FINAL DESIGN REPORT

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Camelback Ranch Levee - North
Glendale Airport Levee
PCN 400052
FCD Contract No. 98-37

Prepared For:

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OCTOBER 26, 1998

TABLE OF CONTENTS

I. INTRODUCTION 1

II. ANALYSES 2

A. HYDROLOGY 2
1. Agua Fria River and New River 2
2. Interior Drainage 2

B. HYDRAULICS 2
1. Agua Fria River and New River 2
2. Glendale Airport Outfall Channel (GAOC) 3
3. Glendale Airport 36 inch Pipe Outfall 4
4. Detention Basin 36 inch Pipe Outfall 4

C. SEDIMENT TRANSPORT 5

D. MINING 5

E. CONDITIONAL LETTER OF MAP REVISION (CLOMR) 6

III. DESIGN 6

A. HORIZONTAL CONTROL 6

B. LEVEE VERTICAL CONTROL 6
1. East Levee Spreadsheet 6
2. Glendale Levee Spreadsheet 7

C. SUPPORTING DESIGN CALCULATIONS 7
1. Terminations 7
2. Ties to Existing Levees 7
3. Glendale Airport Outfall Channel Confluence 8
4. Bethany Home Outfall Channel Confluence 8
5. Maintenance Features 8

D. QUANTITIES 8

E. EARTHWORK 9

F. GEOTECHNICAL INVESTIGATIONS 9
1. Camelback Ranch Levee 9
2. Glendale Levee and New River Channelization 9
3. Glendale West Area Wastewater Reclamation Facility Levee 9
4. Soil Cement 9

IV. REFERENCES 10

APPENDICES

A. Hydrology

B. Hydraulics

C. Sediment Transport

D. Horizontal Control

E. Levee Vertical Control

F. Glendale Levee As-Builts

G. Quantities

H. Earthwork

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I. INTRODUCTION

Daniel, Mann, Johnson, & Mendenhall (DMJM) was retained by the Flood Control District of Maricopa County (FCDMC) to design the Camelback Ranch Levee project in 1995. The first phase of the design, south of Camelback Road was completed in February 1997. The second or north phase includes the design of a levee which begins on the upstream side of Camelback Road, runs along the east bank of the Agua Fria and New Rivers, and ties into the existing soil cement levee just upstream of the Bethany Home Road alignment. The north phase of the project also includes the construction of a detention basin on the north side Camelback Road to safely handle the interior drainage behind the levee system.

Since the completion of the south phase of the project, the City of Glendale has joined in cooperation with the FCDMC to incorporate additional design items into the project. Glendale added the design of an engineered fill for the extension of the existing municipal airport runway; a levee system to protect the fill and the West Area Wastewater Reclamation Facility (WAWRF); the extension of the existing airport drainage system as a result of the new improvements; and the channelization of the New River to safely convey the Standard Project Flood (SPF). The existing gabion levee along the west bank of the New River is extended, using soil cement, a relatively short distance downstream of the Glendale Airport, turned through the confluence with the Agua Fria River, and terminated on the east bank of the Agua Fria River at the southwest side of the WAWRF.

This report documents the 100% level of design for the elements of the north phase of the project. In general, the design accommodates the Corps of Engineers' Standard Project Flood, prior to the completion of the New Waddell Dam, with three feet of freeboard.

DMJM subcontracted with three firms to assist in the design of the project. Simons, Li & Associates, Inc. (SLA) performed the hydrologic, hydraulic and sediment transport analyses for the Agua Fria River and New River. SLA also developed the documentation for a Conditional Letter of Map Revision (CLOMR) for each river system for review by the Federal Emergency Management Agency (FEMA) using the FEMA 100-year discharge. Collins-Pina Consulting Engineers, Inc. (CPA) performed the control survey and detailed topographic mapping for the levees. ATL, Inc. performed the geotechnical investigations and provided recommendations for the design of the levees and engineered fill.

II. ANALYSES

A. Hydrology

1. Agua Fria River and New River

The hydrology used for the Camelback Ranch Levee design is summarized in Table 1 in Appendix A. The design was based on the SPF discharges for both rivers. The Agua Fria discharges do not account for the effects of the recently completed New Waddell Dam. Also, the New River SPF discharge, below the proposed Bethany Home Road outfall channel, reflects an increase of 2300 cfs, based on a DMJM study for the Arizona Department of Transportation, to account for future flows from the Agua Fria Freeway and Flood Control District of Maricopa County projects.

2. Interior Drainage

Interior drainage is addressed in a separate report by DMJM which documents the off-site contributing areas and 100-year peak discharges and volumes for both the south and north phases of the project.

B. Hydraulics

1. Agua Fria River and New River

SLA developed fixed and moveable bed hydraulic models to represent existing conditions, proposed levee conditions, and proposed levee conditions with assumed maximum future, in-stream, sand and gravel mining. The proposed conditions included a significant amount of channelization in the New River. Each of the above conditions were evaluated with and without coincident flooding at the confluence of the two rivers to identify the worst-case SPF hydraulics for scour and freeboard. SLA provided recommendations for minimum top-of-bank profiles and levee toe-down elevations. The SPF design required three (3) feet of freeboard along the east levee and one (1) foot minimum along the levee around the Glendale Airport. Figures 1 and 2, provided in Appendix B, are site maps which provide cross-section locations for the hydraulic models developed for the Agua Fria and New Rivers, respectively.

The worst-case hydraulic condition for water surface (top-of-bank elevation) in the Agua Fria River resulted from the proposed levee without mining. For the New River, the worst-case water surface resulted from the no-mining condition in the Agua Fria with coincident SPF discharges at the confluence. The worst-case hydraulic condition for toe-down elevations in the Agua Fria River also resulted from the no-mining condition. This condition assumes a regulatory setback will prevent mining from affecting the levee toe-down design. The worst-case hydraulic condition for toe-down elevations in the New River was generated with the future mining condition and low tailwater in the Agua Fria River (non-coincident peaks). A summary of the hydraulics for the Agua Fria and New Rivers is provided in Tables 2 and 3 in Appendix B.

To define the impact of the additional SPF discharge (2300 cfs) in the New River on the existing levee upstream of the Bethany Home Road outfall, SLA compared the existing conditions freeboard with the proposed conditions freeboard. The existing conditions freeboard reflects an SPF discharge of 69,000 cfs downstream of the outfall, while the proposed conditions freeboard reflects an SPF discharge of 71,300 cfs in the downstream reach. The combination of confining the flow downstream of the outfall with the new levee and excavating the New River channel results in a lower water surface downstream of the outfall for the proposed conditions. This increases the available freeboard along the existing levee, immediately upstream of the outfall, until the proposed conditions water surface converges to the existing conditions water surface. The results are summarized in Table 4 in Appendix B.

2. Glendale Airport Outfall Channel (GAOC)

There are two separate channels that convey flows from an 84-inch pipe and a 36-inch pipe that penetrate through the existing gabion levee around the Glendale Municipal Airport. The two channels then join together and form a common channel where it then drains into the New River. The toe of slope for the proposed engineered fill for the runway extension, will fill in the existing channel just downstream of the junction (approximately 850' north of the proposed levee). Therefore, the channel was realigned just south of the junction and runs adjacent to the west side of the engineered fill outfalling into the New River.

The new channel is a trapezoidal channel with an eight foot bottom width and side slopes of four to one. The channel will have a longitudinal slope of 0.00067 feet per feet with a bottom cross slope of two percent for low flows. The left top of bank of the channel was set at an elevation of 1035.60 feet which is the standard project flood (SPF) water surface elevation in the New River plus three feet for freeboard. This will match the top of the proposed levee elevation and prevent the flows in the New River from outflanking the proposed levee through the GAOC. The right top of bank elevation was set at an elevation of 1033.60 feet, SPF water surface elevation plus one foot freeboard. A 16 foot wide maintenance road with a cross slope of one percent, sloping towards the channel, will be provided on both channel banks for access. The backslope of the maintenance road on the left bank will be three to one. The right bank will be filled in at a slope of three to one from the edge of the maintenance road to an elevation of 1039.50 feet for the engineered fill.

Due to the considerable difference in size between the drainage areas for the New River and the Glendale Municipal Airport, the backwater analysis of the GAOC was based on the worse case of two scenarios. The first being where the New River is conveying the 100-year flows while the proposed GAOC is conveying the 10-year event and the second where the New River is conveying the 10-year flows while the proposed GAOC is conveying the 100-year event.

The second scenario assumes a combined 100-year peak flow of 259 cubic feet per second (cfs) in the GAOC from both channels. The peak flow was determined by combining the peak discharges from both storm drains. The 84-inch storm drain has a 100-year peak discharge of 230 cfs. Where as the 36-inch storm drain was designed and sized for the 10-year event with a peak discharge capacity of 29 cfs. Since the maximum discharge capacity of the 36-inch storm drain is limited to 29 cfs, the two peak flows for each channel was

added together to get the combined design flows for the proposed channel. The peak flows for the two storm drain pipes was provided by Z&H Engineering, Inc.

A backwater analysis was performed on the GAOC using HEC-RAS version 2.1. The backwater analysis indicates that the maximum water surface elevation in the GAOC is 1030.69 feet and it occurs during the first scenario. This will allow for freeboard depths of 4.9 feet and 2.9 feet for the left and right banks, respectively. The hydraulic analyses for the GAOC is presented in Appendix B.

The GAOC will be graded south of the levee until it daylights into the New River. The channel will only be in cut with four to one side slopes. The channel will have a bottom width of eight feet with a cross slope of two percent.

3. Glendale Airport 36 inch Pipe Outfall

The existing 36-inch pipe south of the runway will be extended 477 feet under the proposed engineered fill. The existing headwall and flap gate will be removed from the existing pipe and the new pipe will be connected to the existing pipe with a concrete pipe collar. The flap gate will be salvaged for use at the new pipe outlet. The proposed pipe will angle 60 degrees to the right and a manhole is being provided so that it will penetrate through the levee at a perpendicular angle. The pipe will run at a continuous slope of 0.0041 feet per feet. A new headwall will be constructed at the GAOC penetration and the salvaged flap gate will be installed at the end of the pipe. Hydraulic grade line (HGL) calculations were performed on the new pipe profile using STORMCAD version 1.0. The original 100-year design discharge of 43.9 cfs and the HGL remains within the pipe. The peak flow of 43.9 cfs for the 36-inch storm drain pipes was provided by Z&H Engineering, Inc. At its present design, no inlets, additional hydrology or upsizing of the pipe has been provided per the original scope of work. Appendix B presents the hydraulic analyses for the 36 inch outfall pipe for the Glendale Municipal Airport.

4. Detention Basin 36 inch Pipe Outfall

The proposed detention basin for this project was designed for the 100-year, 2-hour storm event for existing conditions. The area tributary to the detention basin is 485 acres as defined in the "Master Drainage Report for Camelback Ranch Planned District Community (PCD) Amendment Case No. 108-B-88-05" dated July 1997. The detention basin presented on the plans is sized for the existing conditions at 54 acre-feet. The outfall pipe was sized for PCD conditions at 68 acre-feet in order to avoid reconstruction of the outfall.

The detention basin was designed for the metered release of stormwater after the flows in the Agua Fria have subsided. The basin was designed to retain the runoff for the 100-year, 2-hour storm under existing conditions in the event that the Agua Fria River was flowing, thereby, preventing any discharge from the basin. The outfall pipe will have a headwall and flapgate at the downstream end in order to prevent backwater from entering the basin and interior drainage system. The outfall pipe was designed to drain the detention basin within a 36 hour period as the flows in the Agua Fria River subsided. It was determined that a 36 inch pipe will have be adequate capacity.

The design flow used for the outfall pipe is the peak outflow based on the PCD 100-year, 2-hour condition as taken from the "CBR-PCDA.DAT" HEC-1 analysis presented in the Interior Drainage report. The peak outflow routed from the basin is 58 cfs. The tailwater condition for the outfall pipe was assumed to be at the top of the pipe at the downstream end (Elevation 1017.0 feet) based on the above design criteria. Results of the hydraulic analysis for the outfall pipe indicate that the basin HGL is at 1022.4 feet which is below the top of basin elevation at 1024.0 feet. The hydraulic analyses for the 36 inch outfall pipe is presented in Appendix B.

