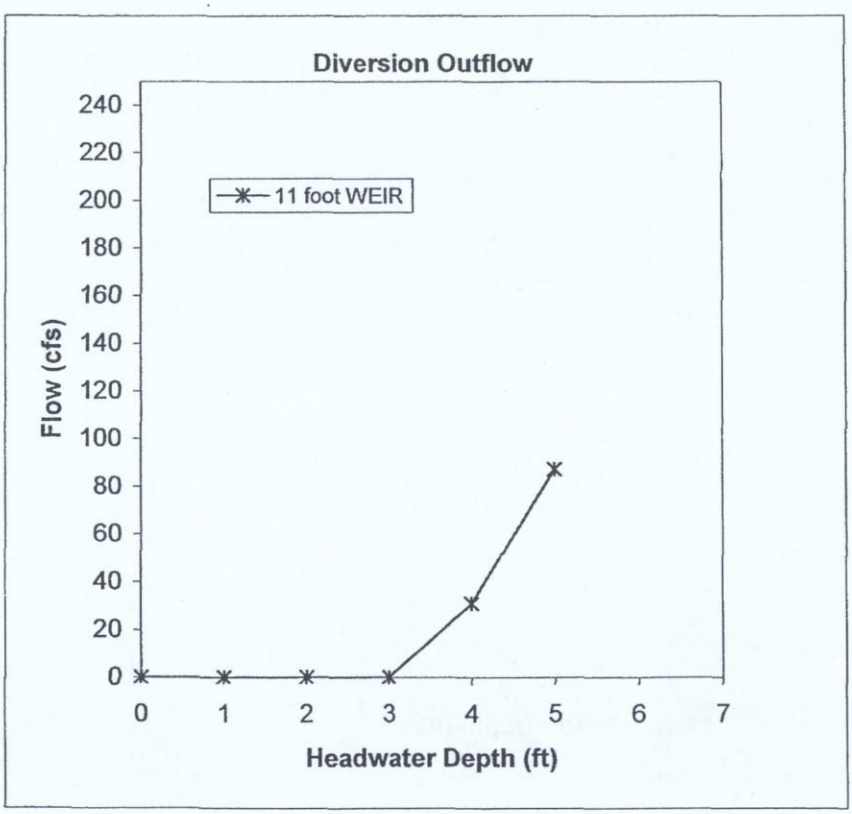
10	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	28
5	79



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS J

11	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	31
5	87

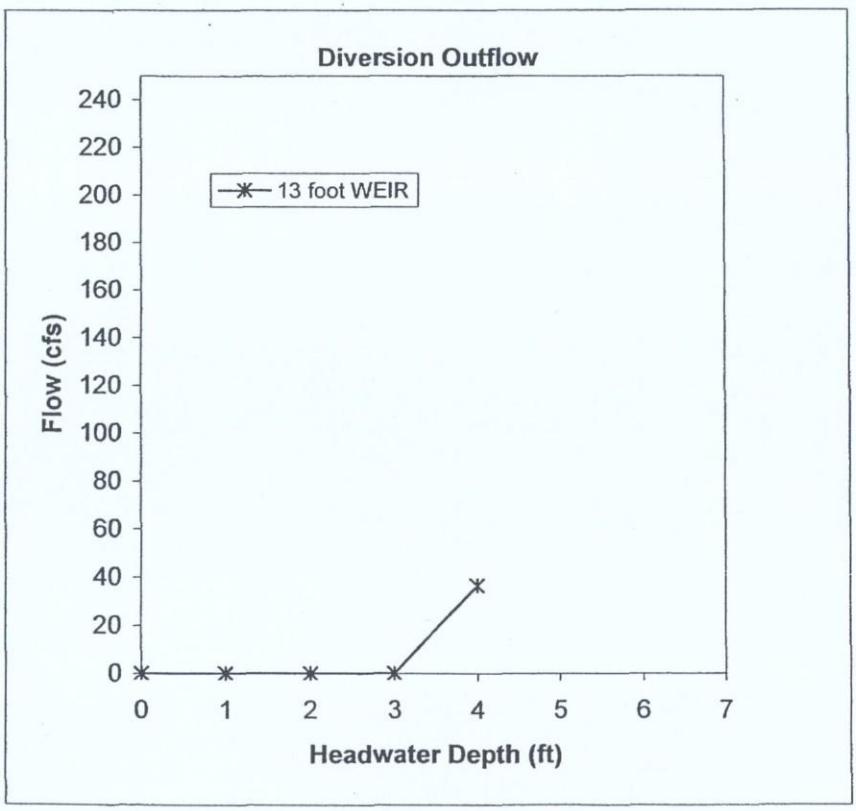


Project: *Sereno Canyon* **W/P#:** *042054*

Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS K

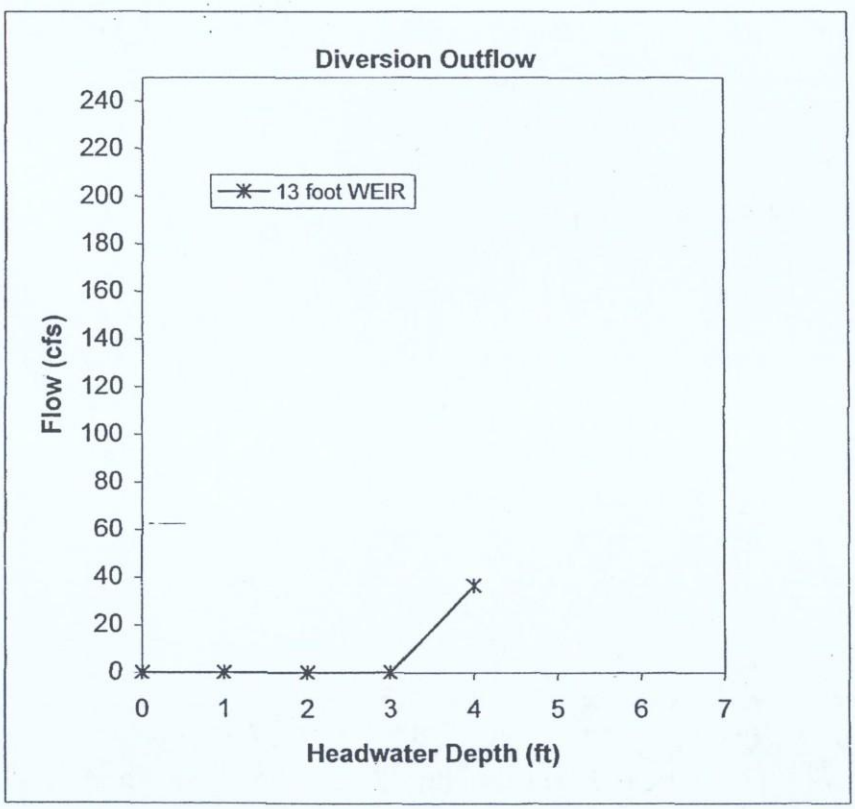
13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	36



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS L

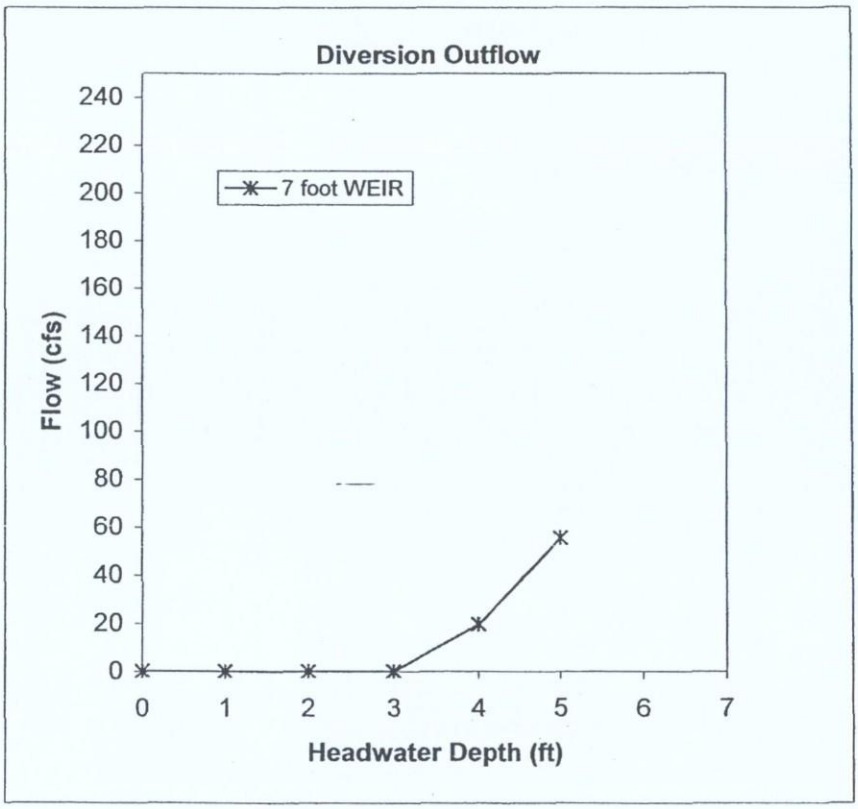
13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	36



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS M

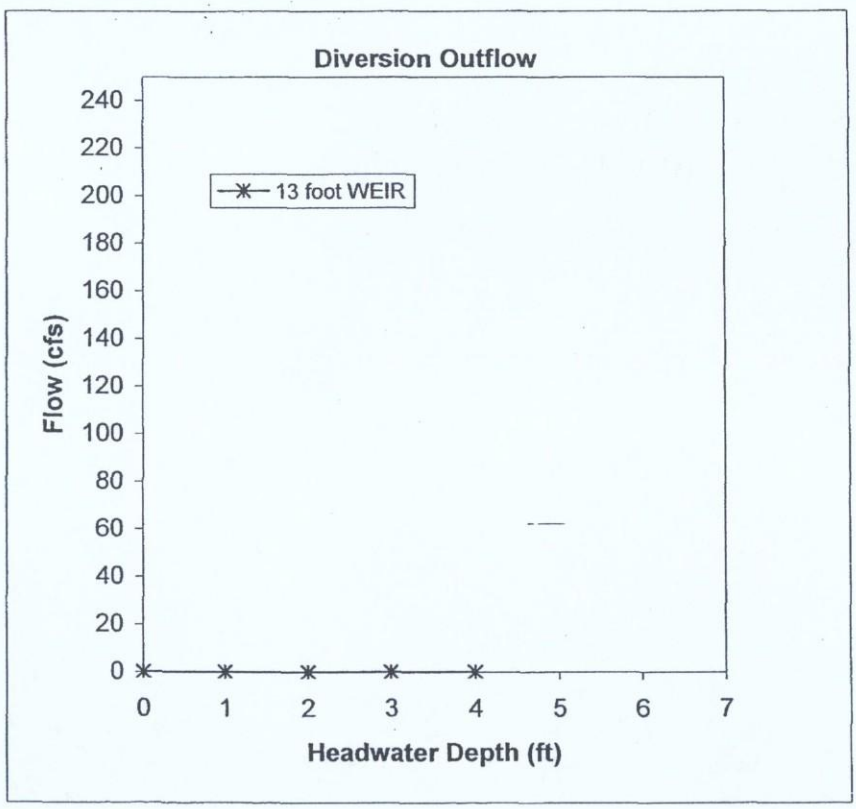
7	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	20
5	55



Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*

Rating Curve for Diversion BAS N

13	foot WEIR
Headwater Depth	Flow
ft	cfs
0	0
1	0
2	0
3	0
4	0
5	36

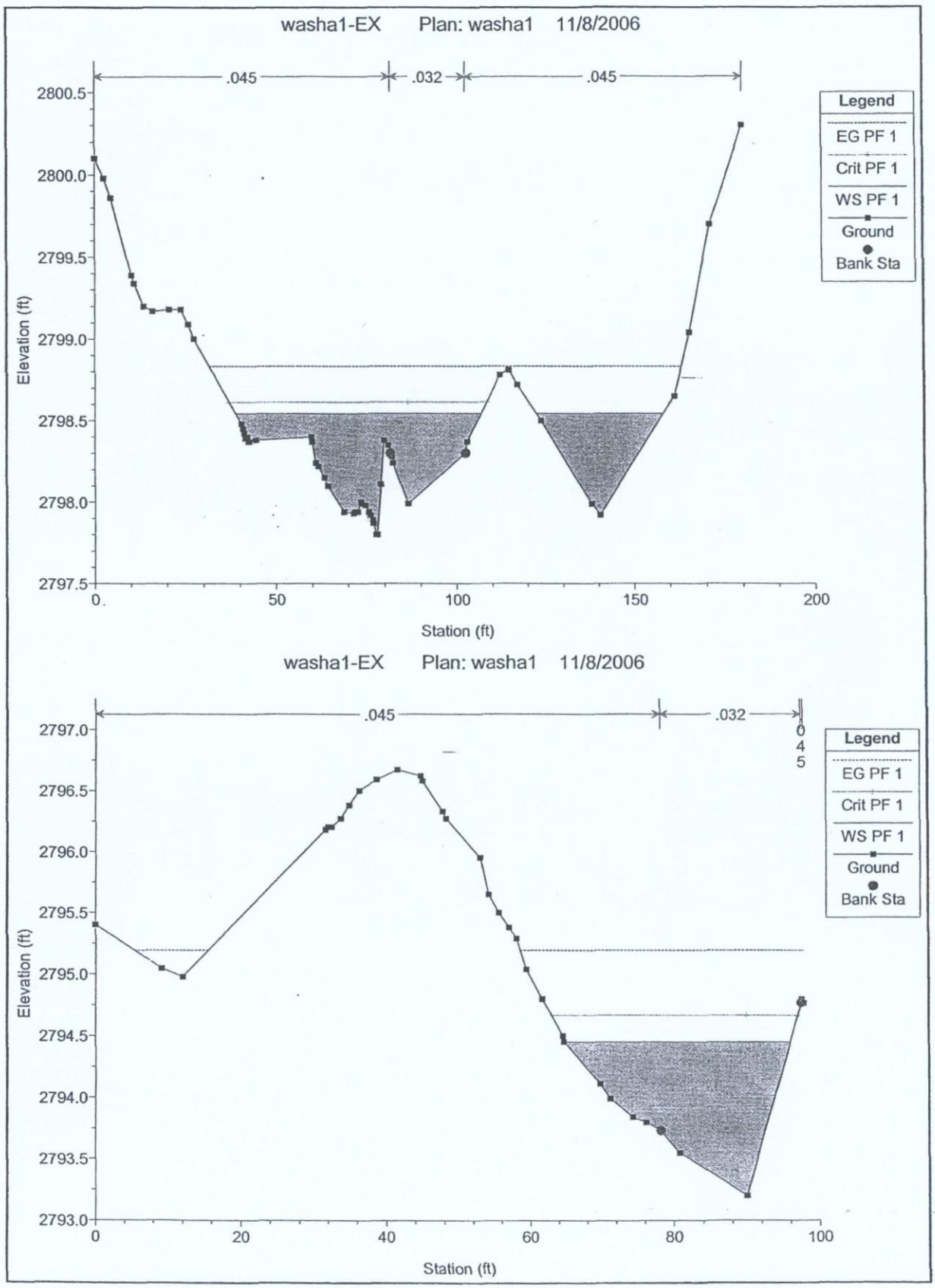


HEC-RAS Output Files

WASH A1

HEC-RAS Plan: wasa1 River: RIVER-1 Reach: Reach-1 Profile: PF 1

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	6	PF 1	133.00	2797.99	2798.54	2798.61	2798.83	0.050016	5.63	33.66	103.73	1.57
Reach-1	5	PF 1	133.00	2793.20	2794.45	2794.67	2795.20	0.029978	7.35	21.29	31.22	1.38
Reach-1	4	PF 1	133.00	2786.79	2787.89	2788.26	2789.23	0.093236	9.42	15.00	33.03	2.25
Reach-1	3.5	PF 1	133.00	2780.30	2781.30	2781.53	2782.07	0.042079	7.04	18.89	29.62	1.55
Reach-1	3	PF 1	133.00	2777.01	2778.00	2778.20	2778.73	0.041792	7.60	22.37	42.27	1.58
Reach-1	2.5	PF 1	133.00	2772.00	2772.83	2773.19	2773.87	0.067610	8.23	16.36	31.78	1.93
Reach-1	2	PF 1	235.00	2761.68	2763.52	2764.13	2765.42	0.052499	12.11	25.99	37.79	1.92
Reach-1	1.5	PF 1	235.00	2759.00	2760.14	2760.27	2760.65	0.033817	5.69	41.27	75.65	1.36
Reach-1	1	PF 1	235.00	2753.00	2754.30	2754.63	2755.50	0.047422	9.88	33.13	58.31	1.77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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2800.5
2800.0
2799.5
2799.0
2798.5
2798.0
2797.5
0
50
100
150
200
Station (ft)
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.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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2796.5
2796.0
2795.5
2795.0
2794.5
2794.0
2793.5
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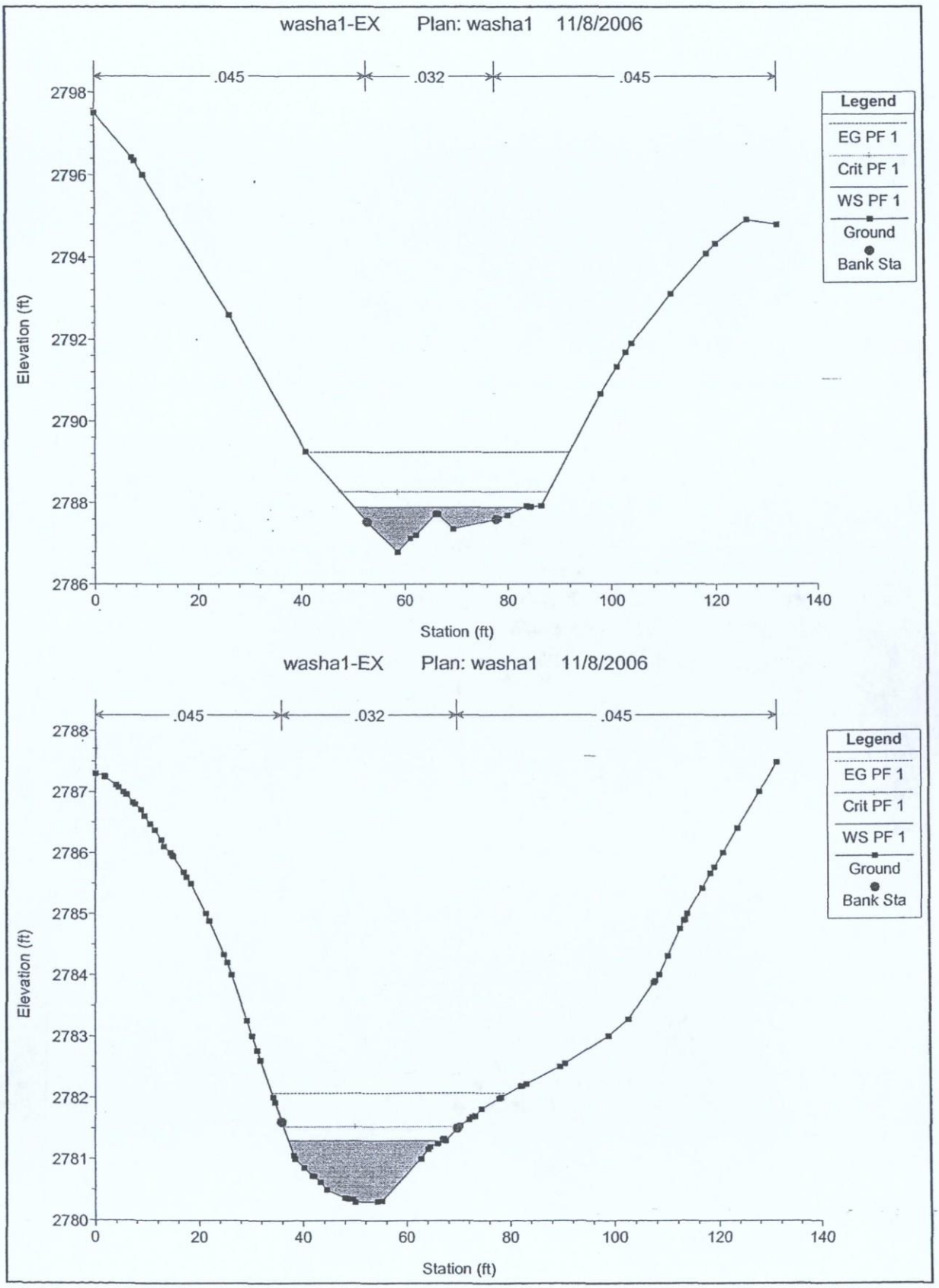
Station (ft)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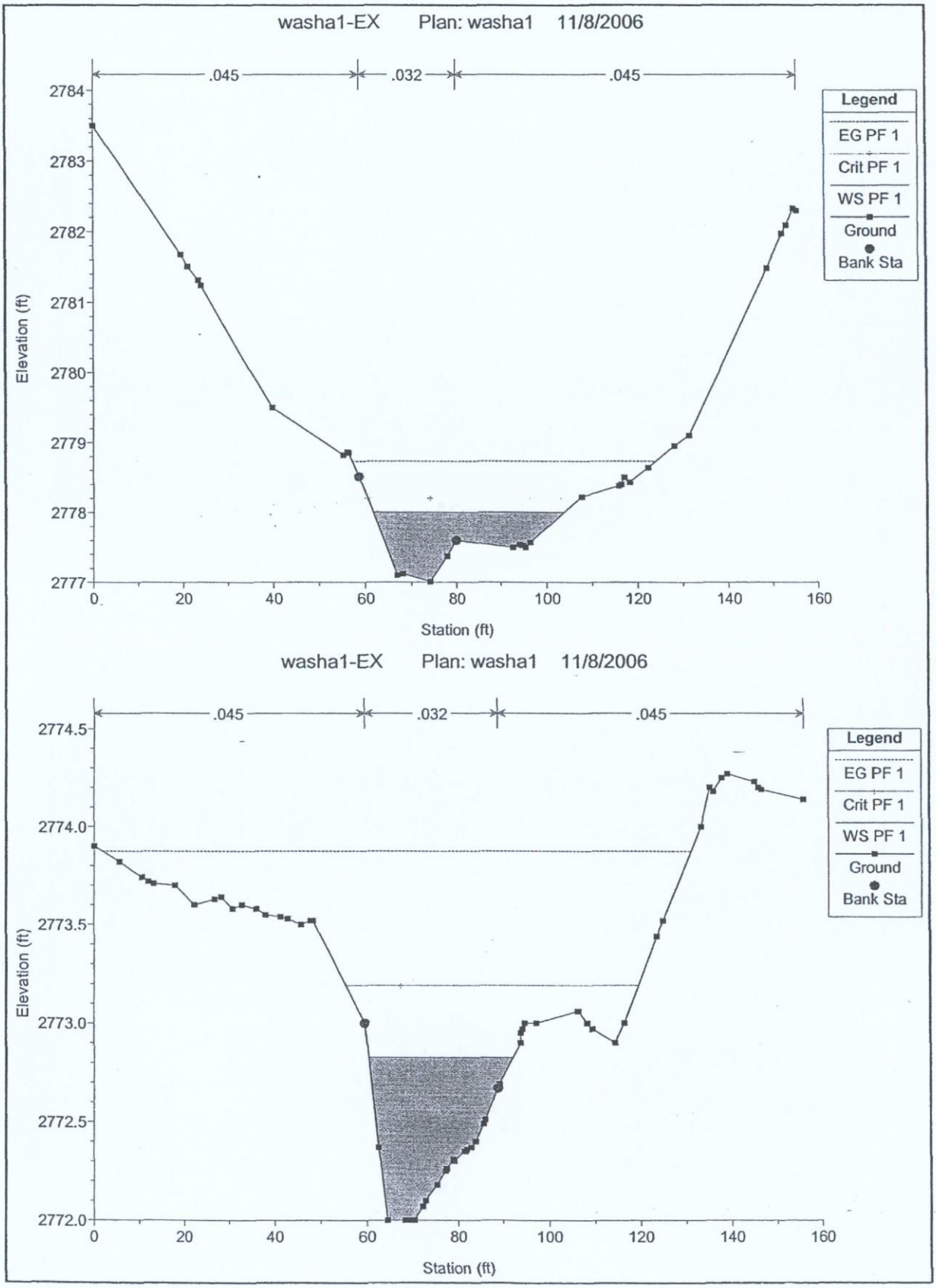
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2798
2796
2794
2792
2790
2788
2786
0
20
40
60
80
100
120
140
washa1-EX Plan: washa1 11/8/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2788
2787
2786
2785
2784
2783
2782
2781
2780
0
20
40
60
80
100
120
140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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-EX Plan: washa1 11/8/2006
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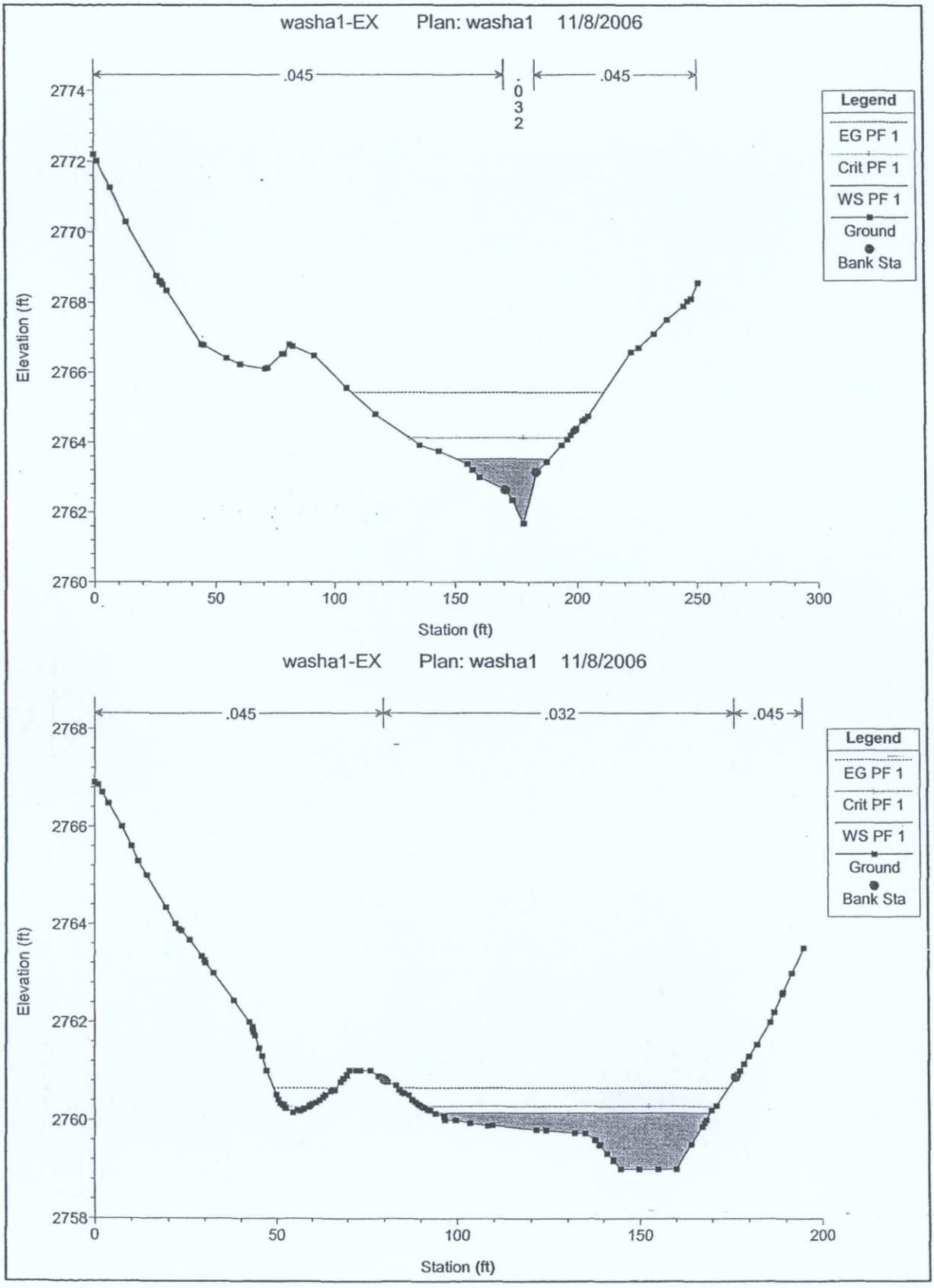
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2774
2772
2770
2768
2766
2764
2762
2760
0
50
100
150
200
250
300
washa1-EX Plan: washa1 11/8/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2766
2764
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2760
2758
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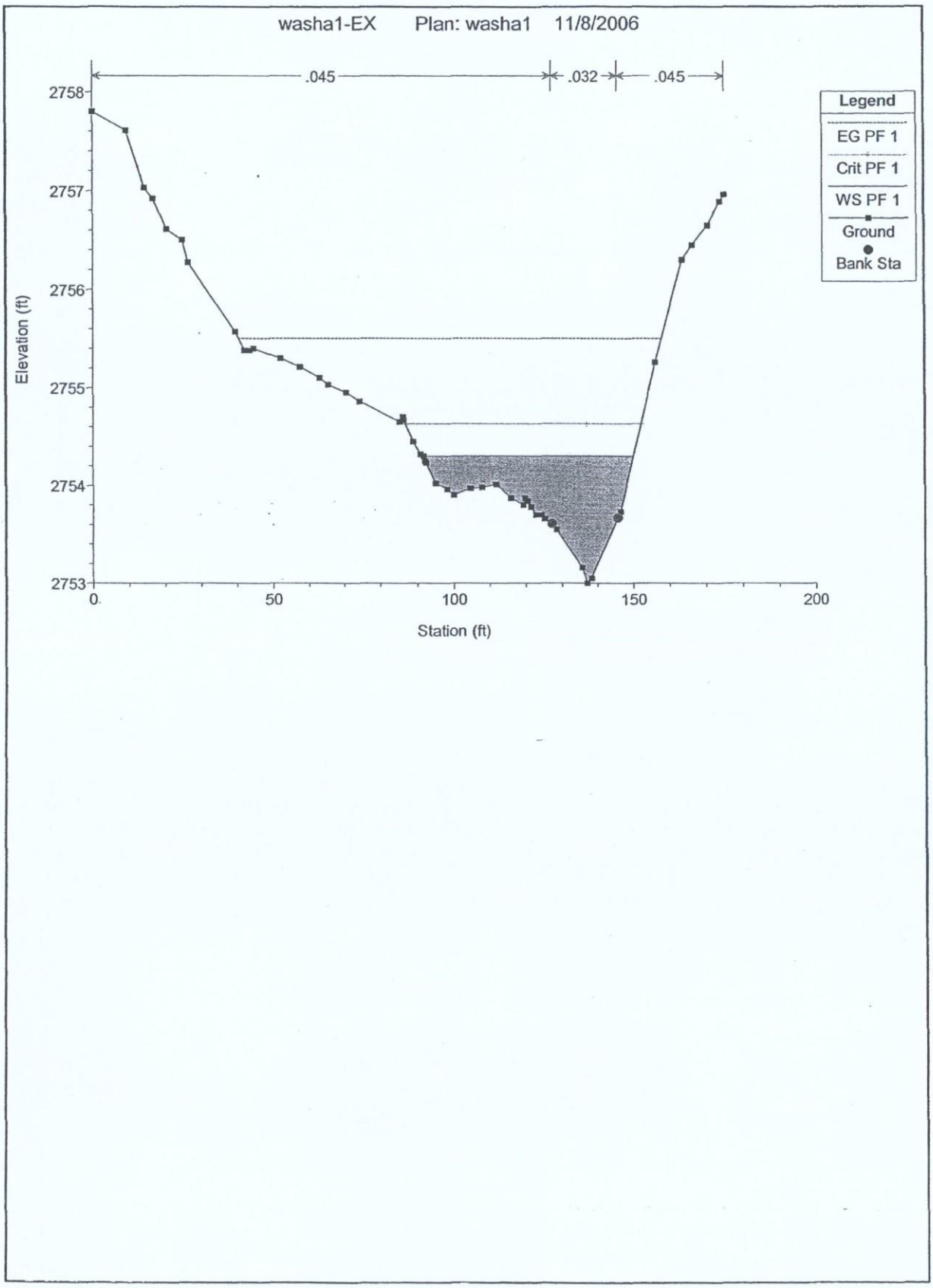
50
100
150
200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.045
.032
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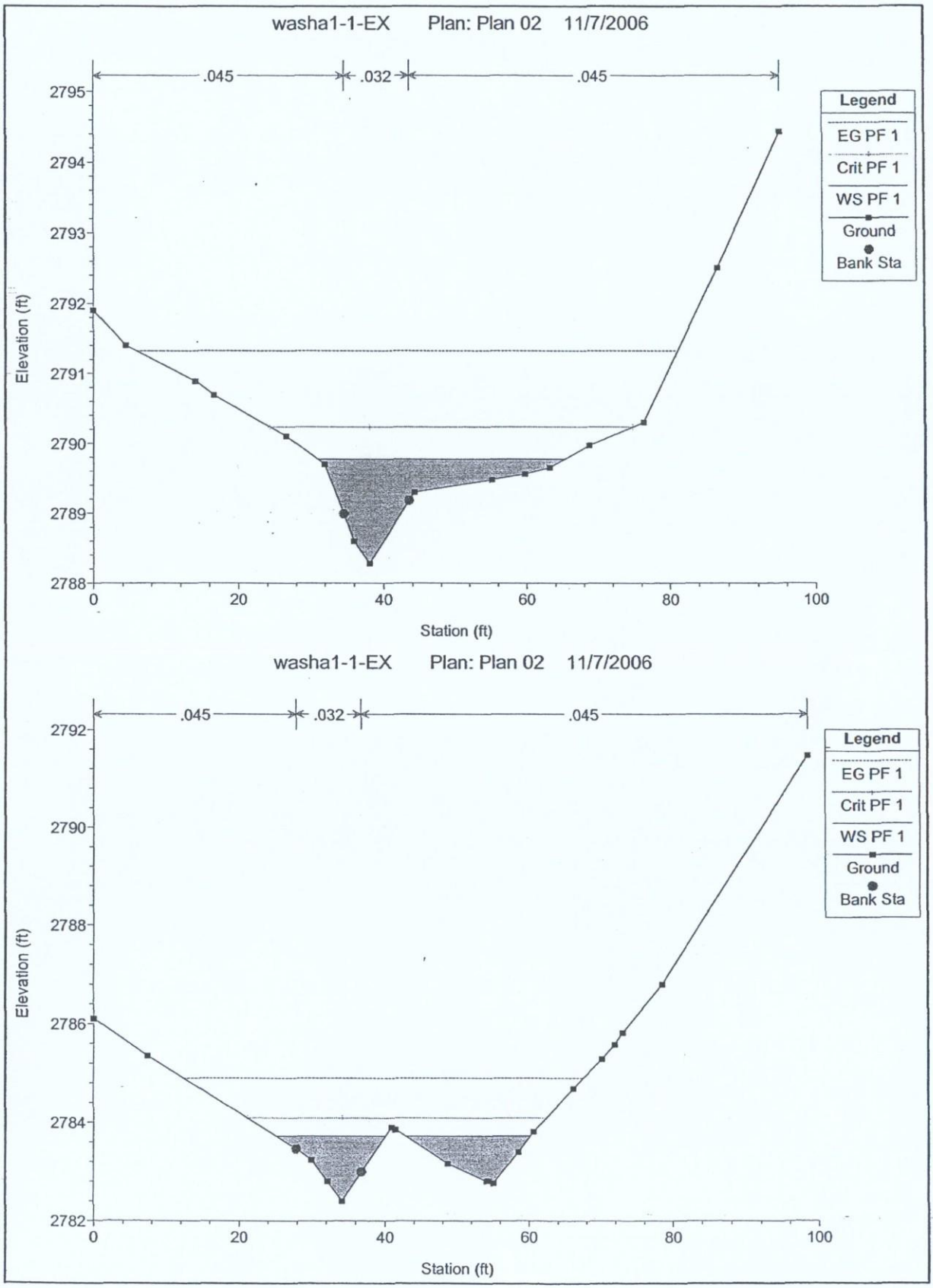
2758
2757
2756
2755
2754
2753
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH A1-1

HEC-RAS Plan: Plan 02 River: RIVER-1 Reach: Reach-1 Profile: PF 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	6	PF 1	133.00	2788.28	2789.77	2790.23	2791.32	0.050087	10.97	17.44	34.33	1.84
Reach-1	5	PF 1	133.00	2782.40	2783.72	2784.08	2784.89	0.068076	10.46	17.98	32.56	2.04
Reach-1	4	PF 1	133.00	2775.92	2777.33	2777.66	2778.36	0.045547	9.75	21.33	41.25	1.72
Reach-1	3	PF 1	133.00	2769.16	2770.48	2771.05	2772.19	0.061709	10.66	13.50	19.67	1.98
Reach-1	2.5	PF 1	133.00	2766.00	2767.19	2767.51	2768.15	0.057608	7.85	16.99	29.16	1.79
Reach-1	2	PF 1	133.00	2761.84	2763.45	2763.69	2764.23	0.028466	7.15	19.39	28.35	1.34
Reach-1	1.5	PF 1	133.00	2759.00	2759.88	2760.03	2760.39	0.048351	5.71	23.31	55.71	1.55
Reach-1	1	PF 1	235.00	2753.00	2754.37	2754.64	2755.33	0.035550	9.07	37.36	60.40	1.55


washa1-1-EX Plan: Plan 02 11/7/2006
.045
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-1-EX Plan: Plan 02 11/7/2006
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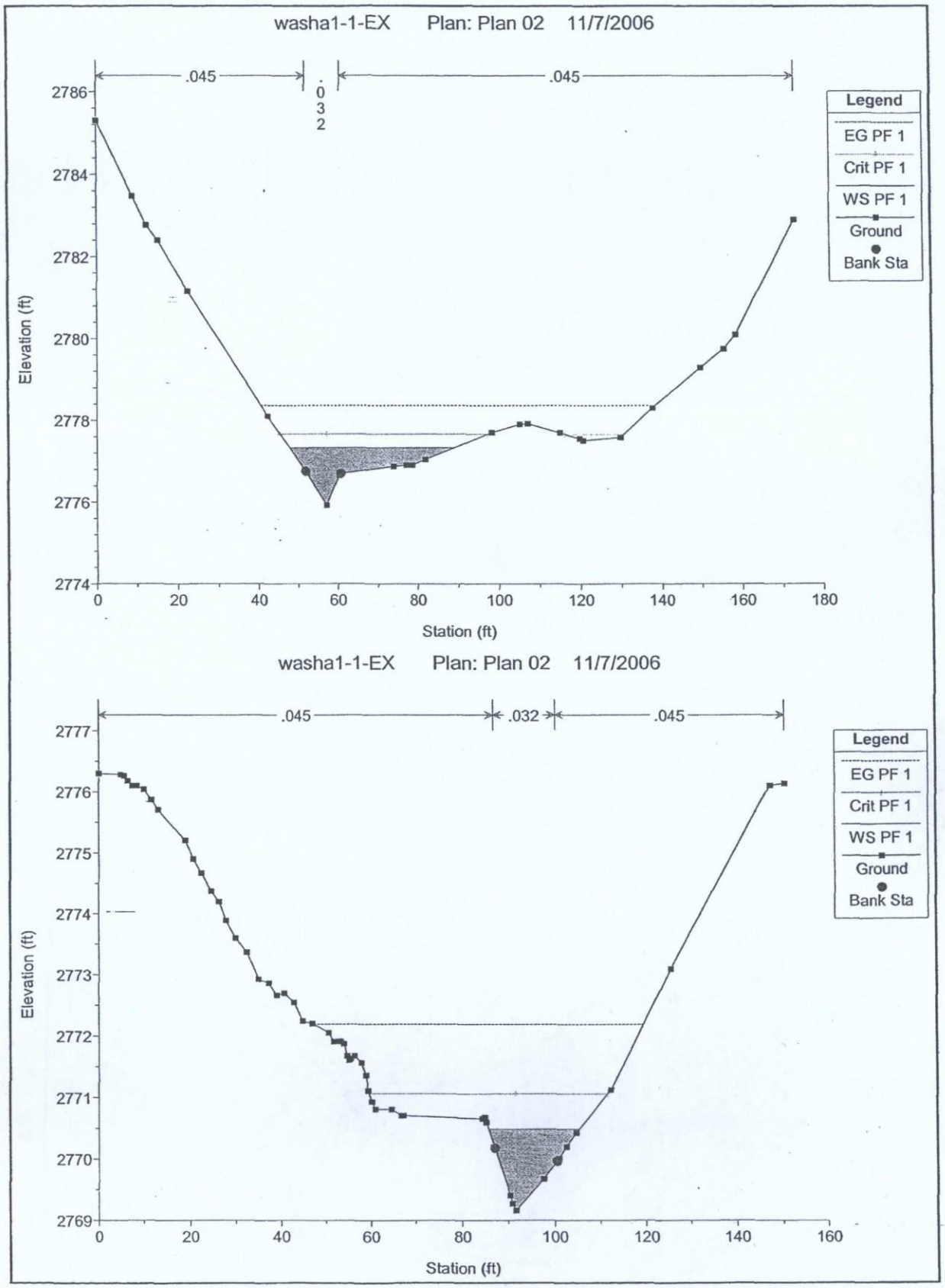
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.032
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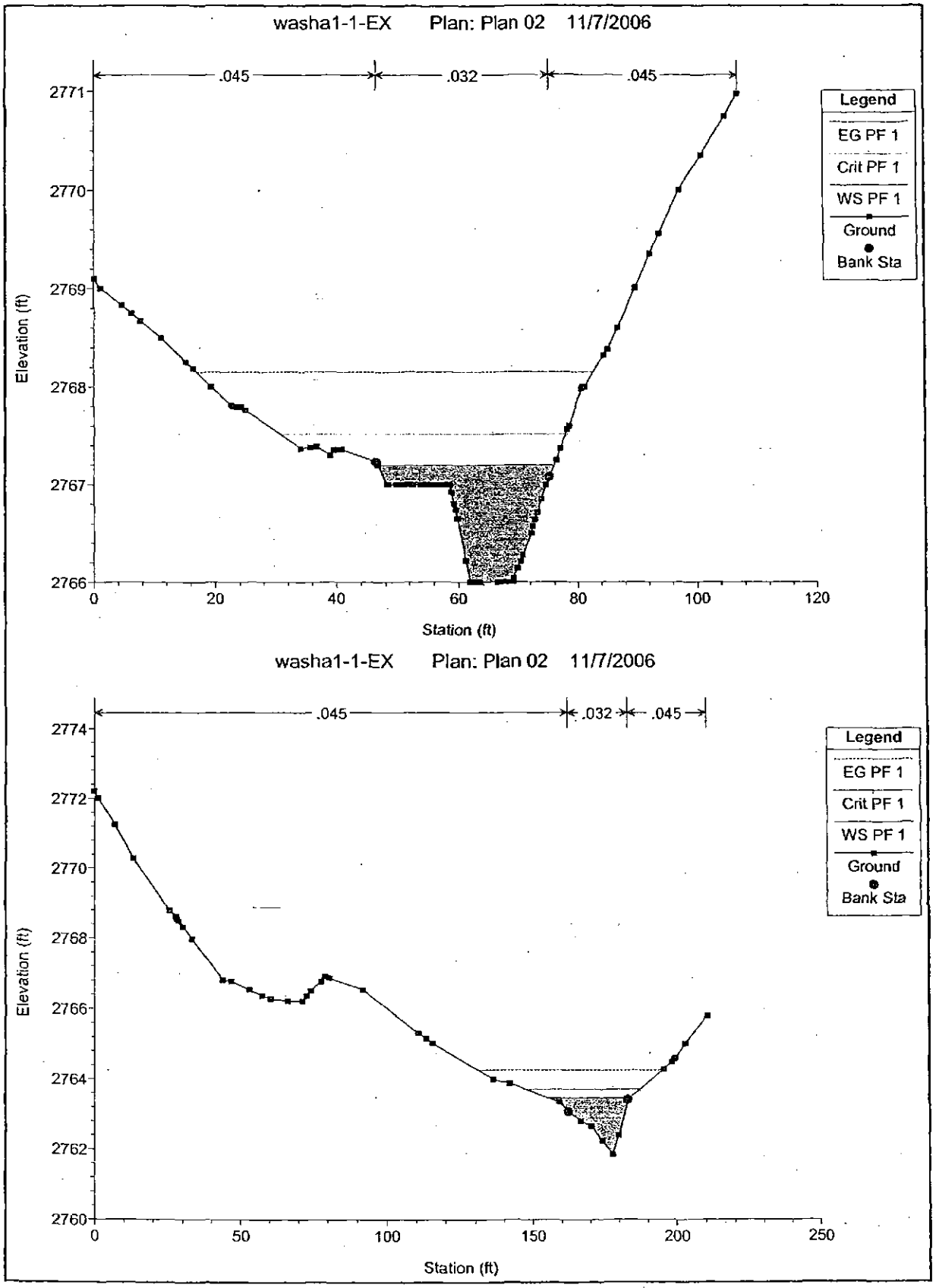
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2786
2784
2782
2780
2778
2776
2774
0
20
40
60
80
100
120
140
160
180
washa1-1-EX Plan: Plan 02 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2777
2776
2775
2774
2773
2772
2771
2770
2769
0
20
40
60
80
100
120
140
160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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa1-1-EX Plan: Plan 02 11/7/2006
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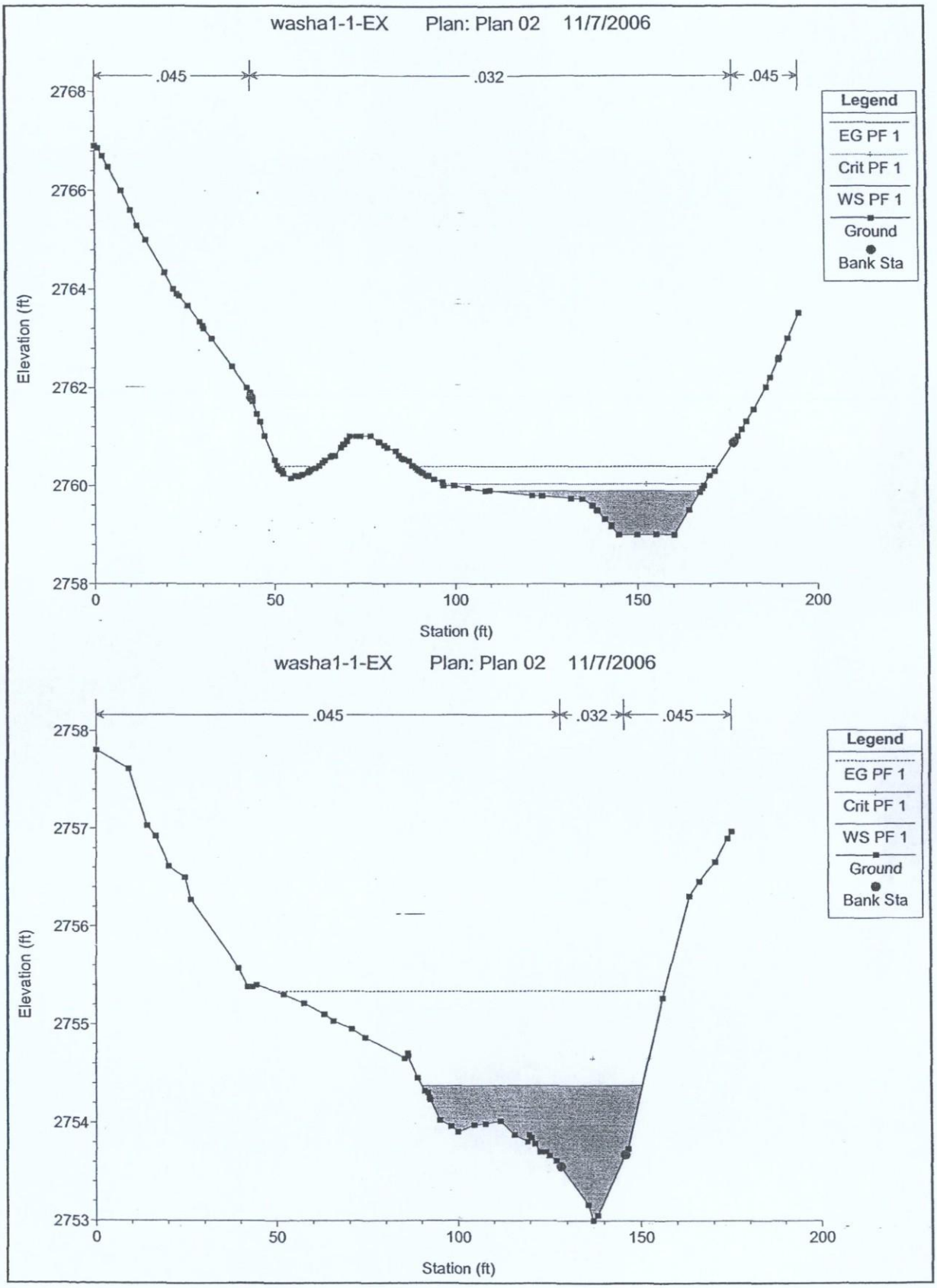
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.032
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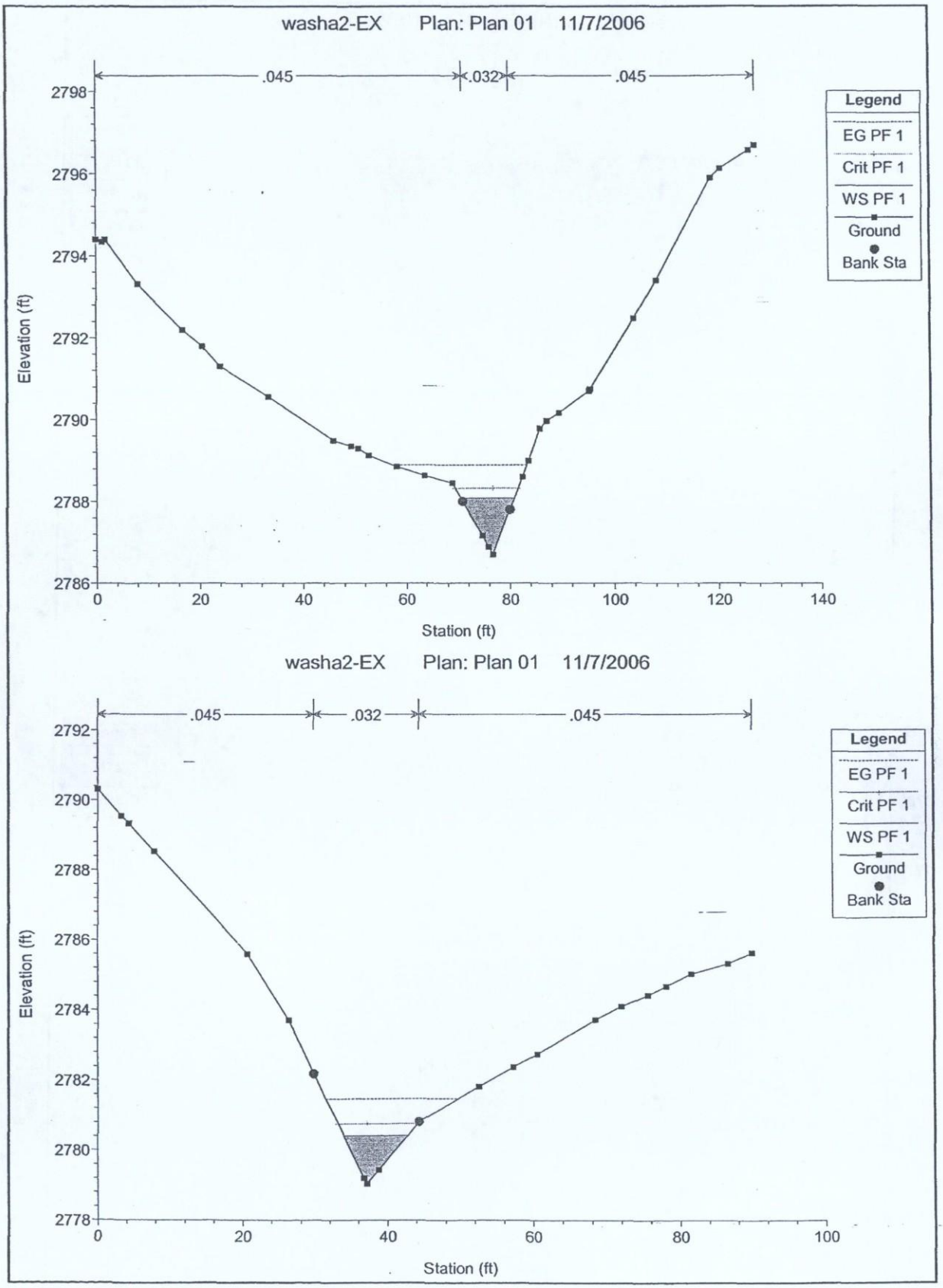
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2768
2766
2764
2762
2760
2758
0
50
100
150
200
Station (ft)
washa1-1-EX Plan: Plan 02 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2758
2757
2756
2755
2754
2753
0
50
100
150
200
Station (ft)

