ELOY
National Gypsum Company
Final Drainage Report
TO 4E

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W.C. SCOUTTEN, INC.

Final Drainage Report
For
National Gypsum Facility
City of Eloy,
Pinal County, Arizona

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37685
JOEL P.
SAUREY
Date Signed 09.27.07
ARIZONA U.S.A.

Project No. 07-013

June 2007
Revised: August 2007
Revised: September 2007

APPROVED

CITY OF ELOY ENGINEER — DATE Oct 26, 2007

THE CITY APPROVES THIS REPORT FOR CONCEPT ONLY AND ACCEPTS NO LIABILITY FOR ERRORS OR OMISSIONS.

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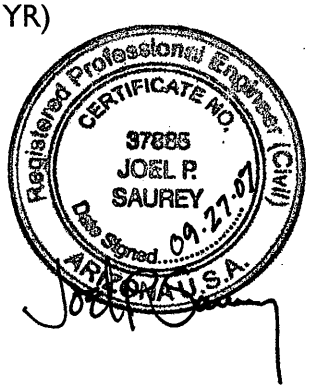
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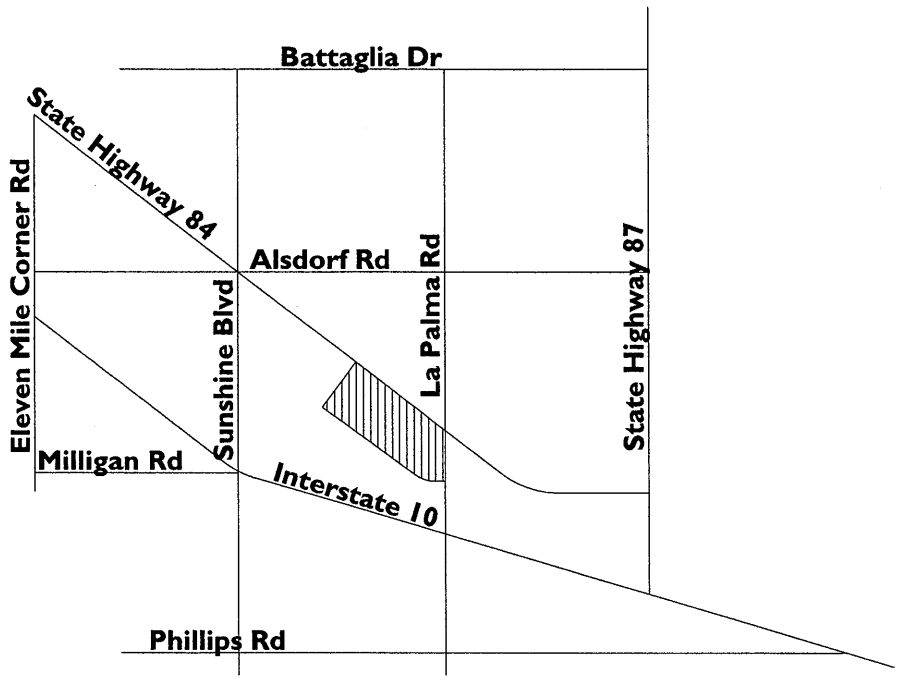


1.0 INTRODUCTION

The National Gypsum Facility is a proposed industrial operation near the City of Eloy on a property of approximately 120 Acres. The site is located within an area bound by Interstate 10 to the south, the La Palma Road alignment to the east, the Union Pacific Railroad (UPRR) to the north, and Sunshine Boulevard to the west. By legal description, the property is located in Section 8 of Township 8 South, Range 8 East of the Gila and Salt River Meridian in the City of Eloy, Arizona. See the vicinity map on the following page.

This final drainage report will describe drainage characteristics for the proposed improvements associated with the National Gypsum Facility. Design parameters from the City of Eloy and Pinal County have been applied to examine the drainage conditions. Calculations have been performed to analyze off-site hydrology, on-site drainage (pre-and-post development), and retention volumes.

VICINITY MAP



2.0 AREA EXISTING DRAINAGE CHARACTERISTICS

Existing Regional Offsite Drainage

The region around Eloy, Arizona is characterized by relatively flat agricultural land that receives storm event runoff from steeper terrain several miles away. Runoff is generated by the Picacho Range, Picacho Peak, and watershed areas as distant as the Tortolita Mountain Range. In close proximity to the Eloy area are notable watercourses. The McClellan Wash approaches Eloy from the East, north of I-10. The Santa Cruz Wash approaches Eloy from the south, essentially terminating into agricultural fields several miles south of Eloy in the area called the "Santa Cruz Flats". Recent storm events have revealed the tendency for Santa Cruz runoff to divert to the Greene's Canal affecting other parts of northwestern Pinal County. Lastly, there is an unnamed wash between the Santa Cruz and I-10 that produces discharge to the area south of the proposed National Gypsum facility in the vicinity of I-10 and La Palma. It is this watercourse that is the focus of this investigation.

Refer to **Appendix B**, Regional Drainage Map for a graphical delineation of the various basin areas that affect the region near Eloy. This Regional Drainage Map comes from a source cited for the benefit of this report, "Hydrologic Modeling Report for Picacho Peak Watersheds and Santa Cruz River Town of Eloy and Pinal County, Arizona" by CMG Drainage Engineering, Inc., hereafter referred to as the "CMG Report". The relation held between the development of the National Gypsum facility and the CMG Report is an analysis performed on the named watersheds, C-1 (Tortolita Tributary) and E-1 (Picacho Tributary) each of which contributes discharge to the unnamed wash in the vicinity of Interstate 10 and La Palma in Eloy. Without additional analysis on the hydrologic modeling from the CMG Report, this report accepts the 100-year discharge rate from the CMG Report near I-10 and La Palma of 4,991 cfs. Refer to **Appendix B**.

Design Storm

The design storm for analysis is the 100-year, 6-hour storm event. The calculated 4,991 cfs is a 100-year, 6-hour flowrate. The 6-hour event accounts for the peak flows for the areas delineated where the peak flow is the attribute of greatest interest. The 6-hour event better relates the peak discharge than other storm events, better particularly than the 24-hour event which offers volume or duration measurements for a watershed. When drainage facilities are to be constructed based on peak flow, as is the case with the National Gypsum site, the 100-year, 6-hour storm event is the more appropriate design event to evaluate.

Offsite Drainage Impacts to the National Gypsum Site

The primary analysis of the Regional Offsite Drainage as it affects the National Gypsum Site is the result of the 4,991 cfs impacting the area near I-10 and La Palma and the dynamic this has on the drainage facilities along I-10 and the land and irrigation features of the area south

of I-10. Refer to **Appendices C and D** for review of the Existing Conditions Drainage Exhibit and the Offsite Drainage- Hydraulic Calculations, respectively.

In the Existing Conditions Drainage Exhibit, three (3) critical features are displayed that dictate how the 100-year event discharge behaves. 1- The agricultural irrigation ditch aligned with the N-S midsection line in the field south of I-10 is a local area high-point. 2- Five (5) culverts (CUL #1- CUL#5) crossing I-10. 3- The La Palma Bridge crossing I-10.

The 100-year runoff collects south of I-10 and is detained by the barrier created by I-10 and the N-S midsection line agricultural ditch. The ponded storm water begins to interact with the three critical features in the following manner:

1- Water overtops the N-S midsection line agricultural irrigation ditch which acts as a broad-crested weir.
2- CUL #1- CUL #5 begin to discharge as headwater accumulates
3- Water crosses I-10 through the La Palma Bridge.

It is the last of these, the La Palma Bridge crossing, which conveys flow impacting the site where the National Gypsum Facility will be developed. The La Palma Bridge crossing results in a discharge of 350 cfs impacting the National Gypsum site.

The first of these, the agricultural irrigation ditch, and the second, the five I-10 culverts do not transfer runoff to areas impacting the National Gypsum Site. Stormwater which overtops the agricultural irrigation ditch heads west toward Sunshine Boulevard along the south side of I-10 impacting the southeast corner of the interchange. The overtopping of the irrigation ditch represents the greatest majority of the 100-year runoff that reaches this area. The five I-10 culverts discharge flow that impacts the area just north of I-10. However, this flow floods agricultural fields south of the National Gypsum site and runs off to the northwest and Sunshine Boulevard by forces of natural topography, graded farm fields, and irrigation facility barriers. Refer to **Appendix C**.

The ponded stormwater south of I-10 resulting from the regional 4,991 cfs was analyzed for each of the three features in the system to a given elevation head. The analysis for the system reached the regional discharge flow rate between elevations significant to the nearest tenth of 1578.7 and 1578.8. This elevation is also the approximate elevation at which I-10 would crest. No I-10 overtopping is considered. In the following table, Table 1, Regional Drainage Hydraulic Analysis, the behavior of each of the area features is explained. While Table 1 relates the discharge at the 1578.7 elevation, **Appendix D** offers hydraulic calculations of the behavior of each of the 3 featured systems beginning at the bottom elevation of the depressed land below I-10 and the irrigation ditch, elevation 1575.5. Hydraulic analysis of each of the features was treated in the following manner:

1- (N-S Midsection Line Irrigation Ditch): Broad-Crested Weir/Weir Equation, assumed ponded water surface, negligible approach velocity.
2- (CUL #1- CUL #5): Inlet control charts from USDOT.
3- (La Palma Bridge): Approach Channel and Bridge Capacity evaluation using HEC-RAS.

Table 1- Regional Drainage Hydraulic Analysis

Drainage Feature	Hydraulic Characteristic	Discharge at Elevation= 1578.7	Comment
N-S Midsection Irrigation Ditch	**Weir**	**4,237 cfs**	**Does not impact National Gypsum Site**
I-10 Culverts (CUL #1- CUL #5)	**Culvert Crossing**	**219 cfs**	**Does not impact National Gypsum Site**
La Palma Bridge	**Bridge Crossing**	**350 cfs**	**Primary Source of Flow impacting National Gypsum Site**

Refer to Appendix D

In **Appendix D**, and in Table 1 above, the total system discharge totals 4,806 cfs where 4,991 cfs is has been reported to generate from the offsite areas upstream. There would appear to be a disparity of 185 cfs. However, if the significance of 0.10', and magnitude of flow are considered, the system discharges 5,315 cfs at elevation 1578.8, far greater than the 4,991 cfs. Thus, the system evaluation to the nearest 0.10' at 1578.7 resulting in a system flow of 4,806 is a much closer approximation.

Once the discharge crosses the La Palma Bridge (350 cfs) this flow is contained in a wash section along La Palma between I-10 and the south section line of Section 8. At the south section line of Section 8, the wash section loses capacity and spill-out of some of the flow begins westerly. This location is the same where the project's collector street (Date St.) will intersect La Palma. There remains some capacity in the wash section that continues along La Palma to carry flow to low-lying area on the south side of the UPRR tracks. It is important to note that in the existing condition, any spill-out of flow continues to run off by sheet flow toward the south side of the UPRR tracks, converging again with the flow that was maintained in the La Palma wash section. Either way, whether or not contained in the La Palma wash section, the entirety of the 350 cfs reaches the south side of the railroad tracks west of La Palma.

Once the La Palma Bridge flow has reached the UPRR tracks, low-lying area on the south side of the tracks creates an existing section sufficient to convey the offsite water. Along the path of the railroad section are periodic berms leading water to culverts crossing to the north side of the UPRR tracks. These culverts cross the tracks from La Palma (upstream in section) to Tryon Avenue (downstream in section) (RR #1 – RR #6). Each culvert diverts a certain portion of the offsite flow along the path of the railroad section. These diversions, and the resulting flow has been analyzed in the existing condition for each of the identified railroad culverts (RR #1- RR #6). Refer to **Appendix C**. Each of the railroad culverts is matched with a culvert crossing State Highway 84 (Casa Grande-Picacho Highway). Ultimately, the offsite drainage in the existing condition crosses the UPRR and State

Highway 84, where on the north side of Highway 84, flow runs along a road ditch to Tryon Avenue. Tryon Avenue is the point of concentration of the outfall in the existing condition for the offsite flow that routes through the existing National Gypsum site property.

To analyze the existing conditions runoff along the La Palma and UPRR corridors, HEC-RAS was used to determine water surface elevations, resulting channel flows after culvert diversions, and flow velocity. Each of the culvert crossings were analyzed for headwater discharge capacity in line with the water surface elevation at a similar station shown in HEC-RAS. Refer to **Appendix E** for review of the Pre-developed Site HEC-RAS.

FEMA Flood Insurance Rate Map (F.I.R.M.) Assessment

The National Gypsum site property exists in Zone 'B' of the Flood Insurance Rate Map (Map Number 040077 1175 C, Effective Date August 15, 1983). Zone 'B' is described as:

"Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood."

Zone 'B' is not a FEMA Special Flood Hazard Area implicating a property to special conditions for insurance or other protective measures. Refer to **Appendix A**.

Reconciled with the offsite drainage analysis performed for this report, a revised FIRM Map will be issued for the area encompassing the National Gypsum site. Following the current effective map in **Appendix A** is the proposed revised FIRM Map. The revised map continues to show the Zone 'A' delineation south of I-10 but now refines the National Gypsum site by differentiating areas where flow will cause different flooding conditions.

The delineation south of I-10 results from the area drainage analyzed by the CMG Report and incorporated by this study to evaluate the affects of the ponded water against I-10. Then on the National Gypsum site, areas have been assigned new flood zone designations. Along the UPRR tracks, a shaded flood zone (base flood elevations and flood hazards determined) will be assessed. The balance of the property will be assessed an un-shaded flood determination (minimal flooding). The shaded flood zone that will be imposed on the property along the UPRR results from similar analysis previously presented in this report.

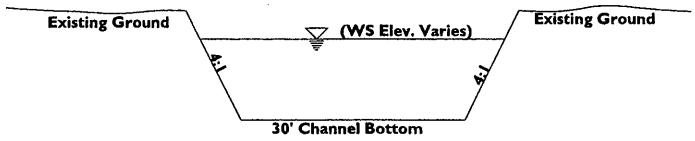
3.0 PROPOSED DRAINAGE PLAN

Management of Offsite Drainage

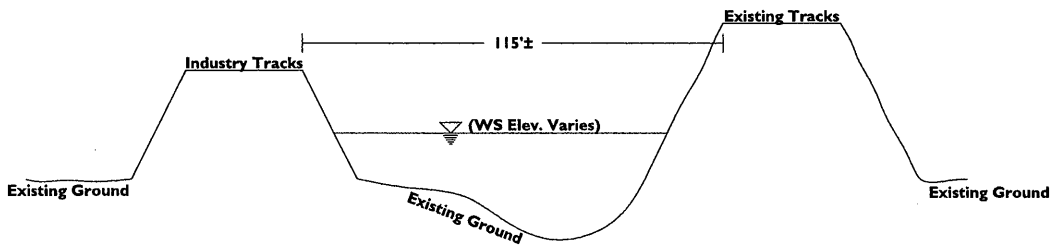
The management of offsite flows that impact the National Gypsum Site is to accept the existing offsite flows and convey them through the site to their historic points of discharge without increase to peak flow. The development of the site will preserve the historic

behavior of the drainage and not affect pre-development conditions post-development of the site.

To accomplish this, a channel, Channel I will be constructed to supplement the capacity of the La Palma wash section north of I-10, the receiving point of the 350 cfs crossing the La Palma Bridge. Refer to **Appendix F**. To service the National Gypsum site and coincident to improvements planned by the UPRR, a set of industry tracks will be constructed with this facility. The depth of Channel I daylights at the location common with the intersection of the industry tracks, where the hydraulic section available to convey the flow becomes the area between the existing UPRR tracks along Highway 84 and the industry tracks built in parallel to the existing tracks on the National Gypsum site. This area is identified as the Railroad Drainage Section in the Post-Developed Conditions Drainage Exhibit, **Appendix F**. A typical section of Channel I and the Railroad Drainage Section are found on the following page. Refer to **Appendix G** for results from the post-developed HEC-RAS analysis.



Channel I - Typical Section



Railroad Drainage - Typical Section

Just as the flow does in the existing condition carried in the section along the south side of the UPRR, the proposed Railroad Drainage Section likewise carries the flow along the UPRR and continues to experience lateral diversion of flow through the railroad culverts, the same as in the existing condition. The resulting hydraulics in the post-developed condition is the same as the pre-developed condition. In the following table, Table 2, Pre-developed and Post-developed Comparison, critical measurements of drainage quantities are evaluated at defined points along the path of La Palma and the UPRR.

Table 2- Pre-developed and Post-developed Comparison (100-yr)

Crossing	Size	Pre-Developed		Post-Developed	
		WSEL (ft)	Discharge (cfs)	WSEL (ft)	Discharge (cfs)
RR#1	48" CMP*	1572.65	20 *(11)*	1572.38	20 *(15)*
RR#2	2-27" CMPs	1569.90	34	1569.79	36
RR#3	2-2'x3.5' Boxes	1567.22	91	1567.30	98
RR#4	4-36"x22" CMPs	1566.75	148	1566.55	152
RR#5	3-60" CMPs*	1563.38	57 *(66)*	1560.04	44 *(49)*
RR#6	3-60" CMPs*	N/A	N/A	N/A	N/A
84#1	30"x24" CMP	1572.65	19	1573.00	22
84#2	2-36" CMP's	1569.90	52	1570.00	56
84#3	2-30" CMP's	1567.22	30	1567.30	40
84#4	4-30" RCP's	1566.75	144	1566.55	180
84#5	2-10'x3' Boxes	1563.38	105	1560.04	52
84#6	2-10'x3' Boxes	N/A	N/A	N/A	N/A

HEC-RAS Sections		Pre-Developed		Post-Developed	
Section Label	Discharge (cfs)	WSEL (ft)	Velocity (fps)	WSEL (ft)	Velocity (fps)
0.15	Minimal	1562.64	0.96	1562.13	0.05
0.21	66-Pre, 49-Post	1563.06	0.68	1563.11	0.02
0.47	214-Pre, 201-Post	1566.97	0.97	1567.12	2.13
0.60	305-Pre, 299-Post	1568.49	1.08	1568.95	2.48
0.75	339-Pre, 335-Post	1571.15	1.84	1571.82	3.29
0.85	350	1572.71	1.22	1573.05	1.52
5	350	1572.88	1.3	1573.09	0.68
15	350	1575.43	1.3	1575.04	0.67
20	350	1575.6	1.67	1575.08	0.64
29.3	350	1578.46	2.99	1578.52	2.93
35	350	1578.7	1.28	1578.75	1.26

* Culvert Crossings have been modified by UPRR from the existing:
48" CMP (new)—36" RCP (was exist), both 3-60" CMP (new)—4-58"x36" CMP (was exist) Refer to the Preliminary Drainage Report.
*Italicized labels in parenthesis represent discharges in the 100-year pre/post of each crossing prior to modification by the UPRR. Refer to the Preliminary Drainage Report.

Noted differences in the pre-developed and post-developed conditions are within reasonable tolerances of common engineering practice. In the particular case of RR #6, this culvert has been determined to serve primarily local flow from adjacent roadway and farm field, including the National Gypsum site. Since the peak flow, duration, and times of concentration between local flows and regional flows (like the flow affecting the site from the La Palma Bridge) are so vastly separated, this report considers primarily the regional flow in its analysis. It is given that local flows will discharge quickly at a lesser peak far in advance of the regional flows that follow.

Refer to **Appendix H**. An analysis of pre-vs.-post offsite hydrology has been performed for the 2-yr, 10-yr, and 25-yr events in concert with requirements of the Pinal County Drainage Manual. Using empirical methods to arrive at flows for the listed events, a summary, similar to Table 2 above has been generated for each of the storm events. Drainage patterns pre-vs.-post for each of these events is identical to that shown in the drainage exhibits for the 100-year event.

Management of Onsite Drainage

Pinal County design standards specify that retention basins must contain the 100-year, 2-hour storm event (2.80"). The maximum allowable side slope on any retention basin is 4:1. The following equation is used to determine the required retention volumes:

$\mathbf{V = D \times A \times C_w}$ (MCFCD Drainage Design Manual, Vol. 1, pp. 3-7, eq. 3.3)

Where:
V = Volume (ac-ft)
D = Rainfall depth from 100-year, 2-hour storm (2.80 in)
A = Drainage area (ac)
C_w = Weighted runoff coefficient

Drywells will be used when needed to aid in runoff percolation. Pinal County standards require all retention basins to drain their volume from the 100-year, 2-hour storm event within a 36-hour period. Where drywells may have to be utilized, unless valid as-built drywell percolation rates for other drywells in the immediate area are available, design percolation rates for drywells is limited to no more than 0.10 cfs.

The National Gypsum site benefits from ample area for site retention. Refer to **Appendix I** for calculations related to the site's runoff, retention, and basin dry-up rates, and for final evaluation of proposed on-site drainage conditions.

Effect of Storms Greater Than Design Event

The National Gypsum site has been afforded considerable open space area that by design has been depressed with the on-site retention basins. Facility floors are elevated above the area outfall at least 18" above the west end of the site at Sunshine Road.

Should an event greater than design, or large events in series occur, the site will experience consumption of the freeboard in the channel, then runoff to the site to the site retention basins, which in turn, runoff to the west end of the site and outfall near the intersection of Highway 84 and Sunshine Road. No facility finished floor is below 1572.00 where site outfall is approximately 1569.00.

4.0 Conclusions

- Drainage impacting the region has been evaluated for magnitude and direction as it affects the general area, and the specific National Gypsum site.

- Offsite drainage will continue to be managed in the post-developed condition in a way that preserves its behavior as evaluated in the existing condition.

- The Flood Insurance Rate Map for the area is being revised to reflect drainage conditions now acknowledged to exist in the area and on the National Gypsum site.

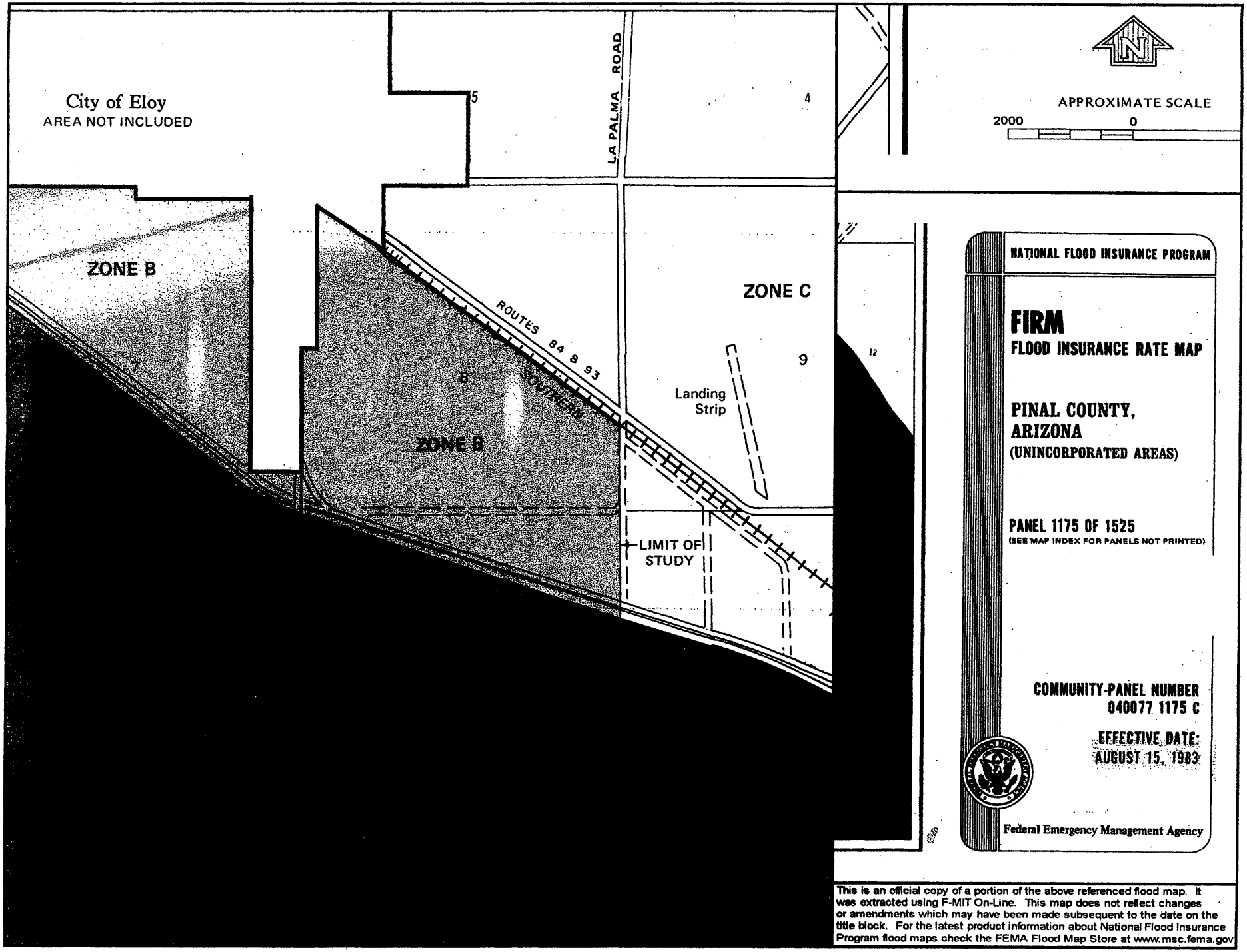
- Retention basins will be properly sized to retain the 100-year, 2-hour storm and the site will demonstrate adequate capacity for parking area and street runoff.

5.0 REFERENCES

CMG Drainage Engineering, Inc.: "Hydrologic Modeling Report for Picacho Peak Watersheds and Santa Cruz River Town of Eloy and Pinal County, Arizona."

Pinal County Drainage Manual, dated August 2004

APPENDIX A
FEMA (F.I.R.M.) Assessment

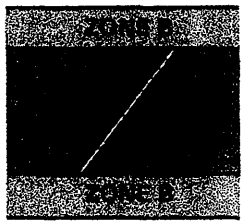

City of Eloy
AREA NOT INCLUDED
LA PALMA ROAD
5
4
APPROXIMATE SCALE
2000
0
ZONE B
ZONE C
ROUTES 84 & 93
SOUTHERN
Landing Strip
9
12
8
7
ZONE B
LIMIT OF STUDY
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
PINAL COUNTY, ARIZONA
(UNINCORPORATED AREAS)
PANEL 1175 OF 1525
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
040077 1175 C
EFFECTIVE DATE:
AUGUST 15, 1983
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

KEY TO MAP

500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations*



100-Year Flood Boundary

500-Year Flood Boundary

Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)

Elevation Reference Mark — RM7x

Zone D Boundary

River Mile — •M1.5

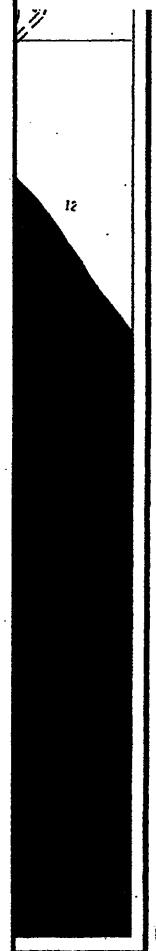
**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors

APPROXIMATE SCALE

2000 0



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

PINAL COUNTY, ARIZONA
(UNINCORPORATED AREAS)

PANEL 1175 OF 1525
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
040077 1175 C

EFFECTIVE DATE:
AUGUST 15, 1983

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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' NAVD 88. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table shown in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12 000 from photography dated 1992 or later.

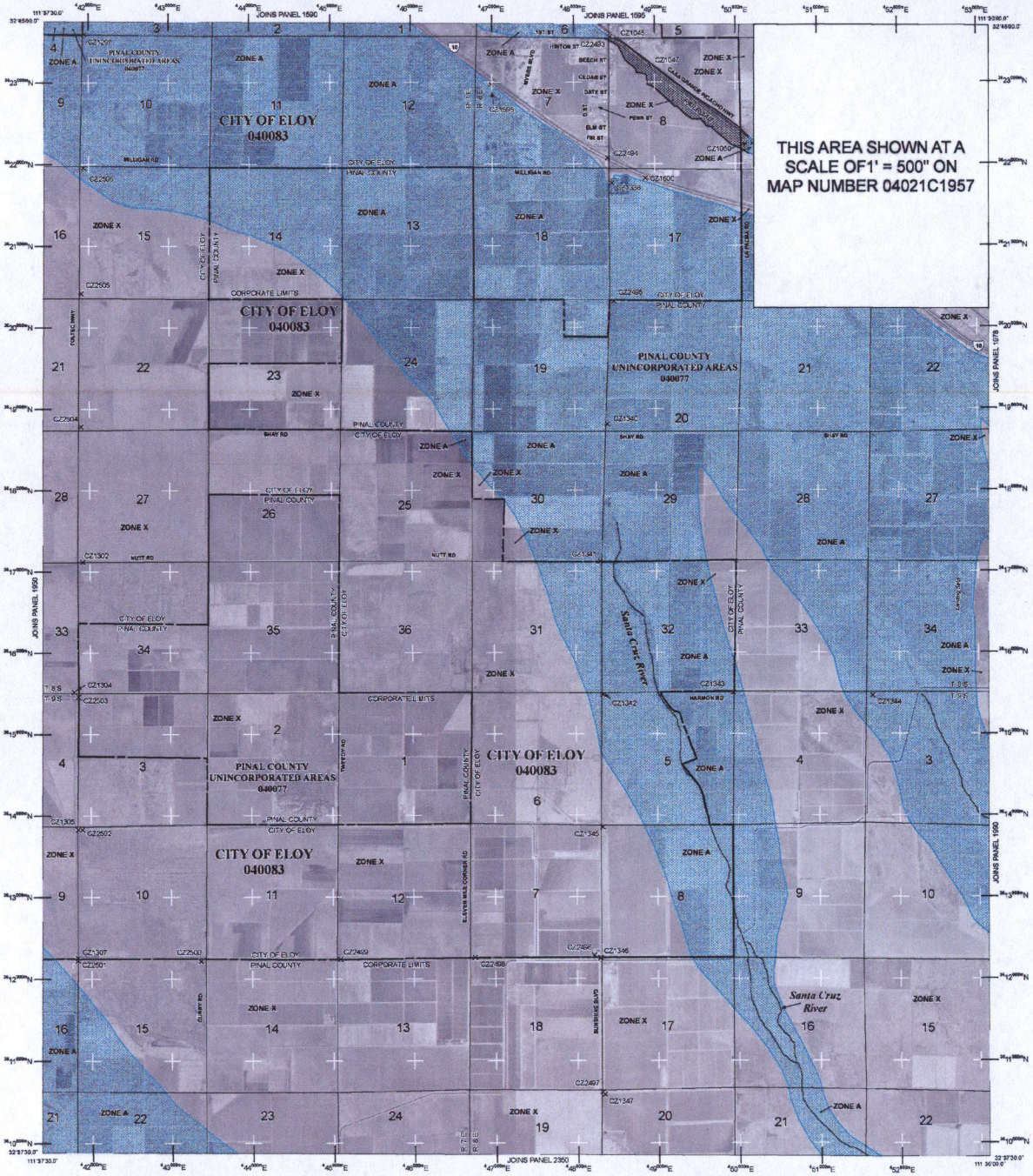
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, an accompanying Flood Insurance Study Report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, A1, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** — No base flood elevations determined.
- **ZONE AE** — Base flood elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** — Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** — Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97° 07' 30", 32° 22' 30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000 m N — 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT — 5000-foot grid ticks: Arizona State Plane coordinate system, central zone (FIPSZONE 0202), Transverse Mercator
- DX5510 x — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

PANEL 1975E

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

PINAL COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1975 OF 2575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PINAL COUNTY UNINCORPORATED AREAS	040077	1975	E
ELOY, CITY OF	040083	1975	E

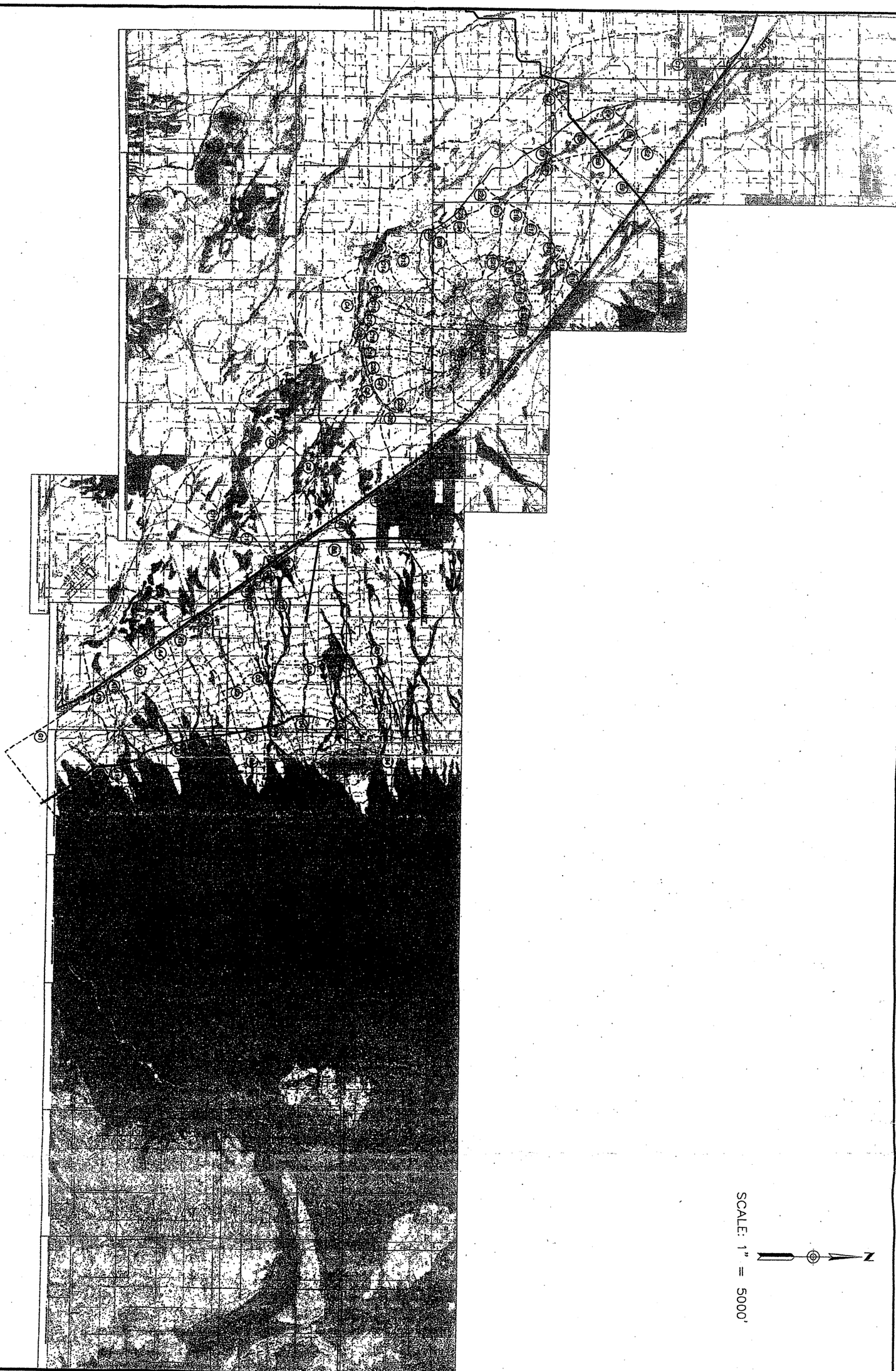
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 04021C1975E

EFFECTIVE DATE

Federal Emergency Management Agency

APPENDIX B
Regional Drainage Map



SCALE: 1" = 5000'

N

CMG DRAINAGE ENGINEERING, INC.

4574 N. 1st. AVE Tucson, Arizona 85718
Phone (520) 882-4244 Fax (520) 882-3006

FIGURE 2
WATERSHED MAP

Pinal County, Arizona

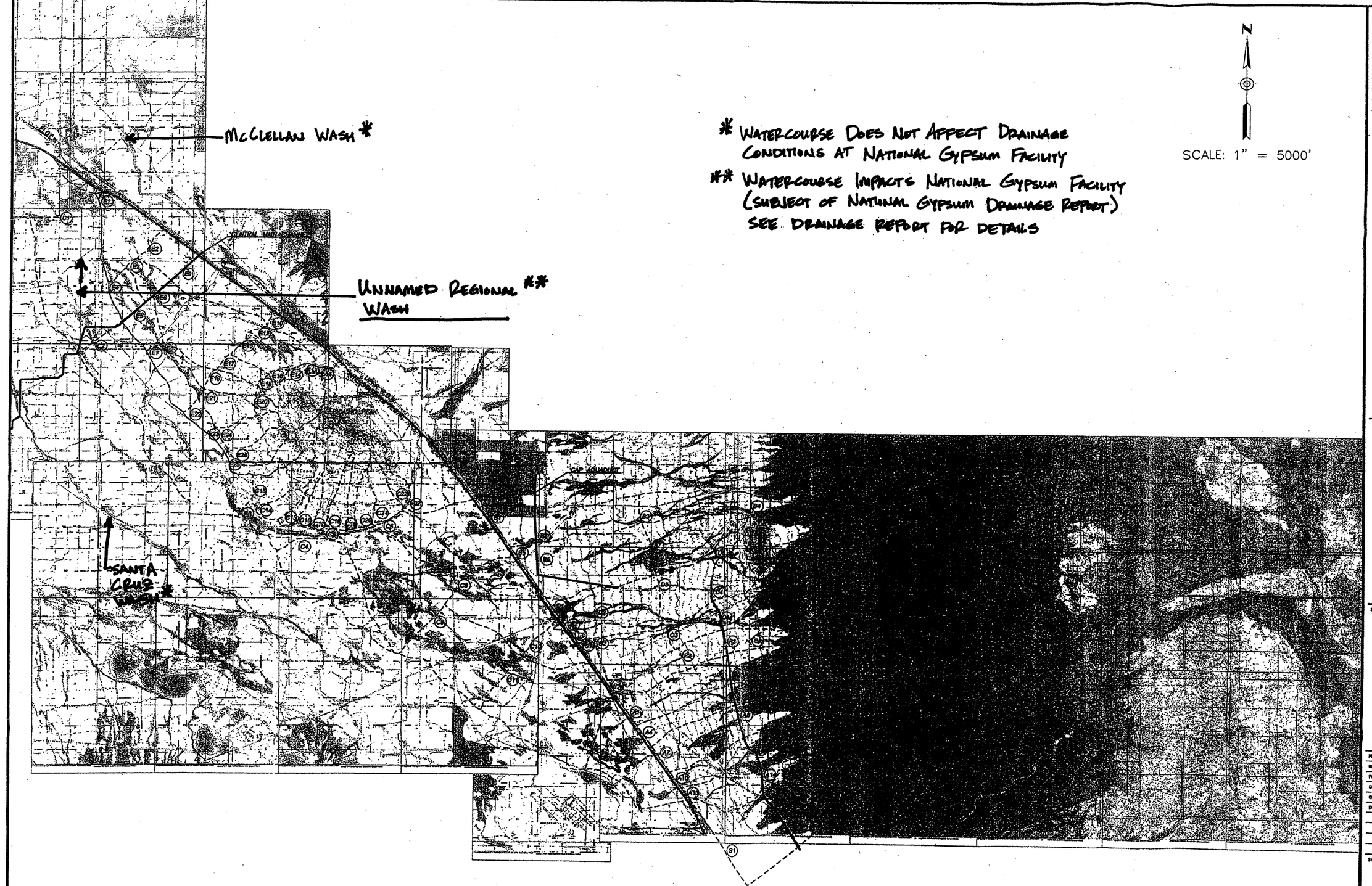
PROJECT NO. 23110
DATE 04-15-2004
DRAWN RJB
CHECKED RJB
APPR. RAS

SHEET NAME

SHEET NUMBER 1

REVISIONS

DATE



* WATERCOURSE DOES NOT AFFECT DRAINAGE CONDITIONS AT NATIONAL GYPSUM FACILITY

** WATERCOURSE IMPACTS NATIONAL GYPSUM FACILITY (SUBJECT OF NATIONAL GYPSUM DRAINAGE REPORT) SEE DRAINAGE REPORT FOR DETAILS

N

SCALE: 1" = 5000'

REVISION: | DATE:

FIGURE 2
WATERSHED MAP

Pinal County, Arizona

CMG DRAINAGE ENGINEERING, INC.
4574 N. 1st AVE Tucson, Arizona 85718
Phone (520) 882-4244 Fax (520) 882-3006

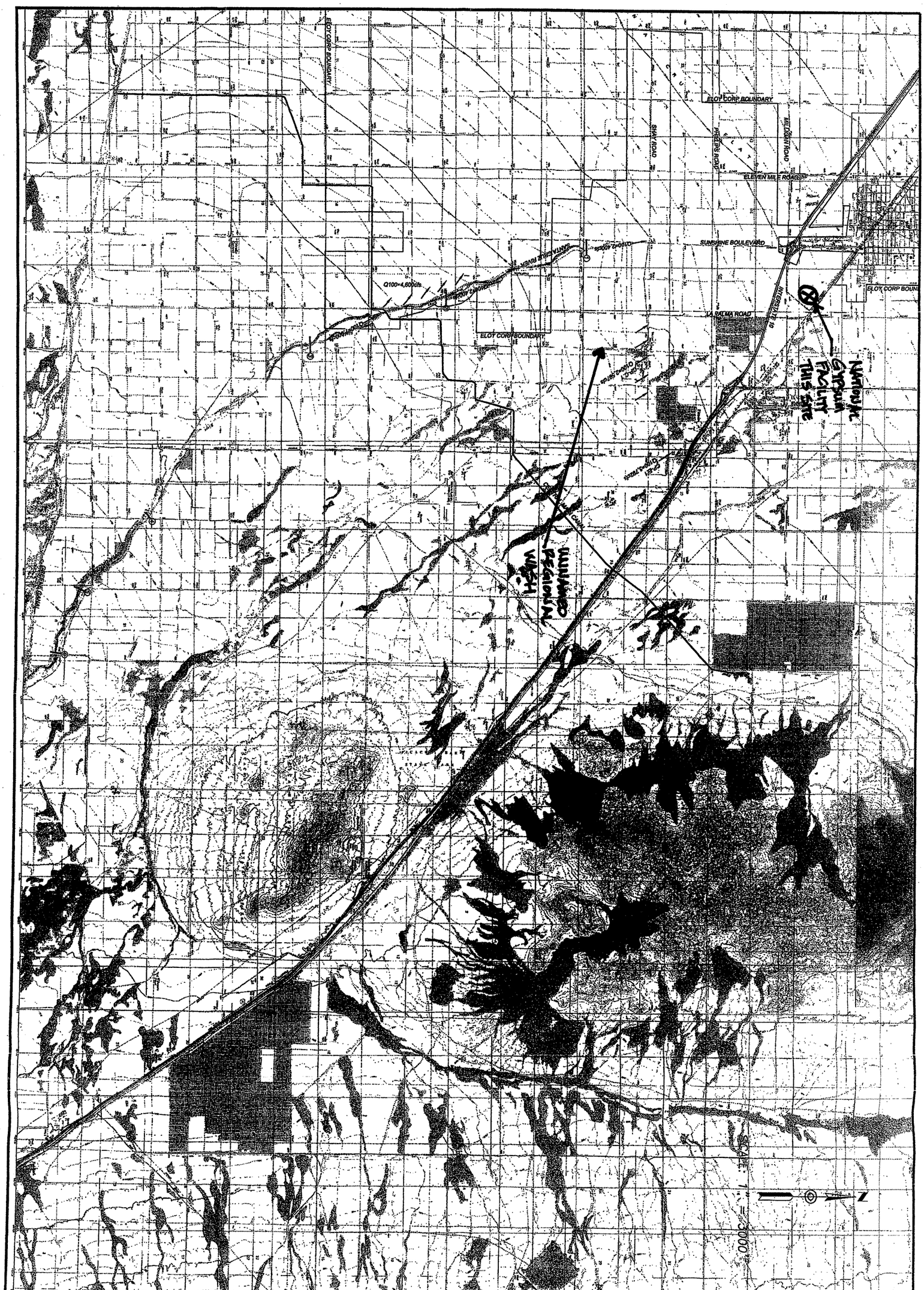
SEAL:

PROJECT NO.: 23118
DATE: 04-13-2004
FILE: -
DESIGN: RLB
CHECKED: RLB
DRAWN: RAS

SHEET NAME:

SHEET NUMBER:

1



SHEET NUMBER: 1

SHEET NAME:

PROJECT No.: 2319
DATE: 04-13-2004
FILE: -
DESIGN: RLB
DRAWN: RAS
RECORD: RLB

SCALE:

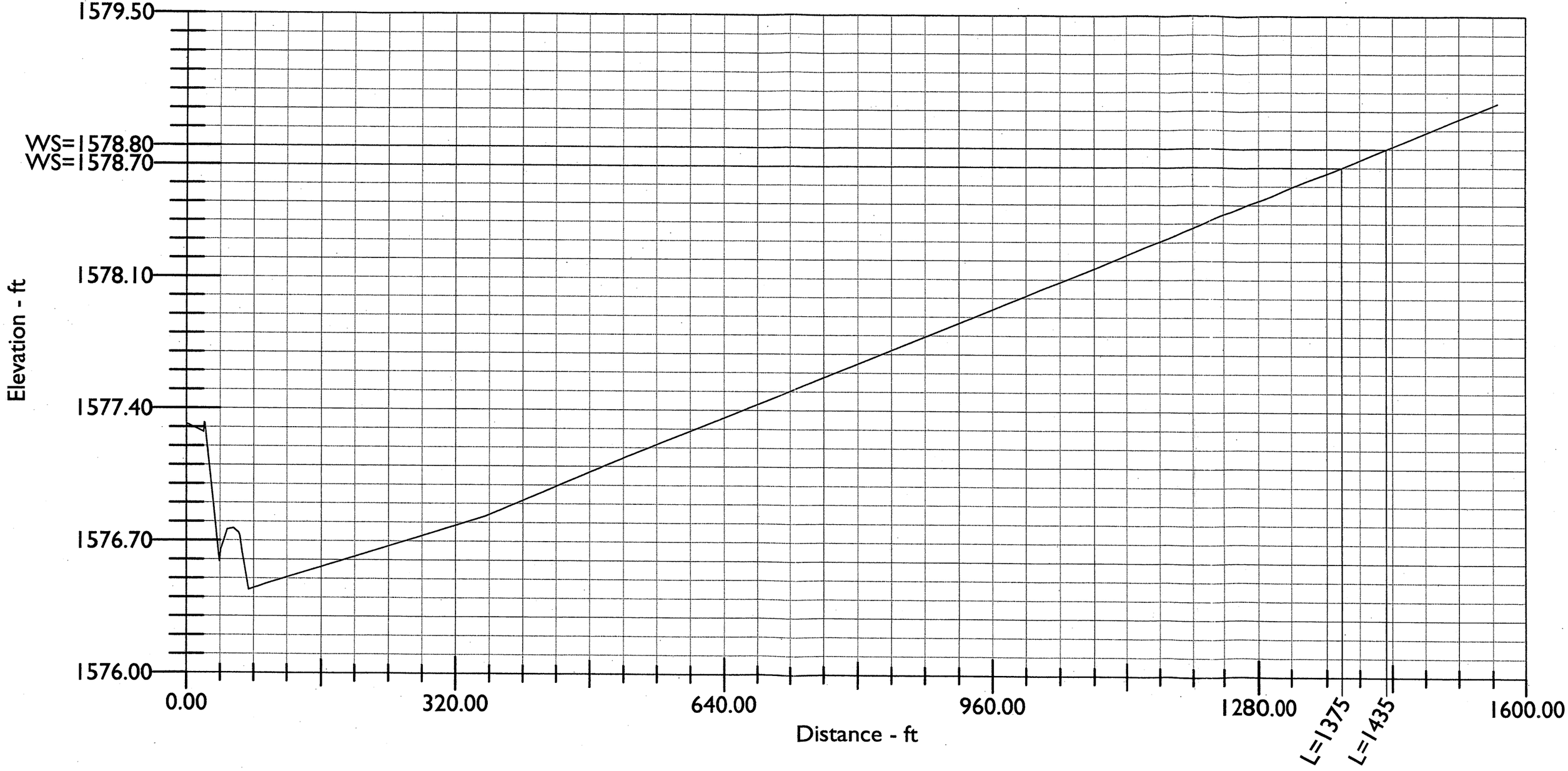
CMG DRAINAGE ENGINEERING, INC.

4574 N. 1st. AVE Tucson, Arizona 85718
Phone (520) 882-4244 Fax (520) 882-3066

FIGURE 3
CONCENTRATION POINTS NEAR ELOY, ARIZONA
Pinal County, Arizona

REVISION:
DATE:

Broadcrested Weir Cross-Section



Yahoo! Maps - Mesa, AZ 85215, US

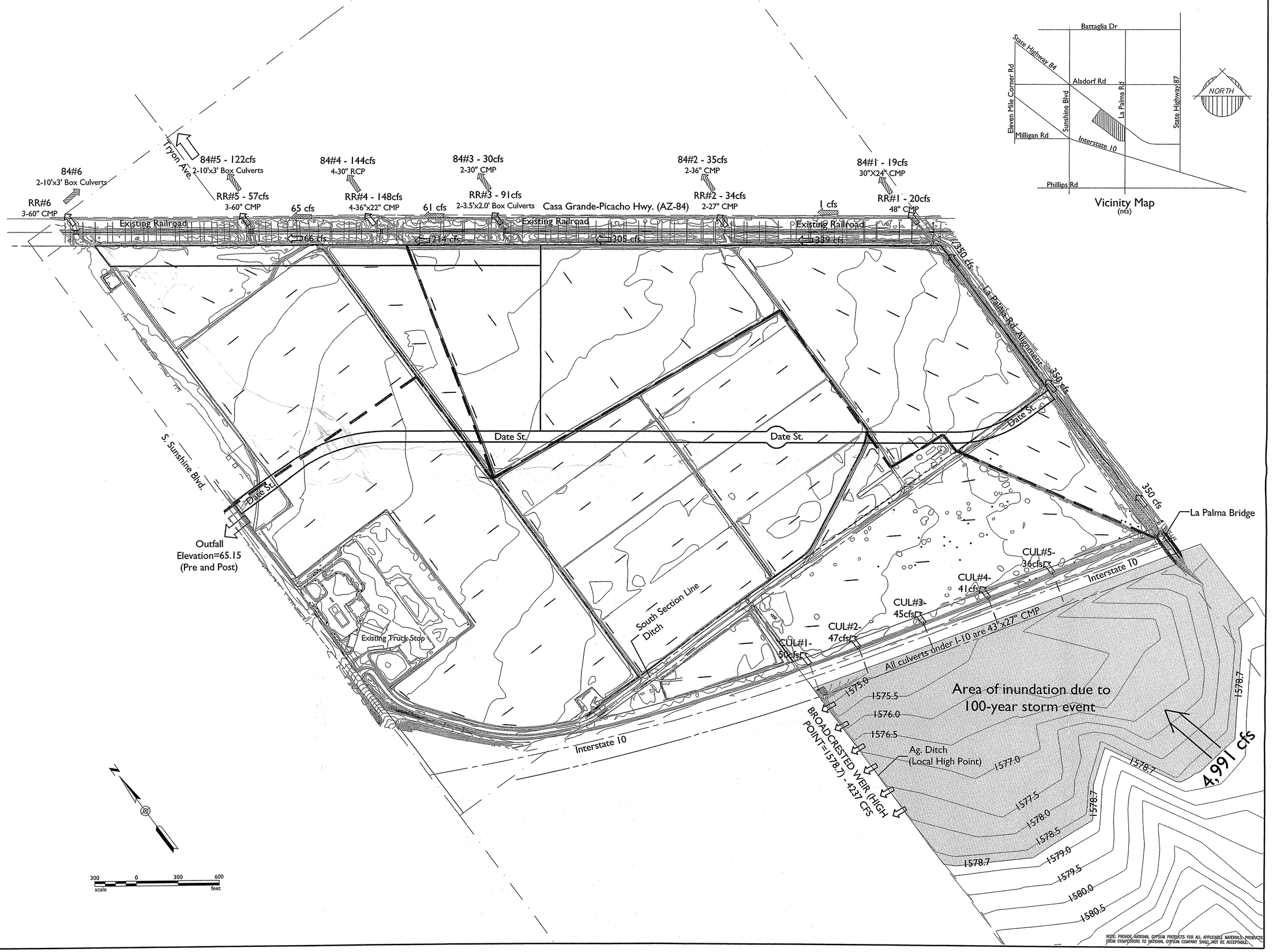
YAHOO! LOCAL Maps

DATE ST./SUNSHINE BLVD. INTERSECTION OUTFALL DETAIL



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, w
follow all traffic safety precautions. This is only to be used as an aid in planning.

APPENDIX C
Existing Offsite Drainage Exhibit



Vicinity Map
(nts)

NEW WALLBOARD FACILITY
FOR
National Gypsum COMPANY
ELOY, ARIZONA

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eps group, inc.
Engineers, Planners & Surveyors
2150-1 S. Country Club Dr., Ste. 22
Mesa, Arizona 85210
Phone (480) 503-2250
Fax (480) 503-2258
www.epsgroupinc.com

SEAL

Professional Professional Engineer (Civil)
CERTIFICATE NO.
37885
JOEL P.
SAUREY
Date Signed 09-28-07
ARIZONA, U.S.A.

REV	DATE	DRAWN	DESCRIPTION
1	04/06/07	–	1st SUBMITTAL
2	06/08/07	–	2nd SUBMITTAL

THIS DOCUMENT HAS BEEN ISSUED SOLELY FOR THE PURPOSE(S) NOTED IN THE REVISION BLOCK. UNTIL THIS SHEET HAS BEEN SPECIFICALLY ISSUED FOR CONSTRUCTION, FINAL PROJECT COORDINATION IS INCOMPLETE AND THE INFORMATION SHOWN HERE IS SUBJECT TO REVISION.

SHEET TITLE
EXISTING CONDITIONS
DRAINAGE EXHIBIT

DRAWN: JAH	
CHECKED: JAH	SHEET SIZE: 24x36
APPROVED: JPS	PLOT FACTOR: PAPER
PROJECT: 07-013	DATE: 04-01-2007
CAD NAME: DEEC	SCALE: 1"=300'

DRAWING NUMBER
EXIST.COND.-DE 1 of 1

NOTE: PROVIDE NATIONAL GYPSUM PRODUCTS FOR ALL APPLICABLE MATERIALS. PRODUCTS FROM COMPETITORS TO NATIONAL GYPSUM COMPANY SHALL NOT BE ACCEPTABLE.

APPENDIX D
Offsite Drainage Hydraulic Calculations

III STUDY RESULTS

The results of the HEC-1 model for the study watersheds are summarized by subbasin in Table 1. Runoff emanating from the Tortolita tributary is conveyed via sheetflow to the southeast property corner (Figure 3). Runoff emanating from the Picacho tributary is conveyed via sheetflow east of the project site, but is directed toward the project site near the northeast property boundary. HEC-1 model output is included in Appendix G of this report.