C. Sediment Transport

The recommended toe-down elevations were determined by adding the channel adjustment components of long-term degradation, general scour, low-flow incisement, bedform scour, and a safety factor as computed using the worst-case hydraulics described in Section II.B.1, except for long-term degradation. Long-term degradation is computed using 10-year hydraulics and was controlled by armoring. General scour was quantified using the QUASED (QUAsi-dynamic hydraulic and SEDiment routing) computer program developed by SLA. QUASED sediment transport calculations are performed using the Meyer-Peter, Muller bedload equation and Einstein's procedure for integrating suspended load to determine the bed material sediment transport capacity and the change in invert elevation. The safety factor was computed as 30% of the general scour, long-term degradation, and bedform scour. The top-of-bank profile was based on the required freeboard added to the higher SPF water-surface generated from the fixed-bed and moveable-bed models for the worst-case hydraulic condition.

Tables 5,6,7,8 in Appendix C summarize the total magnitude of the scour components for the design conditions evaluated and provides the recommended toe-down and top-of-bank design elevations.

D. Mining

The impacts of in-stream sand and gravel mining can be very significant upstream, downstream, as well as, laterally from the mine site. The magnitude of the impacts is primarily dependent upon the dimensions and volume of the pit. The typical downstream impact is general degradation, while the impact upstream and laterally is generally headcutting.

For the proposed conditions with mining, controlled in-stream mining was assumed to take place in the Agua Fria River, between Camelback Road and the confluence with the New River. The upstream and downstream impacts were accounted for by the QUASED sediment routing computer program. The lateral impact was addressed by controlling the location of the mine pit relative to the proposed levee. To preclude future in-stream sand and gravel mining from impacting the required toe-down for the proposed levee, along the east bank of the Agua Fria River, a minimum setback distance of 100 feet from the levee toe is recommended for a 10-foot mining depth on a 3:1 side slope.

E. Conditional Letter of Map Revision (CLOMR)

A CLOMR submittal was prepared for both the New and Agua Fria Rivers. To support each CLOMR request, SLA prepared a duplicate effective regulatory HEC-2 model, an existing conditions floodplain model, and a proposed conditions floodplain model. The proposed conditions HEC-2 model included a proposed floodway that would meet FEMA encroachment criteria. SLA summarized the changed hydraulics between the effective and the proposed floodplain and floodway; provided mapping for the proposed floodplain/floodway geometry; prepared water-surface profiles; completed the required FEMA forms; and prepared a narrative report.

III. DESIGN

A. Horizontal Control

The horizontal control for this project is based on the results of survey performed by CPA in 1996. All the alignments and vertical datum for the facilities designed with this project are based on the CPA survey. Appendix D illustrates the coordinate geometry performed for the facilities designed with this project. The geometric control sheets provided with the plan set presents a summary mathematical model of the coordinate geometry for the project horizontal control.

B. Levee Vertical Control

1. East Levee Spreadsheet

Appendix E presents the vertical control used to develop the profiles for the east levee. The foundation line profile for the east levee is designed to be at least one foot below the existing ground. The profile grades were established in order minimize grade breaks along the alignment.

The top of levee profile was designed in order to maintain the three feet of freeboard above the Standard Project Flood (SPF) water-surface elevation. The SPF water-surface elevations were defined using a HEC-2 analysis developed by SLA. The top of levee profile was established so that the profile is at or above the freeboard requirement along the entire levee. The profile grades for the top of levee were designed to have the same profile grades as the toe of the levee profile wherever possible.

The levee toe profile was established in the same manner as the top of levee profile. The toe down depths were furnished by SLA and a profile grade was established. There are two critical areas where the toe down depths exceed 20 feet. The locations are at the confluence of the Agua Fria and New Rivers (Station 32+70) and the narrowest point on the New River (Station 42+86). At these locations, the toe down depth was maintained at the design toe down elevation a minimum of 250 feet. The profile grades for the levee toe were designed to have the same profile grades as the top of levee profile wherever possible.

2. Glendale Levee Spreadsheet

Appendix E presents the vertical control used to develop the profiles for the Glendale levee. The foundation line profile for the Glendale levee is designed to be at least one foot below the existing ground. The profile grades were established in order minimize grade breaks along the alignment.

The top of the levee was designed in order to maintain three feet of freeboard above the SPF for the leveed condition along the West Area Wastewater Reclamation Facility (WAWRF). Along the runway extension of the Glendale Airport, only one foot of freeboard is provided since it is not a leveed condition. The engineered fill embankment behind the levee is two to eight feet higher than the top of the soil cement bank protection. The proposed design will save Glendale approximately $70,000 to $100,000 in construction costs. The SPF water-surface elevations were defined using a HEC-2 analysis developed by SLA. The top of levee profile was established so that the profile is at or above the freeboard requirement along the entire length.

The toe down elevations were furnished by SLA and a profile grade was established. There are two critical areas where the toe down depths exceed 20 feet. These locations are at the confluence of the Agua Fria River and New River (Station 16+56) and the narrowest point on the New River (Station 29+90). At these locations, the toe down for the levee was maintained through most of the adjacent curves.

C. Supporting Design Calculations

1. Terminations

The top of levee at the south end of the Camelback Ranch levee will tie into the existing Camelback Road embankment. The toe of the soil cement will be brought up at a 2 to 1 slope and tie into the roadway embankment.

The west end of the Glendale levee will terminate on the Agua Fria River. The soil cement will tie back into the existing high ground using a sixty foot radius curve. The soil cement will be full depth for a distance of 50 feet into the curve. The top of the soil cement will the come down to the design toe elevation at a two to one slope. The proposed design should prevent the soil cement levee from being outflanked during the design flood event on the Agua Fria River.

2. Ties to Existing Levees

<u>Camelback Ranch Levee - North</u> (East Levee)

There is an existing soil cement levee with a handrail at the north end of the east levee. The top of levee will tie into the existing grades and the toe down will be brought up at a 2 to 1 slope to the existing soil cement slope. Modifications will be required of the existing handrail.

<u>Glendale Levee</u>

The Glendale levee ties to the existing gabion basket bank protection at the northeast end of the alignment. It is proposed that the gabion baskets be cut and tied vertically down the slope at station 38+45± and the existing gabion baskets on the slope be removed to the south and west. The soil cement would then be constructed at a two to one slope from the toe elevation to match the existing top of levee at station 38+40±. Using rock salvaged from the gabion baskets, grouted riprap can be placed at the interface between the gabion baskets and the soil cement. The grouting operation should overlap into the existing gabions to secure the downstream end of the baskets. Appendix F presents the as-builts for the existing Glendale levee gabion bank protection system.

3. Glendale Airport Outfall Channel Confluence

A simple open channel confluence concept is presented in the plans for the Glendale Airport Outfall Channel at the Glendale Levee. The levee wraps back up the outfall channel using 60 foot radius curves while transitioning from a 1 to 1 slope face on the New River to a 4:1 on the outfall channel over the length of the curve. The soil cement is then proposed to terminate at the outfall channel invert at a point upstream of the levee curve point of tangent at a maximum 2 to 1 slope. The toe of the soil cement on the river side of the outfall channel will be constructed to the toe elevation required by the New River hydraulic and scour analyses. Local scour will also be checked regarding the soil cement toe elevation on the river side of the outfall for the final construction plans.

4. Bethany Home Outfall Channel Confluence

The proposed Bethany Home Outfall Channel (BHOC) is illustrated on the Camelback Ranch Levee – North plan and profile sheet. The location of the channel is based on a preliminary design for the Agua Fria Freeway. The design is being prepared for ADOT by BRW in association with De Leuw, Cather. Coordination with the ADOT design team will continue throughout the design of this project. The east levee ramps were reconfigured in order to avoid conflicts with the BHOC outfall channel.

5. Maintenance Features

Maintenance roads sixteen feet wide are provided at the top of the levees and the Glendale Airport Outlet Channel. Maintenance roads and ramps are presented for the detention basin which provide access from Camelback Road to the top and invert of the basin. River invert access ramps are located at Station 27+00 and Station 75+40 just south of the BHOC confluence.

D. Quantities

The Construction Cost Estimate is prepared on three separate spreadsheets. The first being the construction costs associated with the Camelback Ranch levee, the second being the construction costs associated with the Glendale Levee and the New River channelization and the final spreadsheet will summarize the construction costs the entire project. Quantities for the 100% design are presented in Appendix G.

E. Earthwork

Earthwork is calculated independently for the Camelback Ranch levee, detention basin, Glendale levee, Glendale Airport Outfall Channel, the engineered fill for the extension of the Glendale Airport runway, and the New River channel excavation. A summary of earthwork for the entire project is also presented. The calculations include shrinkage and ground compaction factors. Earthwork for the 100% design are presented in Appendix H.

F. Geotechnical Investigations

1. Camelback Ranch Levee

The geotechnical investigation for the Camelback Ranch levee was performed by ATL, Inc. in 1996. ATL has since revised there recommendation regarding the foundation excavation and backfill. ATL recommended that the levee foundation be scarified and proof rolled. It was not recommended that the foundation be excavated four feet and backfilled prior to constructing the levee embankment. ATL recommends a ground compaction factor of 0.30 feet for the Camelback Ranch Levee and detention basin. Shrinkage of this material for use in embankment is estimated at 10% by ATL.

2. Glendale Levee and New River Channelization

The geotechnical investigation for the Glendale Municipal Airport levee was performed by ATL, Inc. in 1998. ATL recommends that the levee foundation be scarified and proof rolled. ATL did not considered necessary to overexcavate for the levee foundation. Based on ATL's geotechnical investigations, the material excavated from the channelization of the New River is suitable for the use of aggregate for soil cement and embankment for the project. ATL recommends a ground compaction factor of 0.25 feet for the Glendale levee around the airport and for the engineered fill for the runway extension. Shrinkage for the material originating from New River channel for use in embankment is estimated at 5% by ATL.

3. Glendale West Area Wastewater Reclamation Facility Levee

The geotechnical investigation for the Glendale Municipal Airport levee was performed by ATL, Inc. in 1998. ATL recommends that the levee foundation be scarified and proof rolled. ATL did not consider it necessary to overexcavate for the levee foundation. ATL recommends a ground compaction factor of 0.35 feet for the Glendale levee adjacent to the WAWRF. Shrinkage of this material for use in embankment is estimated at 5% by ATL.

4. Soil Cement

ATL recommends an 11 percent cement content, by weight, for the construction of the soil cement levee and channel components of the project. Through the Value Engineering Analysis, it was determined that the specification for cement content be revised to 10 percent for this project since the FCDMC will control the mix proportions.