WASH A2

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	8	PF 1	50.00	2786.70	2788.08	2788.32	2788.89	0.037052	7.25	7.00	10.29	1.47
Reach-1	7	PF 1	50.00	2779.03	2780.41	2780.75	2781.45	0.054930	8.20	6.09	8.86	1.74
Reach-1	6.5	PF 1	50.00	2774.00	2775.12	2775.56	2776.49	0.053771	9.50	5.51	7.56	1.78
Reach-1	6	PF 1	50.00	2769.58	2771.38	2771.63	2772.27	0.035829	7.60	6.58	7.35	1.41
Reach-1	5.5	PF 1	50.00	2766.00	2767.37	2767.82	2768.78	0.045155	9.98	5.95	8.05	1.70
Reach-1	5	PF 1	65.00	2760.85	2762.45	2762.98	2764.14	0.060416	10.47	6.36	7.80	1.89
Reach-1	4	PF 1	65.00	2754.30	2756.01	2756.26	2756.93	0.034820	7.73	8.44	9.82	1.44
Reach-1	3	PF 1	65.00	2749.02	2750.53	2750.80	2751.42	0.041151	7.55	8.61	11.61	1.55
Reach-1	2	PF 1	109.00	2742.10	2743.52	2743.88	2744.58	0.039966	8.35	13.80	21.60	1.58
Reach-1	1.5	PF 1	109.00	2739.00	2740.27	2740.51	2741.01	0.023936	7.10	18.25	35.03	1.26
Reach-1	1	PF 1	109.00	2733.30	2734.60	2735.10	2736.05	0.078453	9.68	11.58	21.73	2.12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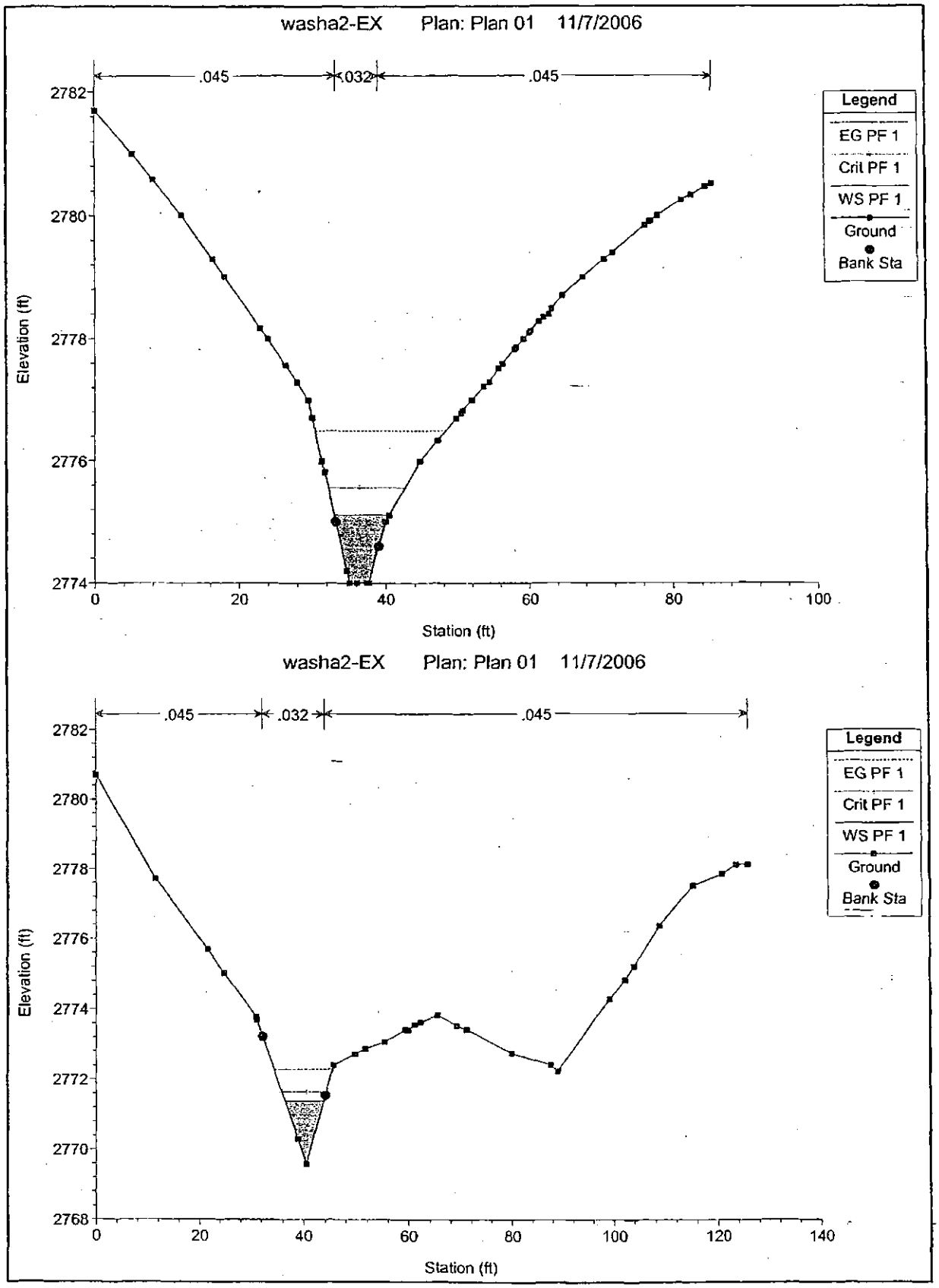
.045
.032
.045
2798
2796
2794
2792
2790
2788
2786
Elevation (ft)
0
20
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washa2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
2792
2790
2788
2786
2784
2782
2780
2778
Elevation (ft)
0
20
40
60
80
100
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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2782
2780
2778
2776
2774
Elevation (ft)
0
20
40
60
80
100
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washa2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
2782
2780
2778
2776
2774
2772
2770
2768
Elevation (ft)
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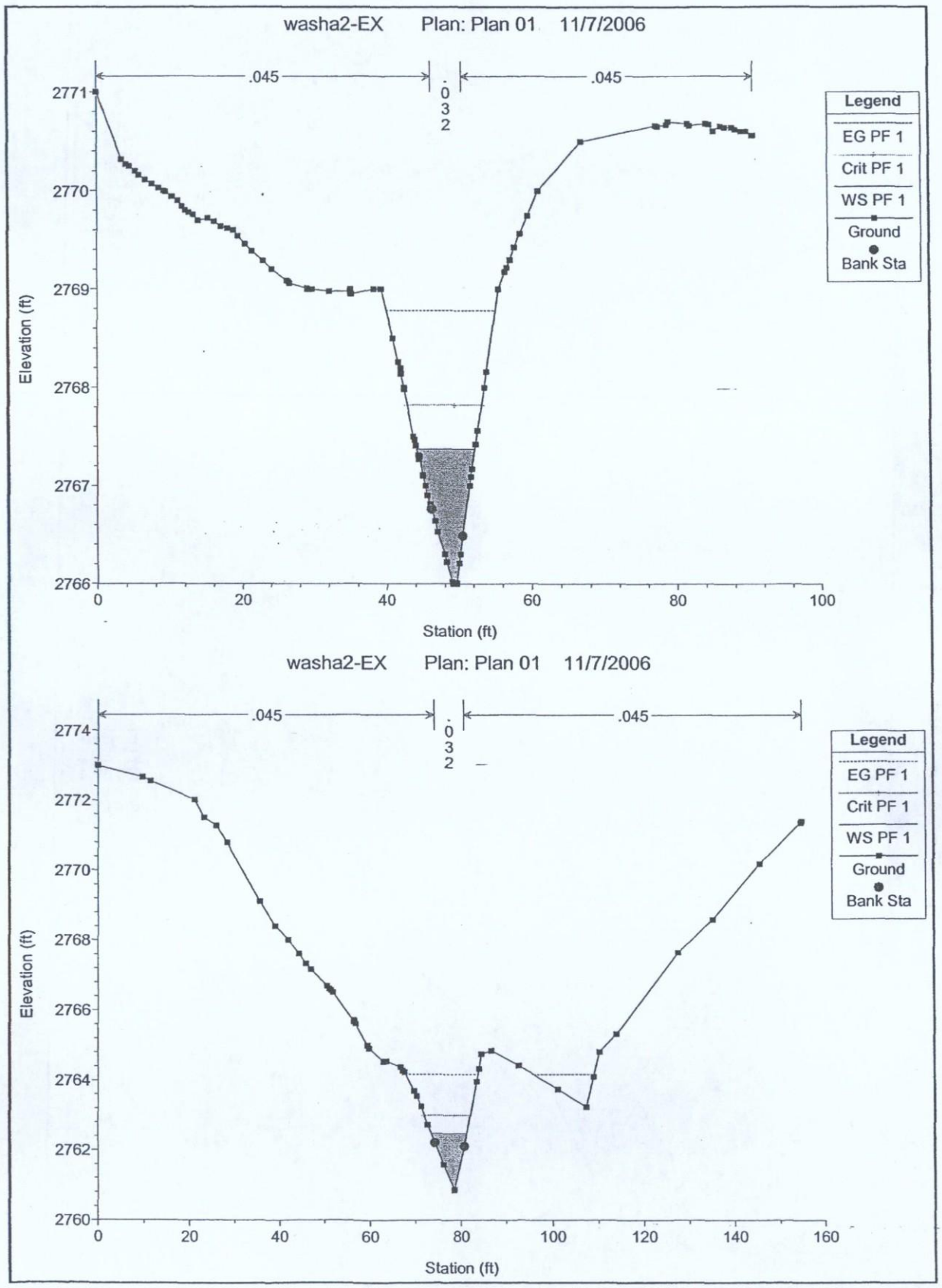
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2771
2770
2769
2768
2767
2766
0
20
40
60
80
100
washa2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2768
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2760
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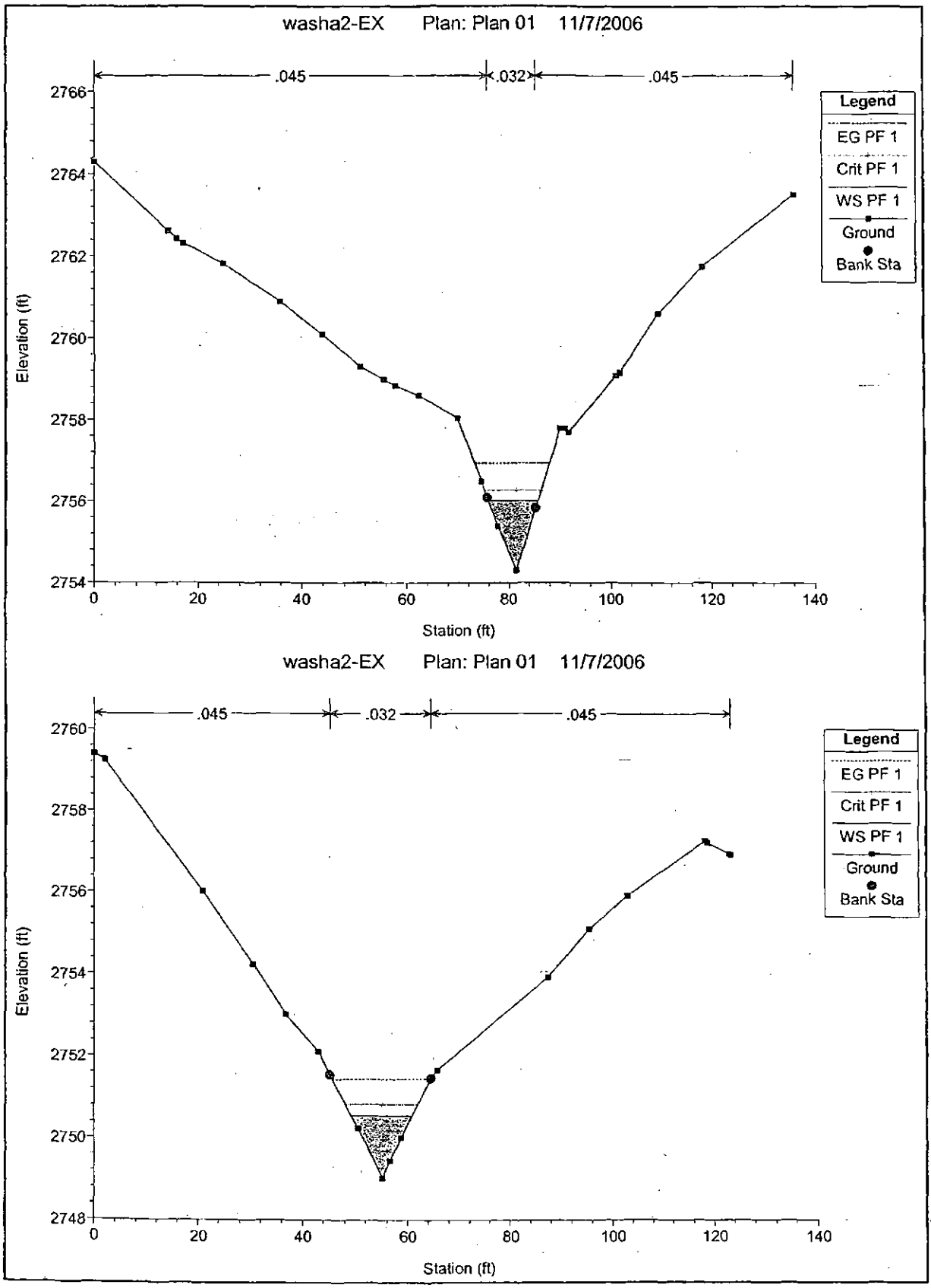
40
60
80
100
120
140
160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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washa2-EX Plan: Plan 01 11/7/2006
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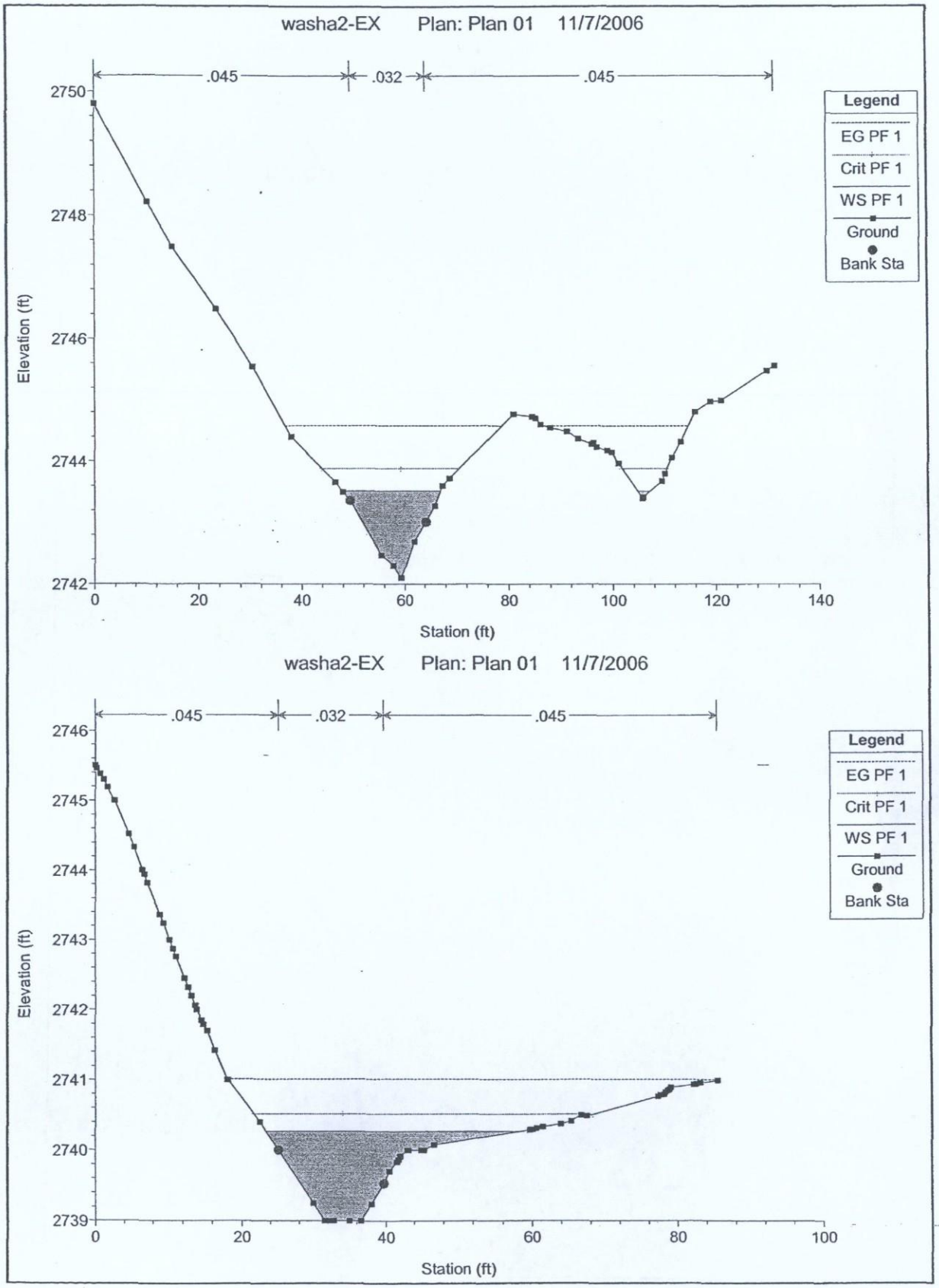
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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.045
.032
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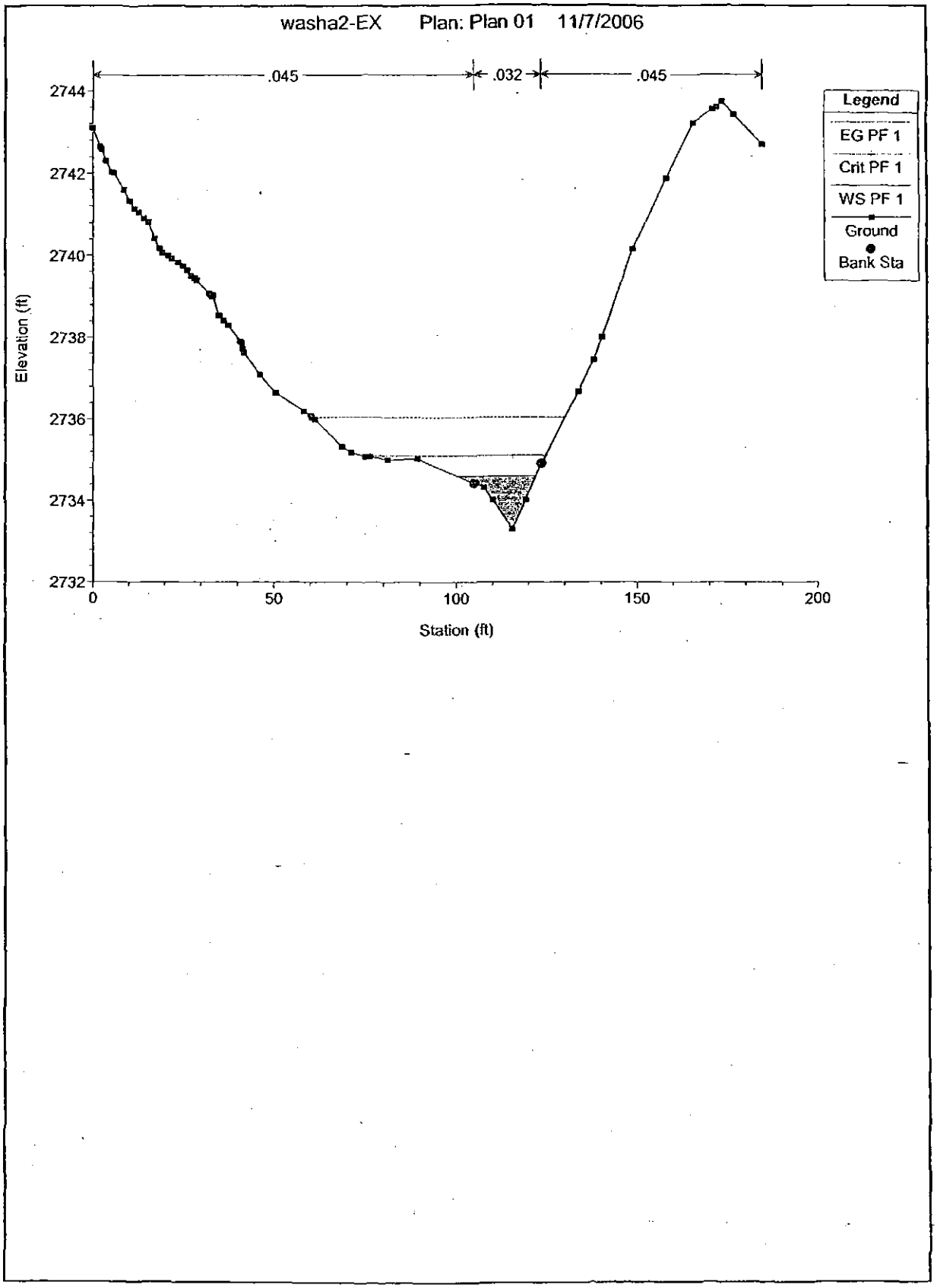
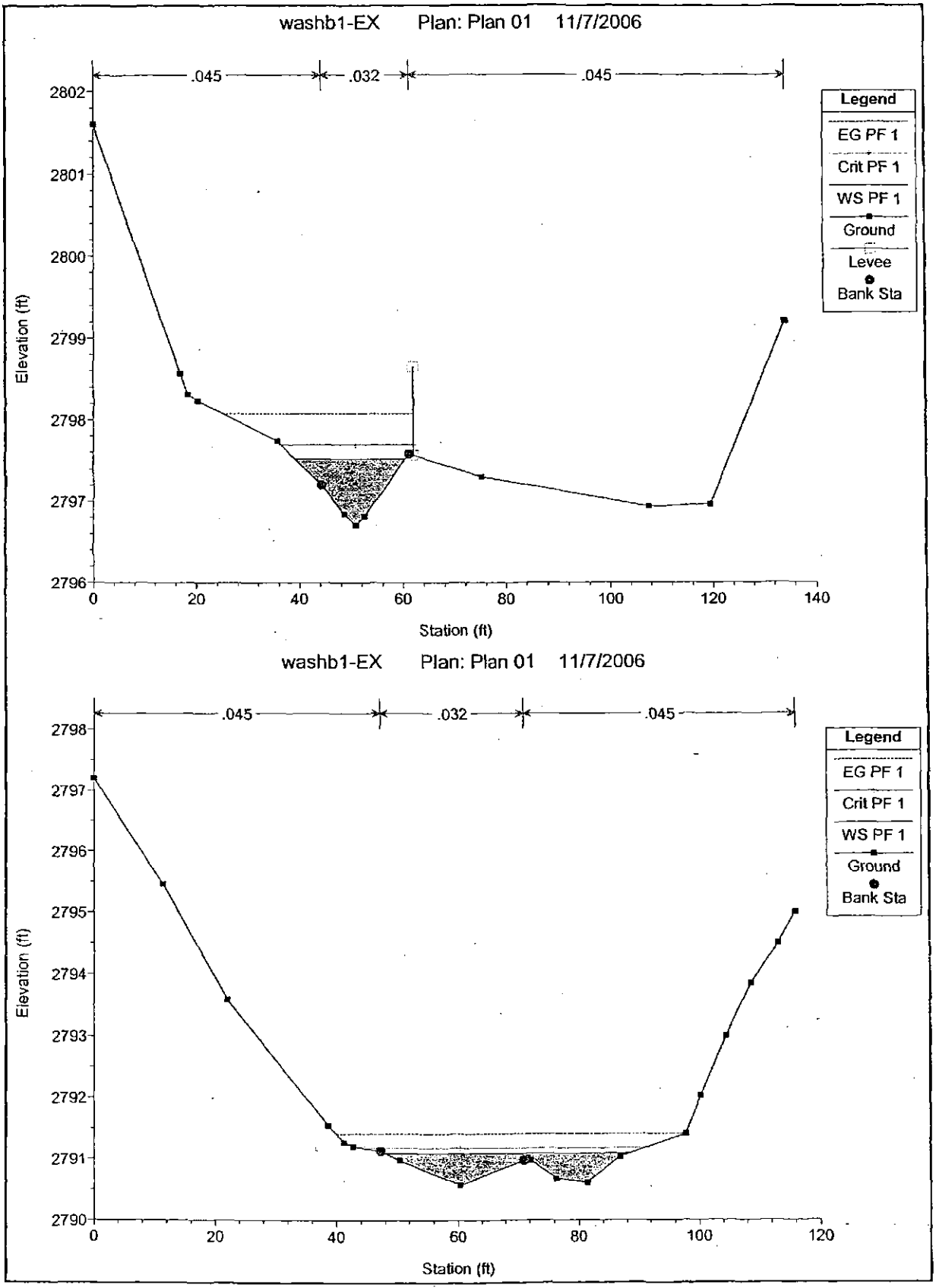
2750
2748
2746
2744
2742
Elevation (ft)
0
20
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washa2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
2746
2745
2744
2743
2742
2741
2740
2739
Elevation (ft)
0
20
40
60
80
100
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


washa2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2744
2742
2740
2738
2736
2734
2732
0
50
100
150
200
Station (ft)

WASH B1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	9	PF 1	50.00	2796.70	2797.52	2797.69	2798.08	0.045030	6.09	8.74	21.32	1.54
Reach-1	8	PF 1	50.00	2790.57	2791.08	2791.17	2791.40	0.059767	4.94	11.57	40.41	1.62
Reach-1	7	PF 1	50.00	2785.37	2786.03	2786.15	2786.38	0.048169	4.80	10.80	39.56	1.49
Reach-1	6.5	PF 1	50.00	2780.43	2780.99	2781.13	2781.43	0.065773	5.37	9.31	30.67	1.72
Reach-1	6	PF 1	50.00	2776.08	2776.54	2776.59	2776.81	0.033697	4.19	11.94	34.58	1.26
Reach-1	5	PF 1	65.00	2771.10	2771.91	2772.14	2772.65	0.053926	7.02	10.88	49.99	1.70
Reach-1	4.5	PF 1	65.00	2768.38	2768.90	2769.02	2769.32	0.046654	5.18	12.54	33.73	1.50
Reach-1	4	PF 1	65.00	2764.68	2765.43	2765.61	2766.02	0.043096	7.04	12.39	29.28	1.57
Reach-1	3	PF 1	65.00	2759.60	2760.51	2760.70	2761.15	0.041337	6.54	10.57	22.11	1.52
Reach-1	2	PF 1	83.00	2754.10	2754.86	2755.04	2755.46	0.046948	6.27	13.96	33.71	1.57
Reach-1	1	PF 1	204.00	2745.67	2747.01	2747.17	2747.53	0.048666	7.85	40.82	87.83	1.67


washb1-EX Plan: Plan 01 11/7/2006
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.032
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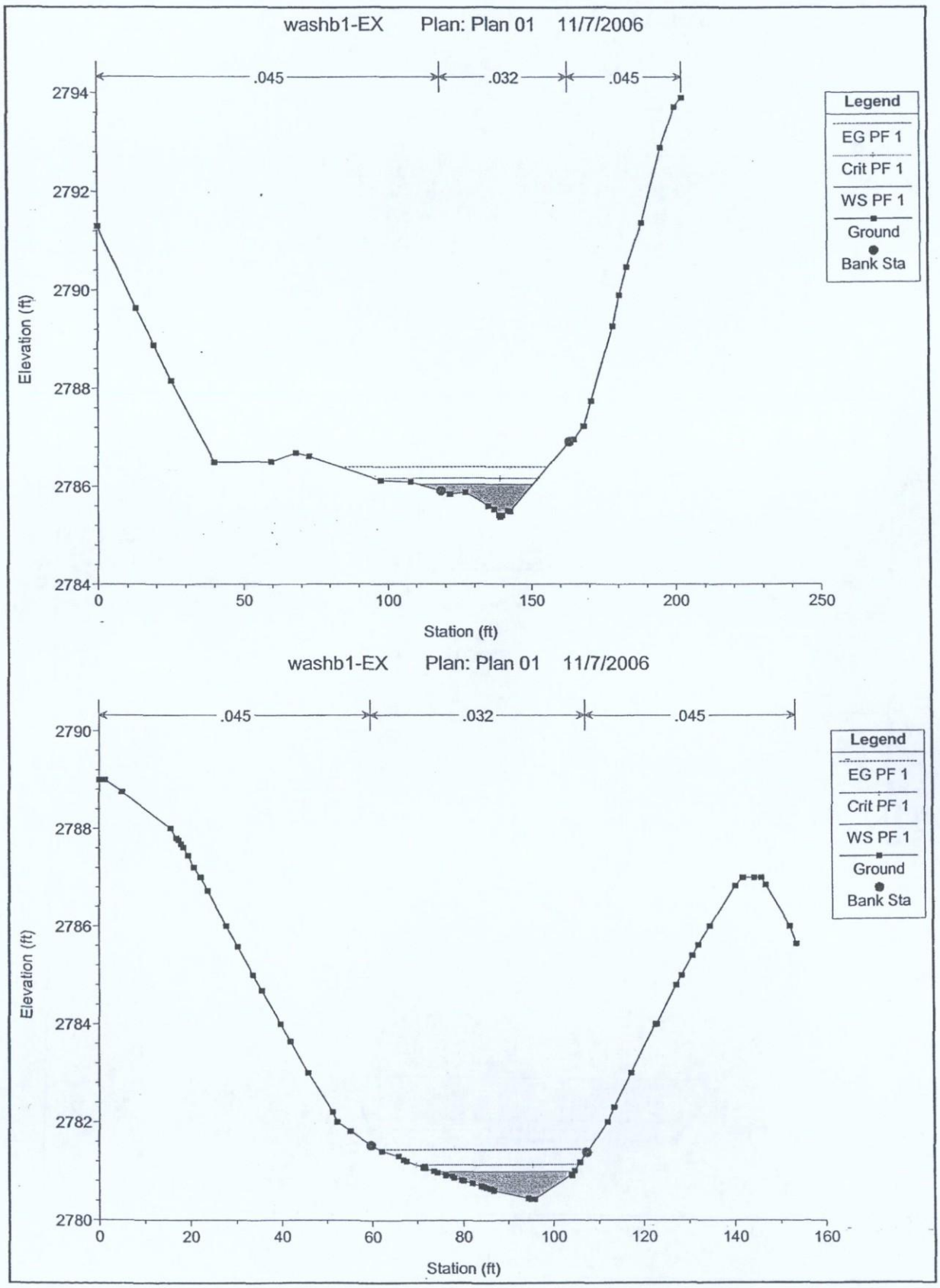
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washb1-EX Plan: Plan 01 11/7/2006
.045
.032
.045
2794
2792
2790
2788
2786
2784
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washb1-EX Plan: Plan 01 11/7/2006
.045
.032
.045
2790
2788
2786
2784
2782
2780
Elevation (ft)
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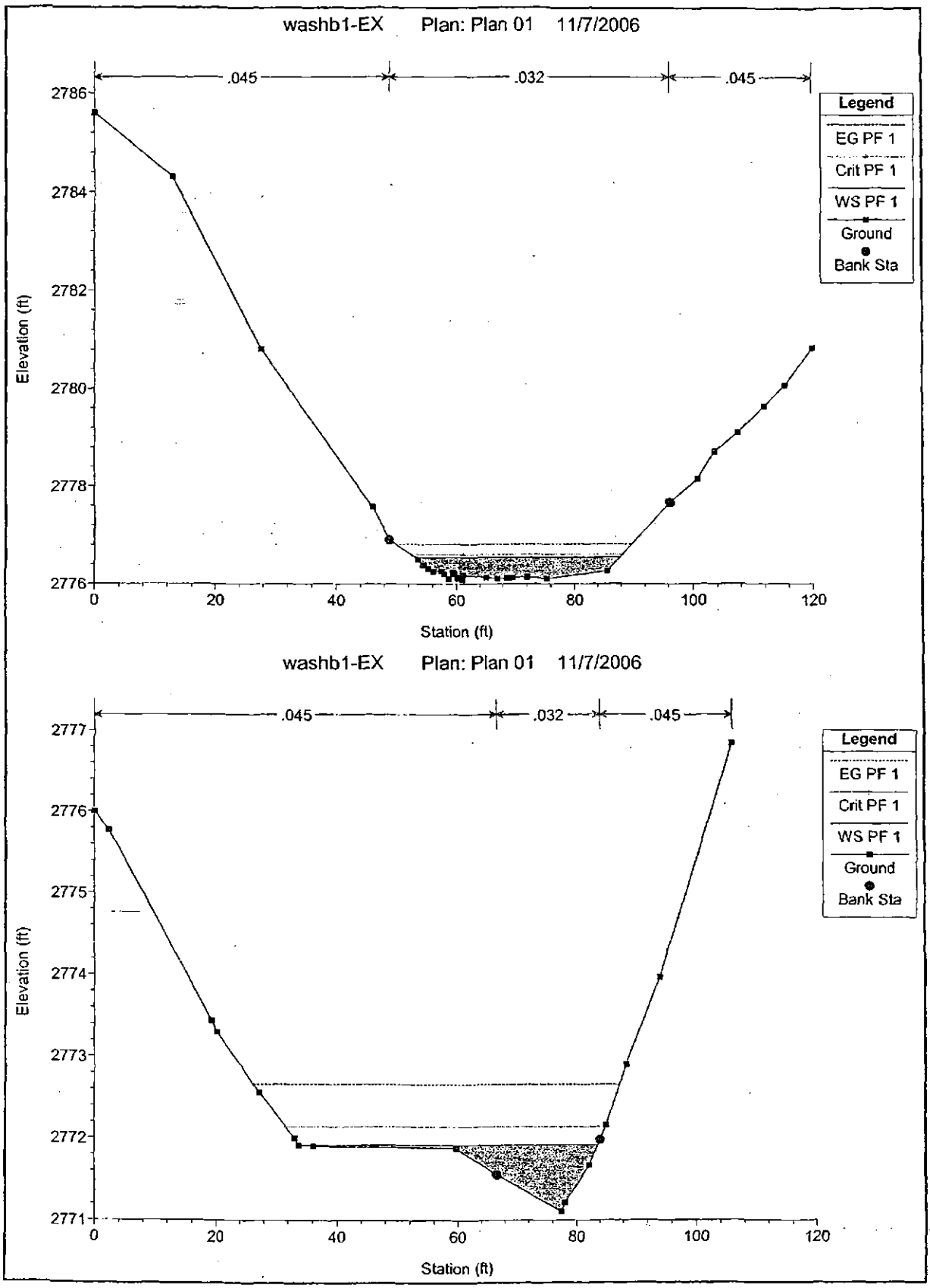
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2784
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40
60
80
100
120
washb1-EX Plan: Plan 01 11/7/2006
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.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2771
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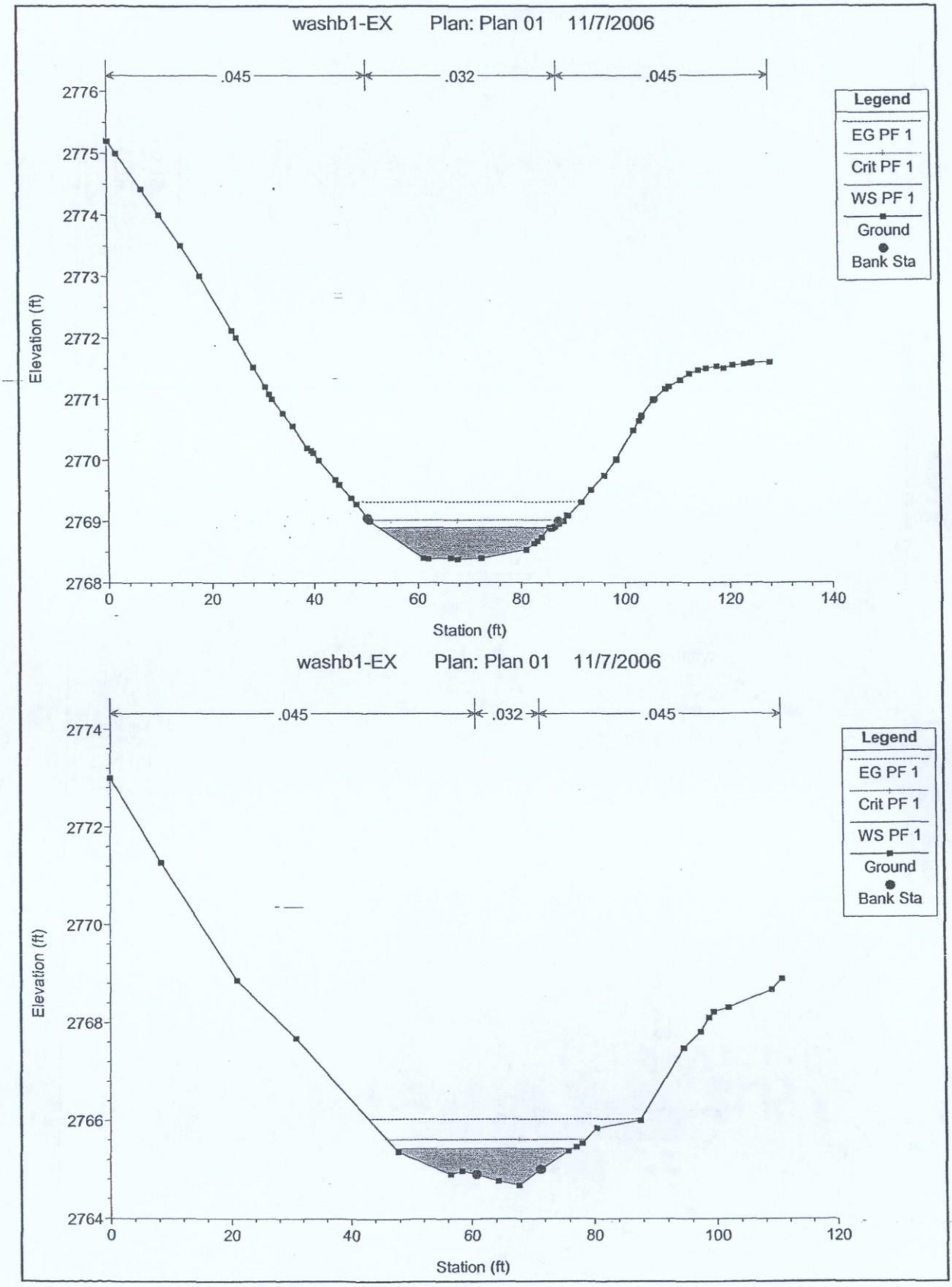
60
80
100
120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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
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Legend
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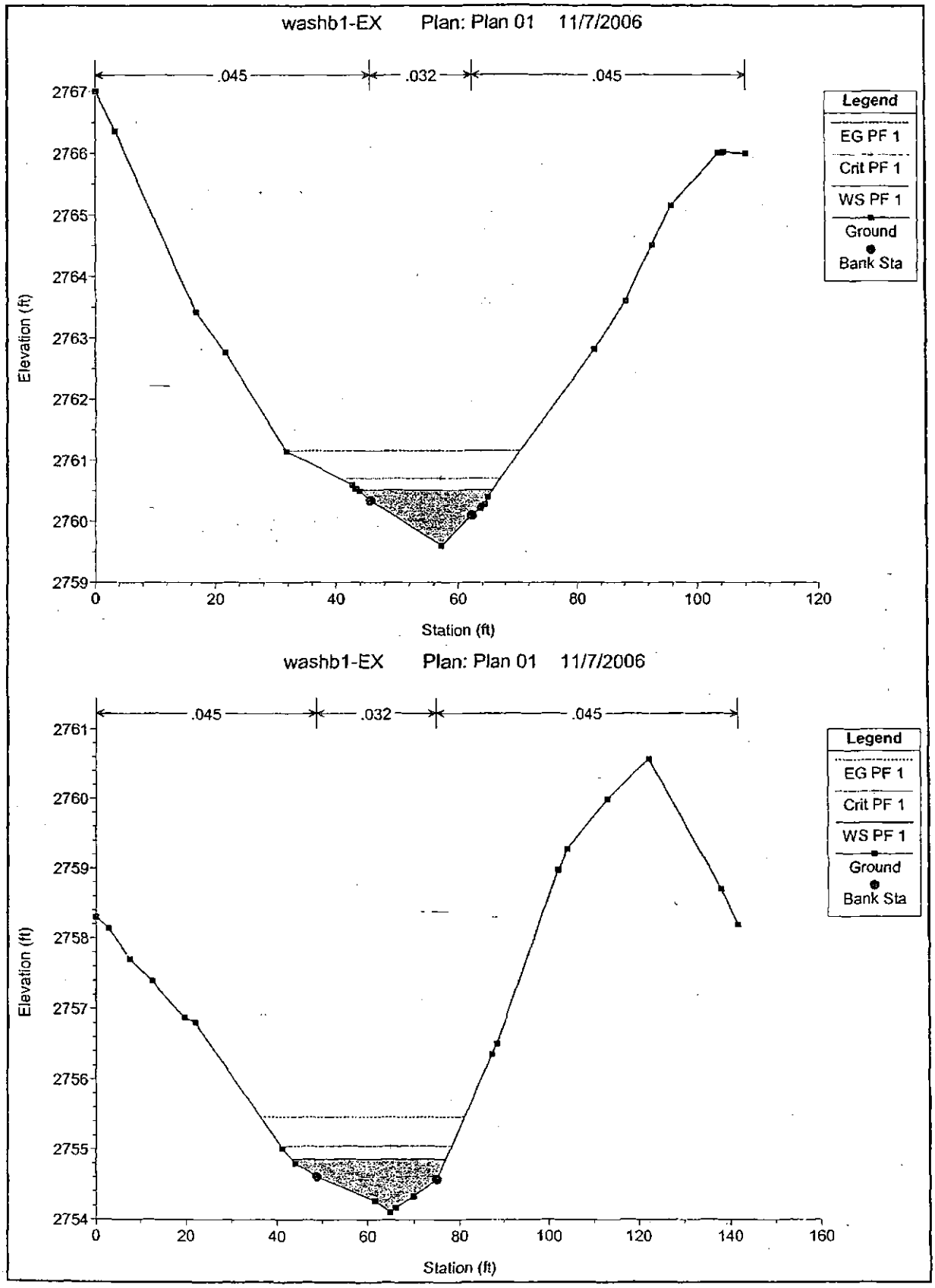
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb1-EX Plan: Plan 01 11/7/2006
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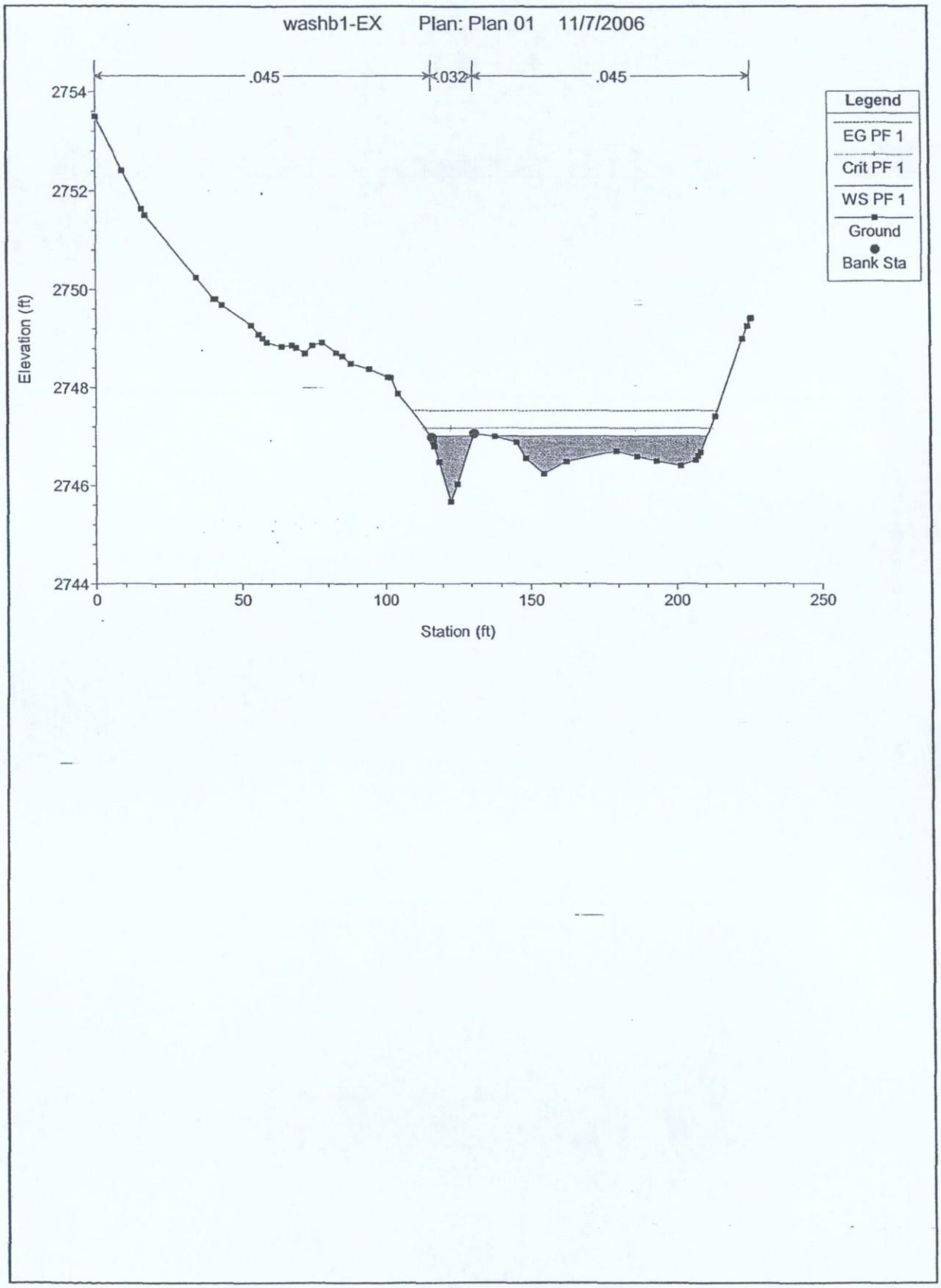
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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2754
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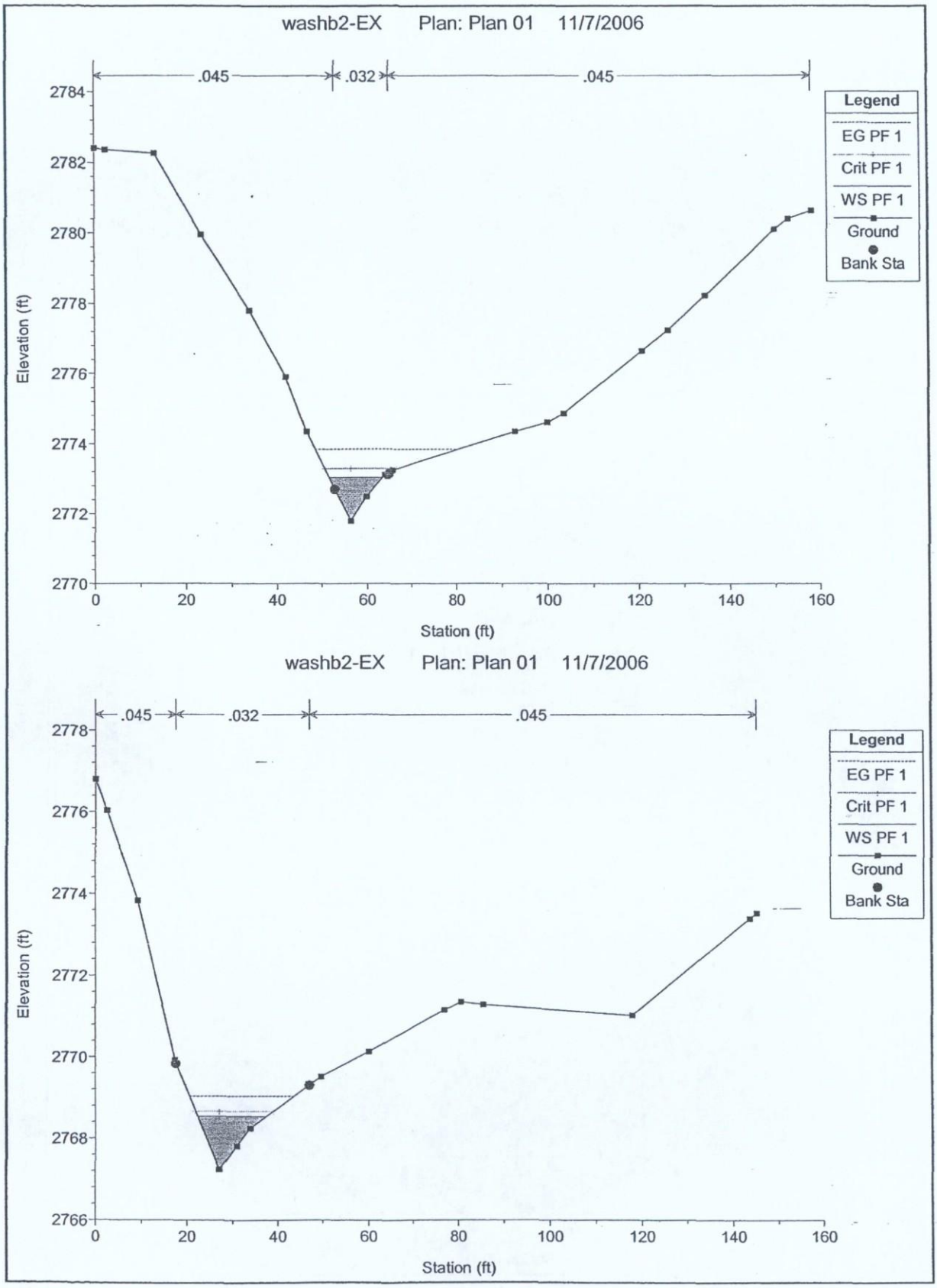
2750
2748
2746
2744
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