Table 1: 100-year Runoff at Watershed Outlet

Watershed	Area (sq. mi)	Subbasin Runoff (cfs)	Time of Peak (hrs)
C-1 (Tortolita Trib.)	130.5	2,597	16.58
E-1 (Picacho Trib.)	17.2	3,792	10.67
Combined	147.7	4,991	9.08

ACCEPTED AREA HYDROLOGY FOR NATIONAL GYPSUM FACILITY

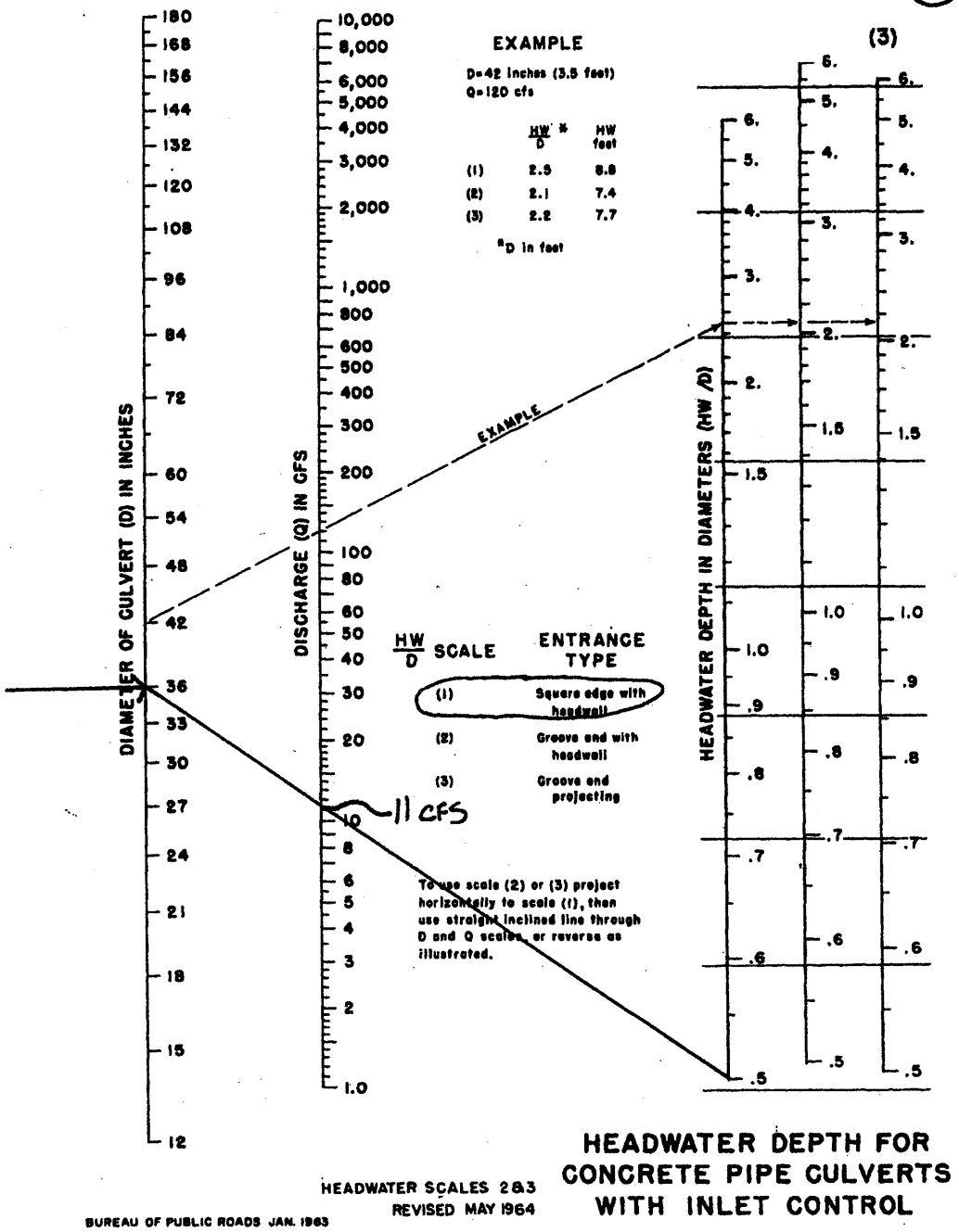
Elevation Based Offsite Runoff Calculations

Flow over broad-crested weir (South of I-10) Q=CLH^(3/2) Weir Coefficient (C)= 2.6				Flow through the 43"x27" culverts under I-10 (D=2.25')												Flow Under Bridge (From HEC-RAS)	Total System Flow
				Culvert #1 Invert = 1574.31		Culvert #2 Invert = 1574.88		Culvert #3 Invert = 1575		Culvert #4 Invert = 1575.26		Culvert #5 Invert = 1575.76		Culverts Total			
Water Surface Elevation	L-Length of Weir (ft)	H-Head (ft)	Q-Flow (cfs)	HW/D	Flow* (cfs)	HW/D	Flow* (cfs)	HW/D	Flow* (cfs)	HW/D	Flow* (cfs)	HW/D	Flow* (cfs)	Flow (cfs)		Flow (cfs)	Flow (cfs)
1579.0	1540	1.27	**5731**	2.08	54	1.83	49	1.78	48	1.66	45	1.44	40	**236**		**395**	**6362**
1578.8	1435	1.17	**4722**	2.00	52	1.74	47	1.69	46	1.57	42	1.35	36	**223**		**370**	**5315**
1578.7	1375	1.12	**4237**	1.95	50	1.70	47	1.64	45	1.53	41	1.31	36	**219**		**350**	**4806**
1578.5	1265	1.02	**3388**	1.86	49	1.61	44	1.56	42	1.44	39	1.22	33	**207**		**305**	**3900**
1578.0	990	0.77	**1739**	1.64	45	1.39	38	1.33	36	1.22	33	1.00	28	**180**		**230**	**2149**
1577.8	890	0.67	**1269**	1.55	42	1.30	36	1.24	34	1.13	30	0.91	22	**164**		**205**	**1638**
1577.6	775	0.57	**867**	1.46	40	1.21	33	1.16	32	1.04	29	0.82	20	**154**		**180**	**1201**
1577.4	665	0.47	**557**	1.37	37	1.12	30	1.07	29	0.95	25	0.73	17	**138**		**160**	**855**
1577.2	525	0.37	**307**	1.28	35	1.03	29	0.98	28	0.86	22	0.64	15	**129**		**140**	**576**
1577.0	415	0.27	**151**	1.20	33	0.94	24	0.89	21	0.77	19	0.55	11	**108**		**120**	**379**
1576.5	50	0.02	**0**	0.97	26	0.72	17	0.67	16	0.55	11	0.33	0	**70**		**80**	**150**
1576.0	0	0	**0**	0.75	18	0.50	9.7	0.44	8	0.33	0	0.11	0	**35.7**		**50**	**86**
1575.5	0	0	**0**	0.53	10.5	0.28	0	0.22	0	0.11	0		0	**10.5**		**26**	**37**

* Flows derived from Chart 34B of Hydraulic Design of Highway Culverts (USDOT)

(R#1
1-36" CONCRETE PIPE)

CHART 1B



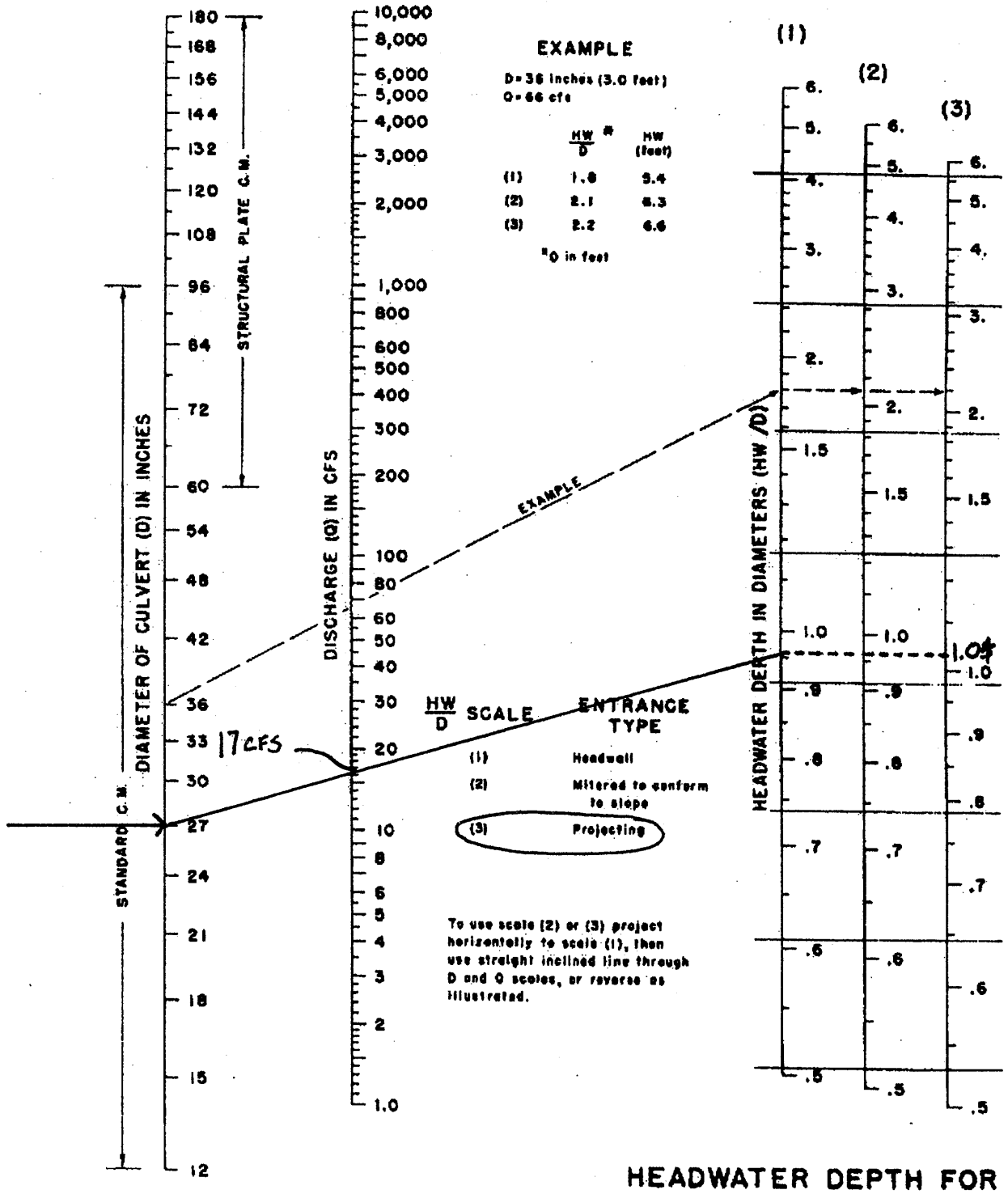
HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

CK#2
(2-27" CMP)

CHART 2B

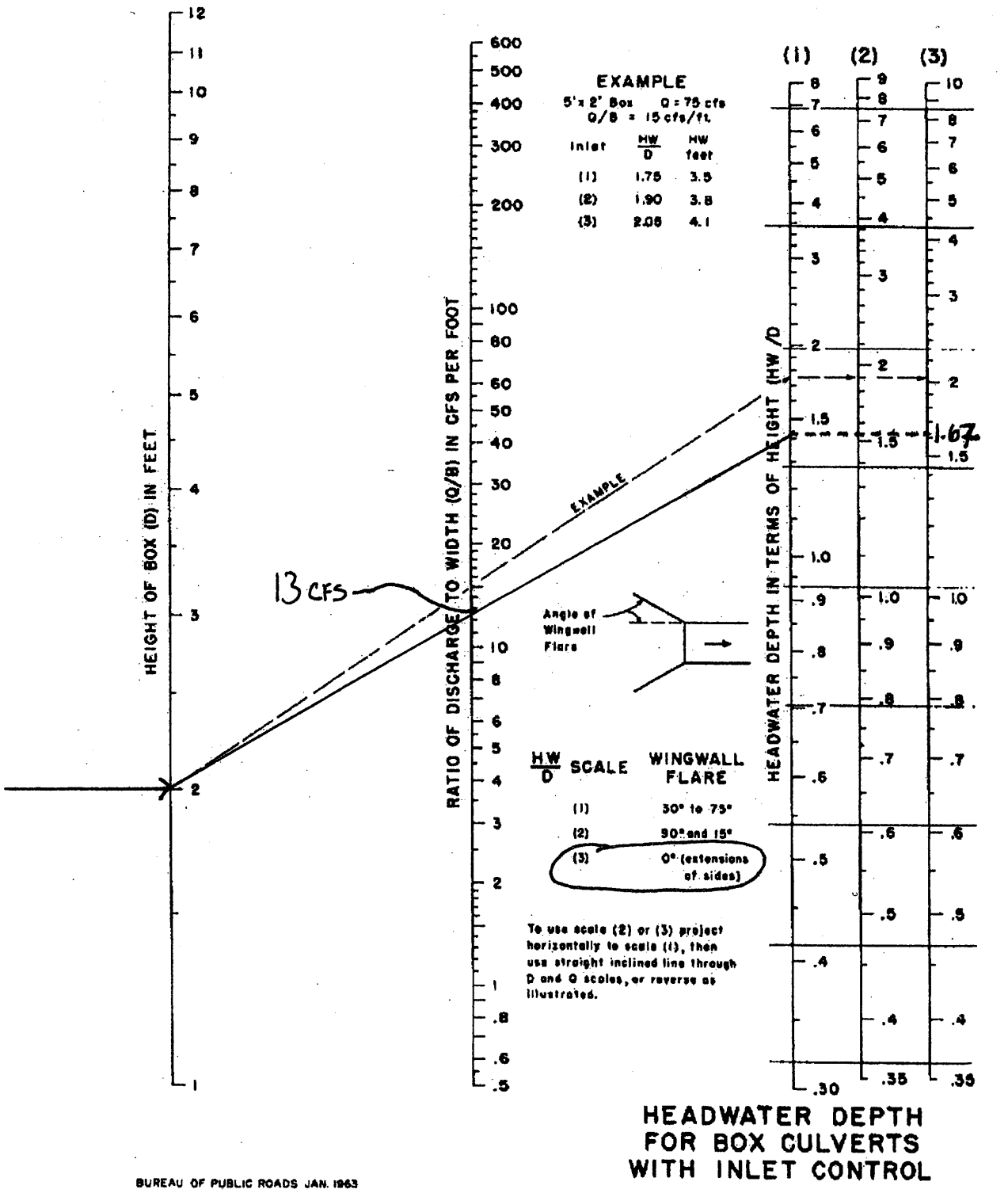


HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

(2- 3.5'W x 2.0'H BOX CULVERTS)

CHART 8B

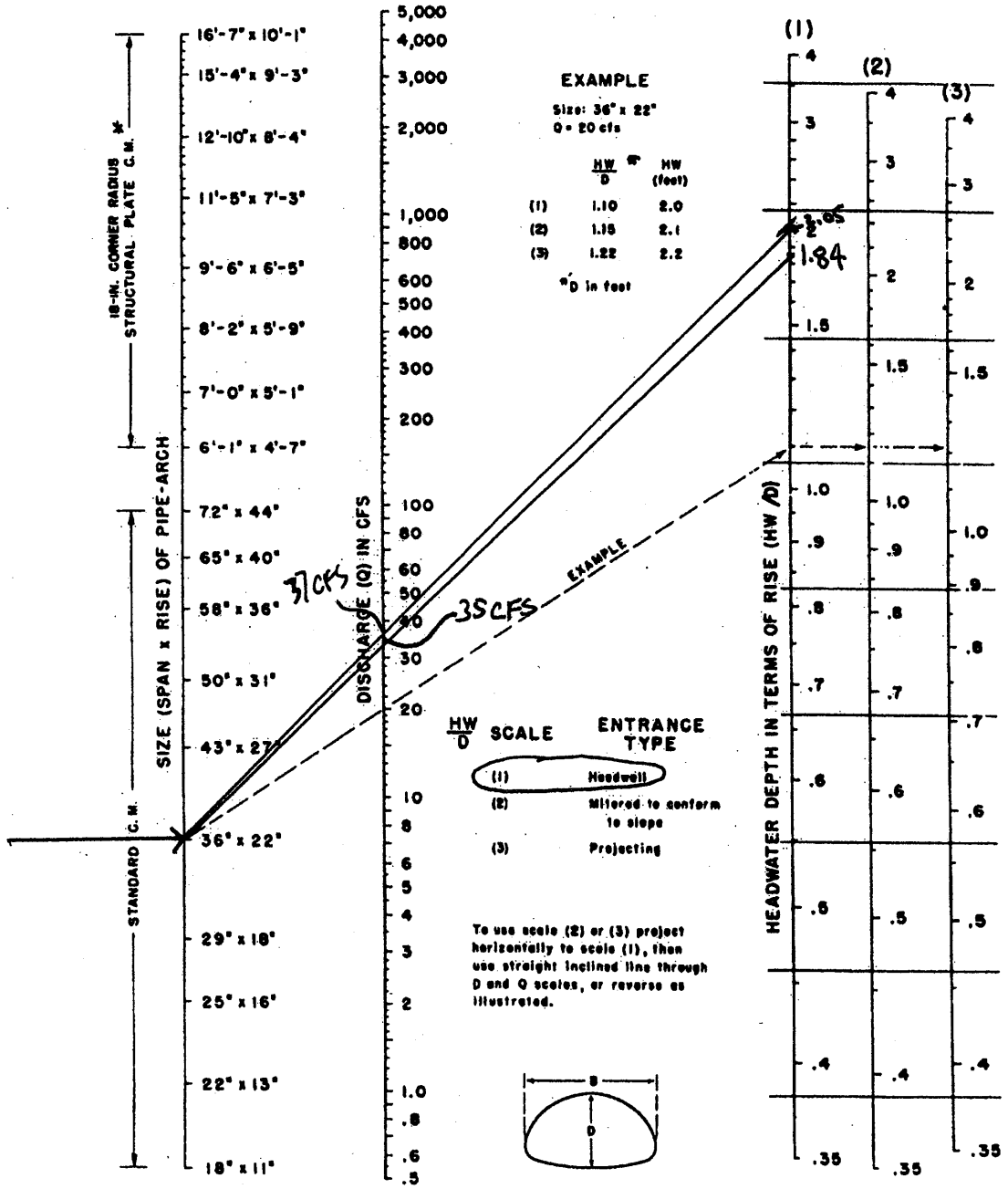


HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

CH#4
4-36"x22" PIPE-ARCH)

CHART 34B



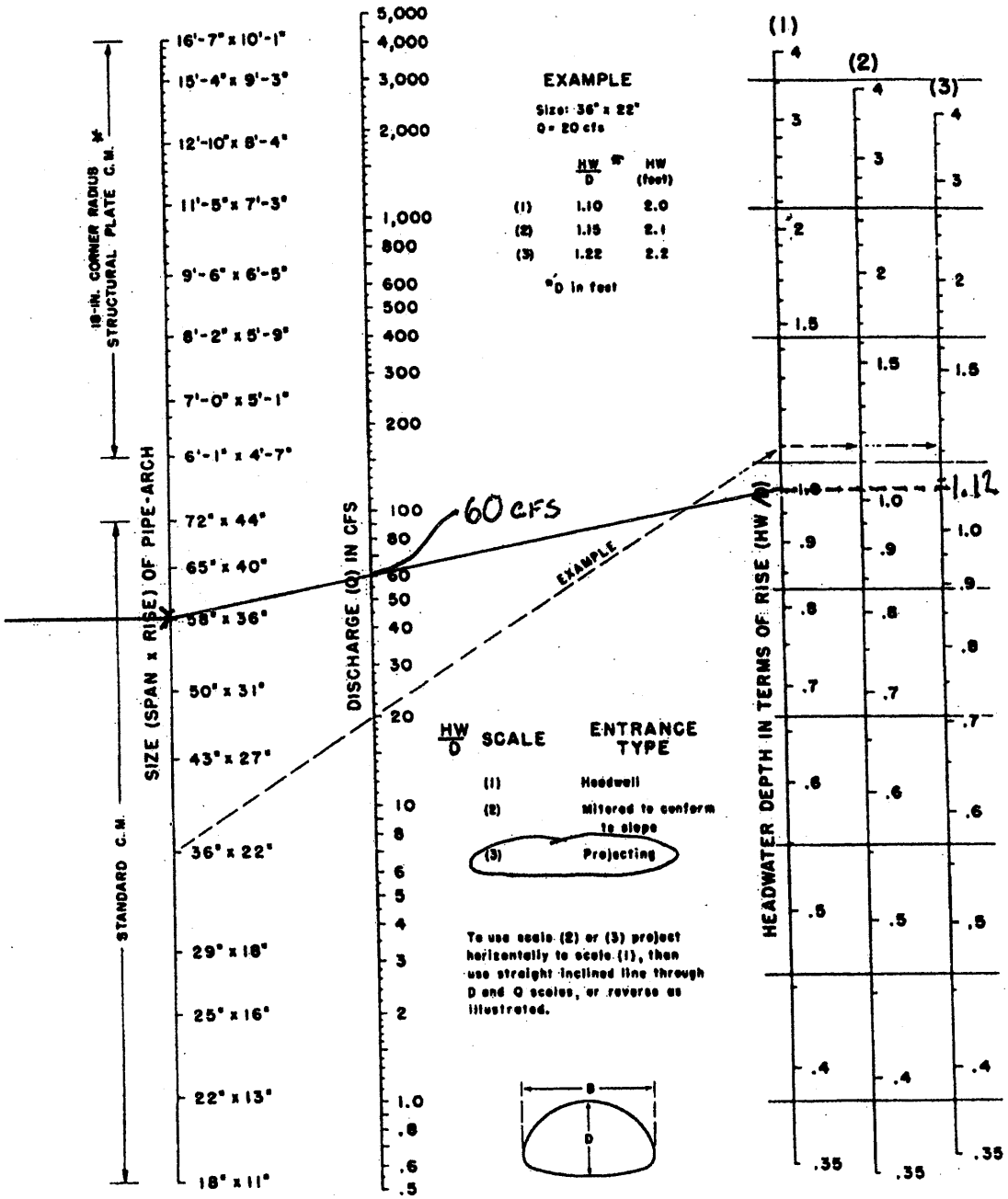
*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL

CK#5
(4-58"x36" PIPE-ARCH)

CHART 34B



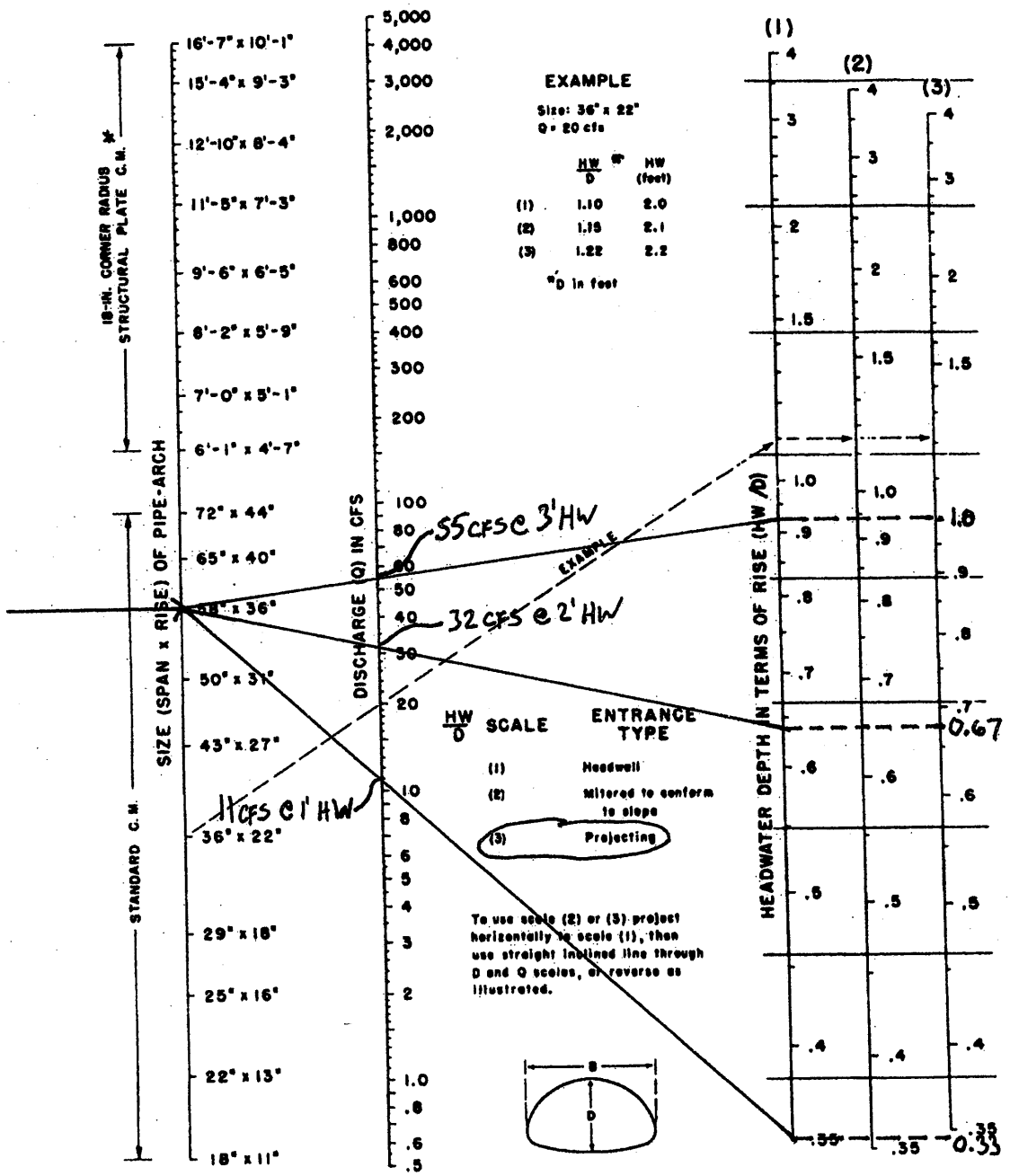
*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL

CR #6
(4-58" x 36" PIPE-ARCH)

CHART 34B

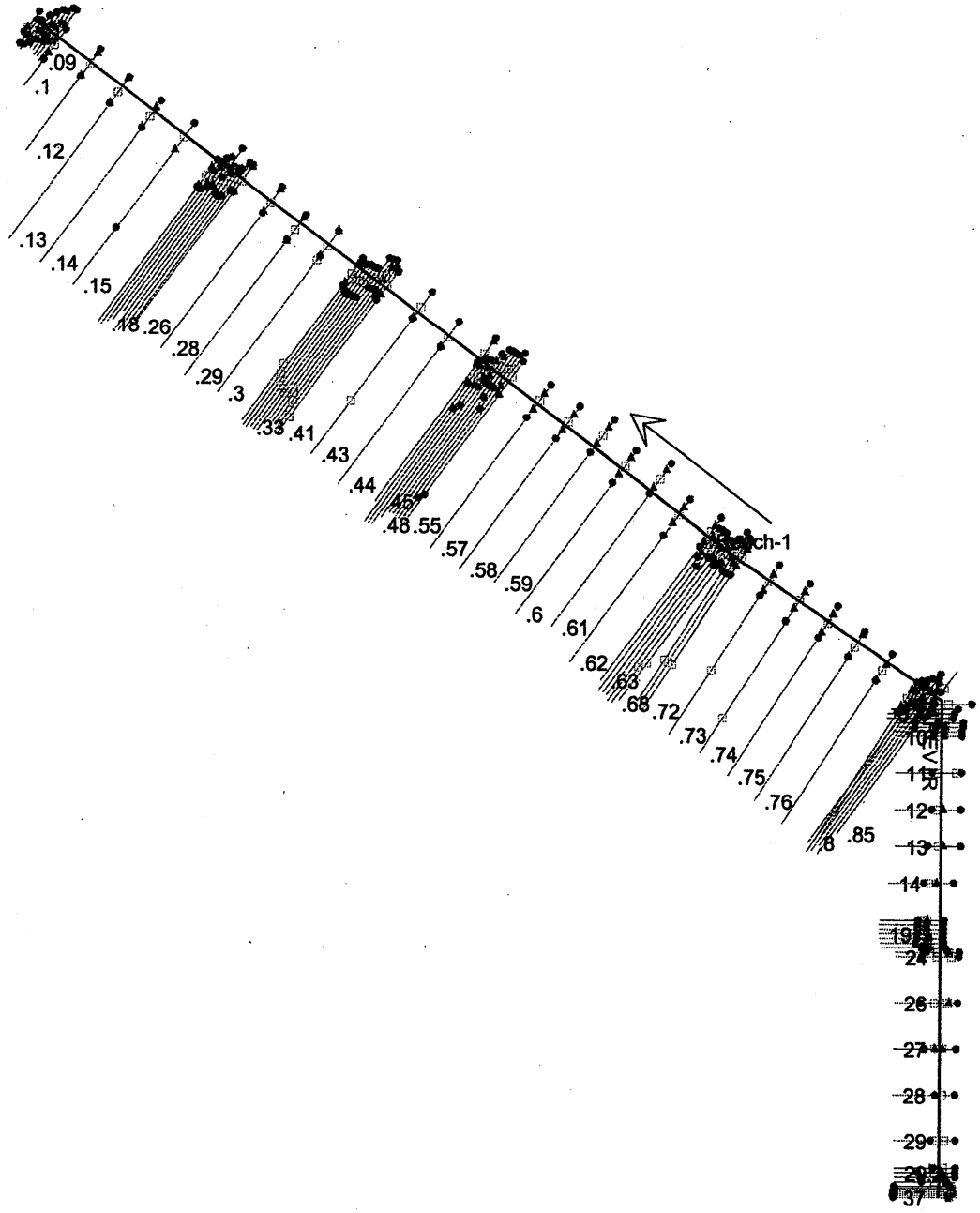


*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL

APPENDIX E
Pre-Developed Site HEC-RAS


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37

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	37	PF 1	350.00	1573.83	1578.71	1575.35	1578.74	0.000319	1.40	249.46	66.38	0.13
Reach-1	36	PF 1	350.00	1574.00	1578.70	1575.47	1578.74	0.000325	1.40	250.21	67.85	0.13
Reach-1	35	PF 1	350.00	1574.00	1578.70	1575.63	1578.73	0.000397	1.28	272.45	98.65	0.14
Reach-1	34	PF 1	350.00	1574.00	1578.70	1575.99	1578.73	0.000429	1.29	271.13	113.28	0.14
Reach-1	33	PF 1	350.00	1574.00	1578.69	1576.12	1578.72	0.000605	1.45	240.55	113.71	0.16
Reach-1	32	PF 1	350.00	1574.00	1578.67	1576.19	1578.71	0.000851	1.65	212.74	113.32	0.19
Reach-1	30	PF 1	350.00	1574.00	1578.65	1576.28	1578.70	0.001218	1.87	186.67	112.58	0.23
Reach-1	29.4	PF 1	350.00	1574.00	1578.55	1576.33	1578.66	0.002271	2.62	133.67	111.28	0.31
Reach-1	29.3	PF 1	350.00	1574.00	1578.46	1576.38	1578.60	0.002084	2.99	117.19	40.68	0.31
Reach-1	29.2	PF 1	350.00	1574.00	1578.38	1576.47	1578.54	0.002357	3.19	109.86	37.82	0.33
Reach-1	29.1	PF 1	350.00	1573.17	1578.31	1576.42	1578.48	0.002546	3.28	106.77	37.13	0.34
Reach-1	29	PF 1	350.00	1573.00	1577.81	1576.23	1578.02	0.003629	3.73	93.85	35.10	0.40
Reach-1	28	PF 1	350.00	1573.00	1577.34	1575.58	1577.42	0.001534	2.51	198.95	272.57	0.26
Reach-1	27	PF 1	350.00	1572.00	1576.94	1574.33	1577.04	0.001432	2.61	133.93	42.42	0.26
Reach-1	26	PF 1	350.00	1571.00	1576.56	1573.70	1576.65	0.001709	2.45	142.69	57.46	0.27
Reach-1	24	PF 1	350.00	1571.00	1575.88	1574.17	1576.03	0.003852	3.06	114.22	61.30	0.40
Reach-1	23	PF 1	350.00	1571.23	1575.68	1574.69	1575.89	0.007159	3.68	95.16	122.27	0.52
Reach-1	22	PF 1	350.00	1572.00	1575.72	1575.31	1575.76	0.002013	1.74	221.37	357.88	0.27
Reach-1	21	PF 1	350.00	1572.00	1575.64	1575.29	1575.69	0.003043	1.73	194.96	358.22	0.32
Reach-1	20	PF 1	350.00	1572.00	1575.60	1575.15	1575.64	0.001532	1.67	241.45	358.57	0.24
Reach-1	19	PF 1	350.00	1572.00	1575.56	1575.10	1575.60	0.001640	1.60	237.44	358.91	0.25
Reach-1	18	PF 1	350.00	1572.00	1575.51	1575.07	1575.55	0.002013	1.59	219.57	359.25	0.26
Reach-1	17	PF 1	350.00	1572.00	1575.47	1575.02	1575.50	0.001767	1.43	227.38	359.60	0.25
Reach-1	15	PF 1	350.00	1572.82	1575.43	1575.01	1575.46	0.001544	1.30	237.17	263.20	0.23
Reach-1	14	PF 1	350.00	1573.00	1575.02	1575.00	1575.07	0.002548	1.40	206.93	362.68	0.28
Reach-1	13	PF 1	350.00	1572.00	1574.73	1574.08	1574.76	0.001027	1.15	275.49	365.43	0.19
Reach-1	12	PF 1	350.00	1572.00	1574.55	1574.00	1574.58	0.000779	1.04	295.14	368.17	0.17
Reach-1	11	PF 1	350.00	1571.00	1573.69	1573.67	1574.08	0.030462	4.99	70.19	86.78	0.98
Reach-1	10	PF 1	350.00	1571.00	1573.05	1573.00	1573.09	0.001690	1.03	231.74	373.66	0.22
Reach-1	9	PF 1	350.00	1571.00	1573.02		1573.05	0.001158	1.34	249.76	344.55	0.21
Reach-1	8	PF 1	350.00	1571.00	1572.99	1572.39	1573.02	0.001277	1.30	240.23	241.81	0.21
Reach-1	7	PF 1	350.00	1571.00	1572.95		1572.98	0.001434	1.44	229.68	236.77	0.23
Reach-1	6	PF 1	350.00	1571.00	1572.91	1572.37	1572.95	0.001538	1.22	231.08	251.26	0.22
Reach-1	5	PF 1	350.00	1571.00	1572.88	1572.35	1572.91	0.001468	1.30	237.83	262.41	0.22
Reach-1	4	PF 1	350.00	1571.00	1572.83	1572.34	1572.87	0.001718	1.26	223.87	255.75	0.24
Reach-1	3	PF 1	350.00	1571.00	1572.80	1572.00	1572.83	0.001437	1.46	239.01	239.98	0.23
Reach-1	85	PF 1	350.00	1571.00	1572.71	1572.39	1572.73	0.002277	1.22	309.12	639.18	0.26
Reach-1	84	PF 1	350.00	1570.73	1572.68	1572.32	1572.69	0.001582	1.13	336.34	660.42	0.22
Reach-1	83	PF 1	350.00	1571.00	1572.64	1572.31	1572.66	0.001966		300.33	655.43	0.00
Reach-1	82	PF 1	339.00	1571.43	1572.60	1572.29	1572.62	0.002016		289.30	655.42	0.00
Reach-1	81	PF 1	339.00	1570.00	1572.55	1572.28	1572.57	0.002443		278.01	683.17	0.00
Reach-1	8	PF 1	339.00	1570.00	1572.50	1572.26	1572.52	0.002779	1.61	272.17	702.36	0.30
Reach-1	79	PF 1	339.00	1570.00	1572.44	1572.21	1572.47	0.002965	1.68	266.44	698.08	0.31
Reach-1	78	PF 1	339.00	1570.00	1572.38	1572.14	1572.41	0.003029	1.60	266.46	705.55	0.31
Reach-1	77	PF 1	339.00	1570.00	1571.79	1571.51	1571.81	0.002978		287.43	946.77	0.00

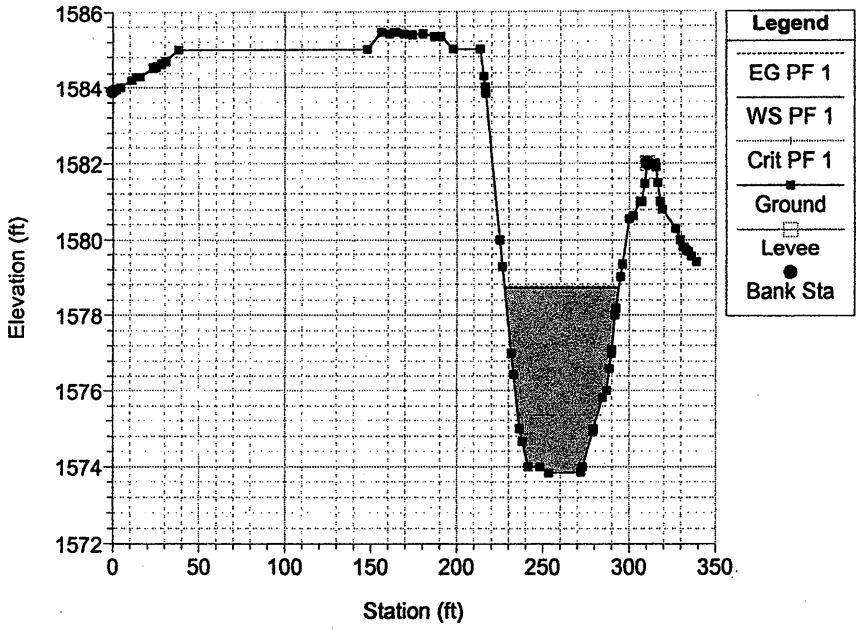
HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

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	76	PF 1	339.00	1570.00	1571.49	1571.19	1571.50	0.000946		433.90	974.52	0.00
Reach-1	75	PF 1	339.00	1570.00	1571.15	1570.97	1571.17	0.003603	1.84	288.27	977.89	0.34
Reach-1	74	PF 1	339.00	1570.00	1570.84	1570.46	1570.86	0.000875	0.81	401.89	743.34	0.16
Reach-1	73	PF 1	339.00	1569.00	1570.64	1570.24	1570.66	0.001108	1.12	325.59	555.42	0.19
Reach-1	72	PF 1	339.00	1569.00	1570.27	1569.99	1570.30	0.003404	1.77	251.94	675.04	0.33
Reach-1	71	PF 1	339.00	1569.00	1570.19	1569.88	1570.22	0.003055	1.87	258.32	685.62	0.32
Reach-1	7	PF 1	339.00	1569.00	1570.12	1569.73	1570.15	0.002657	1.78	269.77	697.54	0.30
Reach-1	69	PF 1	339.00	1569.00	1570.06	1569.63	1570.08	0.002561		281.79	708.74	0.00
Reach-1	68	PF 1	339.00	1569.00	1569.99	1569.57	1570.01	0.002783		277.28	711.02	0.00
Reach-1	67	PF 1	339.00	1569.00	1569.93	1569.49	1569.95	0.002155		303.43	710.86	0.00
Reach-1	66	PF 1	339.00	1569.00	1569.89	1569.44	1569.90	0.001695	1.18	336.24	747.63	0.23
Reach-1	65	PF 1	339.00	1568.00	1569.82	1569.48	1569.85	0.002959	1.54	273.87	683.47	0.30
Reach-1	64	PF 1	305.00	1568.00	1569.76	1569.41	1569.78	0.002163	1.63	278.97	726.61	0.27
Reach-1	63	PF 1	305.00	1568.00	1569.71	1569.42	1569.73	0.002040	1.68	282.06	728.56	0.27
Reach-1	62	PF 1	305.00	1568.00	1568.98	1568.87	1569.04	0.006962	2.48	173.68	666.04	0.47
Reach-1	61	PF 1	305.00	1567.00	1568.66	1568.31	1568.67	0.000804	1.09	391.23	782.56	0.17
Reach-1	6	PF 1	305.00	1567.00	1568.49	1568.20	1568.50	0.000927	1.08	394.90	905.59	0.18
Reach-1	59	PF 1	305.00	1566.00	1568.18	1568.04	1568.20	0.002734	1.80	269.51	843.96	0.31
Reach-1	58	PF 1	305.00	1566.00	1567.87	1567.47	1567.88	0.001045	1.37	350.72	794.24	0.20
Reach-1	57	PF 1	305.00	1566.00	1567.68	1567.28	1567.69	0.000862	1.15	409.40	973.66	0.18
Reach-1	55	PF 1	305.00	1566.00	1567.39	1567.17	1567.41	0.002810	0.94	332.61	947.68	0.26
Reach-1	54	PF 1	305.00	1565.86	1567.33	1567.13	1567.34	0.003662	1.00	309.22	937.49	0.30
Reach-1	53	PF 1	305.00	1564.89	1567.25	1567.09	1567.27	0.003192	0.74	290.45	949.41	0.26
Reach-1	52	PF 1	305.00	1564.28	1567.18	1567.03	1567.20	0.003656	0.64	271.11	934.24	0.26
Reach-1	51	PF 1	305.00	1564.00	1567.09	1566.86	1567.11	0.005204	0.47	236.14	907.56	0.28
Reach-1	5	PF 1	214.00	1564.44	1567.05	1566.60	1567.06	0.001371	1.17	276.95	886.23	0.21
Reach-1	49	PF 1	214.00	1565.00	1567.02	1566.52	1567.03	0.001401	1.21	274.46	859.67	0.22
Reach-1	48	PF 1	214.00	1564.90	1566.99	1566.49	1567.01	0.000914	0.93	268.40	526.71	0.17
Reach-1	47	PF 1	214.00	1564.01	1566.97	1566.51	1566.98	0.001083	0.97	255.78	510.30	0.19
Reach-1	46	PF 1	214.00	1564.60	1566.95	1566.50	1566.96	0.001042		249.57	534.31	0.00
Reach-1	45	PF 1	214.00	1565.70	1566.93	1566.50	1566.94	0.001117		242.75	551.11	0.00
Reach-1	44	PF 1	214.00	1565.00	1566.77	1566.22	1566.77	0.000553	0.64	312.76	523.84	0.13
Reach-1	43	PF 1	214.00	1564.00	1566.59	1566.16	1566.60	0.001209	0.79	221.67	393.25	0.18
Reach-1	41	PF 1	214.00	1565.00	1566.33	1566.16	1566.34	0.001155	1.12	291.90	830.45	0.20
Reach-1	4	PF 1	214.00	1565.00	1566.31	1566.14	1566.32	0.001193	1.23	281.68	807.90	0.20
Reach-1	39	PF 1	214.00	1564.98	1566.28	1566.13	1566.29	0.001441	1.29	262.22	794.16	0.22
Reach-1	38	PF 1	214.00	1564.00	1566.27	1564.97	1566.28	0.000420	0.97	339.84	801.24	0.13
Reach-1	37	PF 1	214.00	1564.00	1566.26	1564.92	1566.27	0.000400	0.97	334.15	774.32	0.13
Reach-1	36	PF 1	214.00	1563.20	1566.25	1564.87	1566.26	0.000413	1.00	322.46	747.29	0.13
Reach-1	35	PF 1	214.00	1563.00	1566.24	1564.83	1566.25	0.000414	1.01	312.94	720.34	0.13
Reach-1	34	PF 1	214.00	1563.00	1566.23	1564.76	1566.24	0.000390	1.01	308.48	693.89	0.13
Reach-1	33	PF 1	66.00	1563.00	1566.24	1564.37	1566.24	0.000039	0.32	301.83	667.40	0.04
Reach-1	32	PF 1	66.00	1563.00	1566.23	1566.07	1566.23	0.001007		130.64	626.87	0.00
Reach-1	31	PF 1	66.00	1564.21	1566.20	1566.08	1566.21	0.001748		108.01	538.53	0.00
Reach-1	3	PF 1	66.00	1563.00	1564.98	1564.98	1565.35	0.019540		13.53	75.14	0.00

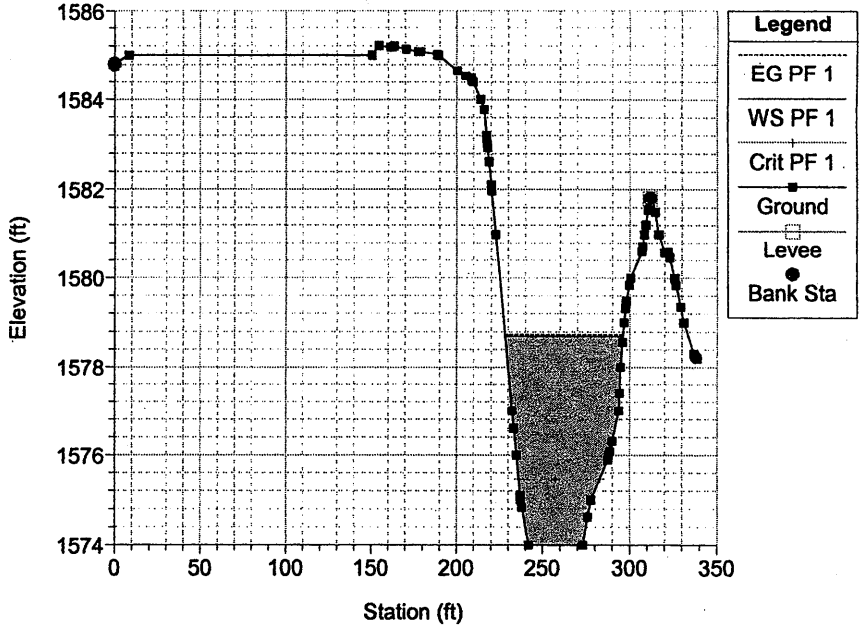
HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

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	29	PF 1	66.00	1562.04	1563.91	1563.71	1563.93	0.003128		63.04	271.35	0.00
Reach-1	28	PF 1	66.00	1562.00	1563.57	1563.21	1563.59	0.001087		71.63	188.98	0.00
Reach-1	26	PF 1	66.00	1562.00	1563.36	1563.12	1563.37	0.001069		96.52	332.54	0.00
Reach-1	25	PF 1	66.00	1562.00	1563.34	1563.13	1563.34	0.001247		92.80	335.66	0.00
Reach-1	24	PF 1	66.00	1562.00	1563.31	1563.12	1563.32	0.001505		89.42	347.31	0.00
Reach-1	23	PF 1	66.00	1562.00	1563.27	1563.12	1563.28	0.002093		82.07	315.50	0.00
Reach-1	22	PF 1	66.00	1562.00	1563.11	1563.11	1563.17	0.034673		35.73	316.24	0.00
Reach-1	21	PF 1	66.00	1561.20	1563.06	1562.10	1563.07	0.000358	0.68	113.98	416.79	0.11
Reach-1	2	PF 1	2.00	1560.57	1563.06	1563.03	1563.06	0.000227		20.07	381.33	0.00
Reach-1	19	PF 1	2.00	1560.00	1563.06	1563.03	1563.06	0.000270		19.34	340.17	0.00
Reach-1	18	PF 1	2.00	1560.00	1563.05	1563.03	1563.05	0.000368		17.78	346.70	0.00
Reach-1	16	PF 1	2.00	1561.63	1563.04	1563.03	1563.05	0.000509		16.68	376.52	0.00
Reach-1	15	PF 1	2.00	1561.00	1562.64	1562.64	1562.66	0.079487	0.96	2.08	122.59	0.93
Reach-1	14	PF 1	2.00	1560.00	1562.15	1562.03	1562.15	0.000142		16.63	198.73	0.00
Reach-1	13	PF 1	2.00	1560.00	1562.03	1562.03	1562.03	0.022180		3.49	185.98	0.00
Reach-1	12	PF 1	2.00	1561.00	1561.54	1561.15	1561.55	0.000286		5.42	69.82	0.00
Reach-1	1	PF 1	2.00	1560.00	1561.41	1561.19	1561.42	0.001735	0.59	3.41	36.06	0.20
Reach-1	09	PF 1	2.00	1560.04	1561.42	1560.23	1561.42	0.000006	0.07	27.19	32.61	0.01
Reach-1	08	PF 1	2.00	1560.00	1561.42	1560.05	1561.42	0.000001	0.03	59.23	49.73	0.01
Reach-1	07	PF 1	2.00	1559.50	1561.42	1559.73	1561.42	0.000000	0.02	94.38	78.06	0.00
Reach-1	06	PF 1	2.00	1559.00	1561.42	1559.07	1561.42	0.000000	0.01	151.25	94.24	0.00
Reach-1	05	PF 1	2.00	1559.00	1561.42	1559.04	1561.42	0.000000	0.01	168.14	117.73	0.00
Reach-1	04	PF 1	2.00	1559.00	1561.42	1559.08	1561.42	0.000000	0.02	110.38	111.51	0.00
Reach-1	03	PF 1	2.00	1559.00	1561.30	1561.30	1561.41	0.033192		0.77	3.57	0.00
Reach-1	02	PF 1	2.00	1559.61	1561.24	1561.07	1561.24	0.001169	0.40	5.02	23.90	0.15
Reach-1	01	PF 1	2.00	1560.00	1561.21	1561.06	1561.22	0.001200	0.40	5.05	24.51	0.15

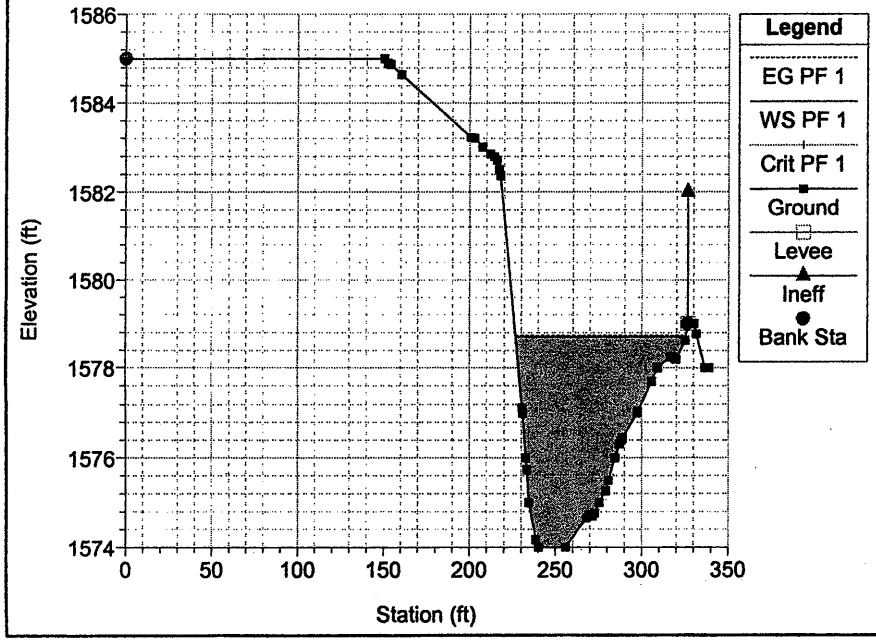
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 37 7



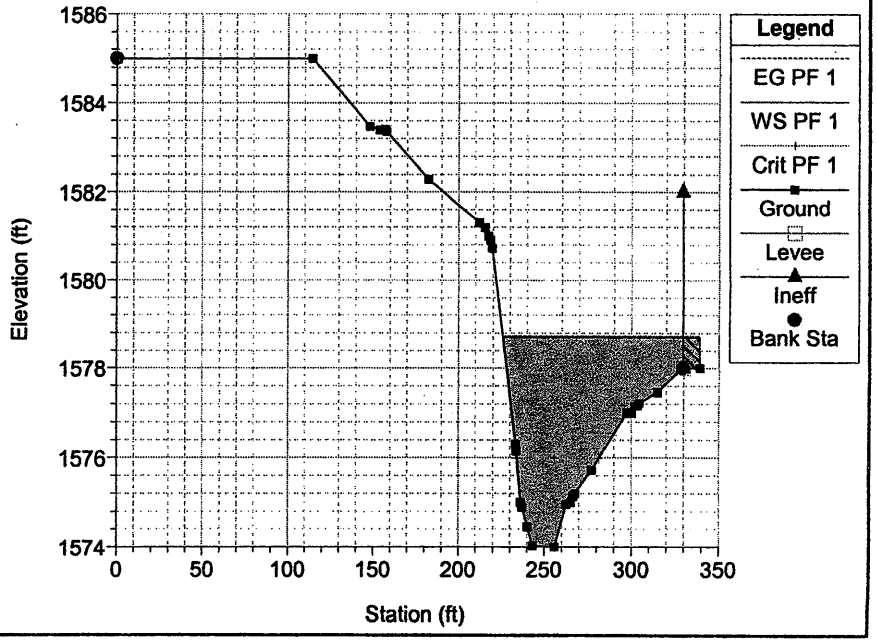
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RS = 36 6



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 35 5

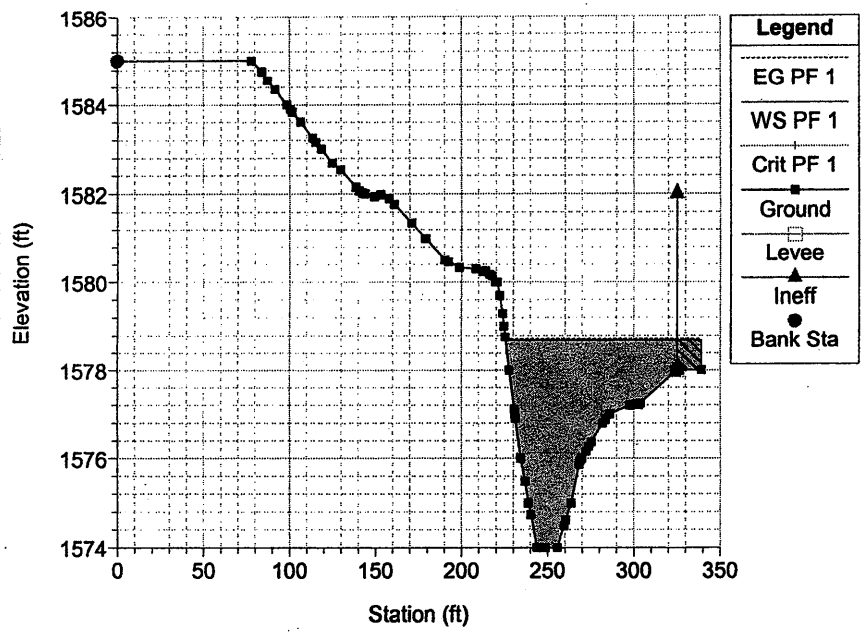


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 34 4



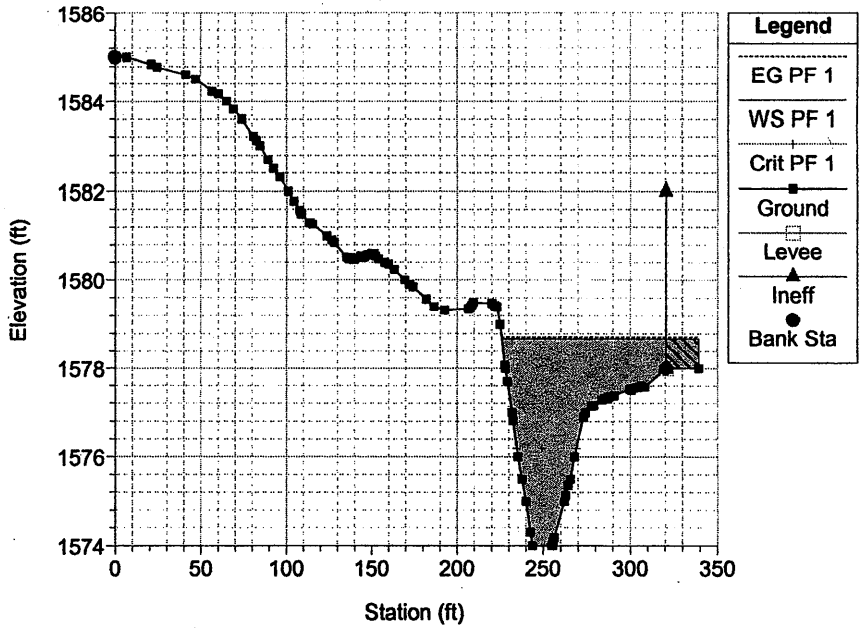
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 33 3



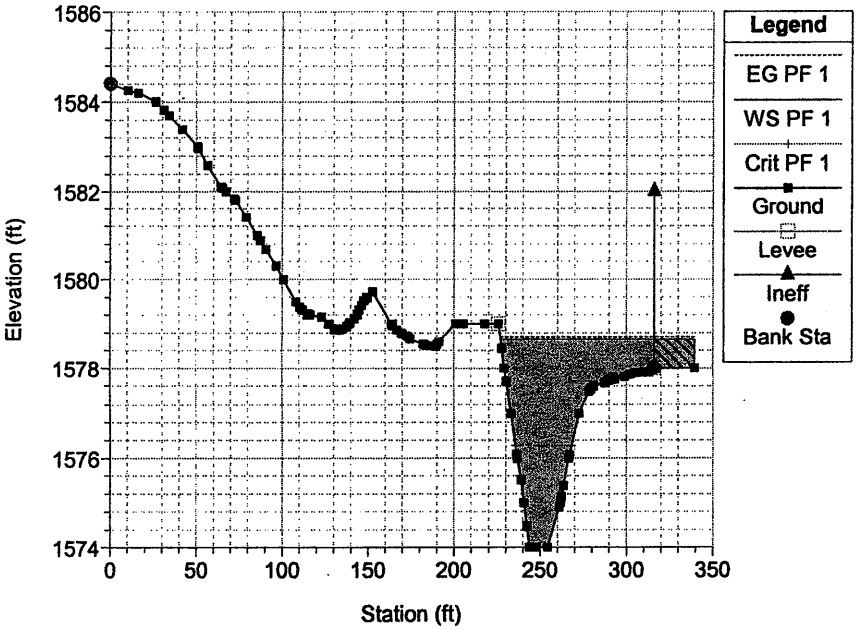
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 32 2



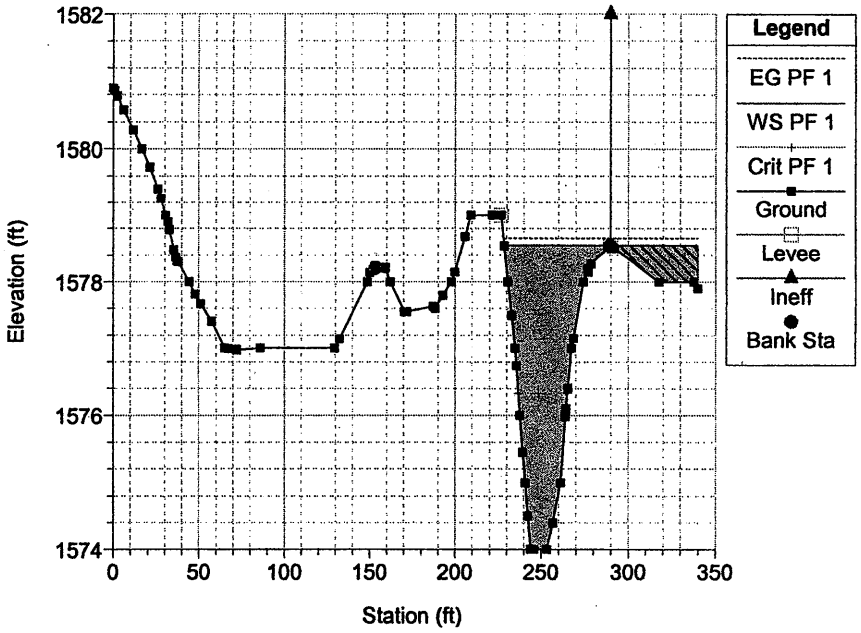
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

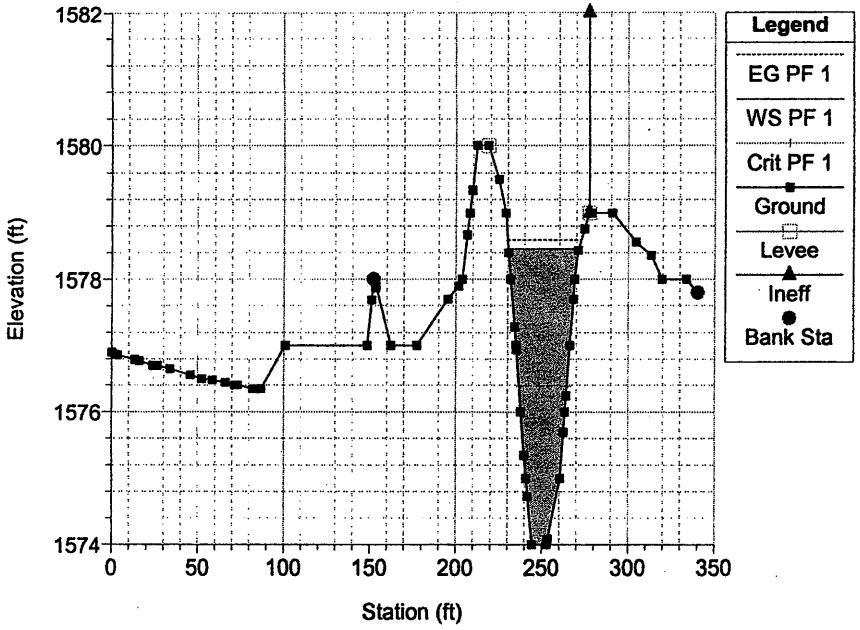
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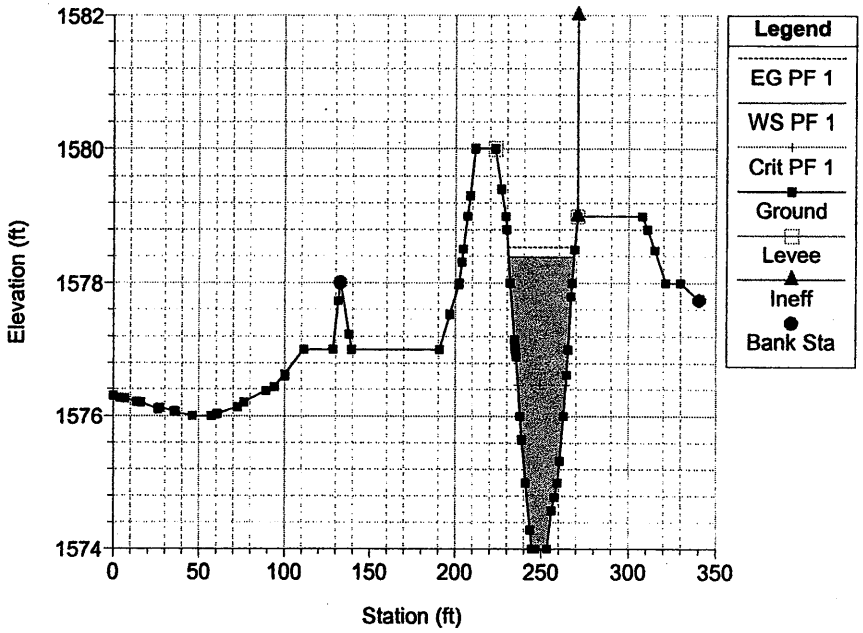