IV. REFERENCES

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APPENDIX A

HYDROLOGY

Table 1 **Hydrology for Agua Fria River and New River (Without New Waddell Dam)**

Return Period (years)	Agua Fria River d/s of the New River confluence (cfs)	Agua Fria River u/s of the New River confluence (cfs)	New River near the Agua Fria River confluence (cfs)	New River u/s of the Bethany Home Outfall Channel (cfs)
10	23,000	18,000	12,500	12,500
100	95,000	90,000	39,000	39,000
SPF	142,000	135,000	71,300 (1)	69,000

(1) 2,300 cfs added due to Bethany Home Outfall Channel

APPENDIX B

HYDRAULICS

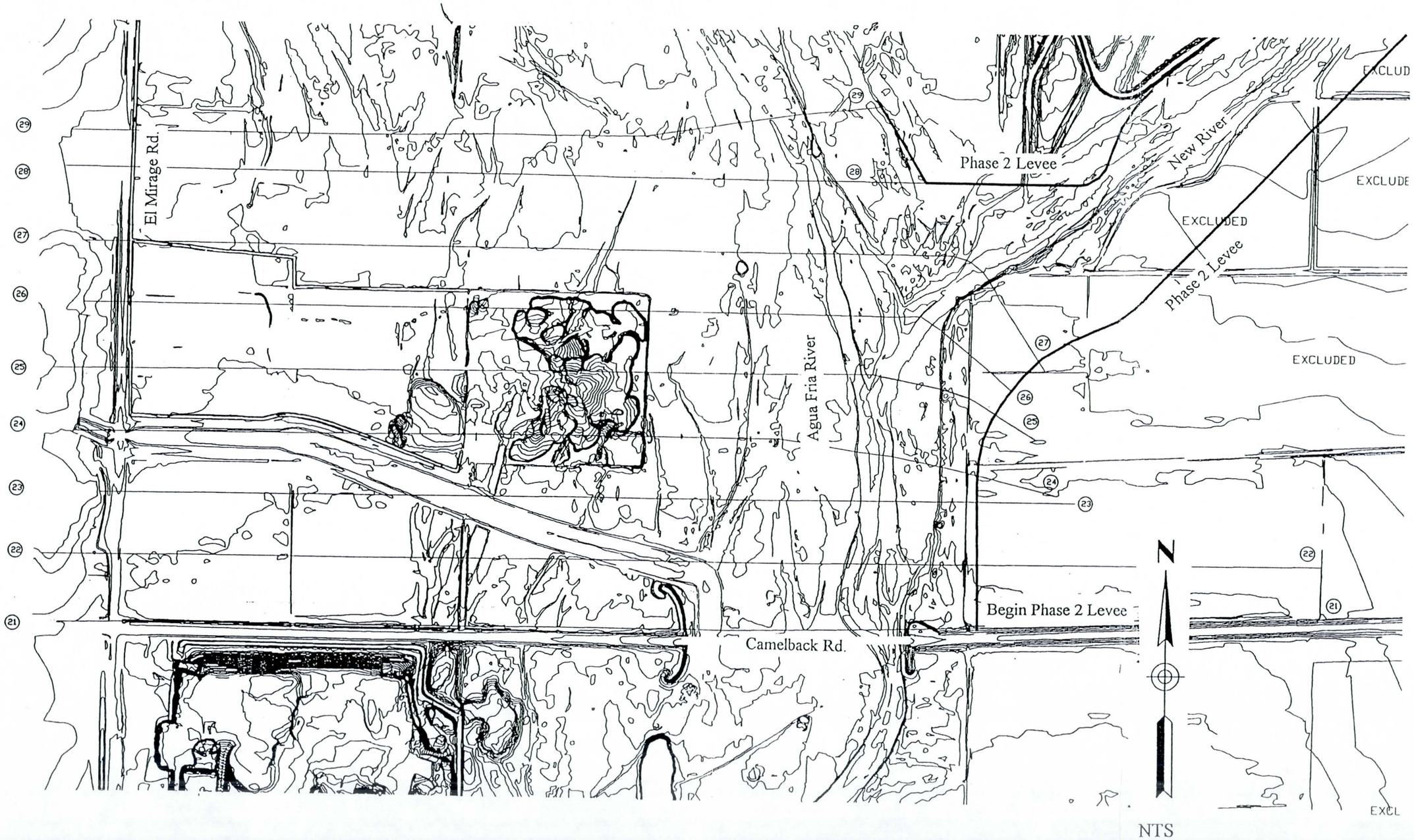


Figure 1. Cross-Section Locations for the Agua Fria River

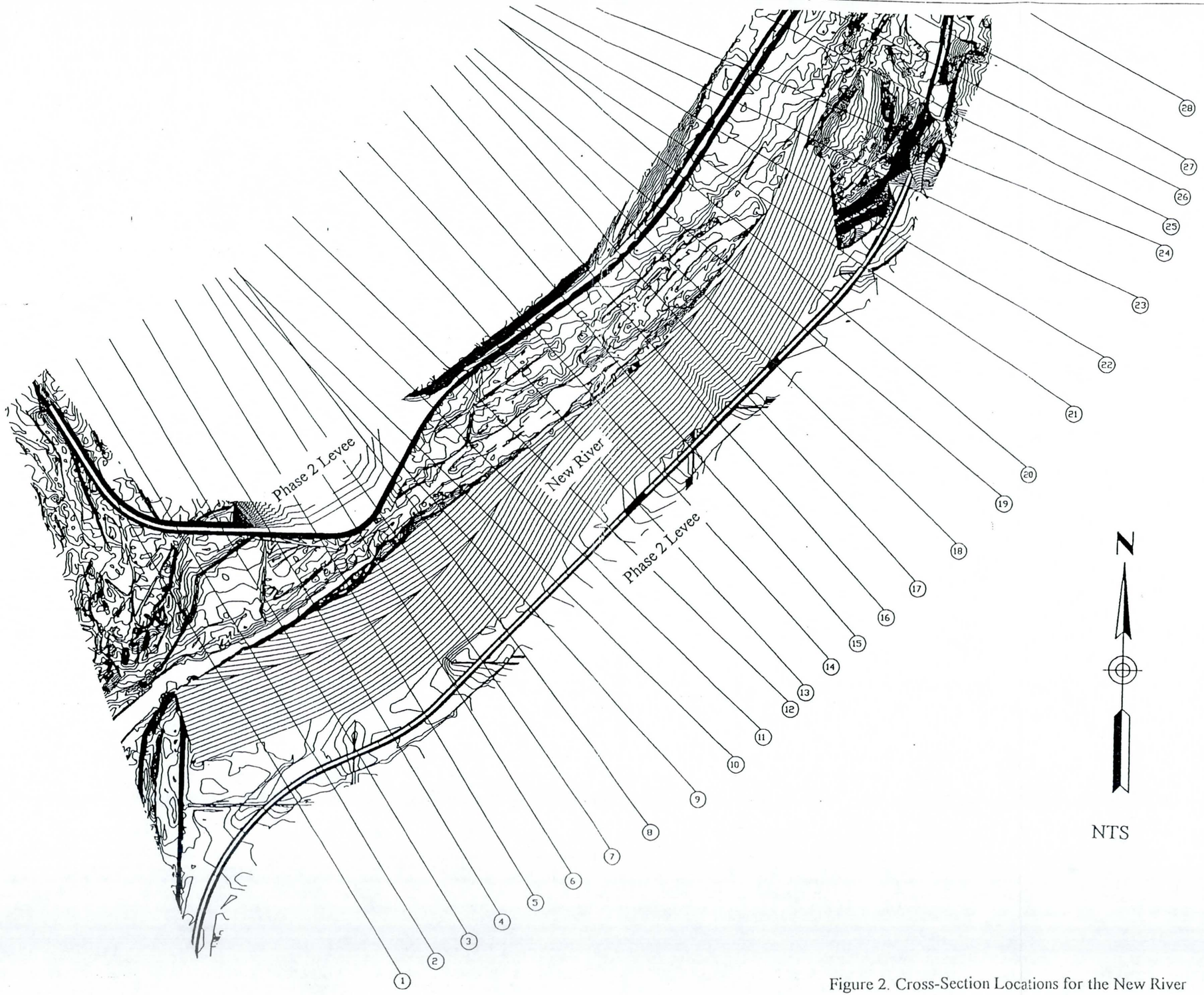


Figure 2. Cross-Section Locations for the New River

Table 2 **Hydraulic Summary Table for Agua Fria River Camelback Ranch Levee - Phase 2 (No Mining)**

DMJM East-Levee Control Line	DMJM West-Levee Control Line	HEC2 Section No.	Q (cfs)	CWSEL (ft)	VCH (ft/s)	DEPTH (ft)	TOPWID (ft)	10*KS (ft/ft)	ELMIN (ft)	FRCH	Remarks
											Start Phase 2 East Levee
10+50		21	23000	1020.1	4.4	8.1	1671	14.9	1012.0	0.4	10-year hydraulics
		21	95000	1023.7	8.4	11.7	1696	20.3	1012.0	0.6	100-year hydraulics
		21	142000	1025.5	10.0	13.5	1708	21.0	1012.0	0.6	SPF hydraulics
15+50		22	23000	1021.0	4.2	7.0	1964	15.4	1014.0	0.5	
		22	95000	1025.1	6.5	11.1	2451	13.5	1014.0	0.5	
		22	142000	1027.1	7.3	13.1	2475	11.8	1014.0	0.5	
20+38		23	23000	1021.8	5.5	5.8	1593	30.3	1016.0	0.6	
		23	95000	1025.8	7.5	9.8	2784	25.9	1016.0	0.6	
		23	142000	1027.7	7.7	11.7	3078	17.6	1016.0	0.5	
24+78		24	23000	1022.8	3.4	4.8	2143	8.5	1018.0	0.4	
		24	95000	1027.0	5.0	9.0	3616	9.3	1018.0	0.4	
		24	142000	1028.7	5.7	10.7	3634	8.5	1018.0	0.4	
27+51		25	23000	1023.3	3.7	5.3	2171	12.0	1018.0	0.5	
		25	95000	1027.5	5.4	9.5	3668	13.2	1018.0	0.5	
		25	142000	1029.1	5.9	11.1	4201	11.9	1018.0	0.4	
29+31		26	23000	1023.8	3.2	5.8	2043	6.8	1018.0	0.4	
		26	95000	1028.2	4.6	10.2	4941	10.3	1018.0	0.4	
		26	142000	1029.8	5.0	11.8	5008	8.3	1018.0	0.4	
32+80		27	23000	1025.2	8.4	5.2	1268	101.7	1020.0	1.2	End of Phase 2 East Levee
		27	95000	1029.3	6.3	9.3	5727	44.3	1020.0	0.7	in the Agua Fria system
		27	142000	1030.7	6.0	10.7	6797	28.3	1020.0	0.6	
	7+50	28	18005	1027.9	3.6	7.9	1483	10.2	1020.0	0.5	Phase 2 Levee
		28	90015	1031.4	4.4	11.4	6908	18.5	1020.0	0.5	Upstream of New River
		28	135000	1032.3	5.0	12.3	7538	18.7	1020.0	0.5	
	0+50	29	18005	1028.9	8.4	4.9	993	141.5	1024.0	1.5	
		29	90015	1032.7	6.2	8.7	5787	63.2	1024.0	0.7	
		29	135000	1033.5	7.1	9.5	5793	57.6	1024.0	0.7	