WASH B2

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	5	PF 1	50.00	2771.78	2773.02	2773.28	2773.84	0.045021	7.27	7.03	11.78	1.59
Reach-1	4	PF 1	50.00	2767.23	2768.51	2768.64	2769.01	0.030968	5.67	8.82	15.02	1.30
Reach-1	3.5	PF 1	50.00	2765.00	2765.78	2765.88	2766.22	0.029393	5.31	9.41	17.14	1.26
Reach-1	3	PF 1	126.00	2762.00	2762.76	2762.84	2763.13	0.035706	4.86	25.91	62.70	1.33
Reach-1	2.5	PF 1	126.00	2759.70	2760.27	2760.30	2760.53	0.024149	4.17	31.63	79.13	1.11
Reach-1	2	PF 1	126.00	2755.39	2756.77	2757.08	2757.69	0.044435	7.69	16.51	26.88	1.68
Reach-1	1.5	PF 1	126.00	2753.00	2754.56	2754.82	2755.36	0.022867	8.53	24.06	38.24	1.29
Reach-1	1	PF 1	204.00	2745.67	2747.03	2747.17	2747.50	0.043743	7.55	42.67	90.73	1.59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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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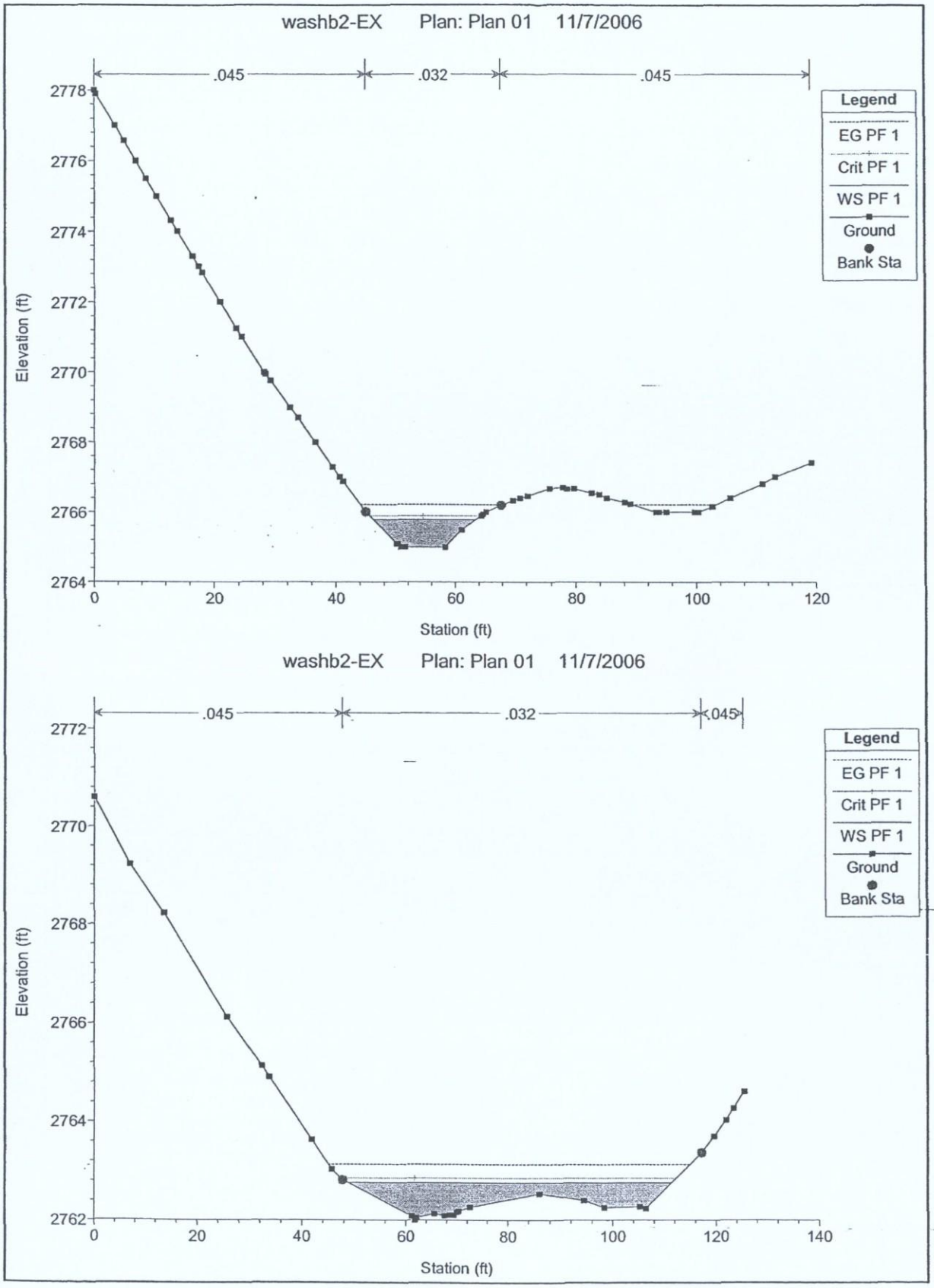
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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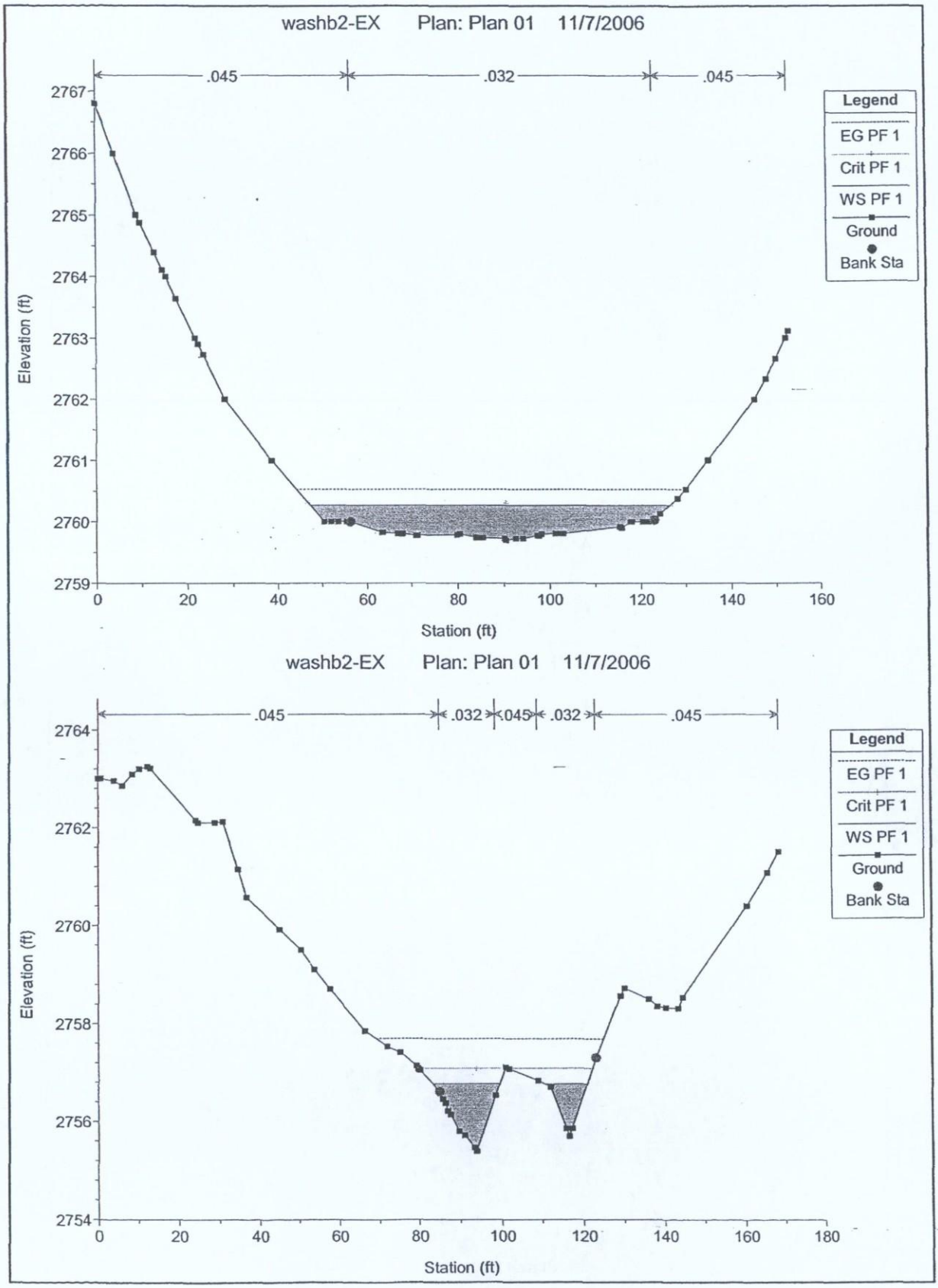
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washb2-EX Plan: Plan 01 11/7/2006
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.032
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.032
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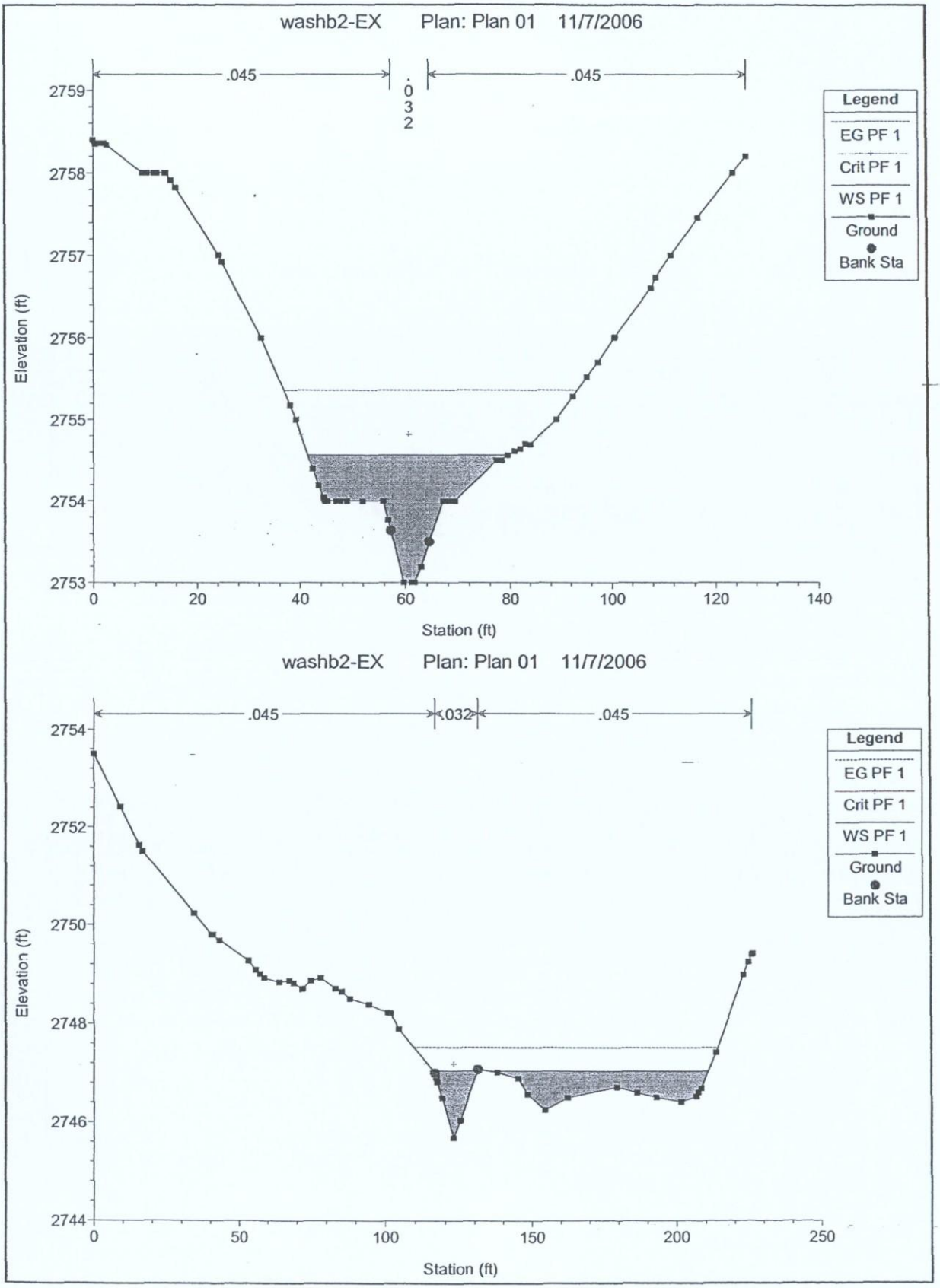
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washb2-EX Plan: Plan 01 11/7/2006
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.032
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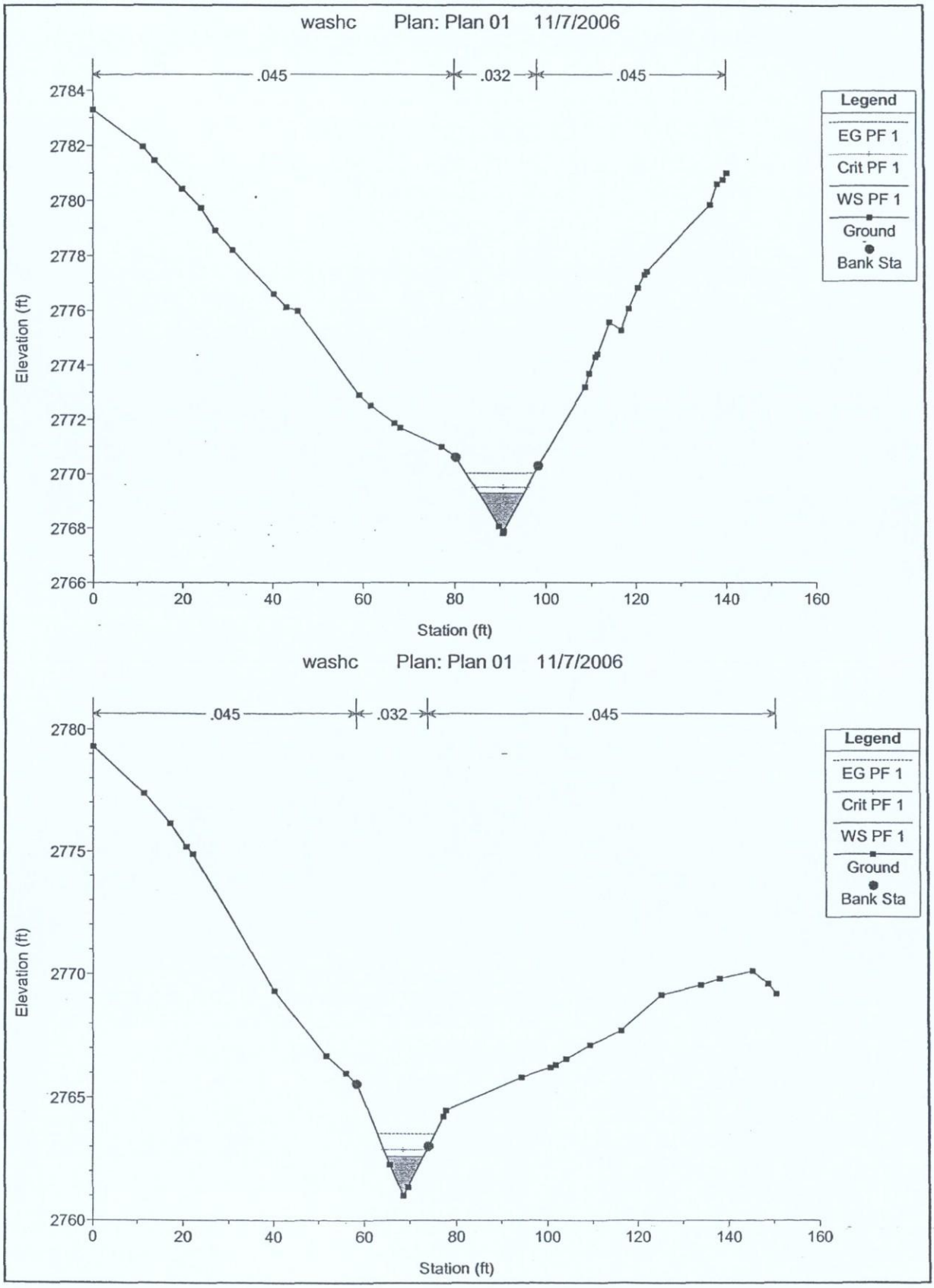
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2759
2758
2757
2756
2755
2754
2753
0
20
40
60
80
100
120
140
washb2-EX Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2754
2752
2750
2748
2746
2744
0
50
100
150
200
250

WASH C

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	5	PF 1	50.00	2767.82	2769.29	2769.50	2770.03	0.036028	6.90	7.25	10.04	1.43
Reach-1	4	PF 1	50.00	2761.00	2762.59	2762.87	2763.50	0.039393	7.65	6.54	8.03	1.49
Reach-1	3.5	PF 1	50.00	2758.90	2760.30	2760.39	2760.92	0.019976	6.32	8.08	9.29	1.11
Reach-1	3	PF 1	70.00	2755.68	2757.09	2757.46	2758.24	0.055674	8.59	8.20	12.65	1.79
Reach-1	2	PF 1	70.00	2749.90	2751.87	2751.94	2752.48	0.020383	6.28	11.14	11.37	1.12
Reach-1	1.5	PF 1	70.00	2748.00	2749.00	2749.31	2749.98	0.056453	7.93	8.83	14.26	1.78
Reach-1	1	PF 1	89.00	2743.99	2745.64	2745.83	2746.38	0.026449	6.92	12.98	16.20	1.29


washc Plan: Plan 01 11/7/2006
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.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2784
2782
2780
2778
2776
2774
2772
2770
2768
2766
0
20
40
60
80
100
120
140
160
washc Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2770
2765
2760
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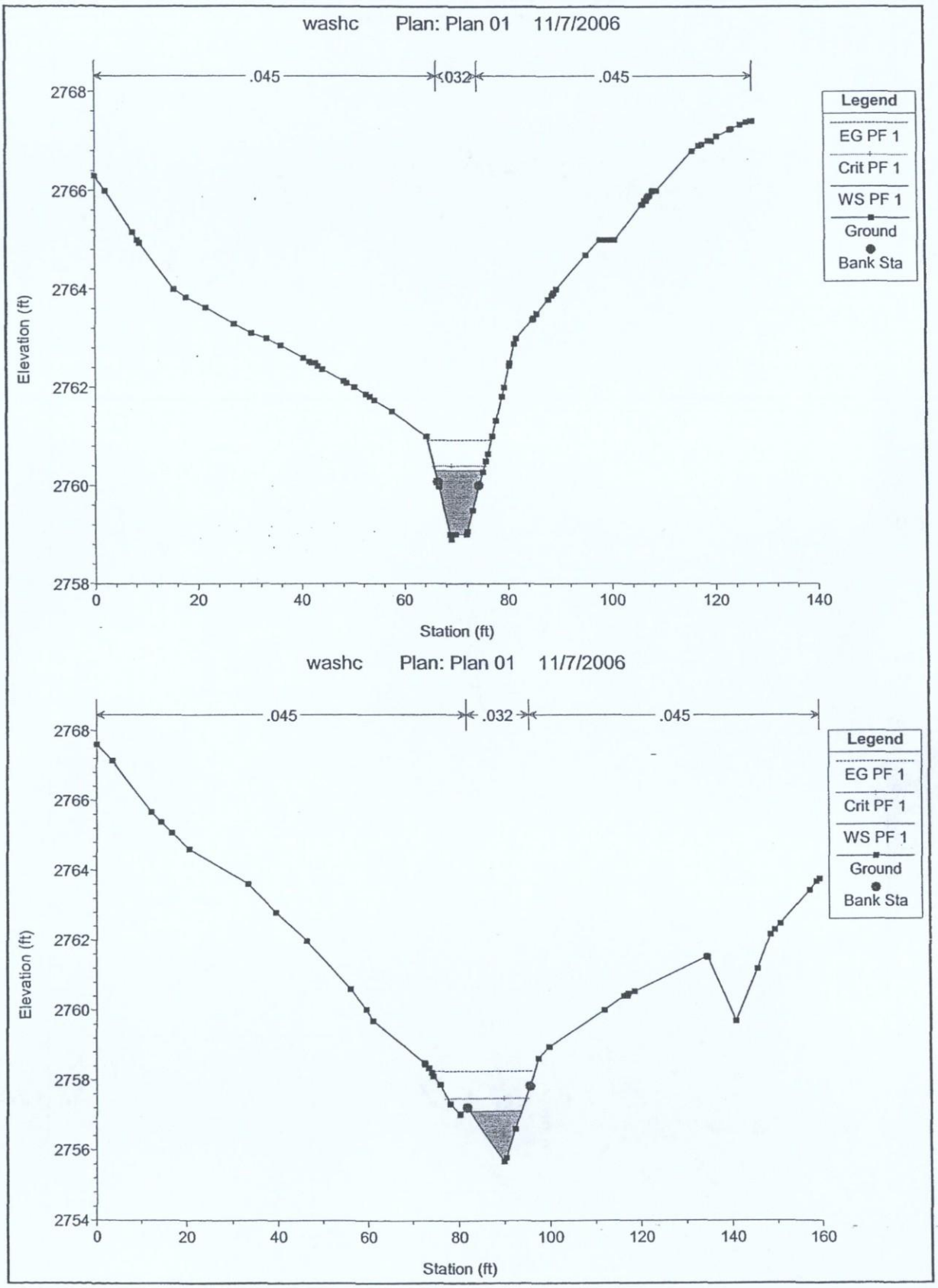
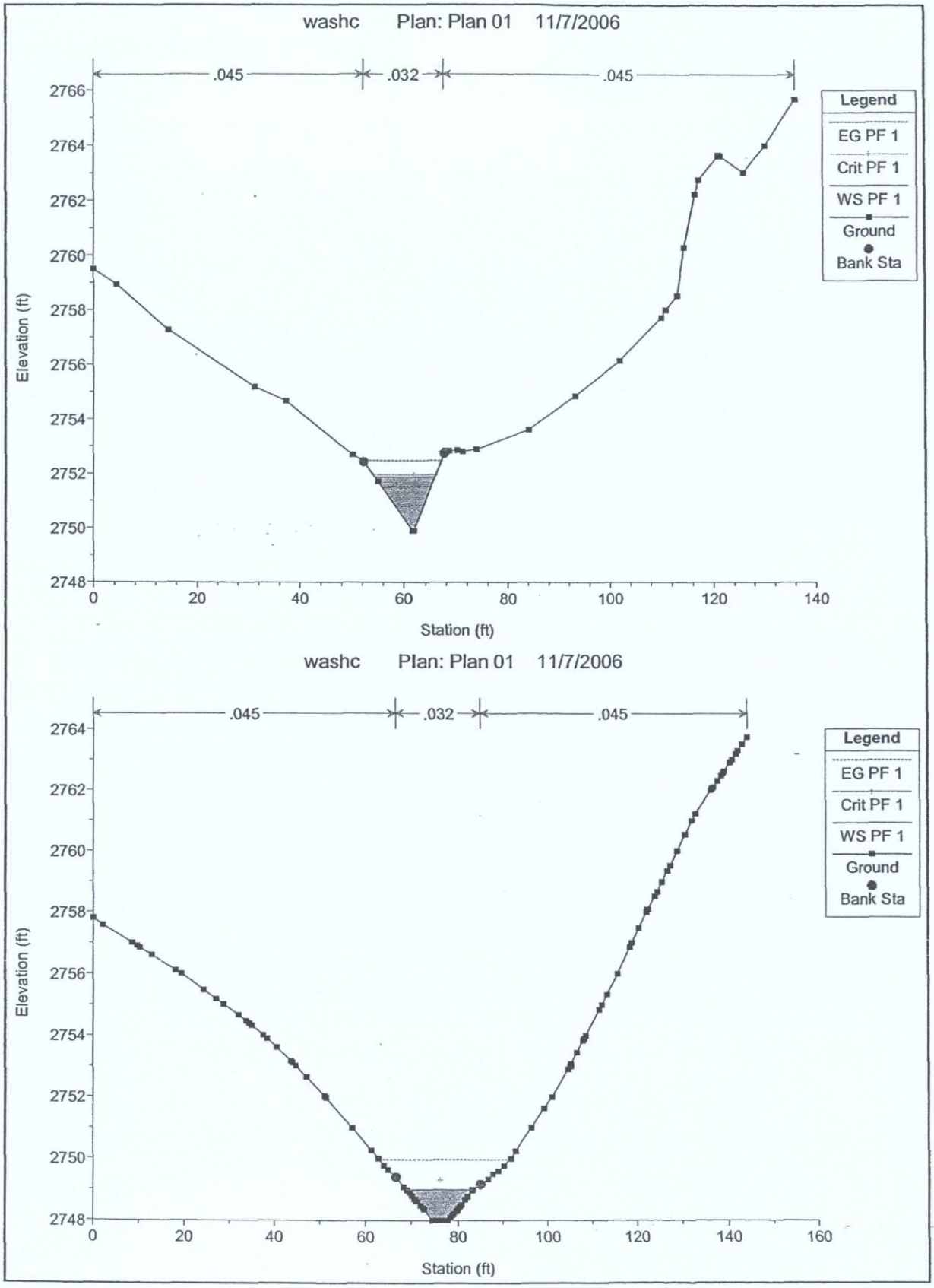
20
40
60
80
100
120
140
160


washc Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2768
2766
2764
2762
2760
2758
0
20
40
60
80
100
120
140
washc Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2768
2766
2764
2762
2760
2758
2756
2754
0
20
40
60
80
100
120
140
160


washc Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washc Plan: Plan 01 11/7/2006
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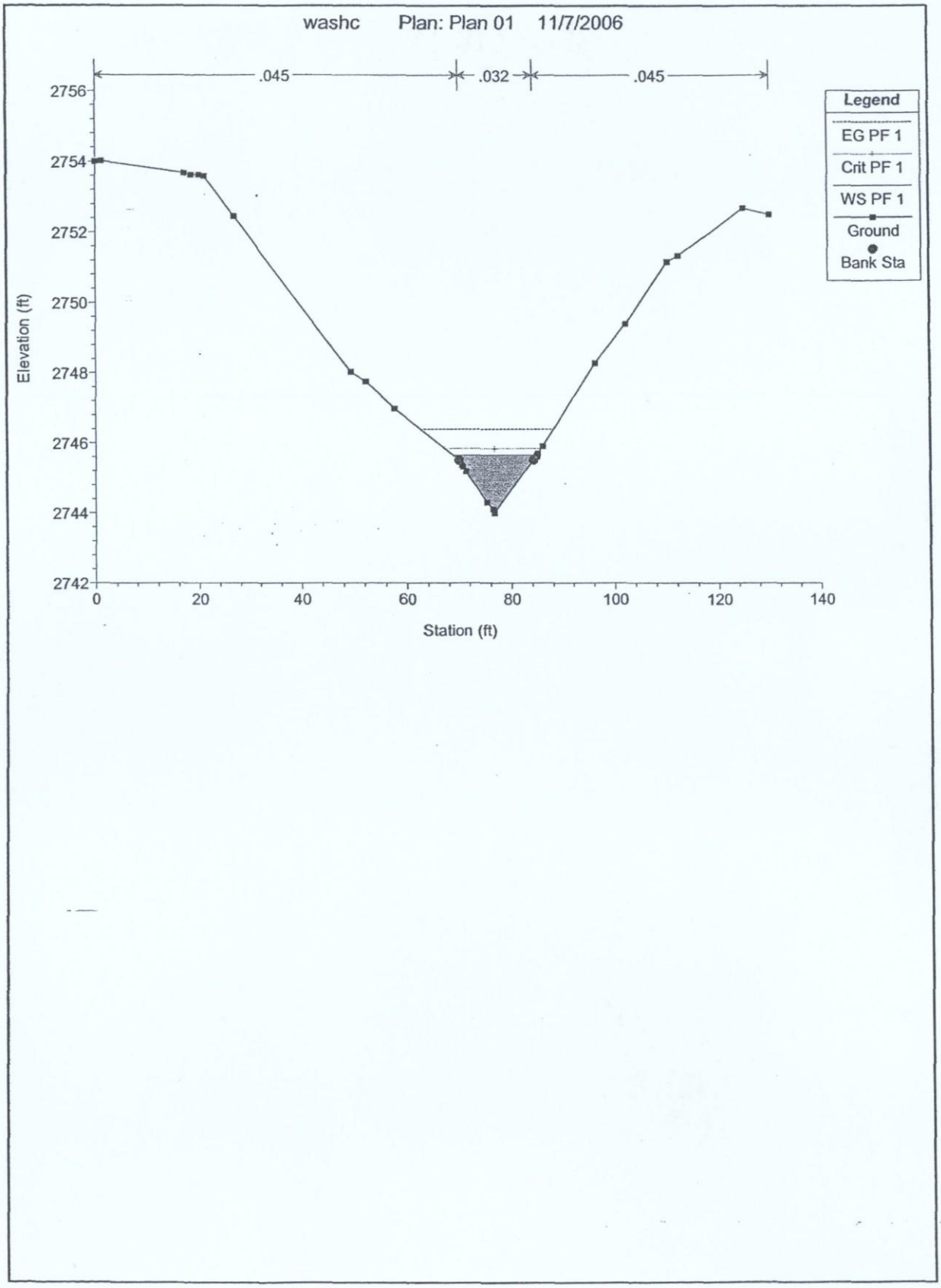
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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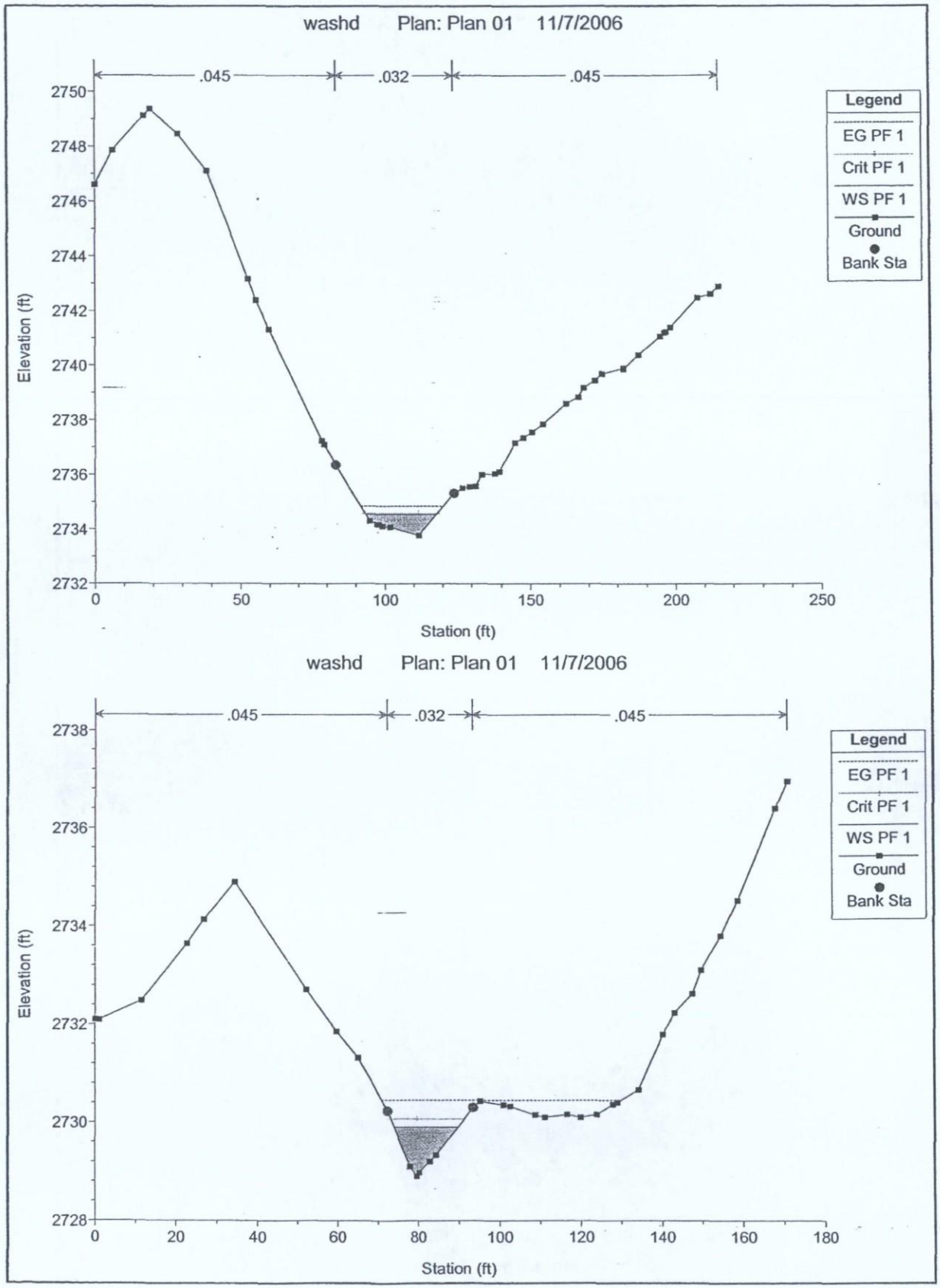
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2756
2754
2752
2750
2748
2746
2744
2742
0
20
40
60
80
100
120
140
Station (ft)

WASH D

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	4	PF 1	50.00	2733.77	2734.54	2734.58	2734.84	0.025006	4.39	11.38	24.53	1.14
Reach-1	3	PF 1	50.00	2728.90	2729.90	2730.06	2730.45	0.038474	5.94	8.42	15.86	1.44
Reach-1	2.5	PF 1	50.00	2727.51	2728.11	2728.12	2728.28	0.023407	3.32	15.16	49.07	1.03
Reach-1	2	PF 1	93.00	2723.41	2724.56	2724.78	2725.31	0.029370	7.14	14.78	24.24	1.36
Reach-1	1	PF 1	93.00	2718.95	2719.84	2719.88	2720.16	0.023707	4.50	20.86	44.50	1.12


washd Plan: Plan 01 11/7/2006
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.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washd Plan: Plan 01 11/7/2006
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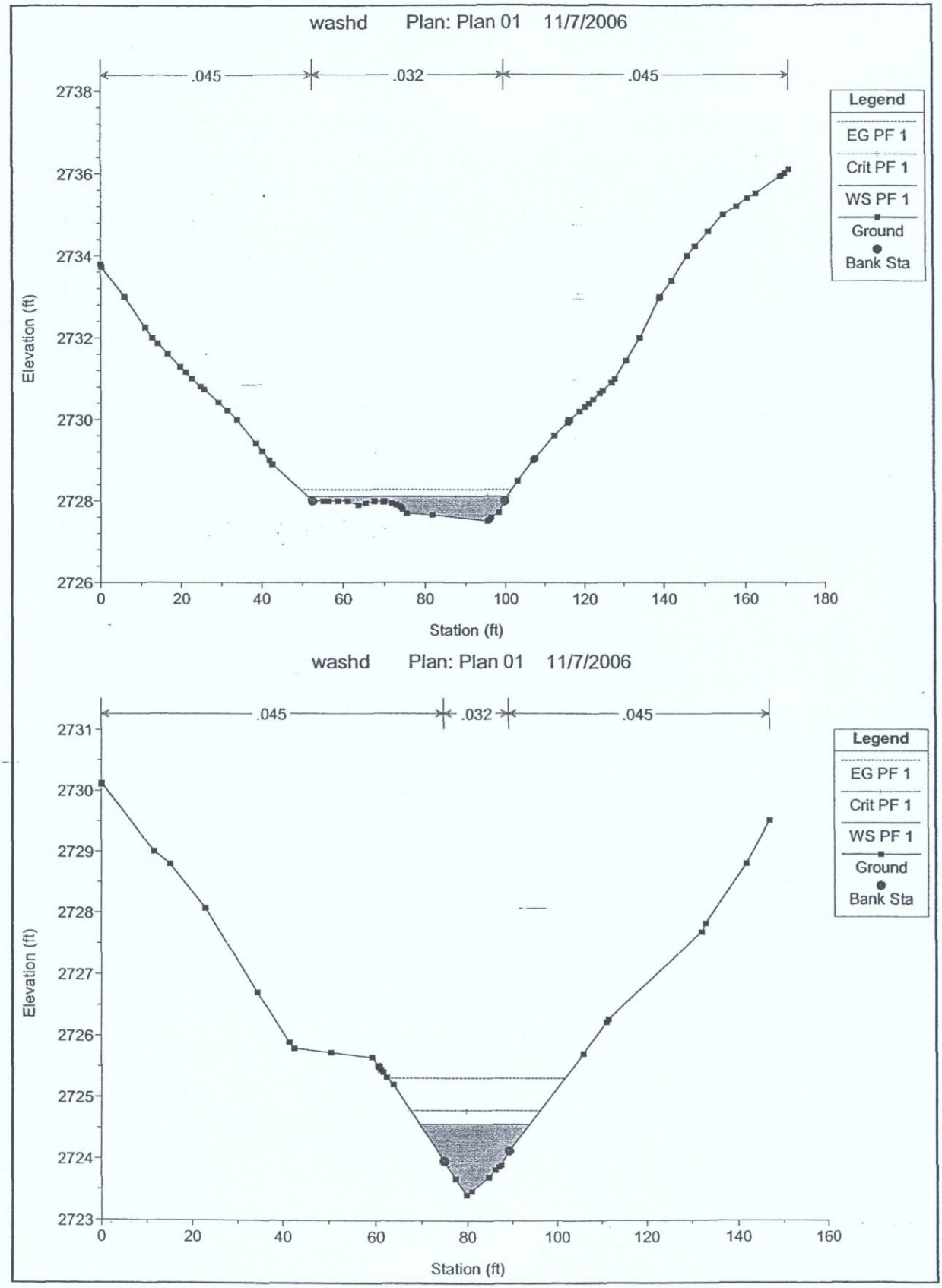
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washd Plan: Plan 01 11/7/2006
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.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washd Plan: Plan 01 11/7/2006
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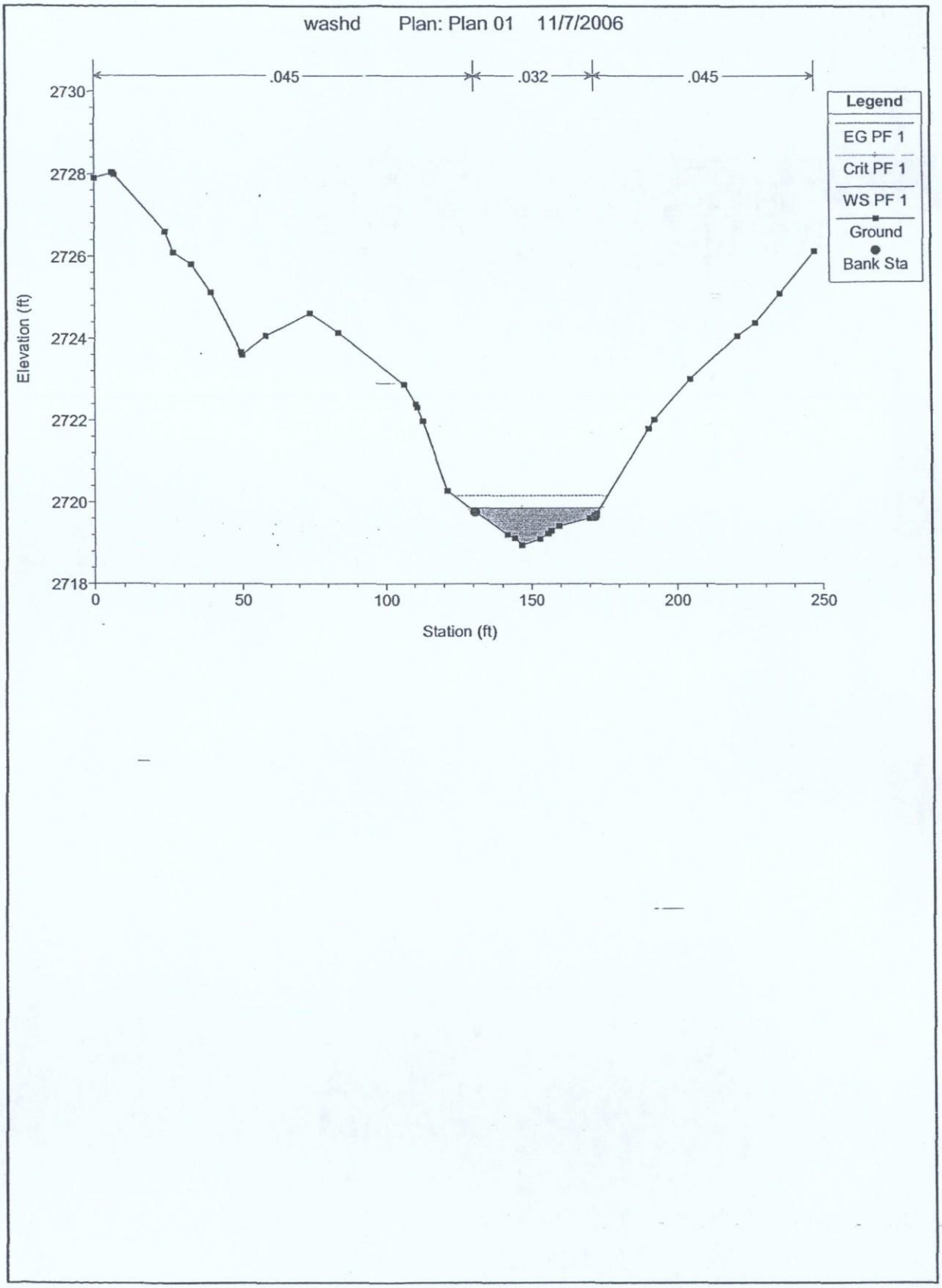
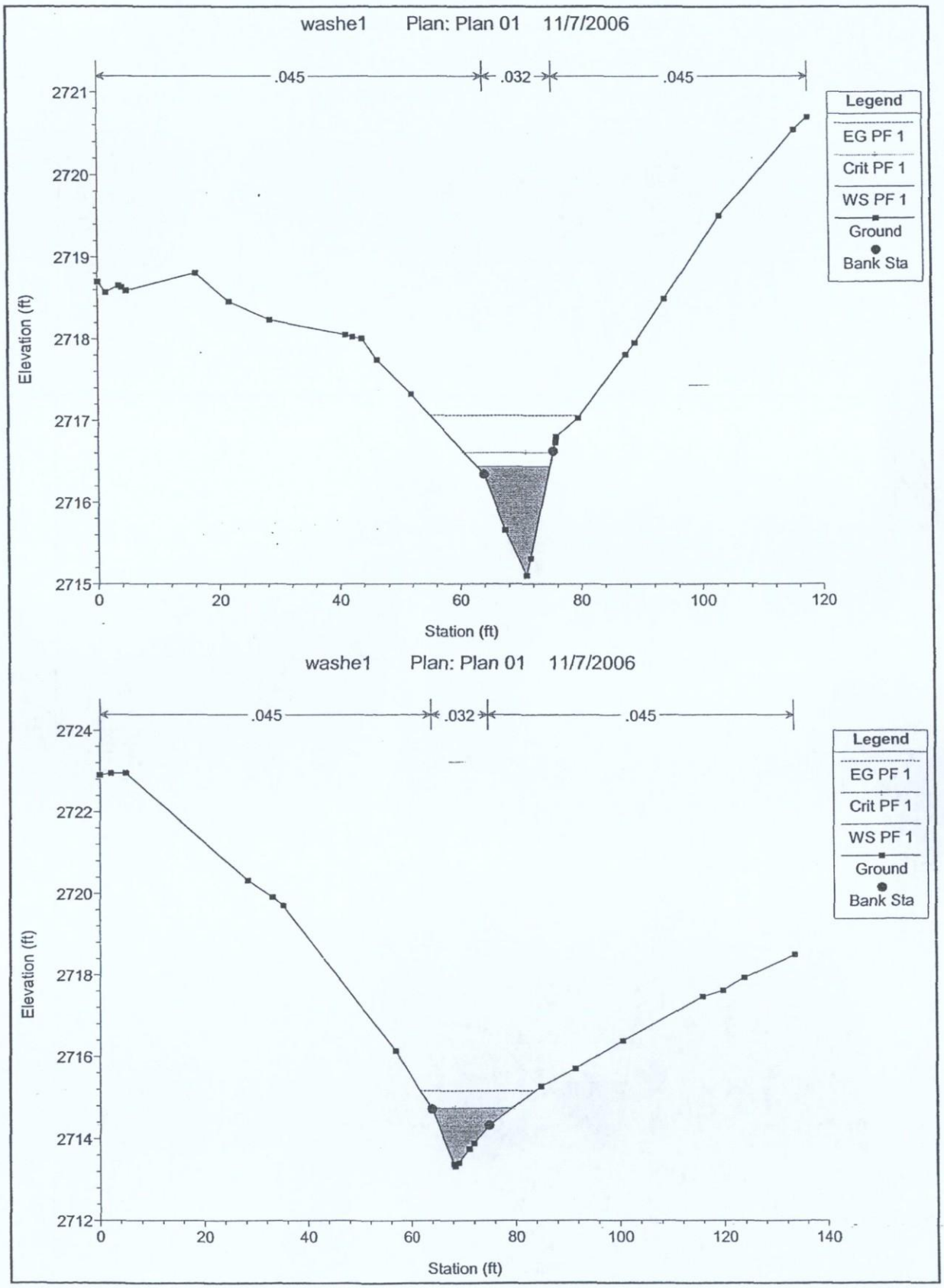
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


washd Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2730
2728
2726
2724
2722
2720
2718
0
50
100
150
200
250
Station (ft)