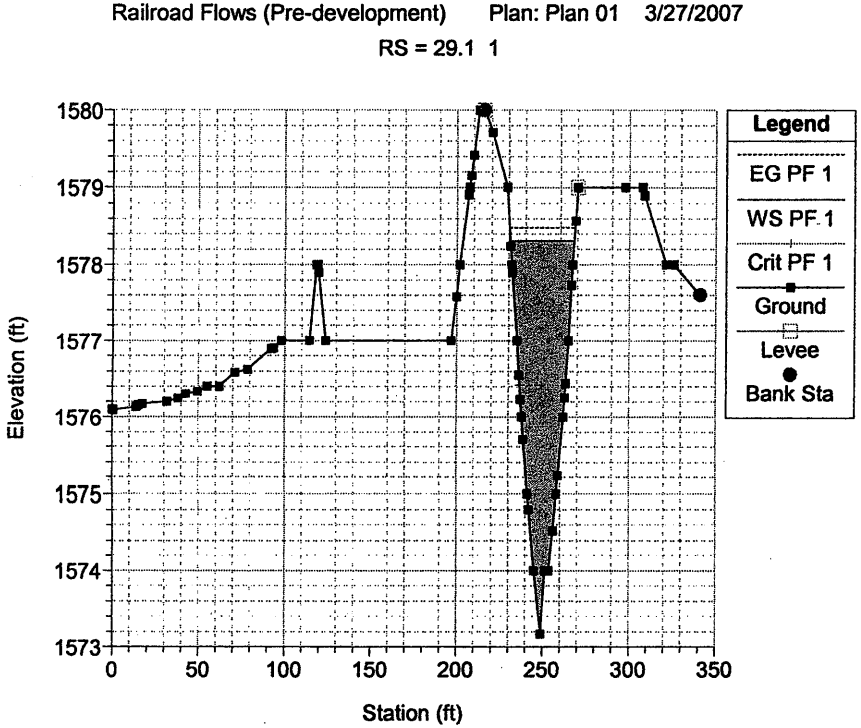
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

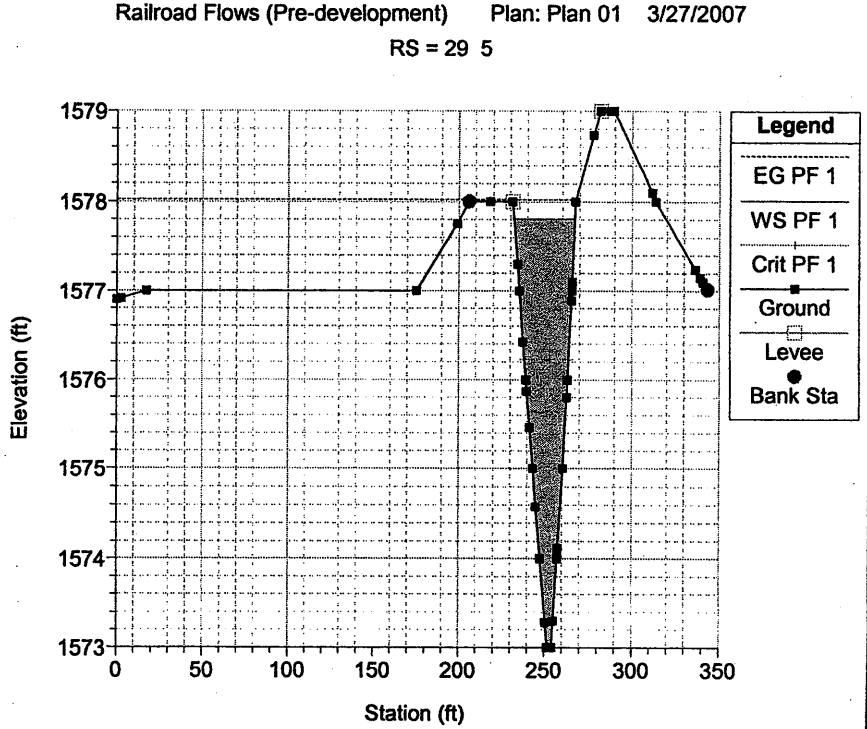
RS = 29.4 4




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 29.3 3
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

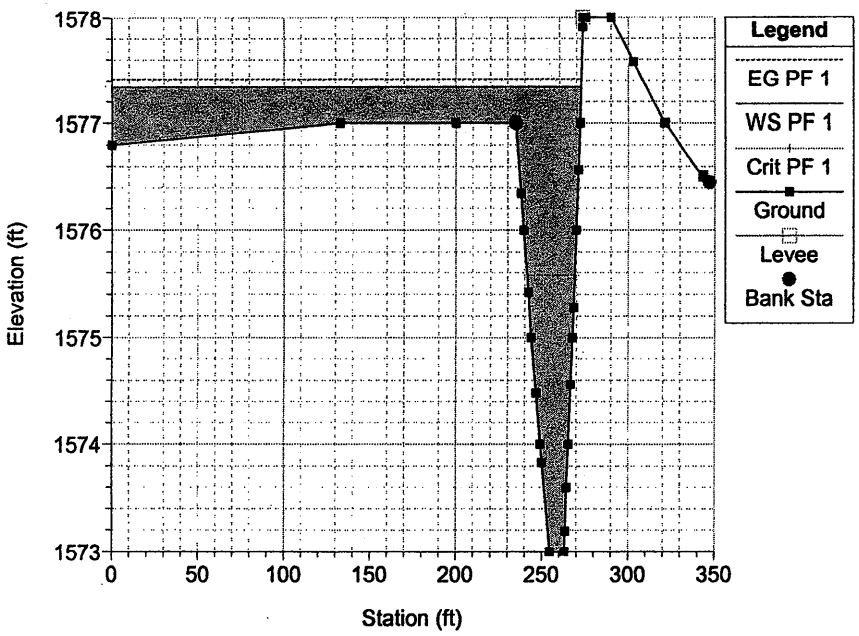

Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 29.2 2
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 29.1 1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 29 5
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

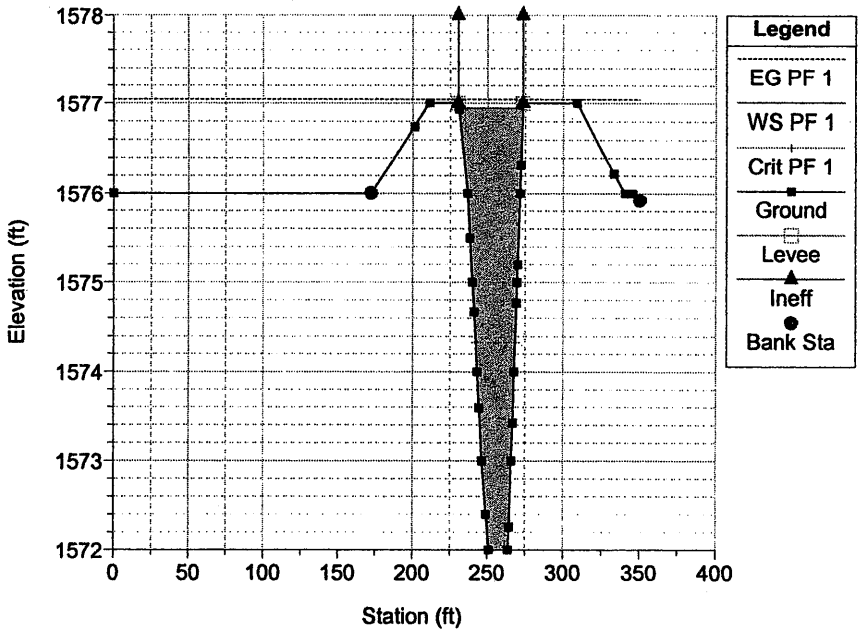
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 28 4



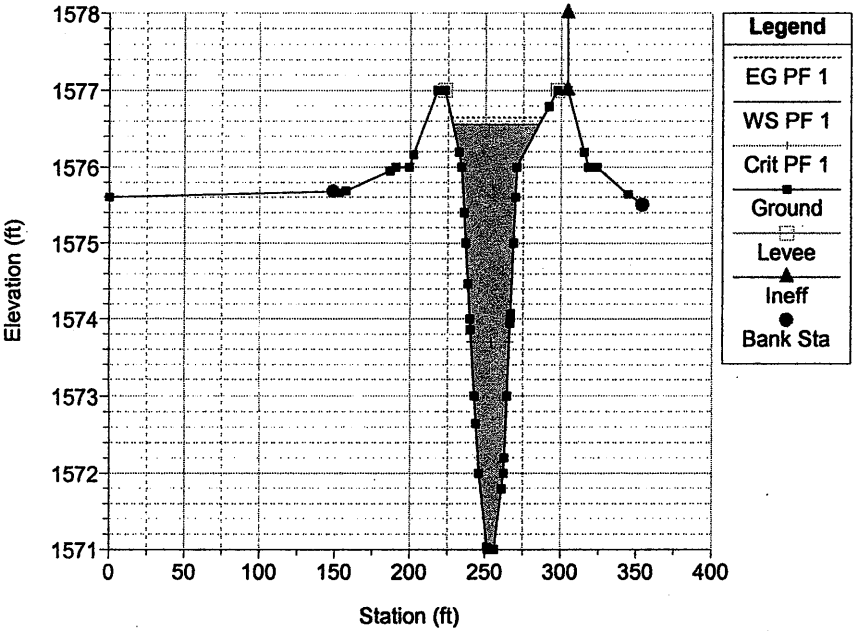
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 27 3



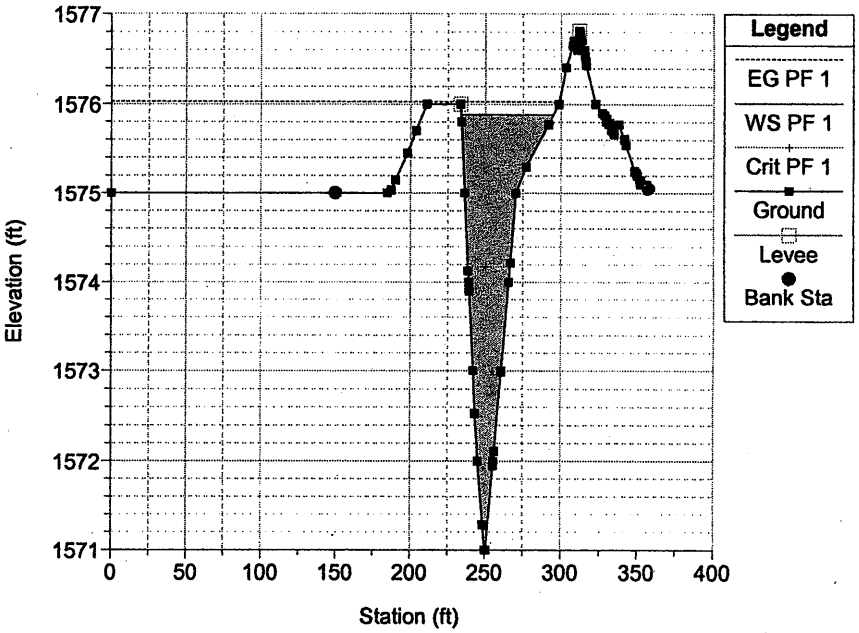
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 26 2



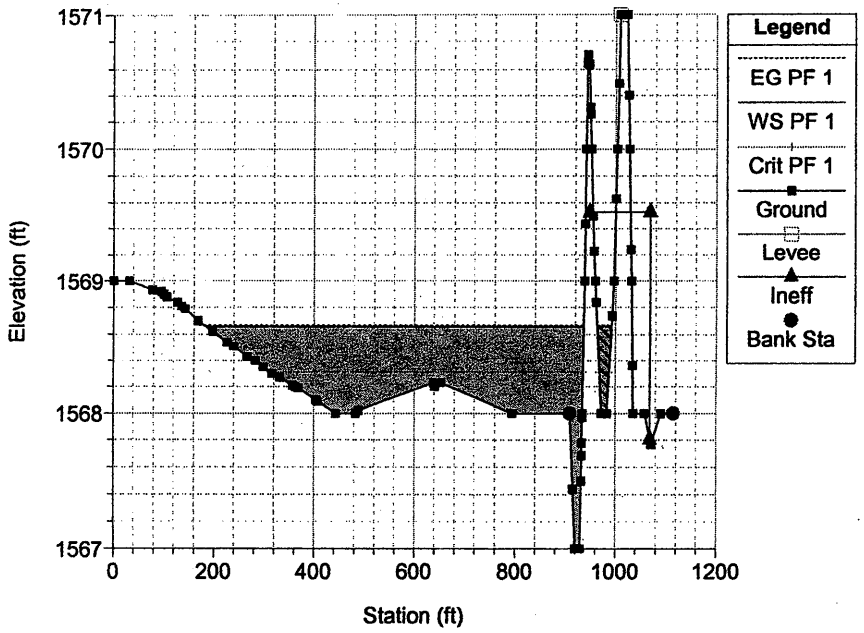
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 24 9



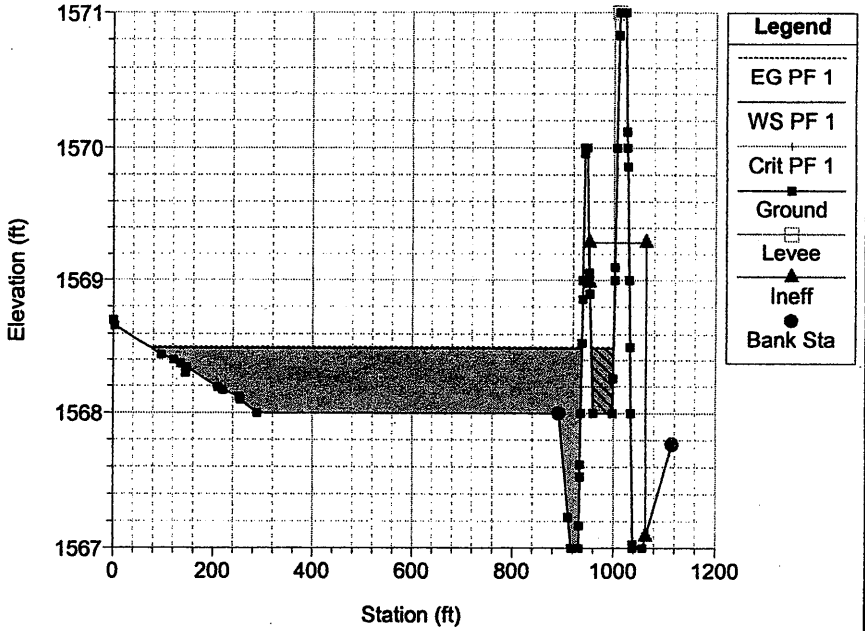
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .61 6



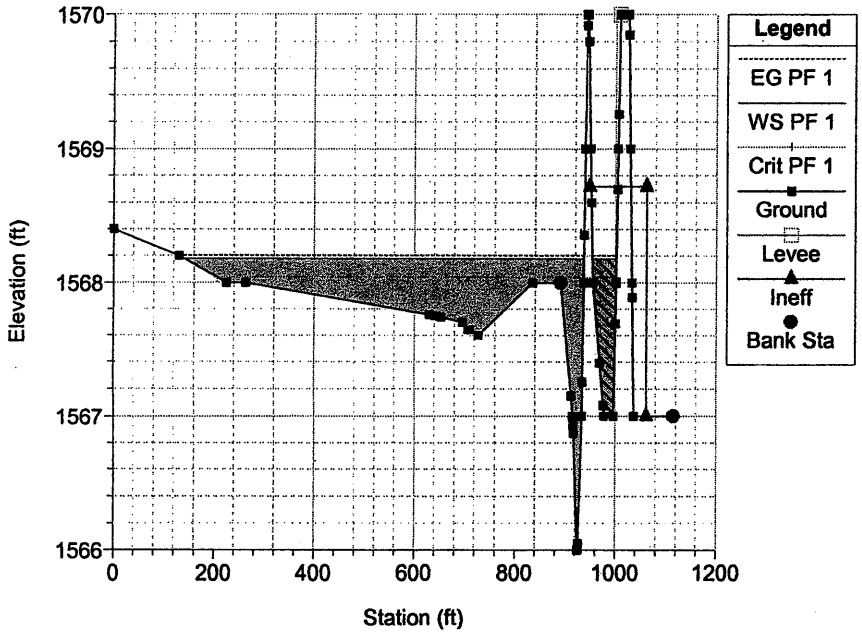
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .6 5



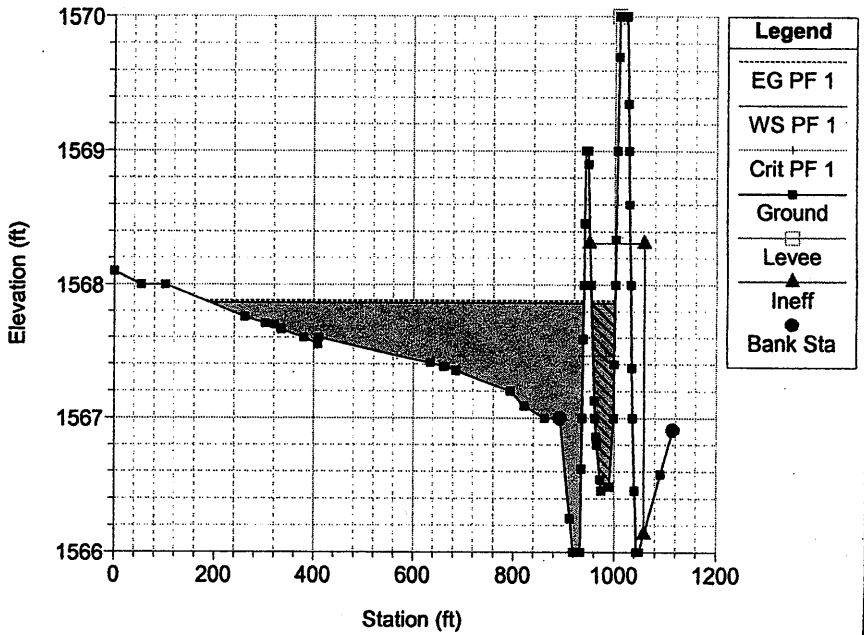
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .59 4

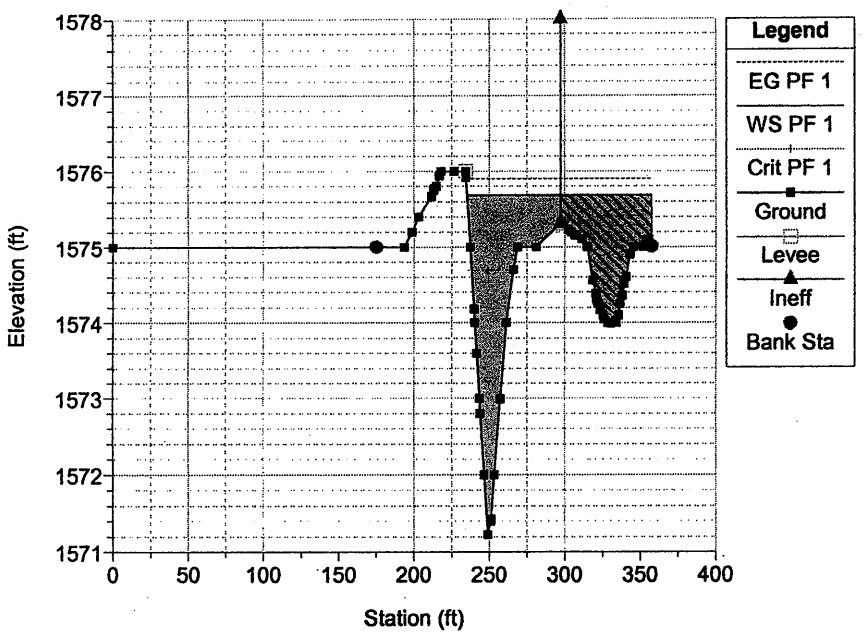


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

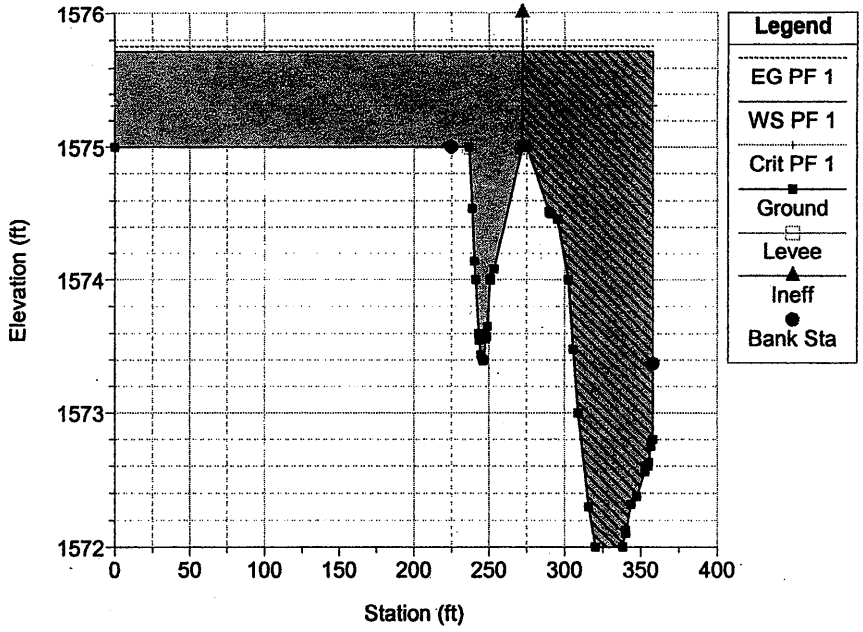
RS = .58 3



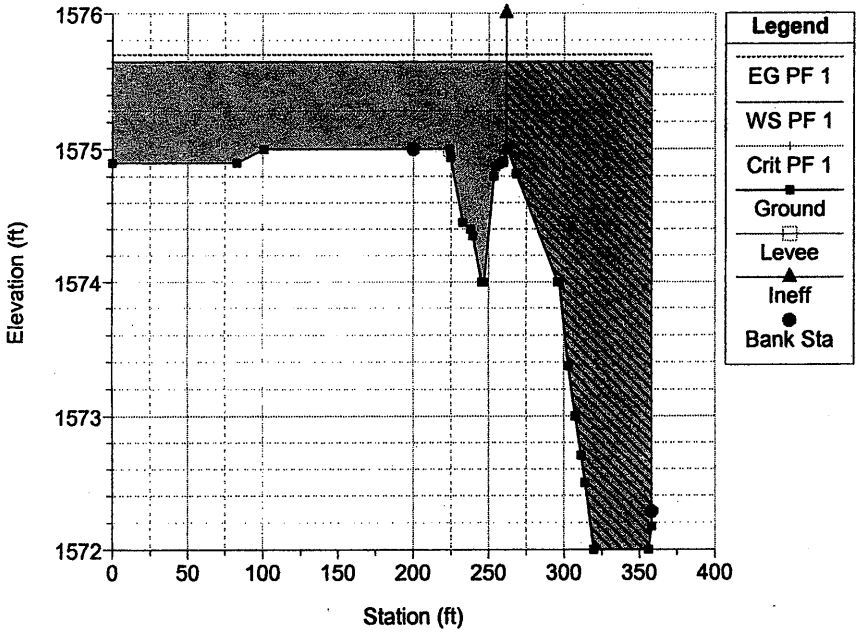
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 23 8



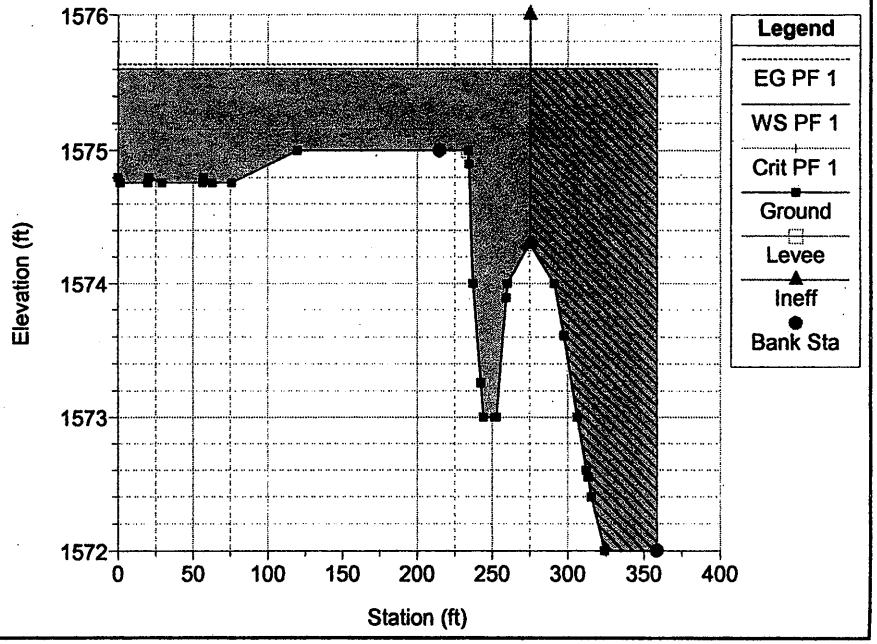
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 22 7

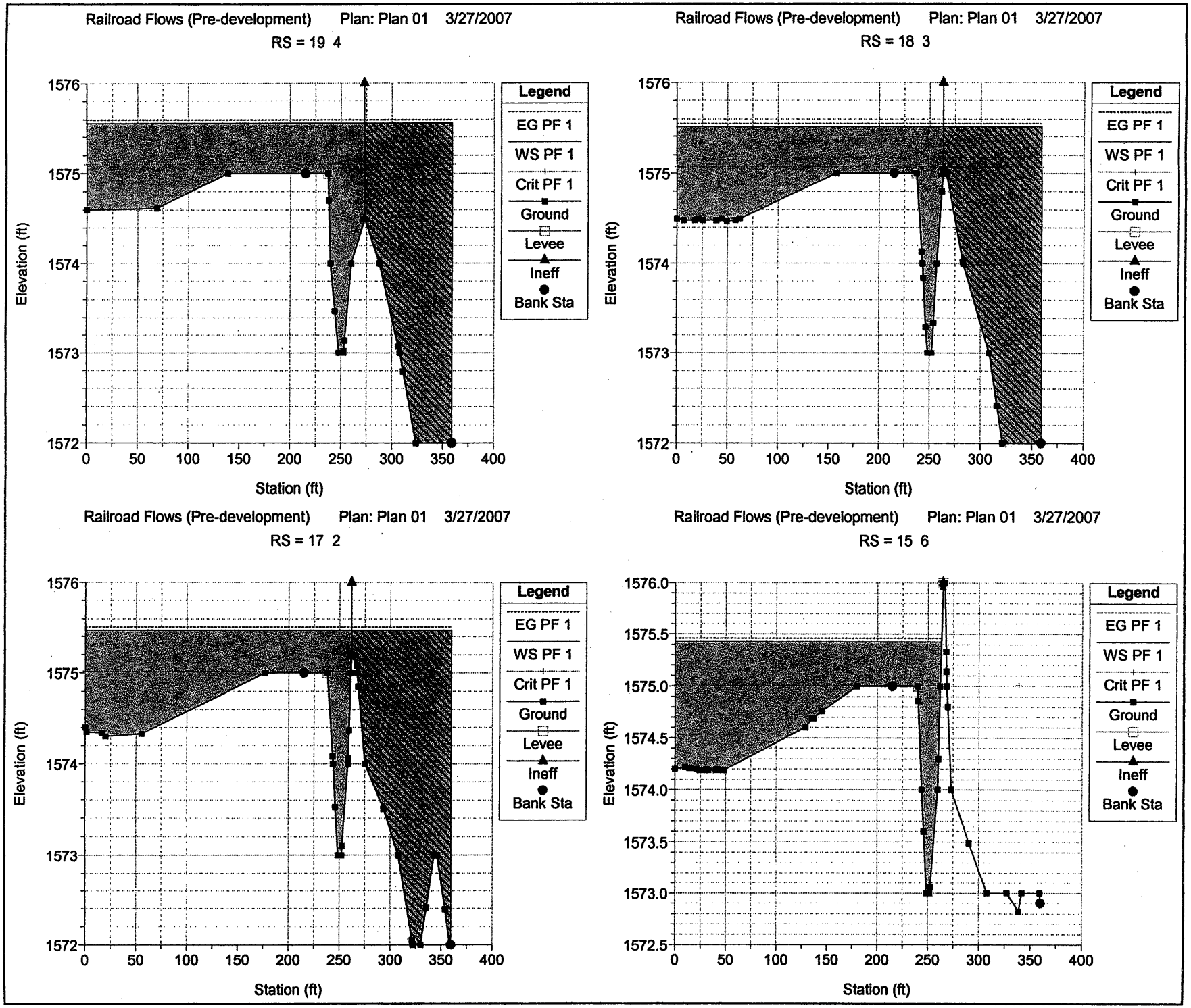


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 21 6



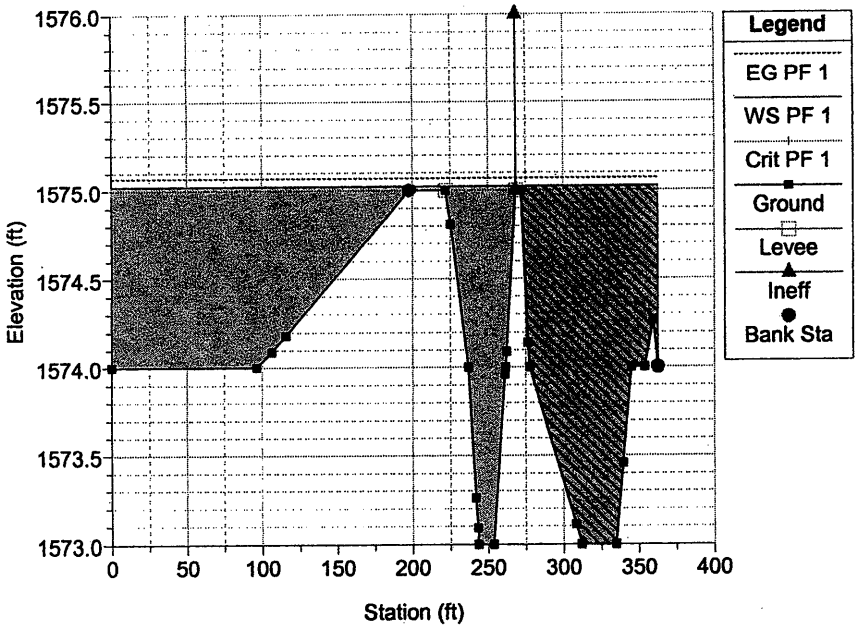
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 20 5




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 19 4
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 18 3
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 17 2
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = 15 6
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1576
1575
1574
1573
1572
1576.0
1575.5
1575.0
1574.5
1574.0
1573.5
1573.0
1572.5
0
50
100
150
200
250
300
350
400

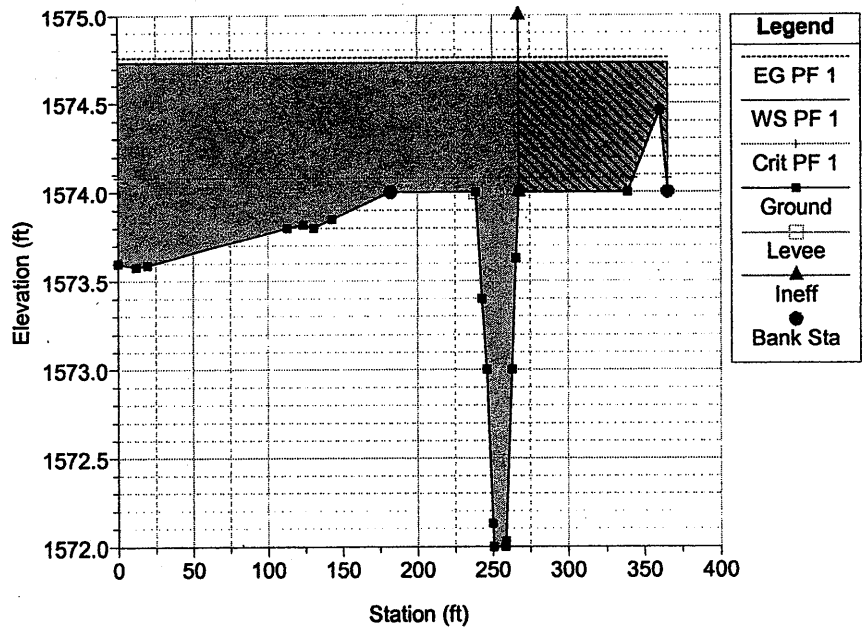
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 14 5



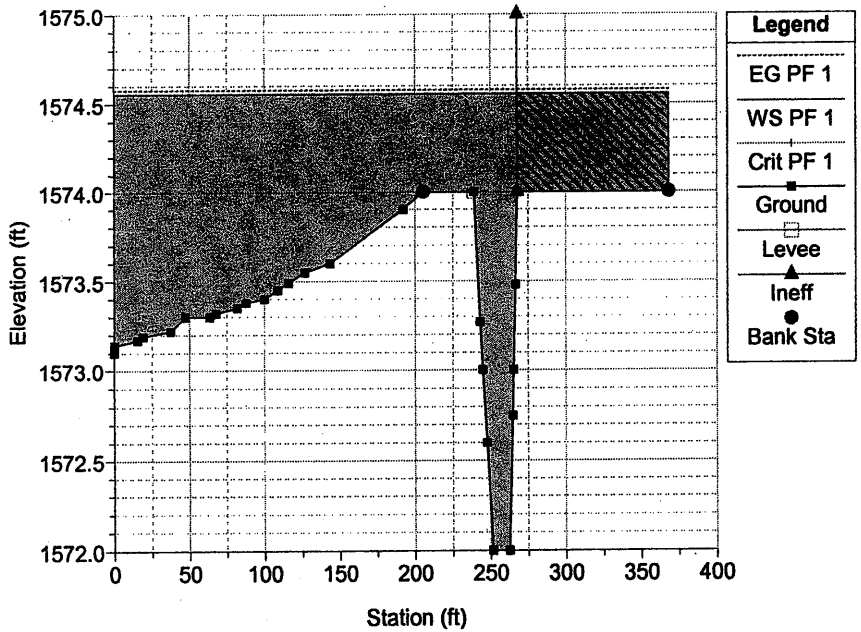
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 13 4



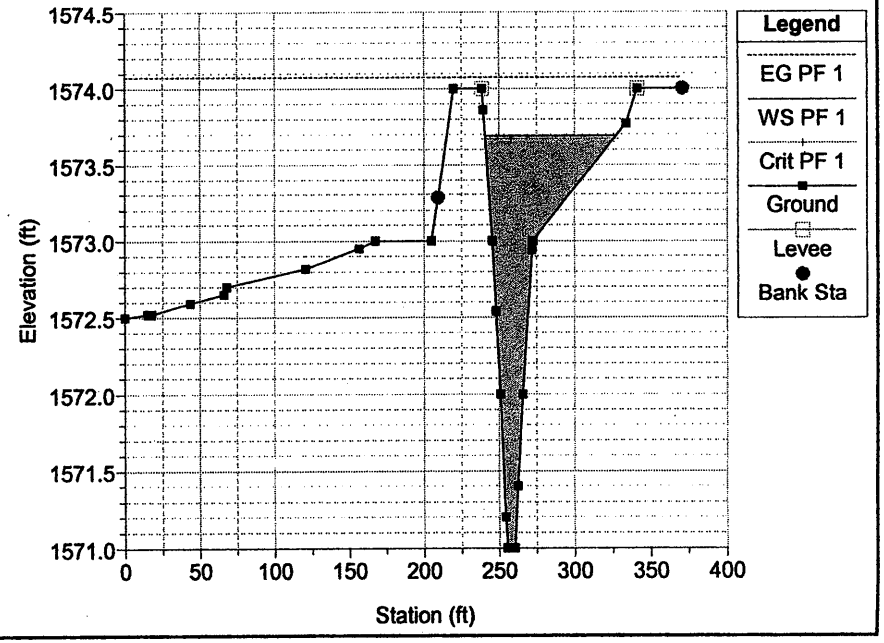
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 12 3



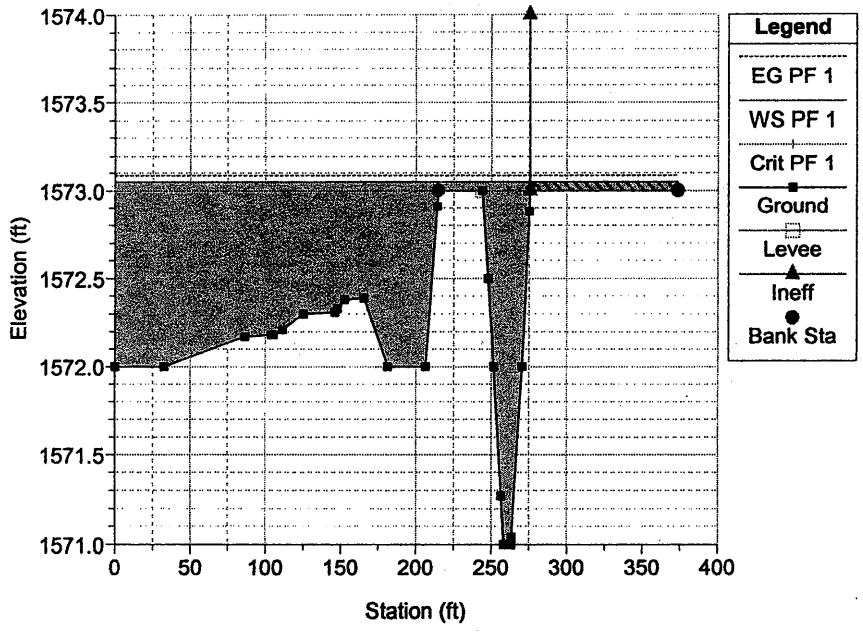
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 11 2



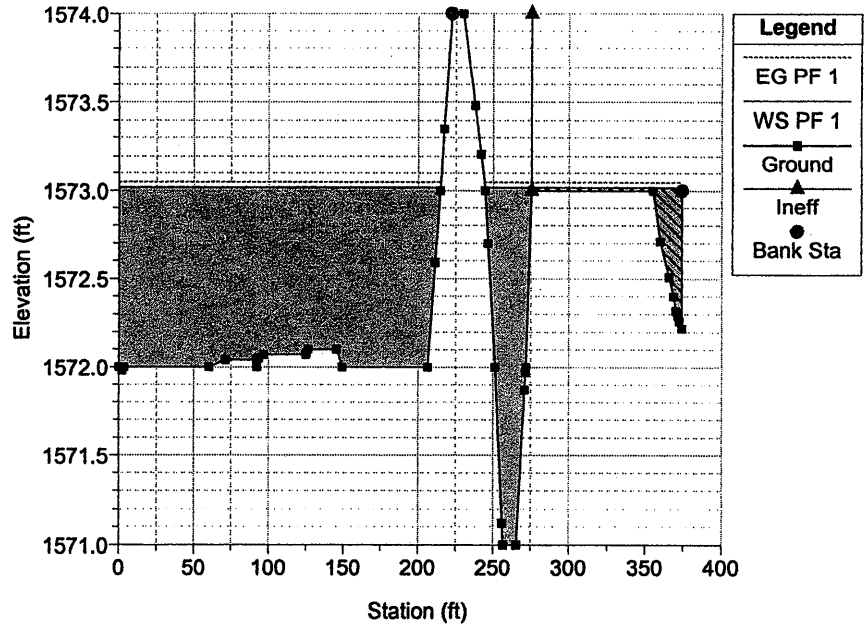
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 10 1



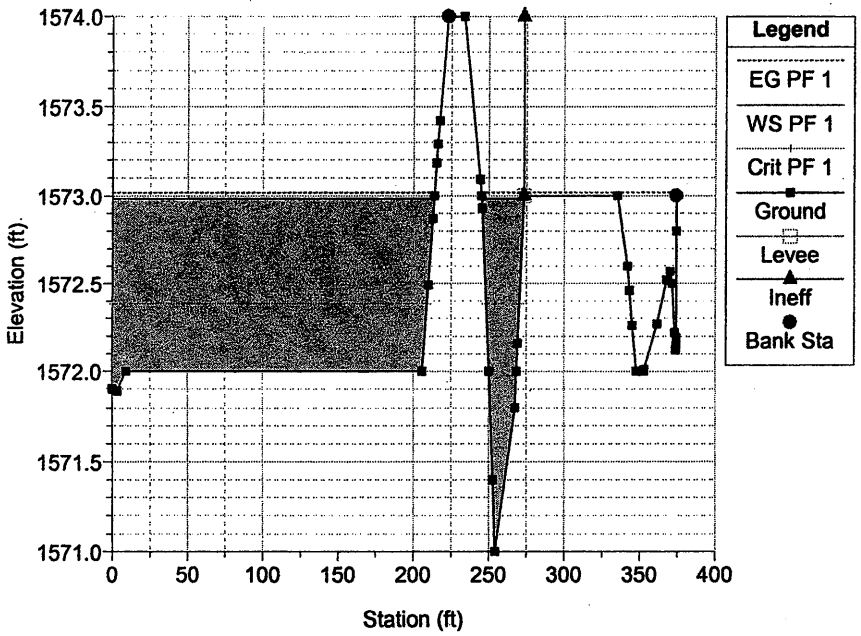
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 9 9



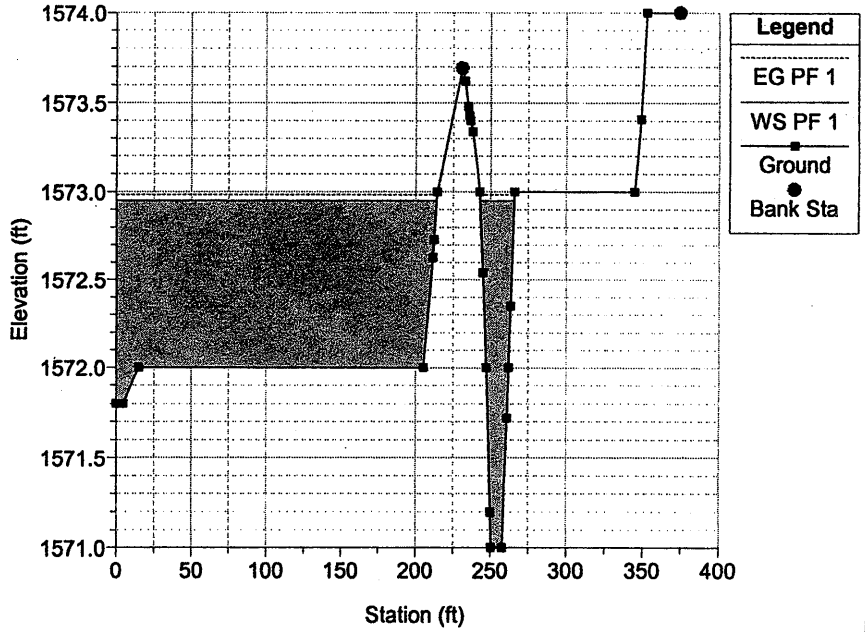
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 8 8



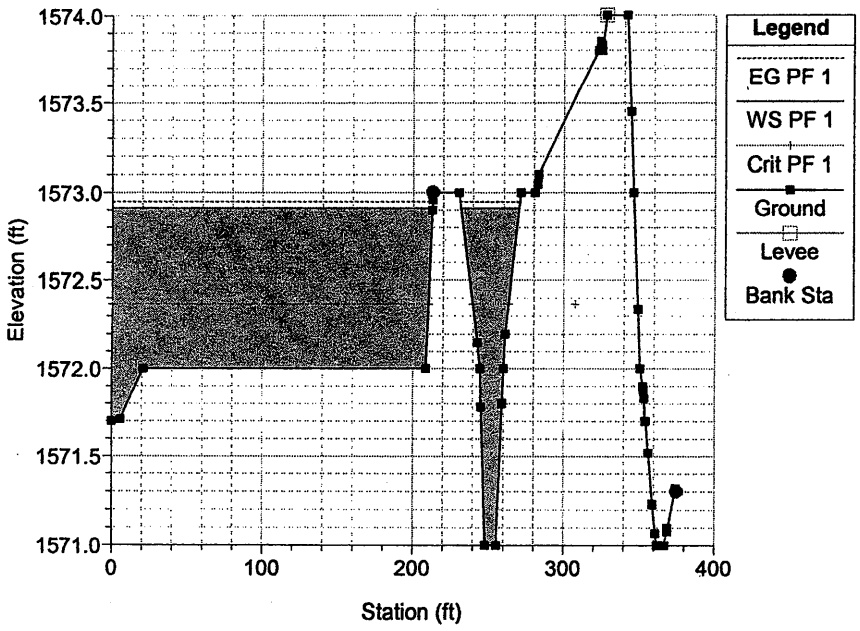
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 7 7



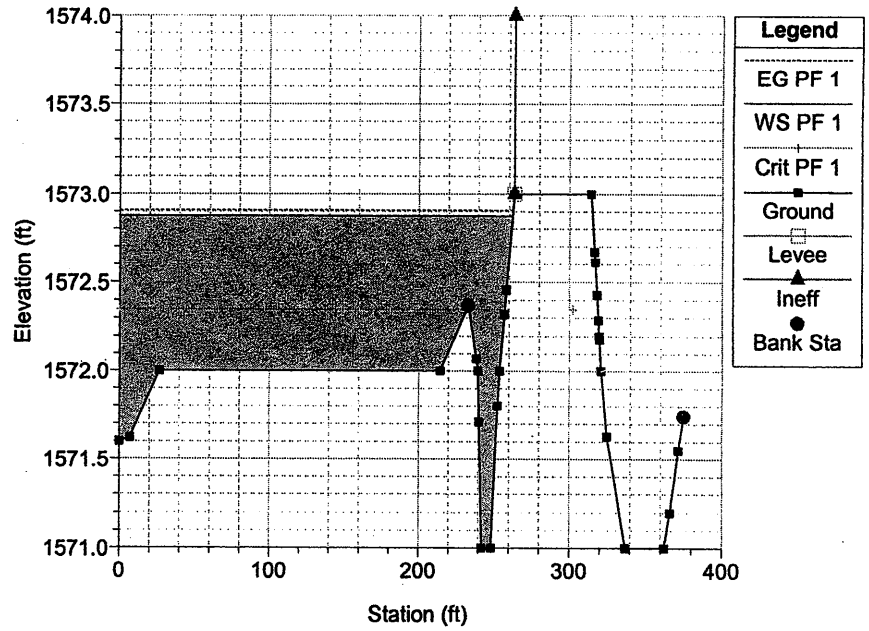
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 6 6



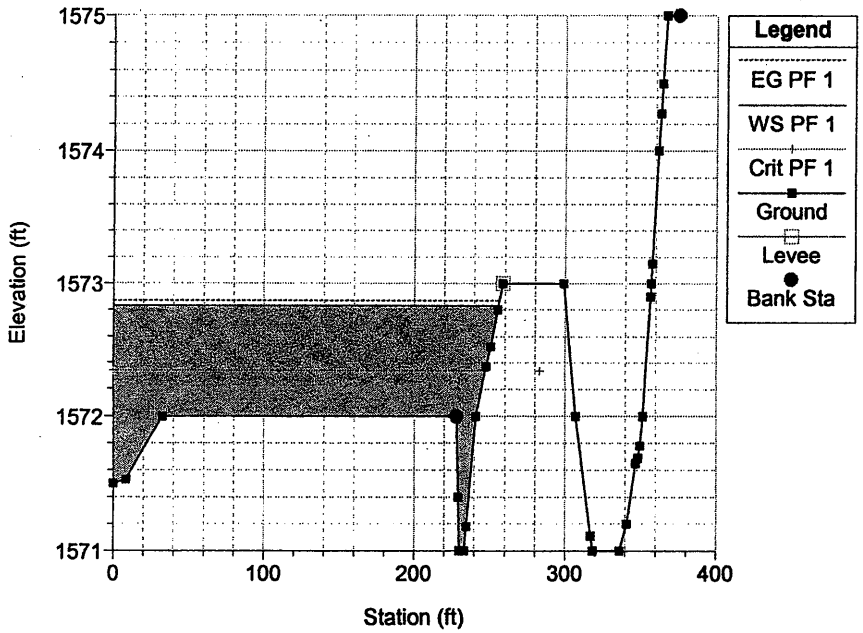
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = 5 5



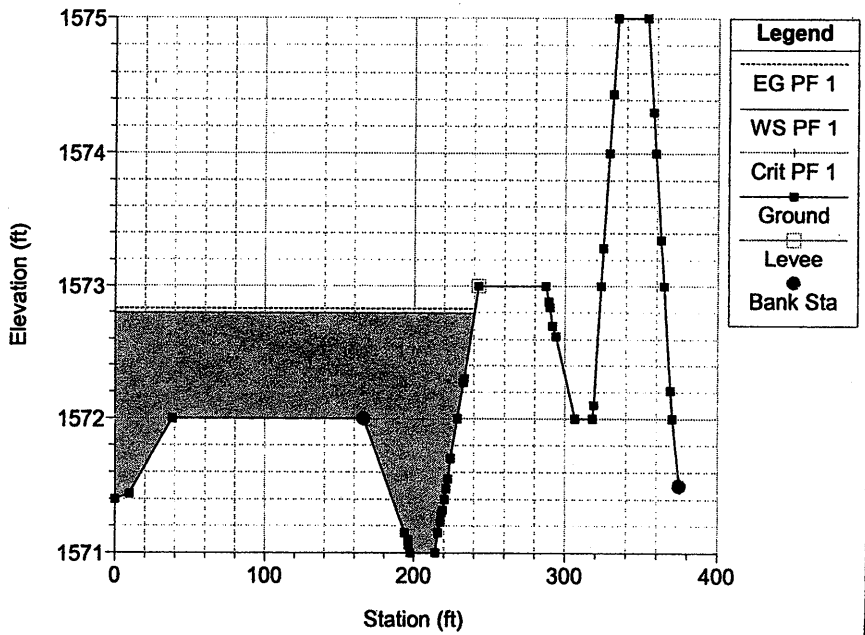
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

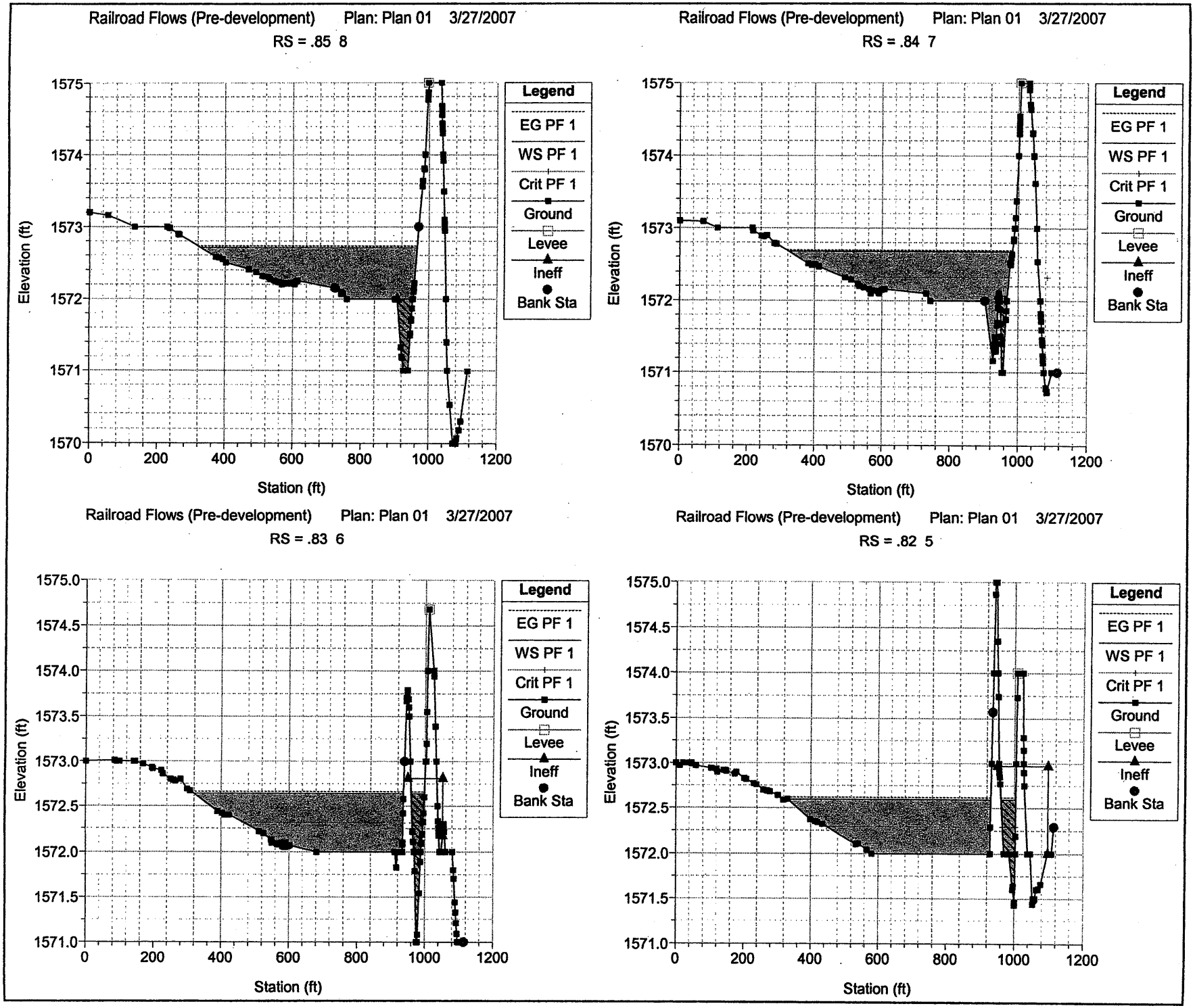
RS = 4 4



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

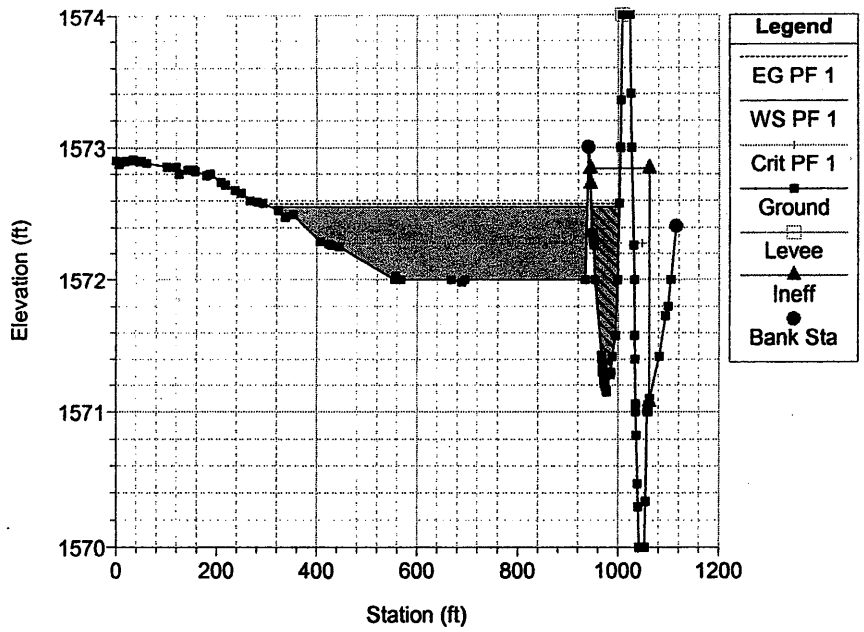
RS = 3 3




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .85 8
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .84 7
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .83 6
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .82 5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

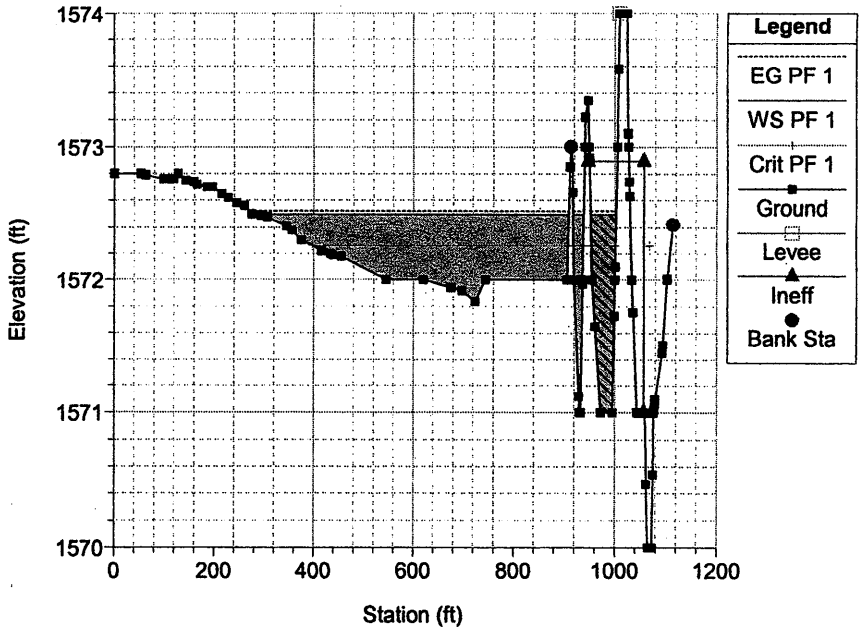
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .81 4