Table 3 Hydraulic Summary Table for New River Camelback Ranch Levee - Phase 2

DMJM East-Levee Control Line	HEC2 Section No.	Q (cfs)	CWSEL (ft)	VCH (ft/s)	DEPTH (ft)	TOPWID (ft)	10*KS (ft/ft)	ELMIN (ft)	FRCH	Remarks
33+00	1	12500	1025.2	6.6	5.7	577	48.5	1019.5	0.6	10-year hydraulics
	1	39000	1029.3	6.7	9.8	1574	43.0	1019.5	0.6	100-year hydraulics
	1	71300	1030.7	8.9	11.2	1624	53.0	1019.5	0.7	SPF hydraulics
34+50	2	12500	1026.3	4.4	6.8	846	20.8	1019.5	0.4	
	2	39000	1030.2	5.3	10.7	1406	16.7	1019.5	0.4	
	2	71300	1031.8	7.3	12.3	1413	22.6	1019.5	0.5	
36+50	3	12500	1026.7	4.1	7.2	909	18.4	1019.5	0.4	
	3	39000	1030.5	5.5	11.0	1304	17.4	1019.5	0.4	
	3	71300	1032.2	7.6	12.7	1312	23.1	1019.5	0.5	
38+50	4	12500	1027.1	4.3	7.1	885	21.5	1020.0	0.4	
	4	39000	1030.8	5.8	10.8	1203	18.8	1020.0	0.4	
	4	71300	1032.6	8.0	12.6	1211	24.5	1020.0	0.5	
40+80	5	12500	1027.5	4.9	7.0	767	27.5	1020.5	0.5	
	5	39000	1031.1	6.8	10.6	1062	27.0	1020.5	0.5	
	5	71300	1033.0	9.2	12.5	1070	33.8	1020.5	0.6	
43+00	6	12500	1028.1	5.5	7.6	689	34.4	1020.5	0.5	
	6	39000	1031.6	7.7	11.1	938	34.4	1020.5	0.6	
	6	71300	1033.5	10.3	13.0	945	42.2	1020.5	0.7	
44+80	7	12500	1028.7	5.4	6.7	714	33.2	1022.0	0.5	
	7	39000	1032.2	7.6	10.2	928	32.6	1022.0	0.6	
	7	71300	1034.3	10.0	12.3	937	37.5	1022.0	0.6	
46+80	8	12500	1029.3	4.6	6.3	784	22.8	1023.0	0.4	
	8	39000	1032.9	6.6	9.9	979	22.4	1023.0	0.5	
	8	71300	1035.3	8.7	12.3	989	24.9	1023.0	0.5	
48+50	9	12500	1029.6	4.3	6.6	795	17.8	1023.0	0.4	
	9	39000	1033.2	6.3	10.2	994	19.6	1023.0	0.5	
	9	71300	1035.7	8.3	12.7	1004	21.8	1023.0	0.5	
50+50	10	12500	1029.9	4.0	6.9	811	15.0	1023.0	0.4	
	10	39000	1033.6	6.0	10.6	1032	17.5	1023.0	0.4	
	10	71300	1036.1	7.8	13.1	1042	19.0	1023.0	0.5	
52+50	11	12500	1030.2	3.9	6.7	814	13.8	1023.5	0.4	
	11	39000	1034.0	5.9	10.5	1072	16.9	1023.5	0.4	
	11	71300	1036.6	7.5	13.1	1086	17.6	1023.5	0.5	
54+00	12	12500	1030.5	4.3	6.0	784	17.9	1024.5	0.4	
	12	39000	1034.3	6.2	9.8	1019	19.1	1024.5	0.4	
	12	71300	1036.9	7.8	12.4	1092	20.2	1024.5	0.5	
56+50	13	12500	1030.9	4.7	6.4	739	22.5	1024.5	0.4	
	13	39000	1034.7	6.7	10.2	937	21.9	1024.5	0.5	
	13	71300	1037.3	8.4	12.8	1050	23.9	1024.5	0.5	

10/23/98

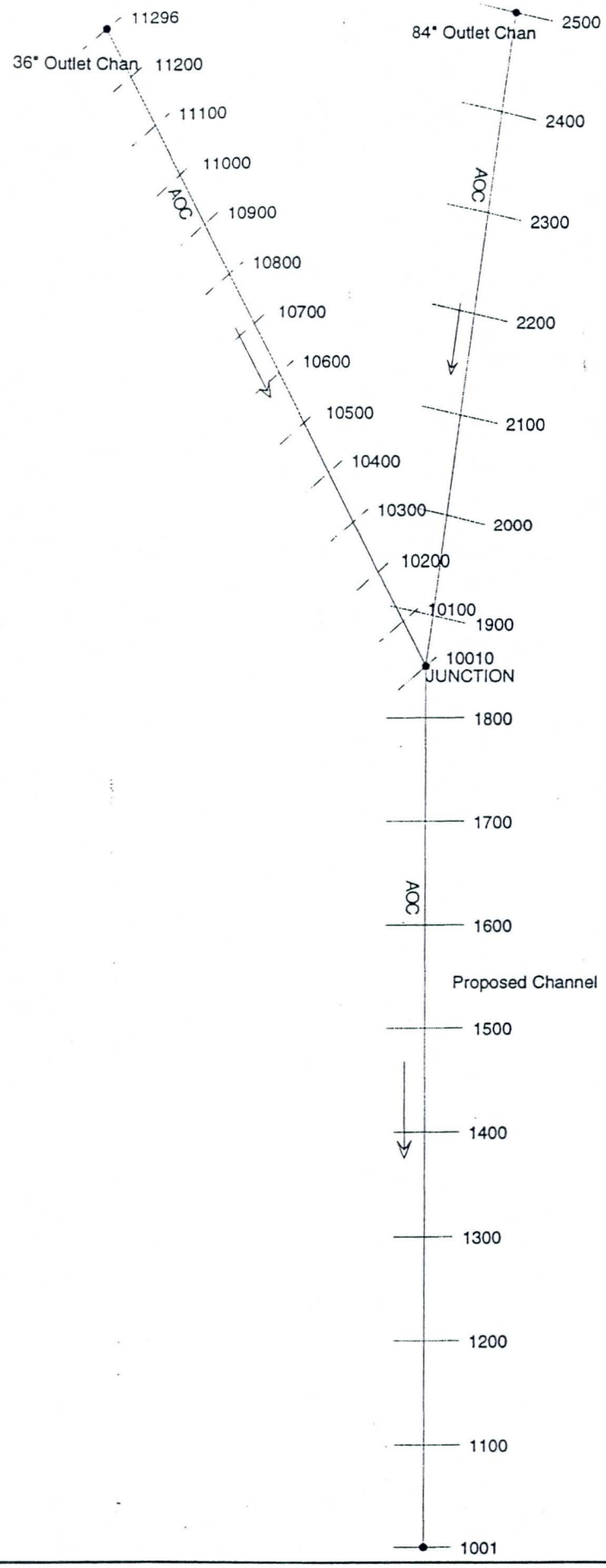
Table 3 (continued) **Hydraulic Summary Table for New River Camelback Ranch Levee - Phase 2**

DMJM East-Levee Control Line	HEC2 Section No.	Q (cfs)	CWSEL (ft)	VCH (ft/s)	DEPTH (ft)	TOPWID (ft)	10*KS (ft/ft)	ELMIN (ft)	FRCH	Remarks
58+50	14	12500	1031.4	5.0	6.4	722	25.7	1025.0	0.5	
	14	39000	1035.1	7.0	10.1	919	24.4	1025.0	0.5	
	14	71300	1037.8	8.7	12.8	1022	26.0	1025.0	0.5	
60+50	15	12500	1031.9	4.9	6.9	726	25.1	1025.0	0.5	
	15	39000	1035.6	6.9	10.6	923	24.1	1025.0	0.5	
	15	71300	1038.3	8.7	13.3	990	25.2	1025.0	0.5	
62l+50	16	12500	1032.4	4.8	6.4	709	22.5	1026.0	0.4	
	16	39000	1036.1	7.0	10.1	900	23.8	1026.0	0.5	
	16	71300	1038.8	8.8	12.8	966	25.1	1026.0	0.5	
64+50	17	12500	1032.9	5.0	5.9	700	24.7	1027.0	0.5	
	17	39000	1036.6	7.1	9.6	886	24.9	1027.0	0.5	
	17	71300	1039.3	8.9	12.3	949	26.0	1027.0	0.5	
66+50	18	12500	1033.4	5.0	5.9	700	25.3	1027.5	0.5	
	18	39000	1037.1	7.1	9.6	899	25.3	1027.5	0.5	
	18	71300	1039.8	8.9	12.3	946	25.5	1027.5	0.5	
68+80	19	12500	1033.9	5.1	5.9	690	26.0	1028.0	0.5	
	19	39000	1037.6	7.2	9.6	885	26.1	1028.0	0.5	
	19	71300	1040.3	8.9	12.3	967	26.6	1028.0	0.6	
70+70	20	12500	1034.4	5.1	5.9	700	26.8	1028.5	0.5	
	20	39000	1038.1	7.2	9.6	896	26.0	1028.5	0.5	
	20	71300	1040.9	8.7	12.4	1000	25.7	1028.5	0.5	
73+20	21	12500	1034.9	5.8	4.9	681	39.3	1030.0	0.6	
	21	39000	1038.6	7.7	8.6	904	33.6	1030.0	0.6	
	21	71300	1041.4	9.1	11.4	1023	31.0	1030.0	0.6	
75+80	22	12500	1035.7	3.5	7.2	945	11.8	1028.5	0.3	
	22	39000	1039.4	5.4	10.9	976	11.4	1028.5	0.4	
	22	71300	1042.3	7.1	13.8	1019	13.2	1028.5	0.4	
78+20	23	12500	1035.9	3.2	6.4	869	7.4	1029.5	0.3	Bethany Home Outfall
	23	39000	1039.7	5.4	10.2	898	9.8	1029.5	0.3	
	23	69000	1042.6	6.9	13.1	986	12.0	1029.5	0.4	
80+50	24	12500	1036.0	3.3	7.5	873	8.2	1028.5	0.3	
	24	39000	1039.9	5.4	11.4	908	10.1	1028.5	0.3	
	24	69000	1042.8	6.9	14.3	936	11.4	1028.5	0.4	
82+54	25	12500	1036.3	4.1	5.3	822	15.6	1031.0	0.4	
	25	39000	1040.1	6.2	9.1	838	14.8	1031.0	0.4	
	25	69000	1043.0	7.9	12.0	850	15.6	1031.0	0.4	

Table 4 Comparison of Freeboard Upstream of Bethany Home Road for the Existing and Proposed Conditions, New River

HEC2 Section No.		TOB Existing Levee (ft)		CWSEL Proposed (1) (ft)	FB Proposed (ft)		CWSEL Existing (ft)	FB Existing (ft)	Remarks
									SPF=69,000 cfs
25		1045.0		1043.0	2.0		1043.9	1.1	Begin Existing Levee
26		1045.3		1043.2	2.2		1044.0	1.3	
27		1045.7		1043.4	2.3		1044.3	1.4	
28		1046.3		1044.0	2.3		1044.5	1.7	
29		1048.1		1045.1	3.0		1045.3	2.7	
30		1049.4		1046.2	3.2		1046.3	3.1	
31		1050.5		1048.8	1.7		1048.9	1.7	
32		1051.6		1049.0	2.7		1049.0	2.6	
33		1052.0		1050.1	1.9		1050.1	1.9	
34		1052.0		1050.3	1.7		1050.3	1.7	
35		1052.0		1051.0	1.0		1051.1	0.9	
36		1053.3		1051.3	1.9		1051.4	1.9	