WASH E1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	13	PF 1	50.00	2715.10	2716.43	2716.60	2717.06	0.030018	6.34	7.93	12.10	1.32
Reach-1	12	PF 1	50.00	2713.32	2714.73	2714.77	2715.16	0.017142	5.31	10.05	15.35	1.02
Reach-1	11	PF 1	50.00	2711.10	2712.13	2712.36	2712.87	0.045013	6.89	7.38	13.63	1.58
Reach-1	10	PF 1	50.00	2708.30	2709.94	2710.07	2710.51	0.018336	6.16	9.08	14.42	1.07
Reach-1	9	PF 1	50.00	2706.40	2707.58	2707.84	2708.40	0.040012	7.29	7.00	11.58	1.52
Reach-1	8	PF 1	50.00	2703.40	2704.77	2705.10	2705.82	0.046780	8.23	6.21	9.25	1.65
Reach-1	7	PF 1	50.00	2701.44	2702.70	2702.85	2703.29	0.030785	6.17	8.11	12.04	1.32
Reach-1	6	PF 1	50.00	2700.00	2701.35	2701.35	2701.71	0.016870	4.84	10.45	15.48	1.00
Reach-1	5	PF 1	110.00	2696.59	2698.23	2698.33	2698.83	0.023198	6.20	17.84	22.36	1.20
Reach-1	4	PF 1	110.00	2692.81	2694.53	2694.74	2695.31	0.024021	7.14	16.08	20.48	1.25
Reach-1	3.5	PF 1	110.00	2692.00	2692.91	2692.96	2693.32	0.017181	5.30	23.38	38.13	1.04
Reach-1	3	PF 1	146.00	2689.21	2690.98	2691.23	2691.71	0.019310	7.16	25.54	49.17	1.16
Reach-1	2	PF 1	275.00	2679.83	2681.81	2682.35	2683.49	0.037223	10.45	27.53	27.33	1.63
Reach-1	1	PF 1	275.00	2677.00	2679.36	2679.56	2680.26	0.015675	8.37	43.76	40.47	1.10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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2721
2720
2719
2718
2717
2716
2715
0
20
40
60
80
100
120
washe1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2722
2720
2718
2716
2714
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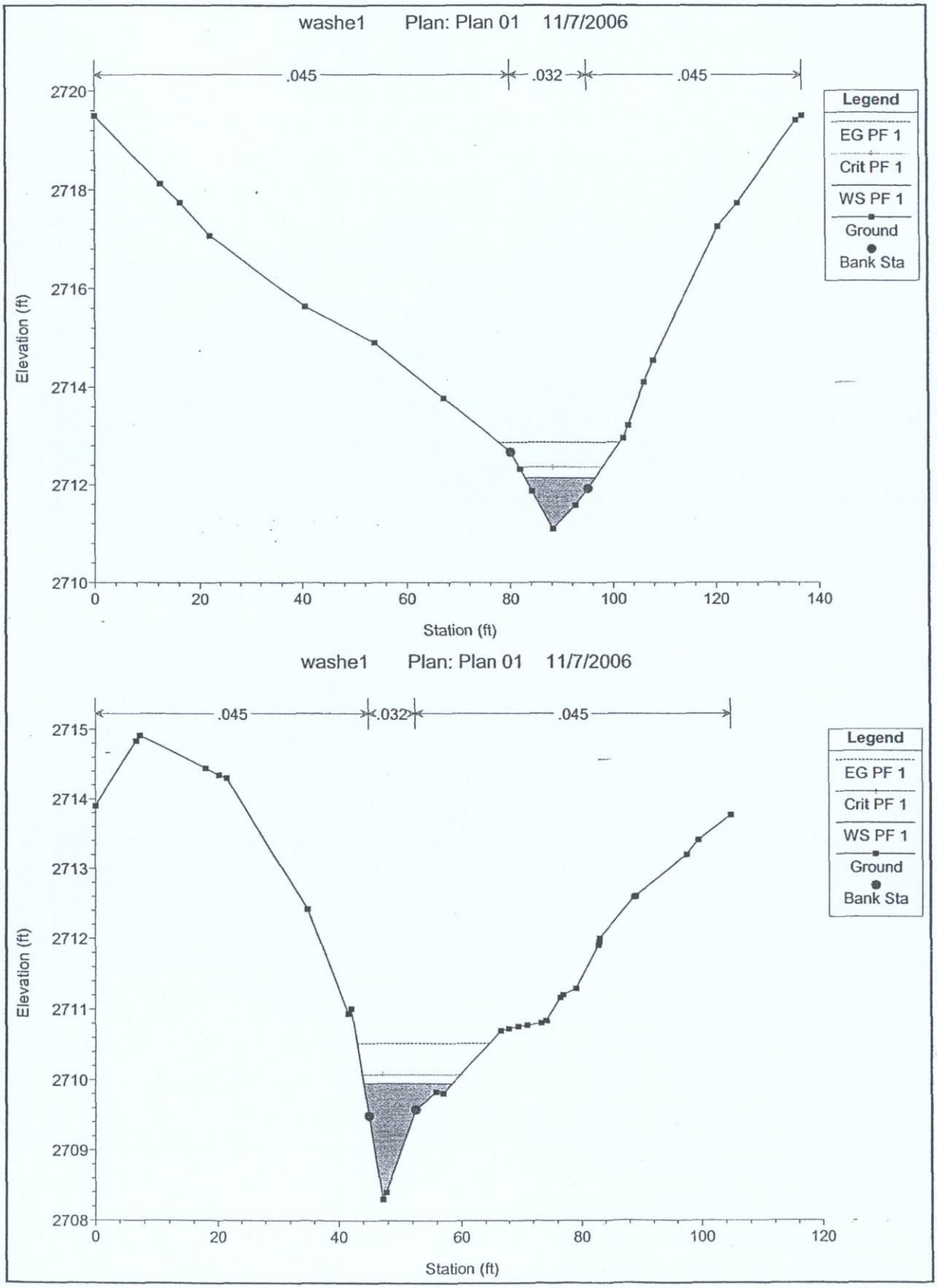
0
20
40
60
80
100
120
140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.032
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2710
Elevation (ft)
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20
40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washe1 Plan: Plan 01 11/7/2006
.045
.032
.045
2715
2714
2713
2712
2711
2710
2709
2708
Elevation (ft)
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20
40
60
80
100
120
Station (ft)
Legend
EG PF 1
Crit PF 1
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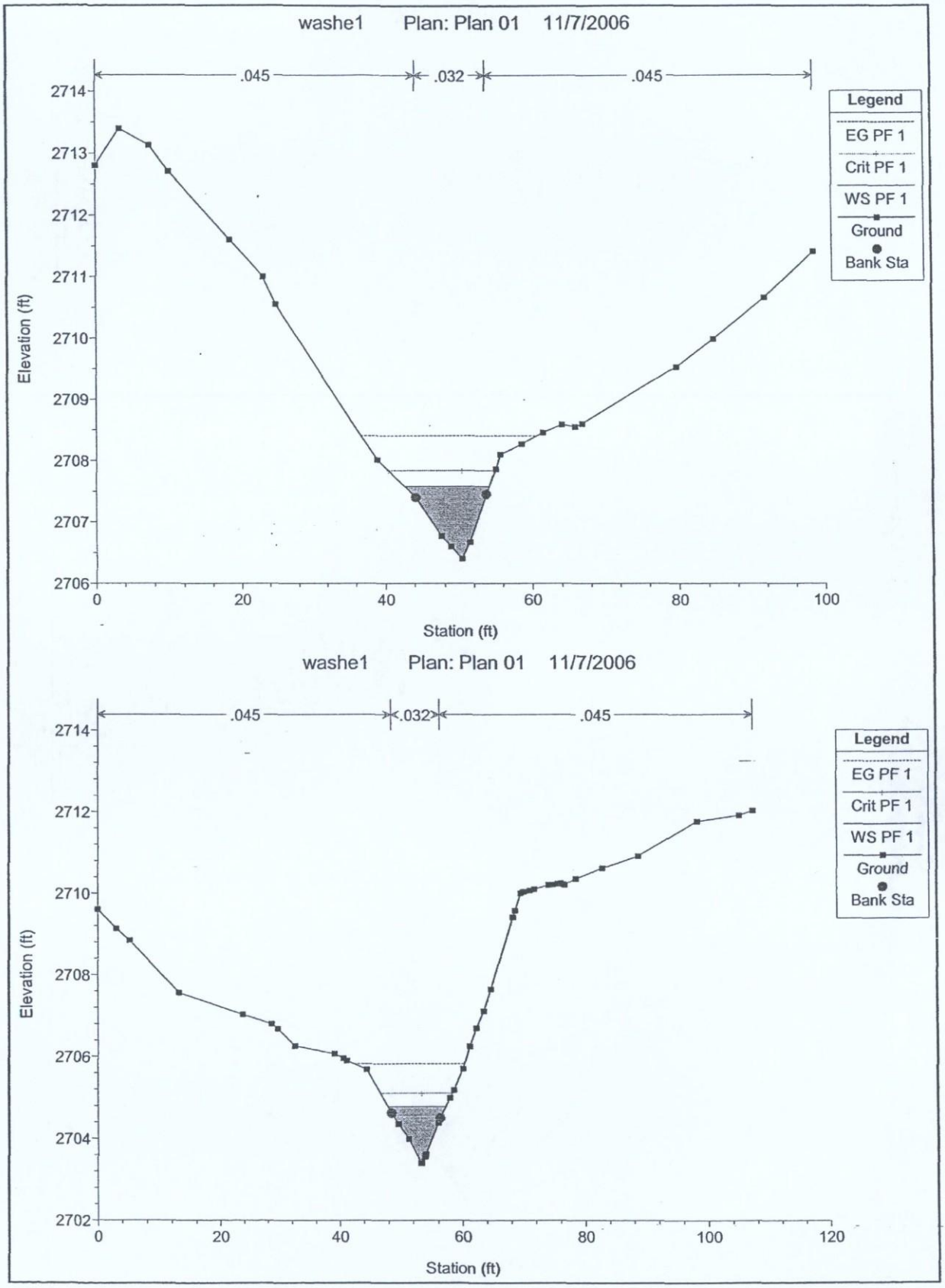
Ground
Bank Sta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Legend
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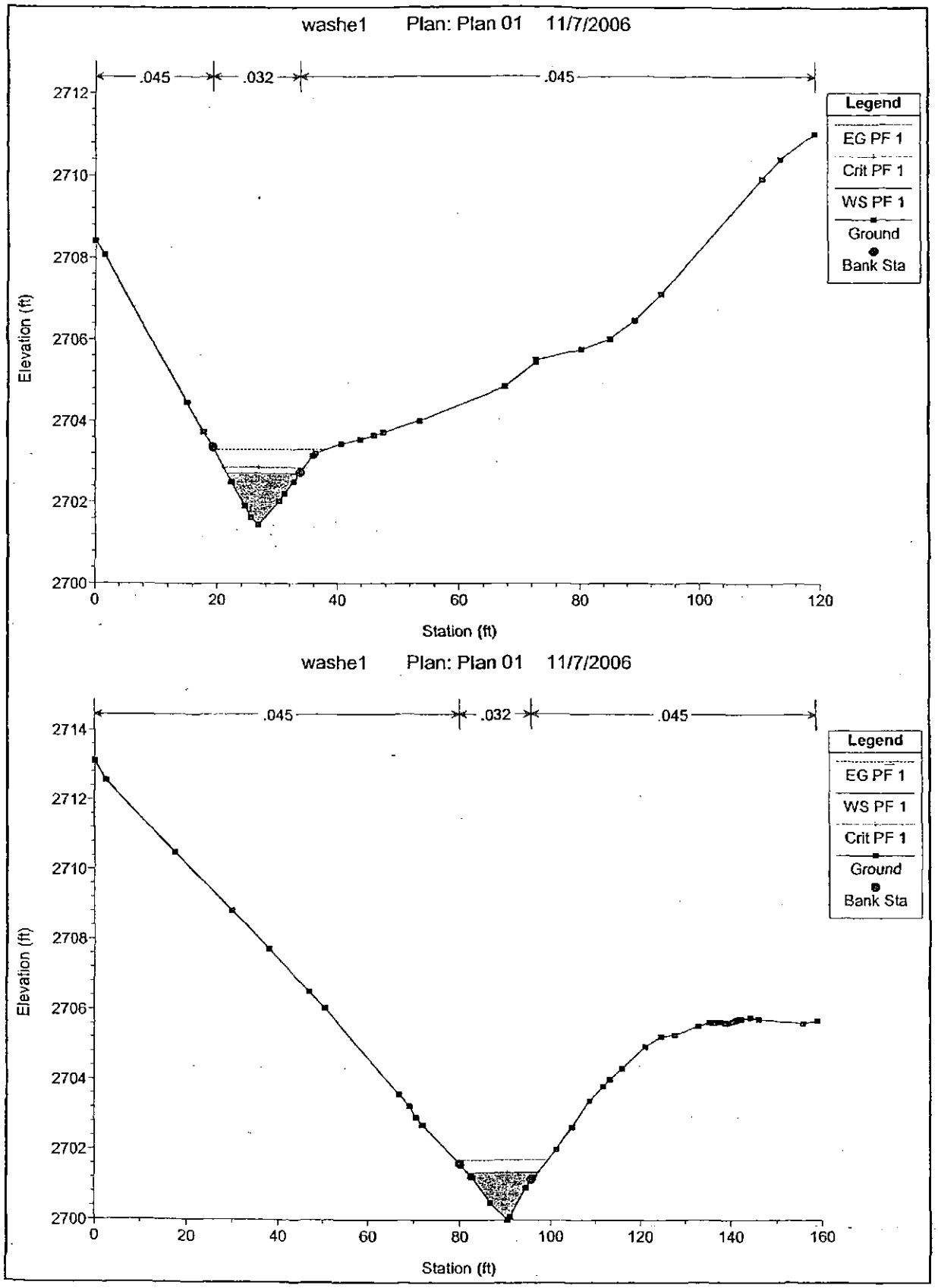
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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washe1 Plan: Plan 01 11/7/2006
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Legend
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WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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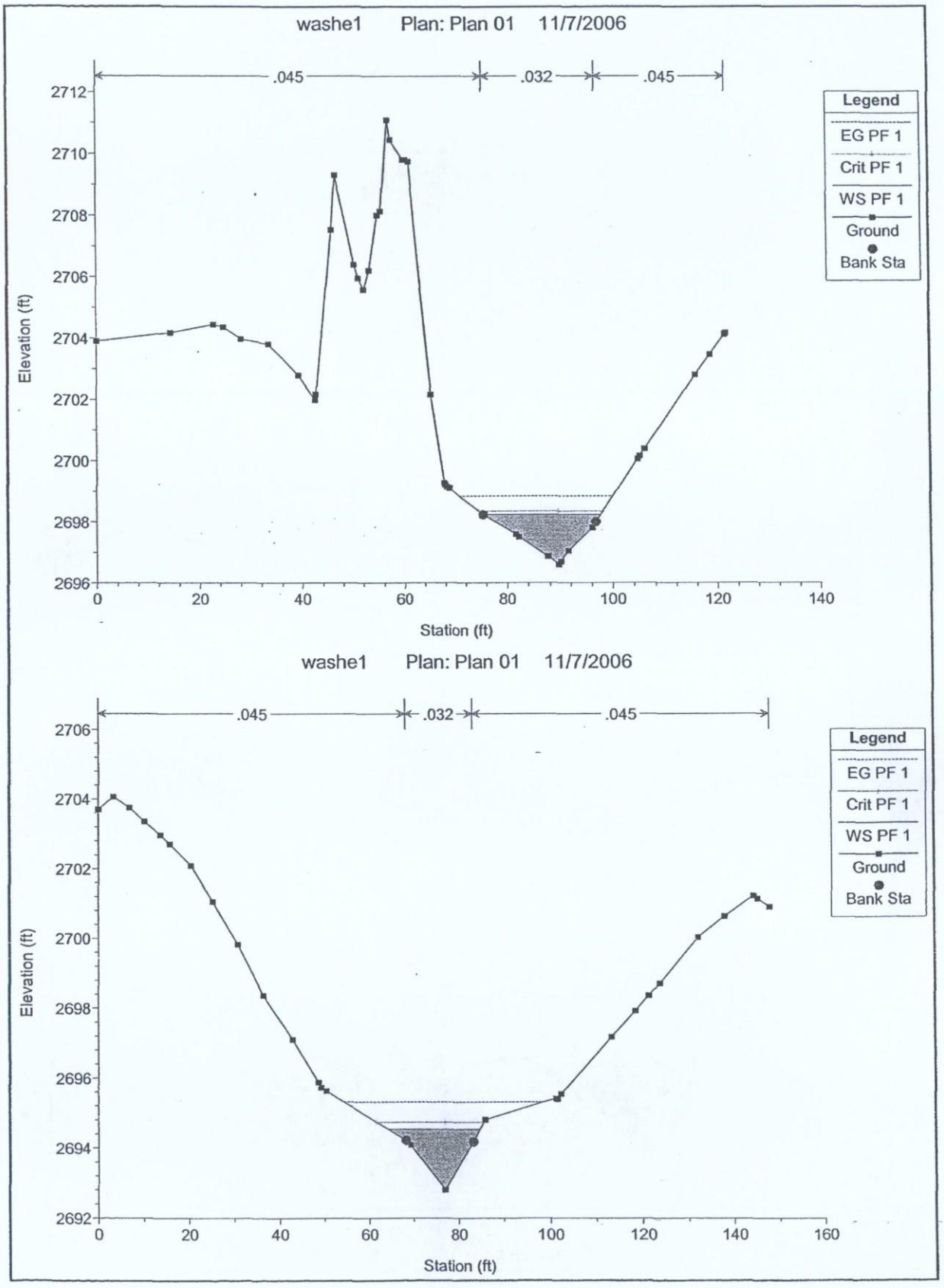
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Bank Sta
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Station (ft)
washe1 Plan: Plan 01 11/7/2006
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Crit PF 1
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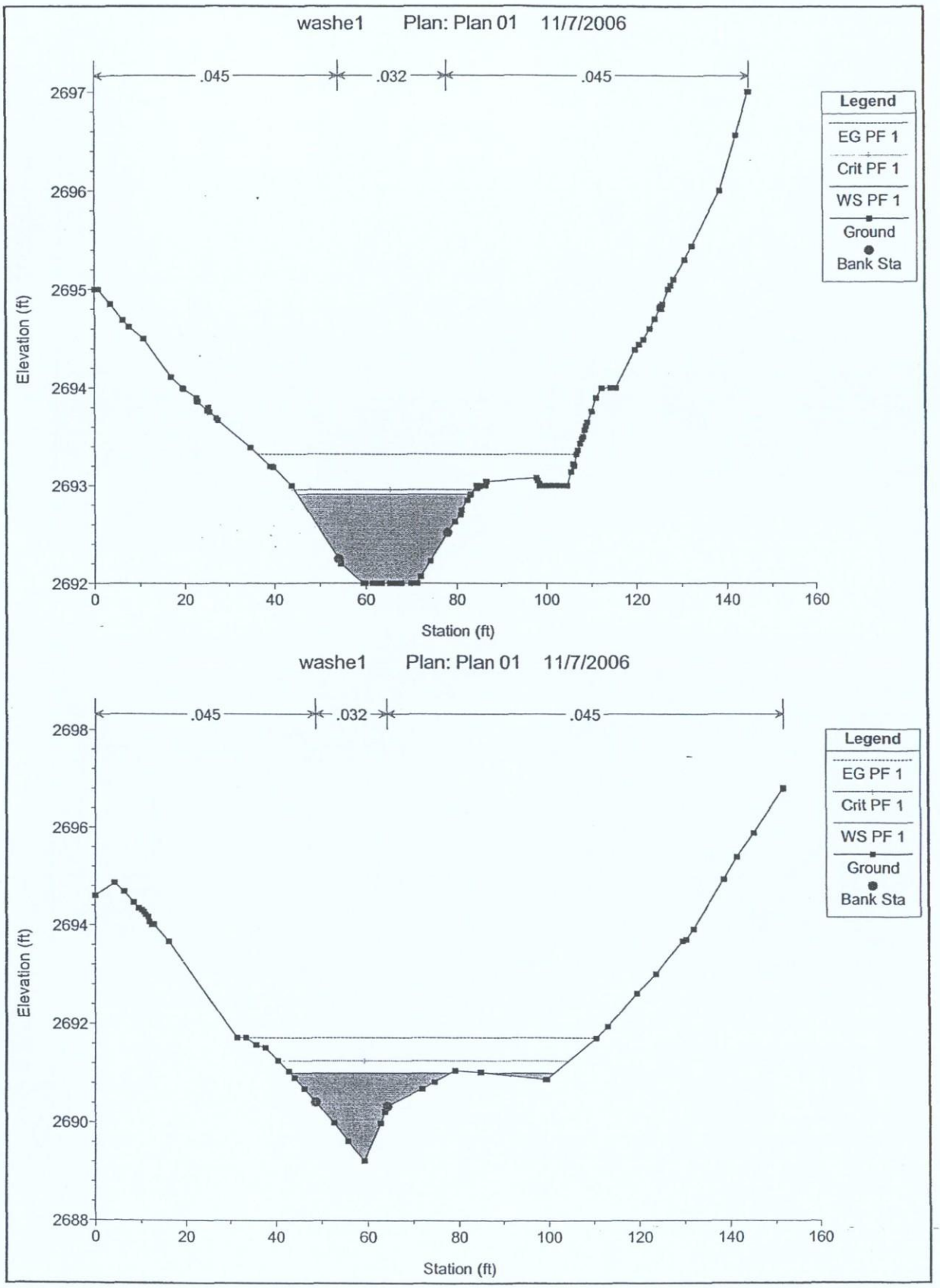
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
Station (ft)
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2696
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2692
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60
80
100
120
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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100
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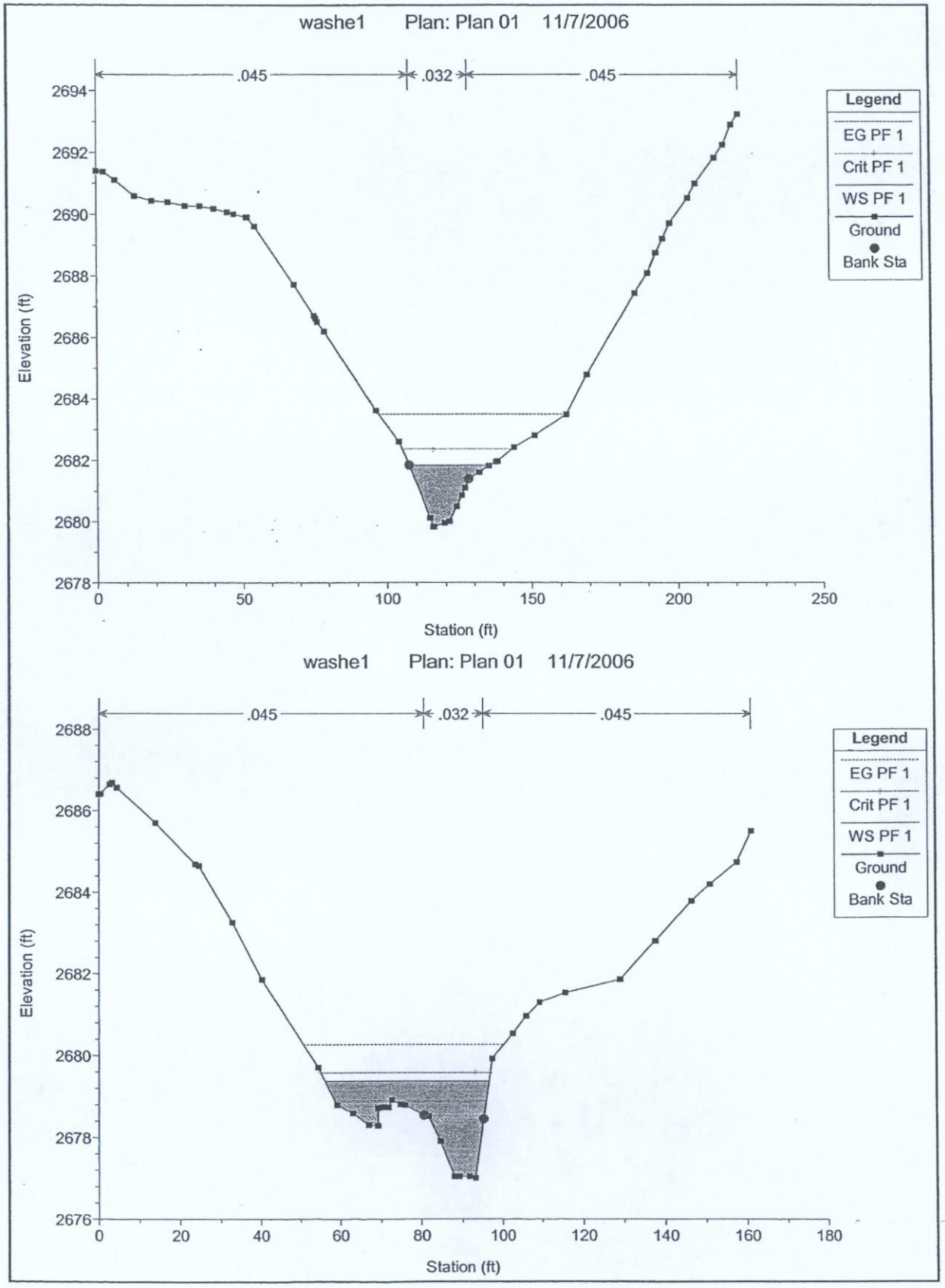
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Bank Sta
Elevation (ft)
Station (ft)
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0
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150
200
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washe1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2688
2686
2684
2682
2680
2678
2676
0
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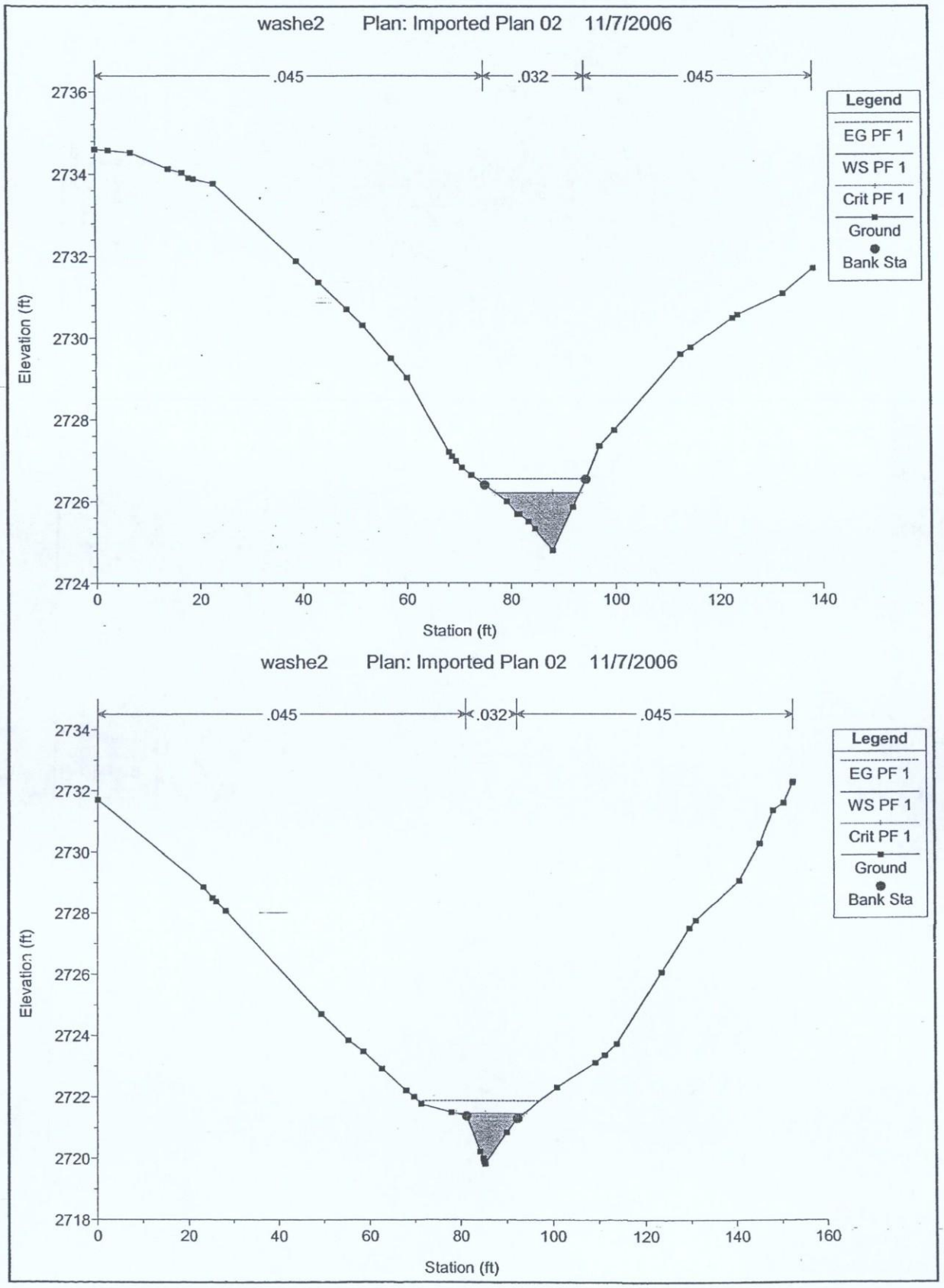
60
80
100
120
140
160
180

WASH E2

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 Profile: PF 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	11	PF 1	50.00	2724.80	2726.21	2726.21	2726.55	0.018084	4.69	10.67	16.13	1.02
Reach-1	10	PF 1	50.00	2719.82	2721.45	2721.45	2721.87	0.015739	5.17	9.85	14.80	0.98
Reach-1	9	PF 1	50.00	2715.71	2717.28	2717.28	2717.71	0.013081	5.64	10.87	14.46	0.94
Reach-1	8	PF 1	75.00	2709.10	2711.09	2711.09	2711.55	0.010257	5.57	16.18	22.55	0.85
Reach-1	7.5	PF 1	75.00	2708.00	2709.19	2709.19	2709.62	0.013563	5.49	15.49	19.83	0.95
Reach-1	7	PF 1	75.00	2705.46	2706.94	2706.94	2707.36	0.015127	5.18	14.90	20.27	0.98
Reach-1	6	PF 1	75.00	2701.53	2703.58	2703.58	2704.11	0.014543	5.84	13.21	14.90	0.97
Reach-1	5	PF 1	75.00	2697.79	2699.88	2699.88	2700.43	0.010621	6.48	15.38	16.38	0.89
Reach-1	4.5	PF 1	75.00	2697.00	2698.52	2698.52	2699.00	0.012220	5.77	14.89	17.87	0.92
Reach-1	4	PF 1	75.00	2694.91	2696.38	2696.38	2696.78	0.016000	5.09	14.92	21.12	0.99
Reach-1	3	PF 1	131.00	2687.45	2689.81	2689.81	2690.44	0.012785	6.41	21.80	21.14	0.95
Reach-1	2	PF 1	275.00	2679.83	2682.39	2682.39	2683.11	0.009982	7.12	46.76	38.39	0.90
Reach-1	1	PF 1	275.00	2677.00	2679.55	2679.55	2680.11	0.016423	7.02	51.48	41.70	0.83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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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Legend
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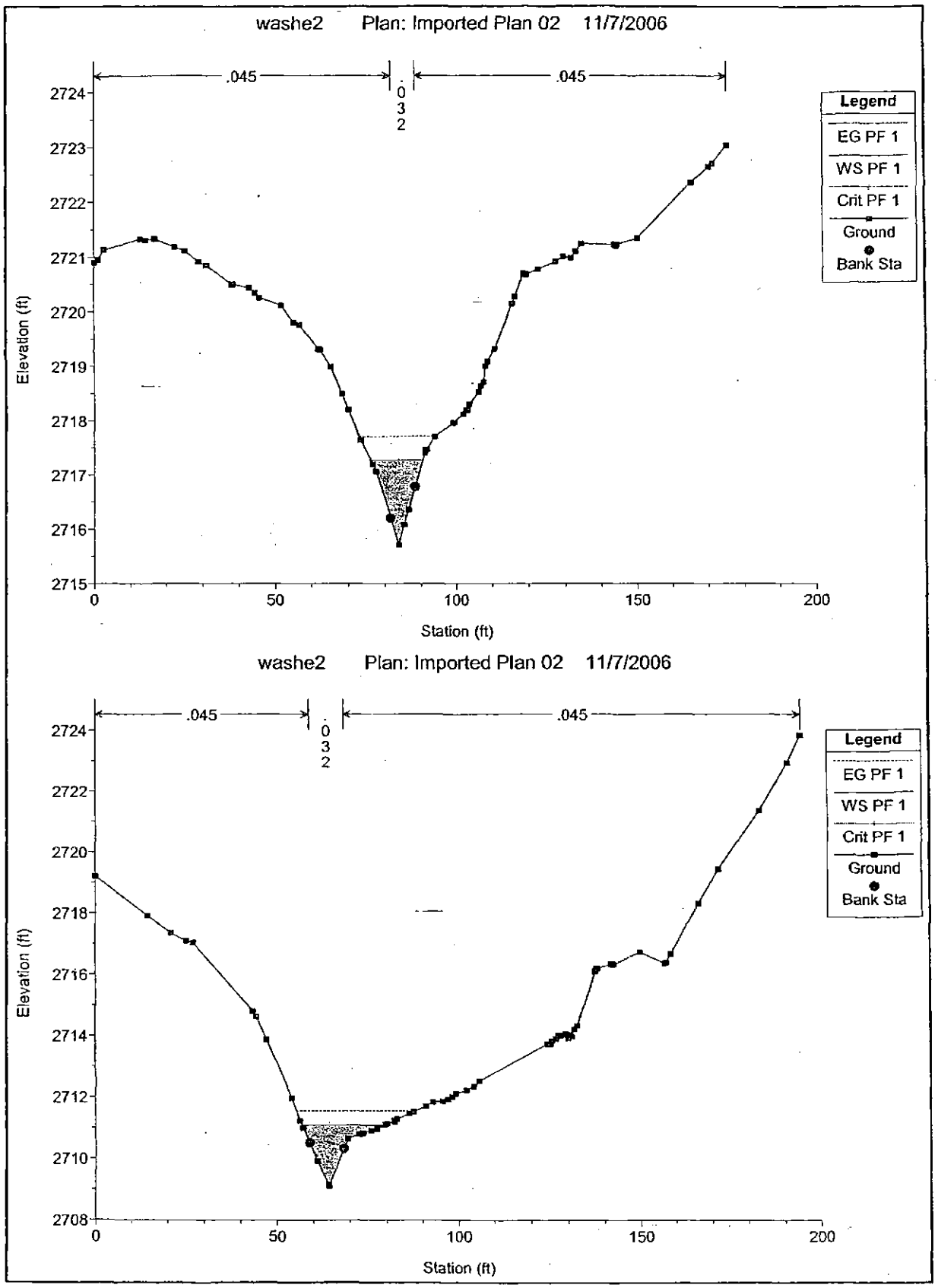
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
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Crit PF 1
Ground
Bank Sta
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Station (ft)
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washe2 Plan: Imported Plan 02 11/7/2006
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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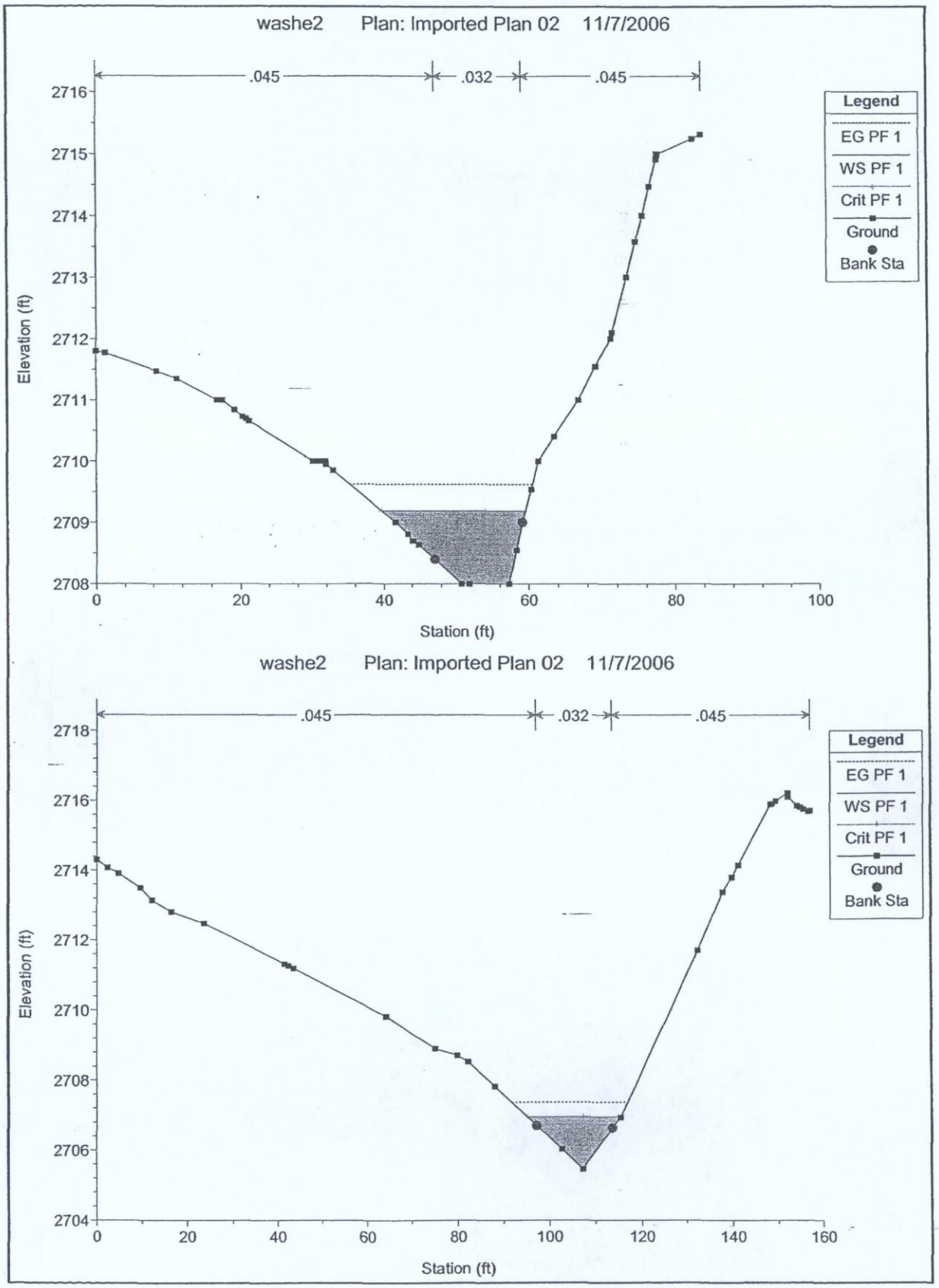
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Bank Sta
Elevation (ft)
Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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EG PF 1
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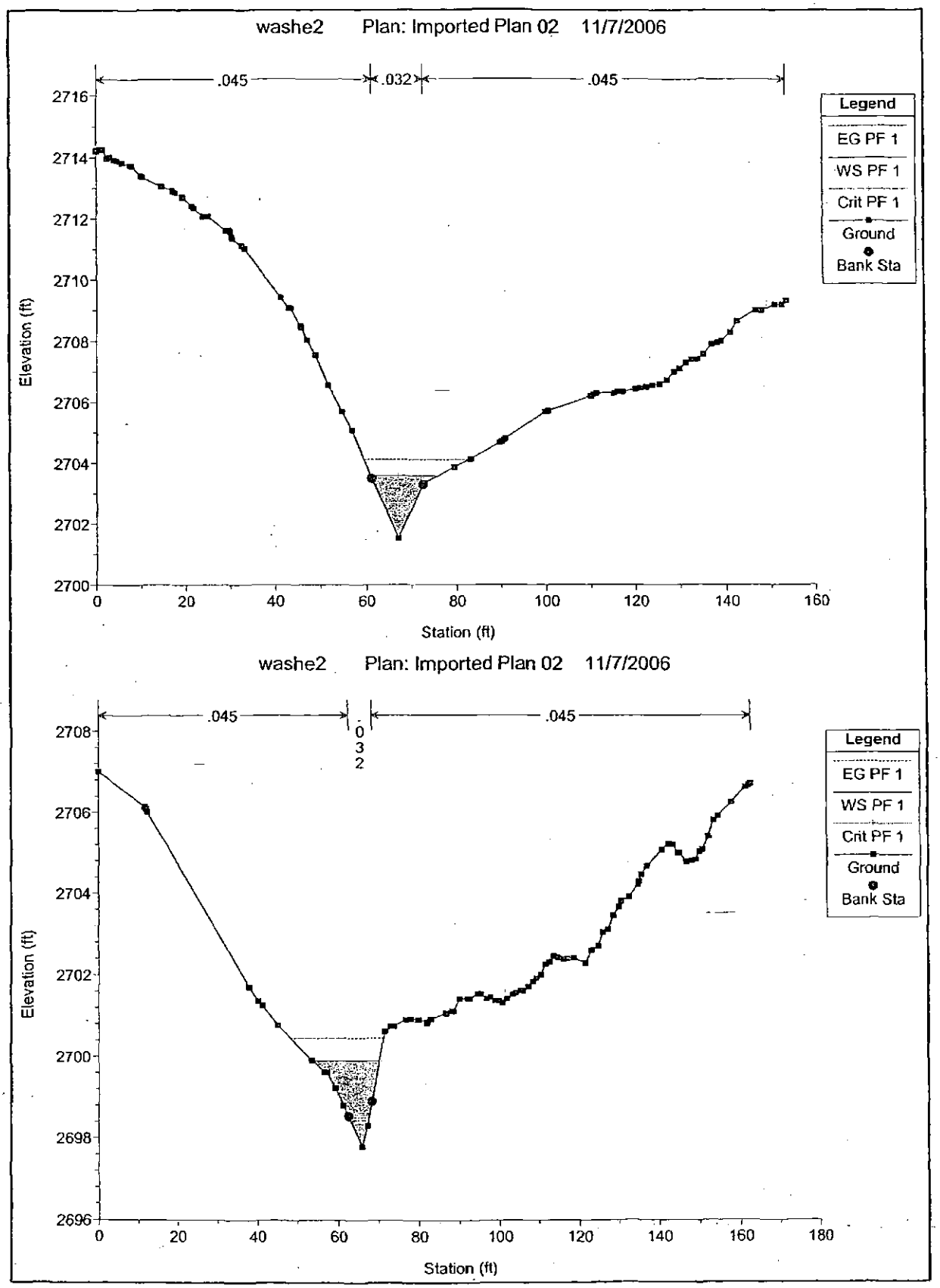
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
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Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washe2 Plan: Imported Plan 02 11/7/2006
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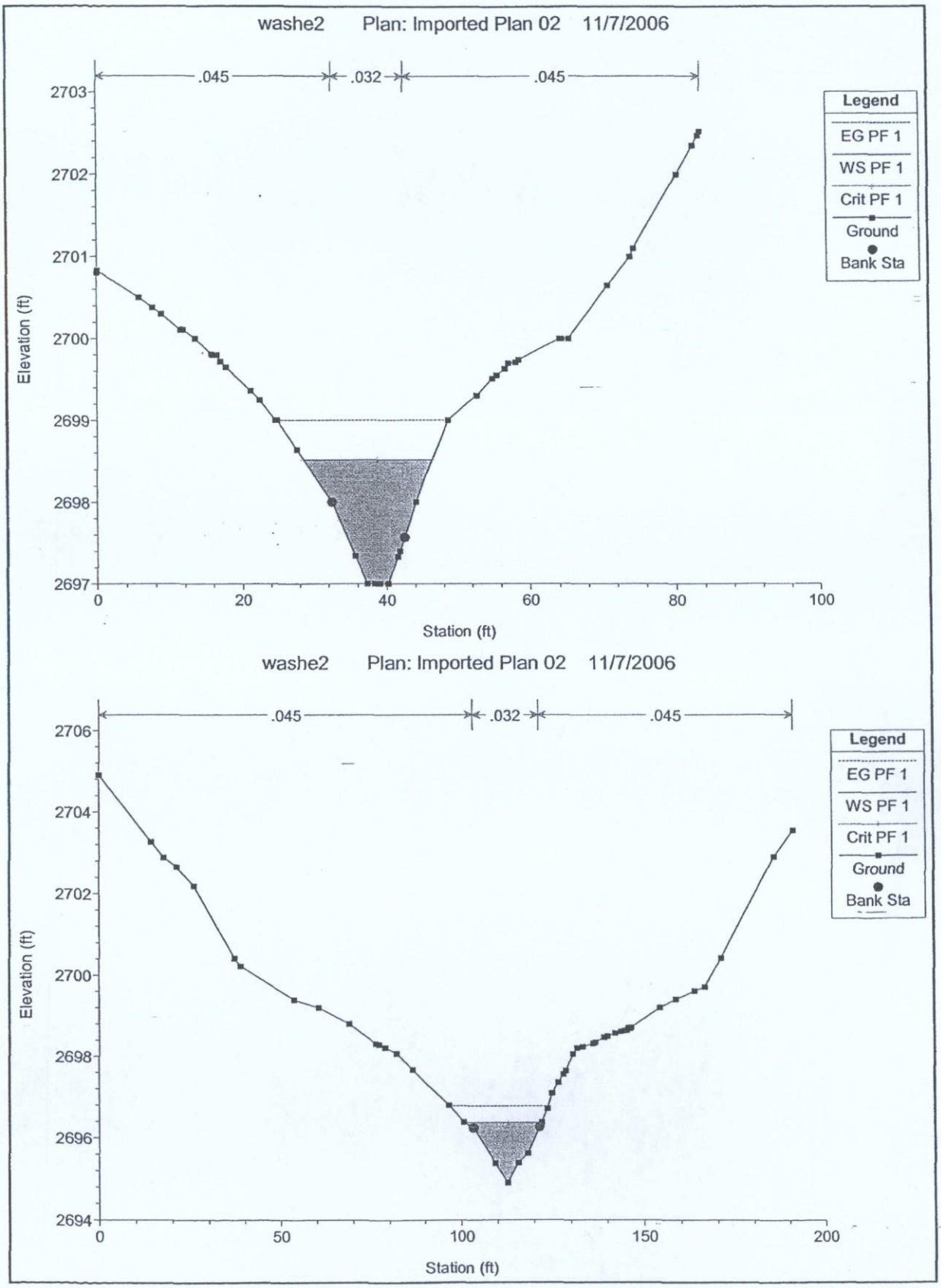
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Elevation (ft)
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Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
washe2 Plan: Imported Plan 02 11/7/2006
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Elevation (ft)
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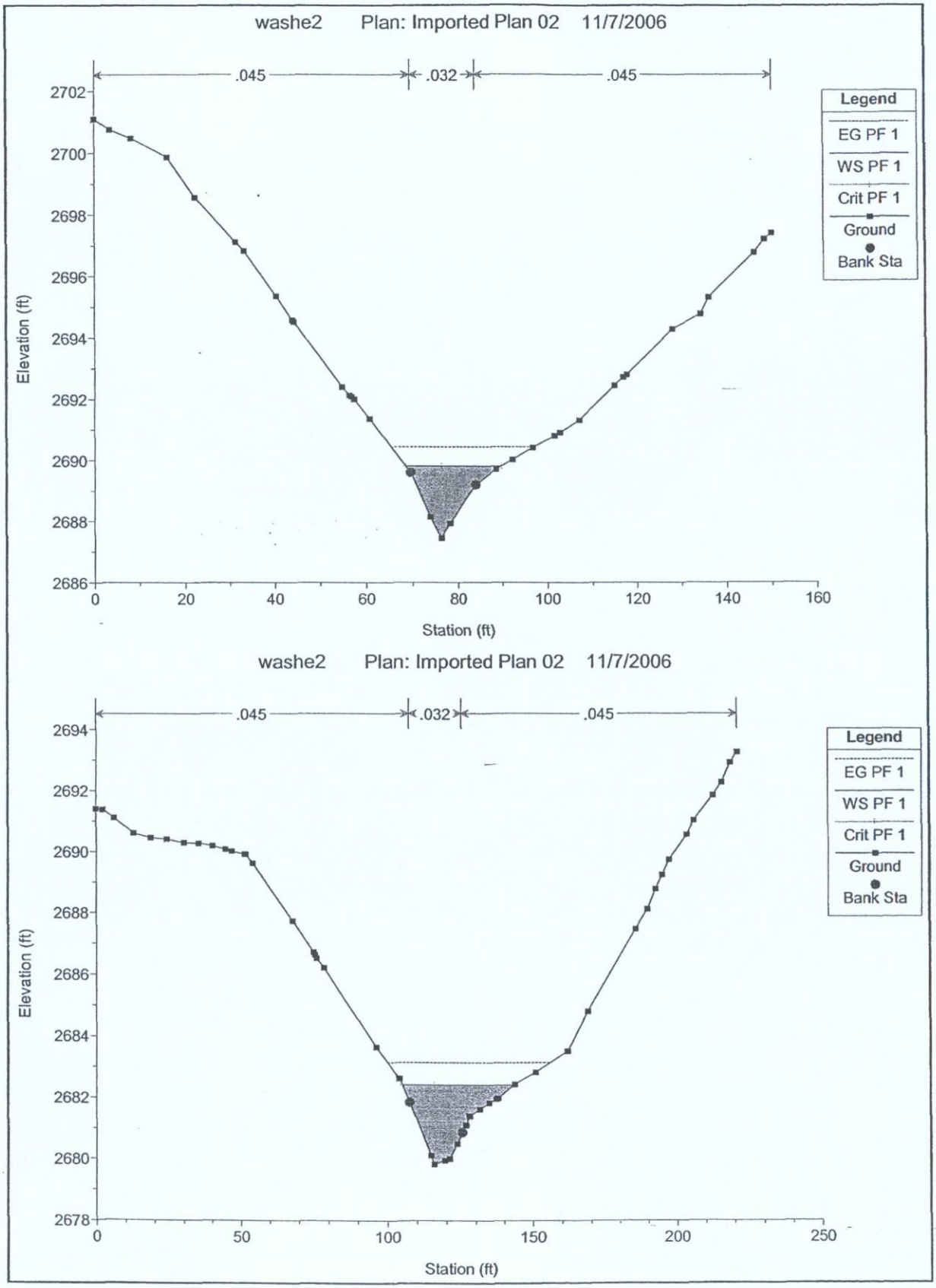
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2694
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2690
2688
2686
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80
100
120
140
160
washe2 Plan: Imported Plan 02 11/7/2006
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.032
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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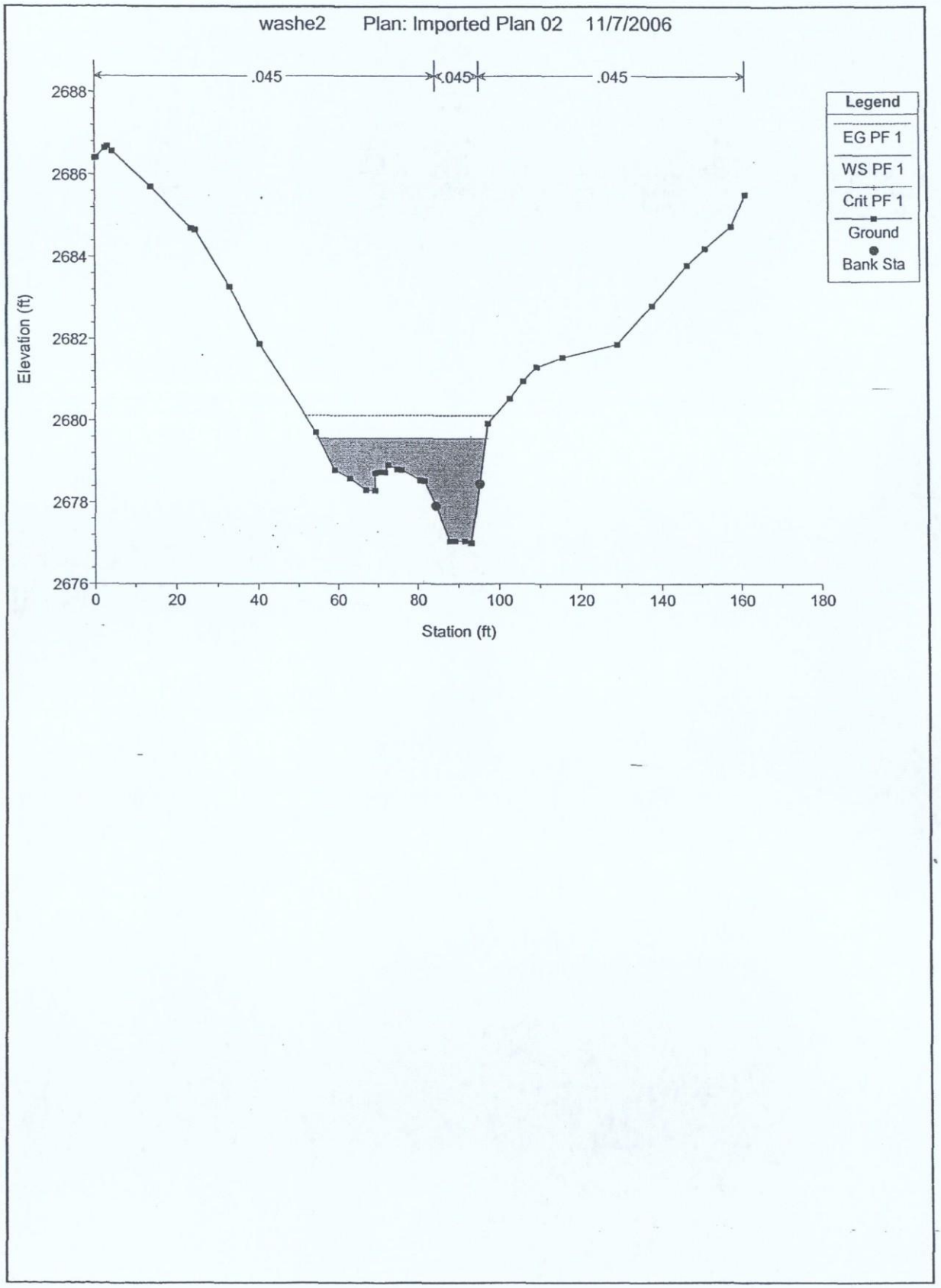
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Elevation (ft)
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40
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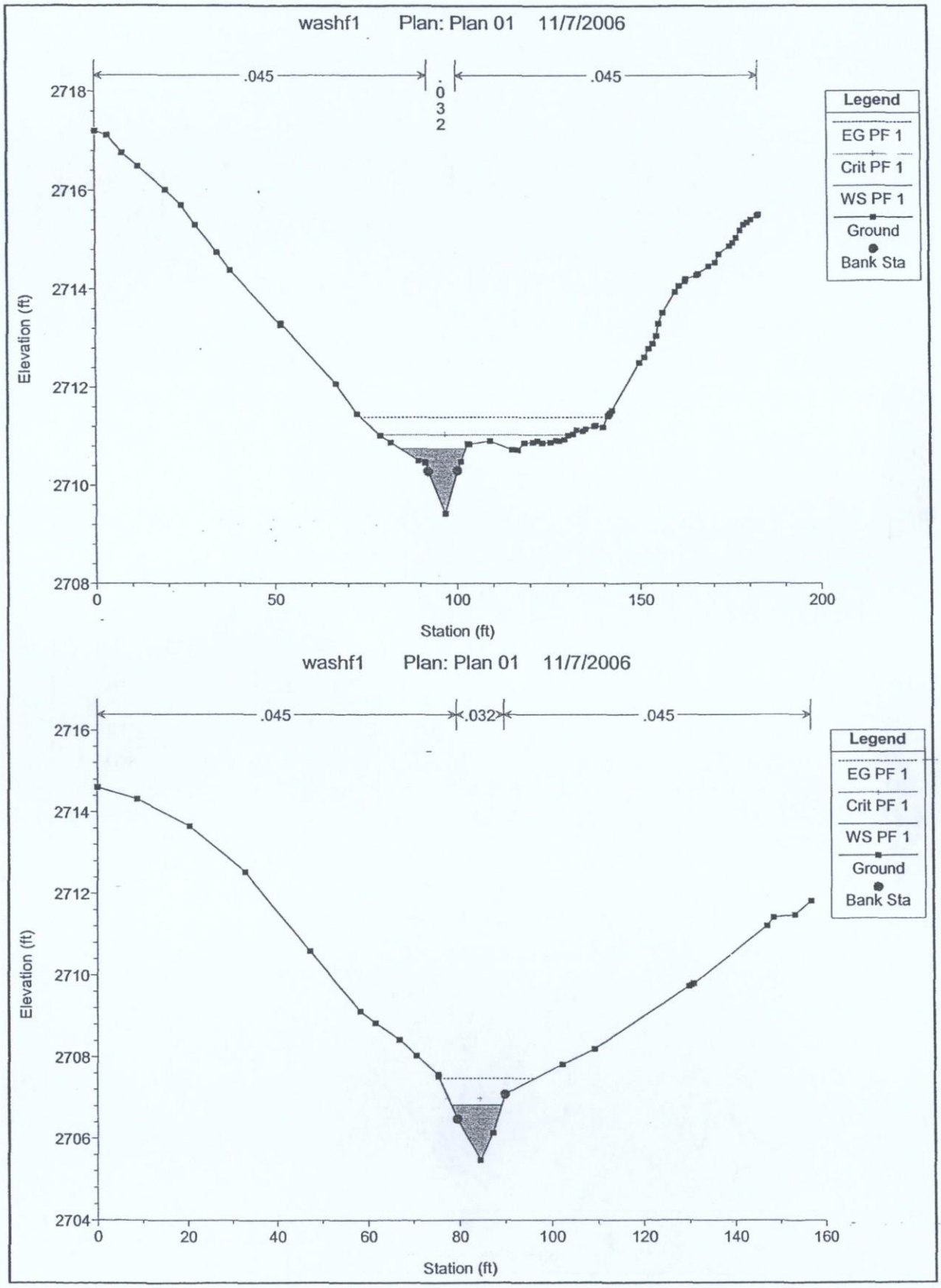
80
100
120
140
160
180
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

WASH F1

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 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	8	PF 1	50.00	2709.42	2710.74	2711.03	2711.38	0.025021	6.65	8.95	20.46	1.25
Reach-1	7	PF 1	50.00	2705.46	2706.81	2706.97	2707.46	0.027912	6.49	7.87	11.03	1.29
Reach-1	6	PF 1	50.00	2700.54	2701.76	2702.06	2702.68	0.039439	7.86	7.10	12.34	1.54
Reach-1	5	PF 1	50.00	2698.48	2699.81	2699.89	2700.28	0.022728	5.49	9.24	14.33	1.15
Reach-1	4.5	PF 1	50.00	2697.00	2697.81	2697.96	2698.38	0.028656	6.06	8.42	13.96	1.29
Reach-1	4	PF 1	76.00	2692.65	2693.93	2694.09	2694.58	0.029509	8.47	11.91	17.84	1.33
Reach-1	3.5	PF 1	76.00	2689.00	2690.62	2690.62	2691.05	0.011337	5.57	16.92	22.78	0.89
Reach-1	3	PF 1	76.00	2686.57	2687.81	2688.10	2688.70	0.034574	7.61	10.42	15.66	1.46
Reach-1	2	PF 1	76.00	2681.90	2683.33	2683.35	2683.65	0.017537	4.63	18.17	36.25	1.00
Reach-1	1	PF 1	99.00	2677.60	2678.80	2679.01	2679.50	0.034655	7.02	18.30	54.88	1.44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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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200
washf1 Plan: Plan 01 11/7/2006
.045
.032
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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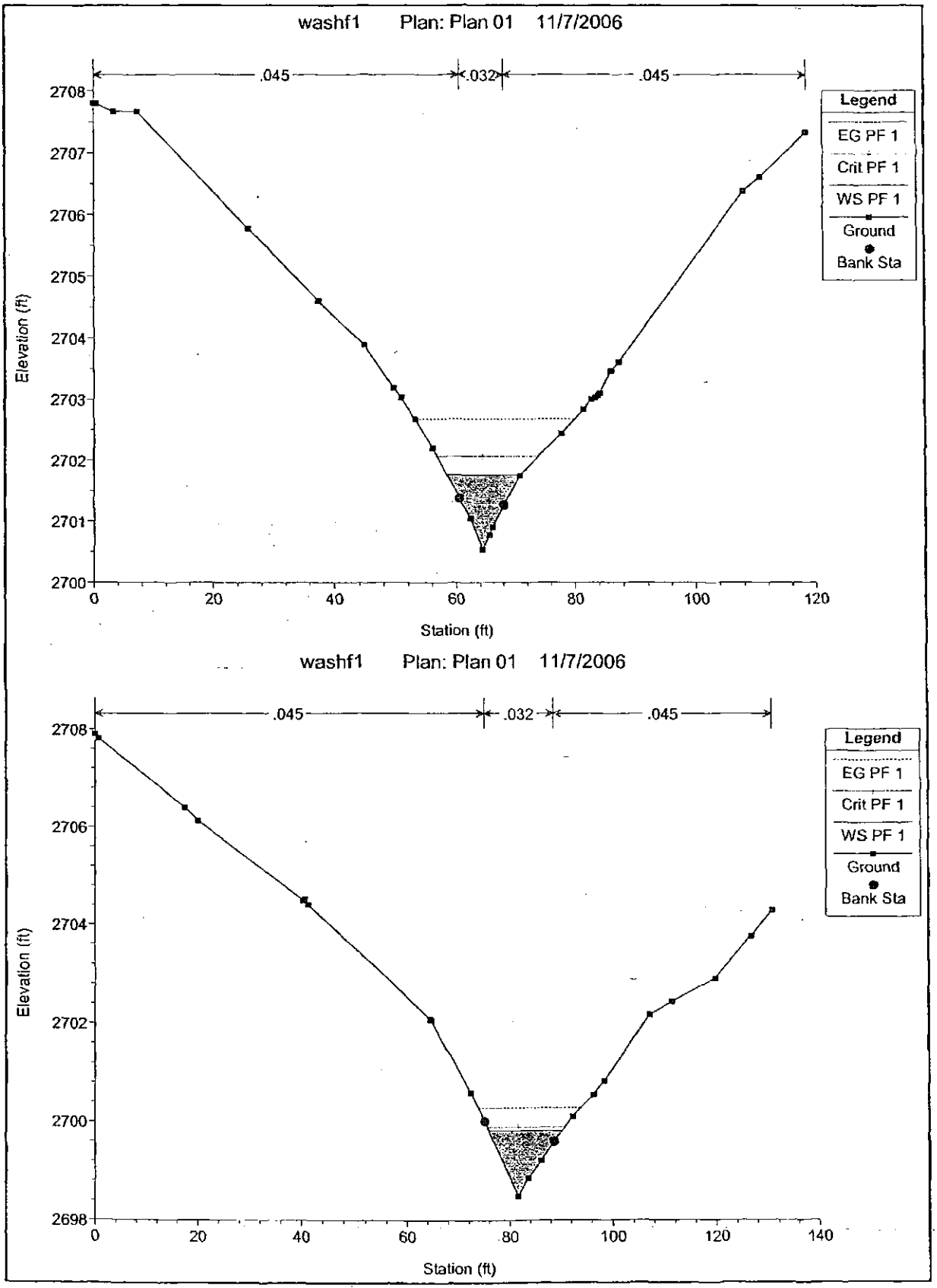
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Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
2708
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2706
2705
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2702
2701
2700
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80
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120
washf1 Plan: Plan 01 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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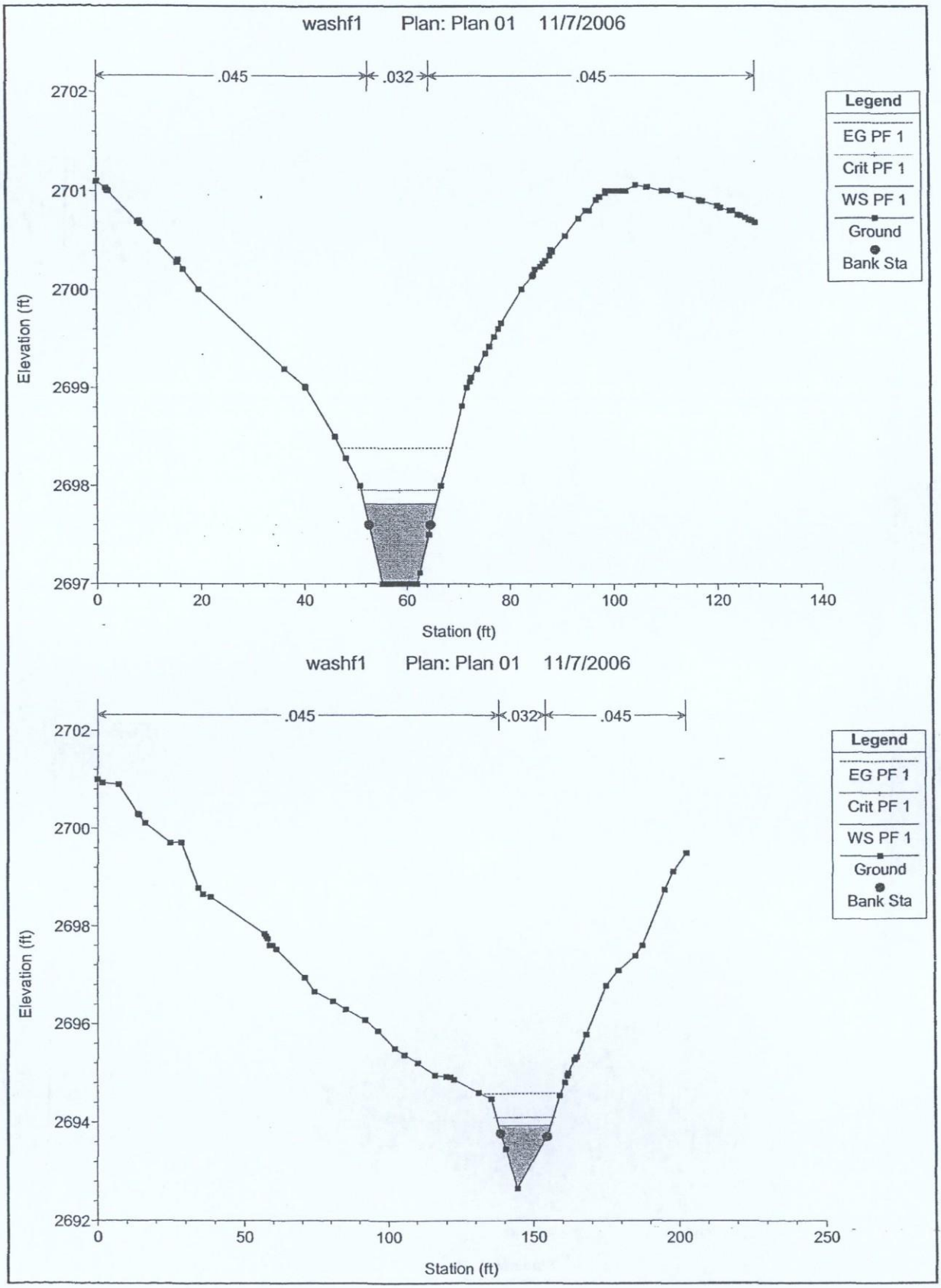
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Elevation (ft)
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40
60
80
100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washf1 Plan: Plan 01 11/7/2006
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2702
2700
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2696
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Elevation (ft)
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Station (ft)
Legend
EG PF 1
Crit PF 1
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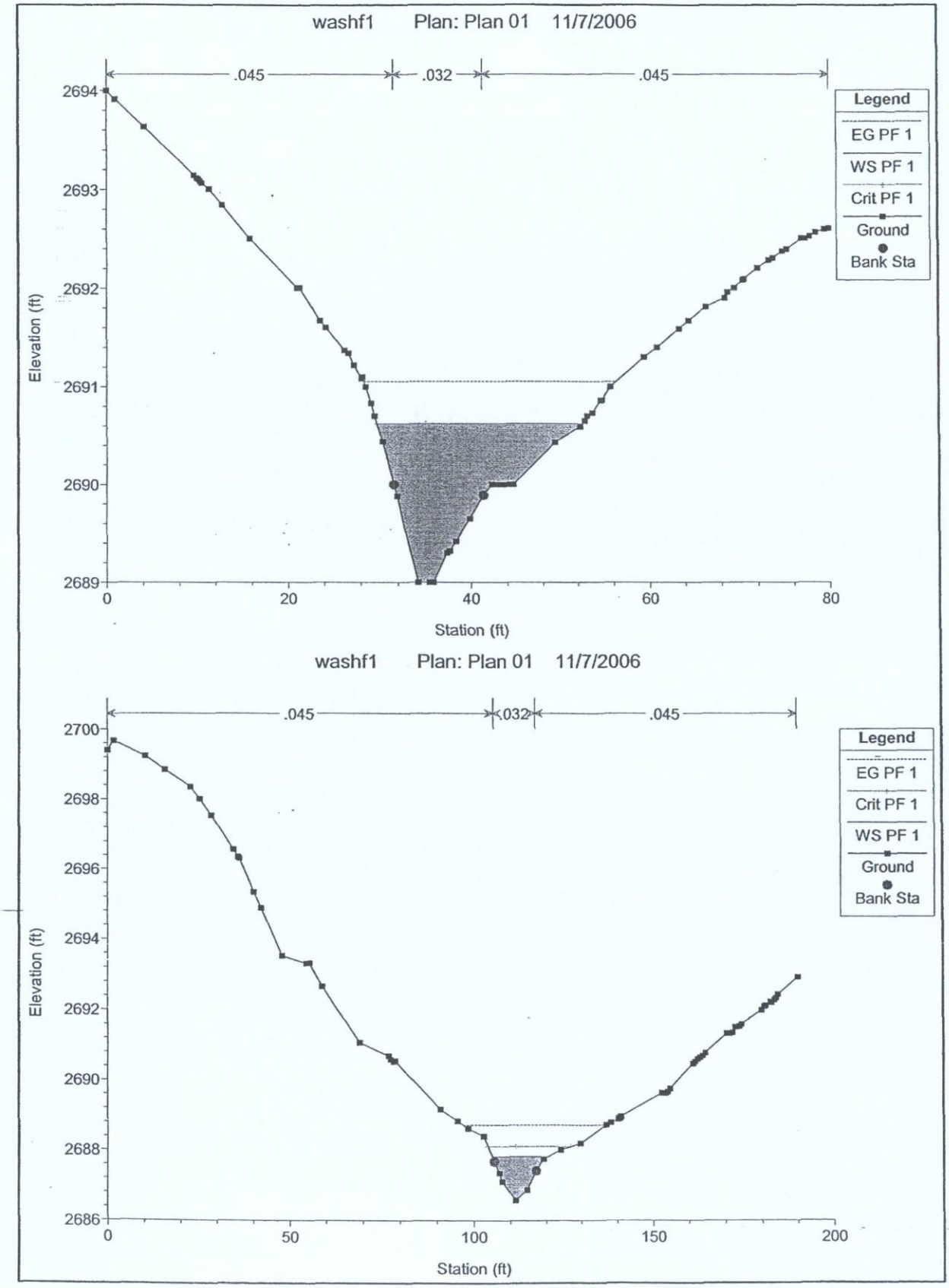
Ground
Bank Sta