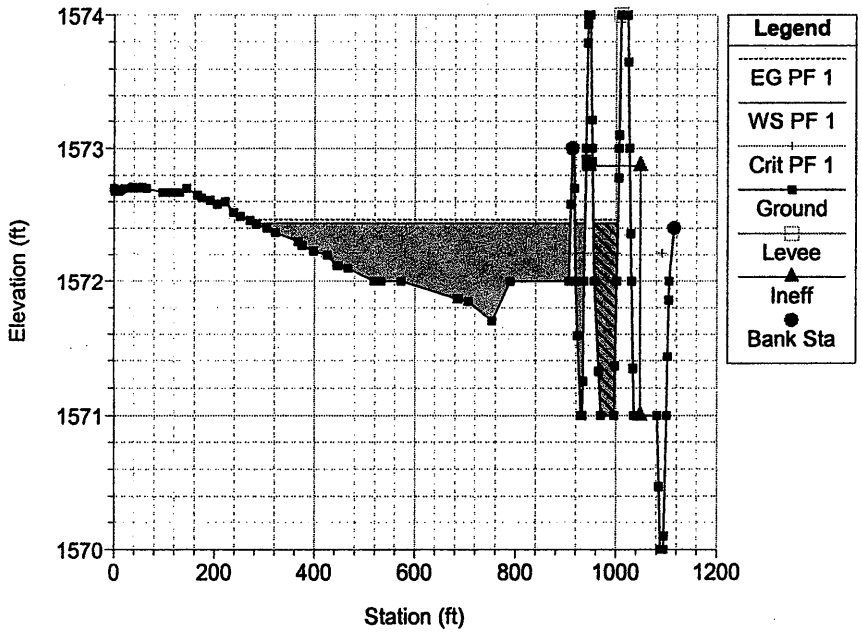
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .8 3



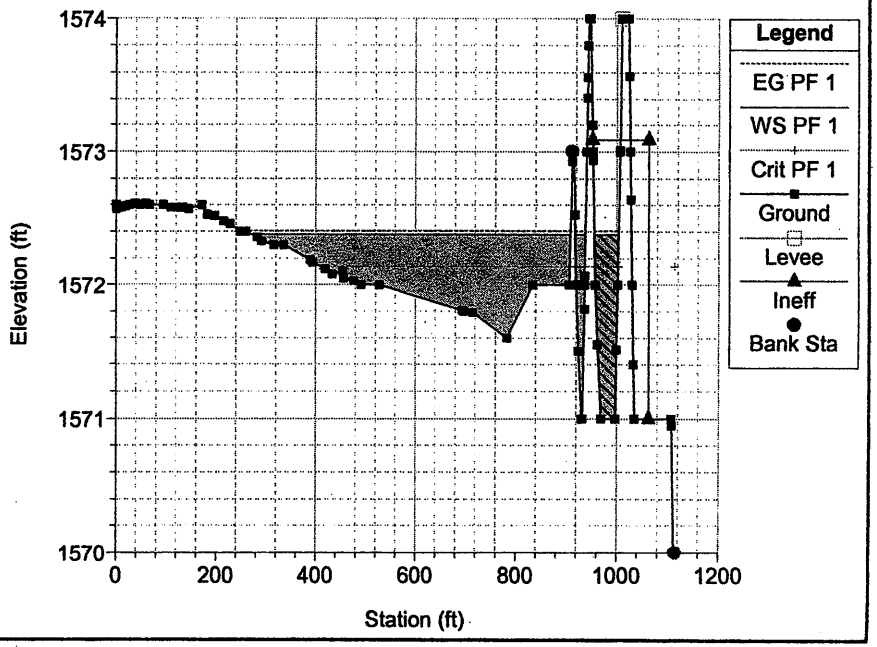
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .79 2

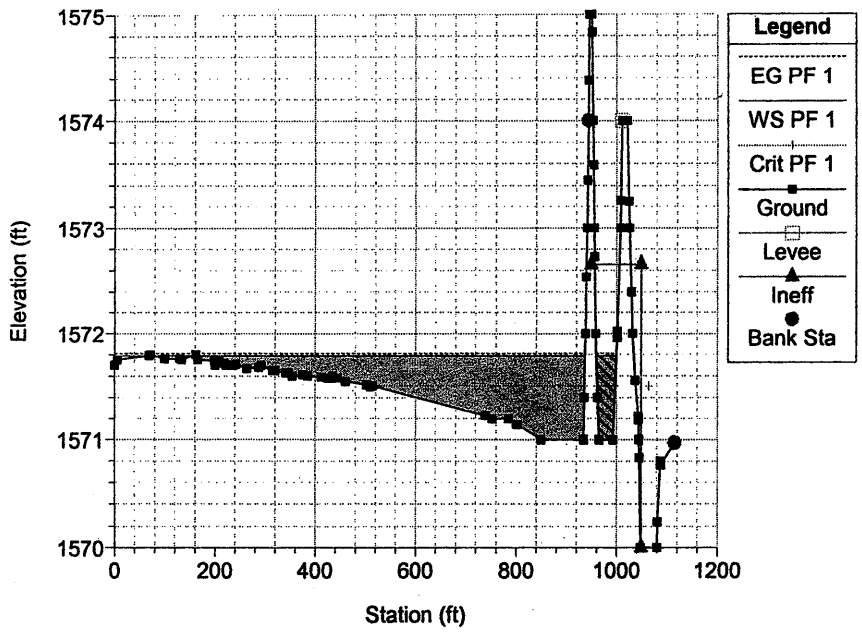


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

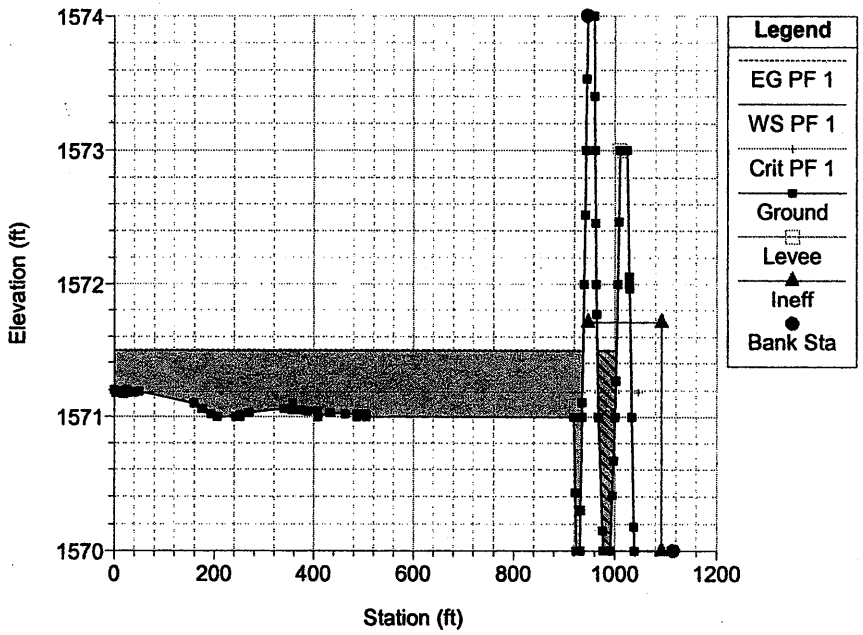
RS = .78 1



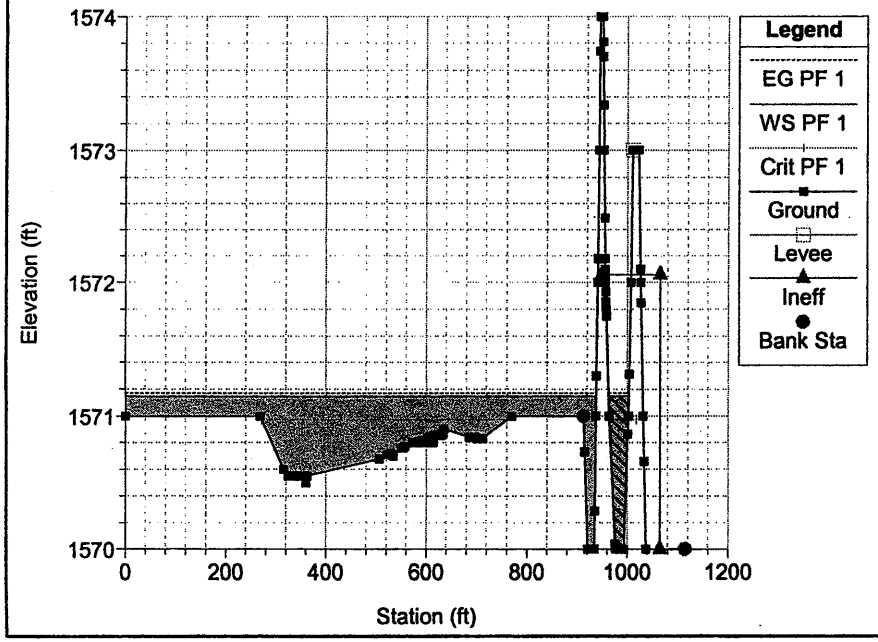
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .77 6



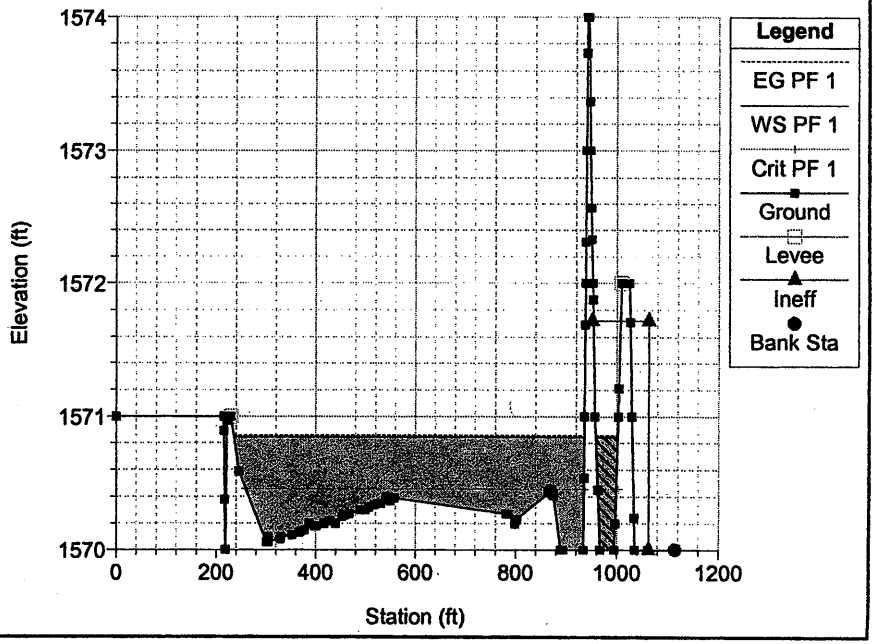
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .76 5

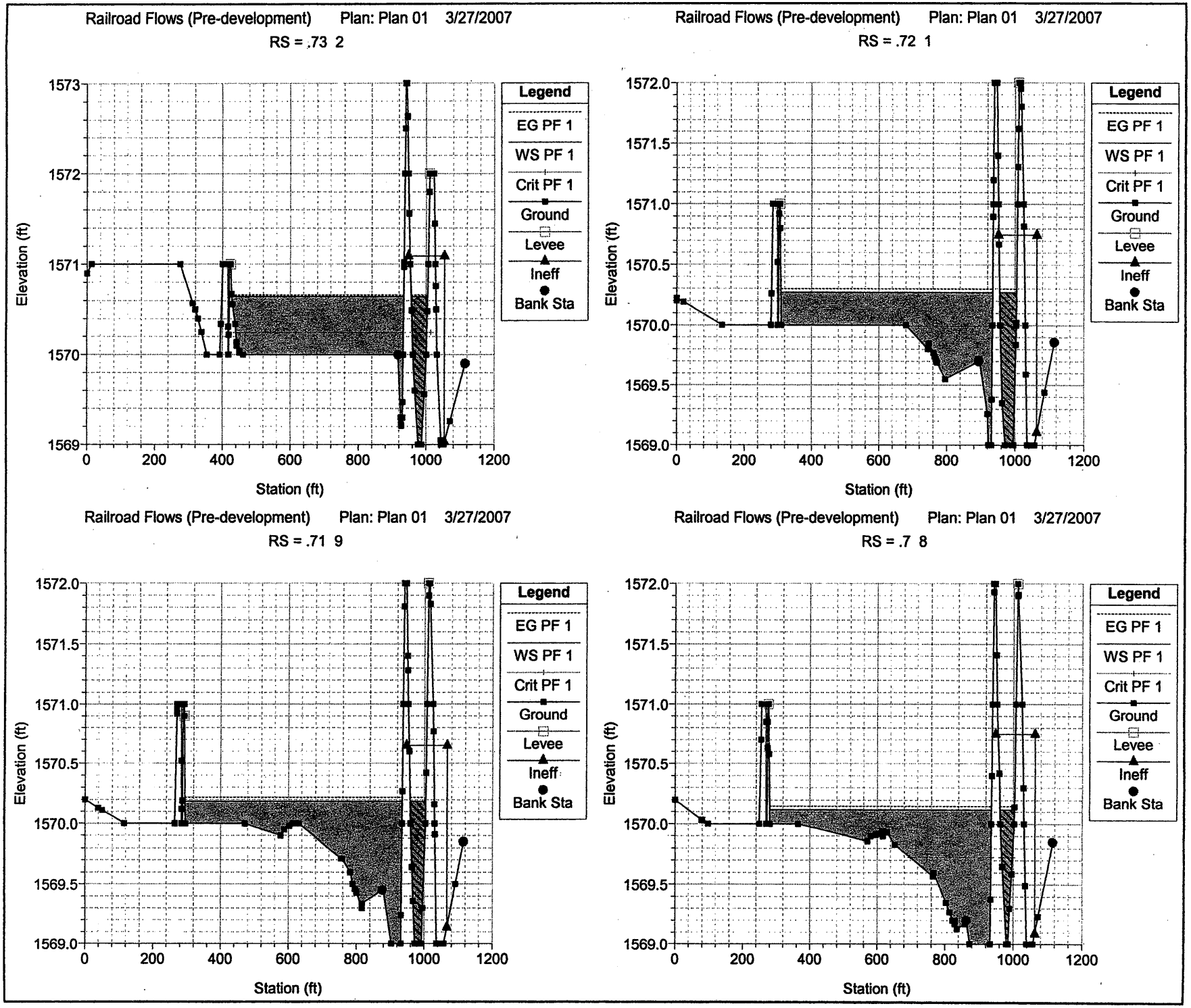


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .75 4



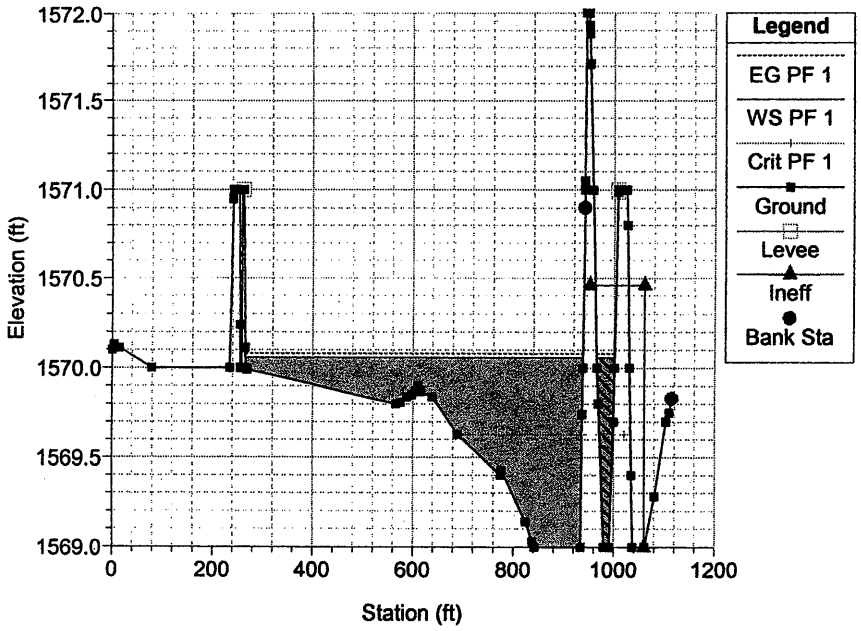
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .74 3




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .73 2
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .72 1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .71 9
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .7 8
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

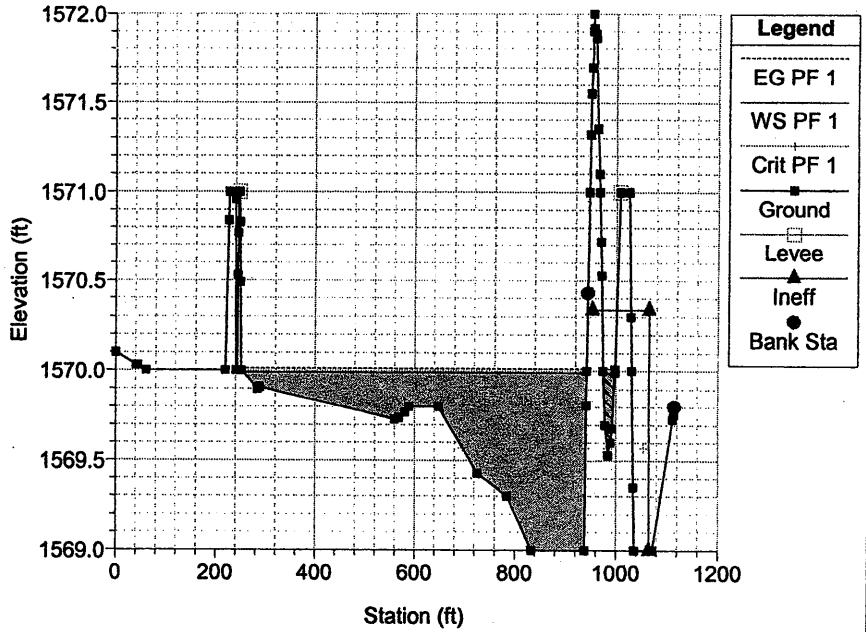
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .69 7



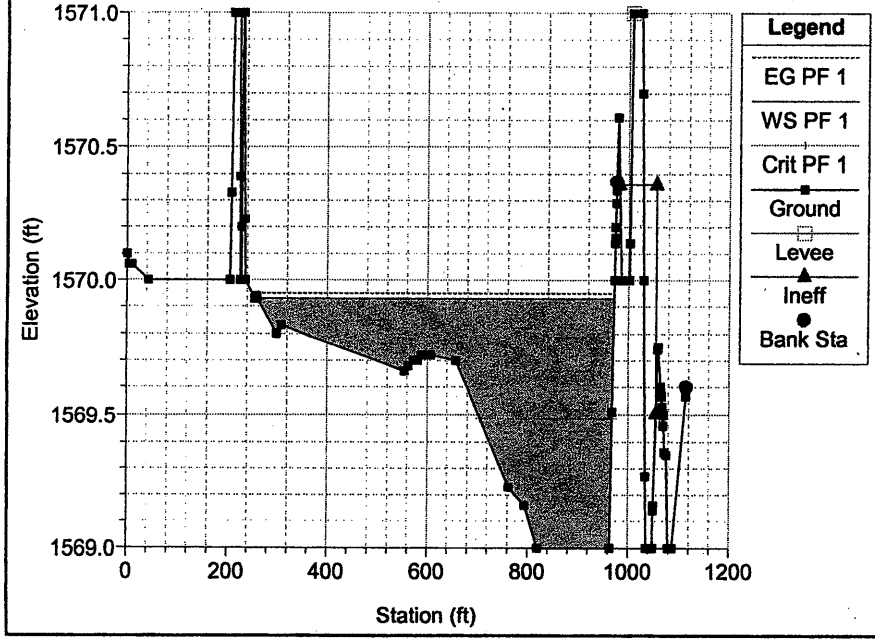
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .68 6



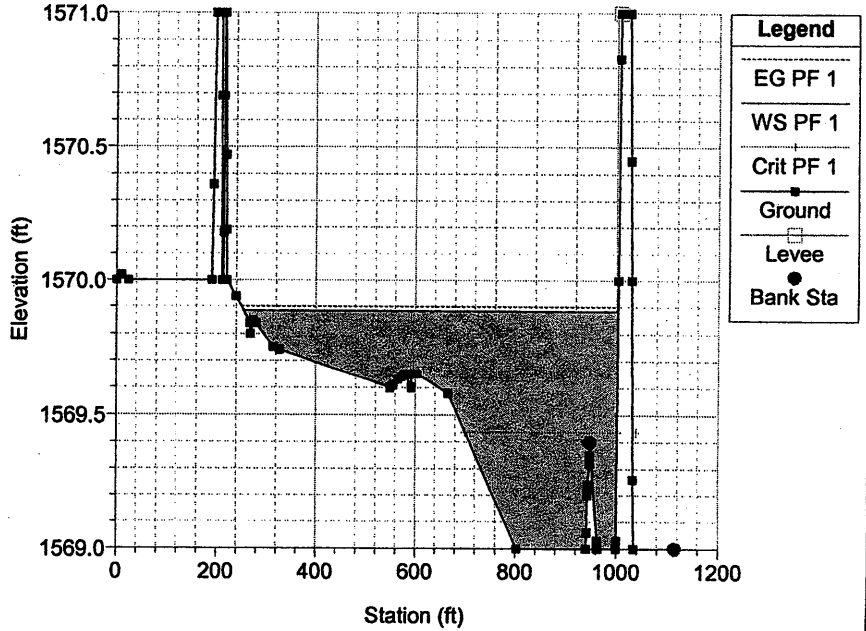
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .67 5



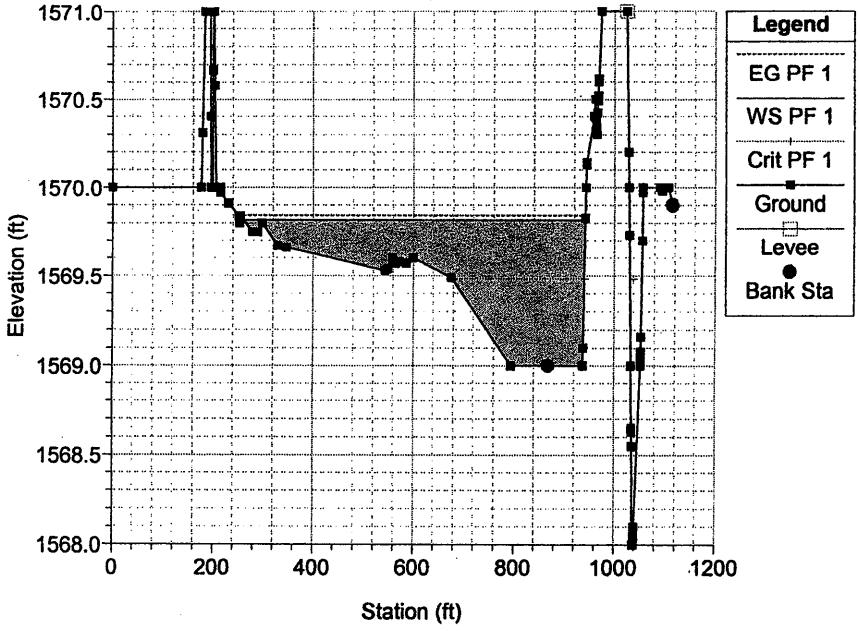
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .66 4



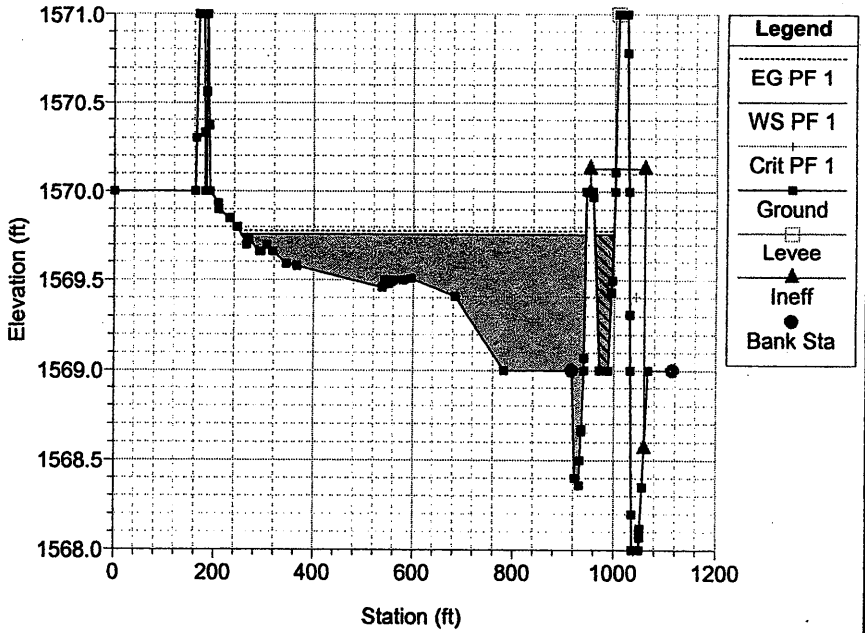
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .65 3



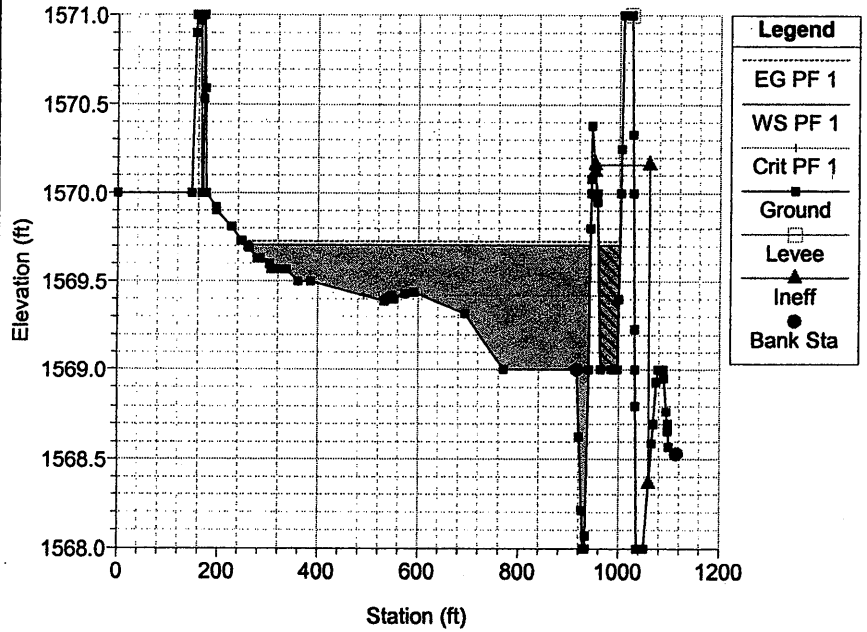
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .64 2



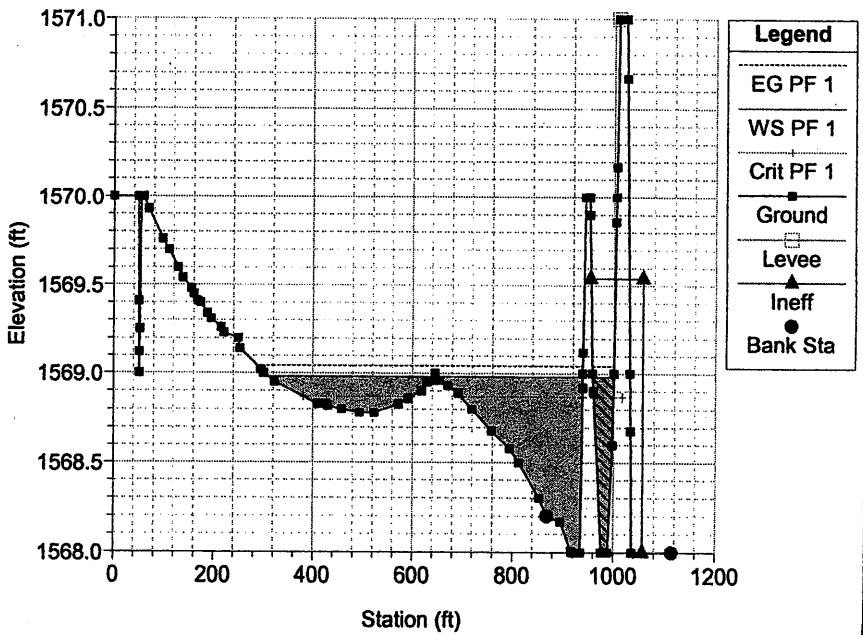
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .63 1

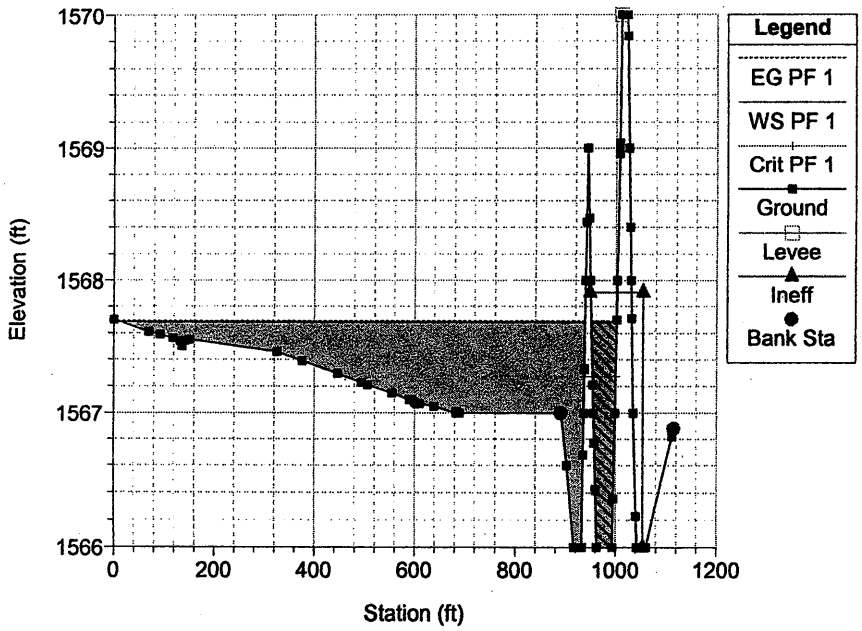


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

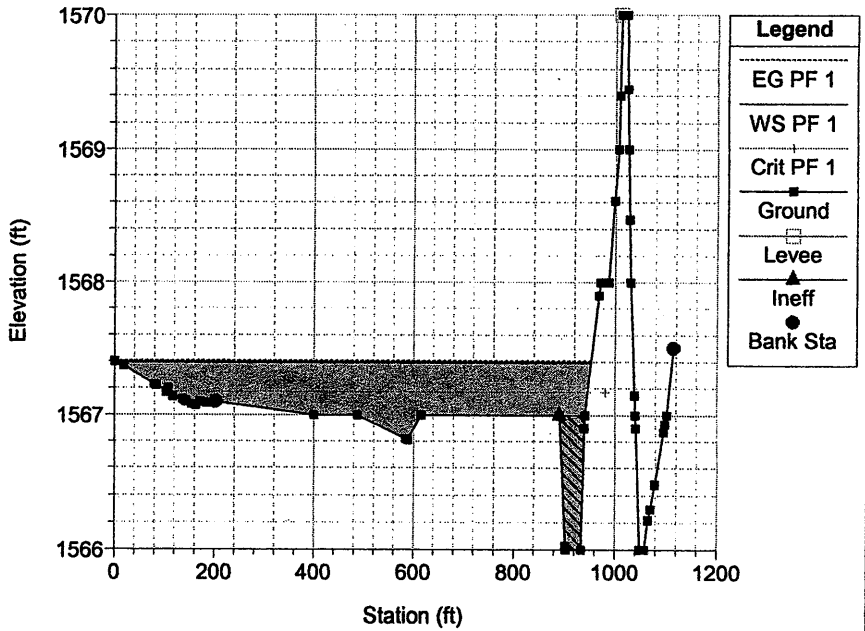
RS = .62 7



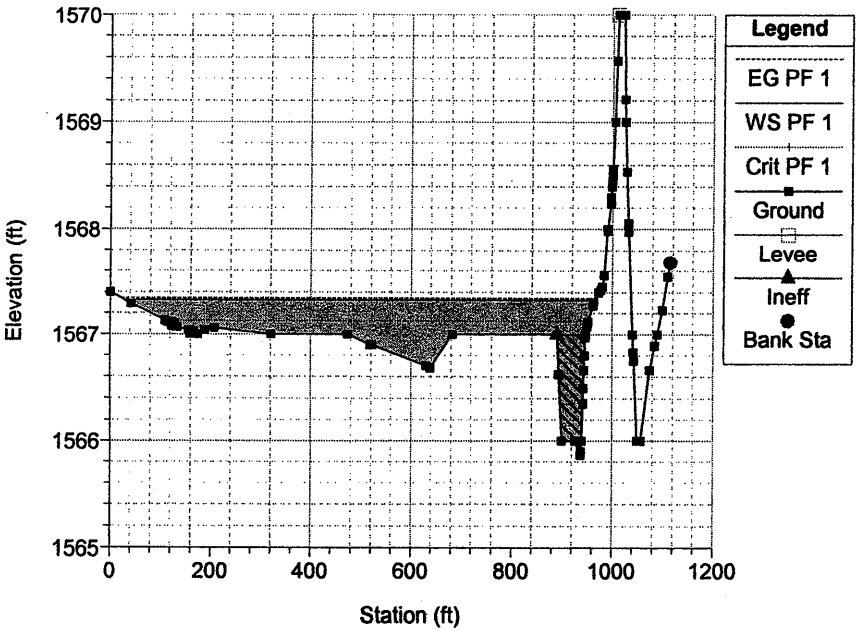
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .57 2



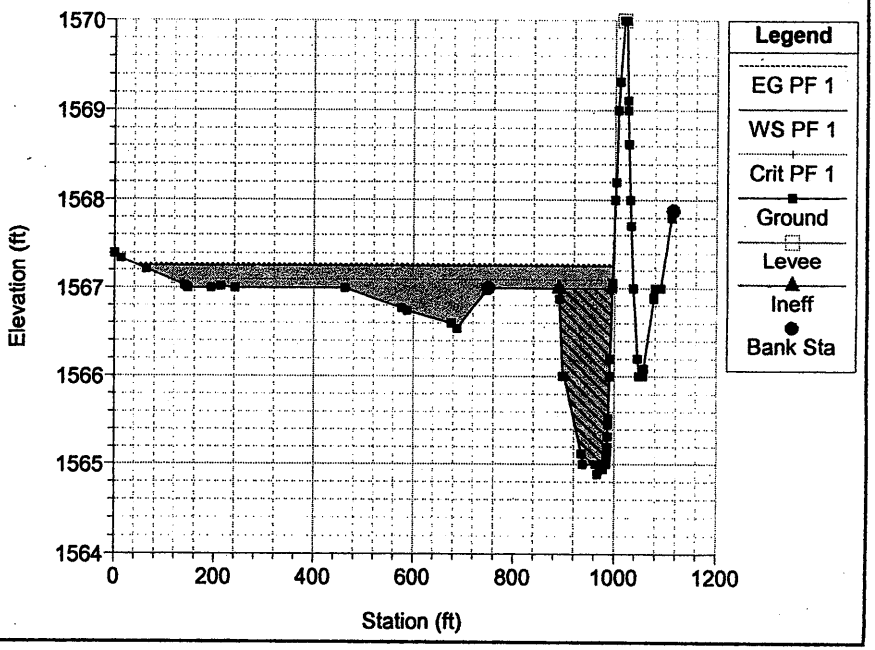
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .55 11



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .54 10

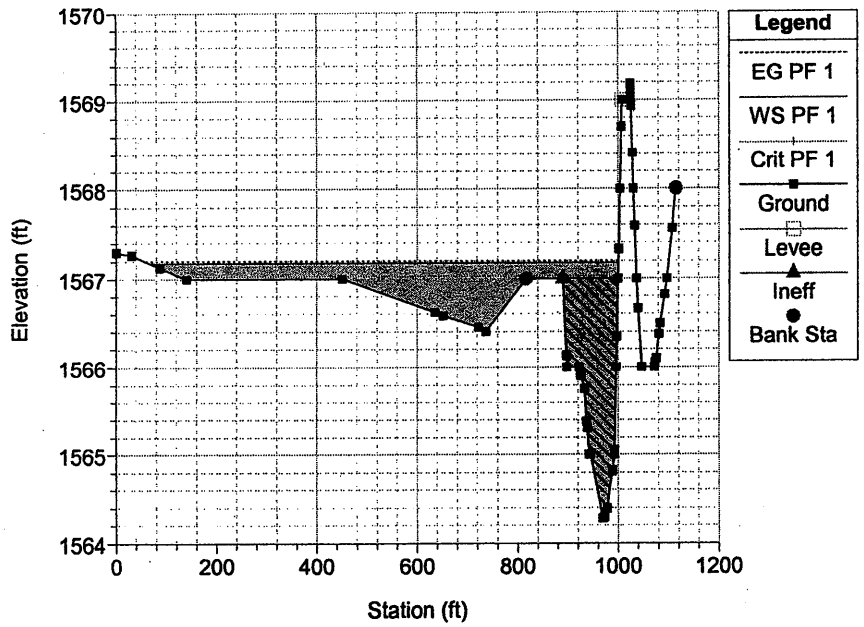


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .53 9



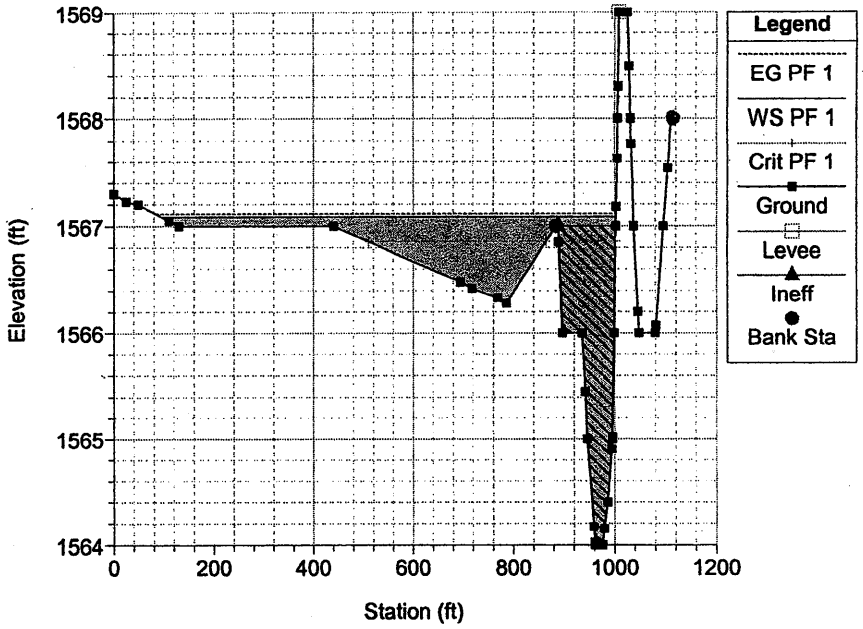
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .52 8



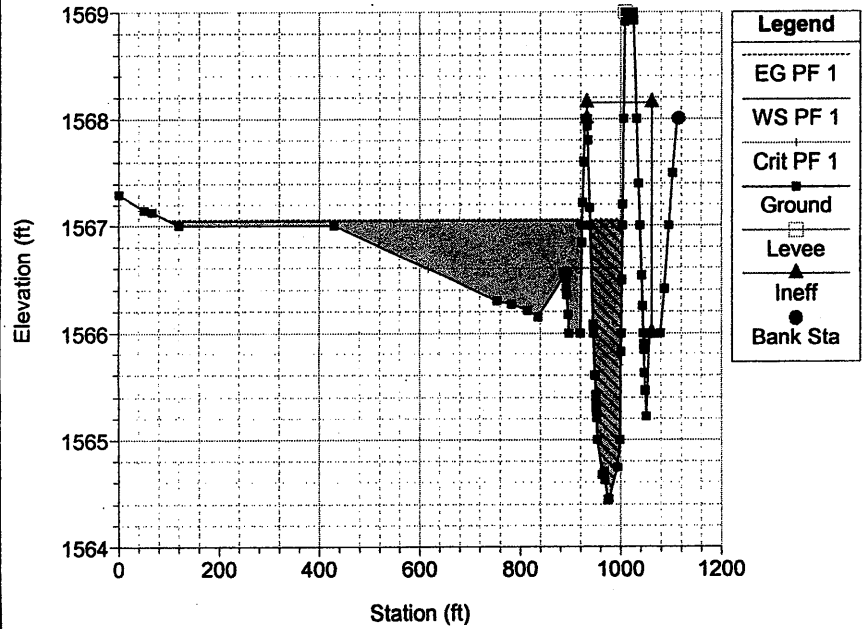
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .51 7



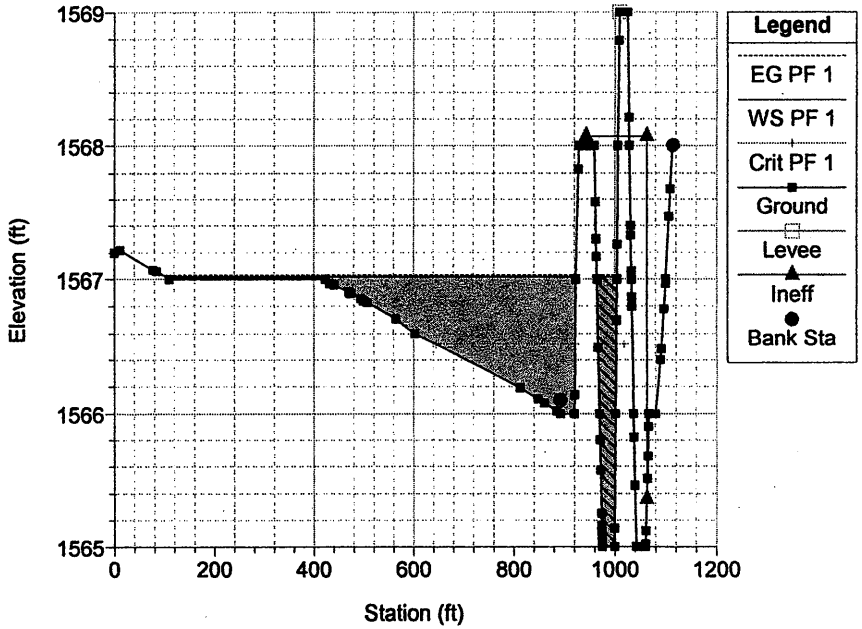
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .5 6

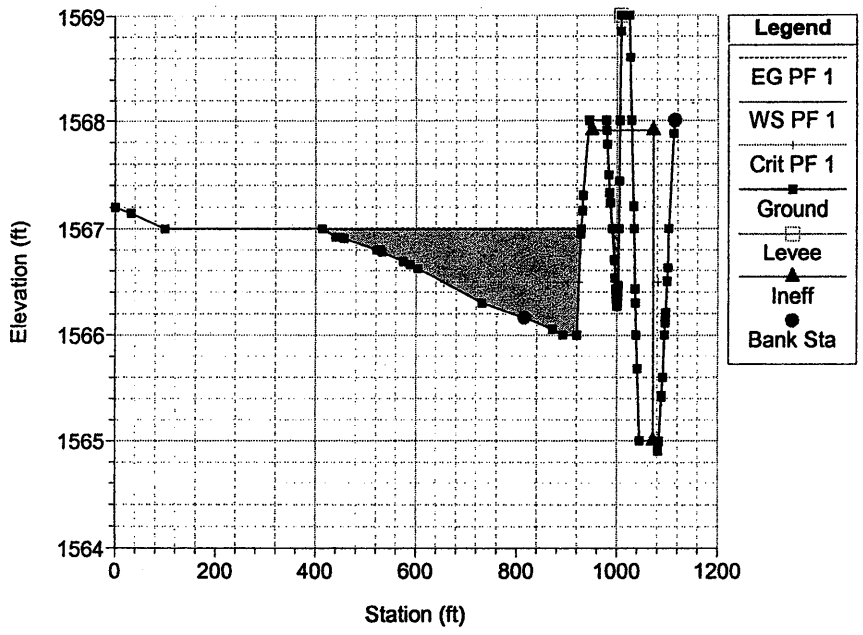


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

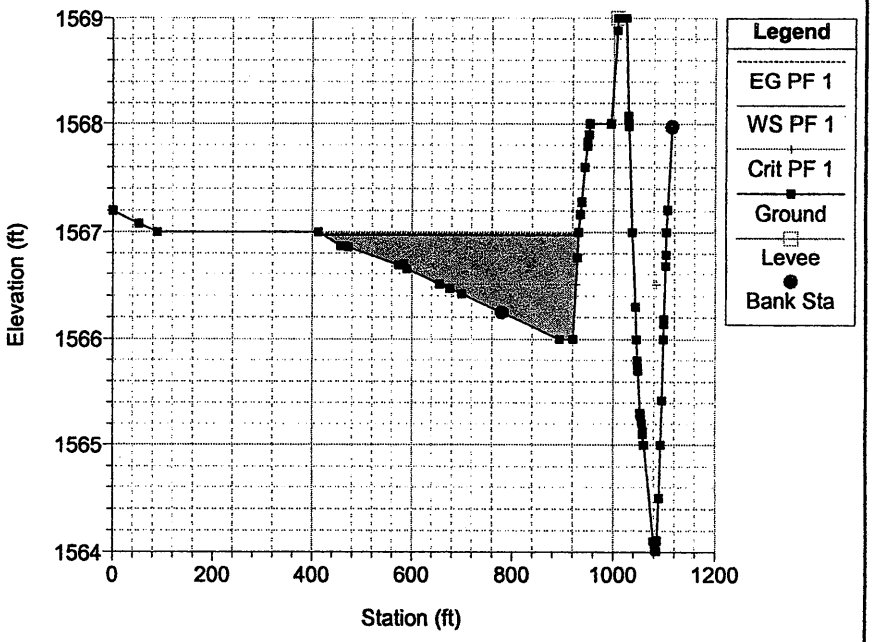
RS = .49 5



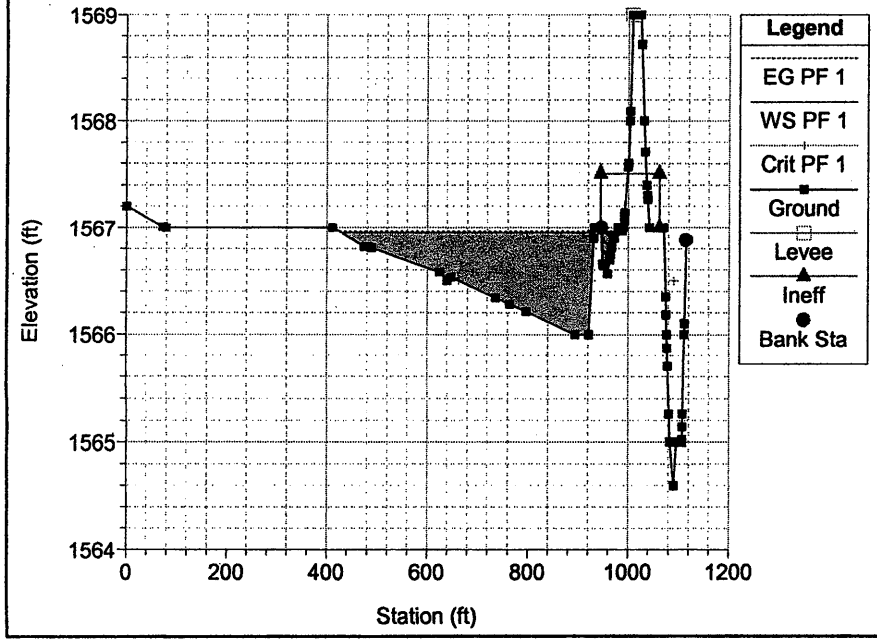
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .48 4



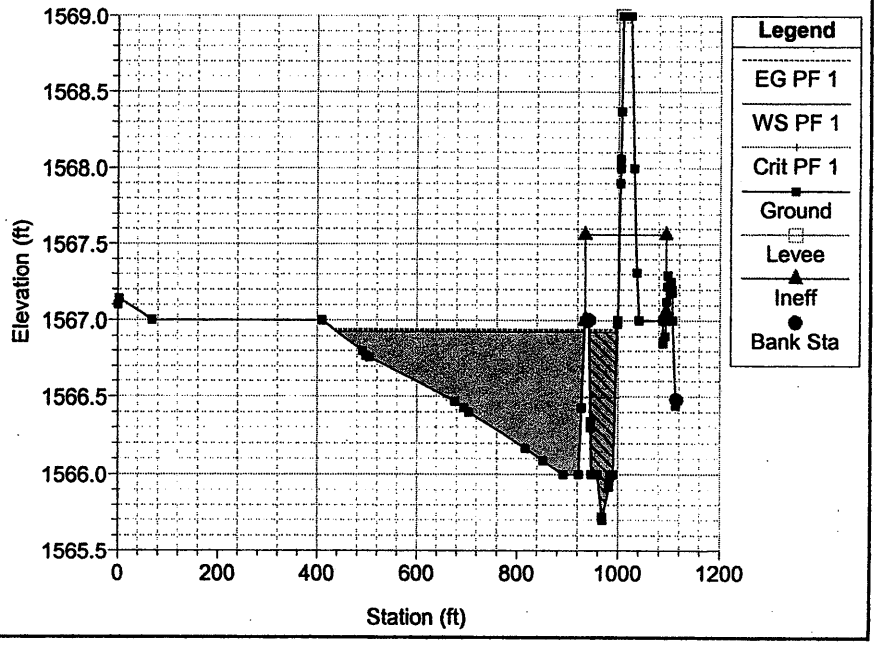
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .47 3



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .46 2

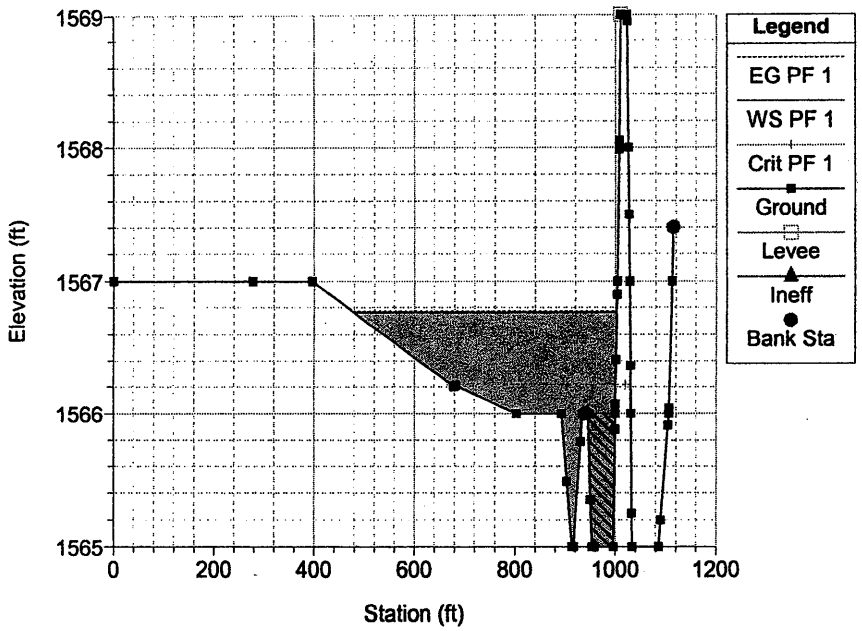


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .45 1



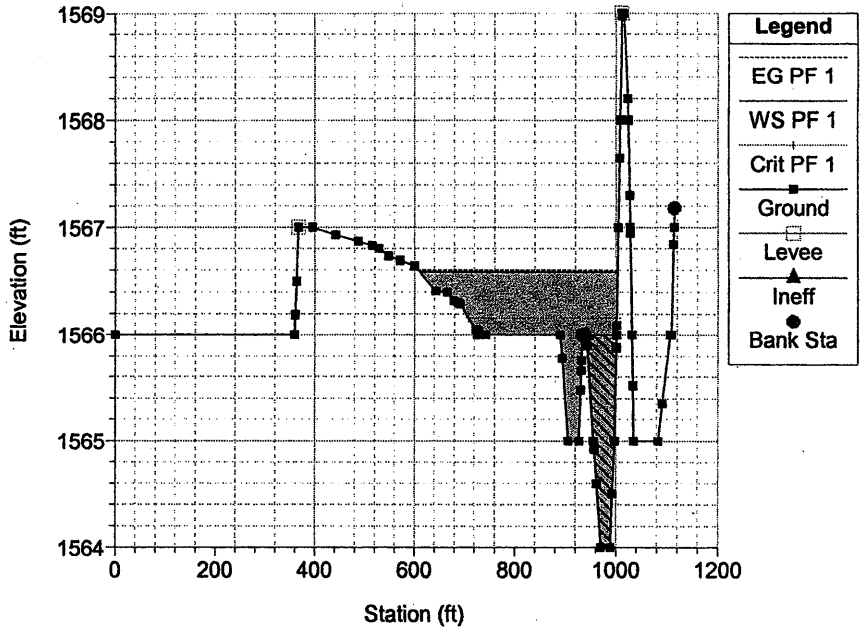
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .44 3



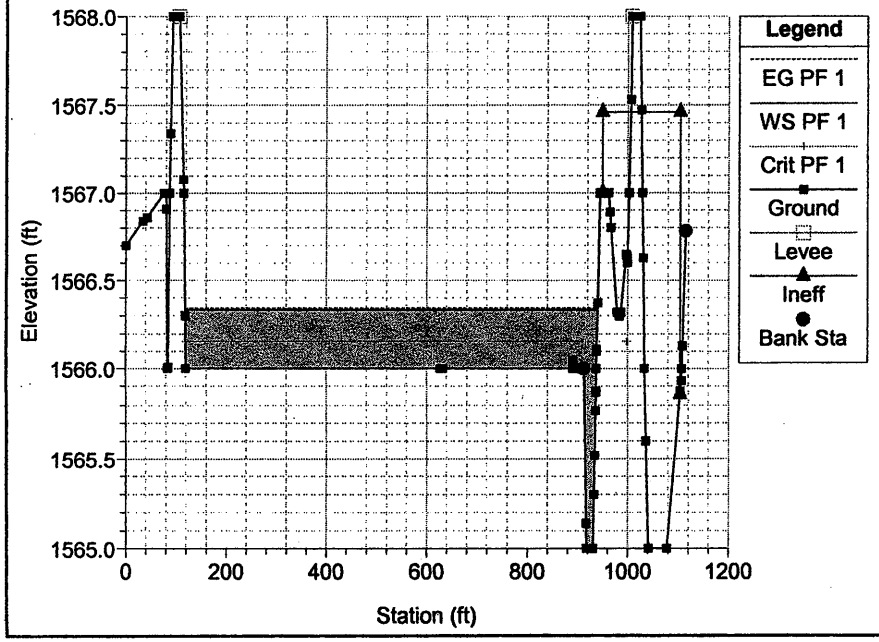
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .43 2



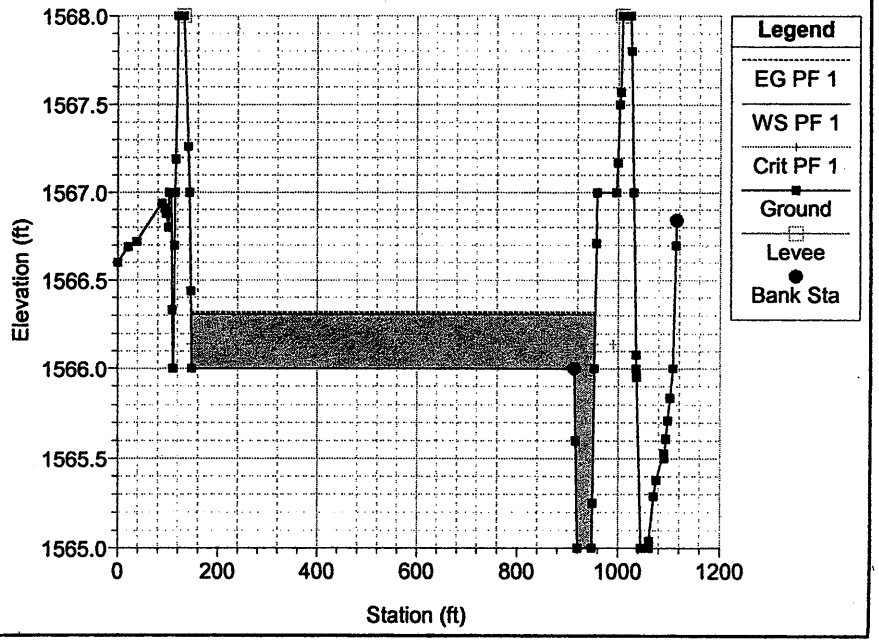
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .41 11



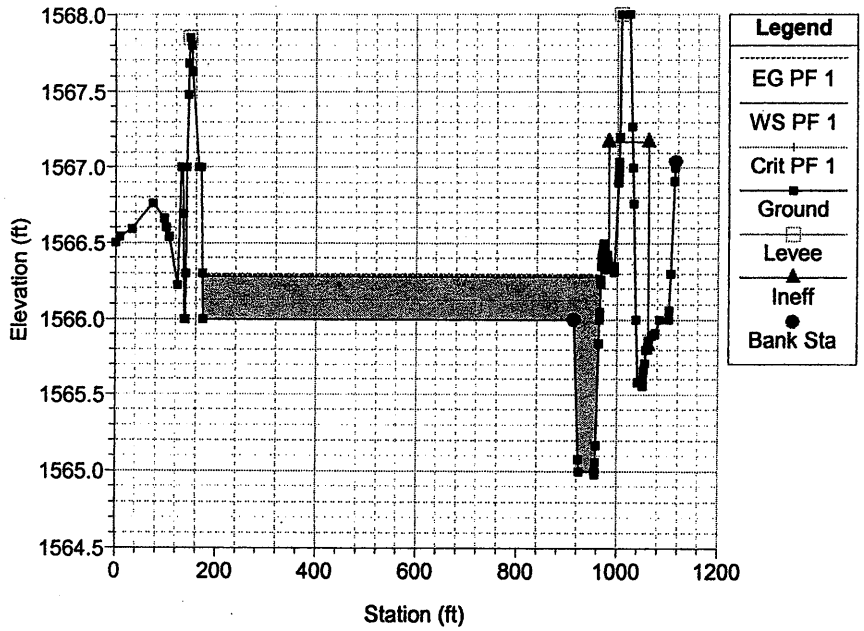
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .4 10