(1) SPF=71,300 cfs below BHOC

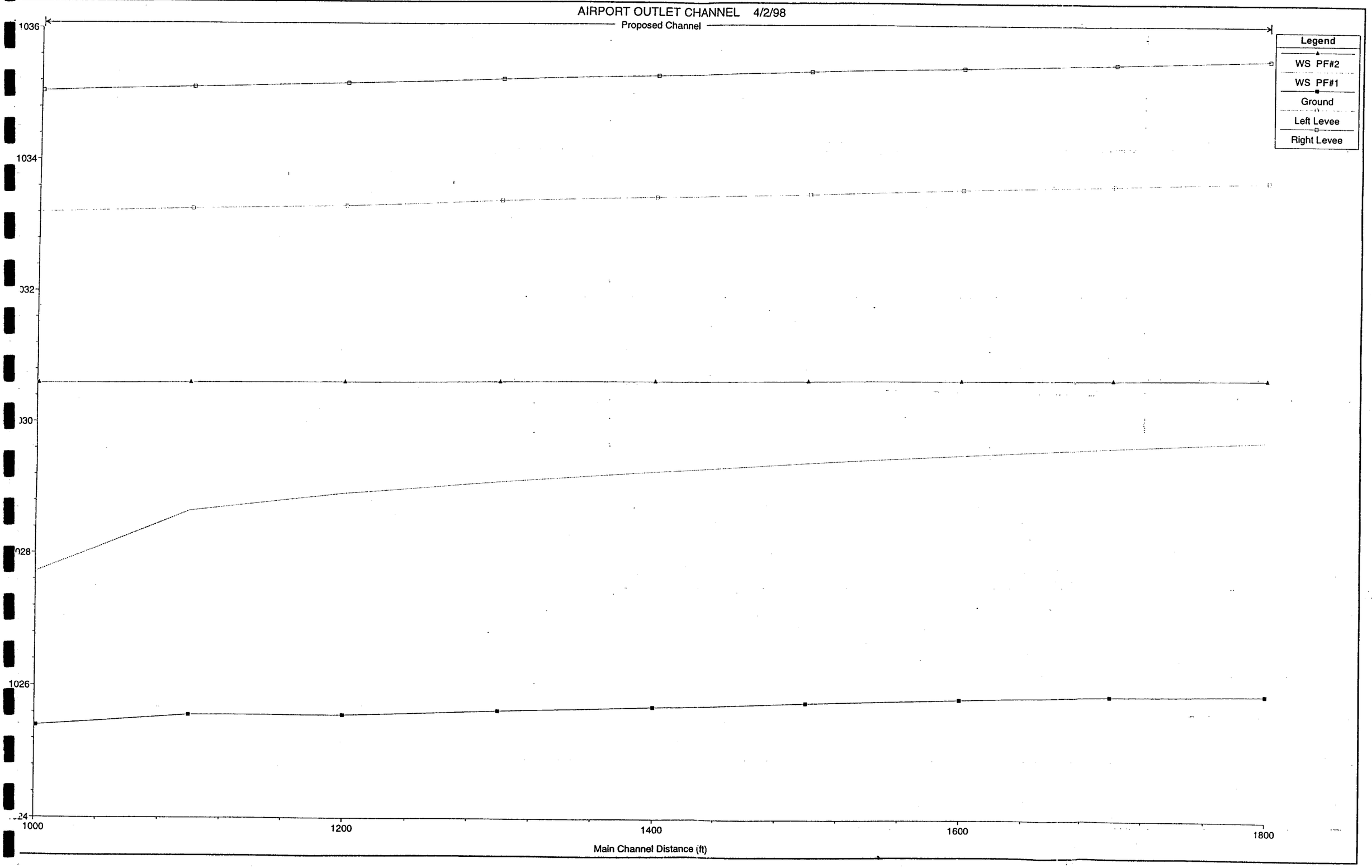

11296
36" Outlet Chan
11200
11100
11000
AOC
10900
10800
10700
10600
10500
10400
10300
10200
10100
10010
JUNCTION
84" Outlet Chan
2500
2400
AOC
2300
2200
2100
2000
1900
1800
1700
AOC
1600
Proposed Channel
1500
1400
1300
1200
1100
1001

HEC-RAS Plan: AOC

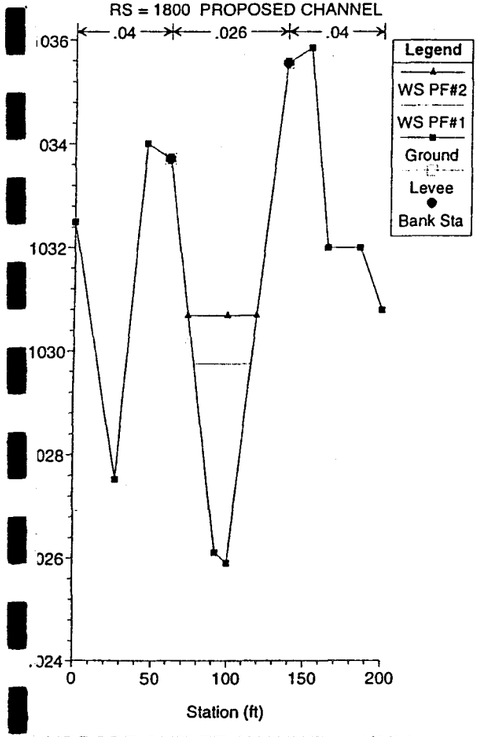
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Max Chl Dpth	Top Width
		(cfs)	(ft)	(ft)	(ft)	(ft)
84" Outlet Chan	2500	230.00	1025.49	1029.92	4.43	40.94
84" Outlet Chan	2500	144.50	1025.49	1030.73	5.24	45.41
84" Outlet Chan	2400	230.00	1026.00	1029.95	3.95	84.73
84" Outlet Chan	2400	144.50	1026.00	1030.73	4.73	120.57
84" Outlet Chan	2300	230.00	1026.00	1029.94	3.94	77.16
84" Outlet Chan	2300	144.50	1026.00	1030.73	4.73	83.98
84" Outlet Chan	2200	230.00	1026.00	1029.93	3.93	78.48
84" Outlet Chan	2200	144.50	1026.00	1030.73	4.73	85.26
84" Outlet Chan	2100	230.00	1024.00	1029.93	5.93	80.42
84" Outlet Chan	2100	144.50	1024.00	1030.73	6.73	87.27
84" Outlet Chan	2000	230.00	1024.00	1029.92	5.92	78.09
84" Outlet Chan	2000	144.50	1024.00	1030.73	6.73	145.34
84" Outlet Chan	1900	230.00	1026.00	1029.91	3.91	93.66
84" Outlet Chan	1900	144.50	1026.00	1030.73	4.73	110.07
36" Outlet Chan	11296	29.00	1032.00	1033.09	1.09	13.63
36" Outlet Chan	11296	29.00	1032.00	1033.09	1.09	13.63
36" Outlet Chan	11200	29.00	1032.00	1032.87	0.87	25.18
36" Outlet Chan	11200	29.00	1032.00	1032.87	0.87	25.18
36" Outlet Chan	11100	29.00	1032.00	1032.35	0.35	27.36
36" Outlet Chan	11100	29.00	1032.00	1032.35	0.35	27.36
36" Outlet Chan	11000	29.00	1030.00	1031.19	1.19	20.11
36" Outlet Chan	11000	29.00	1030.00	1031.20	1.20	20.18
36" Outlet Chan	10900	29.00	1030.00	1031.00	1.00	22.80
36" Outlet Chan	10900	29.00	1030.00	1031.02	1.02	22.98
36" Outlet Chan	10800	29.00	1030.00	1030.85	0.85	27.93
36" Outlet Chan	10800	29.00	1030.00	1030.88	0.88	28.26
36" Outlet Chan	10700	29.00	1030.00	1030.35	0.35	27.31
36" Outlet Chan	10700	29.00	1030.00	1030.74	0.74	31.48
36" Outlet Chan	10600	29.00	1028.00	1029.94	1.94	26.00
36" Outlet Chan	10600	29.00	1028.00	1030.73	2.73	34.44

HEC-RAS Plan: AOC (Continued)

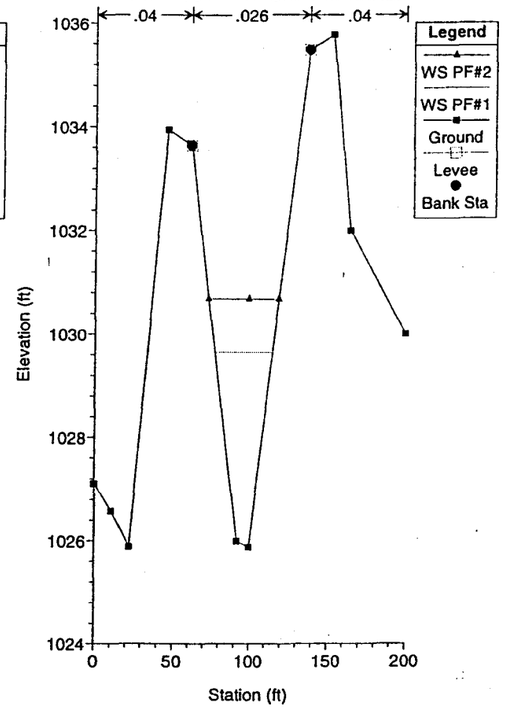
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Max Chl Dpth	Top Width
		(cfs)	(ft)	(ft)	(ft)	(ft)
36" Outlet Chan	10500	29.00	1028.00	1029.92	1.92	31.86
36" Outlet Chan	10500	29.00	1028.00	1030.73	2.73	40.22
36" Outlet Chan	10400	29.00	1028.00	1029.91	1.91	32.11
36" Outlet Chan	10400	29.00	1028.00	1030.73	2.73	40.17
36" Outlet Chan	10300	29.00	1028.00	1029.90	1.90	44.06
36" Outlet Chan	10300	29.00	1028.00	1030.72	2.72	67.46
36" Outlet Chan	10200	29.00	1026.00	1029.90	3.90	45.34
36" Outlet Chan	10200	29.00	1026.00	1030.72	4.72	53.78
36" Outlet Chan	10100	29.00	1026.00	1029.90	5.90	100.10
36" Outlet Chan	10100	29.00	1026.00	1030.72	6.72	104.11
36" Outlet Chan	10010	29.00	1026.00	1029.90	3.90	90.55
36" Outlet Chan	10010	29.00	1026.00	1030.72	4.72	110.95
Proposed Channel	1800	259.00	1025.90	1029.75	3.85	37.87
Proposed Channel	1800	173.50	1025.90	1030.69	4.79	45.39
Proposed Channel	1700	259.00	1025.88	1029.65	3.77	37.56
Proposed Channel	1700	173.50	1025.88	1030.68	4.80	45.80
Proposed Channel	1600	259.00	1025.82	1029.53	3.71	36.97
Proposed Channel	1600	173.50	1025.82	1030.66	4.84	46.07
Proposed Channel	1500	259.00	1025.76	1029.40	3.64	36.53
Proposed Channel	1500	173.50	1025.76	1030.65	4.89	46.52
Proposed Channel	1400	259.00	1025.69	1029.26	3.86	35.79
Proposed Channel	1400	173.50	1025.69	1030.64	5.24	46.85
Proposed Channel	1300	259.00	1025.63	1029.10	3.47	35.09
Proposed Channel	1300	173.50	1025.63	1030.62	4.99	47.29
Proposed Channel	1200	259.00	1025.56	1028.91	3.35	34.22
Proposed Channel	1200	173.50	1025.56	1030.61	5.05	47.82
Proposed Channel	1100	259.00	1025.56	1028.65	3.09	32.44
Proposed Channel	1100	173.50	1025.56	1030.60	5.04	48.11
Proposed Channel	1001	259.00	1025.40	1027.72	2.32	25.73
Proposed Channel	1001	173.50	1025.40	1030.59	5.19	48.64


AIRPORT OUTLET CHANNEL 4/2/98
Proposed Channel
Legend
WS PF#2
WS PF#1
Ground
Left Levee
Right Levee
1036
1034
032
030
028
1026
024
1000
1200
1400
1600
1800
Main Channel Distance (ft)