washf1 Plan: Plan 01 11/7/2006
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WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
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2693
2692
2691
2690
2689
0
20
40
60
80
Station (ft)
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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100
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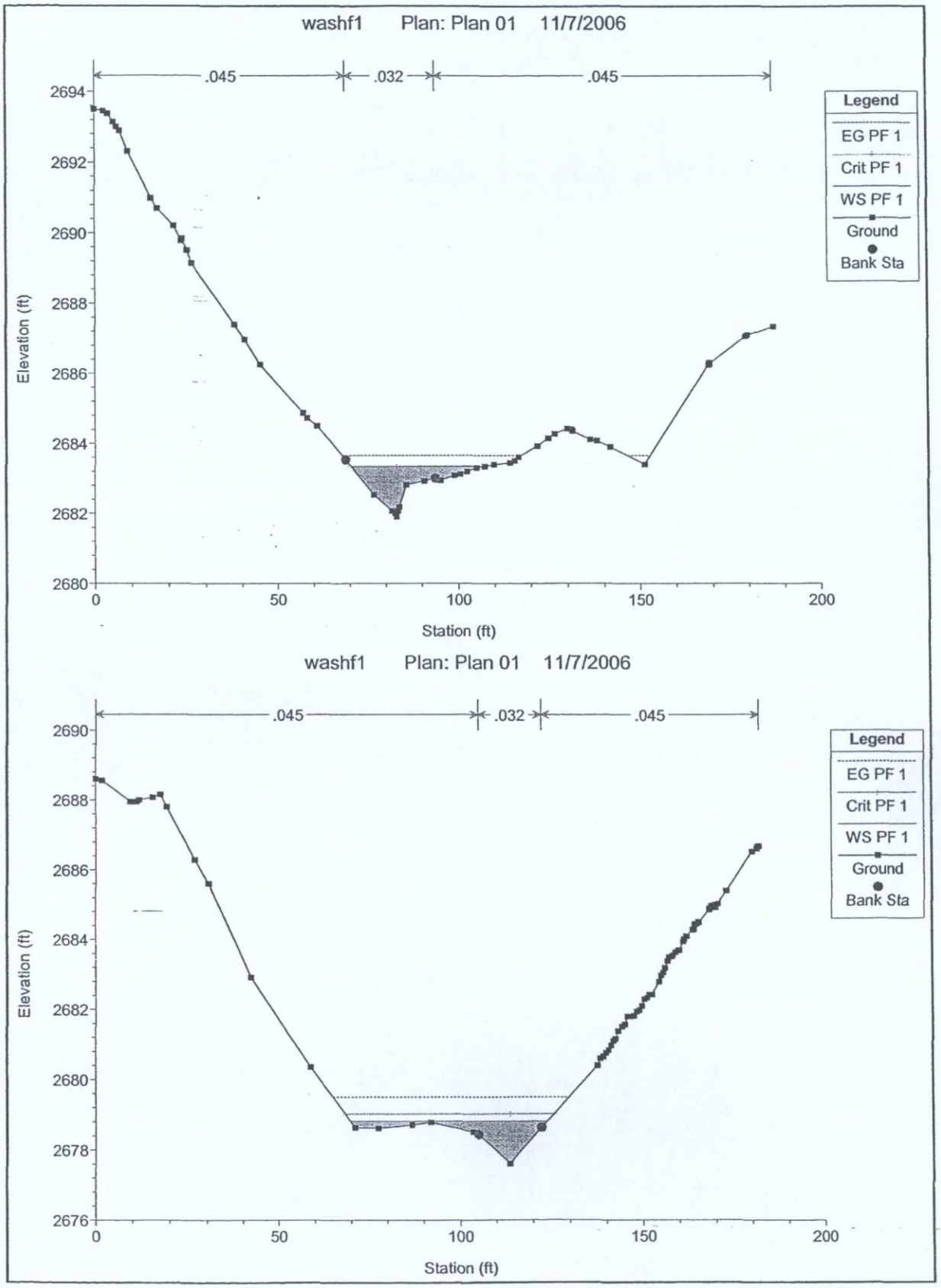
200
Station (ft)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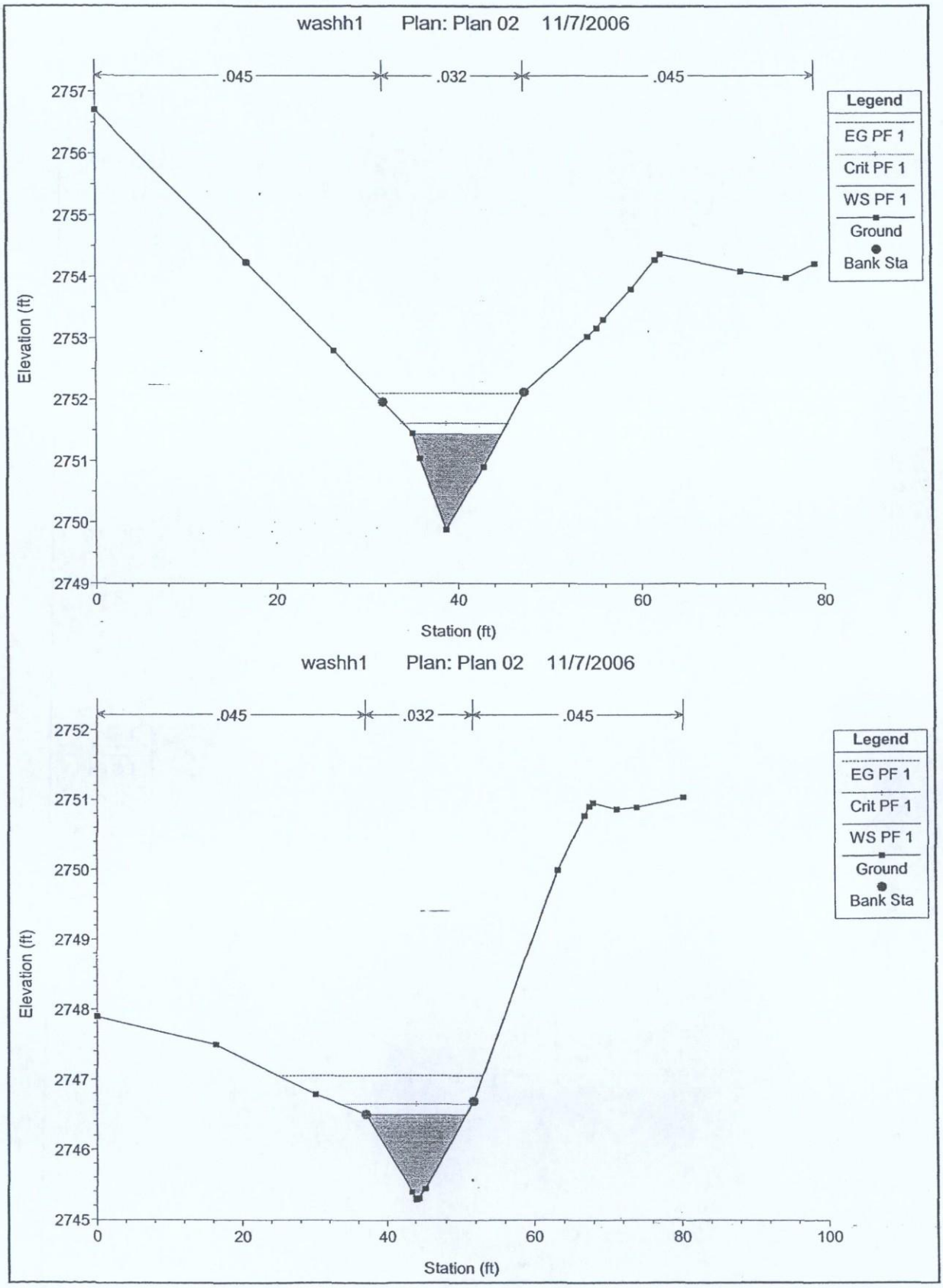
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washf1 Plan: Plan 01 11/7/2006
.045
.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

WASH HI

HEC-RAS Plan: Plan 02 River: RIVER-1 Reach: Reach-1 Profile: PF 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	6	PF 1	50.00	2749.88	2751.43	2751.61	2752.10	0.028975	6.55	7.63	9.59	1.29
Reach-1	5	PF 1	50.00	2745.29	2746.49	2746.65	2747.06	0.033087	6.02	8.30	13.57	1.36
Reach-1	4.5	PF 1	50.00	2741.00	2741.71	2741.89	2742.19	0.040197	5.61	9.42	27.11	1.44
Reach-1	4	PF 1	110.00	2737.70	2739.10	2739.19	2739.51	0.028653	5.14	21.65	43.74	1.24
Reach-1	3	PF 1	110.00	2732.24	2733.50	2733.77	2734.27	0.032757	7.19	17.98	48.55	1.42
Reach-1	2	PF 1	152.00	2725.11	2726.80	2726.97	2727.47	0.035951	6.57	23.25	37.04	1.44
Reach-1	1.5	PF 1	152.00	2723.00	2724.16	2724.25	2724.68	0.017807	5.94	28.69	41.89	1.08
Reach-1	1	PF 1	152.00	2720.27	2721.00	2720.98	2721.22	0.028998	4.37	40.92	87.59	1.20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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washh1 Plan: Plan 02 11/7/2006
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Crit PF 1
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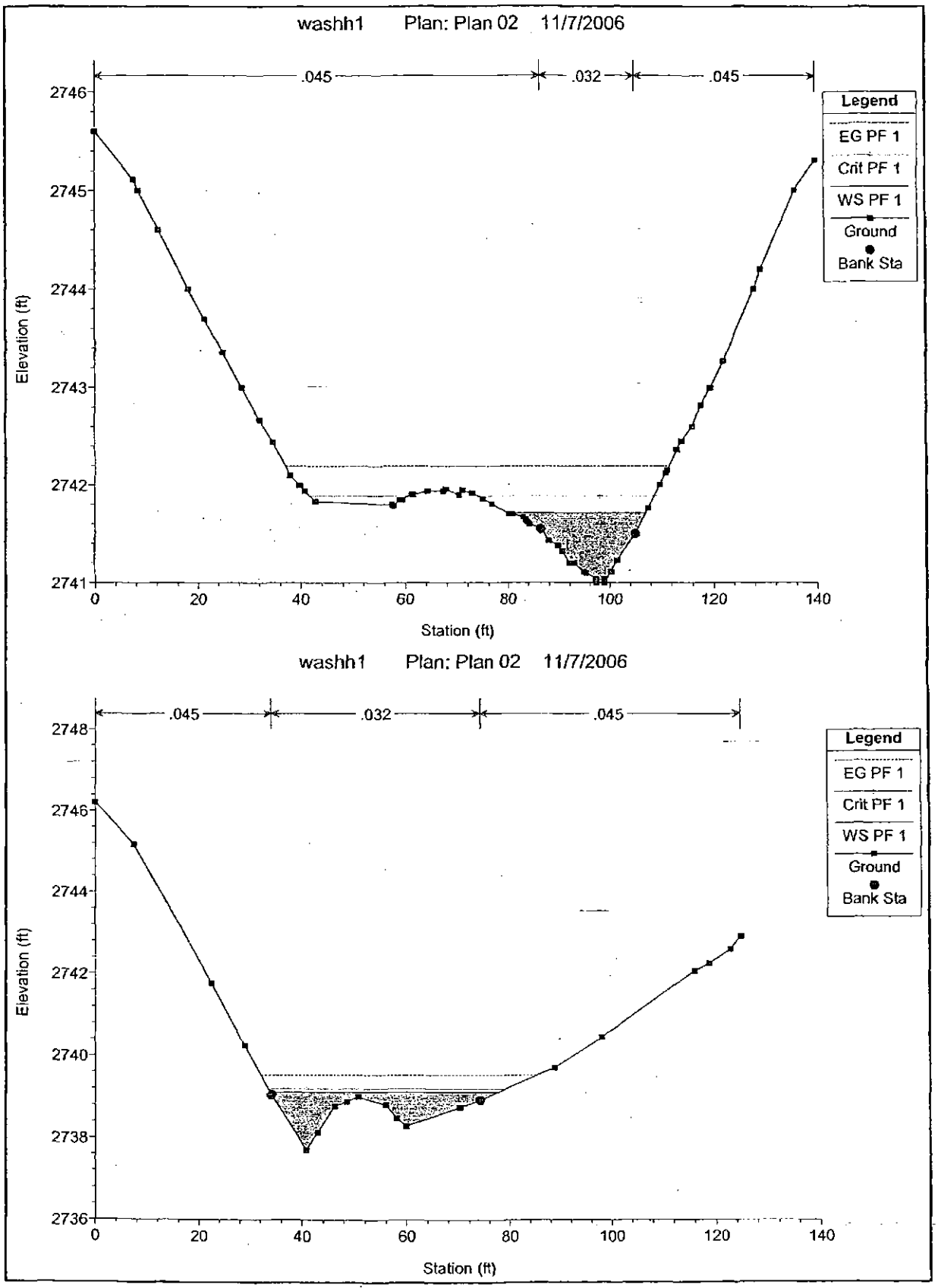
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2745
2744
2743
2742
2741
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60
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100
120
140
washh1 Plan: Plan 02 11/7/2006
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.032
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2746
2744
2742
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2738
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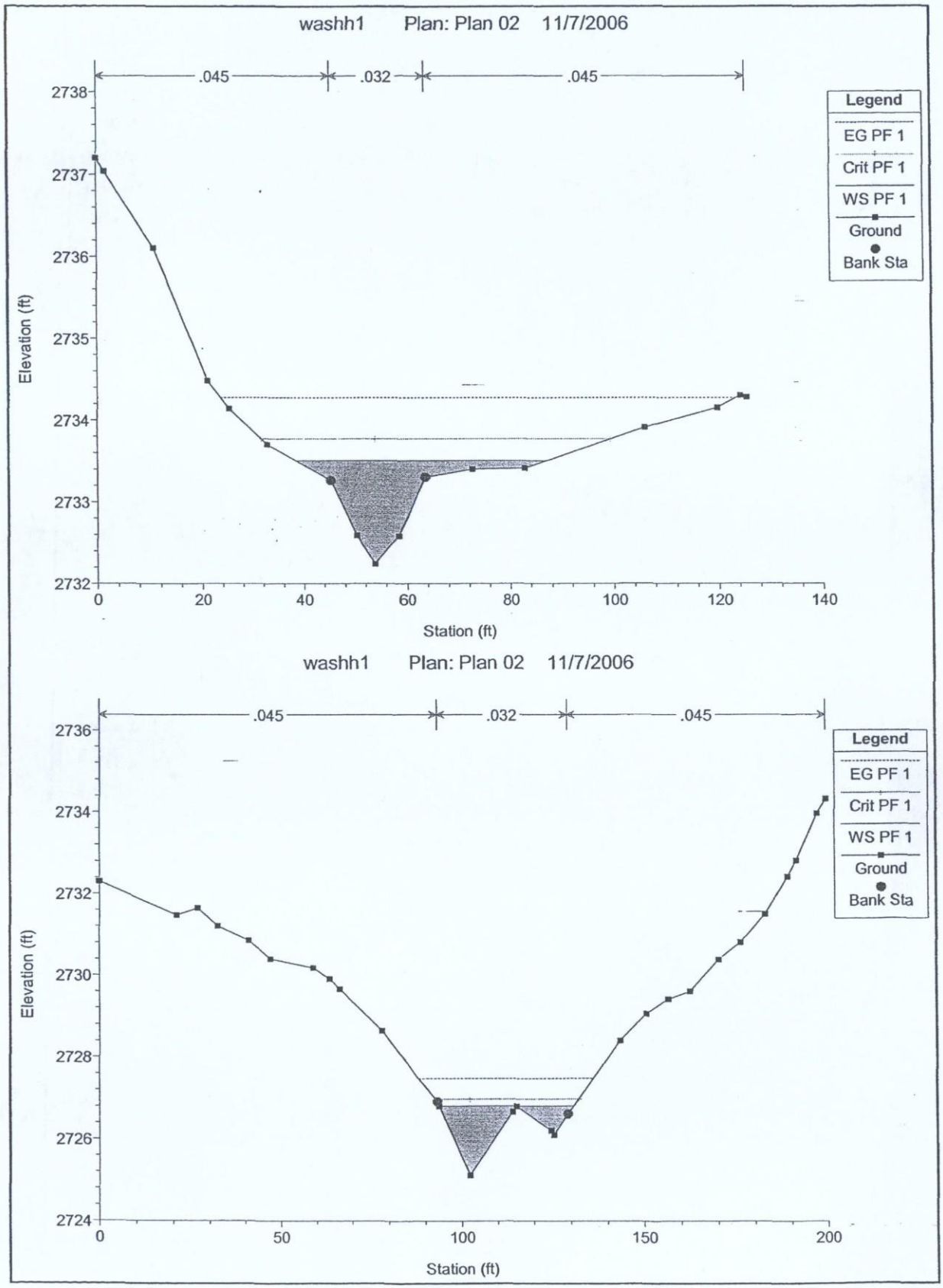
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
washh1 Plan: Plan 02 11/7/2006
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Crit PF 1
WS PF 1
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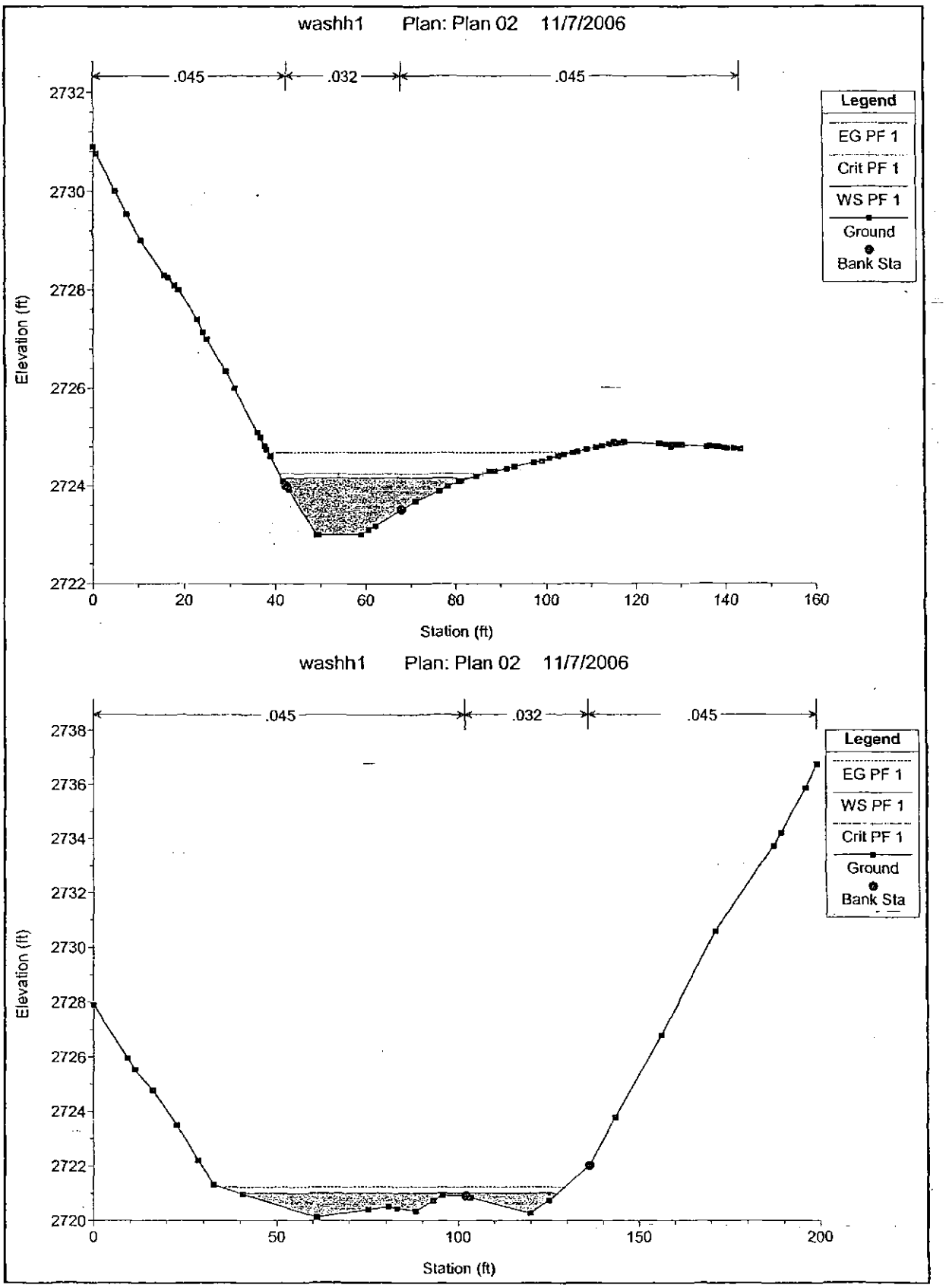
Bank Sta
Elevation (ft)
Station (ft)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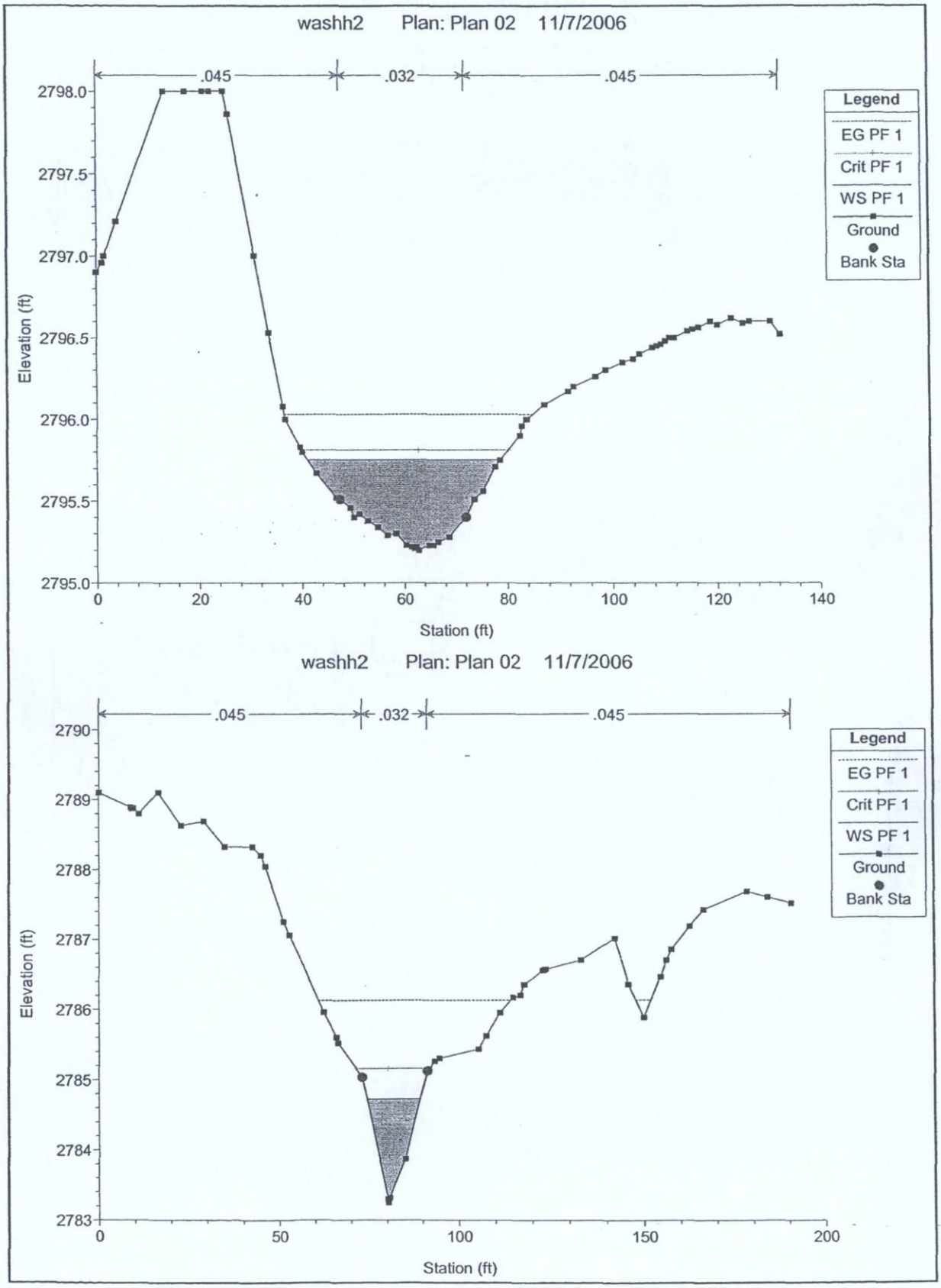
Station (ft)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2795.0
Elevation (ft)
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80
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120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
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2789
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2787
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Elevation (ft)
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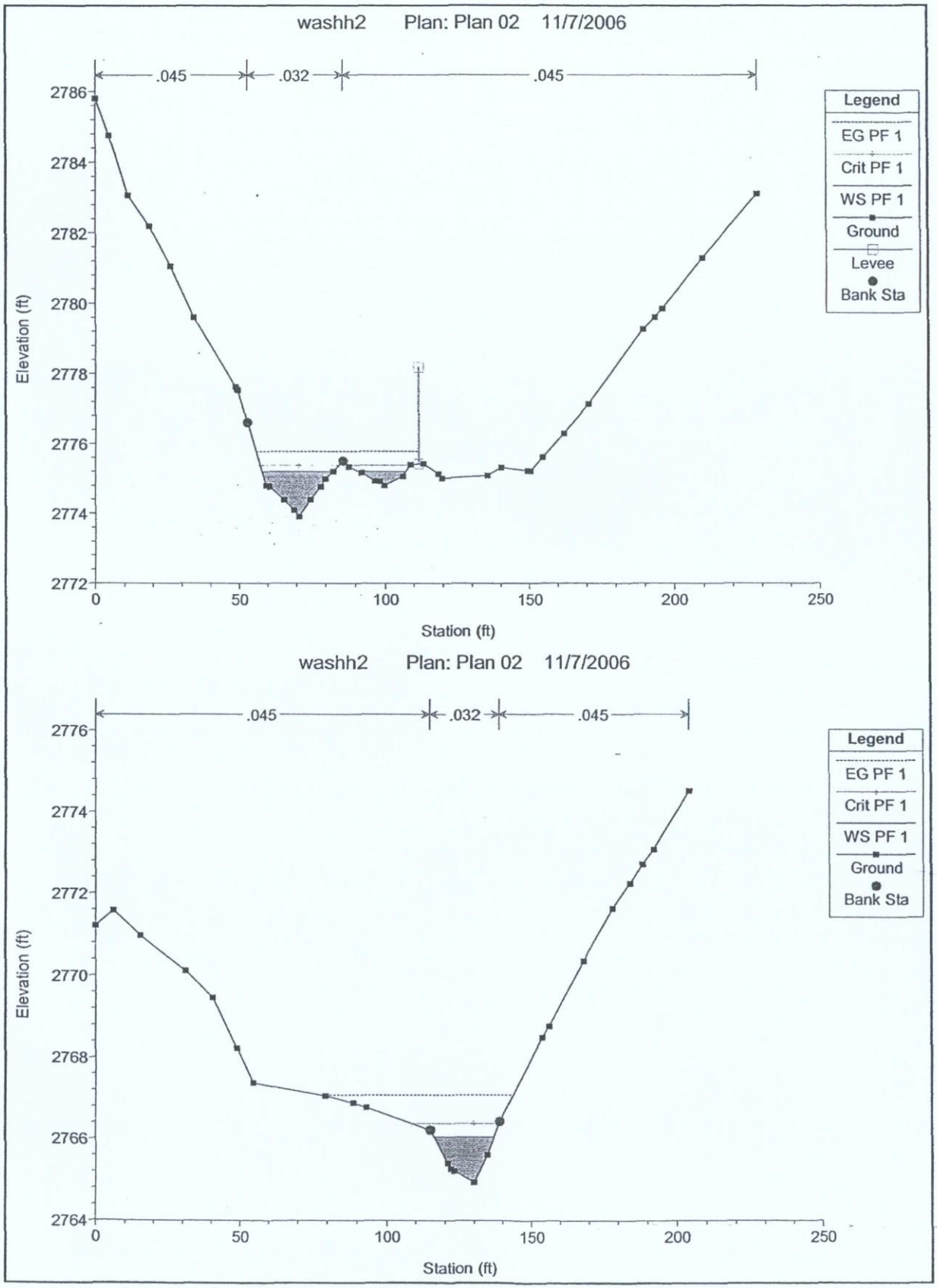
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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Levee
Bank Sta
Elevation (ft)
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2774
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Station (ft)
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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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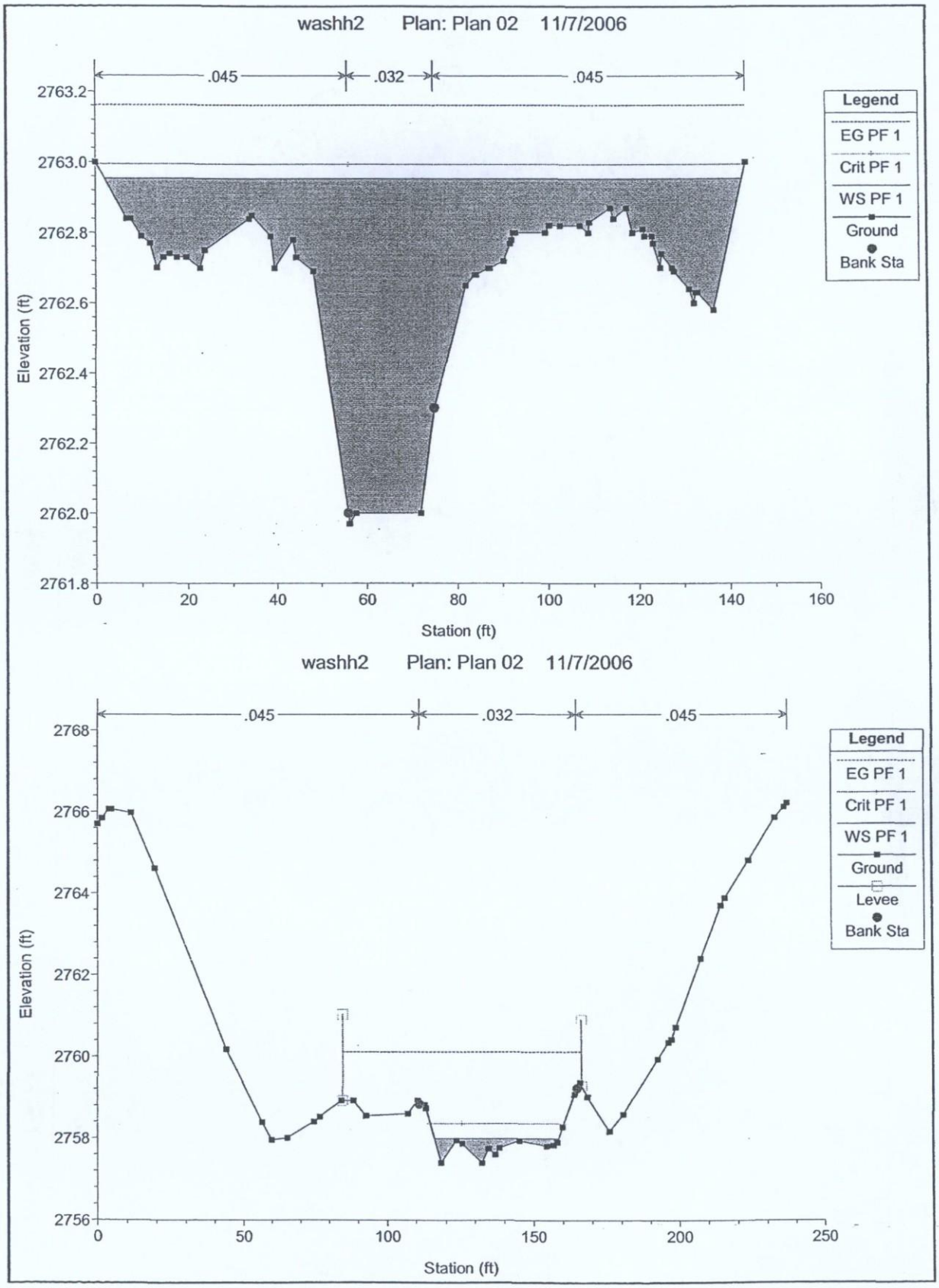
Station (ft)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Station (ft)
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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
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2756
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Station (ft)
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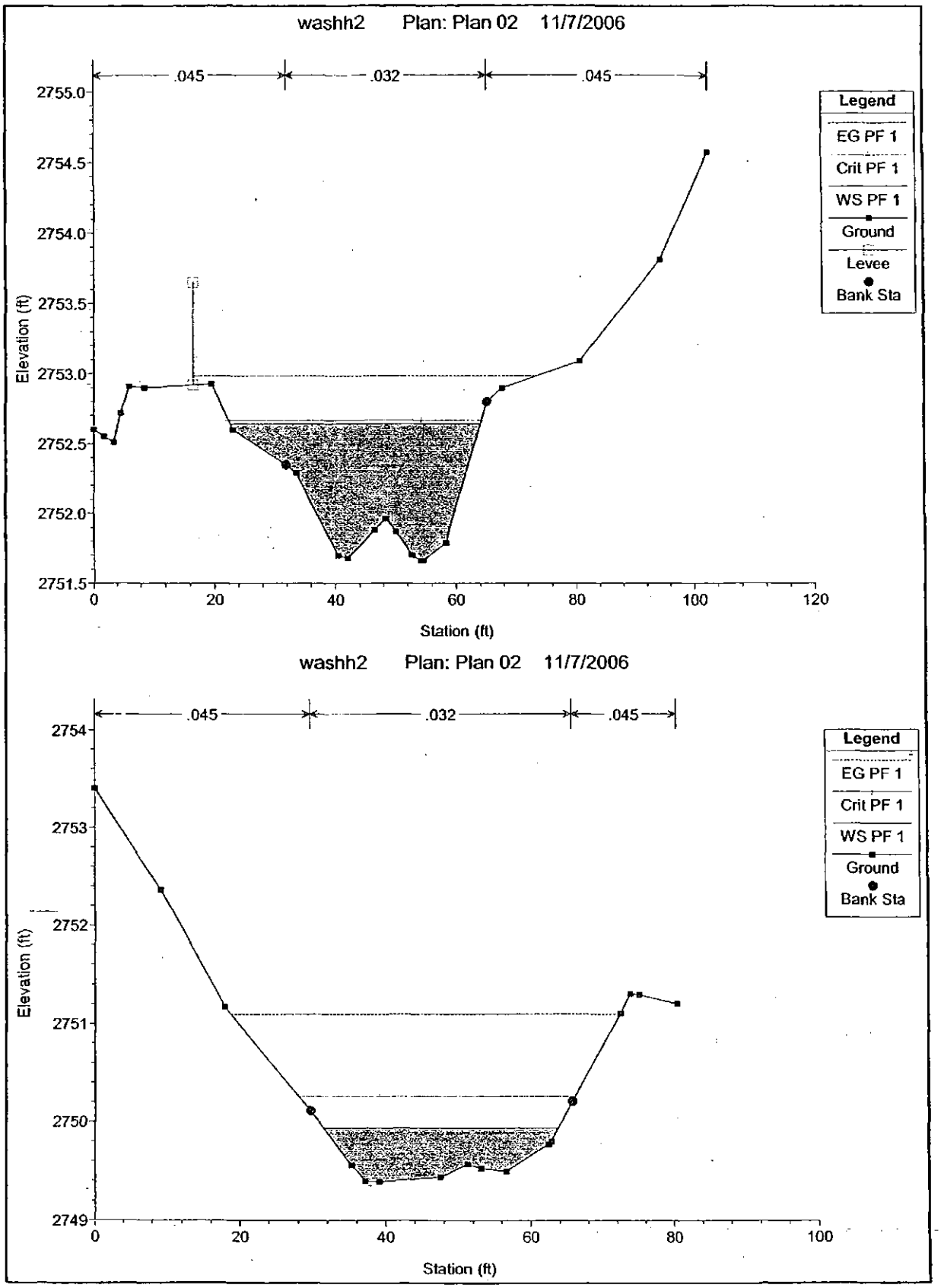
Ground
Levee
Bank Sta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Station (ft)
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WS PF 1
Ground
Levee
Bank Sta
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Station (ft)
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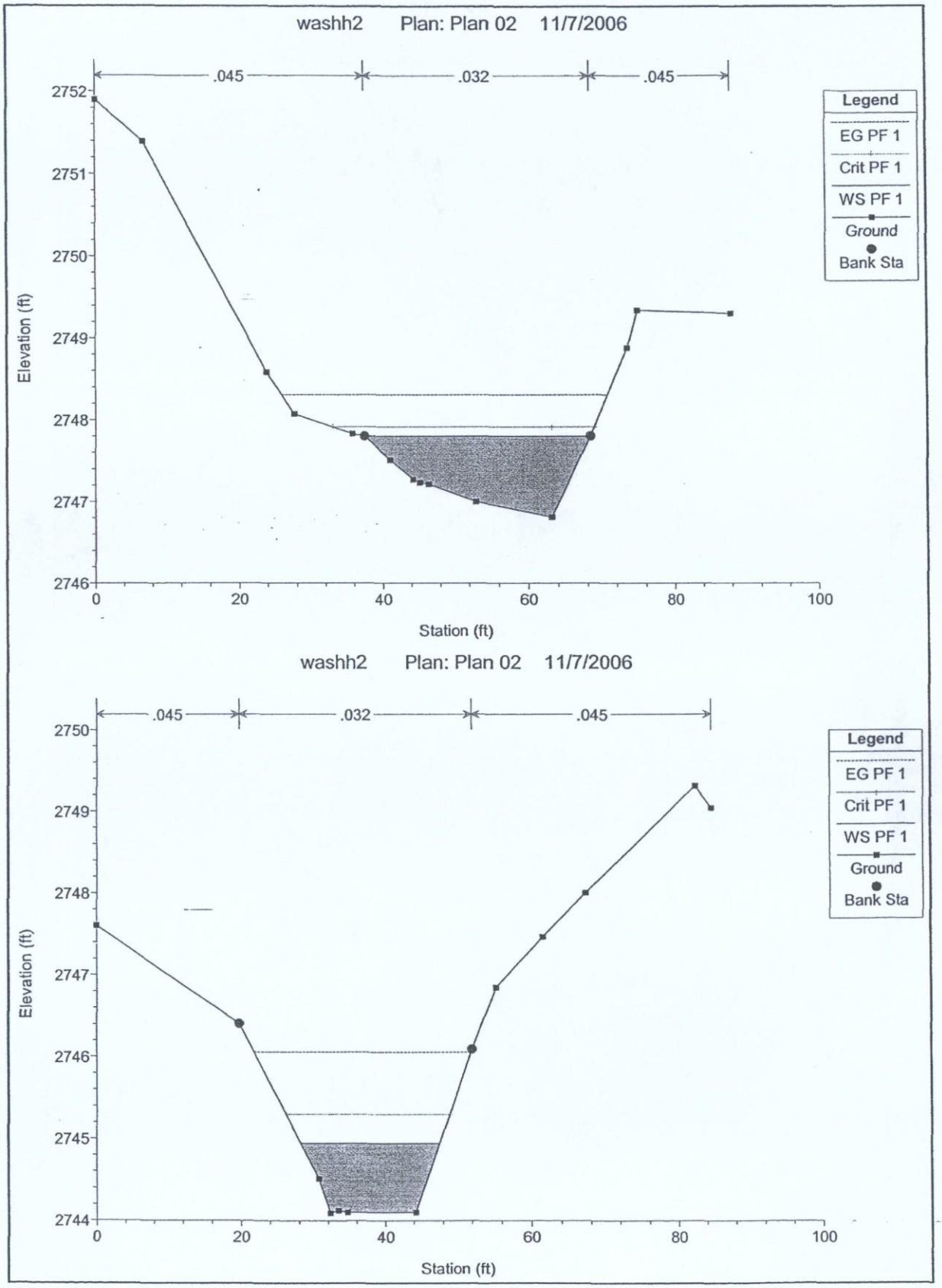
WS PF 1
Ground
Bank Sta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Station (ft)
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
washh2 Plan: Plan 02 11/7/2006
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Station (ft)
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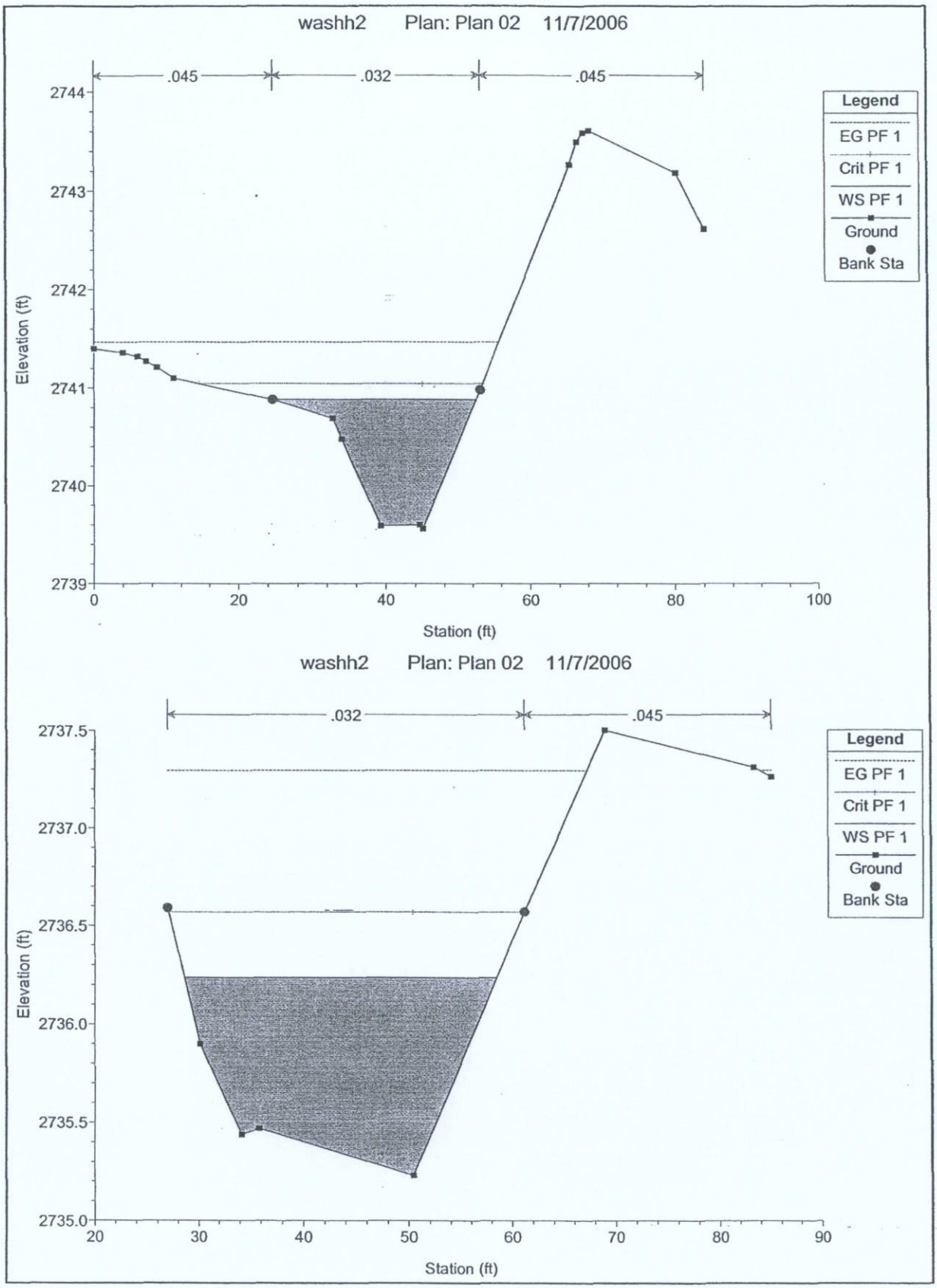
Crit PF 1
WS PF 1
Ground
Bank Sta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Crit PF 1
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Bank Sta
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Station (ft)
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2739
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60
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100
washh2 Plan: Plan 02 11/7/2006
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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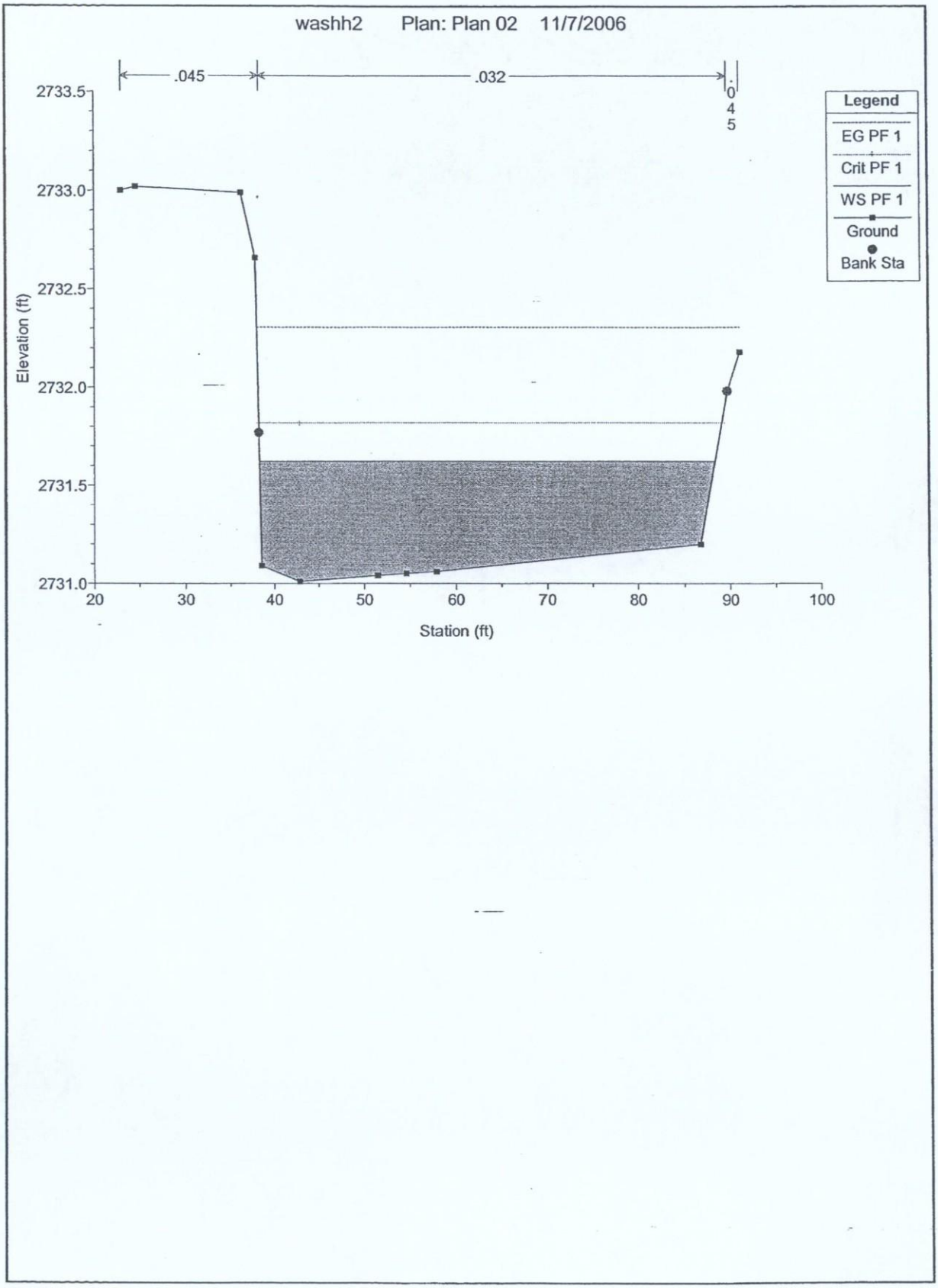
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Ground
Bank Sta
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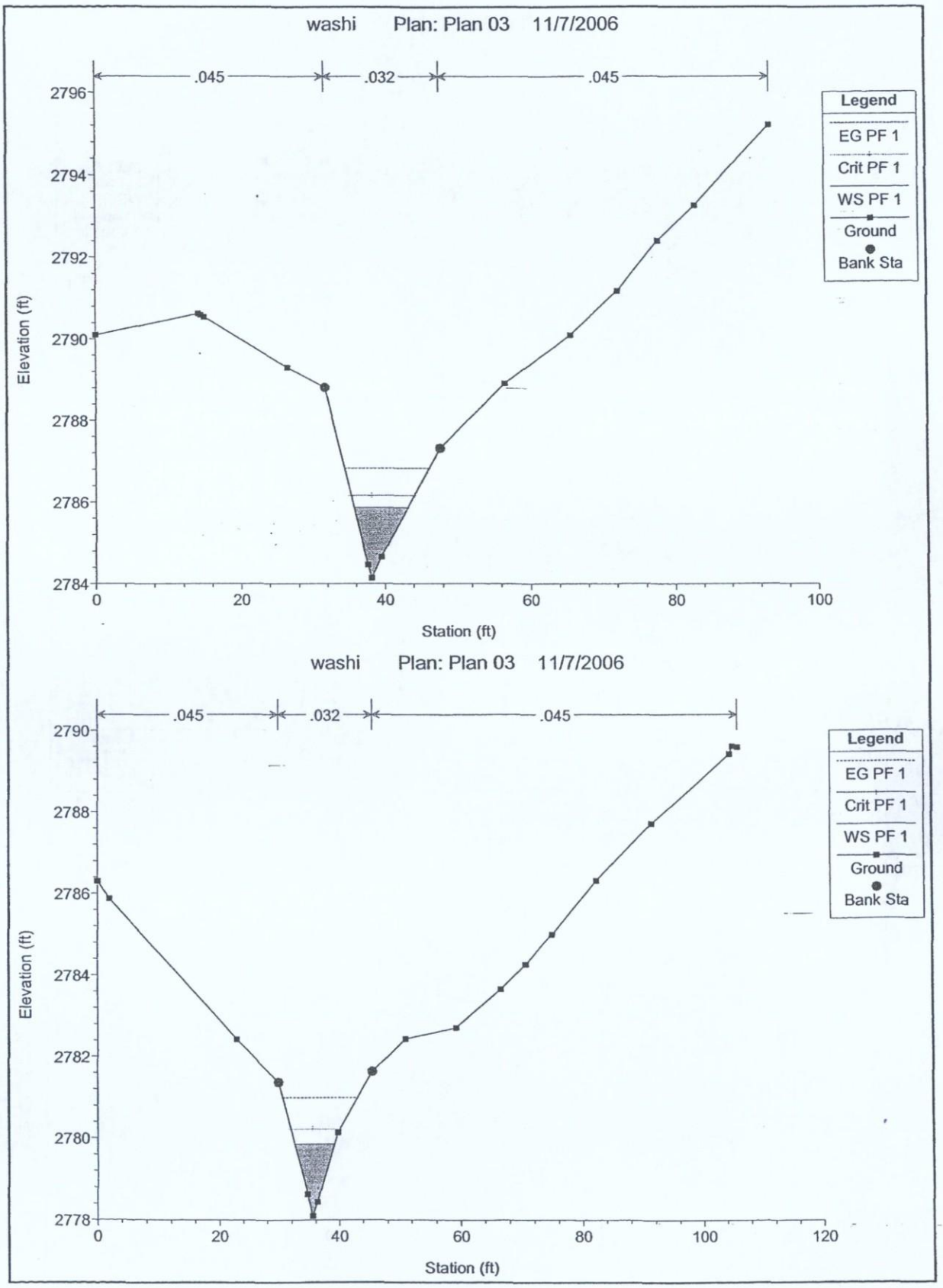
2731.0
20
30
40
50
60
70
80
90
100
Station (ft)