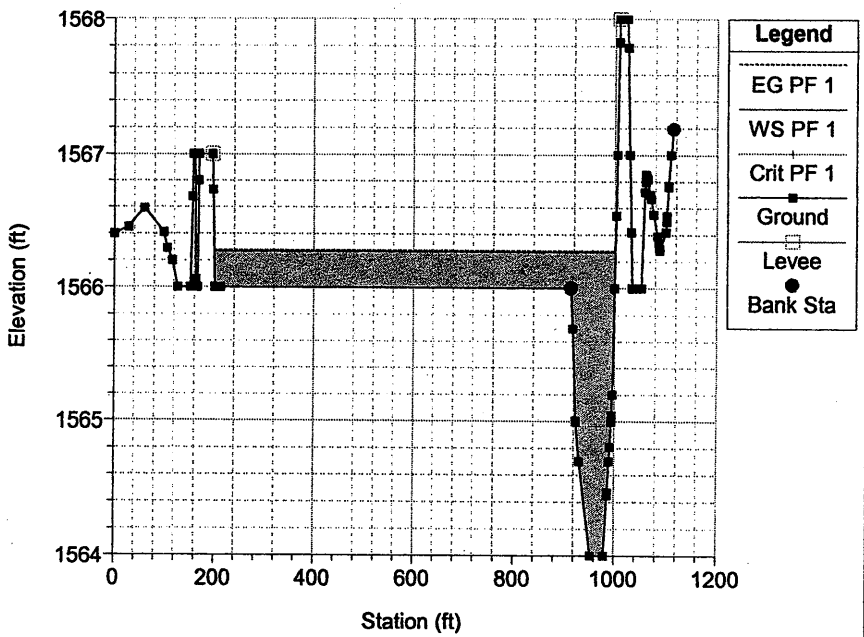
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .39 9



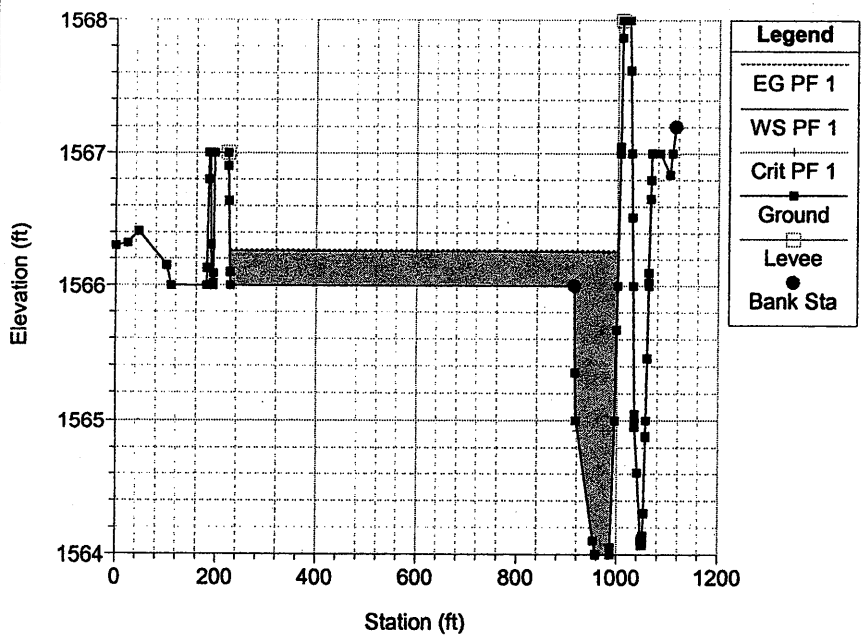
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .38 8



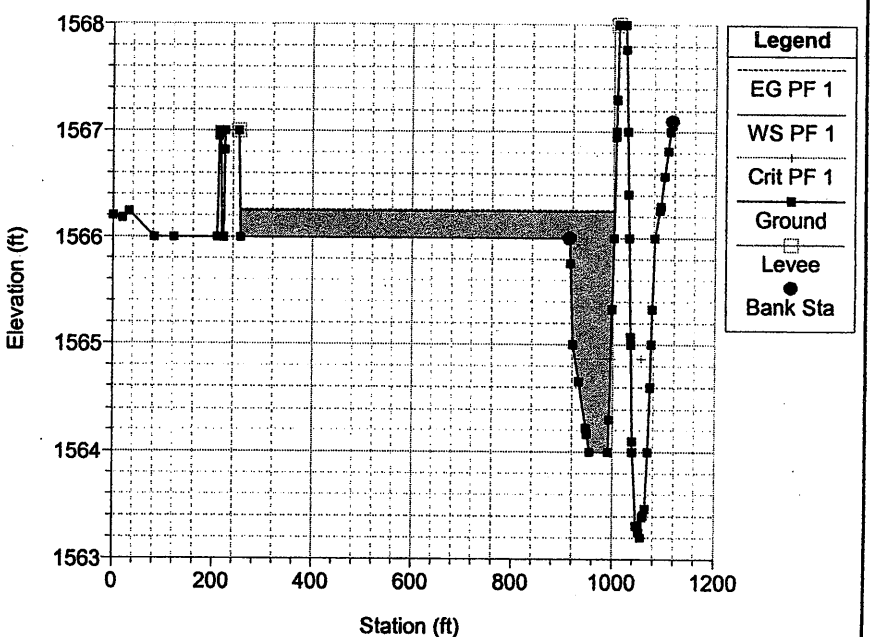
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

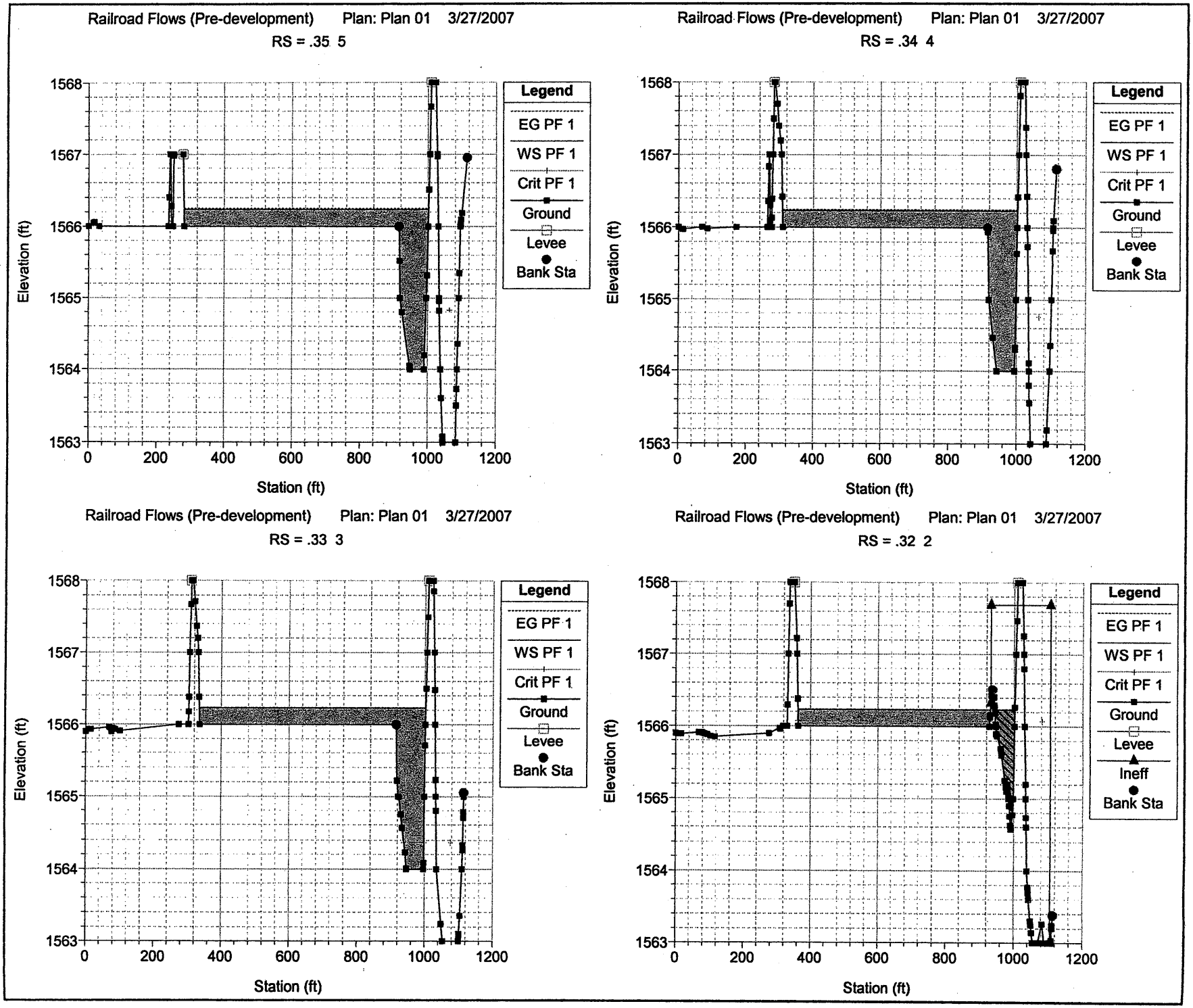
RS = .37 7



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

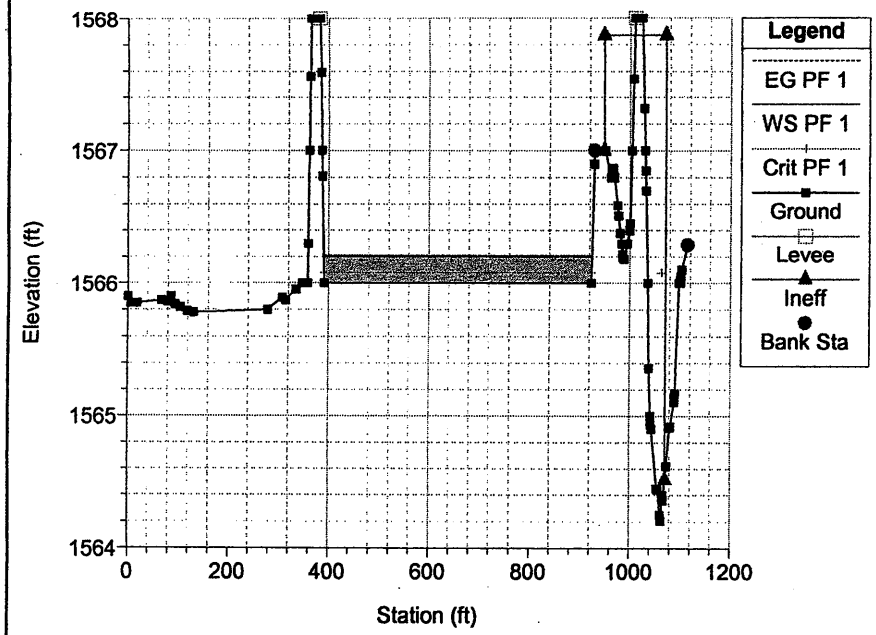
RS = .36 6




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .35 5
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .34 4
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .33 3
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .32 2
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1563
1564
1565
1566
1567
1568
0
200
400
600
800
1000
1200

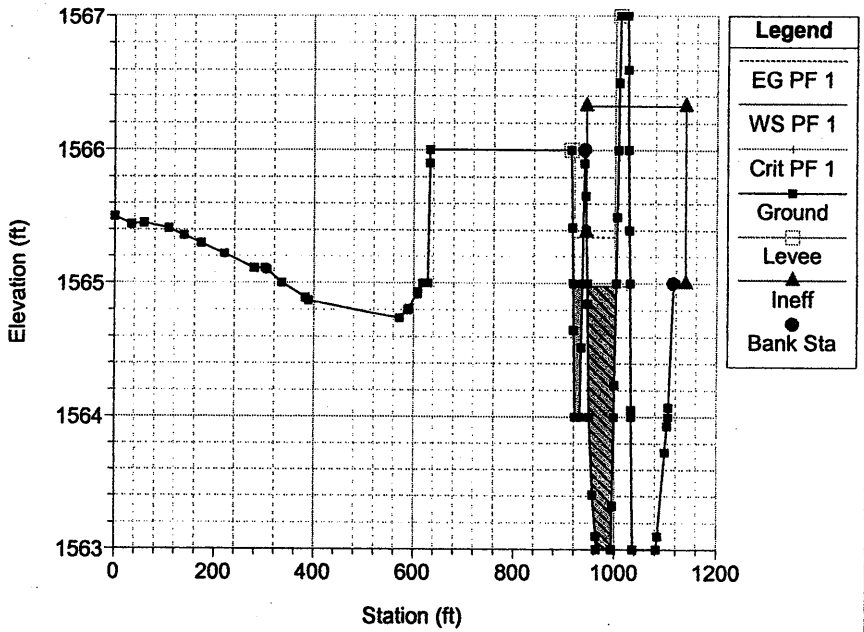
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .31 1



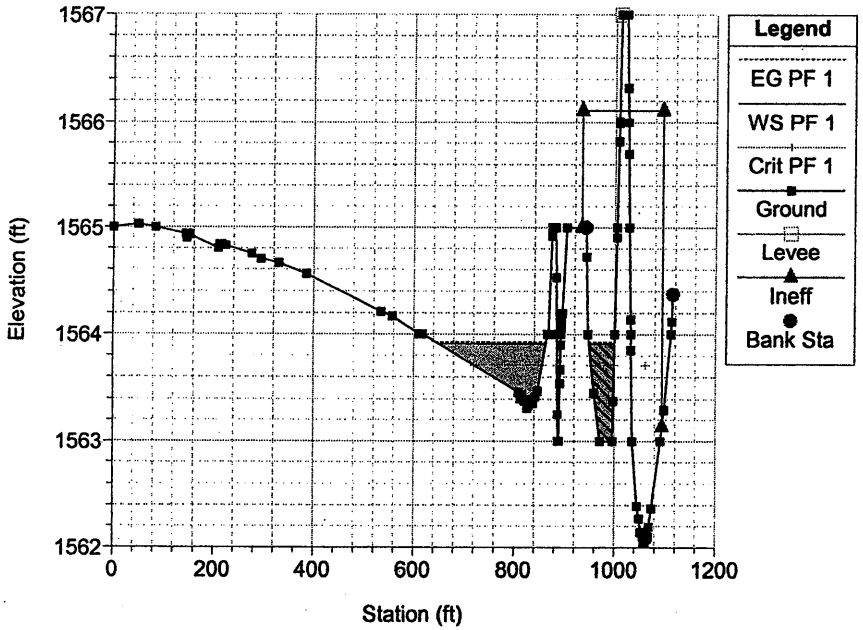
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .3 4



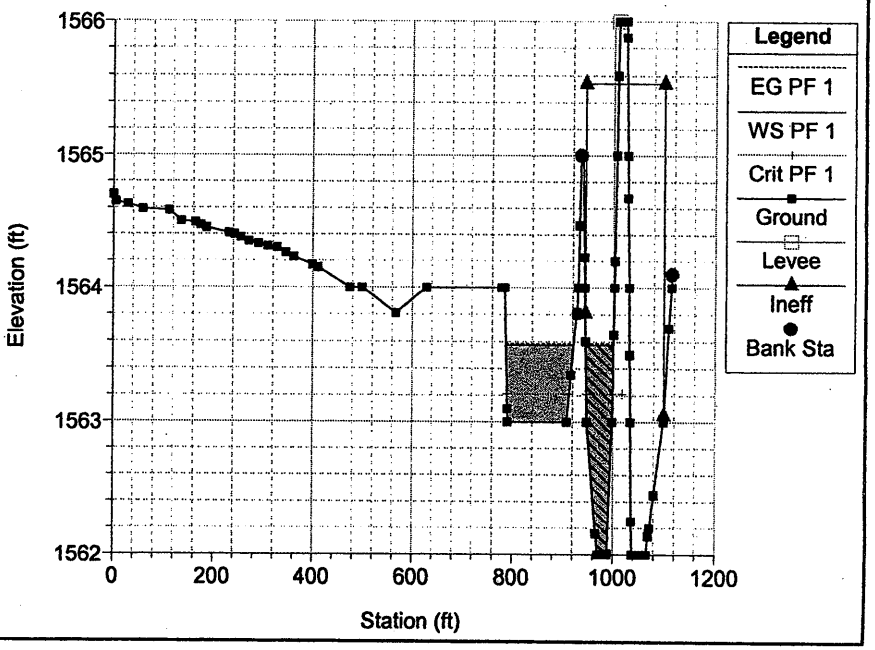
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .29 3



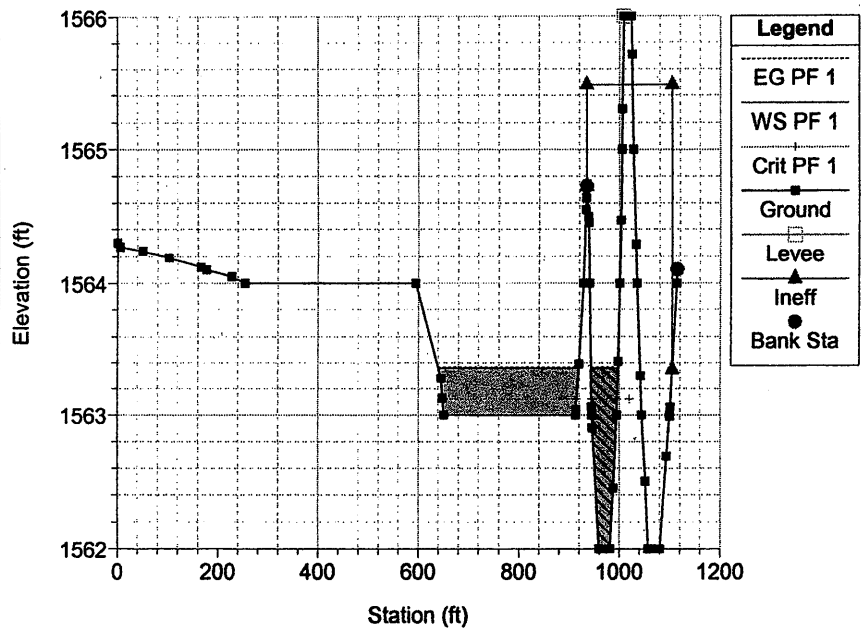
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .28 2



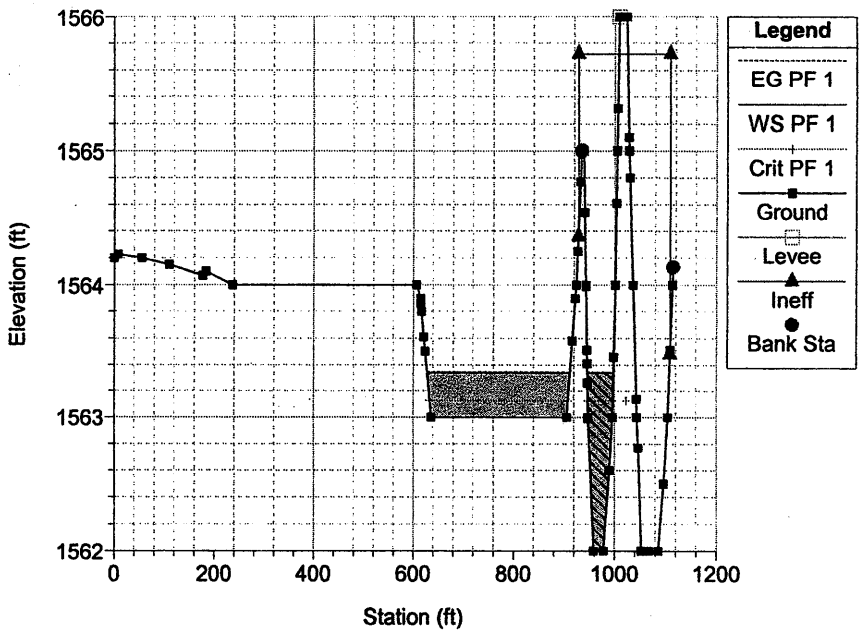
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .26 10



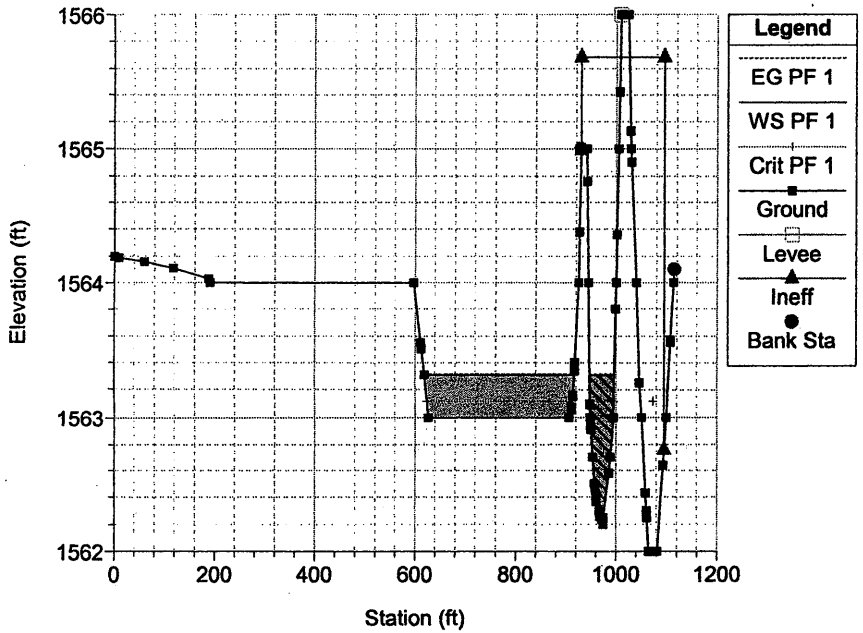
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .25 9



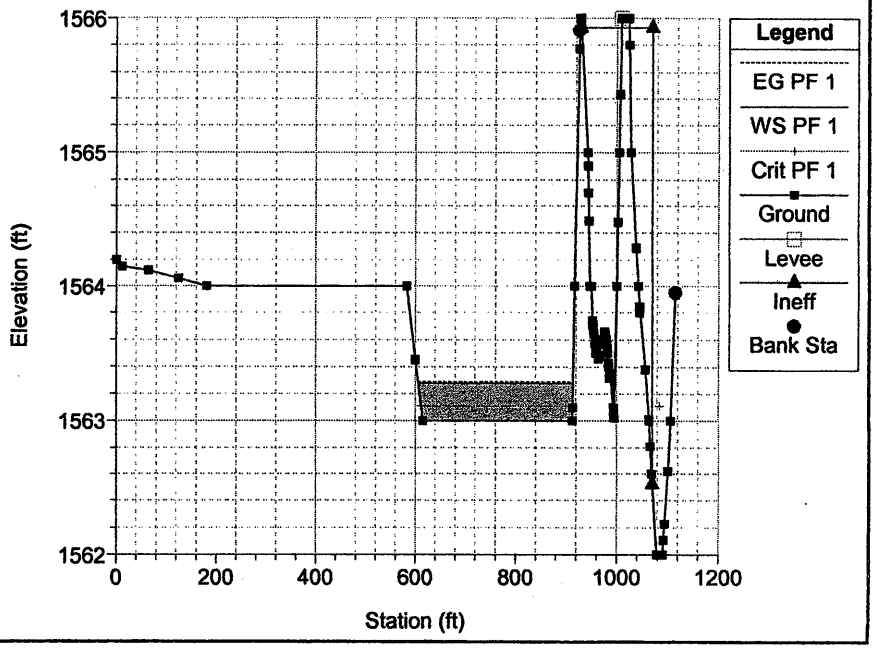
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .24 8



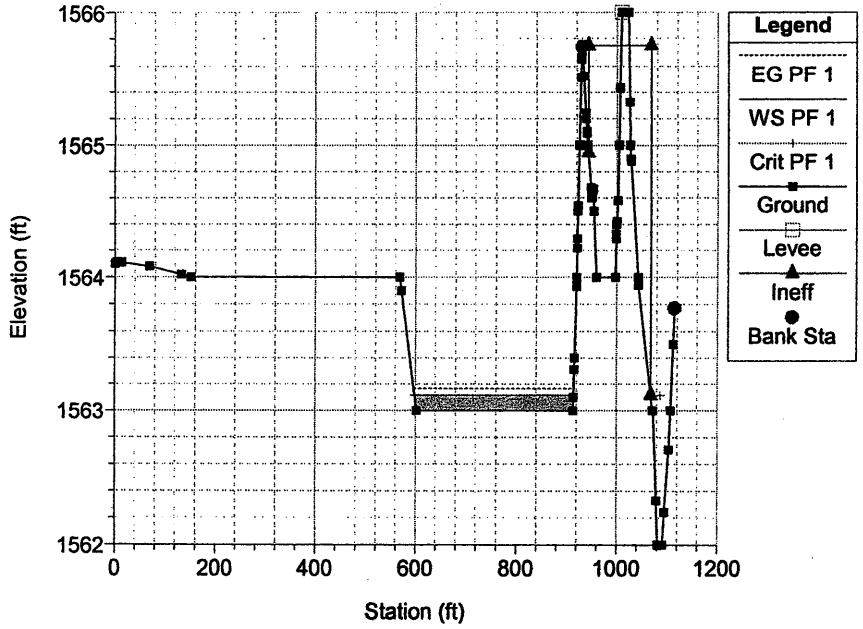
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .23 7



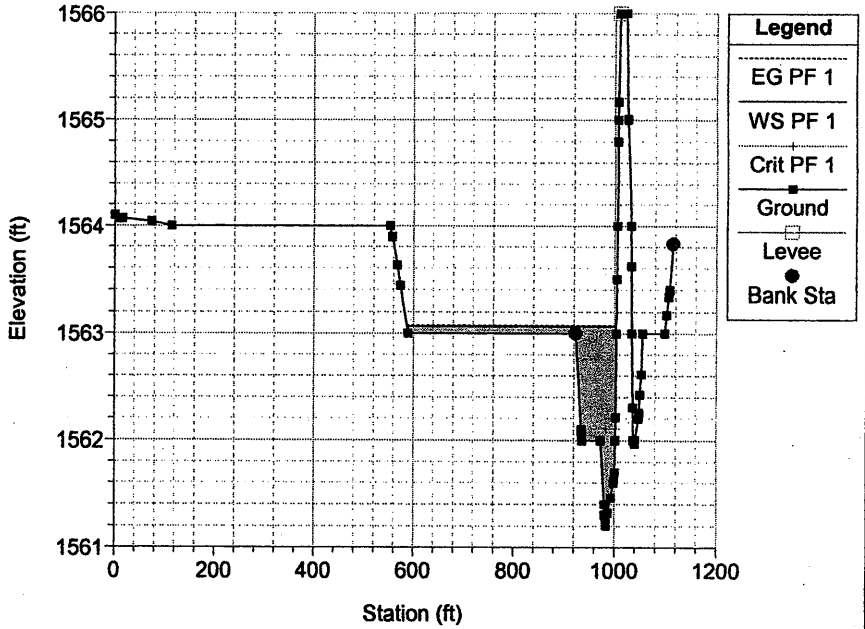
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .22 6



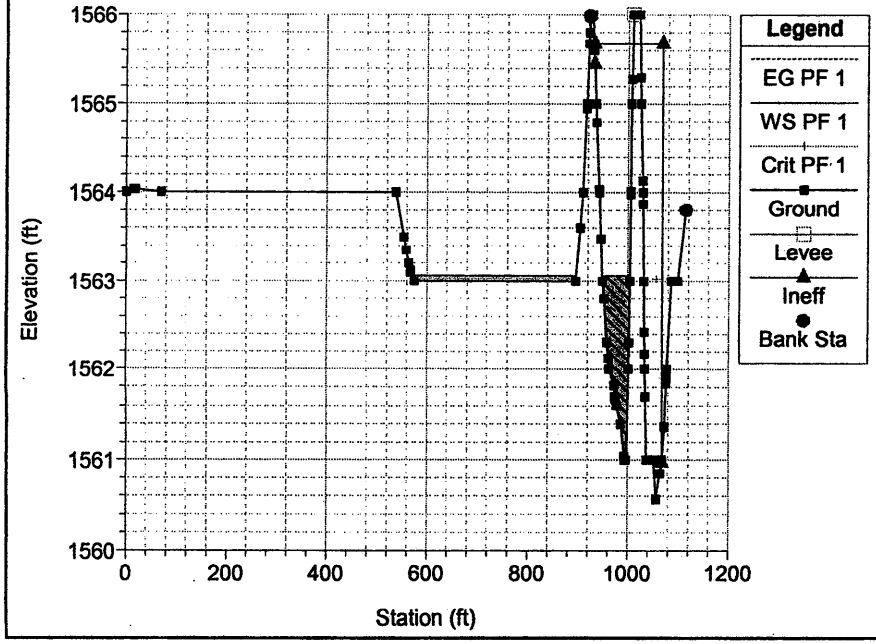
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .21 5



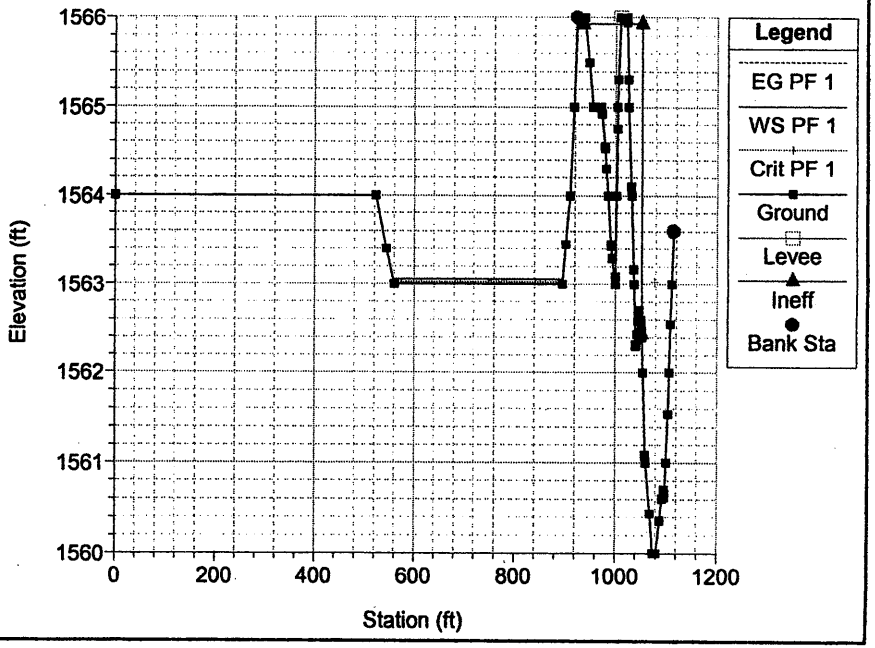
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

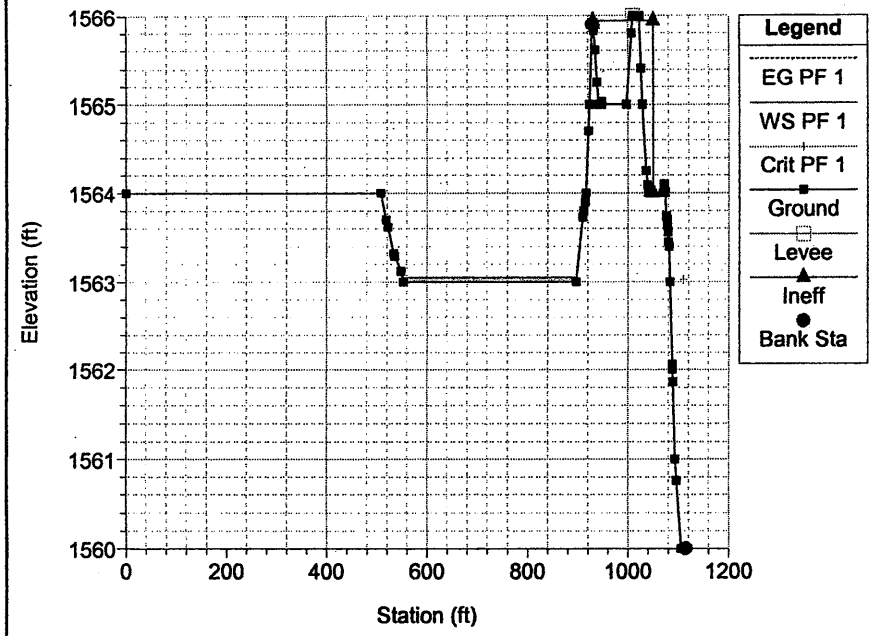
RS = .2 4

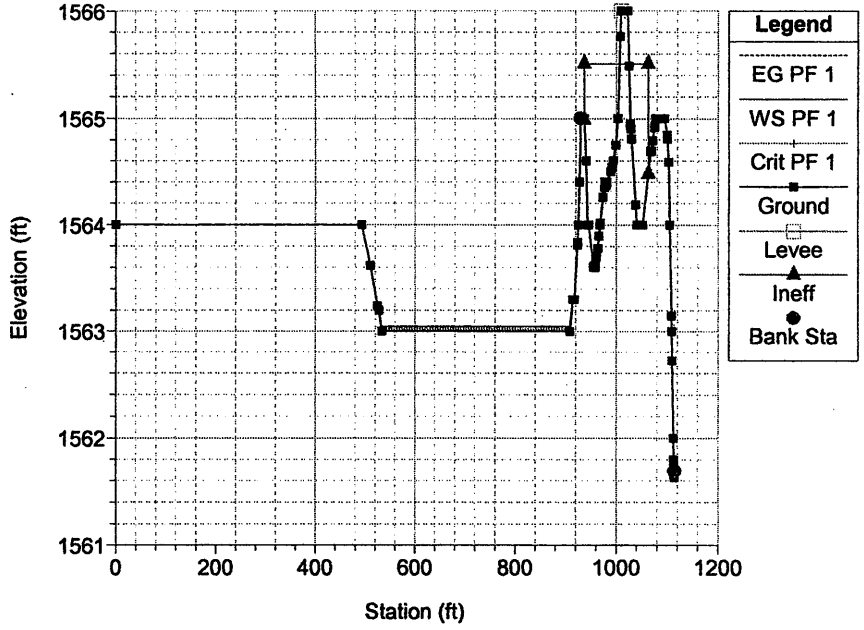


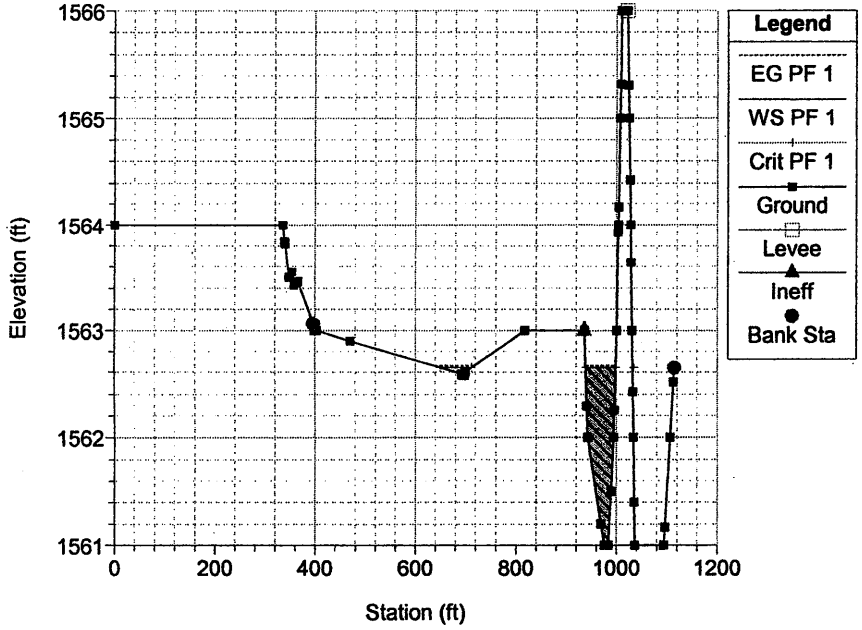
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

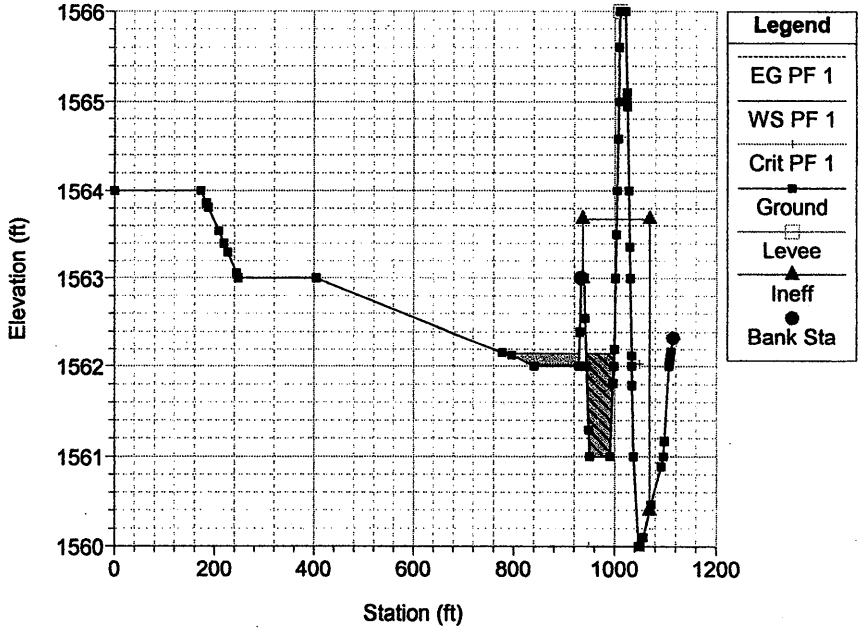
RS = .19 3




Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .18 2
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

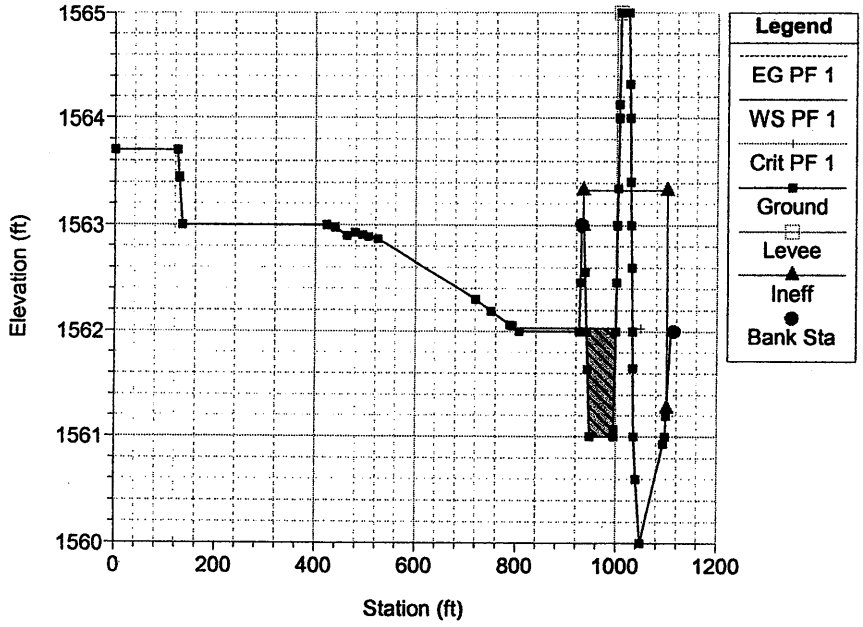

Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .16 6
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .15 5
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .14 4
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

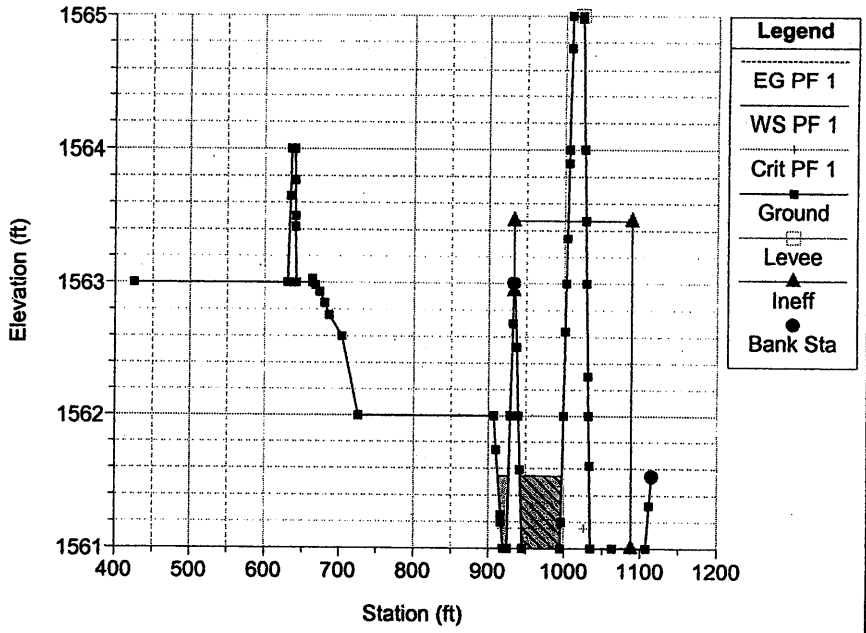
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .13 3



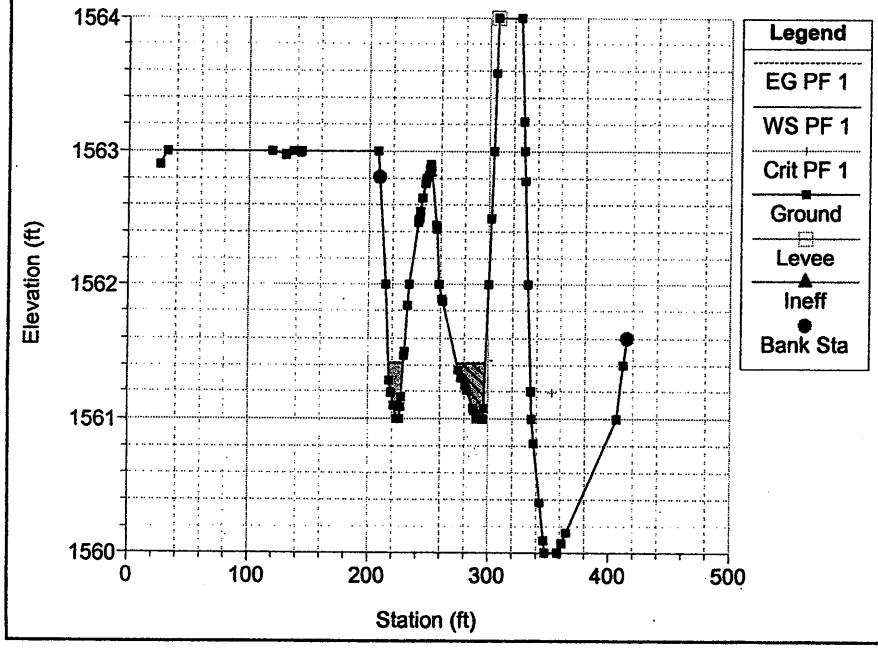
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .12 2



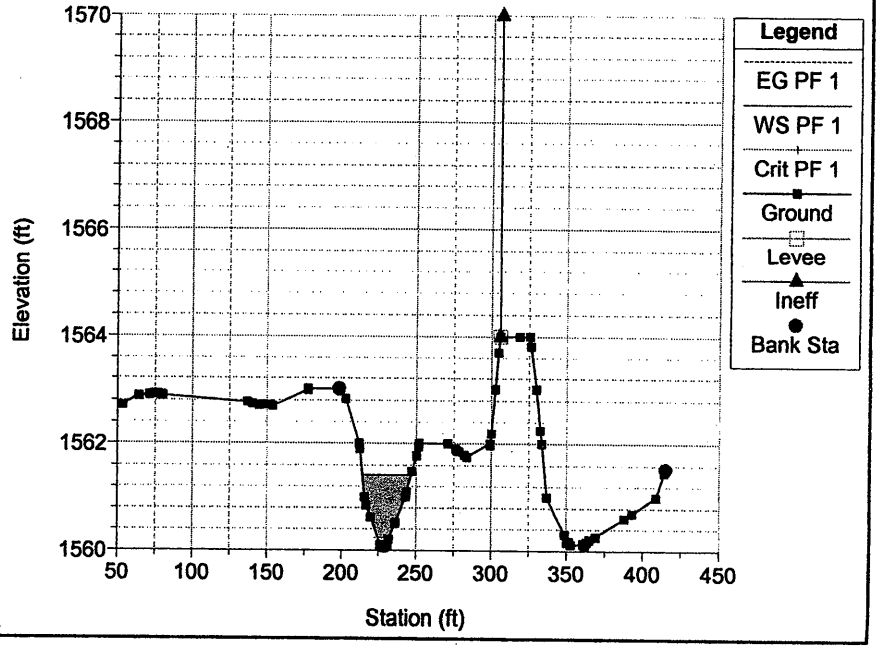
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .1 10

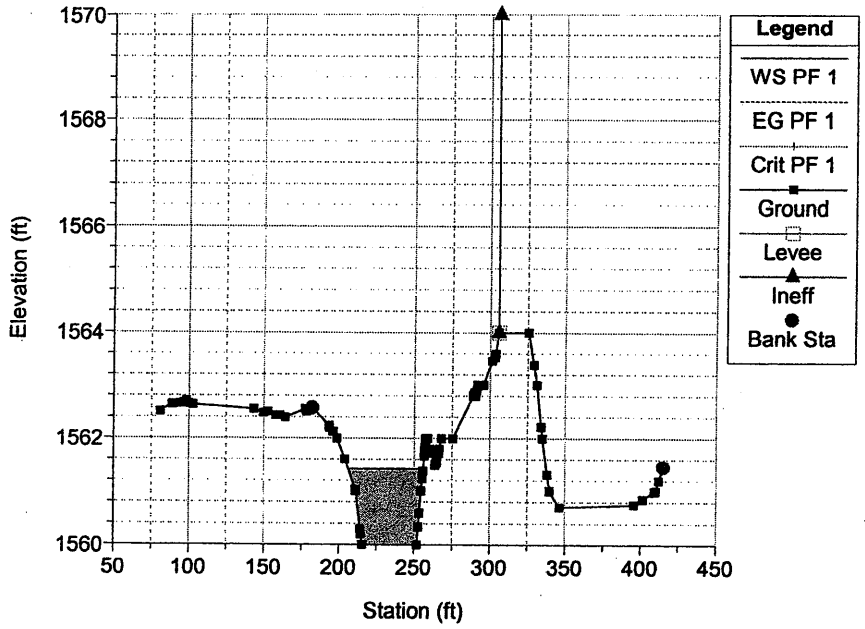


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

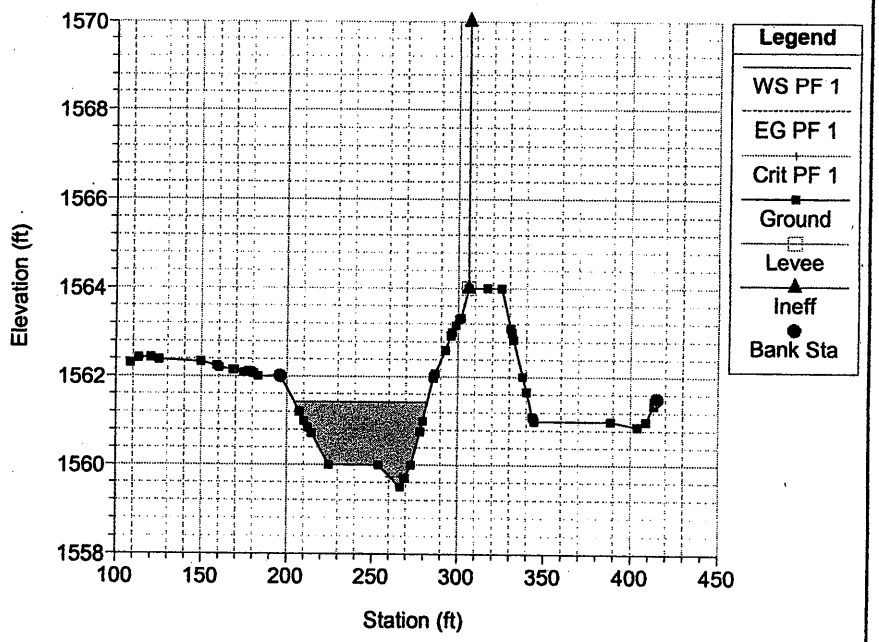
RS = .09 9



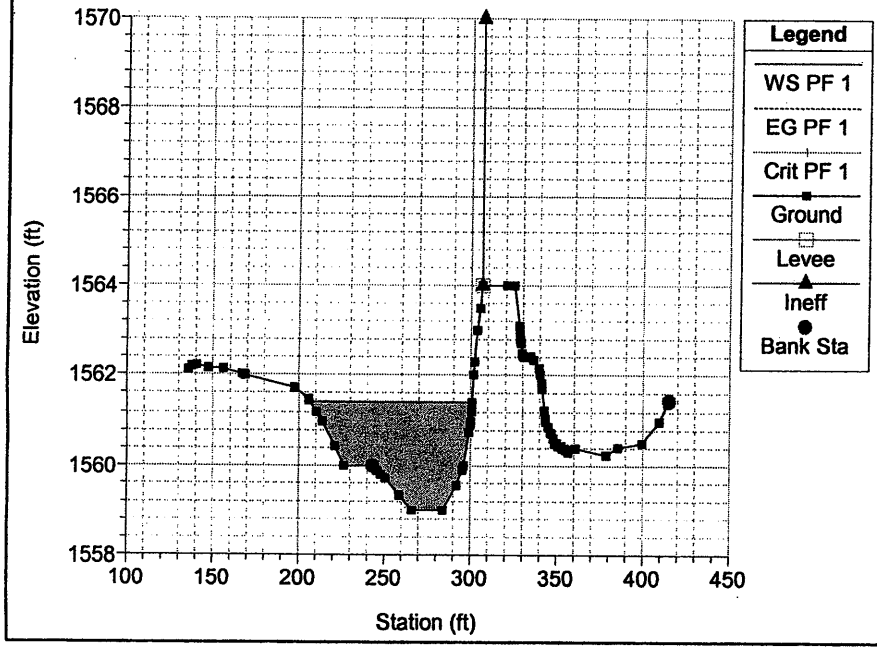
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .08 8



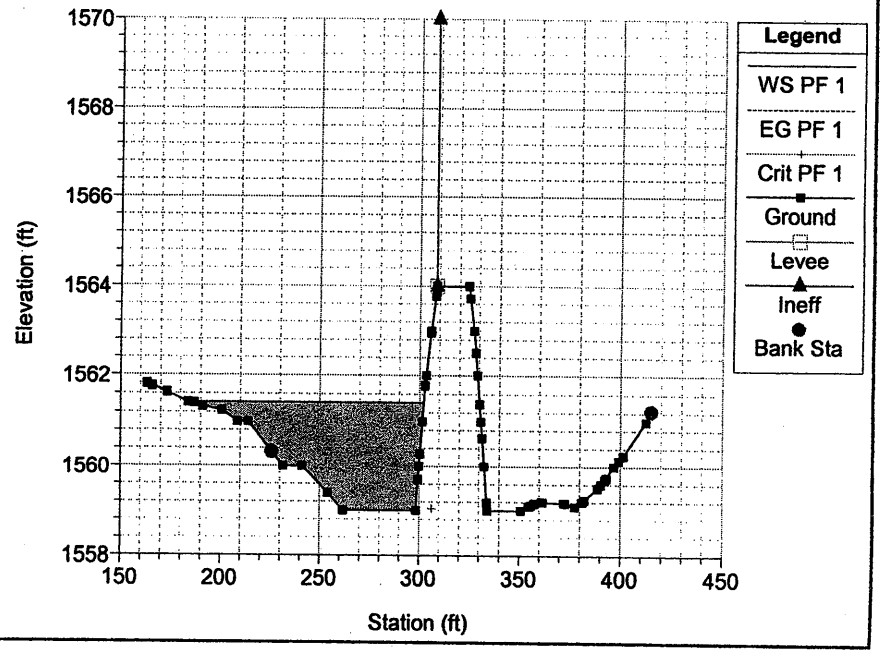
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .07 7



Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .06 6

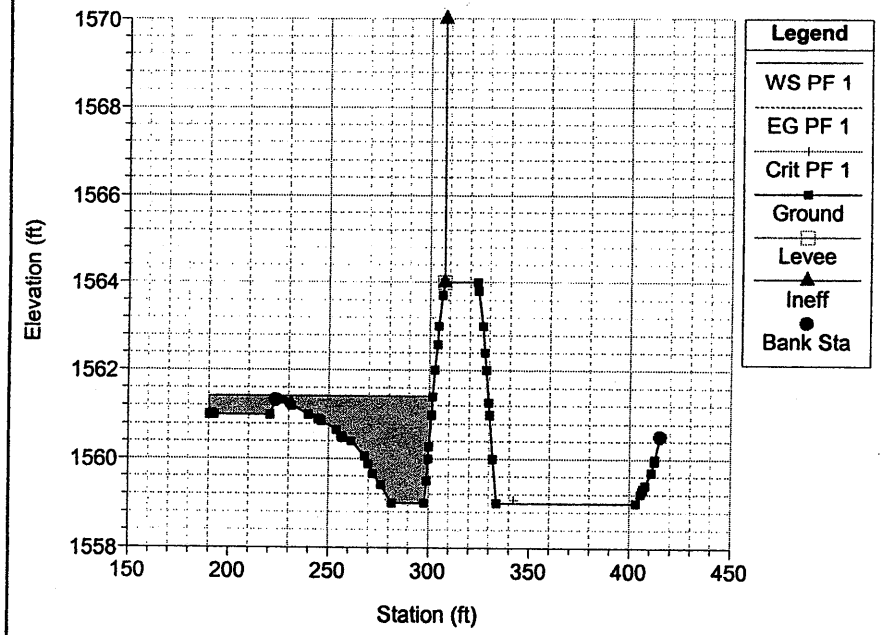


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007
RS = .05 5



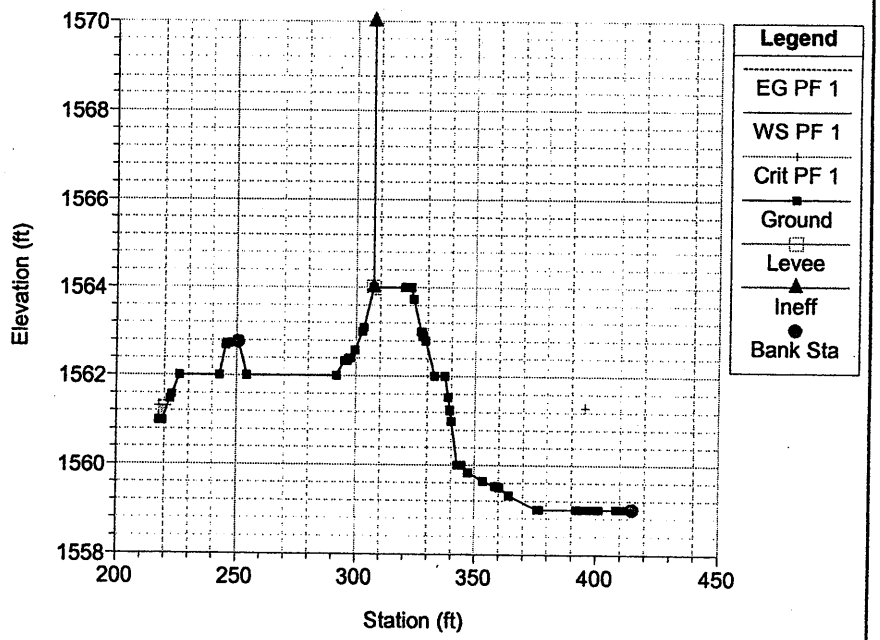
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .04 4



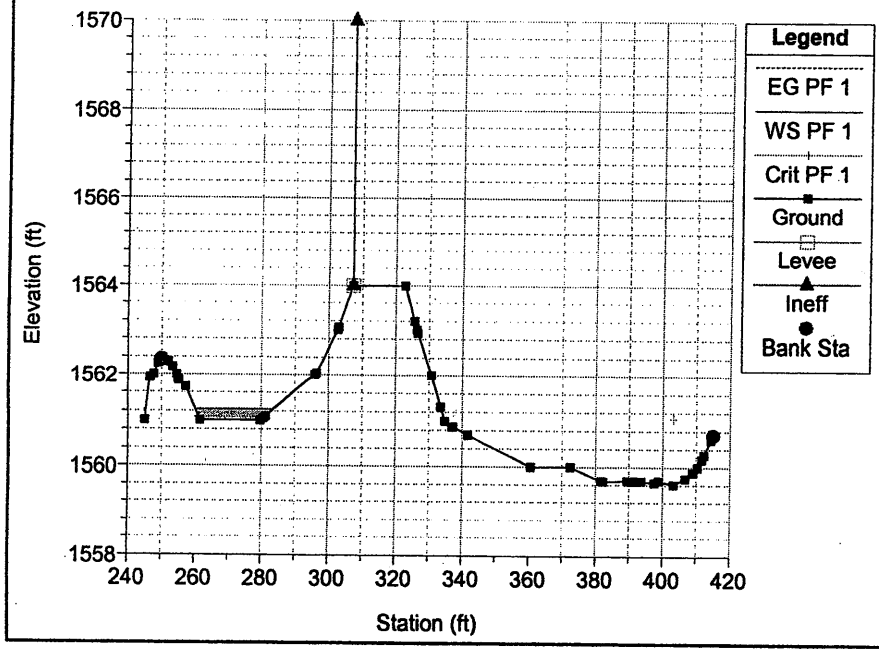
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .03 3



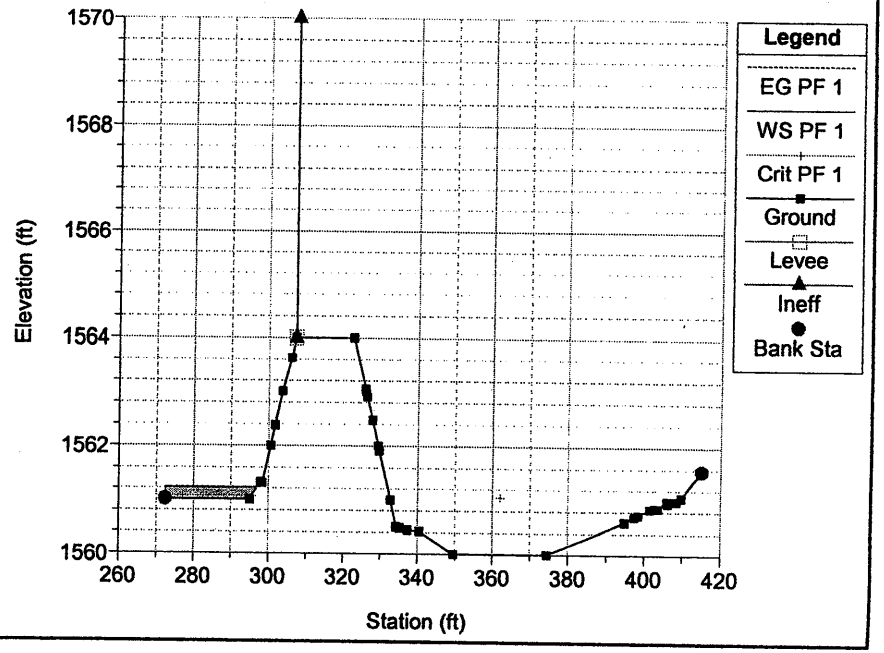
Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .02 2

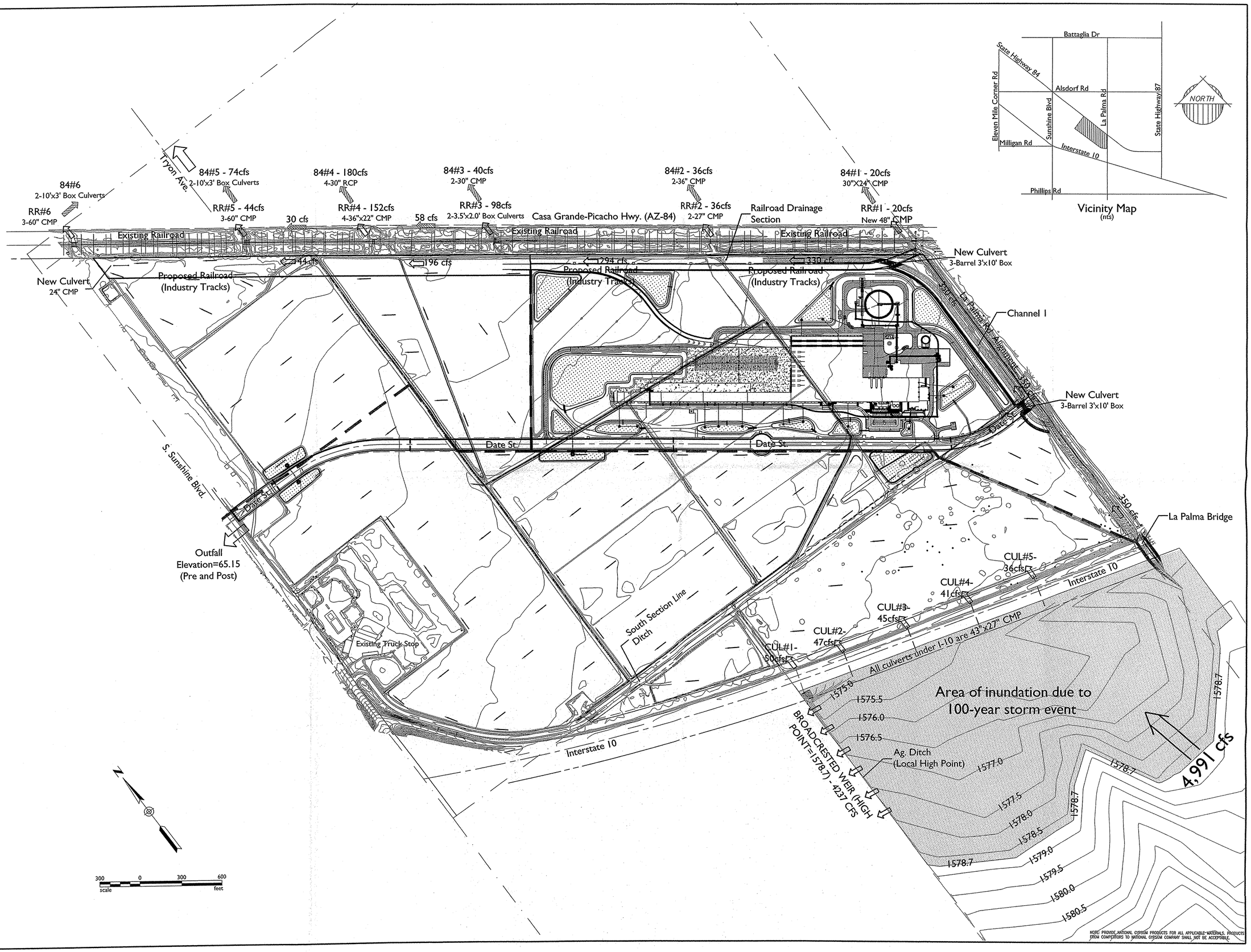


Railroad Flows (Pre-development) Plan: Plan 01 3/27/2007

RS = .01 1



APPENDIX F
Post-Developed Drainage Exhibit



NEW WALLBOARD FACILITY
FOR
National Gypsum COMPANY
ELOY, ARIZONA

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SEAL

Registered Professional Engineer (Civil)
CERTIFICATE No.
37885
JOEL P. SAUREY
Date Signed 10-4-07
ARIZONA U.S.A.