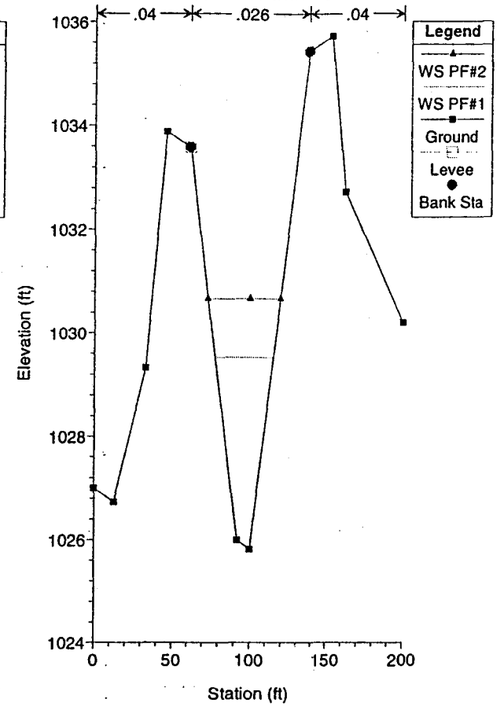
AIRPORT OUTLET CHANNEL 4/2/98
RS = 1800 PROPOSED CHANNEL



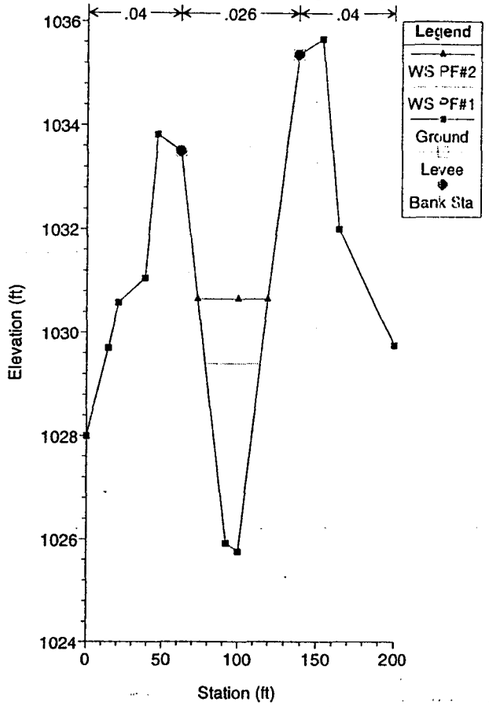
AIRPORT OUTLET CHANNEL 4/2/98
RS = 1700 PROPOSED CHANNEL



AIRPORT OUTLET CHANNEL 4/2/98
RS = 1600 PROPOSED CHANNEL



AIRPORT OUTLET CHANNEL 4/2/98
RS = 1500 PROPOSED CHANNEL



AIRPORT OUTLET CHANNEL 4/2/98
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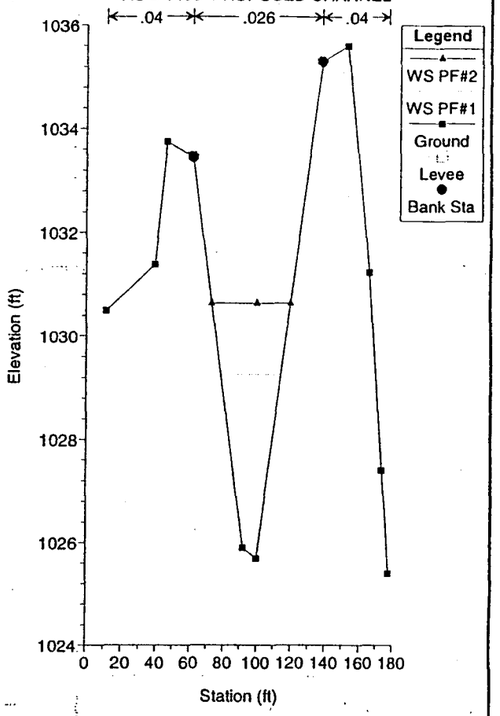

AIRPORT OUTLET CHANNEL 4/2/98
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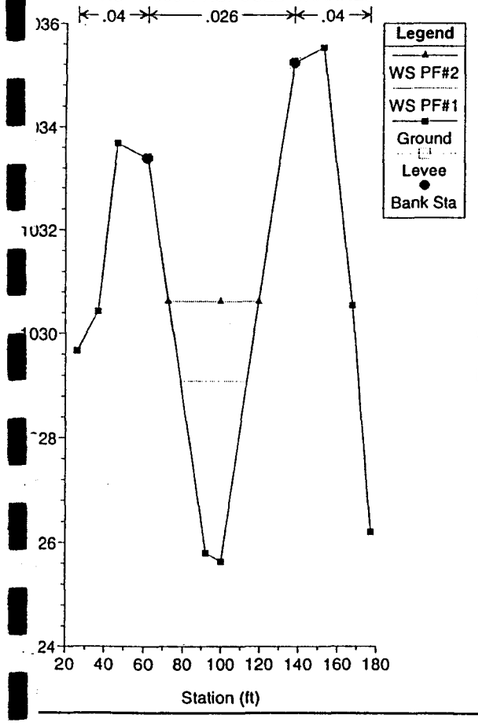

AIRPORT OUTLET CHANNEL 4/2/98
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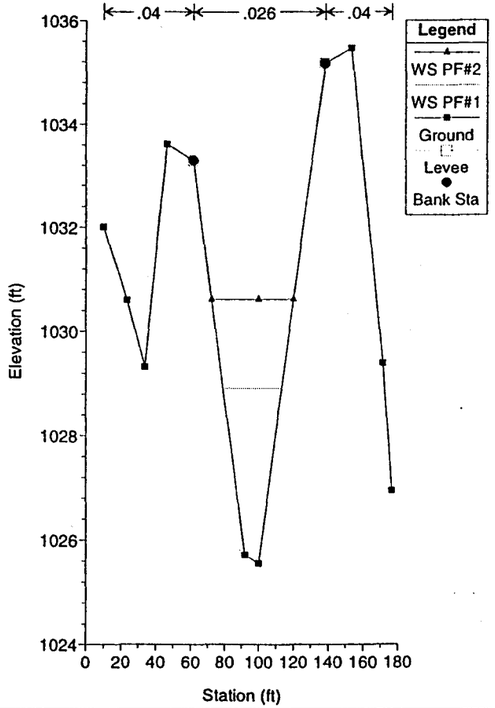

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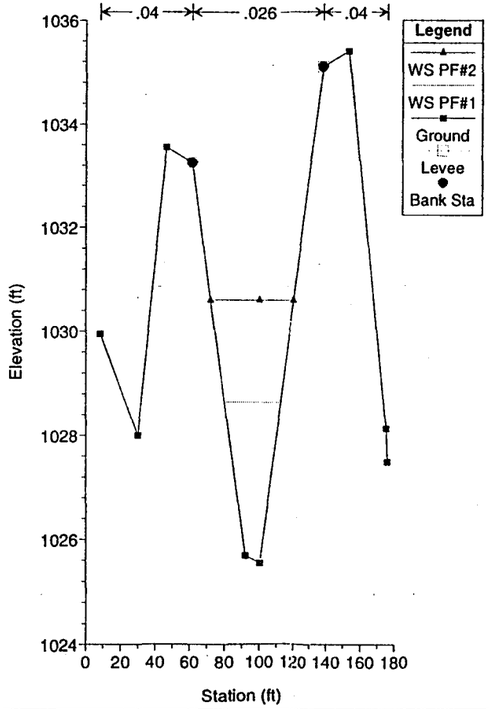

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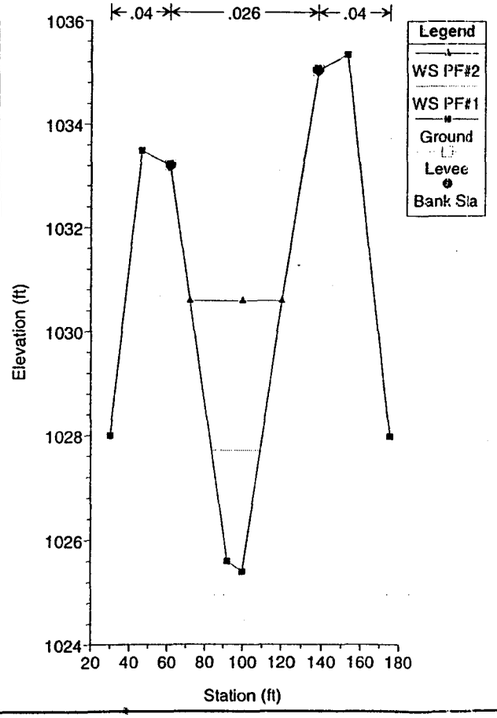

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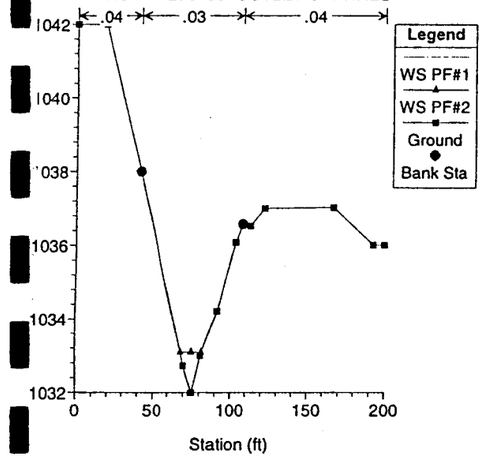

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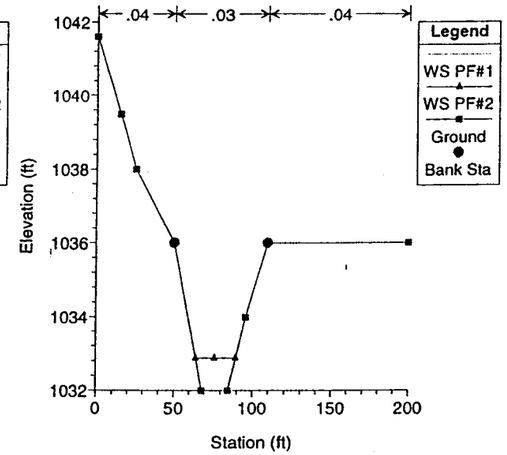

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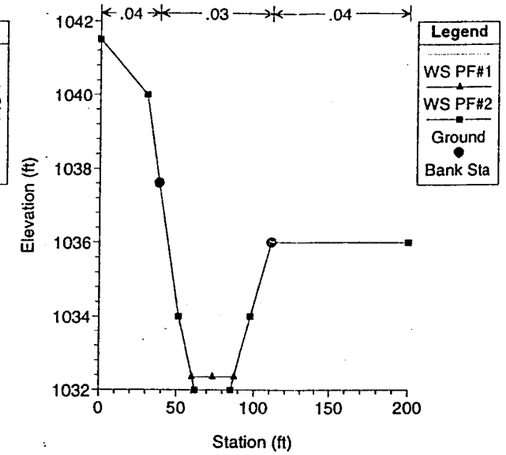

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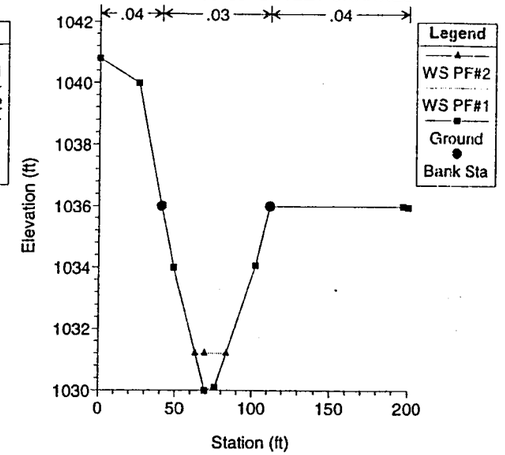

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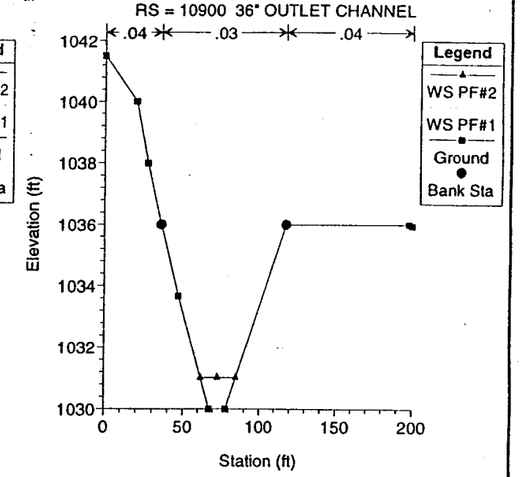

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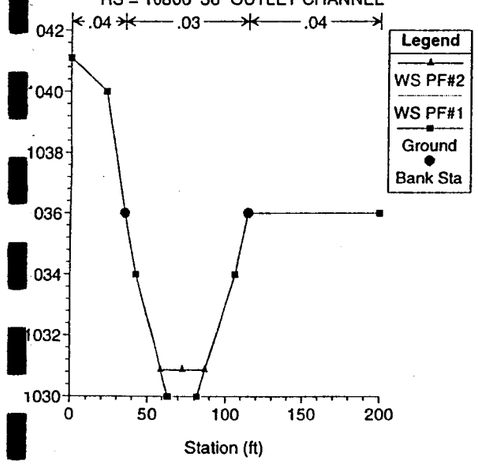

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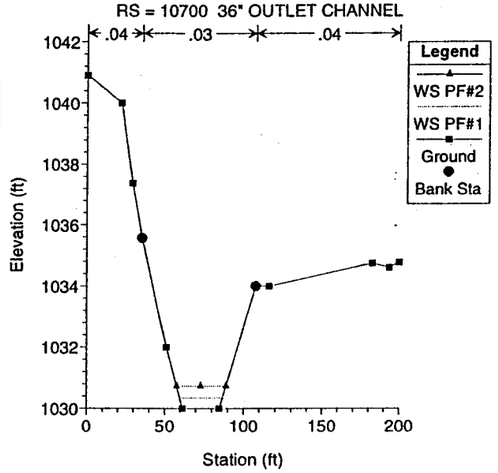