WASH I

HEC-RAS Plan: Plan 03 River: RIVER-1 Reach: Reach-1 Profile: PF 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	7	PF 1	50.00	2784.14	2785.86	2786.15	2786.82	0.041077	7.86	6.36	7.51	1.50
Reach-1	6	PF 1	50.00	2778.10	2779.85	2780.22	2780.99	0.047685	8.57	5.84	6.64	1.61
Reach-1	5	PF 1	50.00	2772.66	2773.89	2774.14	2774.70	0.043982	7.22	6.92	10.54	1.57
Reach-1	4	PF 1	50.00	2768.37	2769.92	2770.18	2770.77	0.038173	7.42	6.74	8.58	1.47
Reach-1	3	PF 1	51.00	2764.31	2765.70	2766.03	2766.69	0.049526	7.97	6.40	9.02	1.67
Reach-1	2	PF 1	51.00	2760.53	2761.93	2762.26	2762.86	0.049033	7.75	6.58	9.66	1.65
Reach-1	1.5	PF 1	51.00	2757.88	2758.42	2758.54	2758.75	0.058439	4.61	11.07	42.05	1.58
Reach-1	1	PF 1	73.00	2754.90	2755.88	2755.98	2756.24	0.034060	4.84	15.07	35.24	1.30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Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washi Plan: Plan 03 11/7/2006
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Station (ft)
Legend
EG PF 1
Crit PF 1
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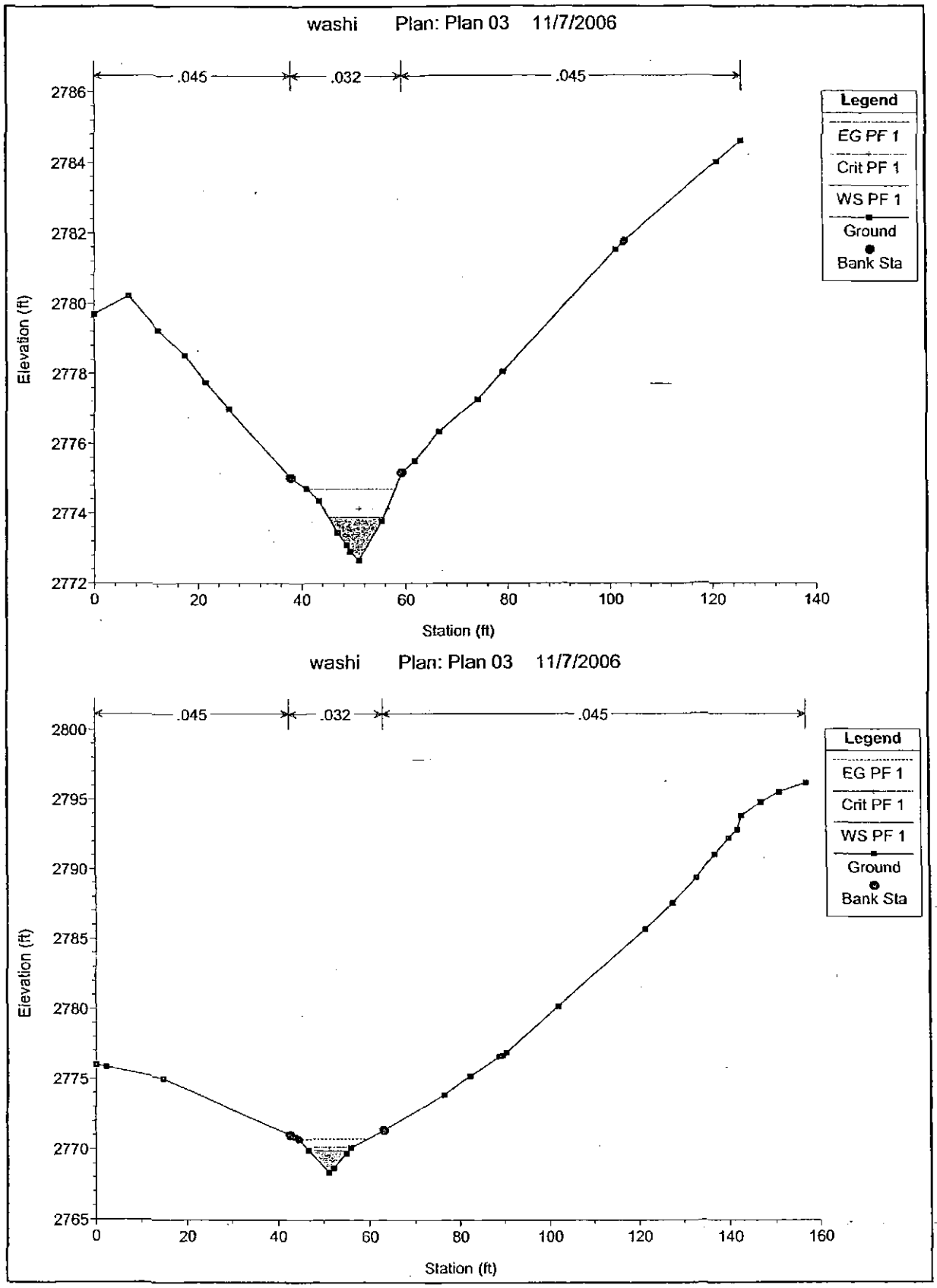
Bank Sta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Bank Sta
Elevation (ft)
Station (ft)
washi Plan: Plan 03 11/7/2006
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Crit PF 1
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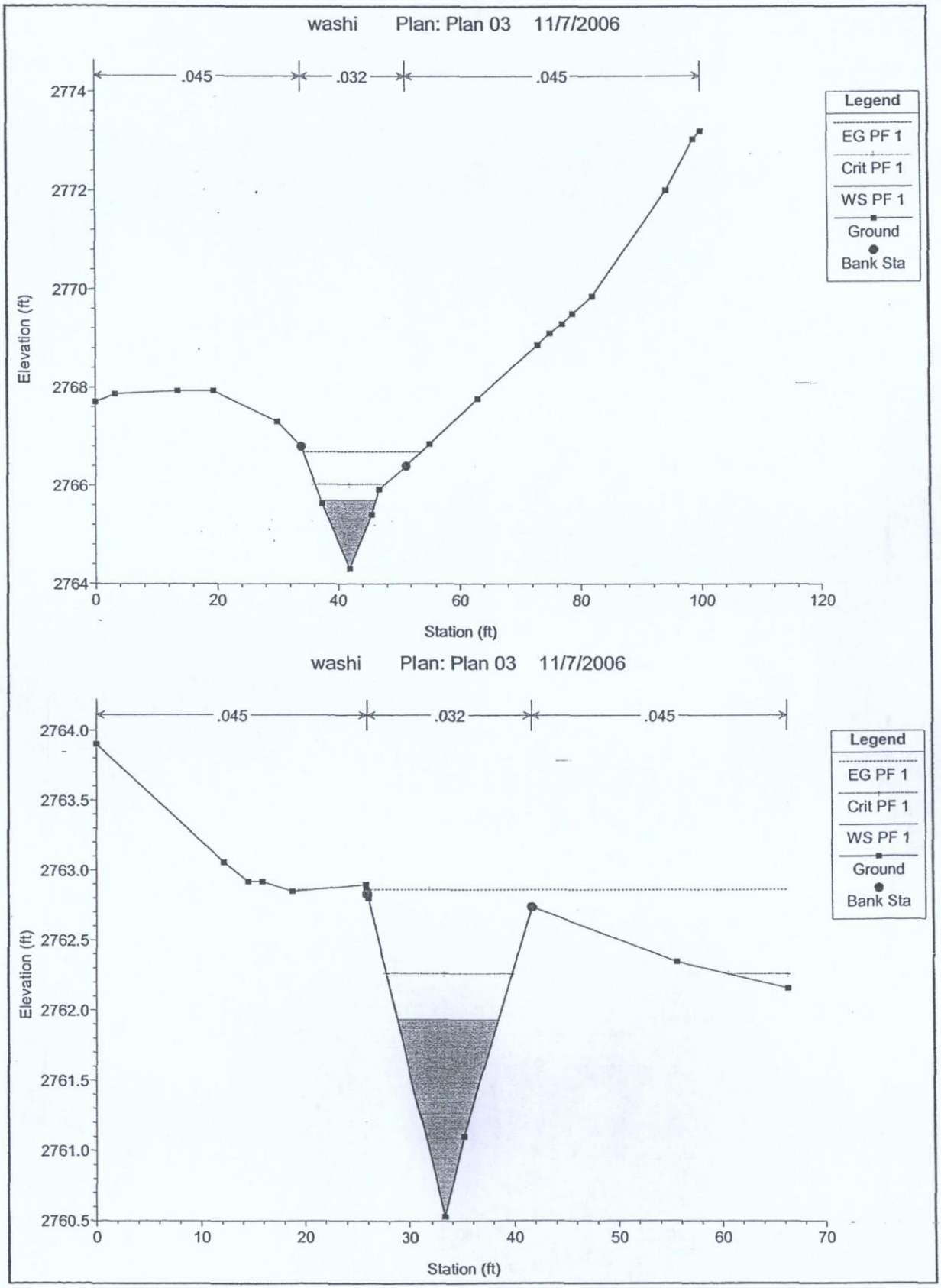
Bank Sta
Elevation (ft)
Station (ft)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Station (ft)
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
washi Plan: Plan 03 11/7/2006
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Elevation (ft)
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60
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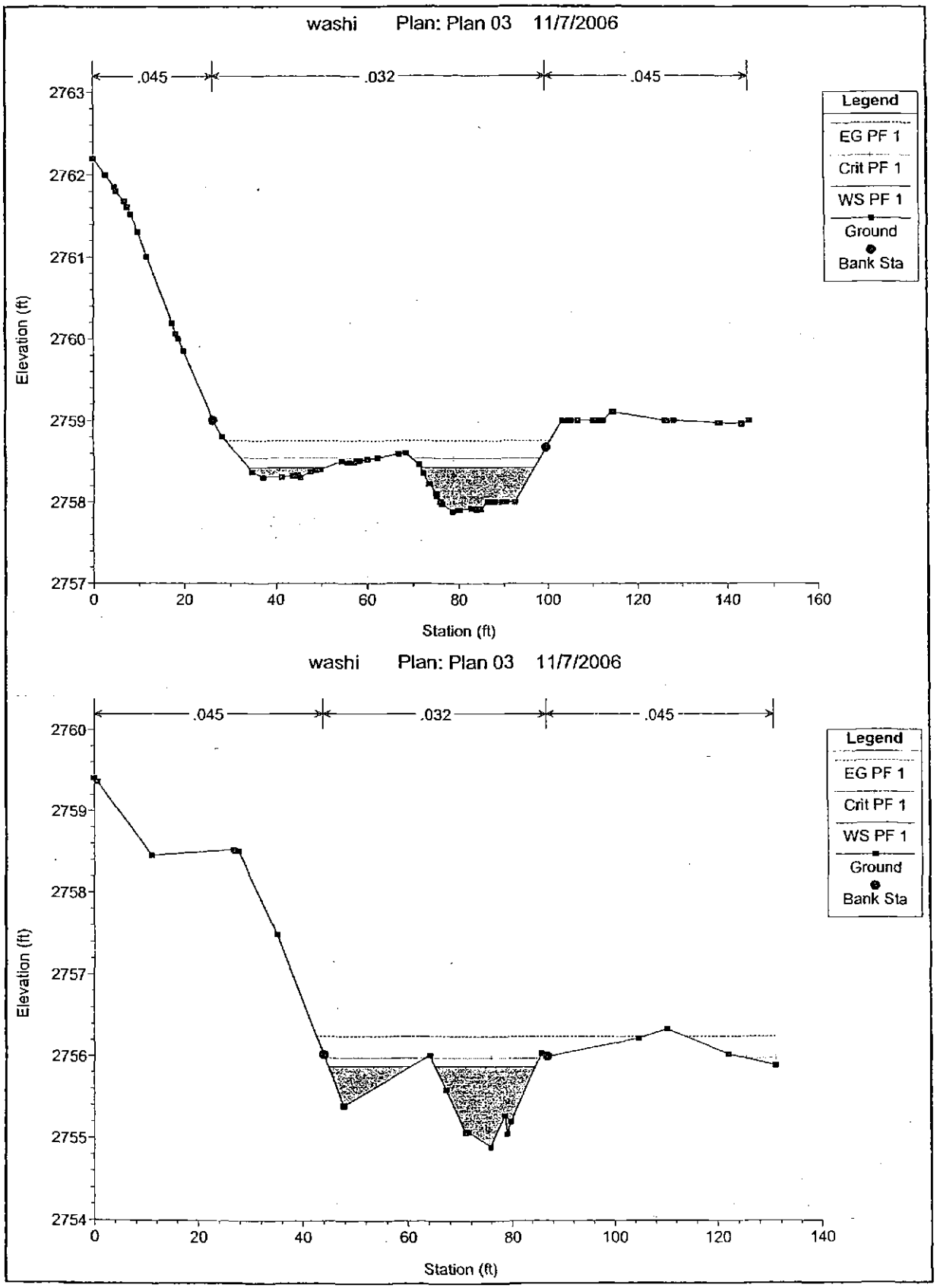
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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100
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140
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Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
washi Plan: Plan 03 11/7/2006
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2759
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2754
Elevation (ft)
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100
120
140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

Orifice Plate Calculation

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: *Sereno Canyon* **W/P#:** *042054*
Location: *City of Scottsdale* **Date:** *11/15/2006*
Reference: *Orifice Equation*

$$Q = CA\sqrt{2gh}$$

Where:

C = Orifice Coefficient =	0.60	
d = Diamter of Orfice =	6.00	in
A = Cross-sectional area of orifice =	0.20	Sq.ft
H = Depth above Orifice =	1.50	ft
Q = Orifice Flow =	1.16	cfs
Time to Drain 2 ac-ft =	20.9	hours

A 6 inch diameter orifice plate will bleed at a rate of 1.16 cfs.

APPENDIX G

Storm Water Storage Volume Calculations

Summary of 100-yr, 2-hr Storm Water Storage Calculations

Drainage Basin	Total Development Area (Acre)	100yr-2 hr. Required Volume (acre-ft)	Provided Volume (acre-ft)	Volume Excess / Shortage ± (acre-ft)
A1	3.79	0.53	0.60	0.07
A2	7.17	1.01	1.01	0.00
B	10.94	1.54	1.78	0.24
C	3.65	0.51	0.57	0.06
D	7.73	1.09	1.25	0.16
E1	14.24	2.01	2.01	0.00
E2	13.23	1.87	2.02	0.15
E3	2.19	0.32	0.58	0.26
F1	10.24	1.44	1.99	0.55
F2	3.56	0.5	0.51	0.01
F3	2.93	0.41	0.40	-0.01
G	3.7	0.52	0.51	-0.01
H1	12.94	1.82	1.98	0.16
H2	8.5	1.2	1.31	0.11
I	4.44	0.63	0.64	0.01
J	4.81	0.68	0.66	-0.02
K	2.06	0.29	0.38	0.09
L	1.49	0.21	0.20	-0.01
M	1.44	0.2	0.21	0.01
N	2.81	0.4	0.49	0.09
O	0.55	0.08	0.22	0.14
P	1.73	0.24	0.37	0.13
Q	0.52	0.07	0.07	0.00
R	0.18	0.02	0.00	-0.02
Total	125	17.59	19.76	2.17

Project: *Sereno Canyon*
Location: *City of Scottsdale*
Date: *15-Nov-06*

Project Number: *062654*
Project Engineer: *Geoff Brownell, P.E.*

100-yr, 2-hr Storm Water Storage Calculations

BASIN A1-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2756	4193.3	0.096	0.000	0.000
2757	5251	0.121	0.108	0.108
2758	6404	0.147	0.134	0.242
2759	7655	0.176	0.161	0.404
2760	9474.23	0.217	0.197	0.600
2762	11468.06	0.263	0.481	1.081

TOTAL PROVIDED VOLUME: **0.600**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. Provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
A1	A1-1	0.1757	0.600		
	TOTAL	0.1757	0.600	0.53	0.070

BASIN A2-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2760	492	0.011	0.000	0.000
2761	1062	0.024	0.018	0.018
2762	1981	0.045	0.035	0.053
2763	3373	0.077	0.061	0.114
2764	4971	0.114	0.096	0.210
2765	7030	0.161	0.138	0.348

TOTAL PROVIDED VOLUME: **0.348**

BASIN A2-2

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2759	200	0.005	0.000	0.000
2760	446	0.010	0.007	0.007
2761	816	0.019	0.014	0.022
2762	1277	0.029	0.024	0.046
2763	1932	0.044	0.037	0.083
2764	2937	0.067	0.056	0.139

TOTAL PROVIDED VOLUME: **0.139**

BASIN A2-3

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2733	2268	0.052	0.000	0.000
2734	2913	0.067	0.059	0.059
2735	3632	0.083	0.075	0.135
2736	4466	0.103	0.093	0.228
2737	5369	0.123	0.113	0.340
2738	6297	0.145	0.134	0.474

TOTAL PROVIDED VOLUME: **0.474**

BASIN A2-4

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2792	168	0.004	0.000	0.000
2793	425	0.010	0.007	0.007
2794	866	0.020	0.015	0.022
2795	1638	0.038	0.029	0.050

TOTAL PROVIDED VOLUME: **0.050**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. Provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
A2	A2-1	0.1614	0.348		
	A2-2	0.0674	0.139		
	A2-3	0.1446	0.474		
	A2-4	0.0376	0.050		
	TOTAL	0.4110	1.011	1.01	0.00

BASIN B-1

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2798	809	0.019	0.000	0.000
2799	1241	0.028	0.024	0.024
2800	1804	0.041	0.035	0.058
2801	2456	0.056	0.049	0.107

TOTAL PROVIDED VOLUME: **0.107**

BASIN B-2

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2798	2378	0.055	0.000	0.000
2799	3095	0.071	0.063	0.063
2800	3952	0.091	0.081	0.144
2801	4986	0.114	0.103	0.246

TOTAL PROVIDED VOLUME: **0.246**

BASIN B-3

STAGE	AREA [ft²]	AREA [acres]	VOLUME INC [acre-feet]	VOLUME CUM [acre-feet]
2781	3419	0.078	0.000	0.000
2782	4333	0.099	0.089	0.089
2783	5371	0.123	0.111	0.200

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
B	B-1	0.0564	0.107		
	B-2	0.1145	0.246		
	B-3	0.1523	0.338		
	B-4	0.1144	0.241		
	B-5	0.2549	0.843		
	TOTAL	0.6924	1.776	1.54	0.236

2784	6633	0.152	0.138	0.338
2785	7269	0.167	0.160	0.498

TOTAL PROVIDED VOLUME: **0.338**

BASIN - B-4

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2768	2154	0.049	0.000	0.000
2769	2990	0.069	0.059	0.059
2770	3950	0.091	0.080	0.139
2771	4983	0.114	0.103	0.241

TOTAL PROVIDED VOLUME: **0.241**

BASIN - B-5

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2742	5494	0.126	0.000	0.000
2743	7220	0.166	0.146	0.146
2744	9089.9	0.209	0.187	0.333
2745	11105	0.255	0.232	0.565
2746	13101	0.301	0.278	0.843

TOTAL PROVIDED VOLUME: **0.843**

BASIN - C-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2779	4198	0.096	0.000	0.000
2780	5112	0.117	0.107	0.107
2781	6102	0.140	0.129	0.236
2782	7169	0.165	0.152	0.388
2783	8375	0.192	0.178	0.566

TOTAL PROVIDED VOLUME: **0.566**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
C	C-1	0.1923	0.566		
	TOTAL	0.1923	0.566	0.51	0.056

BASIN - D-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2749	2054	0.047	0.000	0.000
2750	2819	0.065	0.056	0.056
2751	3699	0.085	0.075	0.131
2752	4712	0.108	0.097	0.227
2753	5928	0.136	0.122	0.349

TOTAL PROVIDED VOLUME: **0.349**

BASIN - D-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2719	732.75	0.017	0.000	0.000
2720	2673.44	0.061	0.039	0.039
2721	5208.95	0.120	0.090	0.130
2722	8803	0.202	0.161	0.290
2723	13007	0.299	0.250	0.541
2724	18123.75	0.416	0.357	0.898

TOTAL PROVIDED VOLUME: **0.898**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
D	D-1	0.1361	0.349		
	D-2	0.2021	0.898		
	TOTAL	0.3382	1.248	1.09	0.158

BASIN - E1-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2723	5198	0.119	0.000	0.000
2724	6100	0.140	0.130	0.130
2725	7068	0.162	0.151	0.281
2726	8098	0.186	0.174	0.455
2727	9189	0.211	0.198	0.653
2728	10351	0.238	0.224	0.878

TOTAL PROVIDED VOLUME: **0.878**

BASIN - E1-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2695	5427	0.125	0.000	0.000
2696	7366	0.169	0.147	0.147
2697	8975	0.206	0.188	0.334
2698	10686	0.245	0.226	0.560
2699	12497	0.287	0.266	0.826
2700	14406	0.331	0.309	1.135

TOTAL PROVIDED VOLUME: **1.135**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E1	E1-1	0.1859	0.878		
	E1-2	0.3307	1.135		
	TOTAL	0.5166	2.013	2.010	0.003

BASIN - E2-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2693	13886	0.319	0.000	0.000

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E2	E2-1	0.4963	2.020	1.87	

2694	15293	0.351	0.335	0.335
2695	16761	0.385	0.368	0.703
2696	18290	0.420	0.402	1.105
2697	19880	0.456	0.438	1.543
2698	21620	0.496	0.476	2.020

TOTAL PROVIDED VOLUME: **2.020**

TOTAL	0.4963	2.020	1.870	0.150	

BASIN E3-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2711	3064	0.070	0.000	0.000
2712	4065	0.093	0.082	0.082
2713	5197	0.119	0.106	0.188
2714	6456	0.148	0.134	0.322

TOTAL PROVIDED VOLUME: **0.322**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
E3	E3-1	0.1482	0.322		
	E3-2	0.1557	0.257		
	TOTAL	0.3039	0.579	0.32	0.259

BASIN E3-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2683	65.87	0.002	0.000	0.000
2684	317.95	0.007	0.004	0.004
2685	1008.73	0.023	0.015	0.020
2686	2251.36	0.052	0.037	0.057
2687	4199.64	0.096	0.074	0.131
2688	6780.55	0.156	0.126	0.257

TOTAL PROVIDED VOLUME: **0.257**

BASIN F1-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2725	5323.24	0.122	0.000	0.000
2726	5822.09	0.134	0.128	0.128
2727	6327.79	0.145	0.139	0.267
2728	6840.34	0.157	0.151	0.419

TOTAL PROVIDED VOLUME: **0.419**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F1	F1-1	0.1570	0.419		
	F1-2	0.2161	0.537		
	F1-3	0.2707	0.701		
	F1-4	0.1630	0.338		
	TOTAL	0.8067	1.995	1.44	0.555

BASIN F1-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2708	6246.38	0.143	0.000	0.000
2709	7252.9	0.167	0.155	0.155
2710	8307.83	0.191	0.179	0.334
2711	9411.15	0.216	0.203	0.537

TOTAL PROVIDED VOLUME: **0.537**

BASIN F1-3

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2696	8712.31	0.200	0.000	0.000
2697	9621.58	0.221	0.210	0.210
2698	10649.01	0.244	0.233	0.443
2699	11791.2	0.271	0.258	0.701

TOTAL PROVIDED VOLUME: **0.701**

BASIN F1-4

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2676	3139.86	0.072	0.000	0.000
2677	4162.11	0.096	0.084	0.084
2678	5460.19	0.125	0.110	0.194
2679	7098.73	0.163	0.144	0.338

TOTAL PROVIDED VOLUME: **0.338**

BASIN F2-1

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2700	765	0.018	0.000	0.000
2701	1324	0.030	0.024	0.024
2702	1953.89	0.045	0.038	0.062
2703	2662.39	0.061	0.053	0.115

TOTAL PROVIDED VOLUME: **0.115**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F2	F2-1	0.0611	0.115		
	F2-2	0.1637	0.396		
	TOTAL	0.2248	0.511	0.5	0.011

BASIN F2-2

STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2681	4470.86	0.103	0.000	0.000
2682	5282.49	0.121	0.112	0.112
2683	6174.37	0.142	0.132	0.243
2684	7130.31	0.164	0.153	0.396

TOTAL PROVIDED VOLUME: **0.396**

BASIN F3-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2704	1240	0.028	0.000	0.000
2705	2048.96	0.047	0.038	0.038
2706	2915.75	0.067	0.057	0.095
2707	3851.96	0.088	0.078	0.172
2708	4957.71	0.114	0.101	0.274
2709	6277.08	0.144	0.129	0.403

TOTAL PROVIDED VOLUME: **0.403**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
F3	F3-1	0.0884	0.403		
	TOTAL	0.0884	0.403	0.41	-0.007

BASIN G-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2722	3720	0.085	0.000	0.000
2723	4513	0.104	0.095	0.095
2724	5460	0.125	0.114	0.209
2725	6561	0.151	0.138	0.347
2726	7817	0.179	0.165	0.512
2727	9484	0.218	0.199	0.711

TOTAL PROVIDED VOLUME: **0.512**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
G	G-1	0.0000	0.512		
	TOTAL	0.0000	0.512	0.520	-0.008

BASIN H1-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2738	36.36	0.001	0.000	0.000
2739	715.37	0.016	0.009	0.009
2740	2504.5	0.057	0.037	0.046
2741	5064.58	0.116	0.087	0.132
2742	8155.31	0.187	0.152	0.284
2743	11514.5	0.264	0.226	0.510
2744	15653.69	0.359	0.312	0.822
2745	20773.56	0.477	0.418	1.240
2745.5	24068.465	0.553	0.257	1.497
2746	27363.37	0.628	0.988	1.809

TOTAL PROVIDED VOLUME: **1.497**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
H1	H1-1	0.5525	1.497		
	H1-2	0.2491	0.484		
	TOTAL	0.8016	1.98	1.82	0.2

BASIN H1-2				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2721	49.02	0.001	0.000	0.000
2722	1008	0.023	0.012	0.012
2723	2630	0.060	0.042	0.054
2724	4585	0.108	0.084	0.138
2725	7311	0.168	0.138	0.276
2726	10849	0.249	0.208	0.484

TOTAL PROVIDED VOLUME: **0.484**

BASIN H2-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2772	6103	0.140	0.000	0.000
2773	6926	0.159	0.150	0.150
2774	7774	0.178	0.169	0.318
2775	8675	0.199	0.189	0.507
2776	9692	0.222	0.211	0.718

TOTAL PROVIDED VOLUME: **0.718**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
H2	H2-1	0.2225	0.718		
	H2-2	0.2463	0.590		
	TOTAL	0.4688	1.308	1.2	0.108

BASIN H2-2				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2785	6526	0.150	0.000	0.000
2786	7846	0.180	0.165	0.165
2787	9247	0.212	0.196	0.361
2788	10730	0.246	0.229	0.590

TOTAL PROVIDED VOLUME: **0.590**

BASIN I-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC [acre-feet]	CUM [acre-feet]
2755	7532	0.173	0.000	0.000
2756	8664	0.199	0.186	0.186
2757	9863	0.226	0.213	0.399
2758	11132	0.256	0.241	0.640

TOTAL PROVIDED VOLUME: **0.640**

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
I	I-1	0.2556	0.640		
	TOTAL	0.2556	0.640	0.63	0.010

BASIN J-1				
STAGE	AREA		VOLUME	
	[ft²]	[acres]	INC	CUM

VOLUME BREAKDOWN

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±

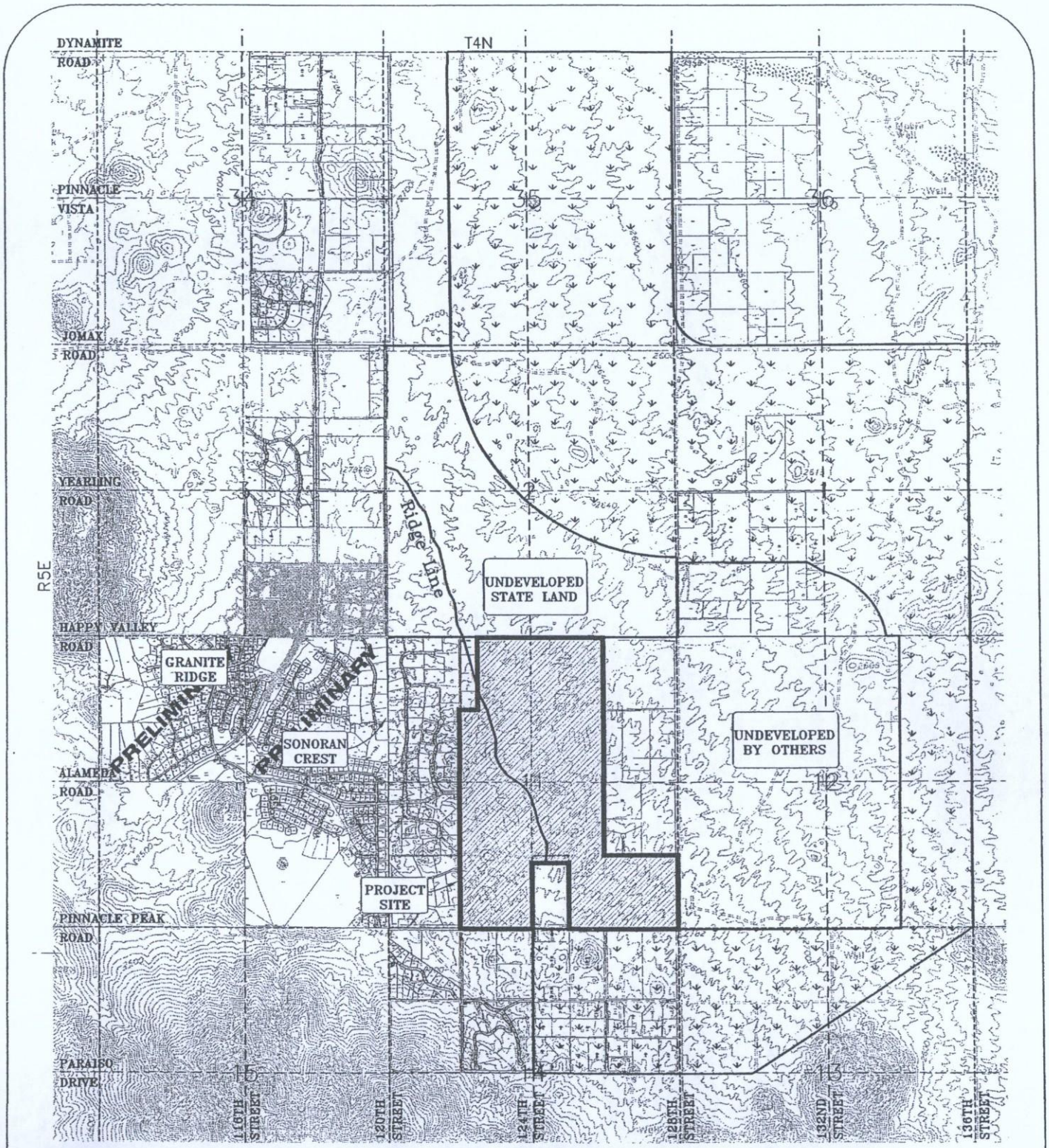
STAGE	AREA		VOLUME	
	[ft^2]	[acres]	INC [acre-feet]	CUM [acre-feet]
2774	2722	0.062	0.000	0.000
2775	3568	0.082	0.072	0.072

TOTAL PROVIDED VOLUME: **0.072**

Drainage Boundary	Sub-Basin Volumes	Disturbance Areas (acres)	100yr-2hr. provided ac-ft	100yr-2hr. Required ac-ft	Volume Shortage / Excess ±
Q	Q-1	0.0819	0.072		
	TOTAL	0.0819	0.072	0.07	0.002

PLATE 1

Vicinity Map



CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

SERENO CANYON

Plate 1
"Vicinity Map"

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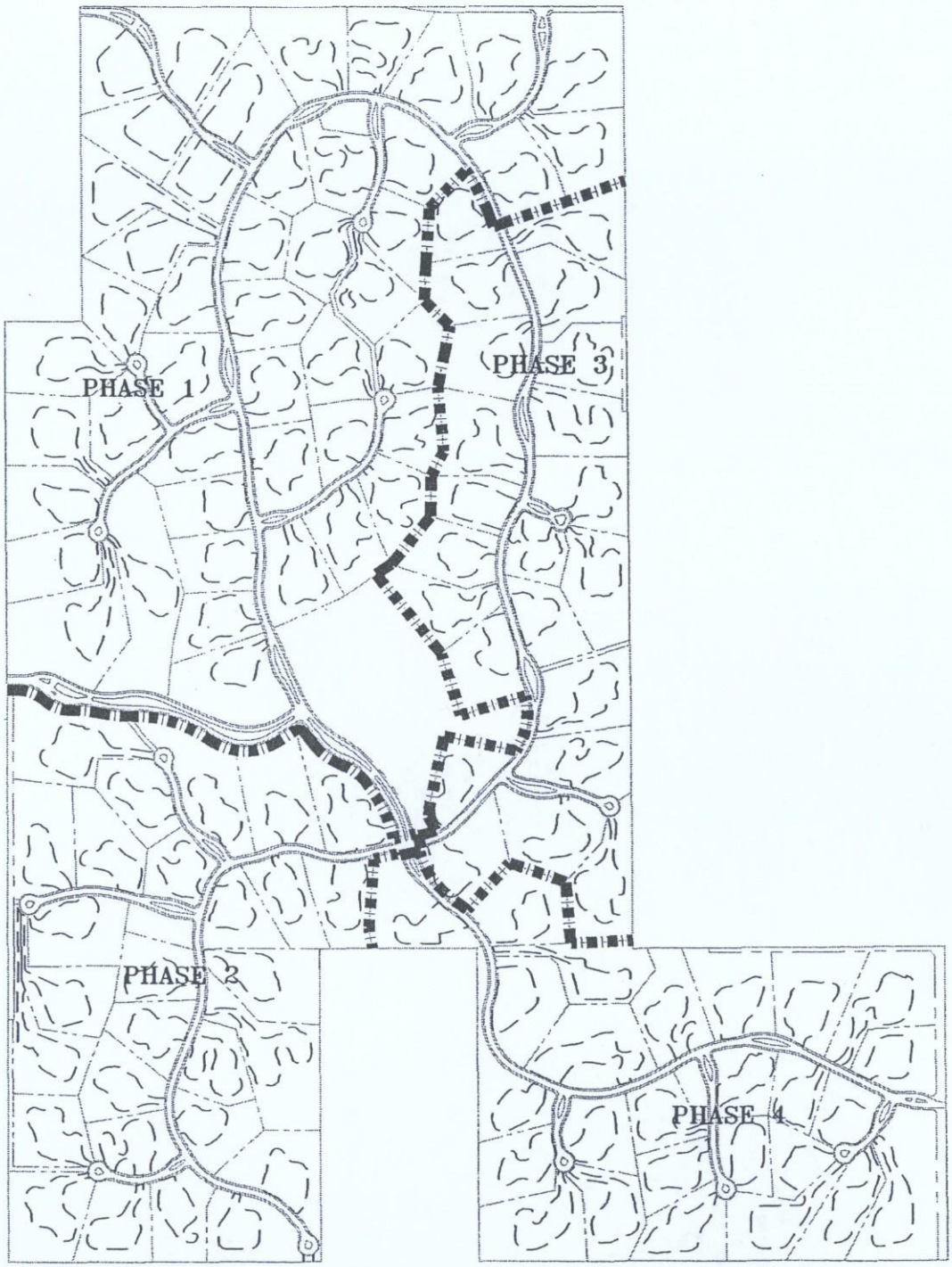
N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 01-VICINITYMAP.dwg - Feb 22,2006

PLATE 1A

Phasing Map



700 0 350 700

1 inch = 700 ft.

CROWN
COMMUNITY DEVELOPMENT
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Plate 1A

"Phasing Map"

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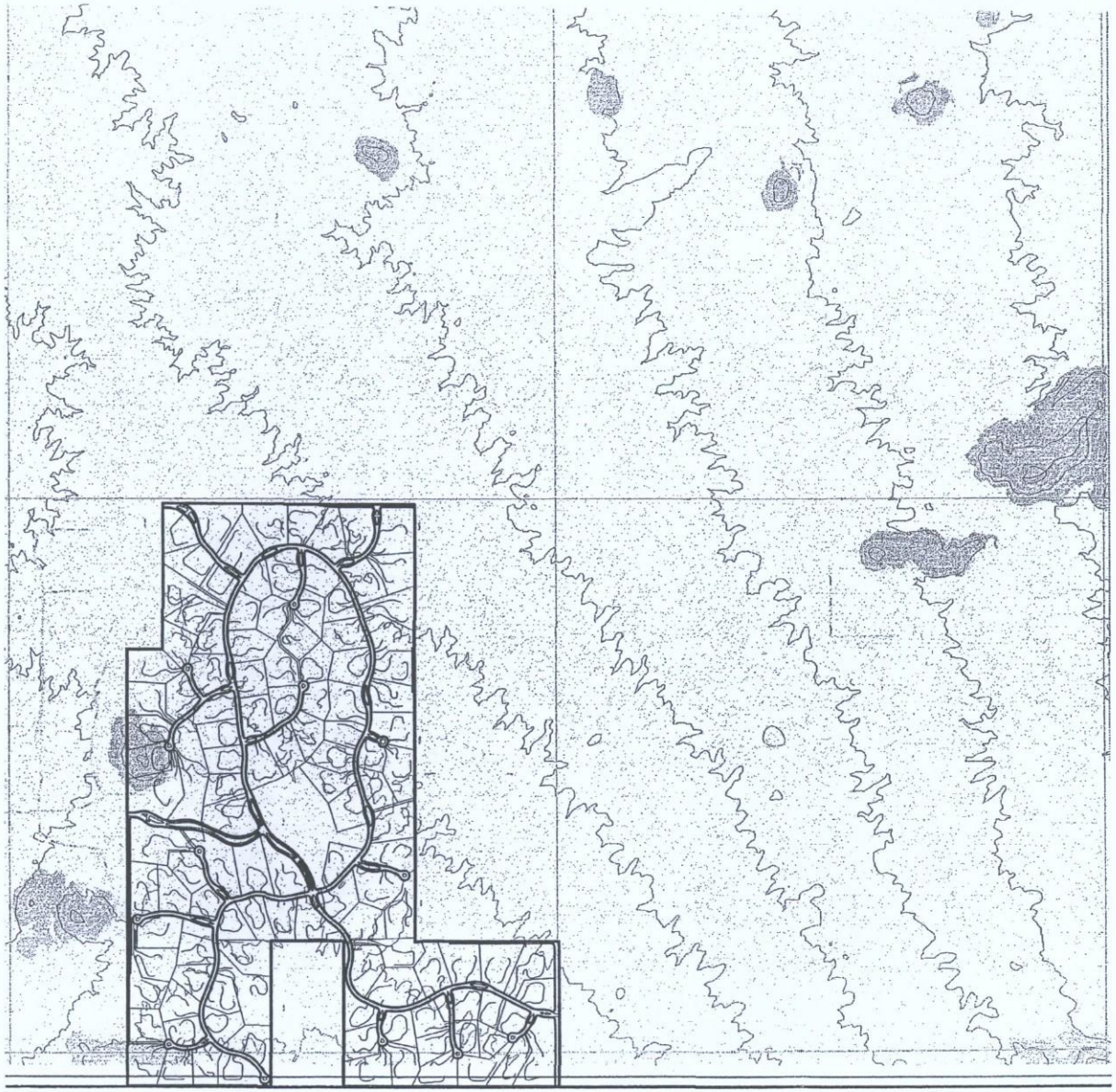
PLATE 2

ESL Classification



ESL Landforms and Protected Peaks and Ridges

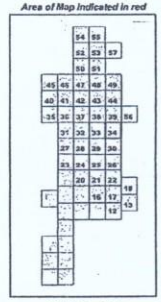
City Limits
Section Boundary
Streets

Landforms
- Lower Desert
- Upper Desert
- Hillside

Elevation
- 50' Contour
- 20' Contour

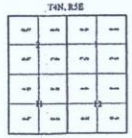
Protected Peaks and Ridges
- Peak or Ridge Line

Area of Map Indicated in red



Official Detail Map

Map 34



Data Source: City of Scottsdale

1000 0 500 1000

Horz. 1 in. = 1000 ft.

PLATE 2
ESL CLASSIFICATION

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PLATE 3

Soils Classification Map

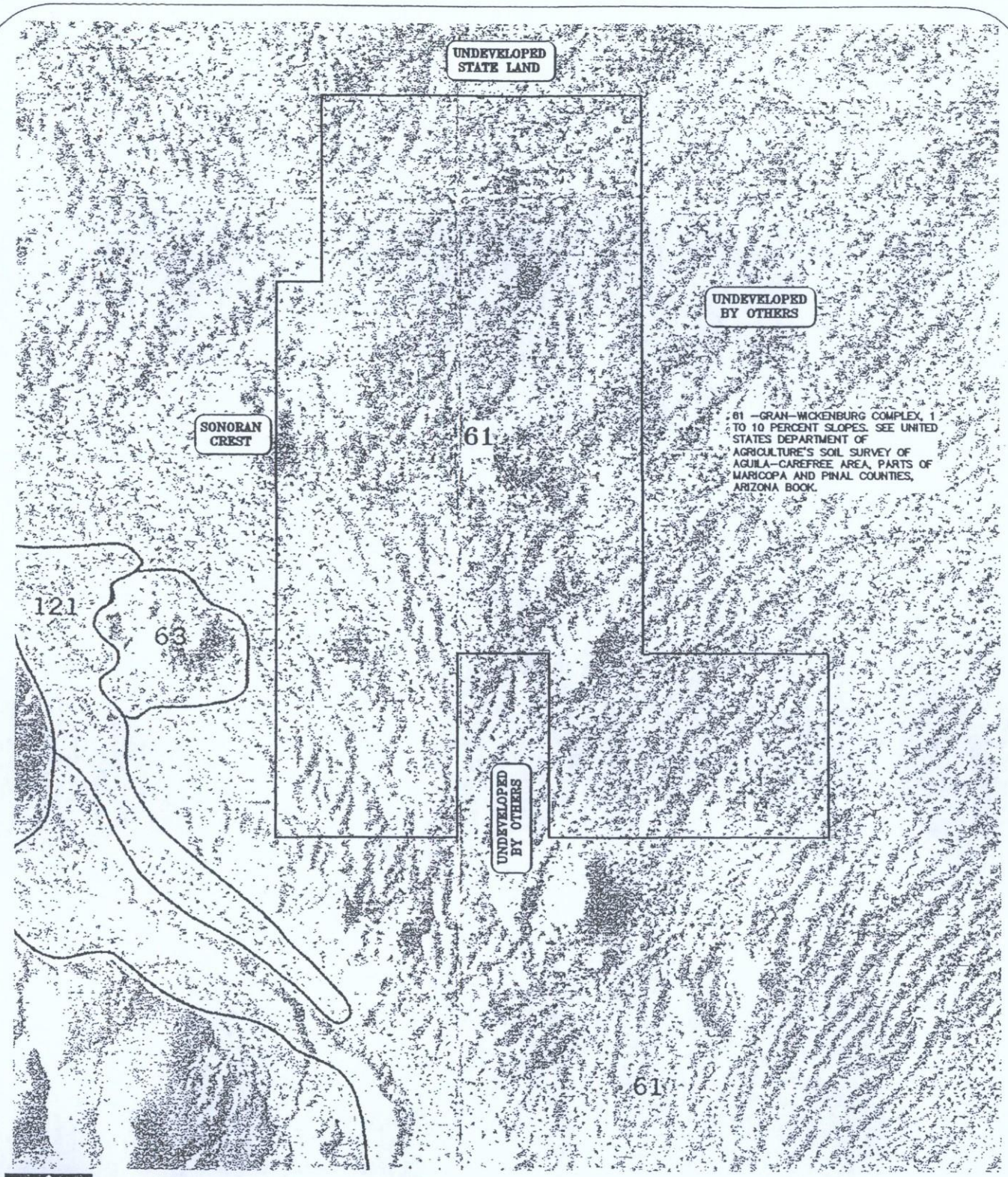

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Plate 3
"Soils Classification"

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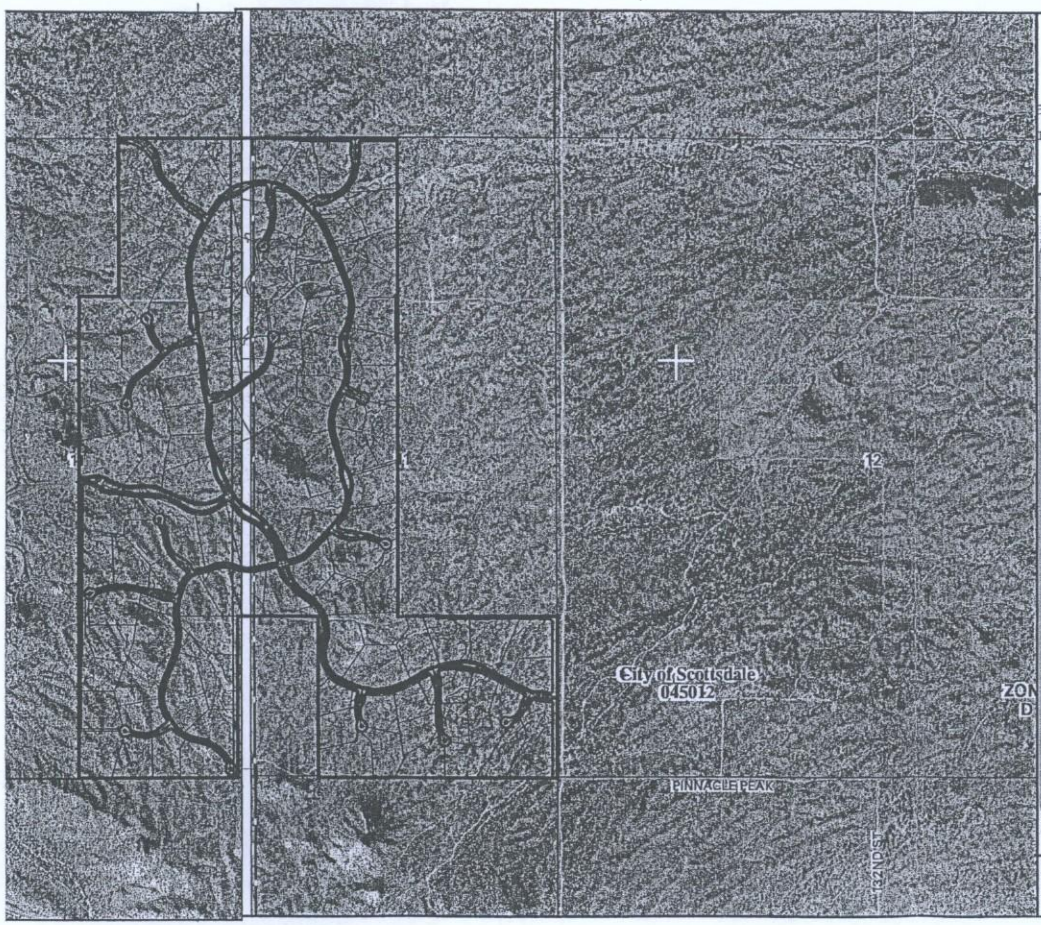
N:\2004\042054\Dwg\Exhibits\Soils Exhibit.dwg

PLATE 4

Flood Insurance Rate Map (FIRM)



MAP SCALE 1" = 1000'

0 1000 2000 FEET

0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1260F

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1260 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1260	F
SCOTTSDALE, CITY OF	045012	1260	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C1260F

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

MAP SCALE 1" = 1000'

0 1000 2000 FEET

0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1255G

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1255 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SCOTTSDALE, CITY OF	045012	1255	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

04013C1255G

MAP REVISED

SEPTEMBER 30, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

PLATE 5

Color Topographic Aerial Photograph

300 0 150 300
Horz. 1 in. = 300 ft.

CROWN
COMMUNITY DEVELOPMENT
A Henry Crown Company

SERENO CANYON
Plate 5
"Topographic Aerial "

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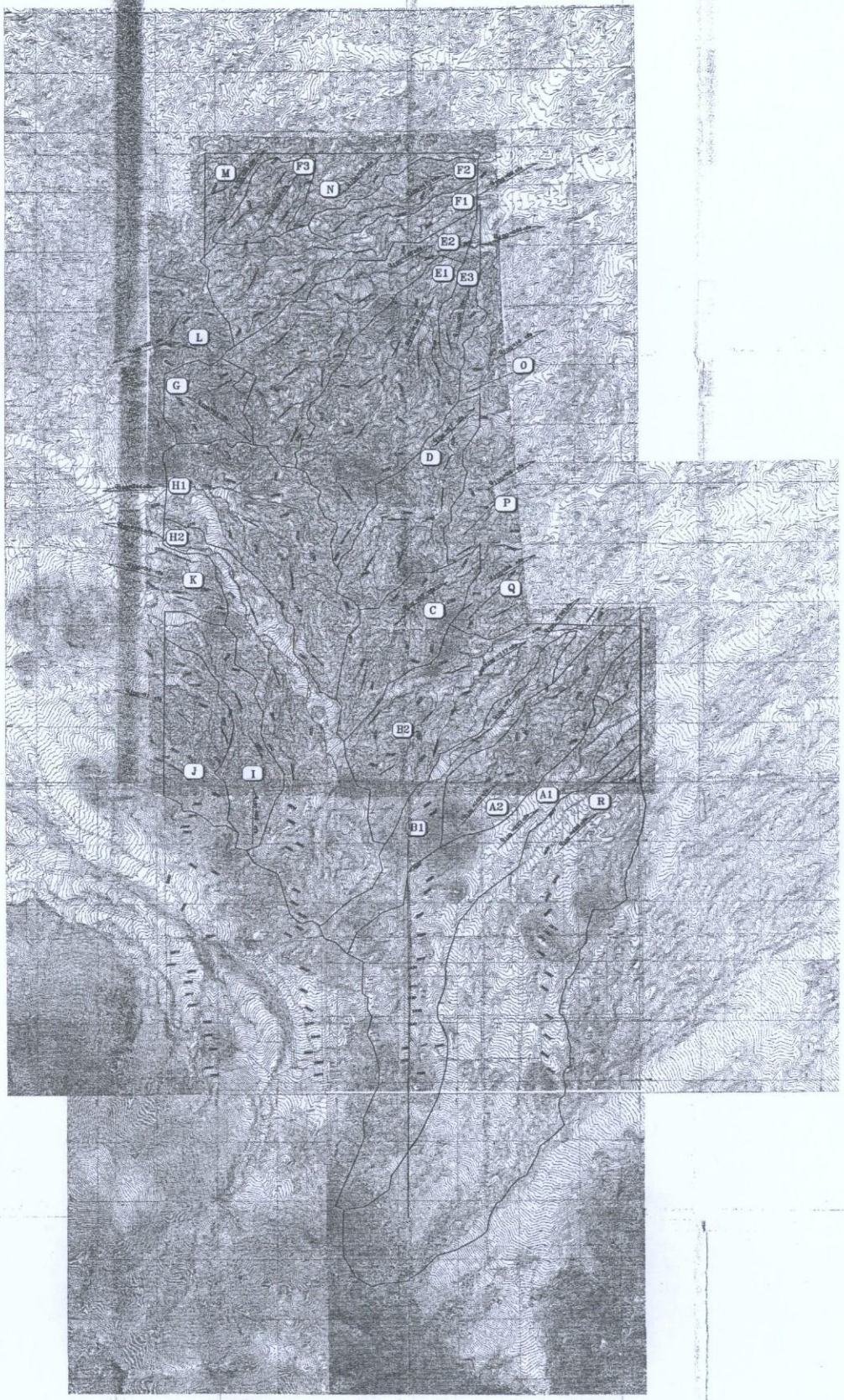
PLATE 6

Off-Site Watershed Area Map



LEGEND

H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT

SUB-BASIN BOUNDARY

FLOWLINE

PRE-DEVELOPMENT PEAK FLOW

PROJECT BOUNDARY

2796 — EXISTING CONTOUR LABELS

FLOW ARROW

400 0 200 400

1 inch = 400 ft.

CROWN COMMUNITY DEVELOPMENT
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SERENO CANYON

Plate 6

"Off-Site Watershed Area Map"

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PLATE 7

Section 404 Washes

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Plate 7
"404 Washes"

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250 0 125 250
1 inch = 250 ft.

LEGEND

PRELIMINARY SECTION 404 JURISDICTIONAL DELINEATION. A REQUEST FOR VERIFICATION HAS BEEN SUBMITTED TO THE A.C.O.E. FOR REVIEW AND APPROVAL.