REV	DATE	DRAWN	DESCRIPTION
1	04/06/07	–	1st SUBMITTAL
2	06/08/07	–	2nd SUBMITTAL

THIS DOCUMENT HAS BEEN ISSUED SOLELY FOR THE PURPOSE(S) NOTED IN THE REVISION BLOCK. UNTIL THIS SHEET HAS BEEN SPECIFICALLY ISSUED FOR CONSTRUCTION, FINAL PROJECT COORDINATION IS INCOMPLETE AND THE INFORMATION SHOWN HERE IS SUBJECT TO REVISION.

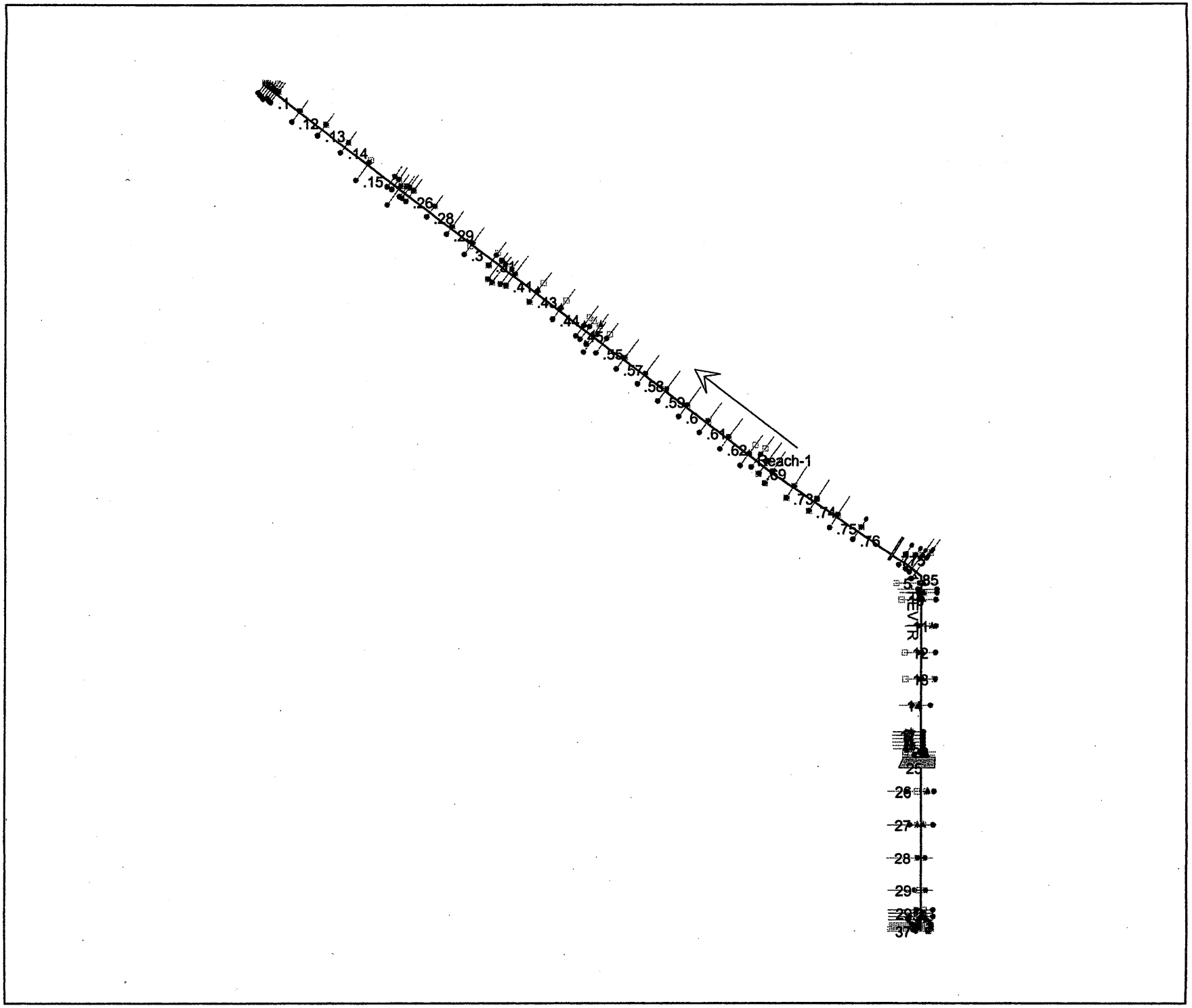
SHEET TITLE
POST-DEVELOPED DRAINAGE EXHIBIT

DRAWN:	JAH		
CHECKED:	JAH	SHEET SIZE:	24x36
APPROVED:	JPS	PLOT FACTOR:	PAPER
PROJECT:	07-013	DATE:	04-01-2007
CAD NAME:	DEDC	SCALE:	1"=300'

DRAWING NUMBER
DEV.COND.-DE 1 of 1

NOTE: PROVIDE NATIONAL GYPSUM PRODUCTS FOR ALL APPLICABLE MATERIALS. PRODUCTS FROM COMPETITORS TO NATIONAL GYPSUM COMPANY SHALL NOT BE ACCEPTABLE.

APPENDIX G
Post-Developed HEC-RAS


Reach-1
REVR

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1

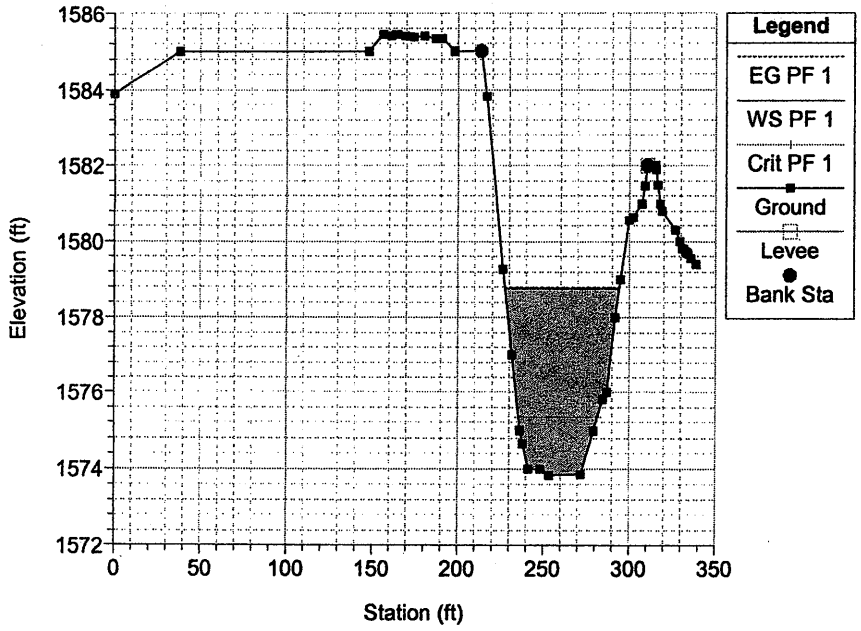
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	37	PF 1	350.00	1573.83	1578.76	1575.34	1578.79	0.000308	1.39	252.33	66.65	0.13
Reach-1	36	PF 1	350.00	1574.00	1578.75	1575.47	1578.78	0.000315	1.38	252.82	67.90	0.13
Reach-1	35	PF 1	350.00	1574.00	1578.75	1575.63	1578.78	0.000375	1.26	277.37	98.97	0.13
Reach-1	34	PF 1	350.00	1574.00	1578.75	1575.98	1578.77	0.000402	1.26	276.77	113.48	0.14
Reach-1	33	PF 1	350.00	1574.00	1578.74	1576.13	1578.77	0.000566	1.43	245.58	113.86	0.16
Reach-1	32	PF 1	350.00	1574.00	1578.72	1576.18	1578.76	0.000788	1.61	217.88	113.47	0.19
Reach-1	30	PF 1	350.00	1574.00	1578.70	1576.26	1578.75	0.001089	1.81	193.22	112.78	0.22
Reach-1	29.4	PF 1	350.00	1574.00	1578.61	1576.35	1578.71	0.002082	2.55	137.38	111.52	0.30
Reach-1	29.3	PF 1	350.00	1574.00	1578.52	1576.41	1578.66	0.002019	2.93	119.31	41.57	0.31
Reach-1	29.2	PF 1	350.00	1574.00	1578.45	1576.48	1578.60	0.002240	3.13	111.86	38.07	0.32
Reach-1	29.1	PF 1	350.00	1573.17	1578.38	1576.45	1578.54	0.002388	3.20	109.30	37.52	0.33
Reach-1	29	PF 1	350.00	1573.00	1577.92	1576.21	1578.12	0.003323	3.61	97.08	35.75	0.39
Reach-1	28	PF 1	350.00	1573.00	1576.96	1575.59	1577.18	0.004204	3.83	91.40	36.98	0.43
Reach-1	27	PF 1	350.00	1572.00	1576.14	1574.34	1576.32	0.002799	3.41	102.56	35.98	0.36
Reach-1	26	PF 1	350.00	1571.00	1575.32	1573.70	1575.54	0.003467	3.76	93.06	33.11	0.40
Reach-1	25		Culvert									
Reach-1	23	PF 1	350.00	1571.23	1575.09	1572.38	1575.14	0.000181		200.59	65.10	0.00
Reach-1	22	PF 1	350.00	1573.39	1575.09	1572.36	1575.13	0.000293	0.50	233.33	225.23	0.10
Reach-1	21	PF 1	350.00	1572.00	1575.08	1575.01	1575.12	0.000266	0.36	222.57	225.53	0.09
Reach-1	20	PF 1	350.00	1572.00	1575.08	1575.00	1575.11	0.000248	0.64	259.86	225.88	0.10
Reach-1	19	PF 1	350.00	1572.00	1575.07	1575.00	1575.10	0.000268	0.64	249.99	226.18	0.10
Reach-1	18	PF 1	350.00	1572.00	1575.06	1575.01	1575.10	0.000289	0.62	233.62	226.48	0.10
Reach-1	17	PF 1	350.00	1572.00	1575.05	1575.01	1575.09	0.000297	0.65	231.92	129.40	0.10
Reach-1	15	PF 1	350.00	1572.82	1575.04	1575.01	1575.08	0.000300	0.67	231.90	129.39	0.10
Reach-1	14	PF 1	350.00	1573.00	1575.00	1575.00	1575.03	0.000190	0.49	267.07	230.68	0.08
Reach-1	13	PF 1	350.00	1572.00	1573.51	1572.11	1573.62	0.000652	0.82	144.60	76.52	0.15
Reach-1	12	PF 1	350.00	1572.00	1573.37	1572.02	1573.49	0.000688	0.86	143.00	76.64	0.15
Reach-1	11	PF 1	350.00	1571.00	1573.23	1571.89	1573.33	0.000815	0.83	160.25	113.31	0.16
Reach-1	10	PF 1	350.00	1571.00	1573.13	1571.80	1573.18	0.000615	0.97	211.52	260.97	0.15
Reach-1	8	PF 1	350.00	1571.00	1573.11	1571.81	1573.15	0.000411	0.76	226.72	251.55	0.12
Reach-1	7	PF 1	350.00	1571.00	1573.10		1573.14	0.000422	0.36	241.17	237.65	0.10
Reach-1	5	PF 1	350.00	1571.00	1573.09	1571.74	1573.12	0.000275	0.68	287.19	316.37	0.10
Reach-1	85	PF 1	350.00	1570.27	1573.05	1571.74	1573.08	0.000349	1.52	230.10	151.88	0.22
Reach-1	83	PF 1	350.00	1570.25	1573.01	1571.76	1573.07	0.000522	1.83	191.30	129.39	0.27
Reach-1	81	PF 1	335.00	1570.22	1572.99	1571.71	1573.04	0.000587	1.93	173.66	118.49	0.28
Reach-1	78	PF 1	335.00	1570.20	1572.89	1571.67	1572.99	0.001023	2.60	128.78	84.88	0.37
Reach-1	775		Culvert									
Reach-1	76	PF 1	335.00	1570.00	1572.15	1571.16	1572.21	0.000543	1.98	168.88	104.11	0.27
Reach-1	75	PF 1	335.00	1570.00	1571.82	1571.51	1571.99	0.002894	3.29	101.86	103.33	0.58
Reach-1	74	PF 1	335.00	1570.00	1571.49	1570.91	1571.59	0.001317	2.60	129.08	103.56	0.41
Reach-1	73	PF 1	335.00	1569.21	1571.19	1570.66	1571.31	0.001505	2.74	122.33	99.93	0.44
Reach-1	72	PF 1	335.00	1569.00	1570.31	1570.31	1570.67	0.009314	4.82	69.51	95.63	1.00
Reach-1	69	PF 1	335.00	1569.00	1570.08	1569.72	1570.23	0.002354	3.09	108.37	103.47	0.53
Reach-1	66	PF 1	335.00	1569.00	1569.99	1569.56	1570.07	0.001552	2.38	161.72	170.68	0.43
Reach-1	63	PF 1	299.00	1568.00	1569.73	1569.50	1569.90	0.003562	3.28	91.13	152.31	0.63

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

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	62	PF 1	299.00	1568.00	1569.39	1568.83	1569.48	0.001233	2.42	123.46	104.66	0.39
Reach-1	61	PF 1	299.00	1567.00	1569.18	1568.50	1569.26	0.000940	2.26	132.09	100.90	0.35
Reach-1	6	PF 1	299.00	1567.00	1568.95	1568.36	1569.05	0.001254	2.48	120.48	99.58	0.40
Reach-1	59	PF 1	299.00	1566.00	1568.46	1568.23	1568.64	0.003650	3.37	88.71	103.25	0.64
Reach-1	58	PF 1	299.00	1566.00	1568.19	1567.41	1568.28	0.000935	2.41	124.32	86.36	0.35
Reach-1	57	PF 1	299.00	1566.00	1567.99	1567.36	1568.08	0.001082	2.37	126.39	100.46	0.37
Reach-1	55	PF 1	299.00	1566.00	1567.26	1567.26	1567.57	0.009880	4.49	66.62	106.82	1.00
Reach-1	51	PF 1	299.00	1564.00	1567.28	1565.39	1567.30	0.000242	1.23	242.46	166.68	0.18
Reach-1	5	PF 1	201.00	1566.00	1567.19	1566.81	1567.29	0.001926	2.54	79.02	152.70	0.47
Reach-1	47	PF 1	201.00	1566.00	1567.12	1566.61	1567.19	0.001229	2.13	94.15	96.38	0.38
Reach-1	45	PF 1	201.00	1566.00	1567.06	1566.60	1567.13	0.001352	2.20	95.00	160.79	0.40
Reach-1	44	PF 1	201.00	1565.00	1566.93	1566.26	1566.96	0.000450	1.45	173.60	164.84	0.24
Reach-1	43	PF 1	201.00	1565.00	1566.83	1566.19	1566.86	0.000493	1.51	166.23	165.10	0.25
Reach-1	41	PF 1	201.00	1565.00	1566.44	1566.31	1566.59	0.004891	3.11	64.70	106.17	0.70
Reach-1	39	PF 1	201.00	1565.00	1566.36	1565.96	1566.44	0.002255	2.25	89.43	133.63	0.48
Reach-1	36	PF 1	201.00	1564.00	1566.38	1564.85	1566.39	0.000208	1.01	198.88	164.63	0.16
Reach-1	34	PF 1	201.00	1564.00	1566.37	1564.73	1566.39	0.000178	0.96	210.19	167.83	0.15
Reach-1	31	PF 1	49.00	1566.00	1566.32	1566.22	1566.37	0.004052	1.81	27.10	87.14	0.57
Reach-1	3	PF 1	49.00	1564.00	1564.82	1564.82	1565.14	0.009829	4.56	10.74	16.57	1.00
Reach-1	29	PF 1	49.00	1563.00	1563.80	1563.52	1563.85	0.001496	1.67	29.41	50.48	0.38
Reach-1	28	PF 1	49.00	1563.00	1563.66	1563.25	1563.68	0.000510	0.98	50.04	85.22	0.23
Reach-1	26	PF 1	49.00	1563.00	1563.50	1563.24	1563.53	0.001173	1.28	38.25	81.36	0.33
Reach-1	24	PF 1	49.00	1563.00	1563.42	1563.25	1563.46	0.002236	1.58	31.04	78.32	0.44
Reach-1	23	PF 1	49.00	1563.00	1563.24	1563.24	1563.36	0.013460	2.77	17.67	73.58	1.00
Reach-1	21	PF 1	2.00	1561.20	1563.11	1561.39	1563.11	0.000000	0.02	104.80	162.76	0.00
Reach-1	19	PF 1	2.00	1563.00	1563.11	1563.03	1563.11	0.000603	0.34	5.91	56.31	0.18
Reach-1	16	PF 1	2.00	1563.00	1563.03	1563.03	1563.05	0.019822	0.89	2.24	67.94	0.87
Reach-1	15	PF 1	2.00	1561.00	1562.13	1561.11	1562.13	0.000001	0.05	37.41	54.01	0.01
Reach-1	14	PF 1	2.00	1562.00	1562.13	1562.03	1562.13	0.000128	0.18	11.09	84.95	0.09
Reach-1	13	PF 1	2.00	1562.00	1562.03	1562.03	1562.04	0.029053	0.89	2.25	91.63	1.00
Reach-1	12	PF 1	2.00	1561.00	1561.45	1561.15	1561.45	0.000290	0.49	4.09	12.90	0.15
Reach-1	1	PF 1	2.00	1561.00	1561.19	1561.19	1561.25	0.016724	1.97	1.02	8.33	0.99
Reach-1	09	PF 1	2.00	1560.04	1560.25	1560.22	1560.29	0.010123	1.66	1.20	8.72	0.79
Reach-1	08	PF 1	2.00	1560.00	1560.06	1560.04	1560.07	0.011635	0.98	2.05	36.59	0.73
Reach-1	07	PF 1	2.00	1559.50	1559.73	1559.73	1559.79	0.017320	1.93	1.04	8.95	1.00
Reach-1	06	PF 1	2.00	1559.00	1559.20	1559.08	1559.20	0.000632	0.47	4.23	25.29	0.20
Reach-1	05	PF 1	2.00	1559.00	1559.19	1559.04	1559.19	0.000186	0.27	7.41	40.96	0.11
Reach-1	04	PF 1	2.00	1559.00	1559.18	1559.07	1559.18	0.001200	0.64	3.11	18.88	0.28

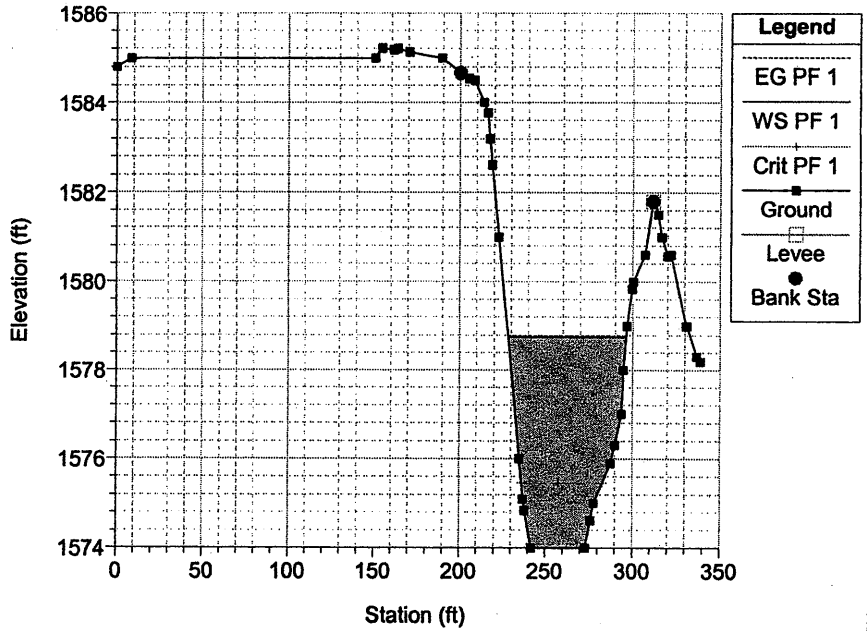
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 37 7



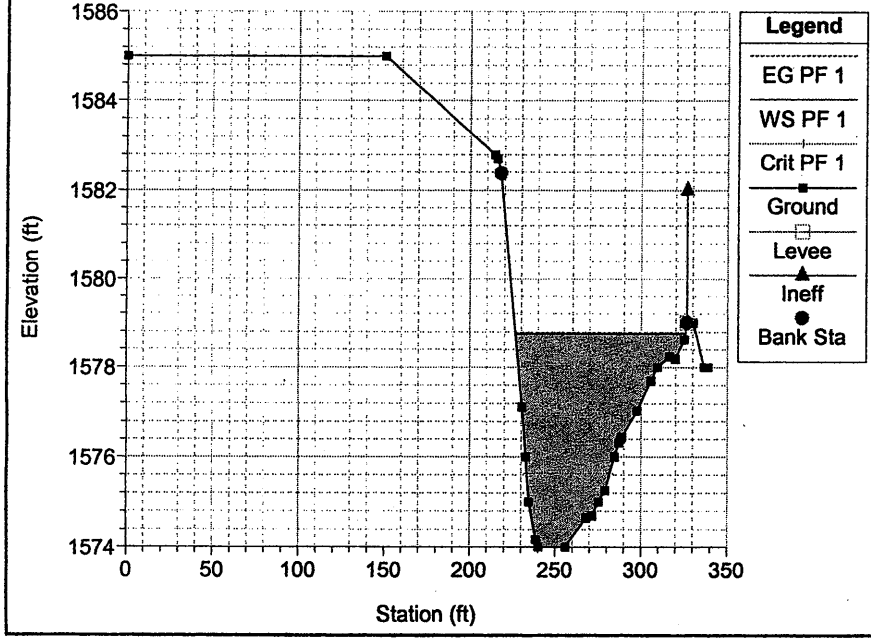
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 36 6



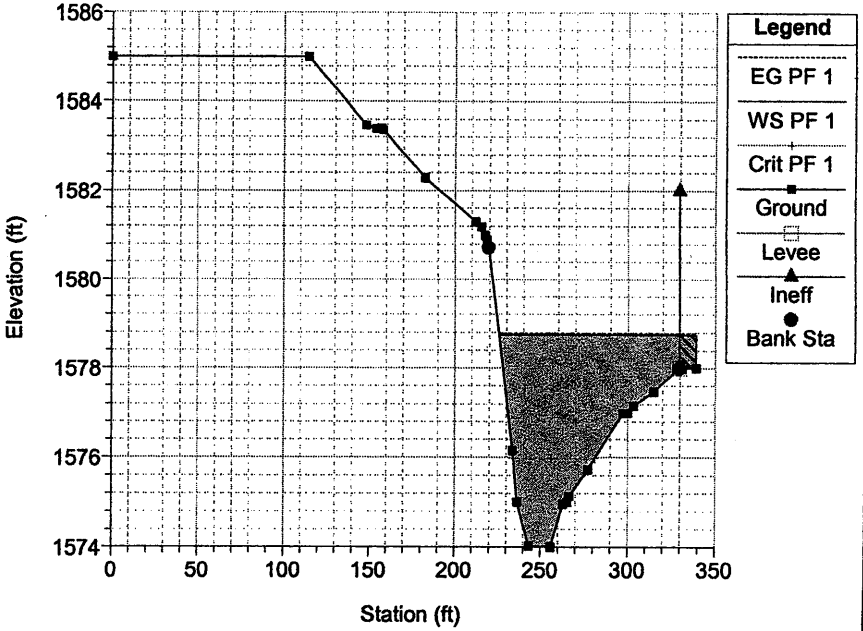
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 35 5



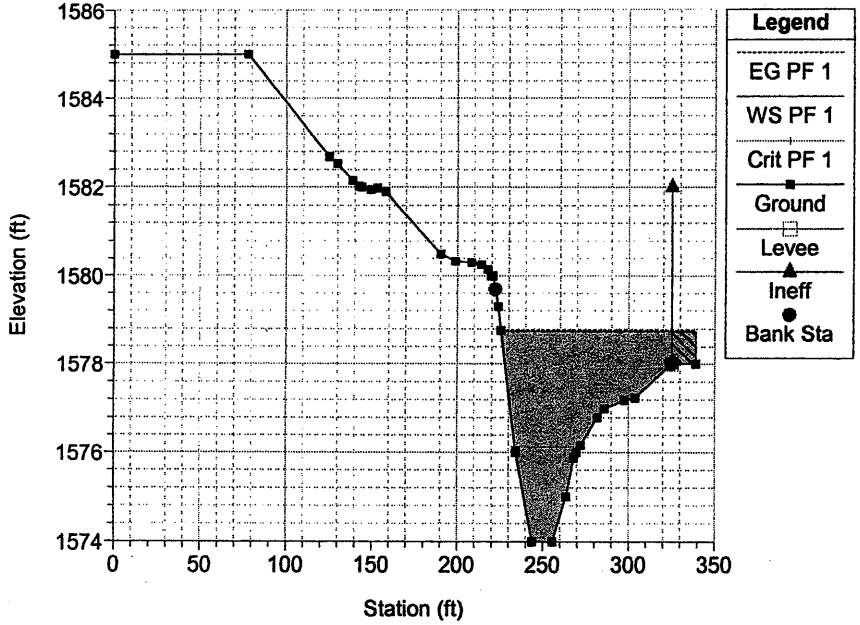
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 34 4



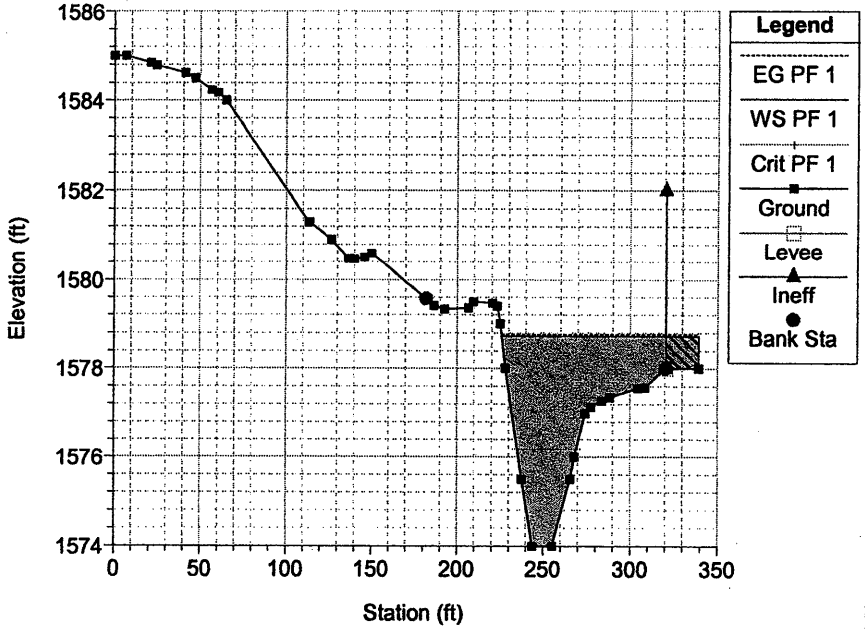
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 33 3



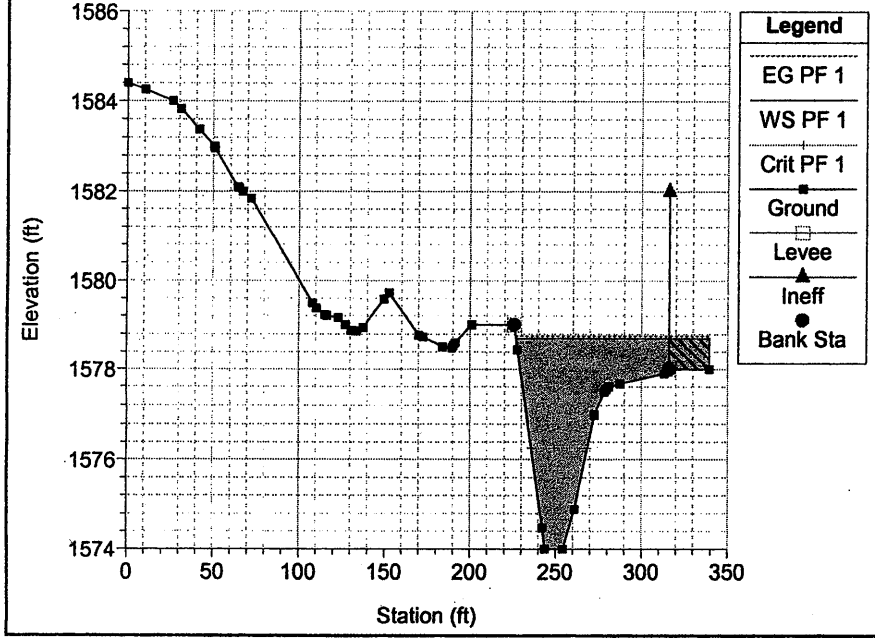
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 32 2



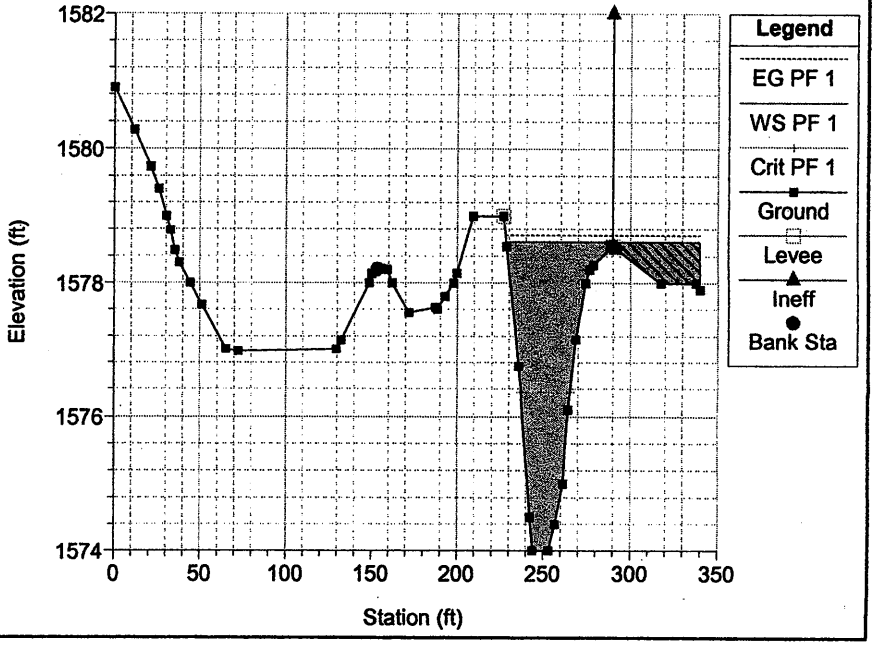
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

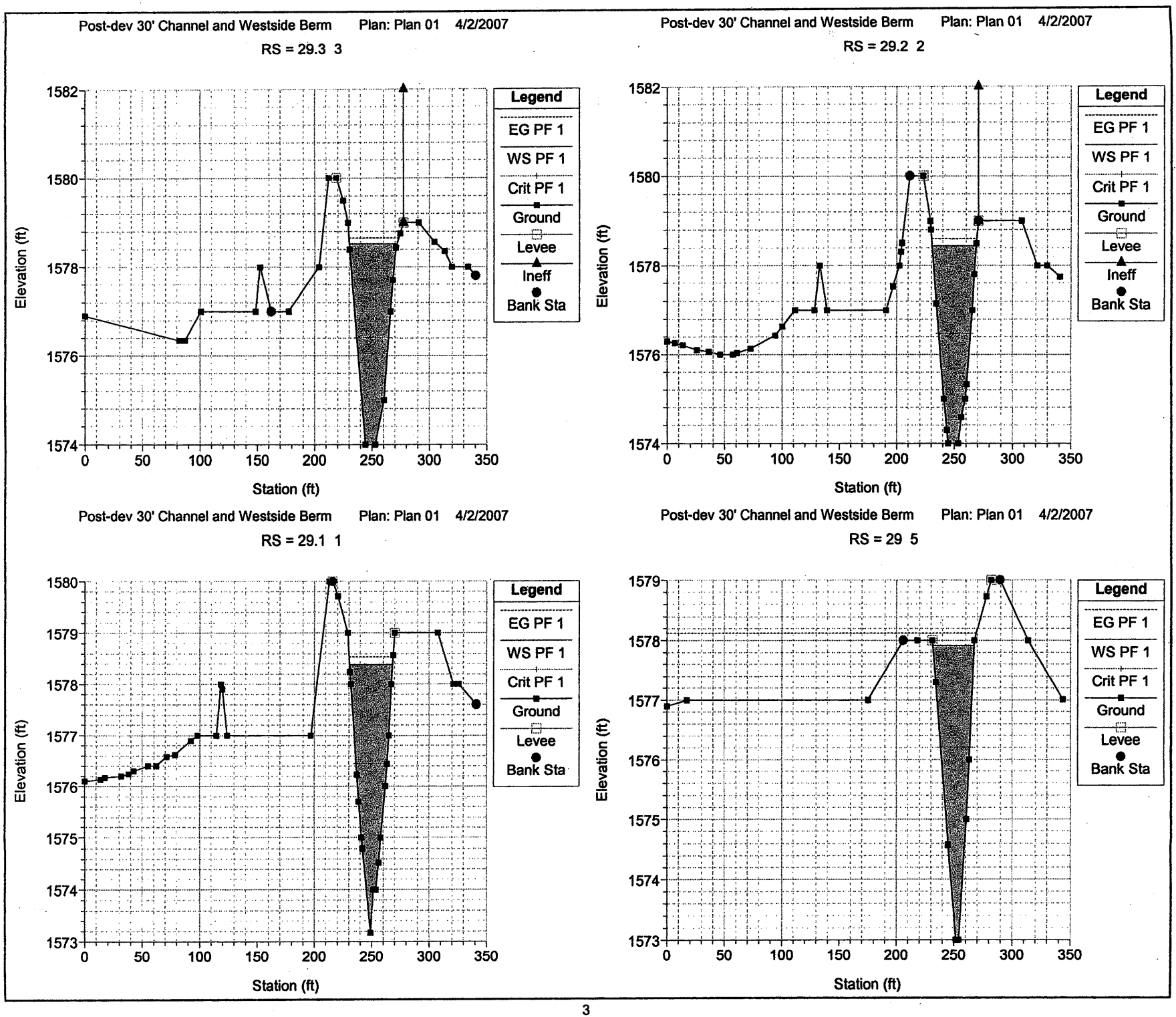
RS = 30 6



Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

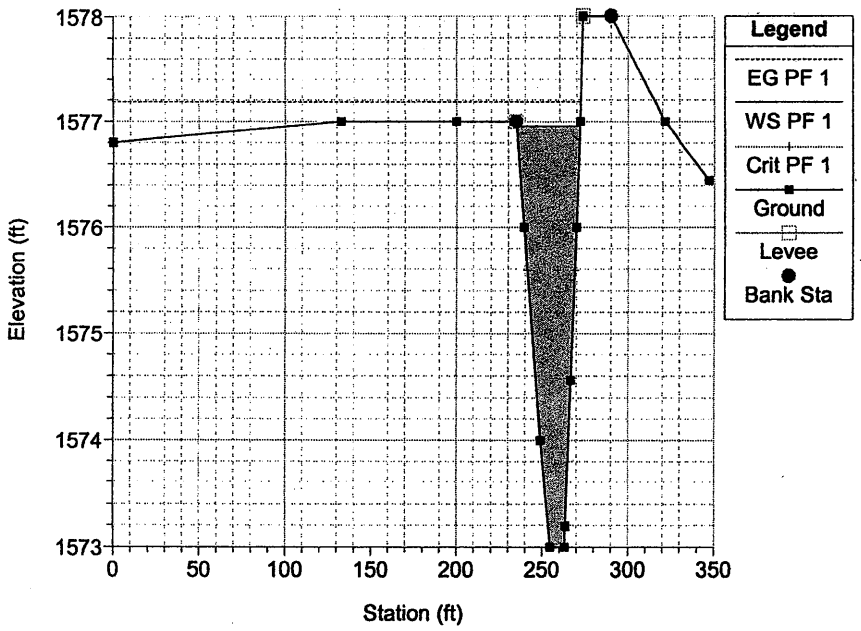
RS = 29.4 4




Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 29.3 3
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 29.2 2
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 29.1 1
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 29 5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

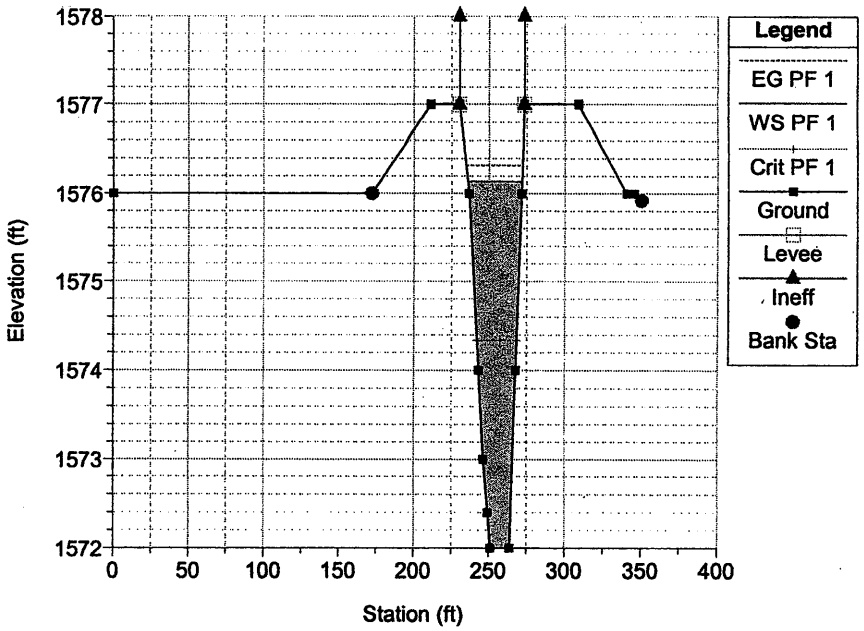
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 28 4



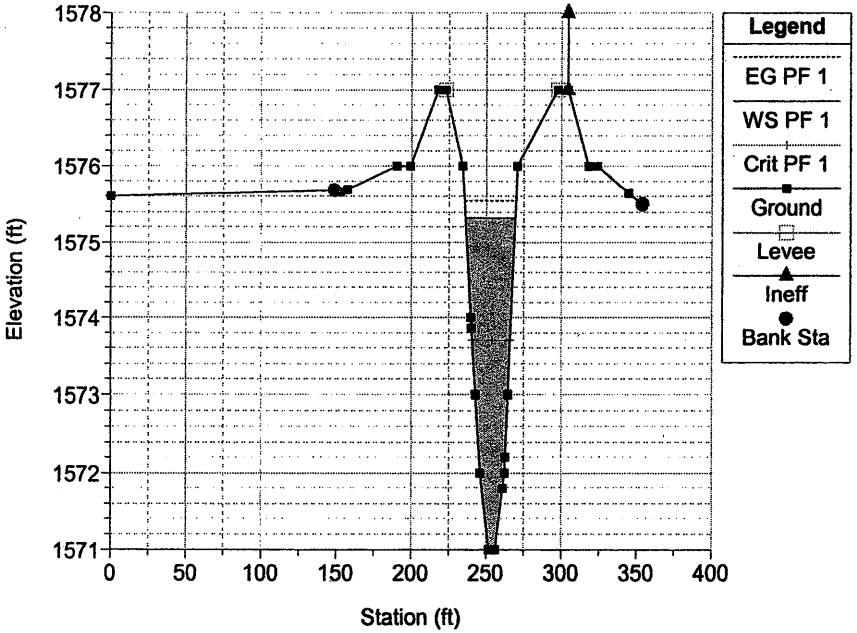
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 27 3



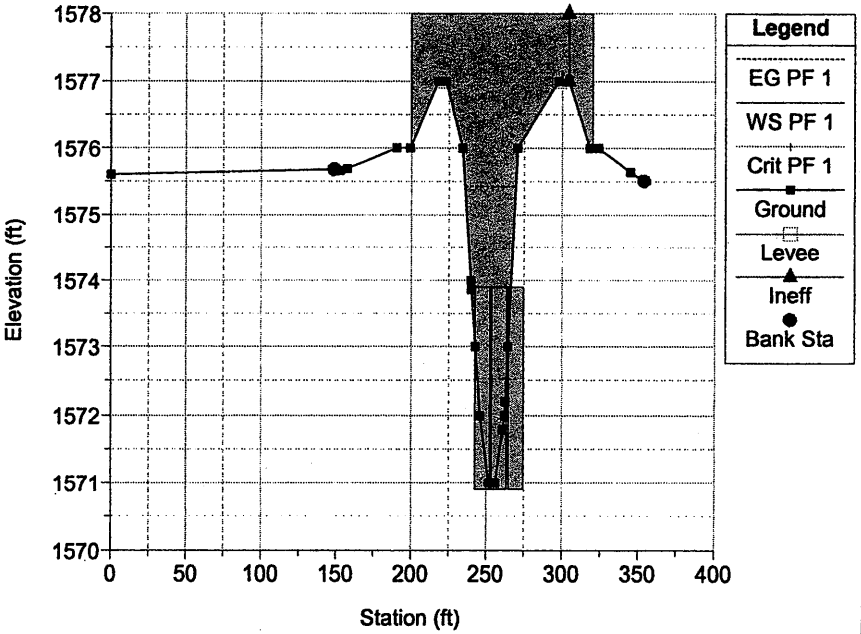
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

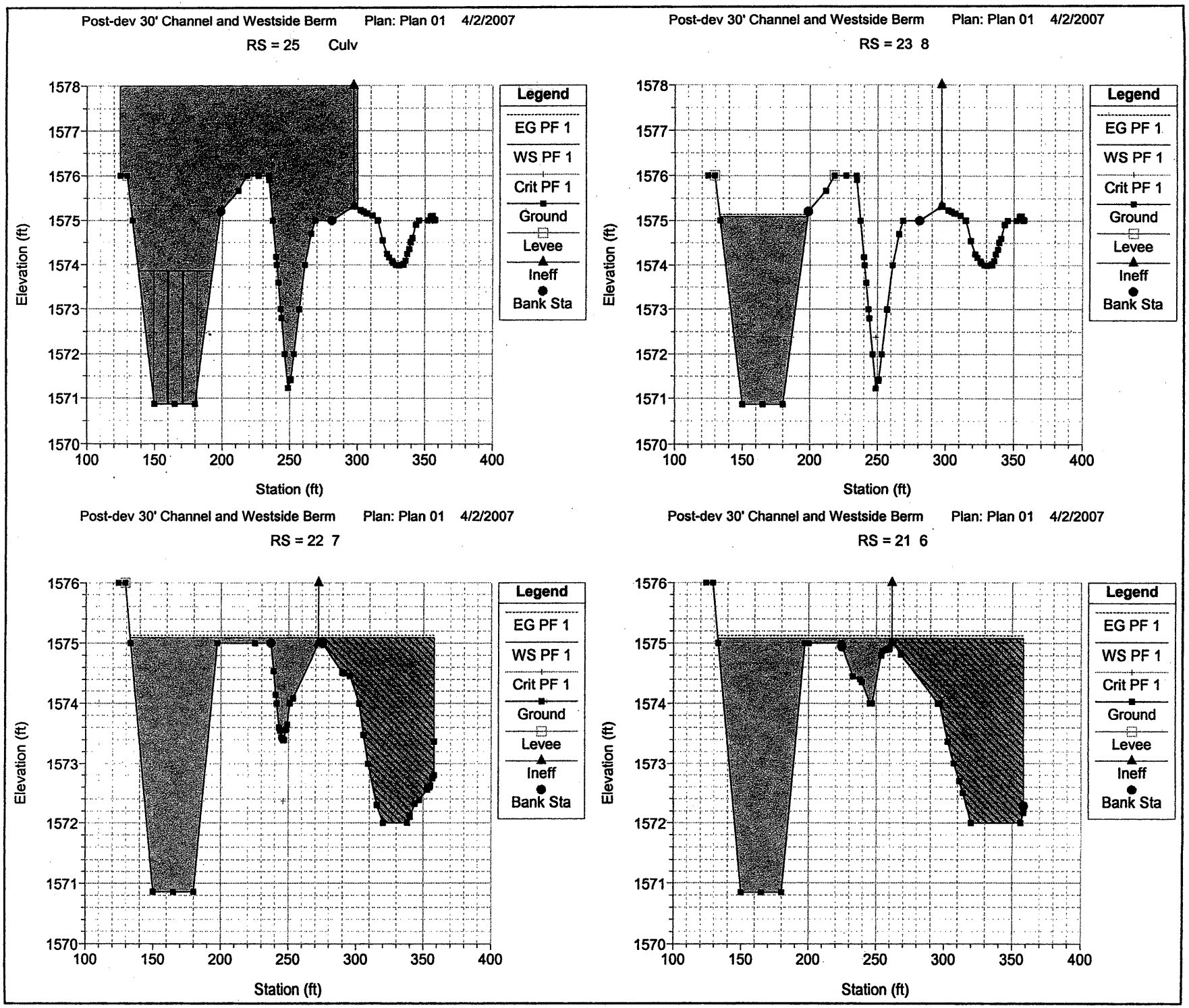
RS = 26 2

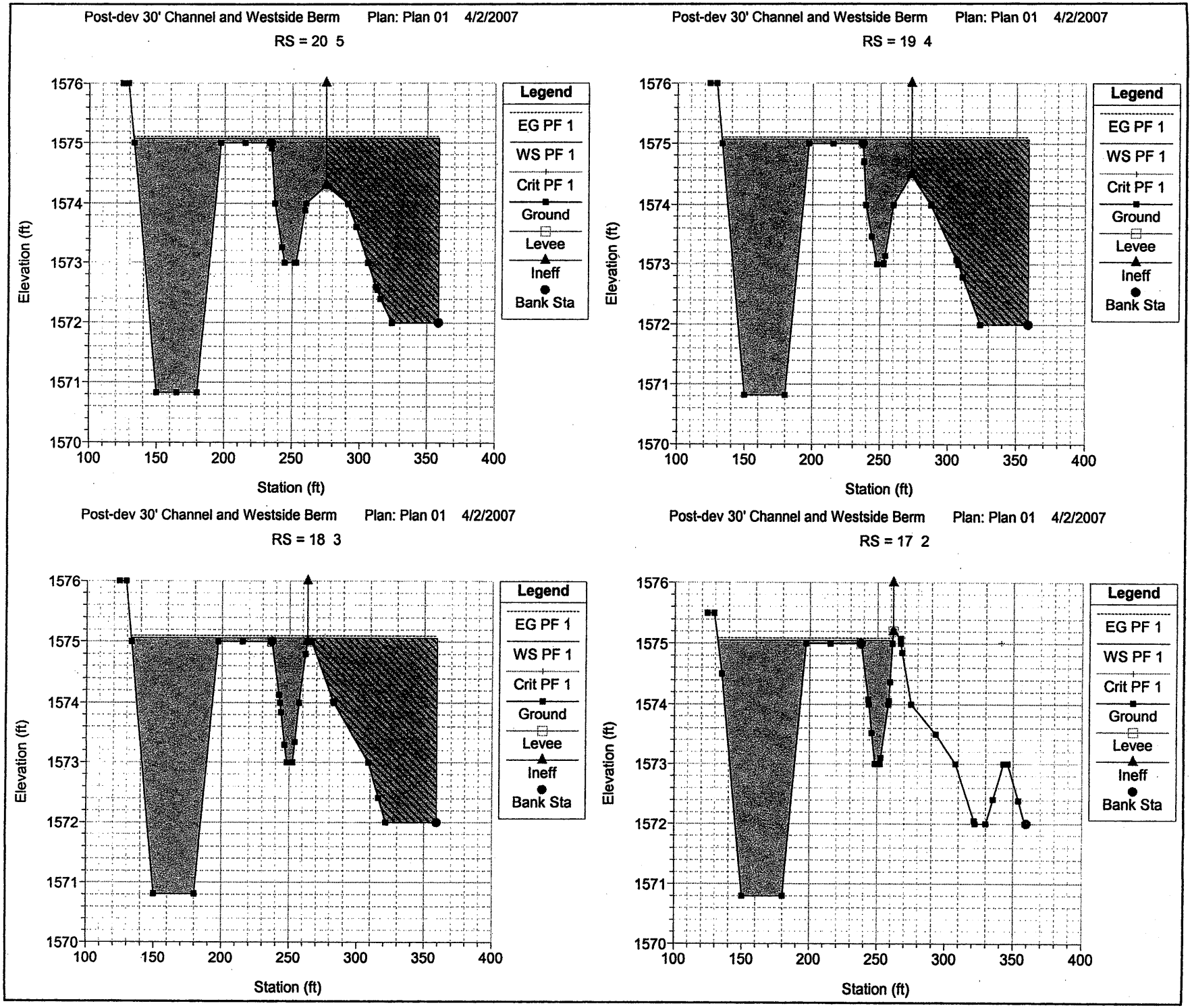


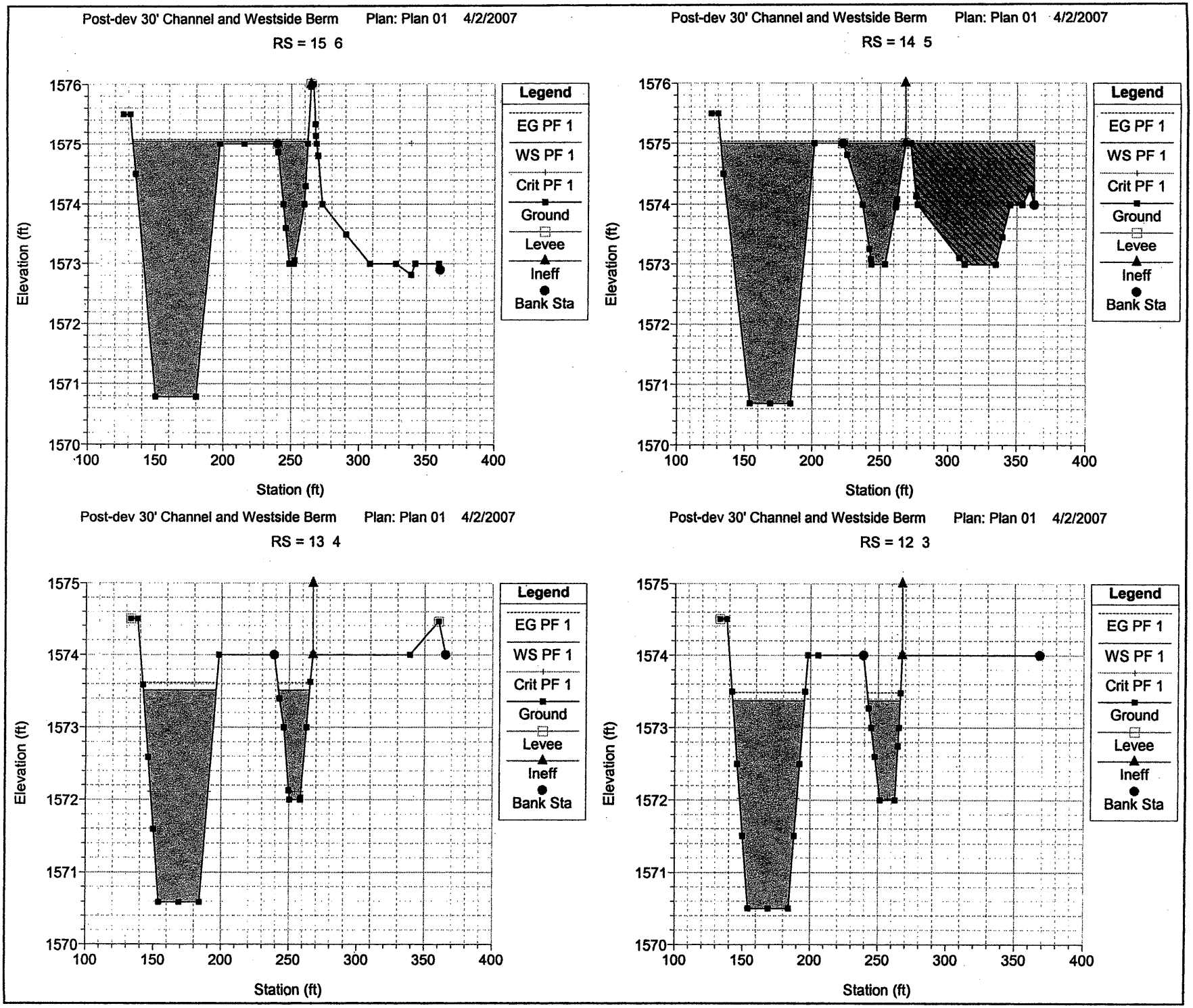
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 25 Culv



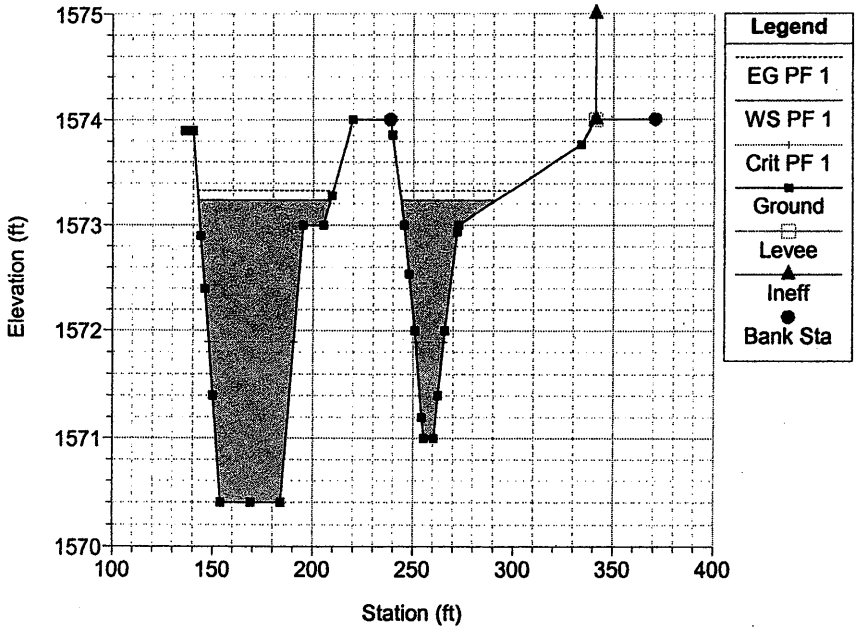

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 25 Culv
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 23 8
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 22 7
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 21 6
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1570
1571
1572
1573
1574
1575
1576
1577
1578
100
150
200
250
300
350
400