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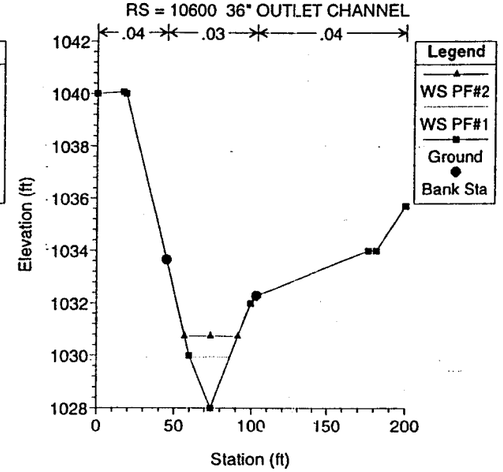

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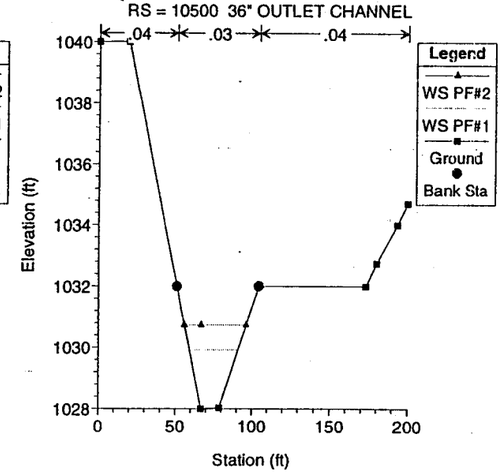

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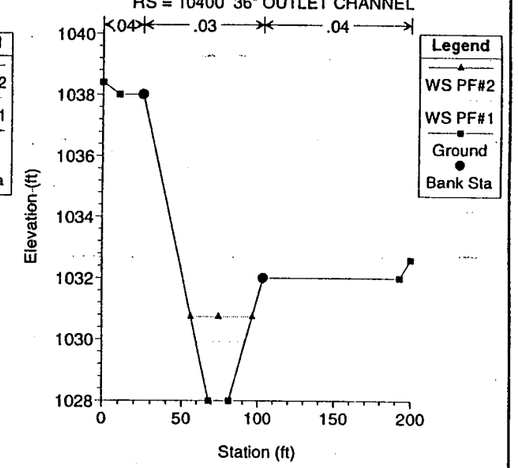

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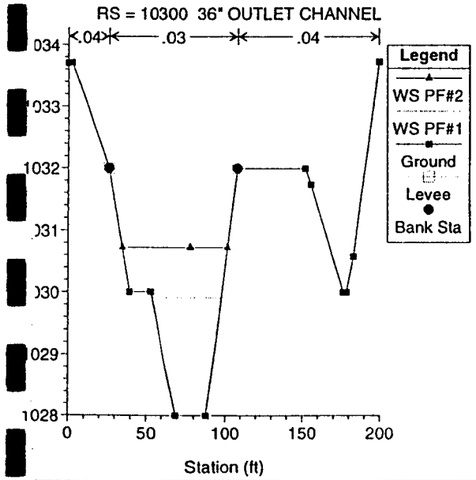

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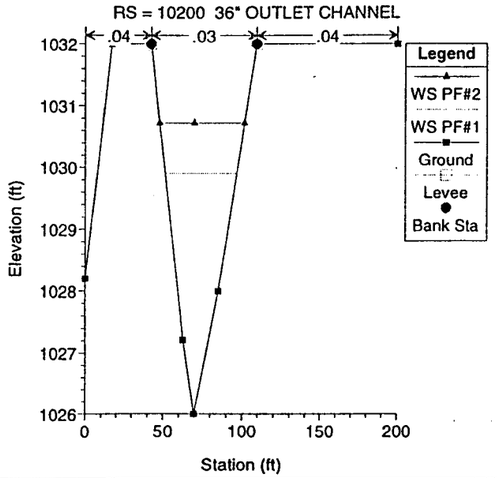

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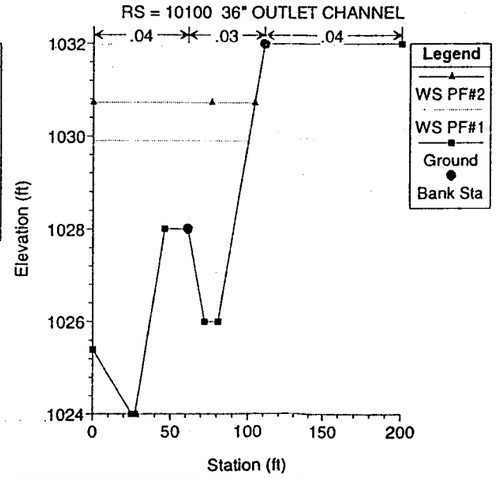

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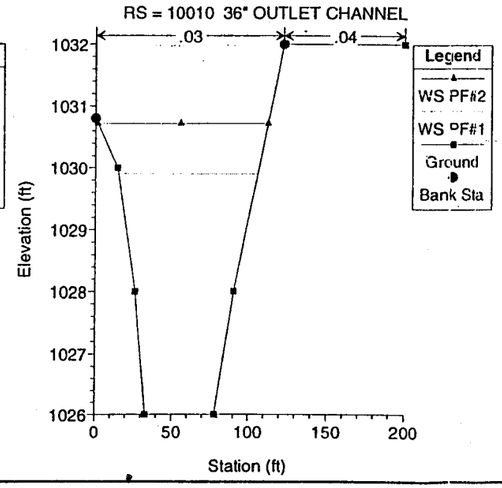

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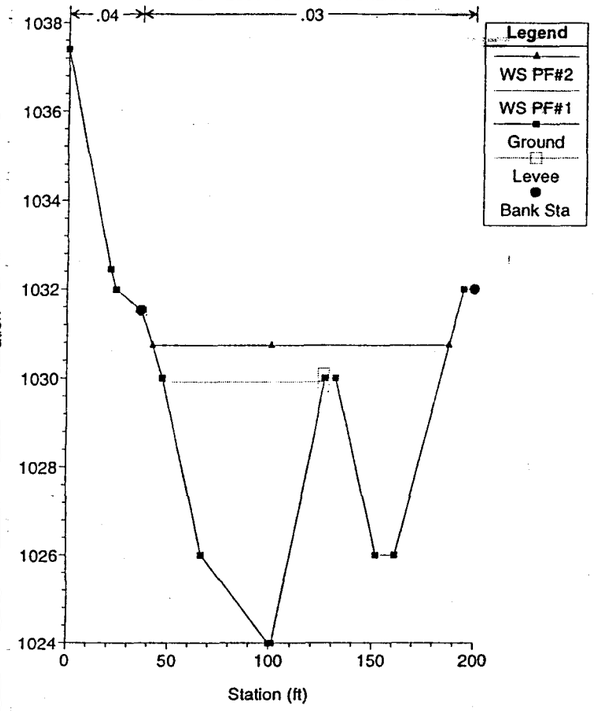

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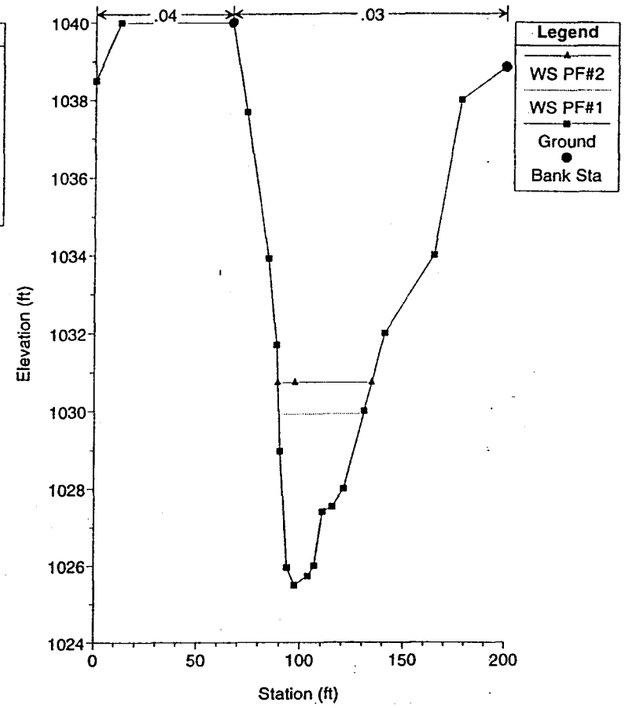

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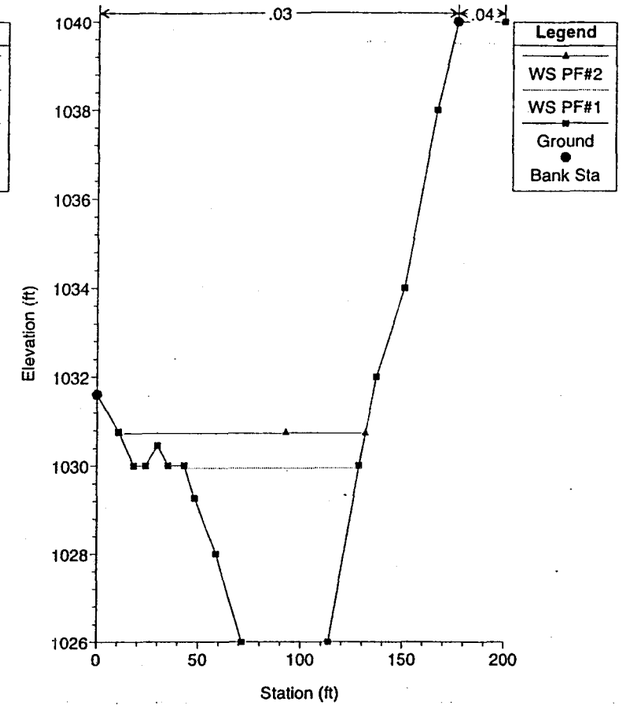

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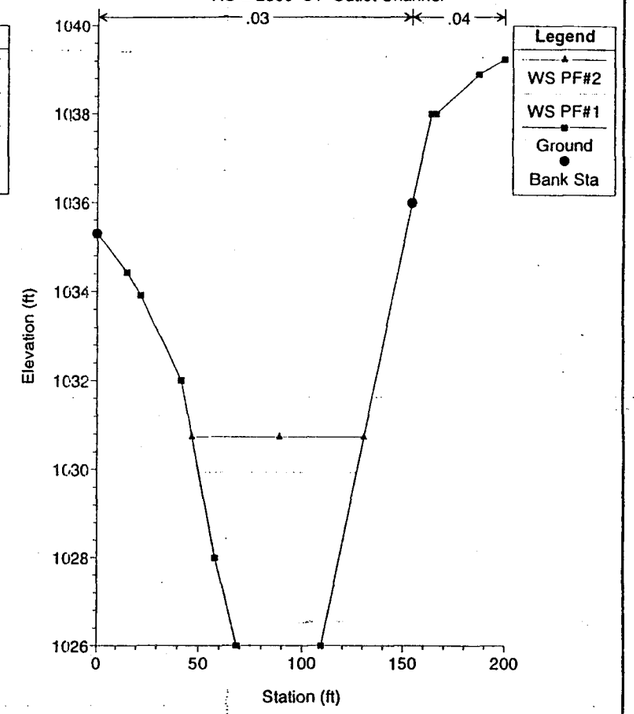