N:\2004\042054\Project Support\Hydro\Exhibits\PDR\ PLATE 07-404.DWG - Feb 22,2006

PLATE 8

Pre-Development Drainage Site Plan

WOOD/PATEL

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WATER & WASTEWATER ENGINEERING
CONSTRUCTION MANAGEMENT

(602) 335-8500

PHOENIX • MESA • TUCSON

SERENO CANYON

Plate 8

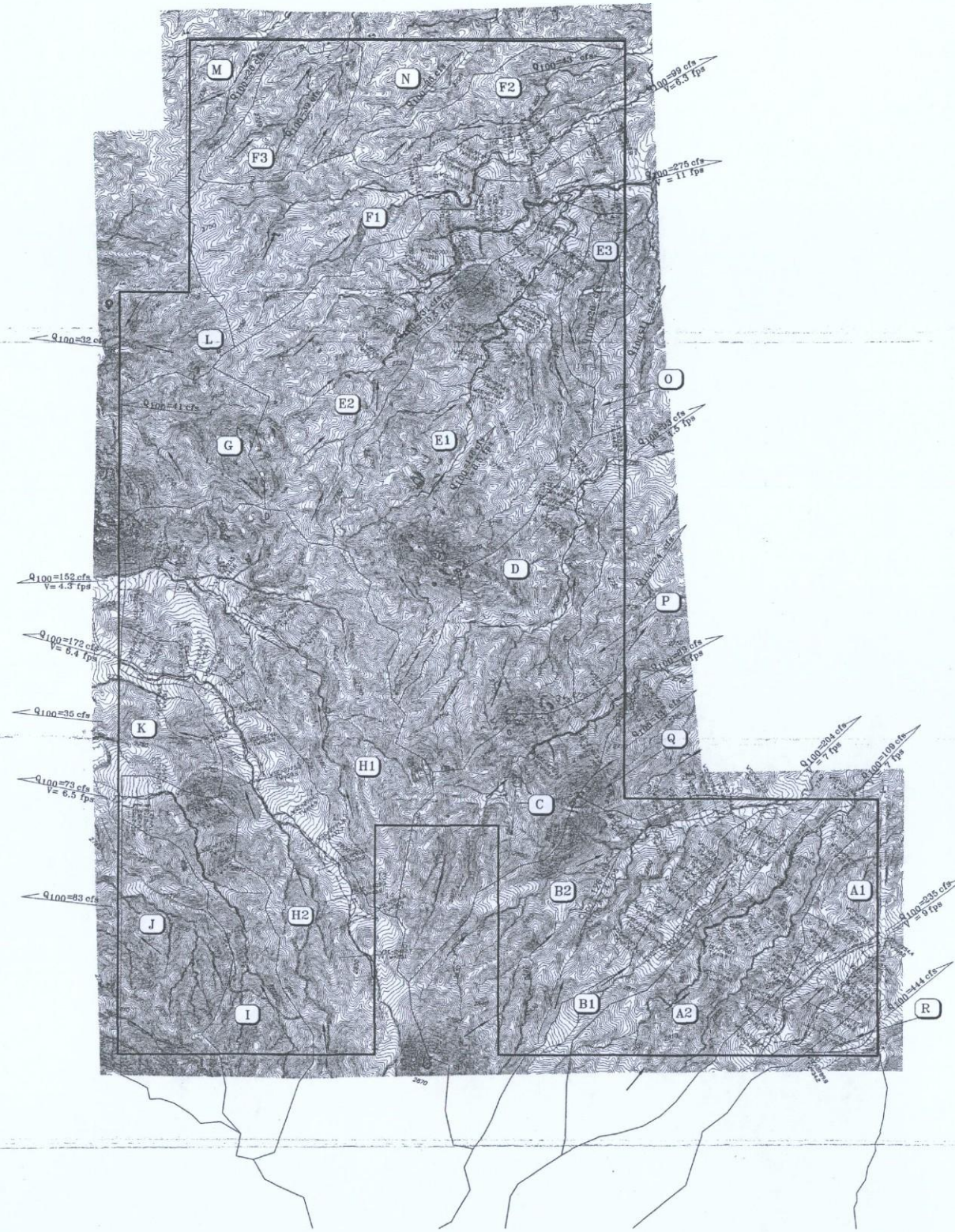
"Pre-Development Drainage Site Plan"

CROWN COMMUNITY DEVELOPMENT

A Henry Crown Company

PLATE 9

Pre-Development Grading and Drainage Plan



LEGEND

- H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT
- SUB-BASIN BOUNDARY
- FLOWLINE
- FLOODPLAIN BOUNDARY
- 404 WASH
- Q_{100}=41 cfs, V= 5 fps — PRE-DEVELOPMENT PEAK FLOW AND CORRESPONDING VELOCITY
- PROJECT BOUNDARY
- 2790 — EXISTING 1 FOOT CONTOUR LABEL
- FLOW ARROW
- 3, WSE=2762.70, TW=6110 — HEC-RAS CROSS SECTION WITH RIVER STATION, WATER SURFACE ELEVATION AND TOP WIDTH

200 0 100 200
1 in. = 200 ft.

SERENO CANYON
Plate 9
"Pre-Development Grading and Drainage Site Plan"

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
TRANSPORTATION / FLOOD
WATER & WASTEWATER UTILITIES
CONSTRUCTION MANAGEMENT
(602) 335-8500
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CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

PLATE 10

Post-Development Drainage Site Plan

WOOD/PATEL

LAND DEVELOPMENT • WATER RESOURCES
PLANNING • ECONOMICS
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT

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SERENO CANYON

Plate 10

"Post-Development Drainage Site Plan"

CROWN COMMUNITY DEVELOPMENT

N:\2004\042054\Project Support\Hydro\Exhibits\FDR\ PLATE 10-POST-DEVELOPMENT-11-08-06.DWG - Nov 14,2006

PLATE 11

Post-Development Grading and Drainage Plan

LEGEND

- H2 — HEC-1 SUB-BASIN ID AND CONCENTRATION POINT
- SUB-BASIN BOUNDARY
- FLOWLINE
- FLOODPLAIN BOUNDARY
- 404 WASH
- Q100=41 cfs — POST-DEVELOPMENT PEAK FLOW
- PROPOSED STORM DRAIN LOCATION
- PROJECT BOUNDARY
- 2790 — EXISTING 1 FOOT CONTOUR LABEL
- FLOW ARROW
- 3 — VE=2762.76, TW=6110 — HEC-RAS CROSS SECTION WITH RIVER STATION, WATER SURFACE ELEVATION AND TOP WIDTH
- RIP RAP

200 0 100 200
1 in. = 200 ft.

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 335-8500

SERENO CANYON
Plate II
"Post-Development Grading and Drainage Site Plan"

CROWN COMMUNITY DEVELOPMENT
A Fluor Daniel Company

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON

NATIVE PLANT INVENTORY
BY DESIERTO VERDE

DECEMBER 6, 2006

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

CACTUS TABLE

Species	SALVAGEABLE		NON-SALVAGEABLE		TOTAL	
	Qty	Ft.	Qty	Ft.	Qty	Ft.
SAGUARO	0.0	0.0	1.0	20.0	1.0	20.0
TOTALS	0.0	0.0	1.0	20.0	1.0	20.0

TREE TABLE

Species	SALVAGEABLE		NON-SALVAGEABLE		TOTAL	
	Qty	in	Qty	in	Qty	in
BLUE PALO VERDE	8.0	69.0	32.0	318.0	40.0	387.0
CATCLAW ACACIA	0.0	0.0	1172.0	10637.0	1172.0	10637.0
CRUCIFIXION THORN	0.0	0.0	20.0	166.0	20.0	166.0
FOOTHILL PALO VERDE	14.0	87.0	73.0	497.0	87.0	584.0
GREYTHORN	3.0	17.0	260.0	2247.0	263.0	2264.0
HACKBERRY	1.0	5.0	177.0	1888.0	178.0	1893.0
NATIVE MESQUITE	5.0	34.0	40.0	514.0	45.0	548.0
SCRUB OAK	0.0	0.0	18.0	227.0	18.0	227.0
WHITE THORN ACACIA	0.0	0.0	4.0	38.0	4.0	38.0
TOTALS	31.0	212.0	1796.0	16532.0	1827.0	16744.0

SALVAGEABILITY CODES:

Y = SALVAGEABLE
N = NON-SALVAGEABLE

SCIENTIFIC NAME:

SAGUARO	*CARNEGIA GIGANTEA*
BLUE PALO VERDE	*CERCIDIUM FLORIDUM*
CATCLAW ACACIA	*ACACIA GREGGII*
CRUCIFIXION THORN	*CASTELA EMORYI*
FOOTHILL PALO VERDE	*PARKINSONIA MICROPHYLLA*
GREYTHORN	*ZIZIPHUS OBTUSIFOLIA*
HACKBERRY	*CELTIS PALLIDA*
NATIVE MESQUITE	*PROSOPIS JULIFLORA*
SCRUB OAK	*QUERCUS SP.*
WHITE THORN ACACIA	*ACACIA CONSTRICTA*

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1	CATCLAW ACACIA				18.0	WEAK STRUCTURE
N	2	HACKBERRY				14.0	WIDE BASE
N	3	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	4	HACKBERRY				8.0	PARTIALLY DEAD
N	5	CATCLAW ACACIA				9.0	WIDE BASE
N	6	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	7	CATCLAW ACACIA				8.0	WIDE BASE
N	8	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	9	CATCLAW ACACIA				9.0	WIDE BASE
N	10	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	11	CATCLAW ACACIA				11.0	WIDE BASE
N	12	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	13	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	14	CATCLAW ACACIA				9.0	WIDE BASE
N	15	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	16	HACKBERRY				7.0	PARTIALLY DEAD
N	17	GREYTHORN				6.0	WIDE BASE
N	18	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	19	HACKBERRY				13.0	PARTIALLY DEAD
N	20	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	21	BLUE PALO VERDE				12.0	DAMAGED CAMBIUM
N	22	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	23	CATCLAW ACACIA				10.0	WIDE BASE
N	24	HACKBERRY				10.0	PARTIALLY DEAD
N	25	BLUE PALO VERDE				7.0	PARTIALLY DEAD
N	26	GREYTHORN				8.0	WEAK STRUCTURE
N	27	HACKBERRY				15.0	PARTIALLY DEAD
N	28	HACKBERRY				15.0	WIDE BASE
N	29	CATCLAW ACACIA				14.0	PARTIALLY DEAD
Y	30	BLUE PALO VERDE				10.0	
N	31	HACKBERRY				15.0	WIDE BASE
N	32	HACKBERRY				12.0	PARTIALLY DEAD
N	33	HACKBERRY				14.0	WIDE BASE
N	34	GREYTHORN				10.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	35	CATCLAW ACACIA				14.0	BROKEN BRANCHES
N	36	CATCLAW ACACIA				12.0	WIDE BASE
N	37	CATCLAW ACACIA				6.0	PARTIALLY DEAD
N	38	CATCLAW ACACIA				12.0	WIDE BASE
N	39	CATCLAW ACACIA				14.0	PARTIALLY DEAD
N	40	NATIVE MESQUITE				10.0	BROKEN BRANCHES
N	41	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	42	CATCLAW ACACIA				8.0	WIDE BASE
N	43	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	44	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	45	CATCLAW ACACIA				18.0	WEAK STRUCTURE
N	46	GREYTHORN				7.0	PARTIALLY DEAD
N	47	HACKBERRY				6.0	WIDE BASE
N	48	CATCLAW ACACIA				6.0	PARTIALLY DEAD
N	49	CATCLAW ACACIA				7.0	WIDE BASE
N	50	CATCLAW ACACIA				6.0	WIDE BASE
N	51	GREYTHORN				7.0	PARTIALLY DEAD
N	52	NATIVE MESQUITE				19.0	ANGLED TRUNK
N	53	CATCLAW ACACIA				6.0	WIDE BASE
N	54	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	55	HACKBERRY				18.0	WEAK STRUCTURE
N	56	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	57	CATCLAW ACACIA				12.0	WIDE BASE
N	58	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	59	NATIVE MESQUITE				7.0	BROKEN BRANCHES
N	60	CATCLAW ACACIA				14.0	WIDE BASE
N	61	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	62	GREYTHORN				12.0	WIDE BASE
N	63	CATCLAW ACACIA				14.0	ANGLED TRUNK
N	64	BLUE PALO VERDE				17.0	DAMAGED CAMBIUM
N	65	CATCLAW ACACIA				12.0	WIDE BASE
N	66	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	67	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	68	NATIVE MESQUITE				13.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	69	CATCLAW ACACIA				10.0	WIDE BASE
Y	70	BLUE PALO VERDE				10.0	
N	71	FOOTHILL PALO VERDE				16.0	ANGLED TRUNK
N	72	FOOTHILL PALO VERDE				19.0	DAMAGED CAMBIUM
N	73	FOOTHILL PALO VERDE				9.0	WEAK STRUCTURE
N	74	CATCLAW ACACIA				7.0	WIDE BASE
N	75	CATCLAW ACACIA				6.0	WIDE BASE
N	76	CATCLAW ACACIA				12.0	WIDE BASE
N	77	GREYTHORN				13.0	WEAK STRUCTURE
N	78	GREYTHORN				10.0	PARTIALLY DEAD
N	79	BLUE PALO VERDE				13.0	BROKEN BRANCHES
N	80	NATIVE MESQUITE				10.0	DAMAGED CAMBIUM
N	81	CATCLAW ACACIA				12.0	WIDE BASE
N	82	GREYTHORN				8.0	WEAK STRUCTURE
N	83	CATCLAW ACACIA				7.0	PARTIALLY DEAD
N	84	CATCLAW ACACIA				9.0	WIDE BASE
N	85	CATCLAW ACACIA				6.0	WEAK STRUCTURE
N	86	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	87	CATCLAW ACACIA				11.0	WIDE BASE
N	88	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	89	HACKBERRY				12.0	WIDE BASE
N	90	HACKBERRY				13.0	PARTIALLY DEAD
N	91	NATIVE MESQUITE				18.0	DAMAGED CAMBIUM
N	92	CATCLAW ACACIA				17.0	WIDE BASE
N	93	BLUE PALO VERDE				6.0	BROKEN BRANCHES
N	94	CATCLAW ACACIA				9.0	WIDE BASE
N	95	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	96	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	97	CATCLAW ACACIA				14.0	WEAK STRUCTURE
Y	98	BLUE PALO VERDE				10.0	
N	99	GREYTHORN				8.0	WIDE BASE
N	100	GREYTHORN				14.0	WEAK STRUCTURE
N	101	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	102	CATCLAW ACACIA				10.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	103	GREYTHORN				19.0	WEAK STRUCTURE
N	104	GREYTHORN				14.0	PARTIALLY DEAD
N	105	CATCLAW ACACIA				14.0	WIDE BASE
N	106	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	107	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	108	CATCLAW ACACIA				10.0	WIDE BASE
N	109	CATCLAW ACACIA				8.0	WIDE BASE
N	110	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	111	CATCLAW ACACIA				14.0	WIDE BASE
N	112	GREYTHORN				10.0	WEAK STRUCTURE
N	113	GREYTHORN				12.0	WIDE BASE
N	114	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	115	CATCLAW ACACIA				14.0	WIDE BASE
N	116	GREYTHORN				12.0	PARTIALLY DEAD
N	117	GREYTHORN				10.0	WEAK STRUCTURE
N	118	GREYTHORN				7.0	BROKEN BRANCHES
N	119	GREYTHORN				9.0	WIDE BASE
N	120	BLUE PALO VERDE				14.0	ANGLED TRUNK
N	121	CATCLAW ACACIA				10.0	WIDE BASE
N	122	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	123	CATCLAW ACACIA				10.0	WIDE BASE
N	124	GREYTHORN				14.0	WEAK STRUCTURE
N	125	GREYTHORN				15.0	WIDE BASE
N	126	NATIVE MESQUITE				17.0	SUCKER GROWTH
N	127	CATCLAW ACACIA				12.0	WIDE BASE
N	128	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	129	GREYTHORN				9.0	PARTIALLY DEAD
N	130	CATCLAW ACACIA				10.0	WIDE BASE
N	131	CATCLAW ACACIA				11.0	WIDE BASE
N	132	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	133	GREYTHORN				10.0	WIDE BASE
N	134	FOOTHILL PALO VERDE				6.0	ANGLED TRUNK
N	135	GREYTHORN				9.0	WIDE BASE
N	136	CATCLAW ACACIA				12.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	137	NATIVE MESQUITE				5.0	BROKEN BRANCHES
N	138	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	139	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	140	CATCLAW ACACIA				12.0	WIDE BASE
N	141	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	142	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	143	CATCLAW ACACIA				19.0	ANGLED TRUNK
N	144	GREYTHORN				10.0	WIDE BASE
N	145	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	146	CATCLAW ACACIA				13.0	WIDE BASE
N	147	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	148	CATCLAW ACACIA				16.0	WIDE BASE
N	149	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	150	CATCLAW ACACIA				10.0	WIDE BASE
N	151	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	152	CATCLAW ACACIA				7.0	WIDE BASE
N	153	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	154	CATCLAW ACACIA				11.0	WIDE BASE
N	155	GREYTHORN				10.0	PARTIALLY DEAD
N	156	GREYTHORN				14.0	WEAK STRUCTURE
N	157	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	158	CATCLAW ACACIA				10.0	WIDE BASE
N	159	GREYTHORN				10.0	PARTIALLY DEAD
N	160	CATCLAW ACACIA				10.0	WIDE BASE
N	161	CATCLAW ACACIA				9.0	WEAK STRUCTURE
N	162	GREYTHORN				10.0	WIDE BASE
N	163	CATCLAW ACACIA				11.0	WEAK STRUCTURE
N	164	GREYTHORN				13.0	WIDE BASE
N	165	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	166	CATCLAW ACACIA				9.0	WIDE BASE
N	167	NATIVE MESQUITE				16.0	ANGLED TRUNK
N	168	GREYTHORN				10.0	WIDE BASE
N	169	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	170	CATCLAW ACACIA				9.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	171	CATCLAW ACACIA				10.0	WIDE BASE
N	172	CATCLAW ACACIA				8.0	WIDE BASE
N	173	BLUE PALO VERDE				11.0	BORE DAMAGE
N	174	NATIVE MESQUITE				19.0	DAMAGED CAMBIUM
N	175	GREYTHORN				10.0	WIDE BASE
N	176	BLUE PALO VERDE				8.0	DAMAGED CAMBIUM
N	177	CATCLAW ACACIA				9.0	WIDE BASE
N	178	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	179	CATCLAW ACACIA				11.0	WIDE BASE
N	180	NATIVE MESQUITE				13.0	DAMAGED CAMBIUM
N	181	CATCLAW ACACIA				10.0	WIDE BASE
N	182	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	183	NATIVE MESQUITE				16.0	ANGLED TRUNK
N	184	GREYTHORN				10.0	WIDE BASE
N	185	CATCLAW ACACIA				11.0	WEAK STRUCTURE
N	186	CATCLAW ACACIA				9.0	WIDE BASE
N	187	FOOTHILL PALO VERDE				5.0	BROKEN BRANCHES
N	188	CATCLAW ACACIA				12.0	WIDE BASE
N	189	CATCLAW ACACIA				13.0	WIDE BASE
N	190	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	191	GREYTHORN				16.0	ANGLED TRUNK
N	192	GREYTHORN				13.0	WIDE BASE
N	193	HACKBERRY				12.0	PARTIALLY DEAD
N	194	GREYTHORN				13.0	WEAK STRUCTURE
N	195	NATIVE MESQUITE				18.0	ANGLED TRUNK
N	196	GREYTHORN				10.0	WIDE BASE
N	197	GREYTHORN				14.0	PARTIALLY DEAD
N	198	GREYTHORN				10.0	WIDE BASE
N	199	GREYTHORN				12.0	PARTIALLY DEAD
N	200	GREYTHORN				10.0	WEAK STRUCTURE
N	201	GREYTHORN				9.0	WIDE BASE
N	202	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	203	CATCLAW ACACIA				9.0	WIDE BASE
N	204	CATCLAW ACACIA				10.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	205	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	206	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
N	207	GREYTHORN				8.0	PARTIALLY DEAD
N	208	FOOTHILL PALO VERDE				7.0	BROKEN BRANCHES
N	209	CATCLAW ACACIA				8.0	WIDE BASE
N	210	GREYTHORN				14.0	PARTIALLY DEAD
N	211	GREYTHORN				10.0	WIDE BASE
N	212	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	213	BLUE PALO VERDE				5.0	DAMAGED CAMBIUM
N	214	GREYTHORN				12.0	WIDE BASE
N	215	CATCLAW ACACIA				10.0	WIDE BASE
Y	216	NATIVE MESQUITE				5.0	
N	217	GREYTHORN				12.0	WEAK STRUCTURE
N	218	GREYTHORN				10.0	PARTIALLY DEAD
N	219	CATCLAW ACACIA				14.0	WIDE BASE
N	220	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	221	BLUE PALO VERDE				8.0	PITTED
N	222	BLUE PALO VERDE				14.0	WIDE BASE
N	223	GREYTHORN				10.0	WIDE BASE
N	224	GREYTHORN				9.0	WEAK STRUCTURE
N	225	GREYTHORN				16.0	WEAK STRUCTURE
N	226	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	227	GREYTHORN				10.0	WIDE BASE
N	228	GREYTHORN				14.0	WEAK STRUCTURE
N	229	NATIVE MESQUITE				16.0	BROKEN BRANCHES
N	230	BLUE PALO VERDE				15.0	BROKEN BRANCHES
N	231	CATCLAW ACACIA				8.0	WIDE BASE
N	232	CATCLAW ACACIA				7.0	PARTIALLY DEAD
N	233	BLUE PALO VERDE				12.0	DAMAGED CAMBIUM
N	234	NATIVE MESQUITE				15.0	ANGLED TRUNK
N	235	GREYTHORN				10.0	WIDE BASE
N	236	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	237	CATCLAW ACACIA				12.0	WIDE BASE
N	238	GREYTHORN				7.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	239	GREYTHORN				12.0	PARTIALLY DEAD
N	240	GREYTHORN				10.0	PARTIALLY DEAD
N	241	CATCLAW ACACIA				13.0	WIDE BASE
N	242	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	243	HACKBERRY				14.0	WIDE BASE
N	244	GREYTHORN				7.0	PARTIALLY DEAD
N	245	GREYTHORN				7.0	WIDE BASE
N	246	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	247	CATCLAW ACACIA				13.0	WIDE BASE
N	248	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	249	CATCLAW ACACIA				15.0	WIDE BASE
N	250	CATCLAW ACACIA				9.0	WIDE BASE
N	251	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	252	CATCLAW ACACIA				12.0	WIDE BASE
N	253	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	254	CATCLAW ACACIA				11.0	WIDE BASE
N	255	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	256	CATCLAW ACACIA				11.0	WIDE BASE
N	257	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	258	CATCLAW ACACIA				14.0	WIDE BASE
N	259	HACKBERRY				12.0	WEAK STRUCTURE
N	260	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	261	NATIVE MESQUITE				9.0	SUCKER GROWTH
N	262	HACKBERRY				11.0	WIDE BASE
N	263	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	264	HACKBERRY				14.0	ANGLED TRUNK
N	265	CATCLAW ACACIA				10.0	WIDE BASE
N	266	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	267	BLUE PALO VERDE				12.0	IN WASH
N	268	CATCLAW ACACIA				8.0	IN ROCK
N	269	CATCLAW ACACIA				10.0	WIDE BASE
N	270	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	271	HACKBERRY				16.0	WEAK STRUCTURE
N	272	HACKBERRY				15.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	273	CATCLAW ACACIA				12.0	WIDE BASE
N	274	HACKBERRY				12.0	WEAK STRUCTURE
N	275	CATCLAW ACACIA				10.0	TIP DIEBACK
N	276	CATCLAW ACACIA				11.0	WIDE BASE
N	277	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	278	GREYTHORN				14.0	PARTIALLY DEAD
N	279	CATCLAW ACACIA				10.0	WIDE BASE
N	280	HACKBERRY				15.0	WEAK STRUCTURE
N	281	HACKBERRY				10.0	WIDE BASE
N	282	HACKBERRY				13.0	WIDE BASE
N	283	HACKBERRY				14.0	WEAK STRUCTURE
N	284	CATCLAW ACACIA				14.0	PARTIALLY DEAD
N	285	CATCLAW ACACIA				8.0	WIDE BASE
N	286	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	287	CATCLAW ACACIA				10.0	WIDE BASE
N	288	HACKBERRY				10.0	PARTIALLY DEAD
N	289	CATCLAW ACACIA				10.0	WIDE BASE
N	290	HACKBERRY				11.0	WIDE BASE
N	291	HACKBERRY				10.0	WEAK STRUCTURE
N	292	HACKBERRY				14.0	WIDE BASE
N	293	CATCLAW ACACIA				16.0	ANGLED TRUNK
N	294	GREYTHORN				8.0	WIDE BASE
N	295	HACKBERRY				12.0	WEAK STRUCTURE
N	296	BLUE PALO VERDE				10.0	BROKEN BRANCHES
N	297	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	298	CATCLAW ACACIA				8.0	WIDE BASE
N	299	CATCLAW ACACIA				10.0	WIDE BASE
N	300	GREYTHORN				14.0	WEAK STRUCTURE
N	301	GREYTHORN				8.0	PARTIALLY DEAD
N	302	CATCLAW ACACIA				12.0	WIDE BASE
N	303	CATCLAW ACACIA				9.0	WIDE BASE
N	304	FOOTHILL PALO VERDE				9.0	DAMAGED CAMBIUM
N	305	CATCLAW ACACIA				10.0	WIDE BASE
Y	306	FOOTHILL PALO VERDE				6.0	

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	307	CATCLAW ACACIA				7.0	WIDE BASE
N	308	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	309	HACKBERRY				10.0	WIDE BASE
N	310	CATCLAW ACACIA				11.0	WEAK STRUCTURE
N	311	GREYTHORN				10.0	PARTIALLY DEAD
N	312	GREYTHORN				11.0	WIDE BASE
N	313	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	314	CATCLAW ACACIA				10.0	WIDE BASE
N	315	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	316	SCRUB OAK				14.0	BHA, WIDE BASE
N	317	SCRUB OAK				14.0	BHA, WEAK STRUCTURE
N	318	GREYTHORN				12.0	WIDE BASE
N	319	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	320	HACKBERRY				10.0	WIDE BASE
N	321	GREYTHORN				10.0	PARTIALLY DEAD
N	322	GREYTHORN				14.0	PARTIALLY DEAD
N	323	CATCLAW ACACIA				8.0	WIDE BASE
N	324	HACKBERRY				14.0	WEAK STRUCTURE
N	325	CATCLAW ACACIA				9.0	WIDE BASE
N	326	SCRUB OAK				14.0	BHA, WIDE BASE
N	327	GREYTHORN				10.0	PARTIALLY DEAD
N	328	GREYTHORN				11.0	WIDE BASE
N	329	GREYTHORN				10.0	WEAK STRUCTURE
N	330	GREYTHORN				12.0	WIDE BASE
N	331	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	332	CATCLAW ACACIA				9.0	WIDE BASE
N	333	CATCLAW ACACIA				11.0	WEAK STRUCTURE
N	334	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	335	GREYTHORN				9.0	PARTIALLY DEAD
N	336	CATCLAW ACACIA				12.0	WIDE BASE
N	337	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	338	NATIVE MESQUITE				18.0	ANGLED TRUNK
N	339	CATCLAW ACACIA				12.0	WIDE BASE
N	340	CATCLAW ACACIA				8.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	341	CATCLAW ACACIA				9.0	WIDE BASE
N	342	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	343	CATCLAW ACACIA				10.0	WIDE BASE
N	344	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	345	CATCLAW ACACIA				7.0	PARTIALLY DEAD
N	346	CATCLAW ACACIA				8.0	WIDE BASE
N	347	CATCLAW ACACIA				9.0	WEAK STRUCTURE
N	348	CATCLAW ACACIA				10.0	WIDE BASE
N	349	CATCLAW ACACIA				9.0	WIDE BASE
N	350	GREYTHORN				8.0	WEAK STRUCTURE
N	351	FOOTHILL PALO VERDE				6.0	PARTIALLY DEAD
N	352	CATCLAW ACACIA				7.0	WIDE BASE
N	353	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	354	CATCLAW ACACIA				9.0	WIDE BASE
N	355	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	356	HACKBERRY				11.0	WIDE BASE
N	357	CATCLAW ACACIA				14.0	PARTIALLY DEAD
N	358	HACKBERRY				13.0	WIDE BASE
N	359	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	360	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	361	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	362	GREYTHORN				13.0	WIDE BASE
N	363	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	364	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	365	GREYTHORN				10.0	WIDE BASE
N	366	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	367	CATCLAW ACACIA				10.0	WIDE BASE
N	368	NATIVE MESQUITE				18.0	BORE DAMAGE
N	369	CATCLAW ACACIA				8.0	WIDE BASE
N	370	GREYTHORN				10.0	PARTIALLY DEAD
N	371	GREYTHORN				8.0	WIDE BASE
N	372	CATCLAW ACACIA				15.0	WEAK STRUCTURE
N	373	GREYTHORN				15.0	WIDE BASE
N	374	CATCLAW ACACIA				8.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	375	GREYTHORN				10.0	WIDE BASE
N	376	HACKBERRY				14.0	WEAK STRUCTURE
N	377	GREYTHORN				8.0	WIDE BASE
N	378	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	379	GREYTHORN				9.0	TIP DIEBACK
N	380	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	381	GREYTHORN				10.0	PARTIALLY DEAD
N	382	GREYTHORN				8.0	PARTIALLY DEAD
N	383	CATCLAW ACACIA				10.0	WIDE BASE
N	384	BLUE PALO VERDE				10.0	ANGLED TRUNK
N	385	CATCLAW ACACIA				10.0	WIDE BASE
N	386	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	387	GREYTHORN				8.0	WIDE BASE
N	388	CATCLAW ACACIA				9.0	WEAK STRUCTURE
N	389	CATCLAW ACACIA				12.0	WIDE BASE
N	390	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	391	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	392	CATCLAW ACACIA				13.0	ANGLED TRUNK
N	393	CATCLAW ACACIA				5.0	WIDE BASE
N	394	CATCLAW ACACIA				9.0	WIDE BASE
N	395	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	396	CATCLAW ACACIA				10.0	WIDE BASE
N	397	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	398	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	399	CATCLAW ACACIA				12.0	WIDE BASE
N	400	CATCLAW ACACIA				16.0	WEAK STRUCTURE
N	401	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	402	CATCLAW ACACIA				10.0	WIDE BASE
N	403	BLUE PALO VERDE				12.0	WIDE BASE
N	404	CATCLAW ACACIA				12.0	WIDE BASE
N	405	CATCLAW ACACIA				17.0	ANGLED TRUNK
N	406	CATCLAW ACACIA				10.0	WIDE BASE
N	407	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	408	CATCLAW ACACIA				10.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	409	CATCLAW ACACIA				11.0	WIDE BASE
N	410	CATCLAW ACACIA				9.0	WEAK STRUCTURE
N	411	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	412	CATCLAW ACACIA				11.0	WIDE BASE
N	413	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	414	CATCLAW ACACIA				9.0	WIDE BASE
N	415	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	416	GREYTHORN				10.0	PARTIALLY DEAD
N	417	CATCLAW ACACIA				8.0	WIDE BASE
N	418	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	419	CATCLAW ACACIA				11.0	WIDE BASE
N	420	GREYTHORN				10.0	WEAK STRUCTURE
N	421	SAGUARO	20.0				DEHYDRATED
N	422	CATCLAW ACACIA				7.0	WIDE BASE
N	423	NATIVE MESQUITE				9.0	DAMAGED CAMBIUM
N	424	CATCLAW ACACIA				8.0	WIDE BASE
N	425	CATCLAW ACACIA				7.0	WIDE BASE
N	426	CATCLAW ACACIA				9.0	WIDE BASE
N	427	CATCLAW ACACIA				9.0	WIDE BASE
N	428	HACKBERRY				6.0	DAMAGED CAMBIUM
N	429	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	430	CATCLAW ACACIA				7.0	WIDE BASE
N	431	CATCLAW ACACIA				9.0	WIDE BASE
N	432	CATCLAW ACACIA				7.0	WIDE BASE
N	433	CATCLAW ACACIA				7.0	WIDE BASE
N	434	HACKBERRY				7.0	DAMAGED CAMBIUM
N	435	CATCLAW ACACIA				6.0	WIDE BASE
N	436	CATCLAW ACACIA				7.0	WEAK STRUCTURE
N	437	CATCLAW ACACIA				7.0	WIDE BASE
N	438	CATCLAW ACACIA				7.0	WIDE BASE
N	439	GREYTHORN				7.0	DAMAGED CAMBIUM
N	440	CATCLAW ACACIA				12.0	WIDE BASE
N	441	CATCLAW ACACIA				9.0	WIDE BASE
N	442	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	443	GREYTHORN				8.0	WIDE BASE
N	444	GREYTHORN				7.0	WIDE BASE
N	445	HACKBERRY				7.0	WIDE BASE
N	446	CATCLAW ACACIA				7.0	WIDE BASE
N	447	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
Y	448	FOOTHILL PALO VERDE				6.0	
N	449	CATCLAW ACACIA				8.0	WIDE BASE
N	450	HACKBERRY				8.0	WIDE BASE
N	451	CATCLAW ACACIA				8.0	WIDE BASE
N	452	GREYTHORN				8.0	DAMAGED CAMBIUM
N	453	GREYTHORN				7.0	DAMAGED CAMBIUM
N	454	CATCLAW ACACIA				5.0	WEAK STRUCTURE
N	455	CATCLAW ACACIA				6.0	WIDE BASE
N	456	CATCLAW ACACIA				10.0	WIDE BASE
N	457	BLUE PALO VERDE				7.0	DAMAGED CAMBIUM
N	458	CATCLAW ACACIA				9.0	WIDE BASE
N	459	SCRUB OAK				13.0	WIDE BASE
N	460	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	461	GREYTHORN				6.0	WIDE BASE
N	462	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	463	CATCLAW ACACIA				7.0	WIDE BASE
N	464	CATCLAW ACACIA				5.0	WIDE BASE
N	465	CATCLAW ACACIA				12.0	WIDE BASE
N	466	GREYTHORN				5.0	WIDE BASE
N	467	CATCLAW ACACIA				8.0	WIDE BASE
N	468	GREYTHORN				8.0	WIDE BASE
N	469	HACKBERRY				7.0	WIDE BASE
N	470	CATCLAW ACACIA				9.0	WIDE BASE
N	471	GREYTHORN				8.0	WIDE BASE
N	472	CATCLAW ACACIA				7.0	WIDE BASE
N	473	CATCLAW ACACIA				6.0	WIDE BASE
N	474	CATCLAW ACACIA				7.0	WIDE BASE
N	475	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	476	CATCLAW ACACIA				7.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	477	CATCLAW ACACIA				12.0	WIDE BASE
N	478	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	479	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	480	CATCLAW ACACIA				7.0	WIDE BASE
N	481	CATCLAW ACACIA				7.0	WIDE BASE
N	482	CATCLAW ACACIA				8.0	WIDE BASE
N	483	CATCLAW ACACIA				6.0	WIDE BASE
N	484	CATCLAW ACACIA				8.0	WIDE BASE
N	485	CATCLAW ACACIA				7.0	WIDE BASE
N	486	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	487	GREYTHORN				6.0	WIDE BASE
N	488	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	489	CATCLAW ACACIA				6.0	WIDE BASE
N	490	CATCLAW ACACIA				12.0	WIDE BASE
N	491	GREYTHORN				6.0	DAMAGED CAMBIUM
N	492	CATCLAW ACACIA				8.0	WIDE BASE
N	493	CATCLAW ACACIA				12.0	WIDE BASE
N	494	CATCLAW ACACIA				10.0	WIDE BASE
N	495	CATCLAW ACACIA				8.0	WIDE BASE
N	496	CATCLAW ACACIA				7.0	WIDE BASE
N	497	CATCLAW ACACIA				7.0	WIDE BASE
N	498	CATCLAW ACACIA				6.0	WIDE BASE
N	499	CATCLAW ACACIA				6.0	WIDE BASE
N	500	CATCLAW ACACIA				5.0	WIDE BASE
N	501	CATCLAW ACACIA				5.0	WIDE BASE
N	502	CATCLAW ACACIA				6.0	WIDE BASE
N	503	CATCLAW ACACIA				8.0	WIDE BASE
N	504	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	505	NATIVE MESQUITE				14.0	DAMAGED CAMBIUM
N	506	CATCLAW ACACIA				12.0	WIDE BASE
N	507	CATCLAW ACACIA				6.0	WIDE BASE
N	508	CATCLAW ACACIA				10.0	WIDE BASE
N	509	CATCLAW ACACIA				10.0	WIDE BASE
N	510	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	511	CATCLAW ACACIA				13.0	WIDE BASE
N	512	CATCLAW ACACIA				7.0	WIDE BASE
N	513	CATCLAW ACACIA				6.0	WIDE BASE
N	514	SCRUB OAK				8.0	WIDE BASE
N	515	CATCLAW ACACIA				7.0	WIDE BASE
N	516	CATCLAW ACACIA				7.0	WIDE BASE
N	517	CATCLAW ACACIA				8.0	WIDE BASE
N	518	HACKBERRY				7.0	WIDE BASE
N	519	CATCLAW ACACIA				14.0	WIDE BASE
N	520	NATIVE MESQUITE				13.0	DAMAGED CAMBIUM
N	521	GREYTHORN				5.0	SUCKER GROWTH
N	522	GREYTHORN				8.0	SUCKER GROWTH
N	523	CATCLAW ACACIA				11.0	WIDE BASE
N	524	GREYTHORN				6.0	ANGLED TRUNK
N	525	CATCLAW ACACIA				12.0	WIDE BASE
N	526	CATCLAW ACACIA				10.0	WIDE BASE
N	527	CATCLAW ACACIA				7.0	WIDE BASE
N	528	NATIVE MESQUITE				20.0	DAMAGED CAMBIUM
N	529	GREYTHORN				8.0	DAMAGED CAMBIUM
N	530	HACKBERRY				9.0	WIDE BASE
N	531	CATCLAW ACACIA				10.0	WIDE BASE
N	532	GREYTHORN				12.0	WIDE BASE
N	533	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	534	CATCLAW ACACIA				5.0	WIDE BASE
N	535	CATCLAW ACACIA				7.0	WIDE BASE
N	536	CATCLAW ACACIA				5.0	WIDE BASE
N	537	CATCLAW ACACIA				9.0	WIDE BASE
N	538	CATCLAW ACACIA				7.0	WIDE BASE
N	539	NATIVE MESQUITE				12.0	DAMAGED CAMBIUM
N	540	NATIVE MESQUITE				11.0	DAMAGED CAMBIUM
N	541	NATIVE MESQUITE				13.0	DAMAGED CAMBIUM
N	542	NATIVE MESQUITE				14.0	DAMAGED CAMBIUM
N	543	CATCLAW ACACIA				10.0	WIDE BASE
N	544	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	545	CATCLAW ACACIA				8.0	WIDE BASE
N	546	GREYTHORN				7.0	DAMAGED CAMBIUM
N	547	GREYTHORN				13.0	WIDE BASE
N	548	CATCLAW ACACIA				8.0	WIDE BASE
N	549	CATCLAW ACACIA				10.0	WIDE BASE
N	550	CATCLAW ACACIA				7.0	WIDE BASE
N	551	CATCLAW ACACIA				6.0	WIDE BASE
N	552	GREYTHORN				12.0	SUCKER GROWTH
N	553	NATIVE MESQUITE				17.0	DAMAGED CAMBIUM
N	554	CATCLAW ACACIA				7.0	WIDE BASE
N	555	CATCLAW ACACIA				8.0	WIDE BASE
N	556	CATCLAW ACACIA				6.0	WIDE BASE
N	557	CATCLAW ACACIA				7.0	WIDE BASE
N	558	CATCLAW ACACIA				6.0	WIDE BASE
N	559	CATCLAW ACACIA				6.0	WIDE BASE
N	560	CATCLAW ACACIA				8.0	WIDE BASE
N	561	CATCLAW ACACIA				7.0	WIDE BASE
N	562	GREYTHORN				5.0	SUCKER GROWTH
	563	**NUMBER NOT USED**					
N	564	CATCLAW ACACIA				6.0	WIDE BASE
N	565	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	566	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	567	GREYTHORN				12.0	DAMAGED CAMBIUM
N	568	GREYTHORN				7.0	ANGLED TRUNK
N	569	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	570	CATCLAW ACACIA				8.0	WIDE BASE
N	571	HACKBERRY				12.0	WIDE BASE
N	572	CATCLAW ACACIA				7.0	WIDE BASE
N	573	CATCLAW ACACIA				8.0	WIDE BASE
N	574	CATCLAW ACACIA				10.0	WIDE BASE
N	575	CATCLAW ACACIA				7.0	WIDE BASE
N	576	CATCLAW ACACIA				14.0	WIDE BASE
N	577	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	578	CATCLAW ACACIA				9.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	579	CATCLAW ACACIA				8.0	WIDE BASE
N	580	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	581	CATCLAW ACACIA				10.0	WIDE BASE
N	582	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	583	CATCLAW ACACIA				12.0	WIDE BASE
N	584	GREYTHORN				10.0	WEAK STRUCTURE
N	585	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	586	CATCLAW ACACIA				12.0	WIDE BASE
N	587	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	587	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	588	CATCLAW ACACIA				10.0	WIDE BASE
N	589	CATCLAW ACACIA				14.0	WEAK STRUCTURE
	590	**NUMBER NOT USED**					
N	591 A	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	591 B	CATCLAW ACACIA				12.0	WIDE BASE
N	592	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	593	CATCLAW ACACIA				11.0	WIDE BASE
N	594	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	595	CATCLAW ACACIA				13.0	WIDE BASE
Y	596	BLUE PALO VERDE				8.0	
N	597	HACKBERRY				10.0	BROKEN BRANCHES
N	598	CATCLAW ACACIA				18.0	ANGLED TRUNK
N	599	CATCLAW ACACIA				14.0	WIDE BASE
N	600	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	601	CATCLAW ACACIA				8.0	WIDE BASE
N	602	CATCLAW ACACIA				6.0	WIDE BASE
N	603	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	604	CATCLAW ACACIA				13.0	WIDE BASE
N	605	CATCLAW ACACIA				13.0	ANGLED TRUNK
N	606	CATCLAW ACACIA				12.0	ANGLED TRUNK
N	607	NATIVE MESQUITE				14.0	ANGLED TRUNK
N	608	CATCLAW ACACIA				8.0	WIDE BASE
N	609	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	610	CATCLAW ACACIA				13.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	611	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	612	SCRUB OAK				13.0	BEH, WIDE BASE
N	613	SCRUB OAK				14.0	BEH, WEAK STRUCTURE
N	614	CATCLAW ACACIA				11.0	WIDE BASE
N	615	CATCLAW ACACIA				13.0	ANGLED TRUNK
N	616	CATCLAW ACACIA				17.0	ANGLED TRUNK
N	617	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	618	HACKBERRY				15.0	WIDE BASE
N	619	CATCLAW ACACIA				17.0	WEAK STRUCTURE
N	620	CATCLAW ACACIA				15.0	WIDE BASE
N	621	CATCLAW ACACIA				13.0	BROKEN BRANCHES
N	622	CATCLAW ACACIA				14.0	WIDE BASE
N	623	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	624	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	625	CATCLAW ACACIA				12.0	WIDE BASE
N	626	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	627	CATCLAW ACACIA				11.0	WIDE BASE
N	628	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	629	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	630	CATCLAW ACACIA				10.0	WIDE BASE
N	631	CATCLAW ACACIA				18.0	BROKEN BRANCHES
N	632	CATCLAW ACACIA				11.0	WIDE BASE
N	633	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	634	CATCLAW ACACIA				13.0	WIDE BASE
N	635	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	636	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	637	CATCLAW ACACIA				8.0	WIDE BASE
N	638	CATCLAW ACACIA				15.0	WEAK STRUCTURE
N	639	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	640	FOOTHILL PALO VERDE				12.0	DAMAGED CAMBIUM
N	641	CATCLAW ACACIA				13.0	WIDE BASE
N	642	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	643	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	644	CATCLAW ACACIA				9.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	645	CATCLAW ACACIA				18.0	WIDE BASE
N	646	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	647	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	648	CATCLAW ACACIA				13.0	WIDE BASE
N	649	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	650	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	651	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	652	CATCLAW ACACIA				15.0	BORE DAMAGE
N	653	CATCLAW ACACIA				17.0	BORE DAMAGE
N	654	CATCLAW ACACIA				15.0	WIDE BASE
N	655	CATCLAW ACACIA				18.0	WEAK STRUCTURE
N	656	CATCLAW ACACIA				15.0	WIDE BASE
N	657	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	658	FOOTHILL PALO VERDE				14.0	BORE DAMAGE
N	659	CATCLAW ACACIA				8.0	BORE DAMAGE
N	660	CATCLAW ACACIA				14.0	WIDE BASE
N	661	CATCLAW ACACIA				16.0	PARTIALLY DEAD
N	662	CATCLAW ACACIA				15.0	WIDE BASE
N	663	CATCLAW ACACIA				12.0	WIDE BASE
N	664	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	665	GREYTHORN				10.0	DAMAGED CAMBIUM
N	666	HACKBERRY				11.0	WIDE BASE
N	667	HACKBERRY				14.0	PARTIALLY DEAD
N	668	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	669	CATCLAW ACACIA				14.0	WIDE BASE
N	670	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	671	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	672	HACKBERRY				15.0	WIDE BASE
N	673	HACKBERRY				16.0	WEAK STRUCTURE
N	674	CATCLAW ACACIA				14.0	PARTIALLY DEAD
N	675	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	676	CATCLAW ACACIA				11.0	WIDE BASE
N	677	HACKBERRY				18.0	ANGLED TRUNK
N	678	CATCLAW ACACIA				12.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	679	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	680	CATCLAW ACACIA				12.0	WIDE BASE
N	681	FOOTHILL PALO VERDE				12.0	ANGLED TRUNK
N	682	CATCLAW ACACIA				8.0	WIDE BASE
N	683	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	684	CATCLAW ACACIA				16.0	WIDE BASE
N	685	CATCLAW ACACIA				7.0	WIDE BASE
N	686	CATCLAW ACACIA				8.0	WEAK STRUCTURE
N	687	CATCLAW ACACIA				8.0	WIDE BASE
N	688	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	689	CATCLAW ACACIA				15.0	WIDE BASE
N	690	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	691	CATCLAW ACACIA				19.0	WIDE BASE
N	692	CATCLAW ACACIA				16.0	WIDE BASE
N	693	CATCLAW ACACIA				15.0	WIDE BASE
N	694	SCRUB OAK				13.0	BEH, PARTIALLY DEAD
N	695	SCRUB OAK				13.0	BEH, WIDE BASE
N	696	SCRUB OAK				15.0	BEH, WEAK STRUCTURE
N	697	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	698	SCRUB OAK				15.0	BEH, WEAK STRUCTURE
N	699	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	700	SCRUB OAK				14.0	BEH, BORE DAMAGE
N	701	HACKBERRY				12.0	WIDE BASE
N	702	SCRUB OAK				13.0	BEH, WEAK STRUCTURE
N	703	GREYTHORN				10.0	PARTIALLY DEAD
N	704	CATCLAW ACACIA				11.0	WIDE BASE
N	705	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	706	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	707	HACKBERRY				11.0	WIDE BASE
N	708	GREYTHORN				11.0	EXPOSED ROOTS
N	709	CATCLAW ACACIA				12.0	WIDE BASE
N	710	HACKBERRY				18.0	WEAK STRUCTURE
N	711	CATCLAW ACACIA				12.0	WIDE BASE
N	712	GREYTHORN				10.0	WEAK STRUCTURE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	713	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	714	NATIVE MESQUITE				5.0	PARTIALLY DEAD
N	715	HACKBERRY				15.0	WIDE BASE
N	716	HACKBERRY				12.0	PARTIALLY DEAD
N	717	CATCLAW ACACIA				13.0	WIDE BASE
N	718	HACKBERRY				13.0	WEAK STRUCTURE
N	719	HACKBERRY				14.0	PARTIALLY DEAD
N	720	HACKBERRY				13.0	WIDE BASE
N	721	HACKBERRY				11.0	WEAK STRUCTURE
N	722	HACKBERRY				14.0	WIDE BASE
N	723	HACKBERRY				18.0	WEAK STRUCTURE
N	724	HACKBERRY				18.0	WIDE BASE
N	725	HACKBERRY				12.0	BROKEN BRANCHES
N	726	CATCLAW ACACIA				13.0	WIDE BASE
N	727	HACKBERRY				15.0	WEAK STRUCTURE
N	728	HACKBERRY				11.0	WIDE BASE
N	729	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	730	GREYTHORN				8.0	PITTED
N	731	CATCLAW ACACIA				14.0	WIDE BASE
N	732	CATCLAW ACACIA				11.0	PARTIALLY DEAD
N	733	CATCLAW ACACIA				12.0	WIDE BASE
N	734	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	735	CATCLAW ACACIA				13.0	WIDE BASE
N	736	GREYTHORN				12.0	BROKEN BRANCHES
N	737	CATCLAW ACACIA				11.0	WIDE BASE
N	738	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	739	HACKBERRY				11.0	WIDE BASE
N	740	GREYTHORN				10.0	PARTIALLY DEAD
N	741	GREYTHORN				9.0	DAMAGED CAMBIUM
N	742	CATCLAW ACACIA				15.0	DAMAGED CAMBIUM
N	743	CATCLAW ACACIA				16.0	WIDE BASE
N	744	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	745	HACKBERRY				15.0	WIDE BASE
N	746	HACKBERRY				12.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	747	HACKBERRY				14.0	WIDE BASE
N	748	HACKBERRY				16.0	WEAK STRUCTURE
N	749	HACKBERRY				17.0	PARTIALLY DEAD
N	750	CATCLAW ACACIA				16.0	WIDE BASE
N	751	GREYTHORN				18.0	WEAK STRUCTURE
N	752	CATCLAW ACACIA				15.0	BROKEN BRANCHES
N	753	NATIVE MESQUITE				12.0	PARTIALLY DEAD
N	754	CATCLAW ACACIA				20.0	ANGLED TRUNK
N	755	HACKBERRY				17.0	WIDE BASE
N	756	HACKBERRY				15.0	WEAK STRUCTURE
N	757	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	758	HACKBERRY				14.0	WIDE BASE
N	759	CATCLAW ACACIA				12.0	WEAK STRUCTURE
Y	760	BLUE PALO VERDE				10.0	
Y	761	BLUE PALO VERDE				10.0	
N	762	HACKBERRY				14.0	WIDE BASE
N	763	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	764	NATIVE MESQUITE				8.0	BORE DAMAGE
N	765	HACKBERRY				10.0	WIDE BASE
N	766	BLUE PALO VERDE				14.0	ANGLED TRUNK
N	767	HACKBERRY				15.0	WIDE BASE
N	768	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	769	HACKBERRY				15.0	WIDE BASE
N	770	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	771	HACKBERRY				11.0	WIDE BASE
N	772	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	773	CATCLAW ACACIA				11.0	WIDE BASE
N	774	CATCLAW ACACIA				9.0	WEAK STRUCTURE
N	775	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	776	HACKBERRY				8.0	WIDE BASE
N	777	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	778	CATCLAW ACACIA				11.0	WIDE BASE
N	779	CATCLAW ACACIA				8.0	BROKEN BRANCHES
N	780	CATCLAW ACACIA				9.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	781	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	782	CATCLAW ACACIA				11.0	WIDE BASE
N	783	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	784	CATCLAW ACACIA				14.0	WIDE BASE
N	785	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	786	CATCLAW ACACIA				9.0	PARTIALLY DEAD
N	787	CATCLAW ACACIA				14.0	WIDE BASE
N	788	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
Y	789	BLUE PALO VERDE				6.0	
N	790	CATCLAW ACACIA				8.0	WIDE BASE
N	791	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	792	CATCLAW ACACIA				16.0	PARTIALLY DEAD
N	793	FOOTHILL PALO VERDE				10.0	ANGLED TRUNK
N	794	FOOTHILL PALO VERDE				5.0	BORE DAMAGE
N	795	BLUE PALO VERDE				7.0	IN WASH
N	796	BLUE PALO VERDE				8.0	IN ROCK
N	797	BLUE PALO VERDE				12.0	IN WASH
N	798	CATCLAW ACACIA				10.0	WIDE BASE
N	799	BLUE PALO VERDE				14.0	ANGLED TRUNK
N	800	CATCLAW ACACIA				15.0	WIDE BASE
N	801	BLUE PALO VERDE				12.0	IN ROCK
N	802	BLUE PALO VERDE				13.0	BORE DAMAGE
N	803	CATCLAW ACACIA				14.0	WIDE BASE
N	804	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	805	CATCLAW ACACIA				12.0	WIDE BASE
N	806	CATCLAW ACACIA				13.0	IN ROCK
N	807	CATCLAW ACACIA				10.0	IN WASH
N	808	NATIVE MESQUITE				10.0	IN WASH
N	809	CATCLAW ACACIA				14.0	WIDE BASE
N	810	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	811	CATCLAW ACACIA				14.0	PARTIALLY DEAD
N	812	CATCLAW ACACIA				13.0	WIDE BASE
N	813	CATCLAW ACACIA				14.0	WEAK STRUCTURE
N	814	CATCLAW ACACIA				10.0	IN WASH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	815	CATCLAW ACACIA				11.0	IN ROCK
N	816	HACKBERRY				9.0	WIDE BASE
N	817	CATCLAW ACACIA				11.0	WEAK STRUCTURE
N	818	BLUE PALO VERDE				6.0	DAMAGED CAMBIUM
N	819	CATCLAW ACACIA				10.0	WIDE BASE
N	820	CATCLAW ACACIA				12.0	WEAK STRUCTURE
N	821	CATCLAW ACACIA				8.0	PARTIALLY DEAD
N	822	BLUE PALO VERDE				14.0	EXPOSED ROOTS
Y	823	BLUE PALO VERDE				5.0	
N	824	CATCLAW ACACIA				12.0	WIDE BASE
N	825	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	826	GREYTHORN				12.0	WIDE BASE
N	827	CATCLAW ACACIA				13.0	PARTIALLY DEAD
N	828	CATCLAW ACACIA				12.0	WIDE BASE
N	829	CATCLAW ACACIA				10.0	WEAK STRUCTURE
N	830	CATCLAW ACACIA				15.0	WEAK STRUCTURE
N	831	CATCLAW ACACIA				10.0	WIDE BASE
N	832	CATCLAW ACACIA				15.0	WEAK STRUCTURE
N	833	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	834	GREYTHORN				10.0	PARTIALLY DEAD
N	835	CATCLAW ACACIA				11.0	WIDE BASE
N	836	BLUE PALO VERDE				5.0	PARTIALLY DEAD
N	837	CATCLAW ACACIA				14.0	WIDE BASE
N	838	CATCLAW ACACIA				10.0	PARTIALLY DEAD
N	839	CATCLAW ACACIA				14.0	WIDE BASE
N	840	CATCLAW ACACIA				15.0	PARTIALLY DEAD
N	841	GREYTHORN				12.0	WIDE BASE
N	842	HACKBERRY				13.0	WEAK STRUCTURE
N	843	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	844	CATCLAW ACACIA				13.0	WIDE BASE
N	845	CATCLAW ACACIA				12.0	PARTIALLY DEAD
N	846	CATCLAW ACACIA				13.0	WEAK STRUCTURE
N	847	CATCLAW ACACIA				12.0	WIDE BASE
N	848	BLUE PALO VERDE				5.0	PARTIALLY DEAD