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 20 5
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 19 4
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 18 3
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 17 2
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1570
1571
1572
1573
1574
1575
1576
100
150
200
250
300
350
400


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 15 6
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 14 5
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 13 4
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = 12 3
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1570
1571
1572
1573
1574
1575
1576
100
150
200
250
300
350
400

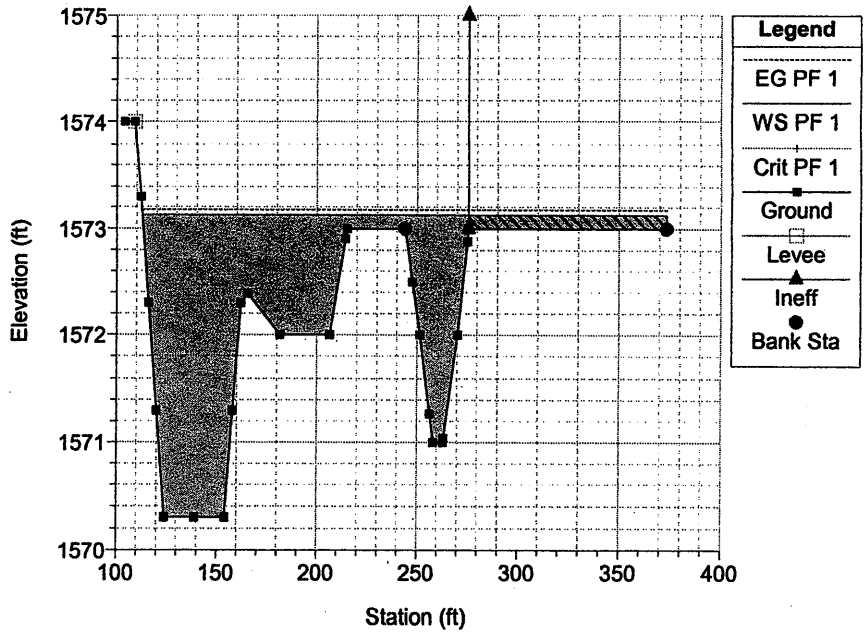
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 11 2



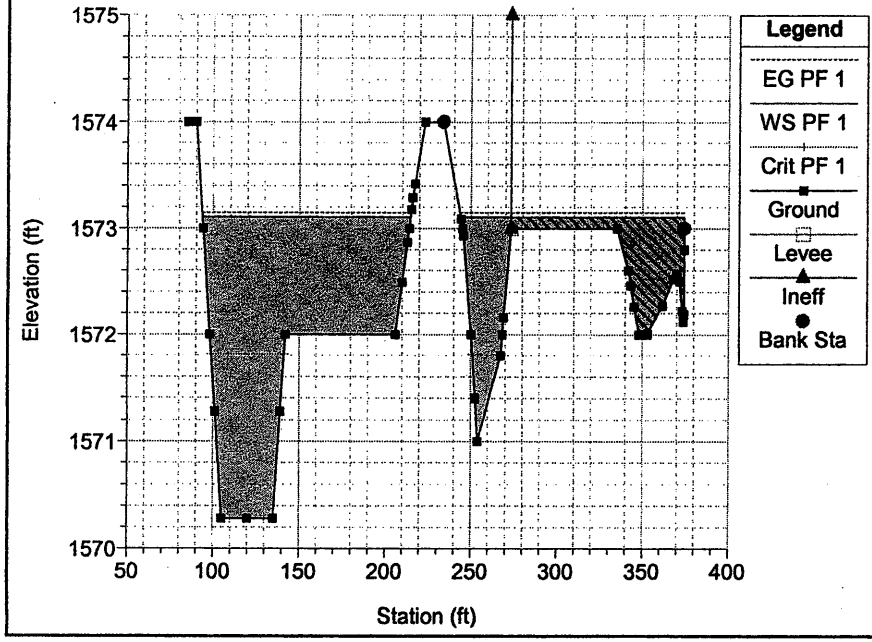
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 10 1



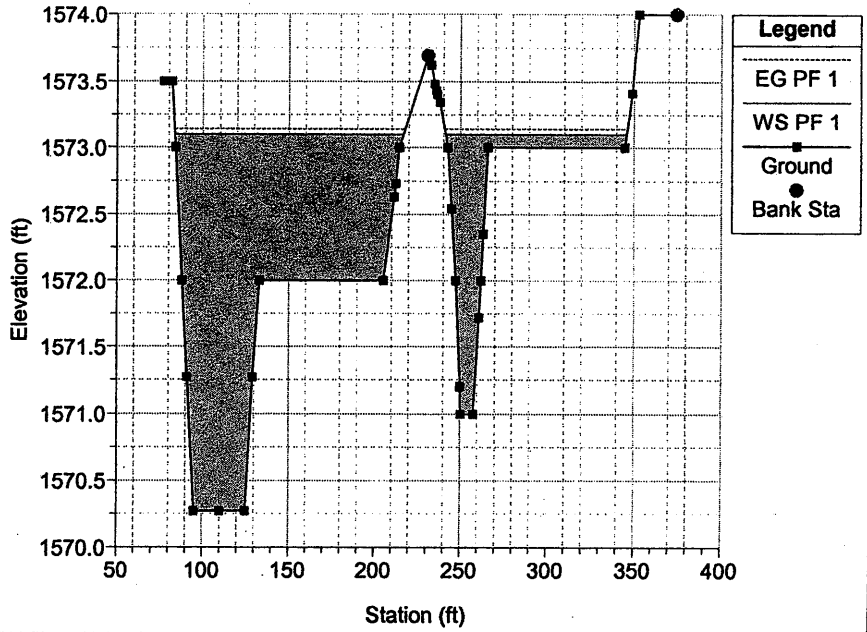
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 8 8



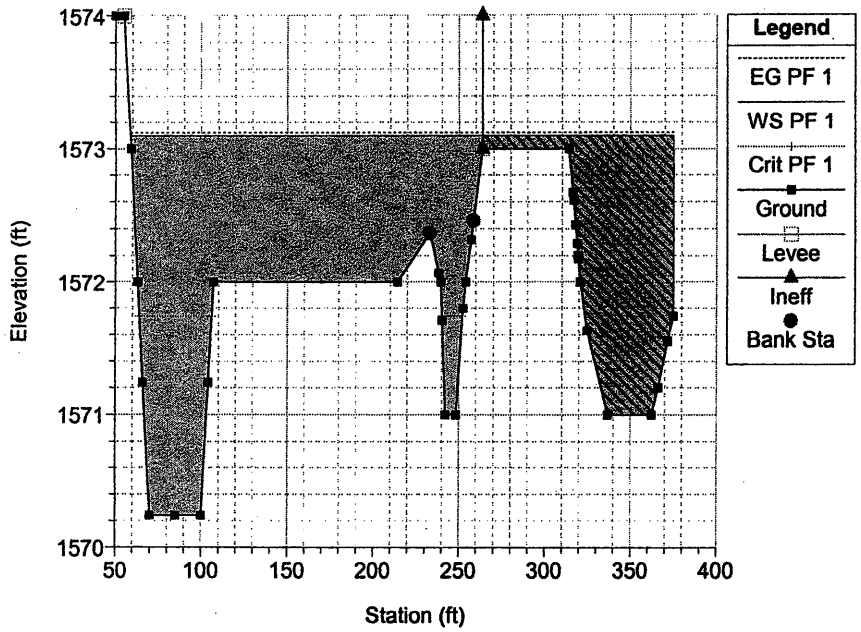
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 7 7



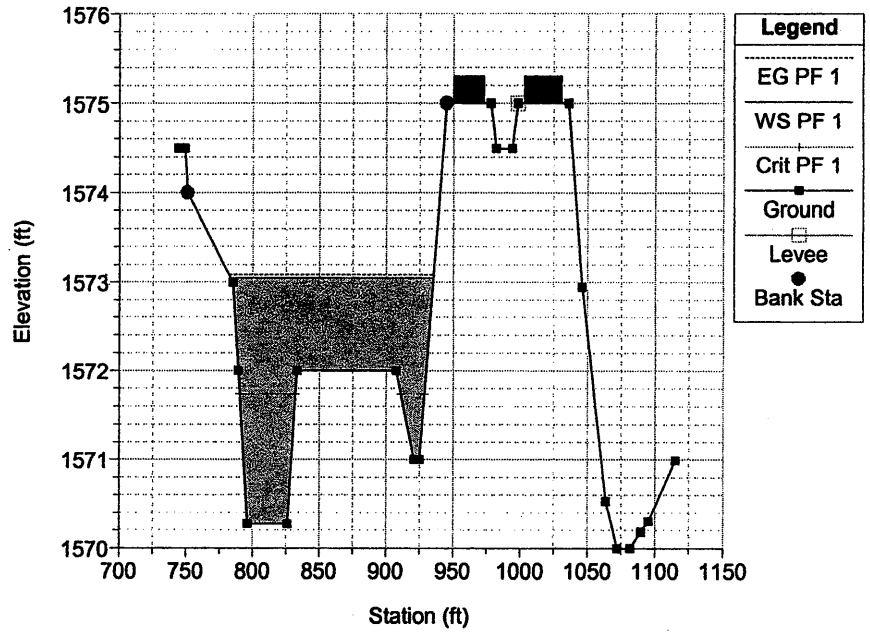
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = 5 5



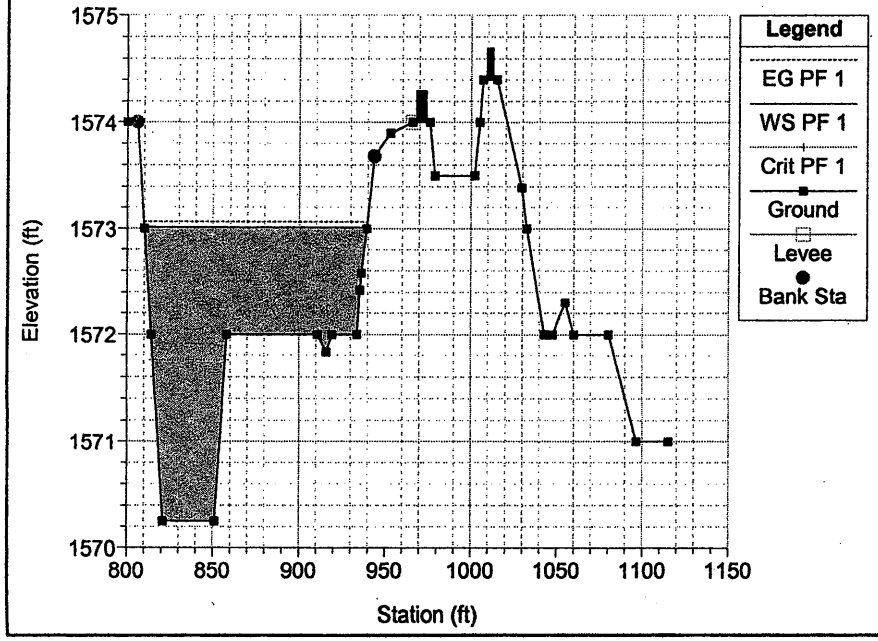
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .85 8



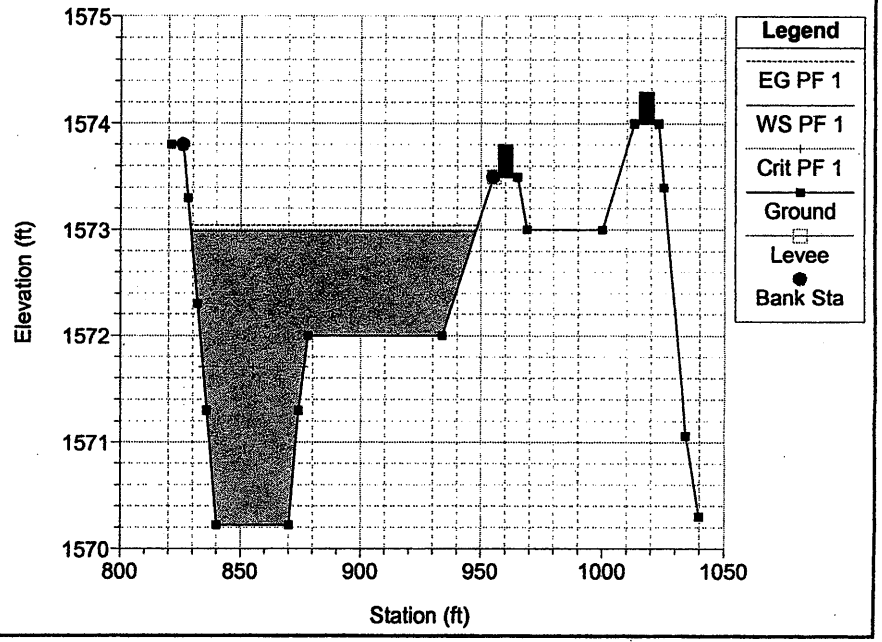
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

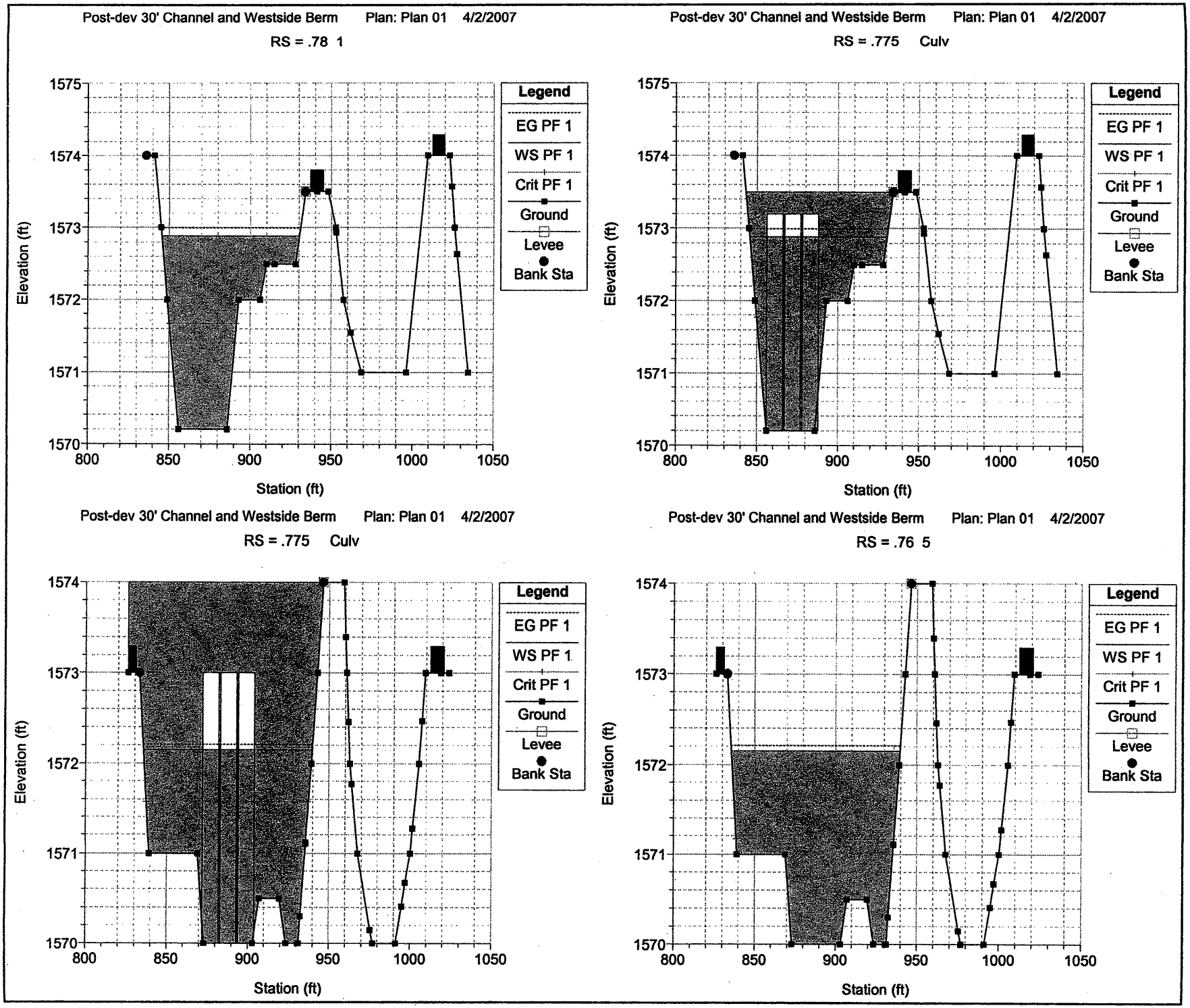
RS = .83 6

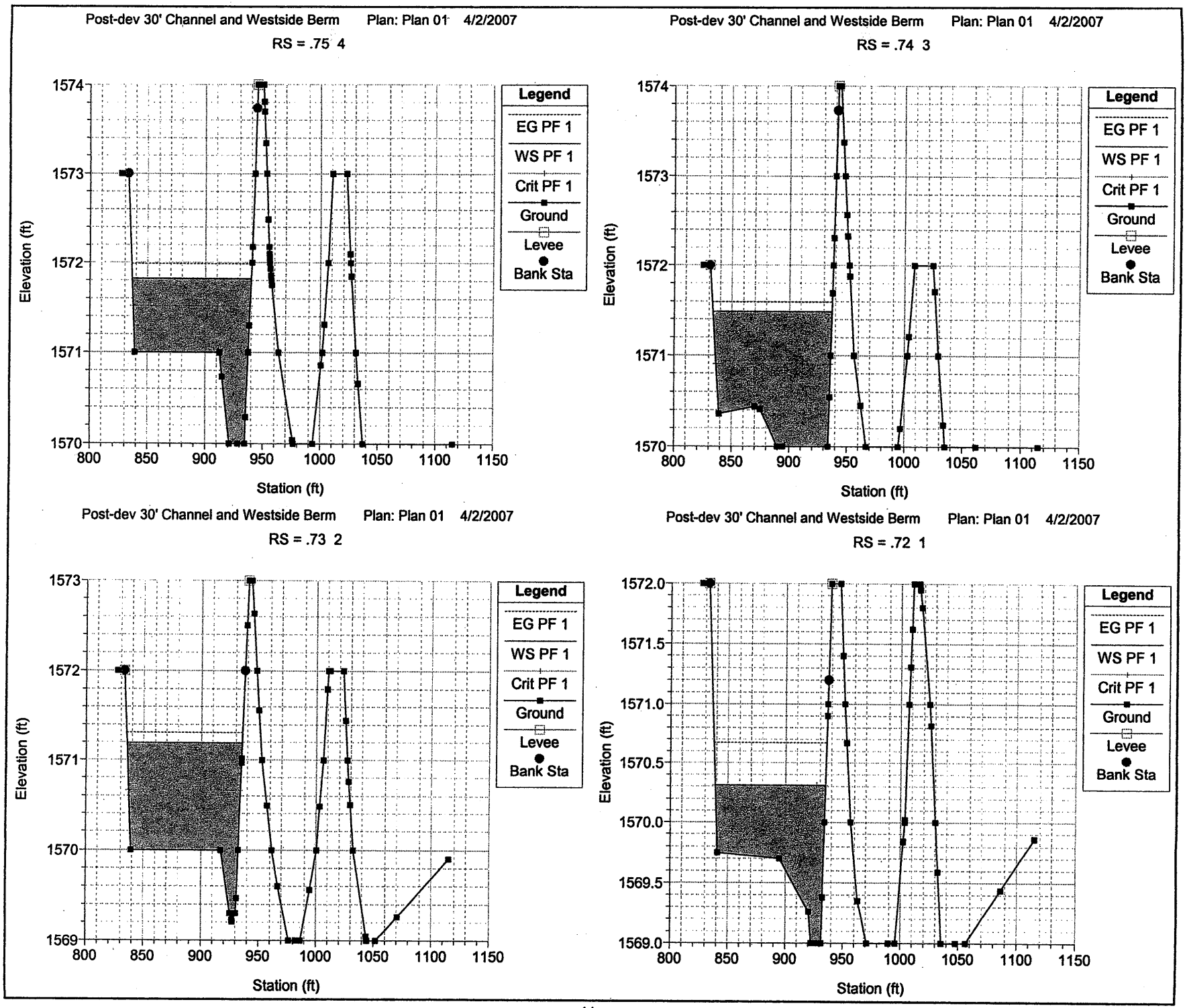


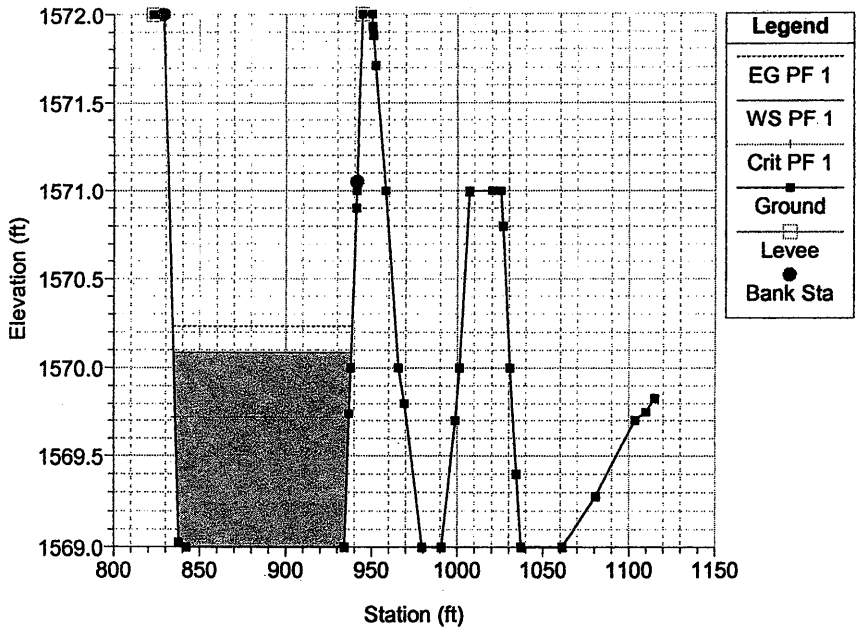
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

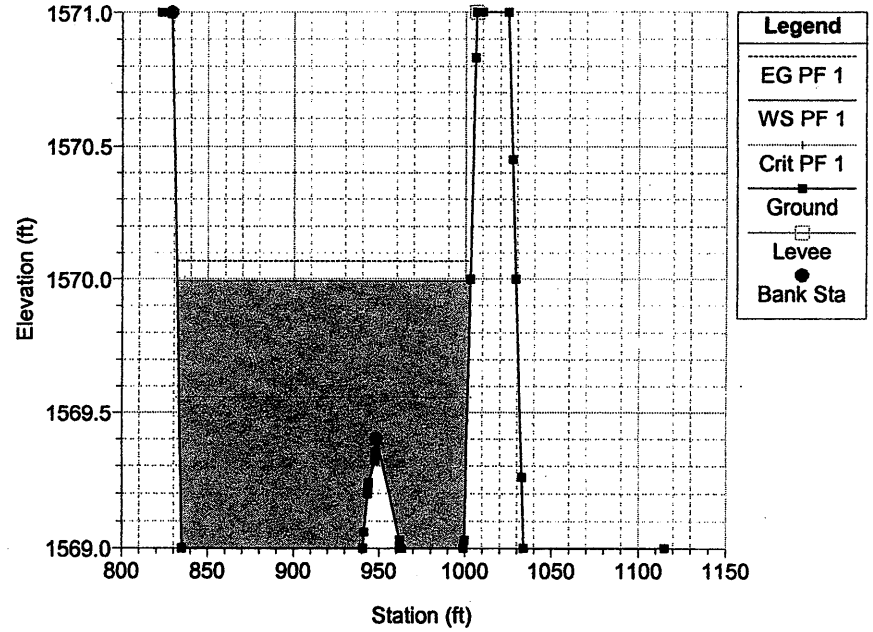
RS = .81 4

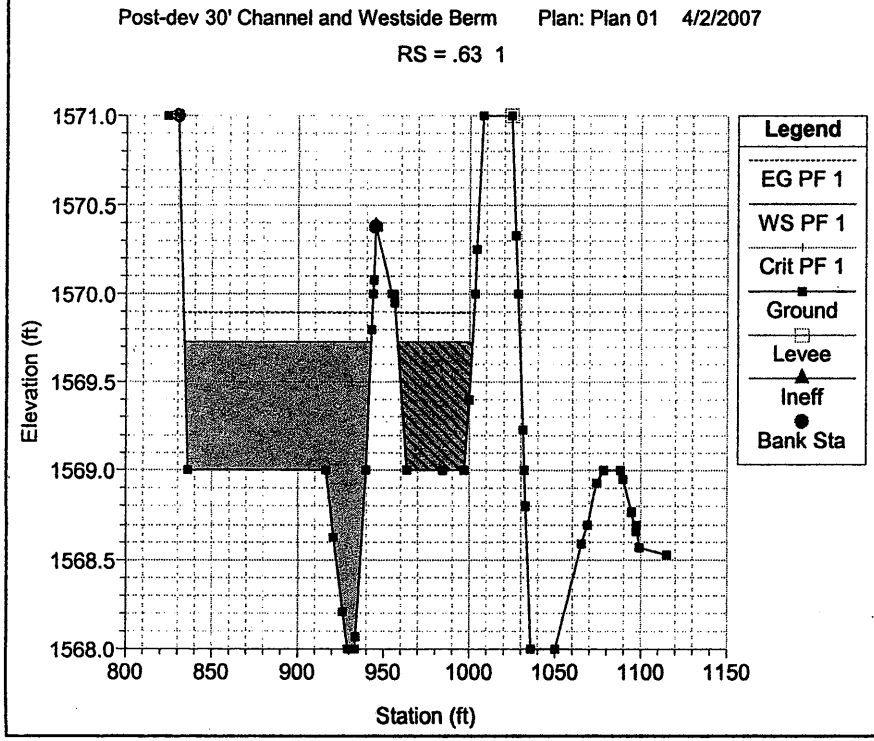


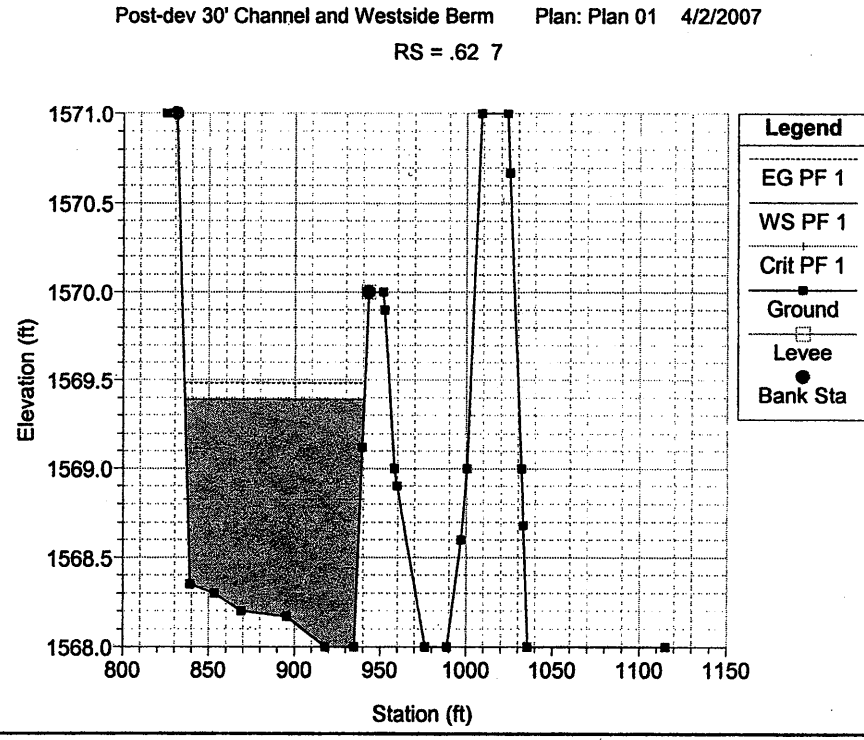

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .78 1
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .775 Culv
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .775 Culv
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .76 5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1570
1571
1572
1573
1574
1575
800
850
900
950
1000
1050


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .75 4
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .74 3
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .73 2
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .72 1
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .69 7
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1572.0
1571.5
1571.0
1570.5
1570.0
1569.5
1569.0
800
850
900
950
1000
1050
1100
1150

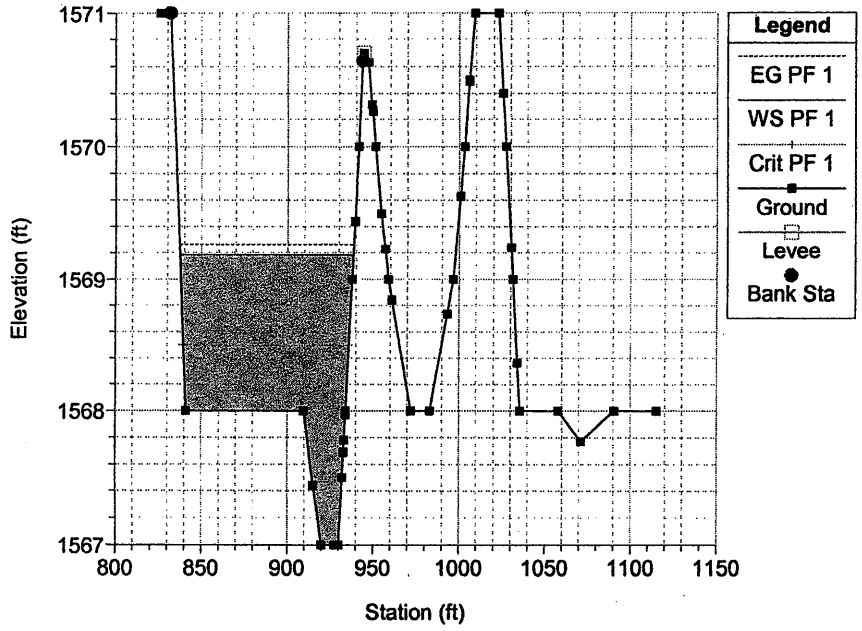

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .66 4
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1571.0
1570.5
1570.0
1569.5
1569.0
800
850
900
950
1000
1050
1100
1150


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .63 1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1571.0
1570.5
1570.0
1569.5
1569.0
1568.5
1568.0
800
850
900
950
1000
1050
1100
1150


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .62 7
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1571.0
1570.5
1570.0
1569.5
1569.0
1568.5
1568.0
800
850
900
950
1000
1050
1100
1150

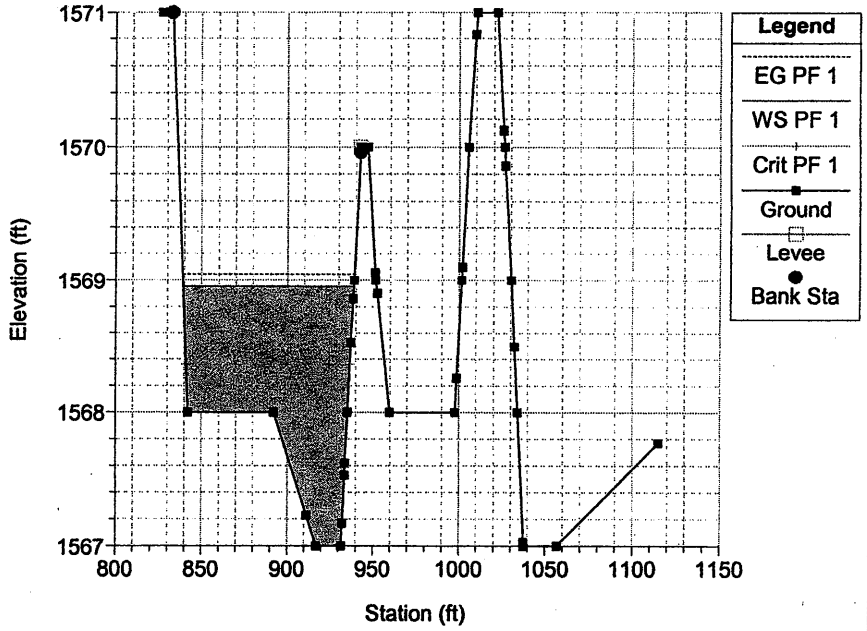
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .61 6



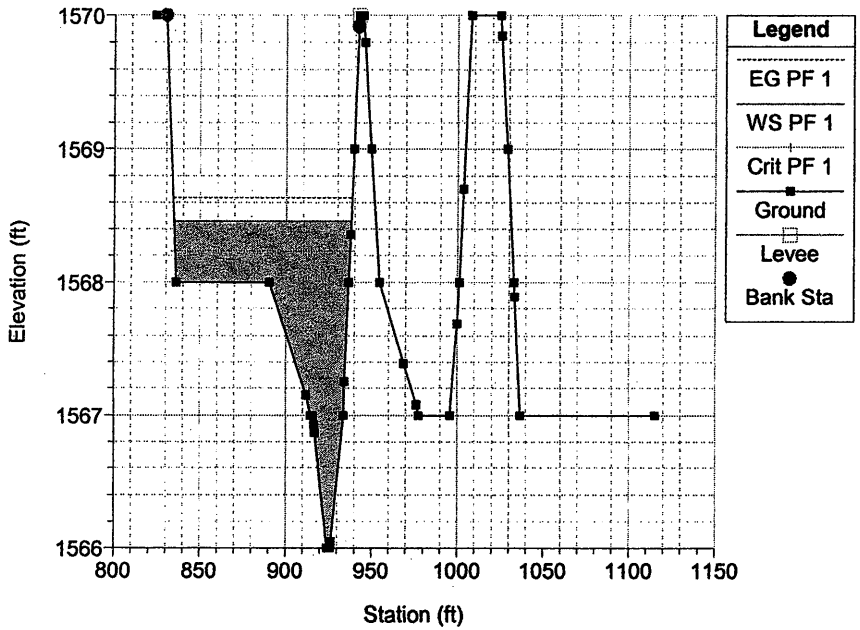
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .6 5



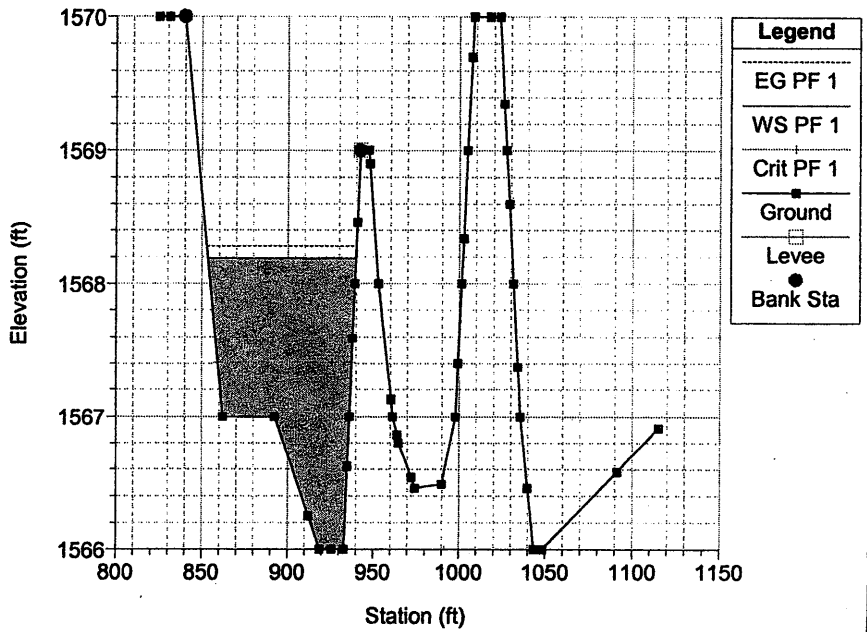
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

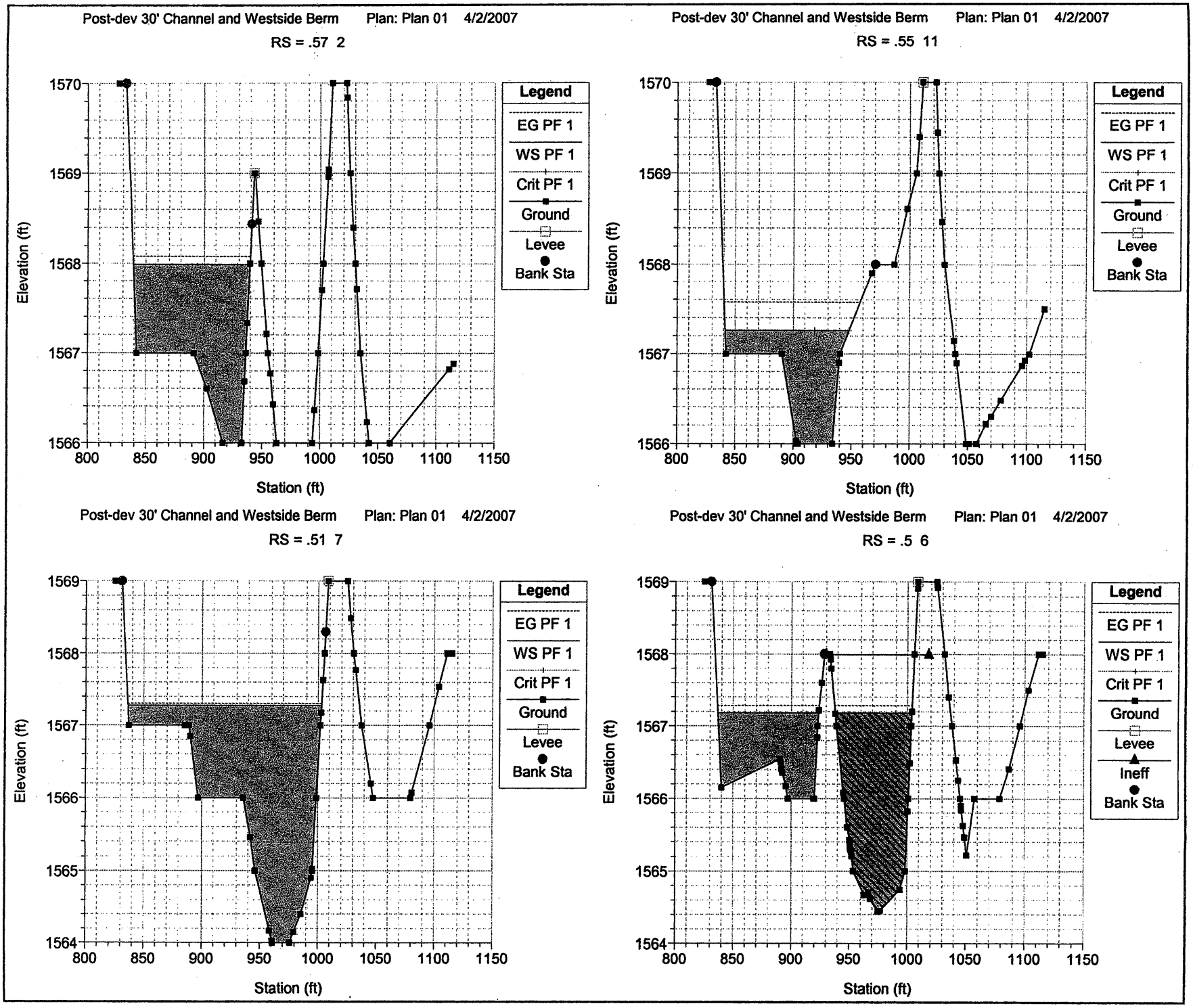
RS = .59 4

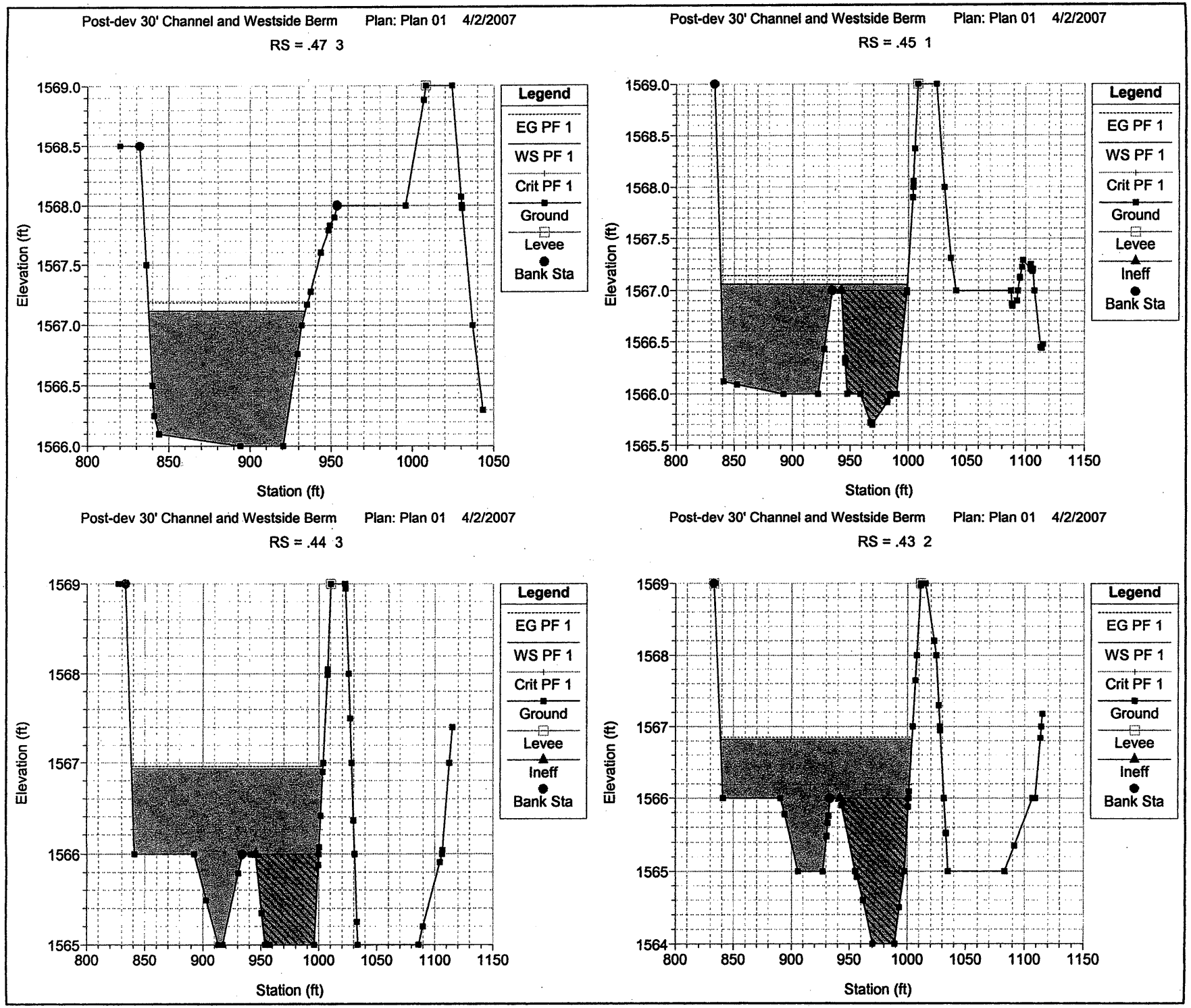


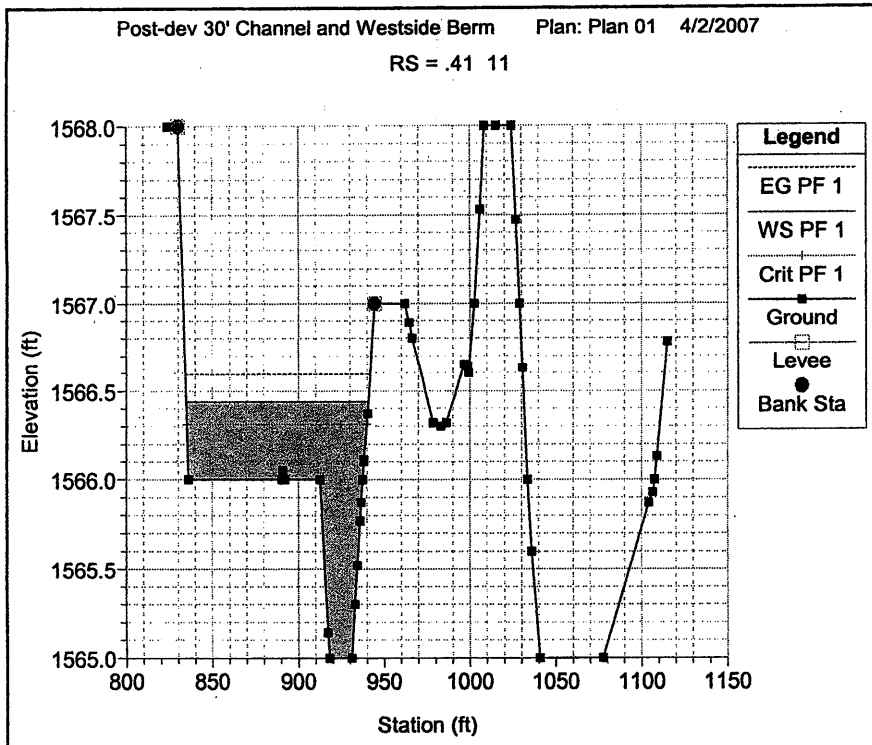
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

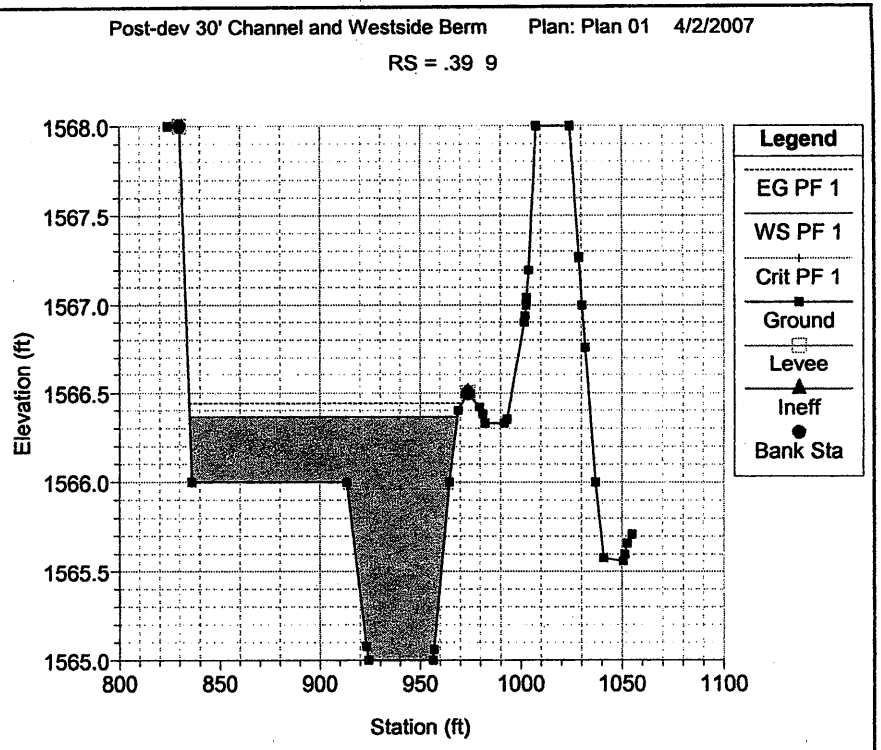
RS = .58 3

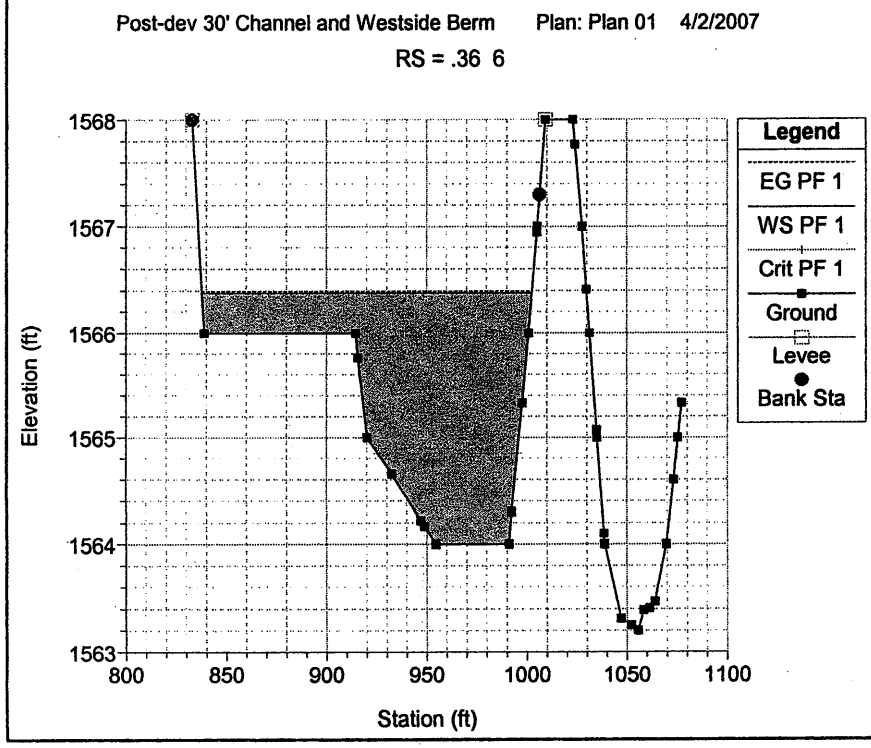


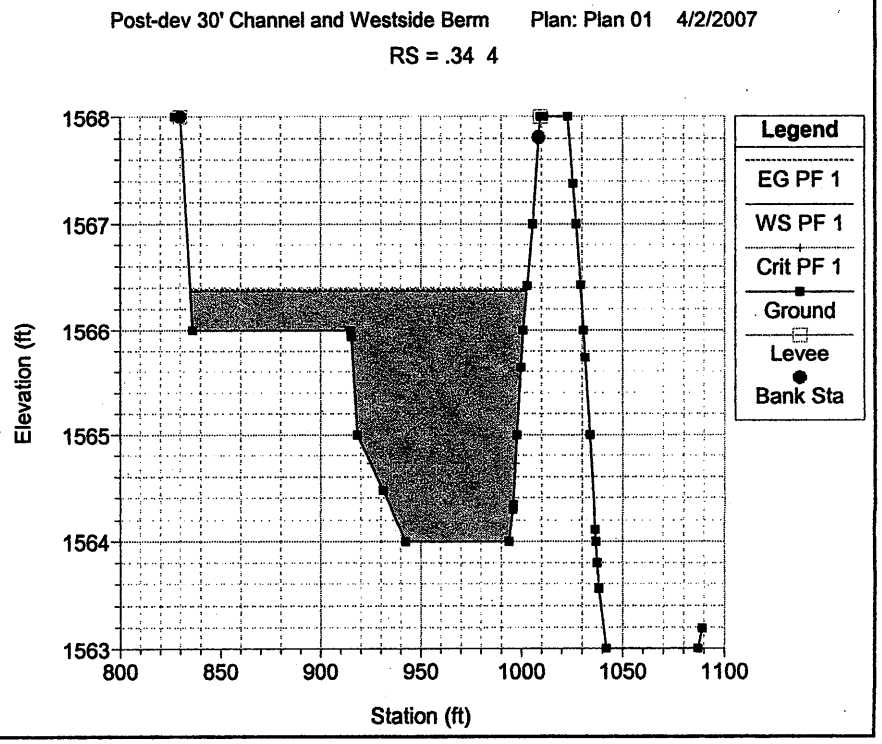

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .57 2
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .55 11
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .51 7
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .5 6
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1570
1569
1568
1567
1566
1565
1564
800
850
900
950
1000
1050
1100
1150


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .47 3
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .45 1
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .44 3
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .43 2
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .41 11
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1568.0
1567.5
1567.0
1566.5
1566.0
1565.5
1565.0
800
850
900
950
1000
1050
1100
1150

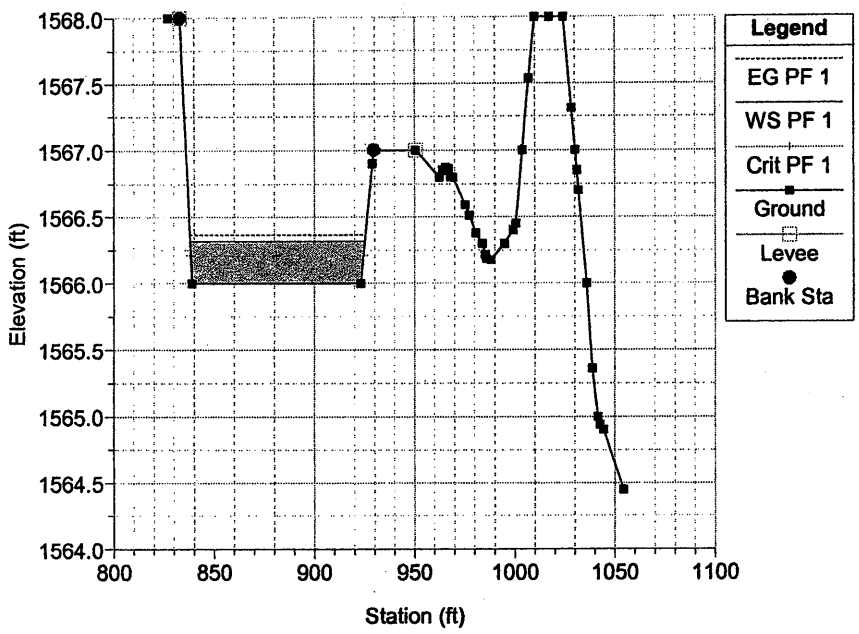

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .39 9
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1568.0
1567.5
1567.0
1566.5
1566.0
1565.5
1565.0
800
850
900
950
1000
1050
1100


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .36 6
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1568
1567
1566
1565
1564
1563
800
850
900
950
1000
1050
1100


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .34 4
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
1568
1567
1566
1565
1564
1563
800
850
900
950
1000
1050
1100

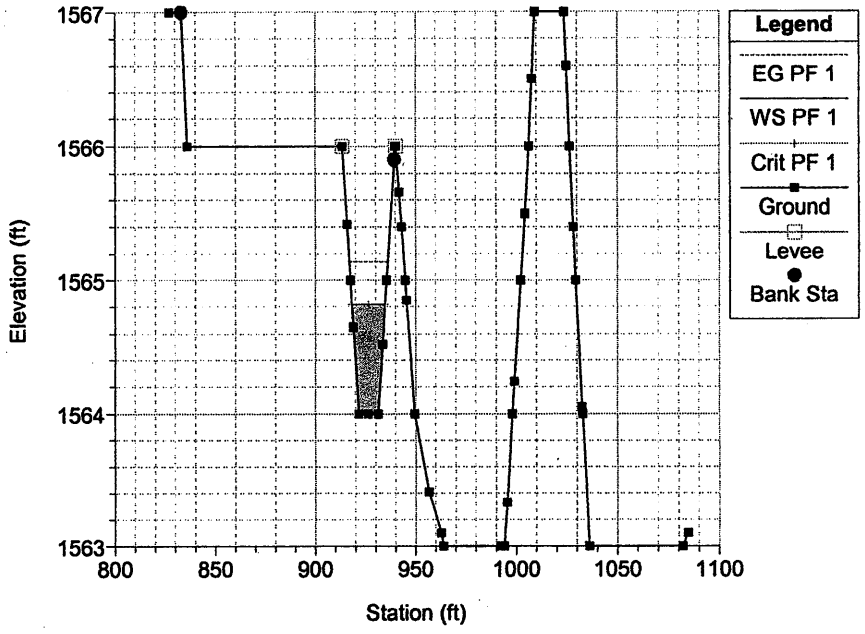
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .31 1



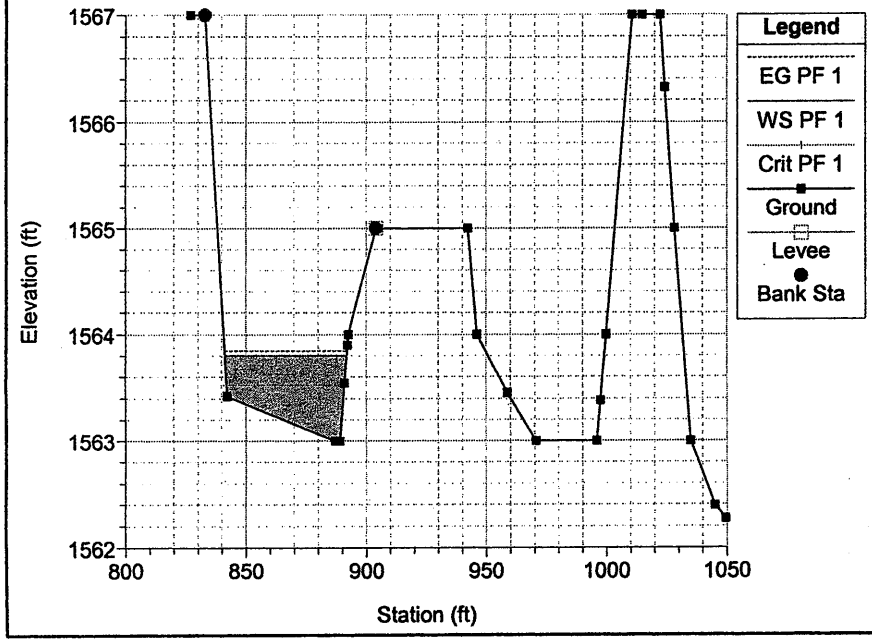
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .3 4



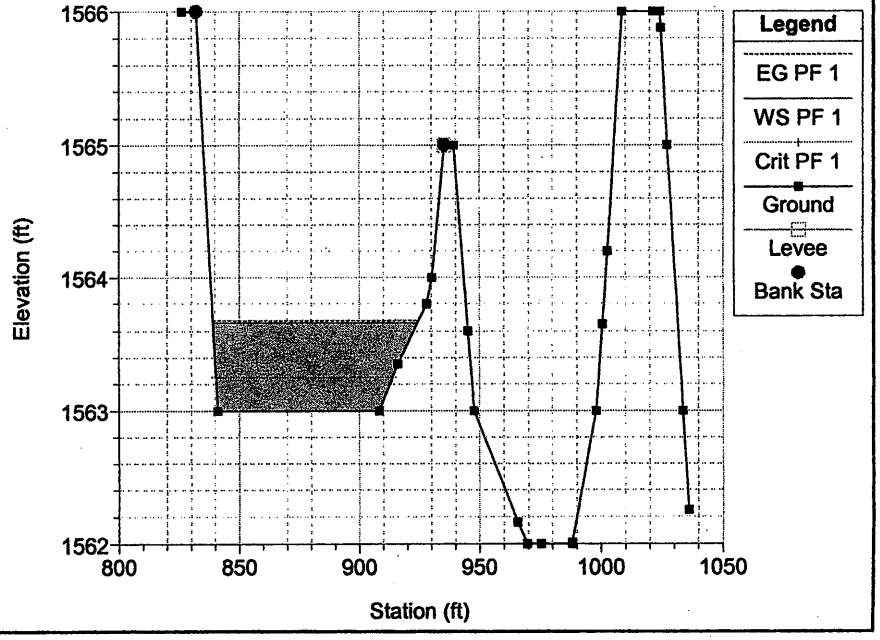
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

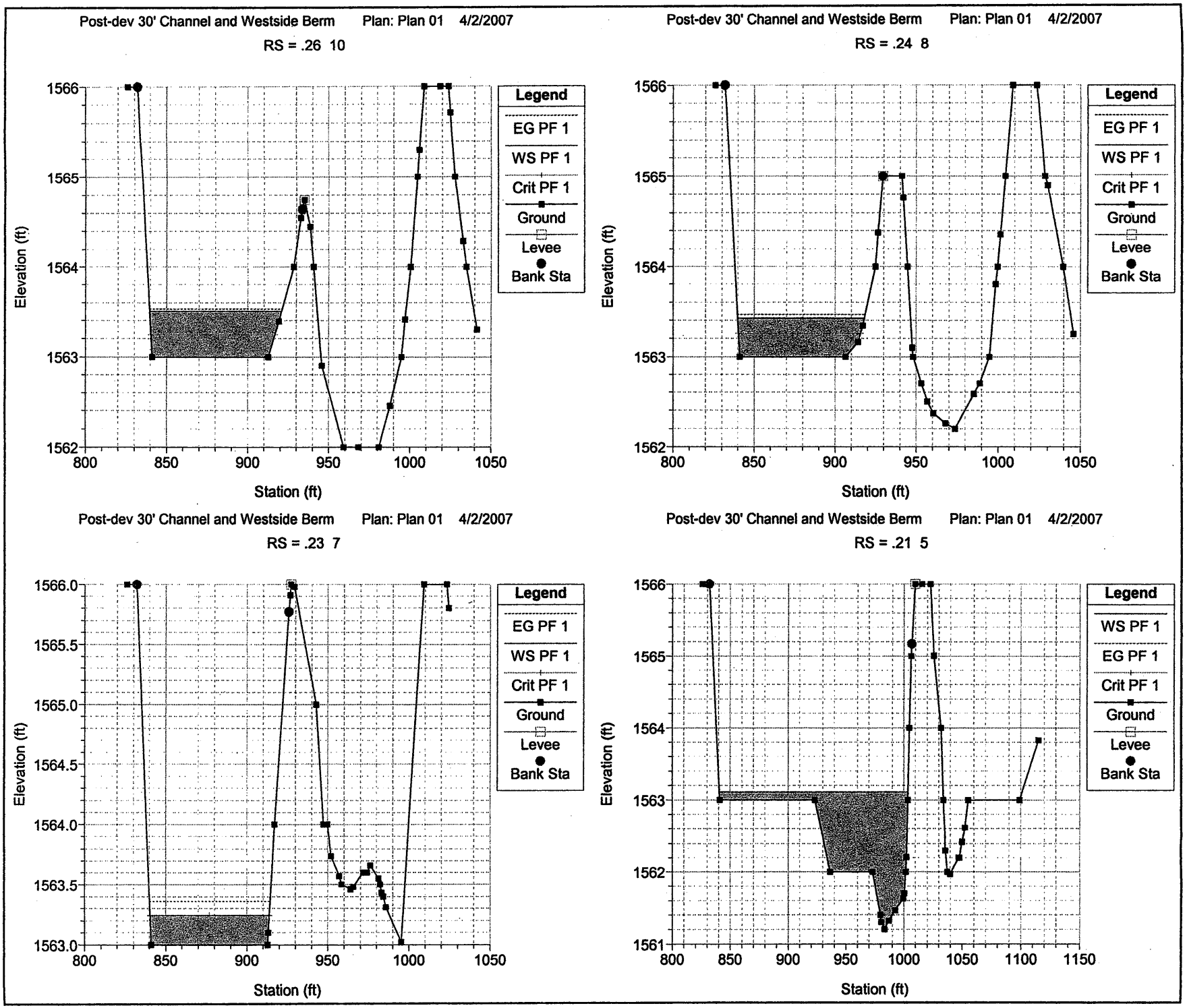
RS = .29 3

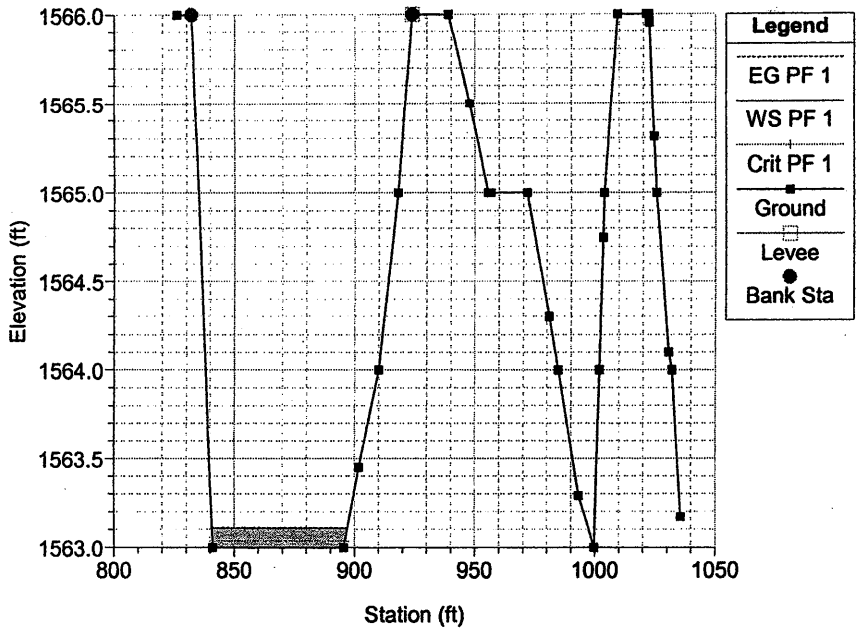


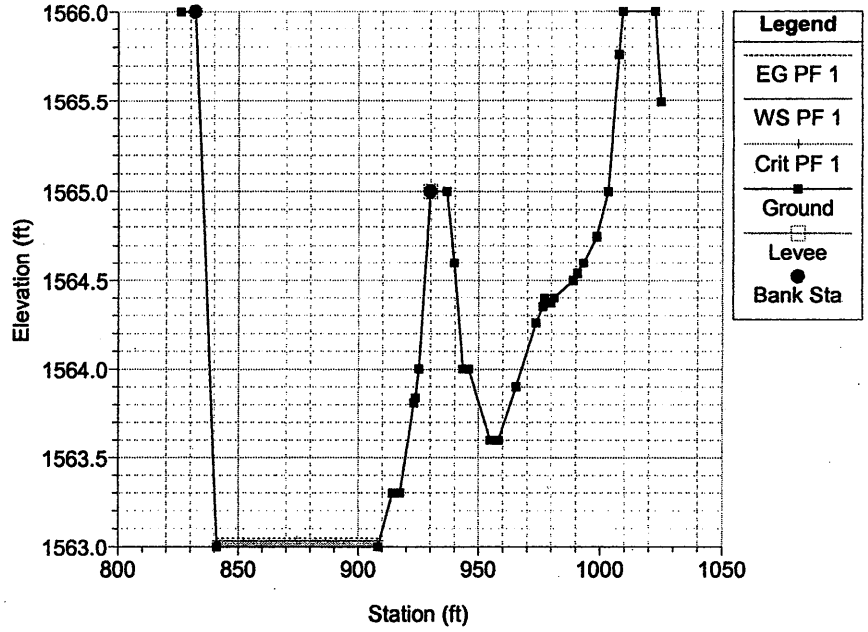
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

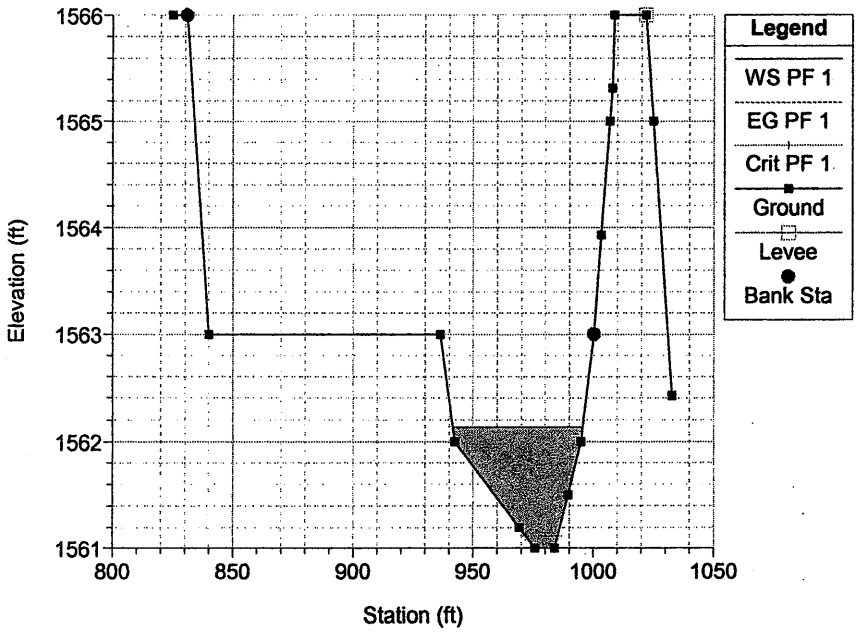
RS = .28 2

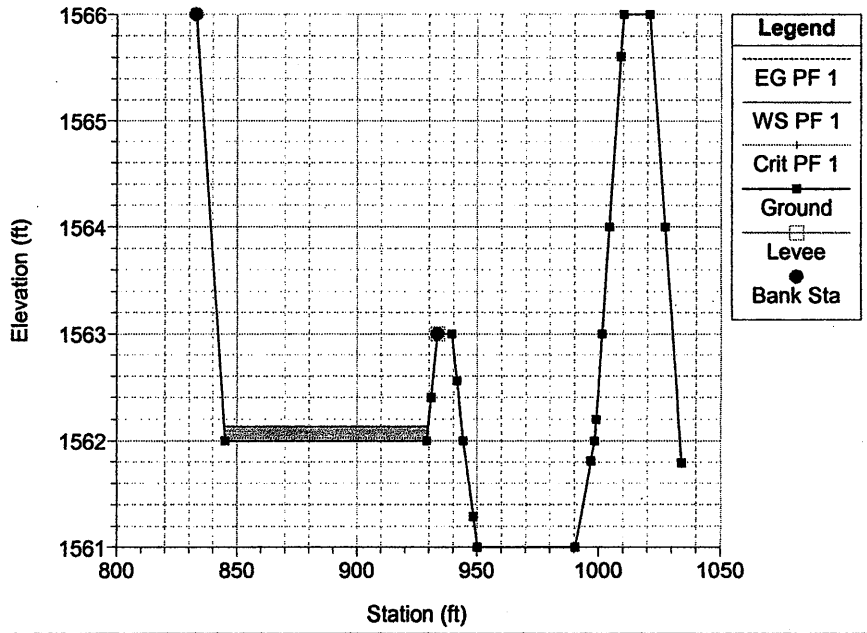


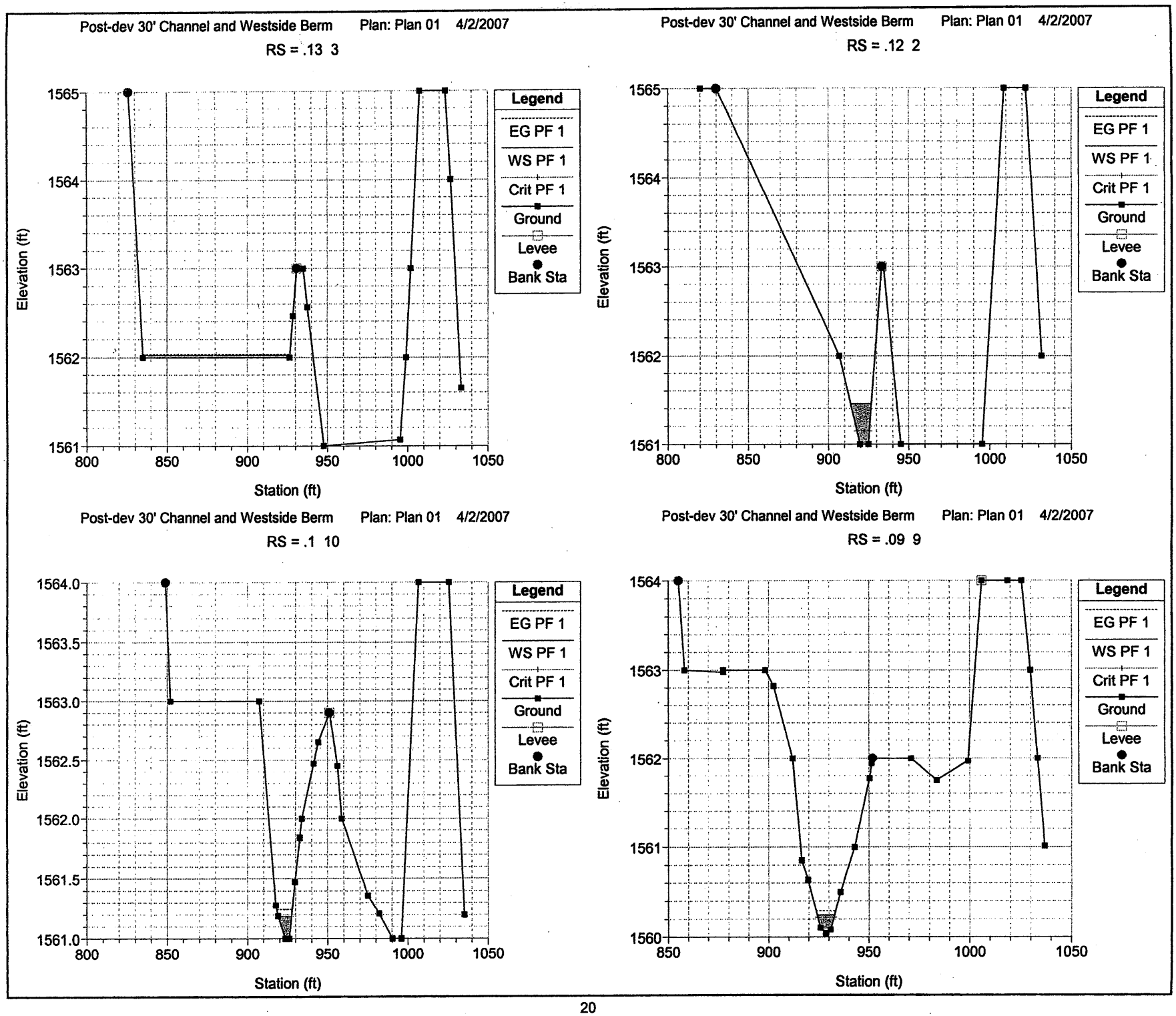

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .26 10
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .24 8
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .23 7
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .21 5
Elevation (ft)
Station (ft)
Legend
WS PF 1
EG PF 1
Crit PF 1
Ground
Levee
Bank Sta


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .19 3
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .16 6
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

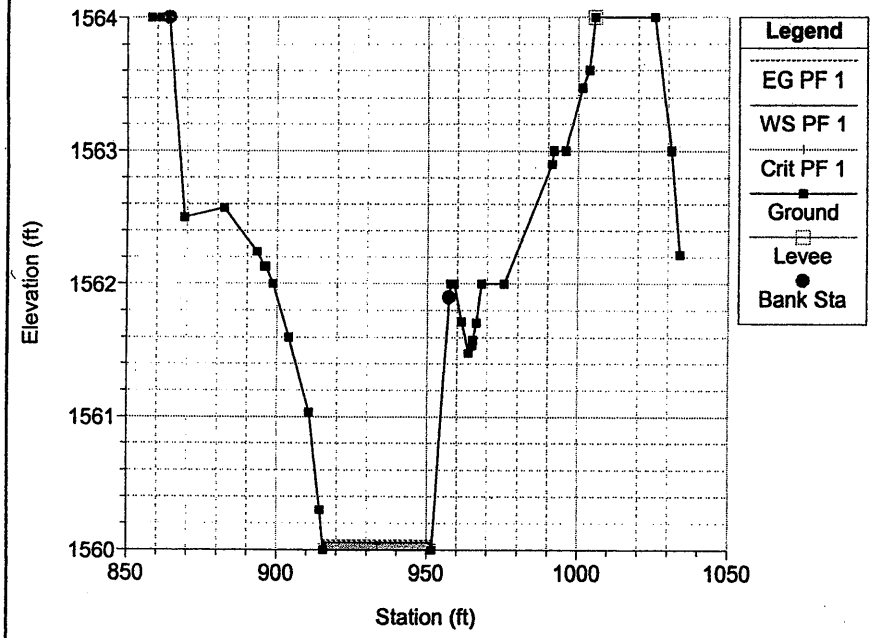

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .15 5
Elevation (ft)
Station (ft)
Legend
WS PF 1
EG PF 1
Crit PF 1
Ground
Levee
Bank Sta


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .14 4
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .13 3
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .12 2
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .1 10
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .09 9
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

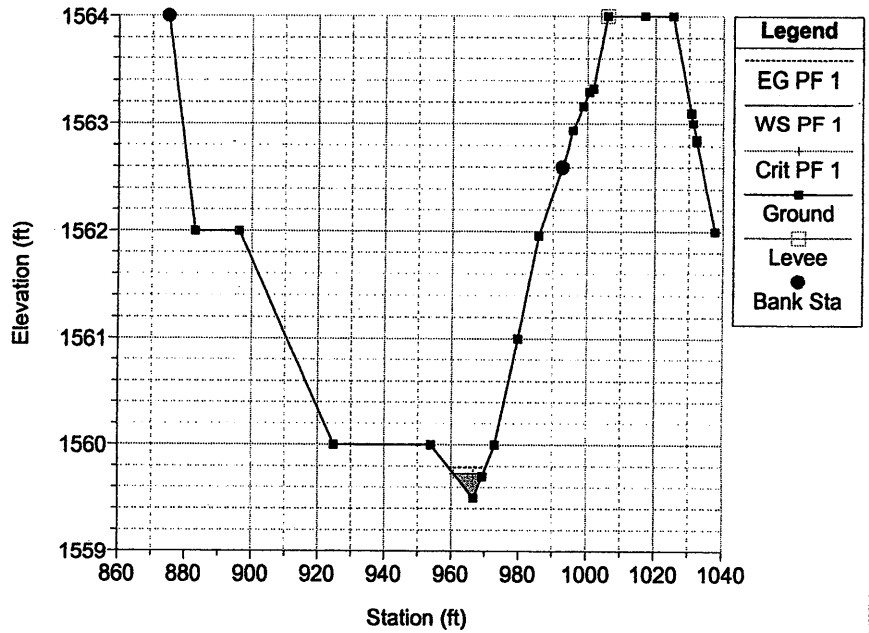
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .08 8



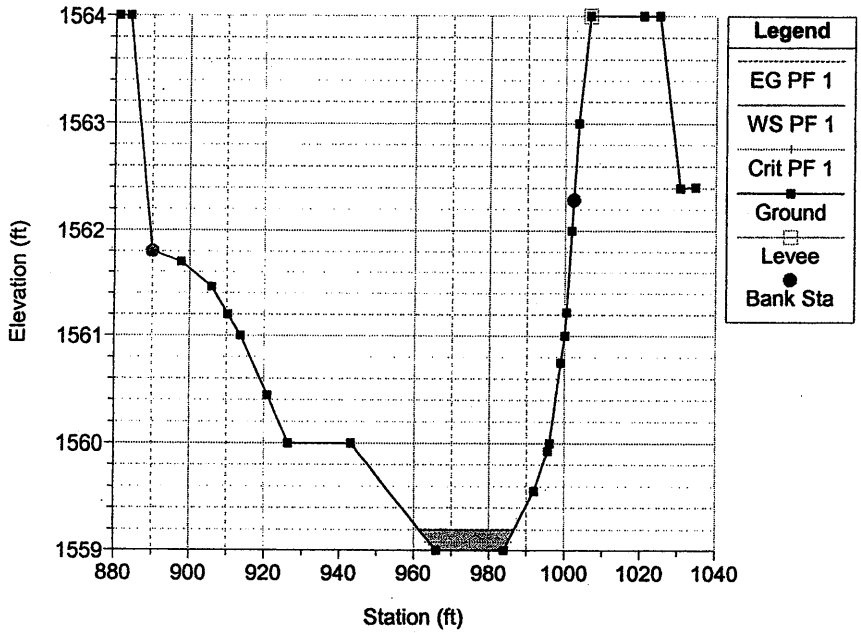
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

RS = .07 7



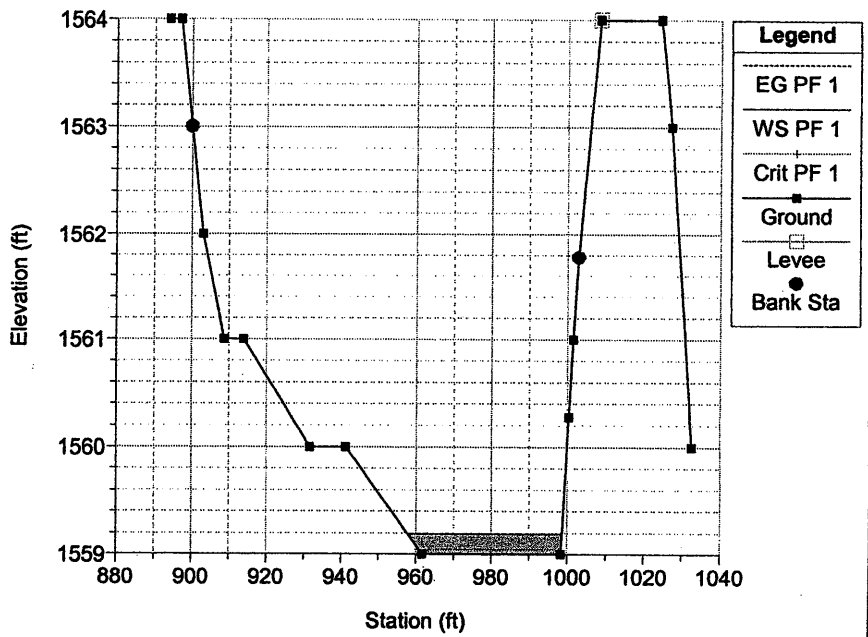
Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

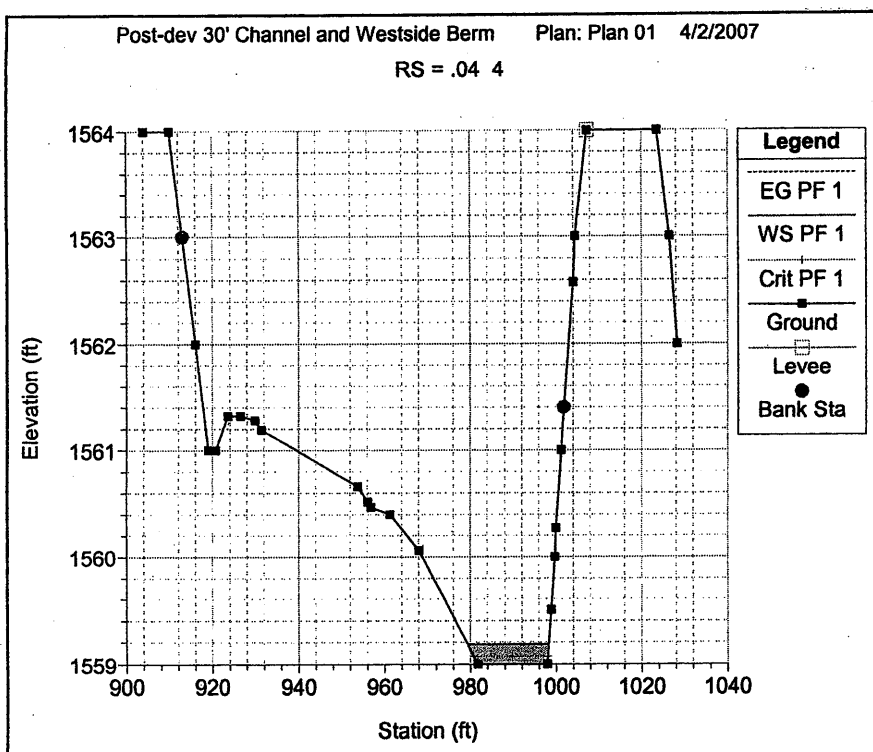
RS = .06 6



Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007

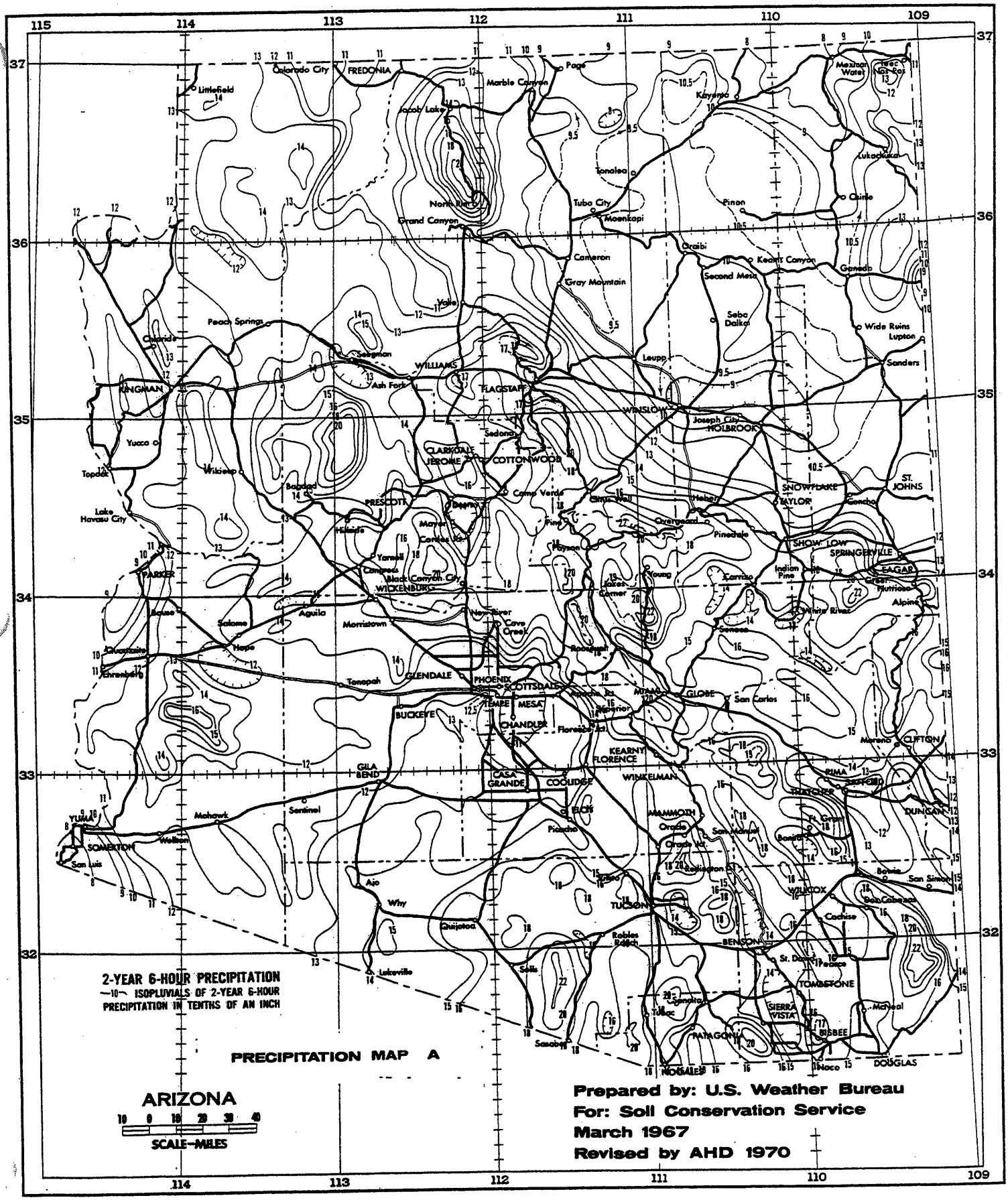
RS = .05 5

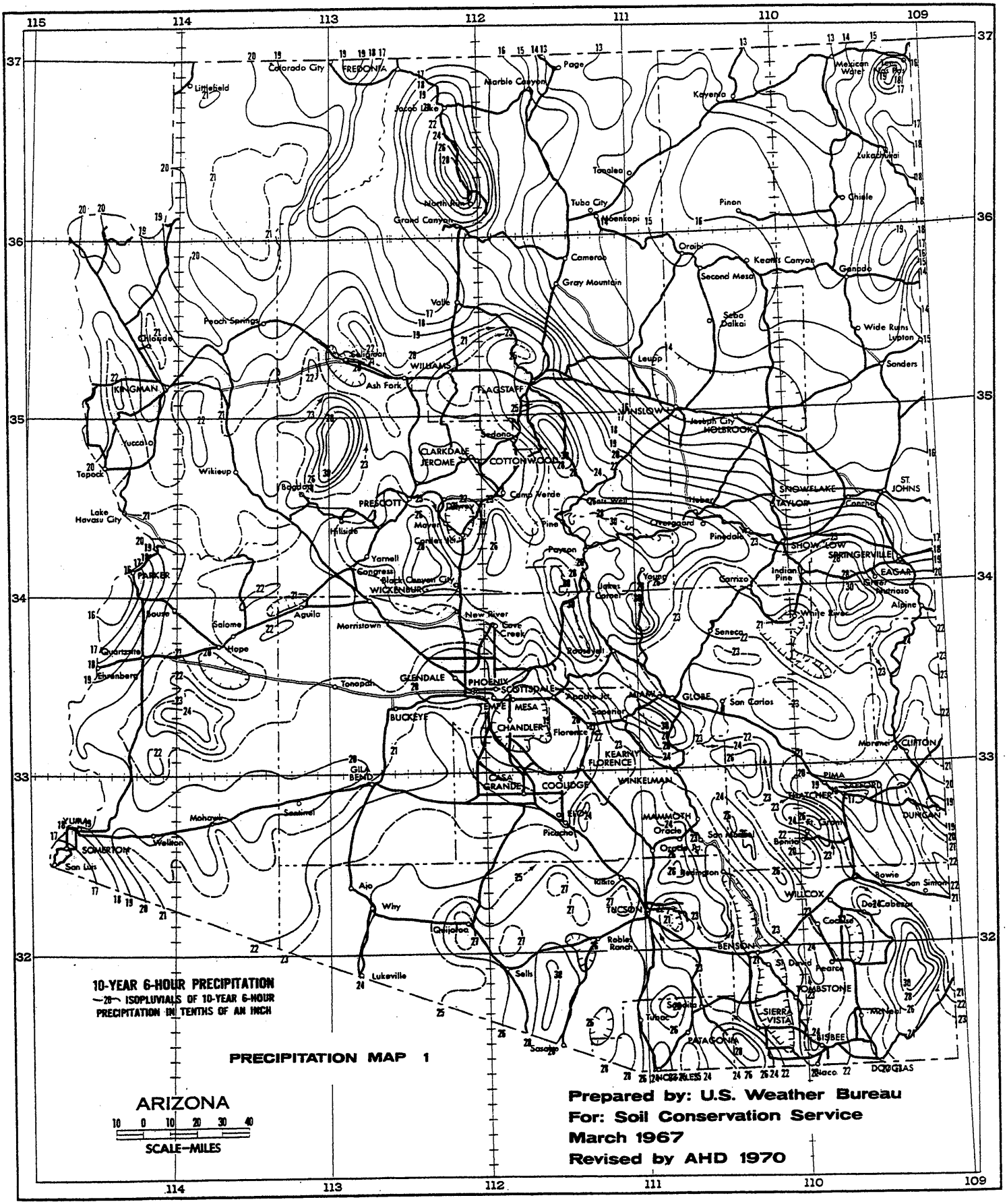


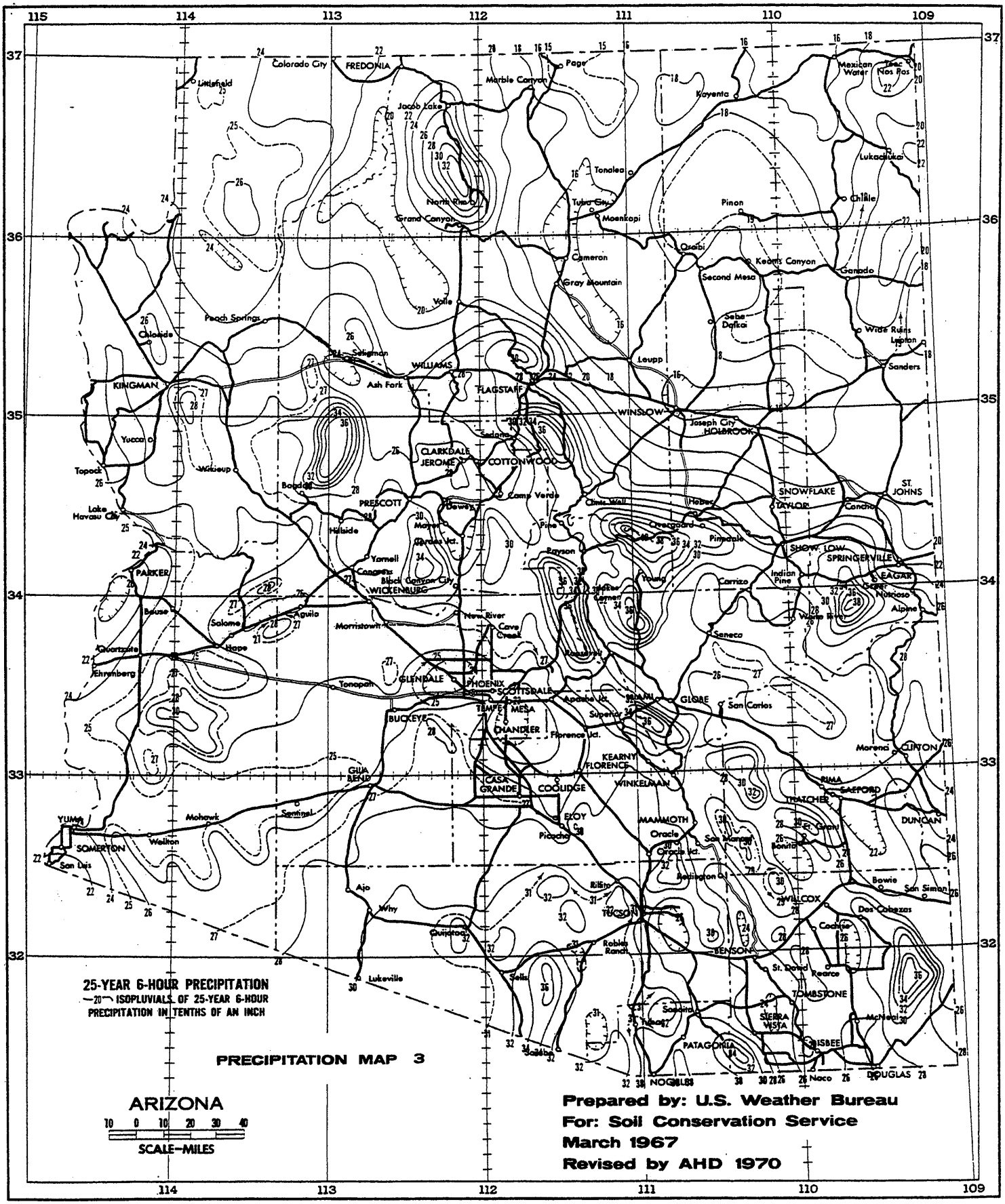

Post-dev 30' Channel and Westside Berm Plan: Plan 01 4/2/2007
RS = .04 4
Elevation (ft)
1564
1563
1562
1561
1560
1559
900
920
940
960
980
1000
1020
1040
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

APPENDIX H

Pre-vs.-Post Offsite Hydrology (2yr, 10yr, 25 yr)


2-YEAR 6-HOUR PRECIPITATION
—10— ISOPLUVIALS OF 2-YEAR 6-HOUR PRECIPITATION IN TENTHS OF AN INCH
PRECIPITATION MAP A
ARIZONA
SCALE—MILES
Prepared by: U.S. Weather Bureau
For: Soil Conservation Service
March 1967
Revised by AHD 1970


10-YEAR 6-HOUR PRECIPITATION
—20— ISOPLUVIALS OF 10-YEAR 6-HOUR PRECIPITATION IN TENTHS OF AN INCH
PRECIPITATION MAP 1
ARIZONA
10 0 10 20 30 40
SCALE—MILES
Prepared by: U.S. Weather Bureau
For: Soil Conservation Service
March 1967
Revised by AHD 1970


25-YEAR 6-HOUR PRECIPITATION
—20— ISOPLUVIALS OF 25-YEAR 6-HOUR PRECIPITATION IN TENTHS OF AN INCH
PRECIPITATION MAP 3
ARIZONA
10 0 10 20 30 40
SCALE—MILES
Prepared by: U.S. Weather Bureau
For: Soil Conservation Service
March 1967
Revised by AHD 1970

25-Year Flows (295 cfs at bridge)

Crossing	Size	Pre-Developed		Post-Developed	
		WSEL (ft)	Discharge (cfs)	WSEL (ft)	Discharge (cfs)
RR#1	48" CMP	1572.60	19	1572.81	17
RR#2	2-27" CMPs	1569.84	32	1569.95	34
RR#3	2-2'x3.5' Boxes	1567.15	91	1567.47	98
RR#4	4-36"x22" CMPs	1566.50	140	1566.84	146
RR#5	3-60" CMPs	1563.16	13	N/A	N/A
RR#6	3-60" CMPs	N/A	N/A	N/A	N/A
84#1	30"x24" CMP	1572.60	18	1573.00	20
84#2	2-36" CMP's	1569.84	48	1570.00	52
84#3	2-30" CMP's	1567.15	28	1567.47	36
84#4	4-30" RCP's	1566.50	136	1566.84	152
84#5	2-10'x3' Boxes	1563.16	65	1560.04	35
84#6	2-10'x3' Boxes	N/A	N/A	N/A	N/A

10-Year Flows (268 cfs at bridge)

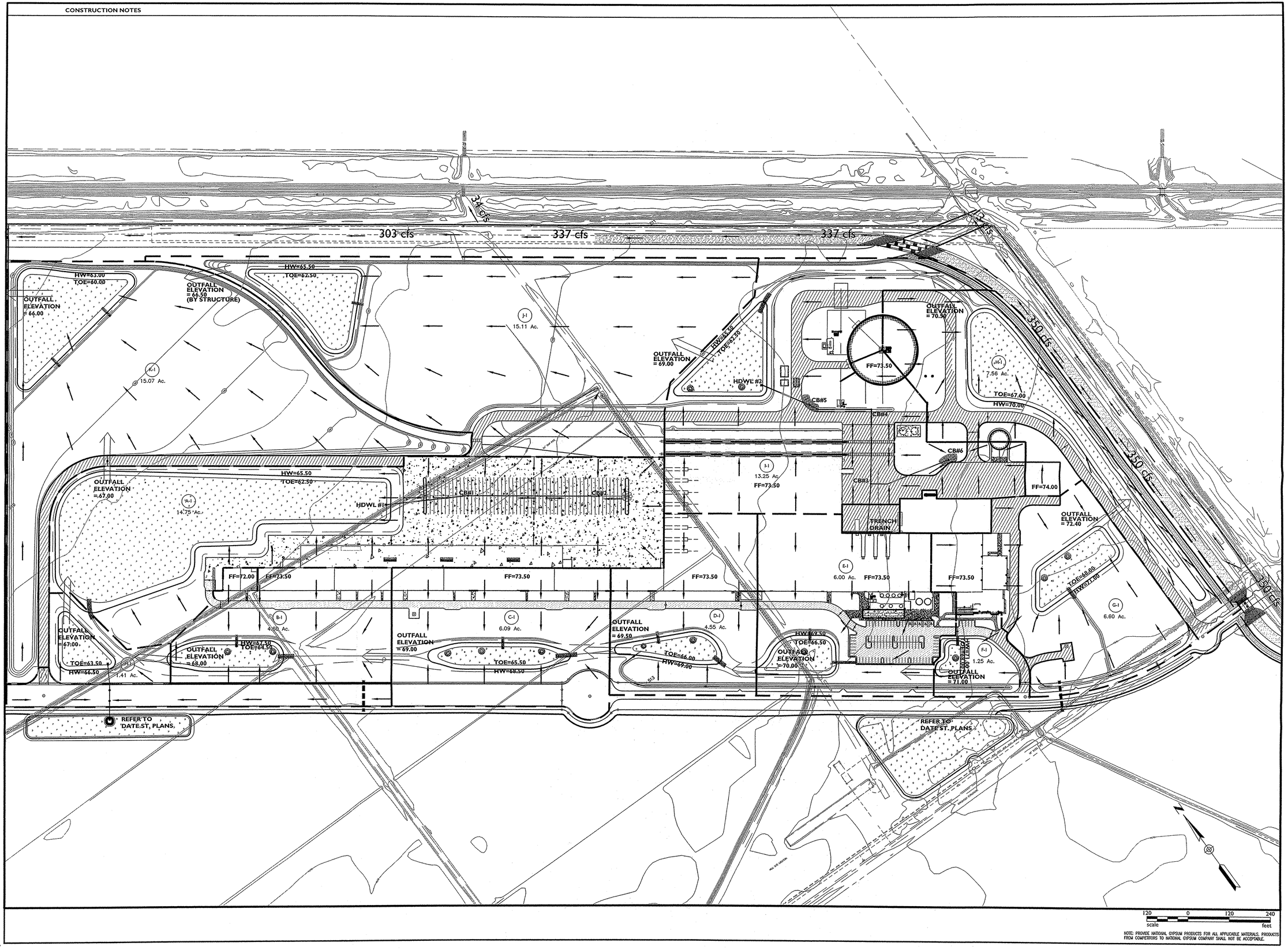
Crossing	Size	Pre-Developed		Post-Developed	
		WSEL (ft)	Discharge (cfs)	WSEL (ft)	Discharge (cfs)
RR#1	48" CMP	1572.57	19	1573.00	11
RR#2	2-27" CMPs	1569.82	32	1570.00	34
RR#3	2-2'x3.5' Boxes	1567.13	91	1567.43	95
RR#4	4-36"x22" CMPs	1566.40	126	1566.76	129
RR#5	3-60" CMPs	N/A	N/A	N/A	N/A
RR#6	3-60" CMPs	N/A	N/A	N/A	N/A
84#1	30"x24" CMP	1572.57	18	1573.00	19
84#2	2-36" CMP's	1569.82	48	1570.00	50
84#3	2-30" CMP's	1567.13	28	1567.43	34
84#4	4-30" RCP's	1566.40	132	1566.76	144
84#5	2-10'x3' Boxes	N/A	42	N/A	21
84#6	2-10'x3' Boxes	N/A	N/A	N/A	N/A

2-Year Flows (218 cfs at bridge)

Crossing	Size	Pre-Developed		Post-Developed	
		WSEL (ft)	Discharge (cfs)	WSEL (ft)	Discharge (cfs)
RR#1	48" CMP	1572.51	17	1573.00	11
RR#2	2-27" CMPs	1569.77	32	1570.00	32
RR#3	2-2'x3.5' Boxes	1566.98	84	1567.30	91
RR#4	4-36"x22" CMPs	1566.29	85	1566.55	84
RR#5	3-60" CMPs	N/A	N/A	N/A	N/A
RR#6	3-60" CMPs	N/A	N/A	N/A	N/A
84#1	30"x24" CMP	1572.51	17	1573.00	16
84#2	2-36" CMP's	1569.77	46	1570.00	46
84#3	2-30" CMP's	1566.98	24	1567.30	32
84#4	4-30" RCP's	1566.29	128	1566.55	124
84#5	2-10'x3' Boxes	N/A	3	N/A	N/A
84#6	2-10'x3' Boxes	N/A	N/A	N/A	N/A

APPENDIX I
On-Site Drainage/Site Retention

CONSTRUCTION NOTES



NOTE: PROVIDE NATIONAL GYPSUM PRODUCTS FOR ALL APPLICABLE MATERIALS. PRODUCTS FROM COMPETITORS TO NATIONAL GYPSUM COMPANY SHALL NOT BE ACCEPTABLE.

NEW WALLBOARD FACILITY
FOR
National Gypsum COMPANY
ELOY, ARIZONA

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SEAL

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37833
JOEL P. SAUREY
Date Signed 06-30-07

REV	DATE	DRAWN	DESCRIPTION

THIS DOCUMENT HAS BEEN ISSUED SOLELY FOR THE PURPOSE(S) NOTED IN THE REVISION BLOCK. UNTIL THIS SHEET HAS BEEN SPECIFICALLY ISSUED FOR CONSTRUCTION, FINAL PROJECT COORDINATION IS INCOMPLETE AND THE INFORMATION SHOWN HERE IS SUBJECT TO REVISION.

SHEET TITLE

ON-SITE DRAINAGE EXHIBIT

DRAWN: MAA	
CHECKED: EDM	SHEET SIZE: 24x36
APPROVED: JPS	PLOT FACTOR: PAPER
PROJECT: 07-013	DATE: 06-07-2007
CAD NAME: DEXX	SCALE: 1"=120'

DRAWING NUMBER

ONSITE-DE 1 of 1

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RETENTION REQUIRED
National Gypsum Wallboard Facility

*Runoff volume calculations based on 100-year, 2-hour storm.
*100-year, 2-hour rainfall depth = 2.80 in

BASIN A

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
A-1 Roof Top	1.00	0.23	1.20	0.28
A-1 Concrete/AC	0.95	0.23	5.80	1.28
A-1 Open Space	0.60	0.23	7.75	1.09
			Total Retention Required	2.65

BASIN B

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
B-1 Roof Top	1.00	0.23	0.77	0.18
B-1 Road Pavement	0.95	0.23	0.28	0.06
B-1 Open Space	0.60	0.23	3.54	0.50
			Total Retention Required	0.74

BASIN C

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
C-1 Roof Top	1.00	0.23	1.00	0.23
C-1 Road Pavement	0.95	0.23	1.55	0.34
C-1 Open Space	0.60	0.23	3.55	0.50
			Total Retention Required	1.07

BASIN D

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
D-1 Roof Top	1.00	0.23	1.51	0.35
D-1 Road Pavement	0.95	0.23	0.37	0.08
D-1 Open Space	0.60	0.23	2.67	0.37
			Total Retention Required	0.81

RETENTION REQUIRED

National Gypsum Wallboard Facility

*Runoff volume calculations based on 100-year, 2-hour storm.

*100-year, 2-hour rainfall depth = 2.80 in

BASIN E

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
E-1 Roof Top	1.00	0.23	2.36	0.55
E-1 Road Pavement	0.95	0.23	1.16	0.26
E-1 Sidewalk	0.95	0.23	0.20	0.04
E-1 Open Space	0.60	0.23	2.29	0.32
			Total Retention Required	1.17

BASIN F

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
F-1 Road Pavement	0.95	0.23	0.32	0.07
F-1 Sidewalk	0.95	0.23	0.02	0.01
F-1 Open Space	0.60	0.23	0.91	0.13
			Total Retention Required	0.20

BASIN G

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
G-1 Roof Top	1.00	0.23	1.09	0.25
G-1 Road Pavement	0.95	0.23	0.69	0.15
G-1 Open Space	0.60	0.23	4.82	0.67
			Total Retention Required	1.08

BASIN H

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
H-1 Roof Top	1.00	0.23	0.29	0.07
H-1 Road Pavement	0.95	0.23	1.44	0.32
H-1 Open Space	0.60	0.23	5.82	0.82
			Total Retention Required	1.20

RETENTION REQUIRED

National Gypsum Wallboard Facility

*Runoff volume calculations based on 100-year, 2-hour storm.

*100-year, 2-hour rainfall depth = 2.80 in

BASIN I

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
I-1 Roof Top	1.00	0.23	3.01	0.70
I-1 Road Pavement	0.95	0.23	3.15	0.70
I-1 Open Space	0.60	0.23	7.09	0.99
			Total Retention Required	2.39

BASIN J

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
J-1 Road Pavement	0.95	0.23	0.45	0.10
J-1 Open Space	0.60	0.23	14.66	2.05
			Total Retention Required	2.15

BASIN K

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
K-1 Road Pavement	0.95	0.23	1.09	0.24
K-1 Open Space	0.60	0.23	13.98	1.96
			Total Retention Required	1.96

BASIN M

Catchment Area	Runoff Coeff. (C_w)	Rainfall Depth (ft)	Area (ac)	Volume (ac-ft)
L-1 Road Pavement	0.95	0.23	3.49	0.77
L-1 Open Space	0.60	0.23	1.41	0.20
			Total Retention Required	0.97

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RETENTION PROVIDED

National Gypsum Wallboard Facility

BASIN A

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1565.50	239759	5.50			
TOE	1562.50	206509	4.74	5.12	3	15.37

BASIN B

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1567.50	27375	0.63			
TOE	1564.50	18592	0.43	0.53	3	1.58

BASIN C

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1568.50	27786	0.64			
TOE	1565.50	16850	0.39	0.51	3	1.54

BASIN D

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1569.00	20080	0.46			
TOE	1566.00	11521	0.26	0.36	3	1.09

BASIN E

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1569.50	21992	0.50			
TOE	1566.50	15046	0.35	0.43	3	1.28

BASIN F

	Elevation (ft)	Area (ft^2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1571.00	6818	0.16			
TOE	1568.00	3325	0.08	0.12	3	0.35

RETENTION PROVIDED

National Gypsum Wallboard Facility

BASIN G

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1571.50	31214	0.72			
TOE	1568.50	22648	0.52	0.62	3	1.85

BASIN H

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1571.00	85505	1.96			
TOE	1568.00	56754	1.30	1.63	3	4.90

BASIN I

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1565.50	43559	1.00			
TOE	1562.50	32544	0.75	0.87	3	2.62

BASIN J

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1568.00	47637	1.09			
TOE	1565.00	36461	0.84	0.97	3	2.90

BASIN K

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1565.50	71466	1.64			
TOE	1562.50	51409	1.18	1.41	3	4.23

BASIN M

	Elevation (ft)	Area (ft2)	Area (ac)	Avg Area (ac)	Depth (ft)	Volume (ac-ft)
HW	1566.50	18462	0.42			
TOE	1563.50	12161	0.28	0.35	3	1.05

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RETENTION SUMMARY
National Gypsum Wallboard Facility

RETENTION BASINS

BASIN #	Retention Provided (ac-ft)	Retention Required (ac-ft)	Excess Volume (ac-ft)	Drywells Required
A	15.37	2.65	12.72	3
B	1.58	0.74	0.84	1
C	1.54	1.07	0.46	2
D	1.09	0.81	0.28	1
E	1.28	1.17	0.10	2
F	0.35	0.20	0.15	1
G	1.85	1.08	0.77	2
H	4.90	1.20	3.69	2
I	2.62	2.39	0.23	3
J	2.90	2.15	0.74	3
K	4.23	1.96	2.27	2
M	1.05	0.97	0.08	1

National Gypsum Center

Retention Basin Dry-Up Rates

Approximate Spatial Basin Percoloation Rate= **30** min/inch

60 min/inch (Conservative measure)
720 min/ft

Drywell Supplement in each basin, one drywell per Ac-ft of Runoff
Max Drywell rate = 0.10 cfs (Per Pinal Co.)

Retention Basin A

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	Status
2.65	115434	206000	4.77	0.3	5.07	**6.3**	OK

Retention Basin B

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
0.74	32235	18500	0.43	0.1	0.53	**17.0**	OK

Retention Basin C

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
1.07	46609	16800	0.39	0.2	0.59	**22.0**	OK

Retention Basin D

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
0.81	35284	11500	0.27	0.1	0.37	**26.8**	OK

Retention Basin E

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
1.17	50965	15000	0.35	0.2	0.55	**25.9**	OK

Retention Basin F

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
0.20	8712	3300	0.08	0.1	0.18	**13.7**	OK

Retention Basin G

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
1.08	47045	22600	0.52	0.2	0.72	**18.1**	OK

Retention Basin H

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
1.20	52272	56700	1.31	0.2	1.51	**9.6**	OK

Retention Basin I

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
2.39	104109	32500	0.75	0.3	1.05	**27.5**	OK

Retention Basin J

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
2.15	93654	36400	0.84	0.3	1.14	**22.8**	OK

Retention Basin K

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
1.96	85378	51400	1.19	0.2	1.39	**17.1**	OK

Retention Basin M

Runoff Volume (Ac-ft)	Runoff Volume (cu-ft)	Surface Area (sf)	Volumetric Drain Rate (cfs)	Drywell Drain Rate (cfs)	Total Drain Rate (cfs)	Percolation Time (hrs)	
0.97	42253	12100	0.28	0.1	0.38	**30.9**	OK

APPENDIX J
Storm Drain Analysis

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Inlet Flows
National Gypsum Wallboard Facility

*Rainfall Intensity based on NOAA Atlas 14
10 year, 5 minute Storm
*10-year intensity = 6.17 in/hr

Storm Drain Profile #1,2 & 3

Trench Drain

Catchment Area	Runoff Coeff. (C_w)	I_{10} (in/hr)	Area (ac)	Flow (cfs)
Road Pavement	0.95	6.17	0.33	1.9
			Subtotal	1.9

Catch Basin #6

Road Pavement	0.95	6.17	0.70	4.1
Roof Top	1.00	6.17	0.65	4.0
Open Space	0.60	6.17	0.33	1.2
			Subtotal	9.3

Catch Basin #3

Road Pavement	0.95	6.17	0.75	4.4
Open Space	0.60	6.17	0.18	0.6
			Subtotal	5.0

Catch Basin #4

Road Pavement	0.95	6.17	0.43	2.5
Dome Roof Top	1.00	6.17	0.22	1.4
Open Space	0.60	6.17	0.49	1.8
			Subtotal	5.7

Catch Basin #5

Road Pavement	0.95	6.17	0.10	0.6
Open Space	0.60	6.17	0.23	0.8
			Subtotal	1.4

Storm Drain Profile #1,2 & 3

Trench Drain

Catchment Area	Runoff Coeff. (C_w)	I_{10} (in/hr)	Area (ac)	Flow (cfs)
Catch Basin #1				
Concrete Pavement	0.95	6.17	3.00	17.6

Catch Basin #2

Concrete Pavement	0.95	6.17	2.93	17.1

CATCH BASIN INLET CAPACITY

NGC utilizes the MAG 535 Catch Basin for all surface flows.

The capacity of the MAG 535 is described by the Inlet Orifice Equation
Assumes max. ponding depth is 6" and the open area of the inlet is clogged 20%.

$Qi = Co*Ag*(2gd)^{0.50}$

Where:

Co =	0.67	
Ag=	8.125	sq. ft.
g=	32.2	ft/s^2
d=	**4**	in.
Qi=	20.2	**(10-year)**

Conclusion:

The MAG 535 Catch Basins utilized by NGC has the capacity at grate 20% clogged to capture max surface runoff (18 cfs) at max ponding depth = 4"

Verify max. ponding in 100-year event does not exceed 1.0'

$Qi = Co*Ag*(2gd)^{0.50}$

Where:

Co =	0.67	
Ag=	8.125	sq. ft.
g=	32.2	ft/s^2
d=	**12**	in.
Qi=	34.9	**(100-year)**

Conclusion:

The MAG 535 Catch Basins utilized by NGC has the capacity at grate 20% clogged to capture max surface runoff (32 cfs) below max ponding depth = 12"

No surface area on-site, except for intended retention basins, will experience ponding above 12".

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STORM DRAIN HGL CALCULATIONS
National Gypsum Wallboard Facility

*HGL calcs based on 10-year peak flow.
*Req'd freeboard between grate/rim and end HGL is 1.0'.
*Manning's n for concrete pipe 0.013
Loss coefficient, K = 0.004925

Begin Pt	End Pt	Pipe length (ft)	Pipe dia. (in)	Pipe x-sec. area (sf)	Wetted perim. (ft)	Hyd. rad. (ft)	Flow (cfs)	Outlet inv elev (ft)	Inlet inv elev (ft)	Pipe slope %	Full flow vel. (fps)	Hvelocity (ft)	Begin HGL elev (ft)	Friction slope (ft/ft)	Hfriction (ft)	Hminor (ft)	Htotal (ft)	End HGL elev (ft)	Rim/grate elev (ft)	freeboard (ft)	freeboard > 1.0' ?
HDWL #2	CB #5	147	30	4.91	7.85	0.63	24.0	1562.50	1563.97	1.00	4.89	0.37	1565.50	0.0025	0.37	0.19	0.55	1566.05	1571.00	4.95	OK
CB #5	CB #4	184	30	4.91	7.85	0.63	22.0	1563.97	1564.33	0.20	4.48	0.31	1566.05	0.0021	0.39	0.16	0.54	1566.60	1571.65	5.05	OK
CB #4	CB #3	217	30	4.91	7.85	0.63	17.0	1564.33	1564.76	0.20	3.46	0.19	1566.60	0.0013	0.27	0.09	0.37	1566.96	1571.00	4.04	OK
CB#3	Trench Drain	139	24	3.14	6.28	0.50	2.0	1564.76	1565.12	0.26	0.64	0.01	1566.96	0.0000	0.01	0.00	0.01	1566.97	1569.50	2.53	OK
CB #3	CB #6	235	24	3.14	6.28	0.50	8.9	1564.76	1565.48	0.31	2.83	0.12	1566.96	0.0010	0.23	0.06	0.29	1567.25	1571.4	4.15	OK
HDWL #1	CB #1	237	30	4.91	7.85	0.63	35.0	1562.50	1564.27	0.75	7.13	0.79	1565.50	0.0053	1.26	0.39	1.66	1567.16	1569.91	2.75	OK
CB #1	CB #2	380	24	3.14	6.28	0.50	17.0	1564.27	1564.84	0.15	5.41	0.45	1567.16	0.0036	1.35	0.23	1.58	1568.74	1569.91	1.17	OK

Note: Assume Begin HGL of Outlet of System is HW Elev. of Receiving Retention Basin