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	849	FOOTHILL PALO VERDE				8.0	SUCKER GROWTH
N	850	CATCLAW ACACIA				7.0	WIDE BASE
N	851	CATCLAW ACACIA				7.0	WIDE BASE
N	852	CATCLAW ACACIA				6.0	WIDE BASE
N	853	HACKBERRY				14.0	WIDE BASE
N	854	CATCLAW ACACIA				8.0	WIDE BASE
N	855	CATCLAW ACACIA				8.0	WIDE BASE
N	856	CATCLAW ACACIA				8.0	WIDE BASE
N	857	CATCLAW ACACIA				7.0	WIDE BASE
N	858	NATIVE MESQUITE				19.0	DAMAGED CAMBIUM
N	859	CATCLAW ACACIA				6.0	WIDE BASE
N	860	CATCLAW ACACIA				10.0	WIDE BASE
N	861	CATCLAW ACACIA				11.0	WIDE BASE
N	862	CATCLAW ACACIA				8.0	WIDE BASE
N	863	HACKBERRY				20.0	WIDE BASE
N	864	CATCLAW ACACIA				10.0	WIDE BASE
N	865	CATCLAW ACACIA				14.0	WIDE BASE
N	866	GREYTHORN				5.0	DAMAGED CAMBIUM
N	867	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	868	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	869	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	870	CATCLAW ACACIA				9.0	WIDE BASE
N	871	CATCLAW ACACIA				7.0	WIDE BASE
N	872	GREYTHORN				6.0	DAMAGED CAMBIUM
N	873	CATCLAW ACACIA				7.0	WIDE BASE
N	874	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	875	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	876	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	877	HACKBERRY				8.0	SUCKER GROWTH
N	878	HACKBERRY				7.0	SUCKER GROWTH
N	879	HACKBERRY				6.0	SUCKER GROWTH
N	880	HACKBERRY				6.0	SUCKER GROWTH
N	881	HACKBERRY				5.0	SUCKER GROWTH
N	882	HACKBERRY				5.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	883	CATCLAW ACACIA				7.0	WIDE BASE
N	884	CATCLAW ACACIA				7.0	WIDE BASE
N	885	CATCLAW ACACIA				8.0	WIDE BASE
N	886	HACKBERRY				6.0	SUCKER GROWTH
N	887	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	888	HACKBERRY				7.0	DAMAGED CAMBIUM
N	889	CATCLAW ACACIA				6.0	WIDE BASE
N	890	CATCLAW ACACIA				7.0	WIDE BASE
N	891	CATCLAW ACACIA				6.0	WIDE BASE
N	892	GREYTHORN				6.0	DAMAGED CAMBIUM
N	893	HACKBERRY				7.0	WIDE BASE
N	894	GREYTHORN				7.0	WIDE BASE
N	895	NATIVE MESQUITE				8.0	DAMAGED CAMBIUM
N	896	CATCLAW ACACIA				7.0	WIDE BASE
N	897	CATCLAW ACACIA				6.0	WIDE BASE
N	898	CATCLAW ACACIA				7.0	WIDE BASE
N	899	HACKBERRY				5.0	DAMAGED CAMBIUM
N	900	CATCLAW ACACIA				5.0	WIDE BASE
N	901	HACKBERRY				7.0	DAMAGED CAMBIUM
N	902	HACKBERRY				7.0	DAMAGED CAMBIUM
N	903	HACKBERRY				7.0	DAMAGED CAMBIUM
N	904	HACKBERRY				7.0	DAMAGED CAMBIUM
N	905	HACKBERRY				8.0	WIDE BASE
N	906	HACKBERRY				7.0	WIDE BASE
N	907	HACKBERRY				7.0	WIDE BASE
N	908	HACKBERRY				12.0	WIDE BASE
N	909	GREYTHORN				5.0	SUCKER GROWTH
N	910	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	911	CATCLAW ACACIA				7.0	WIDE BASE
N	912	CATCLAW ACACIA				6.0	WIDE BASE
N	913	HACKBERRY				6.0	DAMAGED CAMBIUM
N	914	HACKBERRY				8.0	WIDE BASE
N	915	HACKBERRY				7.0	DAMAGED CAMBIUM
N	916	HACKBERRY				12.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	917	CATCLAW ACACIA				8.0	WIDE BASE
N	918	GREYTHORN				5.0	ANGLED TRUNK
N	919	HACKBERRY				8.0	DAMAGED CAMBIUM
N	920	HACKBERRY				5.0	SUCKER GROWTH
N	921	HACKBERRY				7.0	SUCKER GROWTH
N	922	HACKBERRY				10.0	SUCKER GROWTH
N	923	HACKBERRY				6.0	DAMAGED CAMBIUM
N	924	HACKBERRY				15.0	WIDE BASE
N	925	GREYTHORN				7.0	DAMAGED CAMBIUM
N	926	GREYTHORN				5.0	WIDE BASE
N	927	CATCLAW ACACIA				7.0	WIDE BASE
N	928	CATCLAW ACACIA				10.0	WIDE BASE
N	929	CATCLAW ACACIA				7.0	WIDE BASE
N	930	CATCLAW ACACIA				9.0	WIDE BASE
N	931	CATCLAW ACACIA				9.0	WIDE BASE
N	932	CATCLAW ACACIA				6.0	WIDE BASE
N	933	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	934	HACKBERRY				10.0	WIDE BASE
N	935	CATCLAW ACACIA				7.0	WIDE BASE
N	936	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	937	CATCLAW ACACIA				11.0	SUCKER GROWTH
N	938	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	939	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	940	CATCLAW ACACIA				7.0	WIDE BASE
N	941	CATCLAW ACACIA				6.0	WIDE BASE
N	942	GREYTHORN				5.0	TIP DIEBACK
N	943	CATCLAW ACACIA				6.0	WIDE BASE
N	944	CATCLAW ACACIA				6.0	WIDE BASE
N	945	CATCLAW ACACIA				6.0	WIDE BASE
N	946	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	947	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	948	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	949	CATCLAW ACACIA				7.0	WIDE BASE
N	950	CATCLAW ACACIA				6.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	951	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	952	GREYTHORN				6.0	DAMAGED CAMBIUM
N	953	CATCLAW ACACIA				5.0	WIDE BASE
N	954	CATCLAW ACACIA				7.0	WIDE BASE
N	955	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	956	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	957	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	958	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	959	CATCLAW ACACIA				7.0	WIDE BASE
N	960	CATCLAW ACACIA				7.0	WIDE BASE
N	961	CATCLAW ACACIA				6.0	WIDE BASE
N	962	GREYTHORN				5.0	DAMAGED CAMBIUM
N	963	CATCLAW ACACIA				10.0	WIDE BASE
N	964	HACKBERRY				10.0	WIDE BASE
N	965	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	966	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	967	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	968	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	969	CATCLAW ACACIA				6.0	WIDE BASE
N	970	CATCLAW ACACIA				7.0	WIDE BASE
N	971	GREYTHORN				6.0	DAMAGED CAMBIUM
N	972	CATCLAW ACACIA				9.0	WIDE BASE
N	973	CATCLAW ACACIA				6.0	WIDE BASE
N	974	GREYTHORN				7.0	SUCKER GROWTH
N	975	GREYTHORN				8.0	DAMAGED CAMBIUM
N	976	GREYTHORN				7.0	DAMAGED CAMBIUM
N	977	HACKBERRY				7.0	WIDE BASE
N	978	HACKBERRY				7.0	DAMAGED CAMBIUM
Y	979	GREYTHORN				5.0	
N	980	HACKBERRY				10.0	DAMAGED CAMBIUM
N	981	CATCLAW ACACIA				8.0	WIDE BASE
N	982	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	983	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	984	CATCLAW ACACIA				7.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	985	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	986	CATCLAW ACACIA				14.0	WIDE BASE
N	987	CATCLAW ACACIA				7.0	WIDE BASE
N	988	HACKBERRY				12.0	DAMAGED CAMBIUM
N	989	HACKBERRY				12.0	WIDE BASE
N	990	HACKBERRY				14.0	WIDE BASE
N	991	HACKBERRY				18.0	WIDE BASE
N	992	HACKBERRY				16.0	WIDE BASE
N	993	CATCLAW ACACIA				6.0	WIDE BASE
N	994	CATCLAW ACACIA				7.0	WIDE BASE
N	995	CATCLAW ACACIA				5.0	WIDE BASE
N	996	CATCLAW ACACIA				14.0	WIDE BASE
N	997	CATCLAW ACACIA				8.0	WIDE BASE
N	998	CATCLAW ACACIA				7.0	WIDE BASE
N	999	CATCLAW ACACIA				15.0	SUCKER GROWTH
N	1000	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1001	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1002	HACKBERRY				11.0	DAMAGED CAMBIUM
N	1003	NATIVE MESQUITE				5.0	IN ROCK
N	1004	GREYTHORN				10.0	SUCKER GROWTH
N	1005	CATCLAW ACACIA				10.0	WIDE BASE
N	1006	CATCLAW ACACIA				7.0	WIDE BASE
N	1007	CATCLAW ACACIA				8.0	WIDE BASE
N	1008	CATCLAW ACACIA				9.0	WIDE BASE
N	1009	CATCLAW ACACIA				11.0	WIDE BASE
N	1010	CATCLAW ACACIA				9.0	WIDE BASE
N	1011	CATCLAW ACACIA				8.0	WIDE BASE
N	1012	CATCLAW ACACIA				7.0	WIDE BASE
N	1013	CATCLAW ACACIA				9.0	WIDE BASE
N	1014	GREYTHORN				7.0	WIDE BASE
N	1015	CATCLAW ACACIA				7.0	WIDE BASE
N	1016	CATCLAW ACACIA				7.0	WIDE BASE
N	1017	CATCLAW ACACIA				11.0	WIDE BASE
N	1018	CATCLAW ACACIA				12.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1019	CATCLAW ACACIA				11.0	WIDE BASE
N	1020	CATCLAW ACACIA				10.0	WIDE BASE
N	1021	CATCLAW ACACIA				10.0	WIDE BASE
N	1022	CATCLAW ACACIA				10.0	WIDE BASE
N	1023	CATCLAW ACACIA				8.0	WIDE BASE
N	1024	CATCLAW ACACIA				6.0	WIDE BASE
N	1025	CATCLAW ACACIA				16.0	WIDE BASE
N	1026	CATCLAW ACACIA				11.0	WIDE BASE
N	1027	CATCLAW ACACIA				7.0	WIDE BASE
N	1028	CATCLAW ACACIA				7.0	WIDE BASE
N	1029	CATCLAW ACACIA				9.0	WIDE BASE
N	1030	HACKBERRY				9.0	WIDE BASE
N	1031	HACKBERRY				9.0	WIDE BASE
N	1032	HACKBERRY				9.0	DAMAGED CAMBIUM
N	1033	CATCLAW ACACIA				7.0	WIDE BASE
N	1034	CATCLAW ACACIA				7.0	WIDE BASE
N	1035	CATCLAW ACACIA				7.0	WIDE BASE
N	1036	CATCLAW ACACIA				8.0	WIDE BASE
N	1037	CATCLAW ACACIA				8.0	WIDE BASE
N	1038	CATCLAW ACACIA				7.0	WIDE BASE
N	1039	CATCLAW ACACIA				10.0	WIDE BASE
N	1040	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1041	HACKBERRY				11.0	WIDE BASE
N	1042	GREYTHORN				8.0	WIDE BASE
N	1043	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1044	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1045	HACKBERRY				12.0	DAMAGED CAMBIUM
N	1046	CATCLAW ACACIA				7.0	WIDE BASE
N	1047	CATCLAW ACACIA				11.0	WIDE BASE
N	1048	CATCLAW ACACIA				10.0	WIDE BASE
N	1049	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1050	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1051	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1052	HACKBERRY				11.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1053	CATCLAW ACACIA				11.0	WIDE BASE
N	1054	GREYTHORN				8.0	WIDE BASE
N	1055	CATCLAW ACACIA				12.0	WIDE BASE
N	1056	HACKBERRY				10.0	DAMAGED CAMBIUM
N	1057	CATCLAW ACACIA				8.0	WIDE BASE
N	1058	CATCLAW ACACIA				10.0	WIDE BASE
N	1059	CATCLAW ACACIA				8.0	WIDE BASE
N	1060	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1061	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1062	HACKBERRY				6.0	WIDE BASE
N	1063	HACKBERRY				9.0	WIDE BASE
N	1064	CATCLAW ACACIA				9.0	WIDE BASE
N	1065	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1066	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1067	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1068	CATCLAW ACACIA				8.0	WIDE BASE
N	1069	GREYTHORN				8.0	DAMAGED CAMBIUM
N	1070	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1071	CATCLAW ACACIA				8.0	WIDE BASE
N	1072	CATCLAW ACACIA				8.0	WIDE BASE
N	1073	CATCLAW ACACIA				10.0	WIDE BASE
N	1074	CATCLAW ACACIA				8.0	WIDE BASE
N	1075	CATCLAW ACACIA				10.0	WIDE BASE
N	1076	HACKBERRY				7.0	WIDE BASE
N	1077	CATCLAW ACACIA				8.0	WIDE BASE
N	1078	GREYTHORN				8.0	WIDE BASE
N	1079	CATCLAW ACACIA				7.0	WIDE BASE
N	1080	CATCLAW ACACIA				7.0	WIDE BASE
N	1081	CATCLAW ACACIA				6.0	WIDE BASE
N	1082	CATCLAW ACACIA				7.0	WIDE BASE
N	1083	GREYTHORN				6.0	SUCKER GROWTH
N	1084	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1085	CATCLAW ACACIA				7.0	WIDE BASE
N	1086	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1087	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1088	CATCLAW ACACIA				5.0	WIDE BASE
N	1089	GREYTHORN				6.0	SUCKER GROWTH
N	1090	GREYTHORN				6.0	SUCKER GROWTH
N	1091	GREYTHORN				9.0	SUCKER GROWTH
N	1092	GREYTHORN				9.0	SUCKER GROWTH
N	1093	GREYTHORN				6.0	SUCKER GROWTH
N	1094	CATCLAW ACACIA				7.0	WIDE BASE
N	1095	CATCLAW ACACIA				6.0	WIDE BASE
N	1096	CATCLAW ACACIA				9.0	WIDE BASE
N	1097	CATCLAW ACACIA				6.0	WIDE BASE
N	1098	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1099	GREYTHORN				5.0	SUCKER GROWTH
N	1100	CATCLAW ACACIA				5.0	WIDE BASE
N	1101	CATCLAW ACACIA				7.0	WIDE BASE
N	1102	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1103	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1104	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1105	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1106	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1107	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1108	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1109	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1110	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1111	CATCLAW ACACIA				13.0	SUCKER GROWTH
N	1112	GREYTHORN				8.0	SUCKER GROWTH
N	1113	HACKBERRY				10.0	SUCKER GROWTH
N	1114	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1115	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1116	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1117	HACKBERRY				7.0	SUCKER GROWTH
N	1118	HACKBERRY				8.0	SUCKER GROWTH
N	1119	HACKBERRY				8.0	SUCKER GROWTH
N	1120	CATCLAW ACACIA				11.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1121	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1122	CATCLAW ACACIA				10.0	WIDE BASE
N	1123	CATCLAW ACACIA				8.0	WIDE BASE
N	1124	CATCLAW ACACIA				8.0	WIDE BASE
N	1125	CATCLAW ACACIA				6.0	WIDE BASE
N	1126	NATIVE MESQUITE				13.0	DAMAGED CAMBIUM
N	1127	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1128	CATCLAW ACACIA				11.0	WIDE BASE
N	1129	CATCLAW ACACIA				8.0	WIDE BASE
N	1130	CATCLAW ACACIA				5.0	WIDE BASE
N	1131	FOOTHILL PALO VERDE				5.0	IN ROCK
N	1132	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1133	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1134	FOOTHILL PALO VERDE				6.0	DAMAGED CAMBIUM
N	1135	CATCLAW ACACIA				8.0	WIDE BASE
N	1136	CATCLAW ACACIA				6.0	WIDE BASE
N	1137	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1138	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1139	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1140	CATCLAW ACACIA				6.0	IN ROCK
N	1141	FOOTHILL PALO VERDE				6.0	IN ROCK
N	1142	CATCLAW ACACIA				8.0	WIDE BASE
N	1143	HACKBERRY				12.0	DAMAGED CAMBIUM
N	1144	CATCLAW ACACIA				6.0	IN ROCK
N	1145	CATCLAW ACACIA				6.0	WIDE BASE
N	1146	CATCLAW ACACIA				8.0	WIDE BASE
N	1147	CATCLAW ACACIA				8.0	WIDE BASE
N	1148	CATCLAW ACACIA				8.0	WIDE BASE
N	1149	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1150	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1151	CATCLAW ACACIA				5.0	IN ROCK
N	1152	CATCLAW ACACIA				6.0	WIDE BASE
N	1153	CATCLAW ACACIA				12.0	WIDE BASE
N	1154	CATCLAW ACACIA				11.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1155	CATCLAW ACACIA				5.0	WIDE BASE
N	1156	CATCLAW ACACIA				7.0	WIDE BASE
N	1157	CATCLAW ACACIA				12.0	WIDE BASE
N	1158	CATCLAW ACACIA				13.0	SUCKER GROWTH
N	1159	HACKBERRY				9.0	WIDE BASE
N	1160	CATCLAW ACACIA				10.0	WIDE BASE
N	1161	CATCLAW ACACIA				6.0	WIDE BASE
N	1162	CATCLAW ACACIA				9.0	IN ROCK
N	1163	CATCLAW ACACIA				9.0	WIDE BASE
N	1164	CATCLAW ACACIA				9.0	WIDE BASE
N	1165	CATCLAW ACACIA				9.0	WIDE BASE
N	1166	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1167	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1168	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1169	CATCLAW ACACIA				8.0	WIDE BASE
N	1170	CATCLAW ACACIA				6.0	WIDE BASE
N	1171	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1172	GREYTHORN				7.0	SUCKER GROWTH
N	1173	CATCLAW ACACIA				8.0	IN ROCK
N	1174	GREYTHORN				6.0	SUCKER GROWTH
N	1175	CATCLAW ACACIA				7.0	WIDE BASE
N	1176	CATCLAW ACACIA				7.0	WIDE BASE
N	1177	GREYTHORN				7.0	SUCKER GROWTH
N	1178	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1179	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1180	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1181	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1182	GREYTHORN				6.0	DAMAGED CAMBIUM
N	1183	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	1184	GREYTHORN				5.0	DAMAGED CAMBIUM
N	1185	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1186	CATCLAW ACACIA				10.0	WIDE BASE
N	1187	HACKBERRY				15.0	WIDE BASE
N	1188	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1189	GREYTHORN				10.0	SUCKER GROWTH
N	1190	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1191	CATCLAW ACACIA				6.0	WIDE BASE
N	1192	CATCLAW ACACIA				7.0	WIDE BASE
N	1193	CATCLAW ACACIA				7.0	WIDE BASE
N	1194	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1195	HACKBERRY				7.0	WIDE BASE
N	1196	HACKBERRY				7.0	WIDE BASE
N	1197	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1198	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1199	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1200	WHITE THORN ACACIA				7.0	DAMAGED CAMBIUM
N	1201	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1202	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1203	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1204	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1205	CATCLAW ACACIA				9.0	DAMAGED CAMBIUM
N	1206	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1207	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1208	CATCLAW ACACIA				10.0	WIDE BASE
N	1209	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1210	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1211	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1212	CATCLAW ACACIA				10.0	WIDE BASE
N	1213	CATCLAW ACACIA				8.0	WIDE BASE
N	1214	CATCLAW ACACIA				15.0	WIDE BASE
N	1215	CATCLAW ACACIA				11.0	WIDE BASE
N	1216	GREYTHORN				9.0	DAMAGED CAMBIUM
N	1217	GREYTHORN				6.0	ANGLED TRUNK
N	1218	CATCLAW ACACIA				10.0	WIDE BASE
Y	1219	FOOTHILL PALO VERDE				6.0	
N	1220	CATCLAW ACACIA				12.0	WIDE BASE
N	1221	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1222	CATCLAW ACACIA				13.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1223	CATCLAW ACACIA				13.0	WIDE BASE
N	1224	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1225	CATCLAW ACACIA				8.0	WIDE BASE
N	1226	CATCLAW ACACIA				10.0	WIDE BASE
N	1227	CATCLAW ACACIA				15.0	WIDE BASE
N	1228	CATCLAW ACACIA				8.0	WIDE BASE
N	1229	CATCLAW ACACIA				7.0	WIDE BASE
N	1230	CATCLAW ACACIA				9.0	WIDE BASE
N	1231	CATCLAW ACACIA				9.0	WIDE BASE
N	1232	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	1233	CATCLAW ACACIA				10.0	WIDE BASE
N	1234	CATCLAW ACACIA				8.0	WIDE BASE
N	1235	CATCLAW ACACIA				7.0	WIDE BASE
N	1236	CATCLAW ACACIA				7.0	WIDE BASE
N	1237	CATCLAW ACACIA				6.0	WIDE BASE
N	1238	CATCLAW ACACIA				6.0	WIDE BASE
N	1239	CATCLAW ACACIA				6.0	WIDE BASE
N	1240	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1241	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	1242	CATCLAW ACACIA				6.0	WIDE BASE
N	1243	CATCLAW ACACIA				7.0	WIDE BASE
Y	1244	FOOTHILL PALO VERDE				6.0	
N	1245	CATCLAW ACACIA				6.0	WIDE BASE
N	1246	CATCLAW ACACIA				6.0	WIDE BASE
N	1247	CATCLAW ACACIA				8.0	WIDE BASE
N	1248	CATCLAW ACACIA				14.0	WIDE BASE
N	1249	CATCLAW ACACIA				7.0	WIDE BASE
N	1250	CATCLAW ACACIA				6.0	WIDE BASE
N	1251	CATCLAW ACACIA				8.0	WIDE BASE
N	1252	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1253	CATCLAW ACACIA				7.0	WIDE BASE
N	1254	CATCLAW ACACIA				7.0	WIDE BASE
N	1255	HACKBERRY				11.0	DAMAGED CAMBIUM
N	1256	CATCLAW ACACIA				13.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1257	HACKBERRY				13.0	DAMAGED CAMBIUM
N	1258	CATCLAW ACACIA				7.0	WIDE BASE
N	1259	CATCLAW ACACIA				7.0	WIDE BASE
N	1260	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1261	HACKBERRY				10.0	DAMAGED CAMBIUM
N	1262	HACKBERRY				13.0	DAMAGED CAMBIUM
N	1263	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1264	CATCLAW ACACIA				7.0	WIDE BASE
N	1265	CATCLAW ACACIA				7.0	TIP DIEBACK
N	1266	CATCLAW ACACIA				14.0	WIDE BASE
N	1267	CATCLAW ACACIA				8.0	WIDE BASE
N	1268	CATCLAW ACACIA				10.0	WIDE BASE
N	1269	HACKBERRY				8.0	DAMAGED CAMBIUM
N	1270	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1271	CATCLAW ACACIA				6.0	WIDE BASE
N	1272	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1273	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1274	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1275	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	1276	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1277	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1278	GREYTHORN				6.0	DAMAGED CAMBIUM
N	1279	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	1280	FOOTHILL PALO VERDE				6.0	EXPOSED ROOTS
N	1281	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1282	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1283	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1284	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1285	GREYTHORN				7.0	SUCKER GROWTH
N	1286	CATCLAW ACACIA				14.0	WIDE BASE
N	1287	NATIVE MESQUITE				6.0	DAMAGED CAMBIUM
N	1288	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1289	GREYTHORN				6.0	DAMAGED CAMBIUM
N	1290	CATCLAW ACACIA				6.0	IN ROCK

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1291	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	1292	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1293	CATCLAW ACACIA				8.0	WIDE BASE
N	1294	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1295	HACKBERRY				12.0	WIDE BASE
N	1296	HACKBERRY				12.0	WIDE BASE
N	1297	CATCLAW ACACIA				9.0	ANGLED TRUNK
N	1298	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1299	FOOTHILL PALO VERDE				6.0	IN ROCK
N	1300	CATCLAW ACACIA				6.0	IN ROCK
N	1301	WHITE THORN ACACIA				10.0	SUCKER GROWTH
N	1302	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1303	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1304	CATCLAW ACACIA				7.0	IN ROCK
N	1305	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1306	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1307	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1308	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1309	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1310	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1311	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1312	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1313	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1314	GREYTHORN				7.0	ANGLED TRUNK
N	1315	FOOTHILL PALO VERDE				6.0	EXPOSED ROOTS
N	1316	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1317	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1318	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1319	CATCLAW ACACIA				9.0	DAMAGED CAMBIUM
N	1320	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1321	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1322	FOOTHILL PALO VERDE				8.0	DAMAGED CAMBIUM
Y	1323	FOOTHILL PALO VERDE				6.0	
N	1324	CATCLAW ACACIA				7.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1325	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1326	GREYTHORN				7.0	SUCKER GROWTH
N	1327	GREYTHORN				6.0	ANGLED TRUNK
N	1328	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1329	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1330	CATCLAW ACACIA				7.0	SUCKER GROWTH
Y	1331	FOOTHILL PALO VERDE				6.0	
N	1332	CATCLAW ACACIA				7.0	WIDE BASE
N	1333	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	1334	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	1335	CATCLAW ACACIA				6.0	SUCKER GROWTH
Y	1336	FOOTHILL PALO VERDE				7.0	
N	1337	CATCLAW ACACIA				6.0	SUCKER GROWTH
Y	1338	GREYTHORN				6.0	
N	1339	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1340	GREYTHORN				10.0	WIDE BASE
N	1341	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1342	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1343	GREYTHORN				7.0	ANGLED TRUNK
N	1344	CRUCIFIXION THORN				6.0	DAMAGED CAMBIUM
N	1345	SCRUB OAK				8.0	SUCKER GROWTH
N	1346	CATCLAW ACACIA				6.0	WIDE BASE
N	1347	GREYTHORN				7.0	SUCKER GROWTH
N	1348	CRUCIFIXION THORN				9.0	DAMAGED CAMBIUM
N	1349	CRUCIFIXION THORN				7.0	DAMAGED CAMBIUM
N	1350	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1351	CATCLAW ACACIA				7.0	WIDE BASE
N	1352	GREYTHORN				6.0	SUCKER GROWTH
N	1353	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1354	CATCLAW ACACIA				9.0	ANGLED TRUNK
N	1355	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1356	GREYTHORN				7.0	SUCKER GROWTH
N	1357	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1358	CATCLAW ACACIA				8.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1359	CATCLAW ACACIA				8.0	WIDE BASE
N	1360	CRUCIFIXION THORN				7.0	DAMAGED CAMBIUM
N	1361	CRUCIFIXION THORN				5.0	DAMAGED CAMBIUM
N	1362	GREYTHORN				11.0	SUCKER GROWTH
N	1363	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1364	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1365	CRUCIFIXION THORN				13.0	DAMAGED CAMBIUM
N	1366	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1367	GREYTHORN				9.0	SUCKER GROWTH
N	1368	CRUCIFIXION THORN				7.0	DAMAGED CAMBIUM
N	1369	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1370	FOOTHILL PALO VERDE				5.0	SUCKER GROWTH
N	1371	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1372	FOOTHILL PALO VERDE				9.0	EXPOSED ROOTS
N	1373	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1374	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1375	GREYTHORN				7.0	SUCKER GROWTH
N	1376	FOOTHILL PALO VERDE				6.0	EXPOSED ROOTS
N	1377	FOOTHILL PALO VERDE				5.0	SUCKER GROWTH
N	1378	CATCLAW ACACIA				8.0	WIDE BASE
N	1379	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1380	CATCLAW ACACIA				9.0	WIDE BASE
N	1381	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1382	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1383	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1384	FOOTHILL PALO VERDE				8.0	DAMAGED CAMBIUM
N	1385	CATCLAW ACACIA				7.0	WIDE BASE
N	1386	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1387	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1388	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1389	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1390	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1391	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1392	CATCLAW ACACIA				5.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1393	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1394	GREYTHORN				7.0	SUCKER GROWTH
N	1395	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1396	CATCLAW ACACIA				8.0	WIDE BASE
N	1397	CRUCIFIXION THORN				8.0	SUCKER GROWTH
N	1398	CRUCIFIXION THORN				6.0	SUCKER GROWTH
N	1399	CRUCIFIXION THORN				10.0	SUCKER GROWTH
N	1400	GREYTHORN				7.0	SUCKER GROWTH
N	1401	GREYTHORN				7.0	SUCKER GROWTH
N	1402	CRUCIFIXION THORN				7.0	SUCKER GROWTH
N	1403	CRUCIFIXION THORN				8.0	SUCKER GROWTH
N	1404	CRUCIFIXION THORN				12.0	SUCKER GROWTH
N	1405	CRUCIFIXION THORN				14.0	SUCKER GROWTH
N	1406	CATCLAW ACACIA				5.0	TIP DIEBACK
N	1407	CATCLAW ACACIA				5.0	WIDE BASE
N	1408	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1409	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1410	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1411	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	1412	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	1413	CRUCIFIXION THORN				9.0	DAMAGED CAMBIUM
N	1414	CRUCIFIXION THORN				7.0	DAMAGED CAMBIUM
N	1415	CRUCIFIXION THORN				7.0	DAMAGED CAMBIUM
N	1416	CRUCIFIXION THORN				7.0	WIDE BASE
N	1417	GREYTHORN				5.0	SUCKER GROWTH
N	1418	GREYTHORN				5.0	SUCKER GROWTH
N	1419	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1420	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1421	CATCLAW ACACIA				9.0	WIDE BASE
N	1422	CRUCIFIXION THORN				7.0	SUCKER GROWTH
N	1423	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1424	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1425	GREYTHORN				9.0	SUCKER GROWTH
N	1426	CATCLAW ACACIA				9.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1427	GREYTHORN				9.0	SUCKER GROWTH
N	1428	HACKBERRY				8.0	DAMAGED CAMBIUM
N	1429	CATCLAW ACACIA				9.0	SUCKER GROWTH
N	1430	FOOTHILL PALO VERDE				7.0	EXPOSED ROOTS
N	1431	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1432	CATCLAW ACACIA				9.0	WIDE BASE
N	1433	CATCLAW ACACIA				8.0	WIDE BASE
Y	1434	NATIVE MESQUITE				6.0	
N	1435	CATCLAW ACACIA				9.0	DAMAGED CAMBIUM
N	1436	CATCLAW ACACIA				12.0	SUCKER GROWTH
N	1437	GREYTHORN				9.0	SUCKER GROWTH
N	1438	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1439	GREYTHORN				6.0	WIDE BASE
N	1440	GREYTHORN				10.0	SUCKER GROWTH
N	1441	GREYTHORN				7.0	SUCKER GROWTH
N	1442	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	1443	GREYTHORN				6.0	SUCKER GROWTH
N	1444	GREYTHORN				6.0	SUCKER GROWTH
N	1445	SCRUB OAK				12.0	SUCKER GROWTH
N	1446	SCRUB OAK				10.0	SUCKER GROWTH
N	1447	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1448	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1449	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1450	CATCLAW ACACIA				6.0	WIDE BASE
N	1451	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1452	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1453	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1454	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1455	GREYTHORN				9.0	SUCKER GROWTH
N	1456	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1457	CATCLAW ACACIA				15.0	SUCKER GROWTH
N	1458	FOOTHILL PALO VERDE				8.0	SUCKER GROWTH
N	1459	CATCLAW ACACIA				7.0	WIDE BASE
N	1460	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1461	CATCLAW ACACIA				13.0	WIDE BASE
Y	1462	FOOTHILL PALO VERDE				6.0	
N	1463	CATCLAW ACACIA				10.0	WIDE BASE
N	1464	CATCLAW ACACIA				10.0	WIDE BASE
N	1465	CATCLAW ACACIA				10.0	ANGLED TRUNK
N	1466	GREYTHORN				9.0	SUCKER GROWTH
N	1467	CATCLAW ACACIA				8.0	WIDE BASE
N	1468	SCRUB OAK				16.0	WIDE BASE
N	1469	CATCLAW ACACIA				6.0	WIDE BASE
N	1470	CATCLAW ACACIA				6.0	WIDE BASE
N	1471	CATCLAW ACACIA				7.0	WIDE BASE
N	1472	GREYTHORN				6.0	SUCKER GROWTH
N	1473	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1474	CATCLAW ACACIA				9.0	WIDE BASE
N	1475	CATCLAW ACACIA				6.0	WIDE BASE
N	1476	CATCLAW ACACIA				6.0	WIDE BASE
N	1477	CATCLAW ACACIA				8.0	WIDE BASE
N	1478	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1479	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1480	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1481	CATCLAW ACACIA				6.0	WIDE BASE
N	1482	CATCLAW ACACIA				6.0	WIDE BASE
N	1483	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1484	GREYTHORN				9.0	SUCKER GROWTH
N	1485	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1486	GREYTHORN				5.0	DAMAGED CAMBIUM
N	1487	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1488	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1489	GREYTHORN				6.0	SUCKER GROWTH
N	1490	CATCLAW ACACIA				12.0	WIDE BASE
N	1491	CATCLAW ACACIA				10.0	WIDE BASE
N	1492	CATCLAW ACACIA				6.0	WIDE BASE
N	1493	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1494	FOOTHILL PALO VERDE				6.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1495	FOOTHILL PALO VERDE				6.0	DAMAGED CAMBIUM
N	1496	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1497	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1498	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1499	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1500	CATCLAW ACACIA				7.0	WIDE BASE
N	1501	CATCLAW ACACIA				7.0	WIDE BASE
N	1502	GREYTHORN				5.0	SUCKER GROWTH
N	1503	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1504	GREYTHORN				7.0	SUCKER GROWTH
N	1505	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
N	1506	GREYTHORN				7.0	SUCKER GROWTH
N	1507	GREYTHORN				7.0	SUCKER GROWTH
N	1508	GREYTHORN				12.0	SUCKER GROWTH
N	1509	GREYTHORN				10.0	SUCKER GROWTH
N	1510	GREYTHORN				7.0	SUCKER GROWTH
N	1511	CATCLAW ACACIA				12.0	WIDE BASE
N	1512	CATCLAW ACACIA				12.0	WIDE BASE
N	1513	CATCLAW ACACIA				9.0	WIDE BASE
N	1514	GREYTHORN				13.0	SUCKER GROWTH
N	1515	CATCLAW ACACIA				15.0	WIDE BASE
N	1516	GREYTHORN				5.0	SUCKER GROWTH
N	1517	CATCLAW ACACIA				5.0	SUCKER GROWTH
N	1518	GREYTHORN				5.0	SUCKER GROWTH
N	1519	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1520	GREYTHORN				6.0	SUCKER GROWTH
N	1521	GREYTHORN				8.0	ANGLED TRUNK
N	1522	NATIVE MESQUITE				19.0	DAMAGED CAMBIUM
N	1523	GREYTHORN				10.0	SUCKER GROWTH
N	1524	CATCLAW ACACIA				7.0	WIDE BASE
N	1525	CATCLAW ACACIA				7.0	WIDE BASE
N	1526	GREYTHORN				5.0	SUCKER GROWTH
N	1527	FOOTHILL PALO VERDE				6.0	DAMAGED CAMBIUM
N	1528	CATCLAW ACACIA				6.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1529	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1530	CATCLAW ACACIA				9.0	WIDE BASE
N	1531	CATCLAW ACACIA				14.0	WIDE BASE
N	1532	GREYTHORN				12.0	WIDE BASE
N	1533	GREYTHORN				7.0	ANGLED TRUNK
N	1534	GREYTHORN				9.0	WIDE BASE
N	1535	CATCLAW ACACIA				6.0	WIDE BASE
N	1536	CATCLAW ACACIA				10.0	WIDE BASE
Y	1537	GREYTHORN				6.0	
N	1538	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	1539	CATCLAW ACACIA				6.0	WIDE BASE
N	1540	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1541	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1542	FOOTHILL PALO VERDE				10.0	SUCKER GROWTH
N	1543	FOOTHILL PALO VERDE				7.0	SUCKER GROWTH
N	1544	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1545	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1546	CATCLAW ACACIA				14.0	WIDE BASE
N	1547	CATCLAW ACACIA				7.0	WIDE BASE
N	1548	CATCLAW ACACIA				7.0	WIDE BASE
N	1549	CATCLAW ACACIA				7.0	WIDE BASE
N	1550	CATCLAW ACACIA				7.0	WIDE BASE
N	1551	CATCLAW ACACIA				8.0	WIDE BASE
N	1552	CATCLAW ACACIA				8.0	WIDE BASE
N	1553	GREYTHORN				5.0	ANGLED TRUNK
N	1554	GREYTHORN				6.0	SUCKER GROWTH
N	1555	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1556	CATCLAW ACACIA				6.0	WIDE BASE
N	1557	CATCLAW ACACIA				7.0	WIDE BASE
N	1558	GREYTHORN				9.0	SUCKER GROWTH
N	1559	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1560	WHITE THORN ACACIA				7.0	SUCKER GROWTH
N	1561	CATCLAW ACACIA				11.0	SUCKER GROWTH
N	1562	GREYTHORN				6.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1563	CATCLAW ACACIA				6.0	WIDE BASE
N	1564	CATCLAW ACACIA				10.0	WIDE BASE
N	1565	FOOTHILL PALO VERDE				8.0	DAMAGED CAMBIUM
N	1566	CATCLAW ACACIA				7.0	WIDE BASE
N	1567	WHITE THORN ACACIA				14.0	DAMAGED CAMBIUM
N	1568	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1569	GREYTHORN				10.0	WIDE BASE
N	1570	GREYTHORN				10.0	WIDE BASE
N	1571	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1572	GREYTHORN				8.0	DAMAGED CAMBIUM
N	1573	CATCLAW ACACIA				7.0	WIDE BASE
N	1574	CATCLAW ACACIA				7.0	WIDE BASE
Y	1575	FOOTHILL PALO VERDE				6.0	
N	1576	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1577	FOOTHILL PALO VERDE				5.0	EXPOSED ROOTS
N	1578	CRUCIFIXION THORN				10.0	SUCKER GROWTH
N	1579	GREYTHORN				8.0	SUCKER GROWTH
Y	1580	FOOTHILL PALO VERDE				6.0	
N	1581	FOOTHILL PALO VERDE				6.0	ANGLED TRUNK
N	1582	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
N	1583	FOOTHILL PALO VERDE				5.0	EXPOSED ROOTS
N	1584	CATCLAW ACACIA				9.0	WIDE BASE
N	1585	CATCLAW ACACIA				5.0	WIDE BASE
N	1586	CATCLAW ACACIA				9.0	WIDE BASE
N	1587	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1588	CATCLAW ACACIA				7.0	WIDE BASE
N	1589	CATCLAW ACACIA				7.0	WIDE BASE
N	1590	GREYTHORN				10.0	SUCKER GROWTH
N	1591	CATCLAW ACACIA				6.0	WIDE BASE
Y	1592	FOOTHILL PALO VERDE				5.0	
N	1593	CATCLAW ACACIA				8.0	WIDE BASE
N	1594	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
Y	1595	FOOTHILL PALO VERDE				7.0	
N	1596	CATCLAW ACACIA				7.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1597	GREYTHORN				6.0	SUCKER GROWTH
Y	1598	NATIVE MESQUITE				7.0	
N	1599	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1600	CATCLAW ACACIA				7.0	WIDE BASE
N	1601	CATCLAW ACACIA				7.0	WIDE BASE
N	1602	NATIVE MESQUITE				10.0	DAMAGED CAMBIUM
N	1603	CATCLAW ACACIA				14.0	SUCKER GROWTH
N	1604	GREYTHORN				7.0	SUCKER GROWTH
N	1605	FOOTHILL PALO VERDE				9.0	WIDE BASE
Y	1606	HACKBERRY				5.0	
N	1607	GREYTHORN				5.0	SUCKER GROWTH
N	1608	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1609	CATCLAW ACACIA				7.0	WIDE BASE
N	1610	CATCLAW ACACIA				9.0	WIDE BASE
N	1611	GREYTHORN				9.0	SUCKER GROWTH
N	1612	FOOTHILL PALO VERDE				5.0	ANGLED TRUNK
N	1613	GREYTHORN				8.0	SUCKER GROWTH
N	1614	GREYTHORN				6.0	SUCKER GROWTH
N	1615	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1616	CATCLAW ACACIA				7.0	WIDE BASE
N	1617	CATCLAW ACACIA				13.0	WIDE BASE
N	1618	HACKBERRY				14.0	WIDE BASE
N	1619	CATCLAW ACACIA				7.0	WIDE BASE
N	1620	CATCLAW ACACIA				7.0	WIDE BASE
N	1621	CATCLAW ACACIA				12.0	WIDE BASE
N	1622	CATCLAW ACACIA				9.0	ANGLED TRUNK
N	1623	CATCLAW ACACIA				12.0	WIDE BASE
N	1624	CATCLAW ACACIA				13.0	WIDE BASE
N	1625	CATCLAW ACACIA				7.0	WIDE BASE
N	1626	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1627	CATCLAW ACACIA				13.0	WIDE BASE
N	1628	CATCLAW ACACIA				10.0	DAMAGED CAMBIUM
N	1629	CATCLAW ACACIA				16.0	WIDE BASE
N	1630	CATCLAW ACACIA				9.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1631	CATCLAW ACACIA				7.0	WIDE BASE
N	1632	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1633	CATCLAW ACACIA				7.0	WIDE BASE
N	1634	CATCLAW ACACIA				7.0	WIDE BASE
N	1635	FOOTHILL PALO VERDE				5.0	SUCKER GROWTH
N	1636	CATCLAW ACACIA				12.0	WIDE BASE
N	1637	HACKBERRY				9.0	WIDE BASE
N	1638	CATCLAW ACACIA				8.0	WIDE BASE
Y	1639	NATIVE MESQUITE				9.0	
N	1640	CATCLAW ACACIA				8.0	WIDE BASE
N	1641	GREYTHORN				8.0	SUCKER GROWTH
N	1642	GREYTHORN				13.0	SUCKER GROWTH
N	1643	CATCLAW ACACIA				9.0	WIDE BASE
N	1644	GREYTHORN				9.0	SUCKER GROWTH
N	1645	GREYTHORN				7.0	SUCKER GROWTH
N	1646	CATCLAW ACACIA				7.0	WIDE BASE
N	1647	CATCLAW ACACIA				8.0	WIDE BASE
N	1648	GREYTHORN				12.0	WIDE BASE
N	1649	CATCLAW ACACIA				12.0	WIDE BASE
N	1650	GREYTHORN				7.0	SUCKER GROWTH
N	1651	GREYTHORN				7.0	ANGLED TRUNK
N	1652	CATCLAW ACACIA				6.0	WIDE BASE
N	1653	GREYTHORN				8.0	SUCKER GROWTH
N	1654	GREYTHORN				7.0	SUCKER GROWTH
N	1655	CATCLAW ACACIA				9.0	WIDE BASE
N	1656	CATCLAW ACACIA				11.0	WIDE BASE
N	1657	CATCLAW ACACIA				13.0	WIDE BASE
N	1658	CATCLAW ACACIA				7.0	WIDE BASE
N	1659	CATCLAW ACACIA				10.0	WIDE BASE
N	1660	CATCLAW ACACIA				8.0	WIDE BASE
N	1661	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	1662	GREYTHORN				9.0	SUCKER GROWTH
N	1663	CATCLAW ACACIA				8.0	WIDE BASE
N	1664	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1665	FOOTHILL PALO VERDE				6.0	SUCKER GROWTH
N	1666	NATIVE MESQUITE				5.0	DAMAGED CAMBIUM
N	1667	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1668	FOOTHILL PALO VERDE				5.0	SUCKER GROWTH
N	1669	CATCLAW ACACIA				10.0	SUCKER GROWTH
N	1670	CATCLAW ACACIA				13.0	DAMAGED CAMBIUM
N	1671	GREYTHORN				7.0	SUCKER GROWTH
N	1672	CATCLAW ACACIA				10.0	WIDE BASE
N	1673	CATCLAW ACACIA				9.0	WIDE BASE
Y	1674	FOOTHILL PALO VERDE				8.0	
Y	1675	NATIVE MESQUITE				7.0	
N	1676	CATCLAW ACACIA				7.0	WIDE BASE
N	1677	GREYTHORN				7.0	WIDE BASE
N	1678	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1679	CATCLAW ACACIA				9.0	ANGLED TRUNK
N	1680	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1681	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1682	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1683	CATCLAW ACACIA				8.0	WIDE BASE
N	1684	CATCLAW ACACIA				6.0	WIDE BASE
N	1685	GREYTHORN				8.0	SUCKER GROWTH
N	1686	HACKBERRY				8.0	PARTIALLY DEAD
N	1687	CATCLAW ACACIA				7.0	WIDE BASE
N	1688	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1689	CATCLAW ACACIA				9.0	DAMAGED CAMBIUM
N	1690	CATCLAW ACACIA				10.0	WIDE BASE
N	1691	CATCLAW ACACIA				9.0	WIDE BASE
N	1692	CATCLAW ACACIA				6.0	WIDE BASE
N	1693	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1694	CATCLAW ACACIA				9.0	WIDE BASE
N	1695	CATCLAW ACACIA				10.0	WIDE BASE
N	1696	HACKBERRY				10.0	WIDE BASE
N	1697	HACKBERRY				8.0	WIDE BASE
N	1698	GREYTHORN				6.0	DAMAGED CAMBIUM

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1699	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1700	CATCLAW ACACIA				8.0	WIDE BASE
Y	1701	FOOTHILL PALO VERDE				6.0	
N	1702	CATCLAW ACACIA				6.0	WIDE BASE
N	1703	CATCLAW ACACIA				5.0	WIDE BASE
N	1704	CATCLAW ACACIA				7.0	WIDE BASE
N	1705	FOOTHILL PALO VERDE				5.0	DAMAGED CAMBIUM
N	1706	CATCLAW ACACIA				7.0	WIDE BASE
N	1707	CATCLAW ACACIA				5.0	WIDE BASE
N	1708	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1709	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1710	CATCLAW ACACIA				7.0	WIDE BASE
N	1711	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1712	CATCLAW ACACIA				12.0	WIDE BASE
N	1713	CATCLAW ACACIA				9.0	DAMAGED CAMBIUM
N	1714	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1715	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1716	CATCLAW ACACIA				6.0	WIDE BASE
N	1717	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1718	CATCLAW ACACIA				9.0	WIDE BASE
N	1719	CATCLAW ACACIA				6.0	WIDE BASE
N	1720	CATCLAW ACACIA				6.0	WIDE BASE
N	1721	CATCLAW ACACIA				6.0	WIDE BASE
N	1722	CATCLAW ACACIA				7.0	WIDE BASE
N	1723	CATCLAW ACACIA				10.0	WIDE BASE
N	1724	CATCLAW ACACIA				8.0	WIDE BASE
N	1725	CATCLAW ACACIA				6.0	WIDE BASE
N	1726	CATCLAW ACACIA				6.0	WIDE BASE
N	1727	CATCLAW ACACIA				7.0	WIDE BASE
N	1728	BLUE PALO VERDE				5.0	DAMAGED CAMBIUM
N	1729	CATCLAW ACACIA				12.0	WIDE BASE
N	1730	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	1731	CATCLAW ACACIA				7.0	WIDE BASE
N	1732	CATCLAW ACACIA				7.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1733	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1734	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1735	GREYTHORN				10.0	SUCKER GROWTH
N	1736	GREYTHORN				10.0	SUCKER GROWTH
N	1737	GREYTHORN				10.0	SUCKER GROWTH
N	1738	GREYTHORN				7.0	SUCKER GROWTH
N	1739	FOOTHILL PALO VERDE				7.0	DAMAGED CAMBIUM
N	1740	CATCLAW ACACIA				7.0	WIDE BASE
N	1741	GREYTHORN				5.0	DAMAGED CAMBIUM
N	1742	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1743	GREYTHORN				6.0	SUCKER GROWTH
N	1744	CATCLAW ACACIA				10.0	WIDE BASE
N	1745	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	1746	GREYTHORN				5.0	SUCKER GROWTH
N	1747	GREYTHORN				6.0	SUCKER GROWTH
N	1748	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1749	CATCLAW ACACIA				10.0	WIDE BASE
N	1750	CATCLAW ACACIA				8.0	WIDE BASE
N	1751	CATCLAW ACACIA				5.0	DAMAGED CAMBIUM
N	1752	GREYTHORN				9.0	DAMAGED CAMBIUM
N	1753	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1754	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1755	GREYTHORN				6.0	WIDE BASE
N	1756	CATCLAW ACACIA				7.0	WIDE BASE
N	1757	HACKBERRY				8.0	DAMAGED CAMBIUM
N	1758	CATCLAW ACACIA				8.0	WIDE BASE
N	1759	CATCLAW ACACIA				6.0	WIDE BASE
N	1760	CATCLAW ACACIA				7.0	WIDE BASE
N	1761	HACKBERRY				9.0	DAMAGED CAMBIUM
N	1762	SCRUB OAK				8.0	SUCKER GROWTH
N	1763	CATCLAW ACACIA				8.0	WIDE BASE
N	1764	BLUE PALO VERDE				5.0	ANGLED TRUNK
N	1765	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1766	CATCLAW ACACIA				8.0	WIDE BASE

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1767	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1768	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1769	CATCLAW ACACIA				6.0	WIDE BASE
N	1770	CATCLAW ACACIA				7.0	WIDE BASE
N	1771	GREYTHORN				5.0	DAMAGED CAMBIUM
N	1772	CATCLAW ACACIA				5.0	ANGLED TRUNK
N	1773	CATCLAW ACACIA				6.0	WIDE BASE
N	1774	CATCLAW ACACIA				6.0	WIDE BASE
N	1775	CATCLAW ACACIA				6.0	WIDE BASE
N	1776	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1777	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1778	CATCLAW ACACIA				7.0	WIDE BASE
N	1779	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1780	CATCLAW ACACIA				8.0	SUCKER GROWTH
N	1781	HACKBERRY				8.0	WIDE BASE
N	1782	CATCLAW ACACIA				8.0	WIDE BASE
N	1783	CATCLAW ACACIA				6.0	WIDE BASE
N	1784	HACKBERRY				11.0	WIDE BASE
N	1785	CATCLAW ACACIA				7.0	WIDE BASE
N	1786	CATCLAW ACACIA				8.0	WIDE BASE
N	1787	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	1788	CATCLAW ACACIA				8.0	DAMAGED CAMBIUM
N	1789	HACKBERRY				10.0	WIDE BASE
N	1790	CATCLAW ACACIA				7.0	WIDE BASE
N	1791	CATCLAW ACACIA				7.0	WIDE BASE
N	1792	GREYTHORN				7.0	DAMAGED CAMBIUM
N	1793	HACKBERRY				6.0	WIDE BASE
N	1794	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1795	HACKBERRY				10.0	WIDE BASE
N	1796	HACKBERRY				6.0	DAMAGED CAMBIUM
N	1797	HACKBERRY				7.0	WIDE BASE
N	1798	HACKBERRY				7.0	WIDE BASE
N	1799	CATCLAW ACACIA				7.0	WIDE BASE
N	1800	BLUE PALO VERDE				5.0	DEHYDRATED

CROWN COMMUNITY DEVELOPMENT
SERENO CANYON
NATIVE PLANT INVENTORY BY DESIERTO VERDE

SALVAGEABLE	TREE ID #	SPECIES	CACTI HT (FT.)	ARMS TOTAL FT.	NUM. OF ARMS	TRUNK DIA. IN.	COMMENTS
N	1801	CATCLAW ACACIA				7.0	WIDE BASE
N	1802	CATCLAW ACACIA				8.0	WIDE BASE
N	1803	CATCLAW ACACIA				8.0	WIDE BASE
N	1804	CATCLAW ACACIA				7.0	WIDE BASE
N	1805	CATCLAW ACACIA				8.0	WIDE BASE
N	1806	CATCLAW ACACIA				7.0	WIDE BASE
N	1807	CATCLAW ACACIA				7.0	WIDE BASE
N	1808	CATCLAW ACACIA				6.0	SUCKER GROWTH
N	1809	CATCLAW ACACIA				6.0	WIDE BASE
N	1810	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1811	CATCLAW ACACIA				7.0	ANGLED TRUNK
N	1812	CATCLAW ACACIA				7.0	WIDE BASE
N	1813	CATCLAW ACACIA				7.0	WIDE BASE
N	1814	CATCLAW ACACIA				7.0	WIDE BASE
N	1815	CATCLAW ACACIA				6.0	ANGLED TRUNK
N	1816	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1817	CATCLAW ACACIA				7.0	SUCKER GROWTH
N	1818	CATCLAW ACACIA				7.0	WIDE BASE
N	1819	CATCLAW ACACIA				7.0	WIDE BASE
N	1820	CATCLAW ACACIA				7.0	DAMAGED CAMBIUM
N	1821	CATCLAW ACACIA				6.0	DAMAGED CAMBIUM
N	1822	CATCLAW ACACIA				6.0	WIDE BASE
N	1823	HACKBERRY				7.0	WIDE BASE
N	1824	HACKBERRY				7.0	WIDE BASE
N	1825	HACKBERRY				7.0	WIDE BASE
N	1826	HACKBERRY				8.0	WIDE BASE
N	1827	HACKBERRY				7.0	DAMAGED CAMBIUM
N	1828	CATCLAW ACACIA				6.0	WIDE BASE