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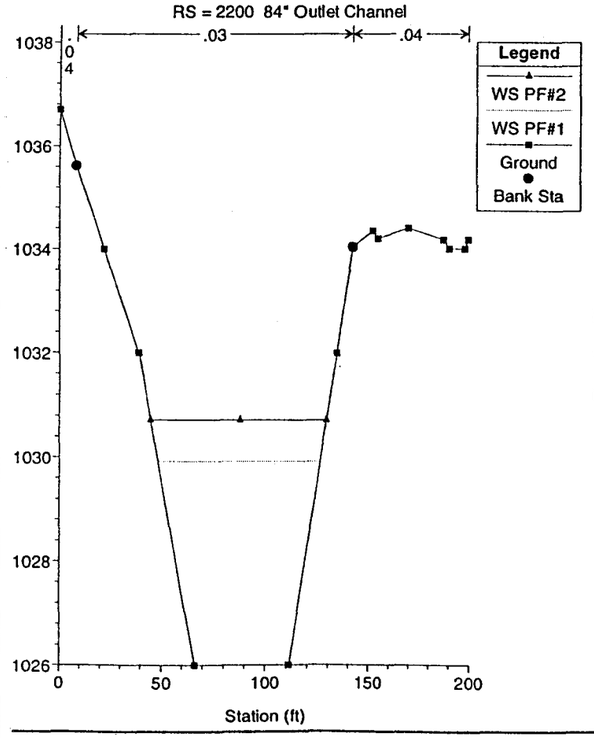

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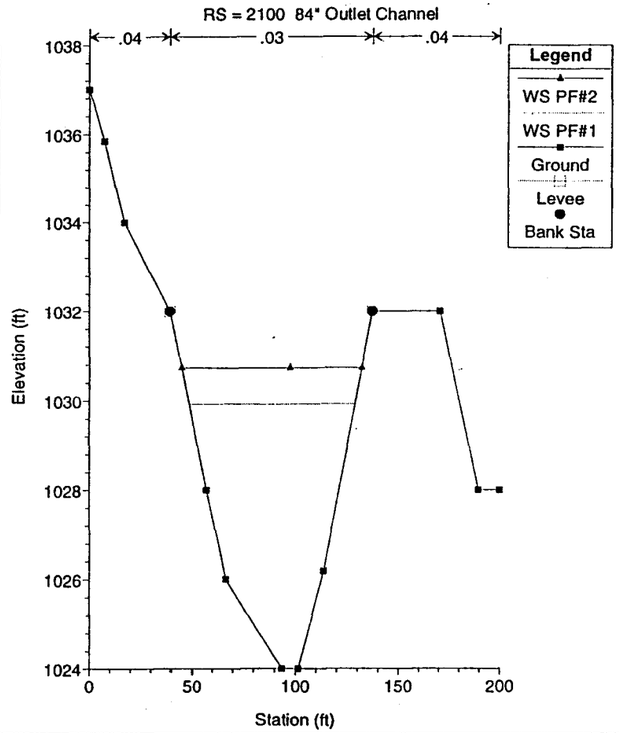

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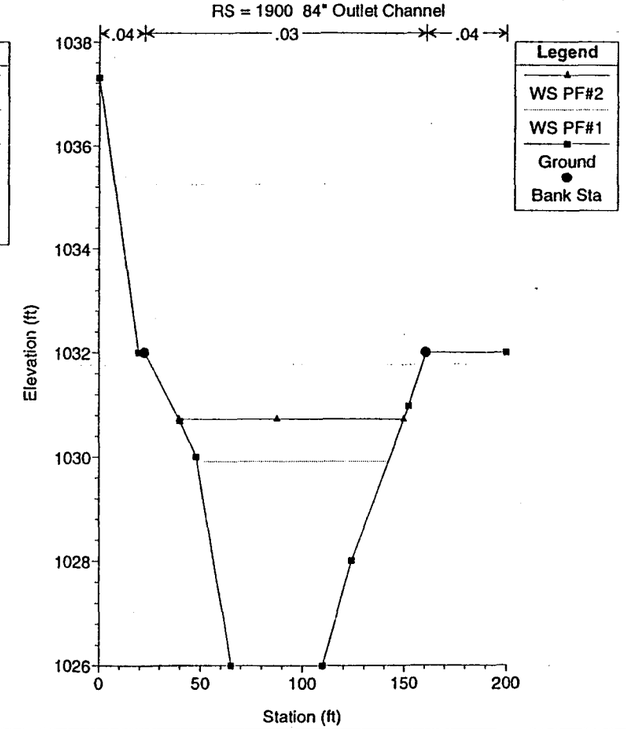

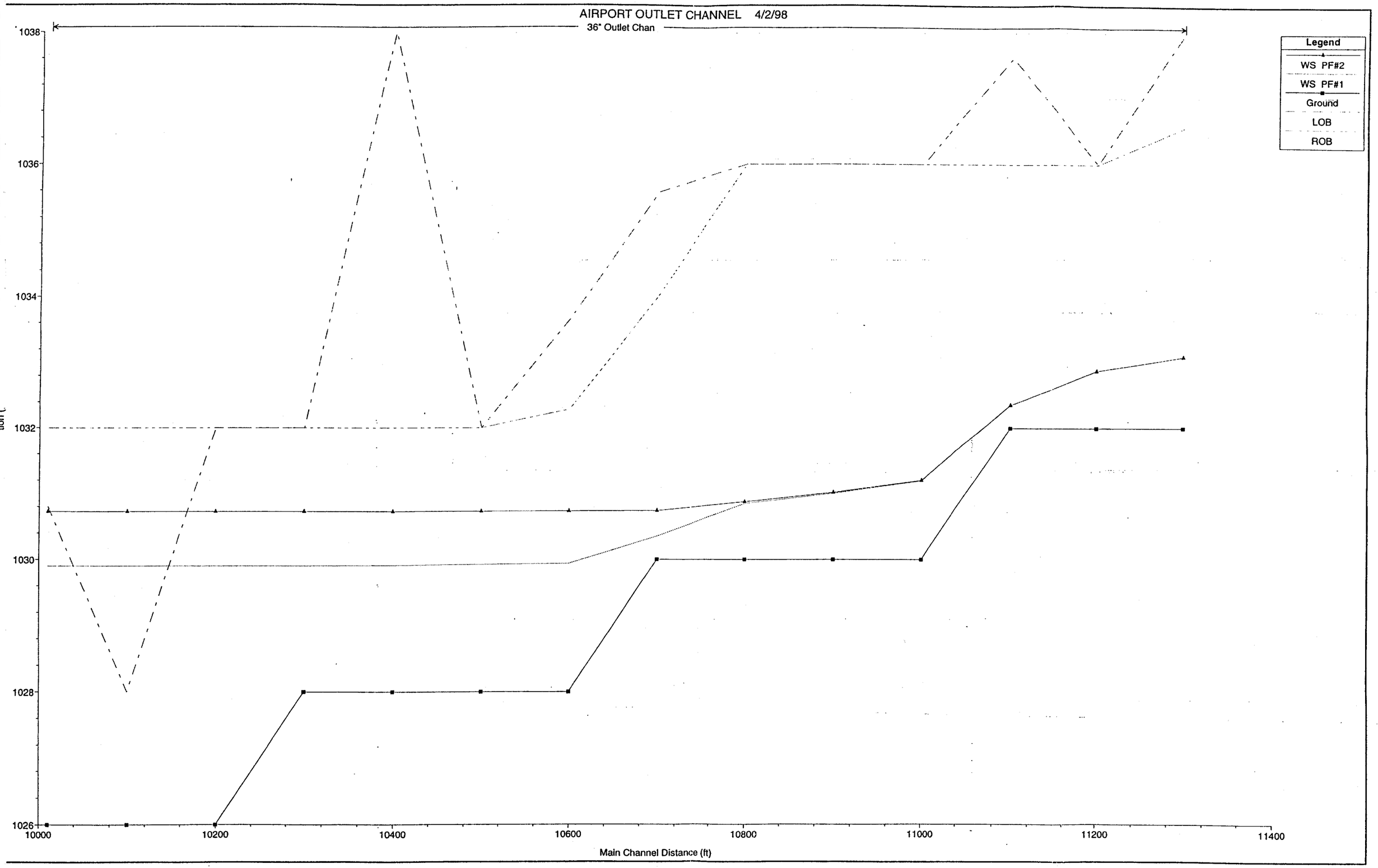
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36" Outlet Chan
Legend
WS PF#2
WS PF#1
Ground
LOB
ROB
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1036
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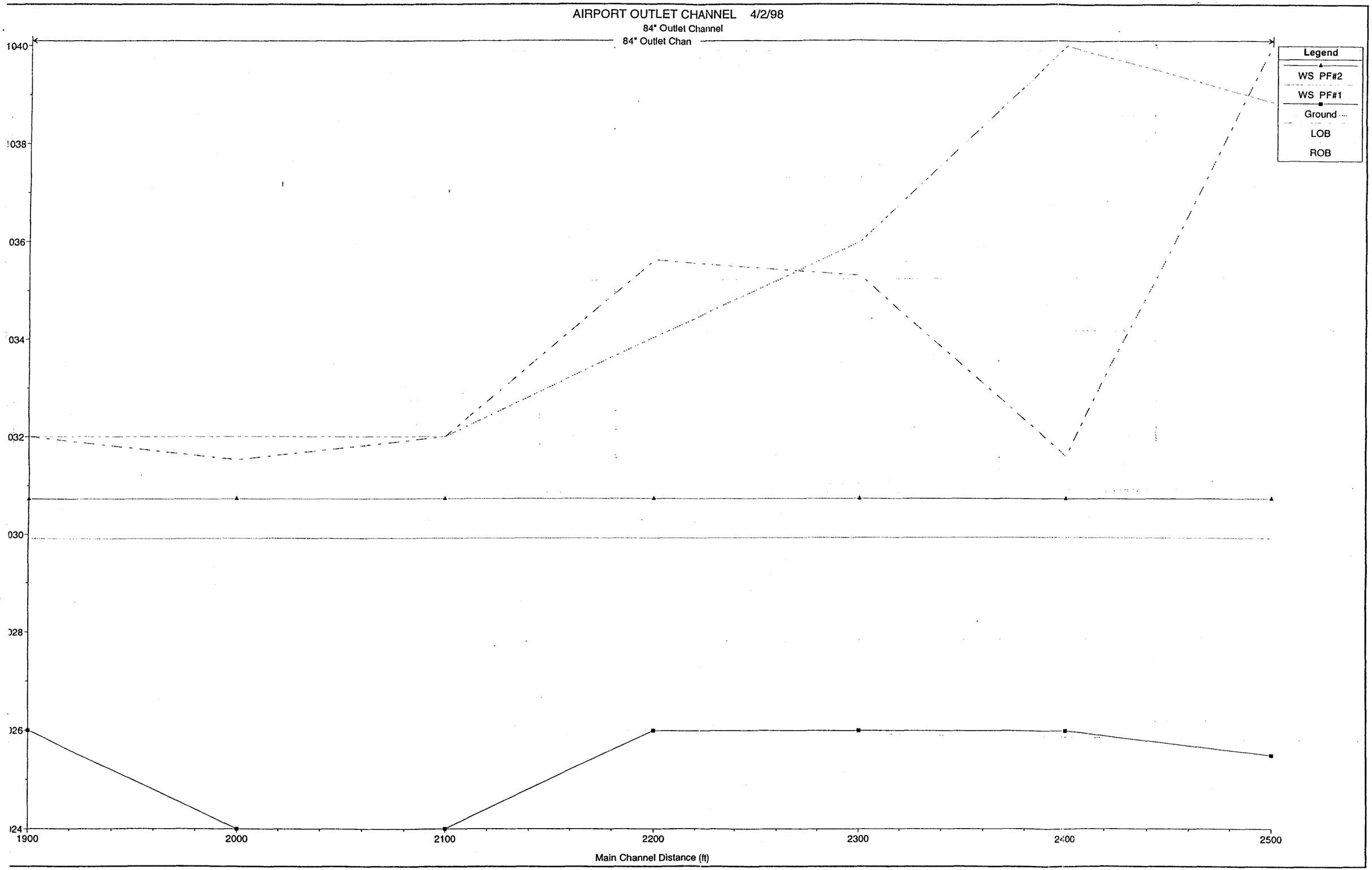
11400
Main Channel Distance (ft)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84" Outlet Channel
84" Outlet Chan
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WS PF#1
Ground
LOB
ROB
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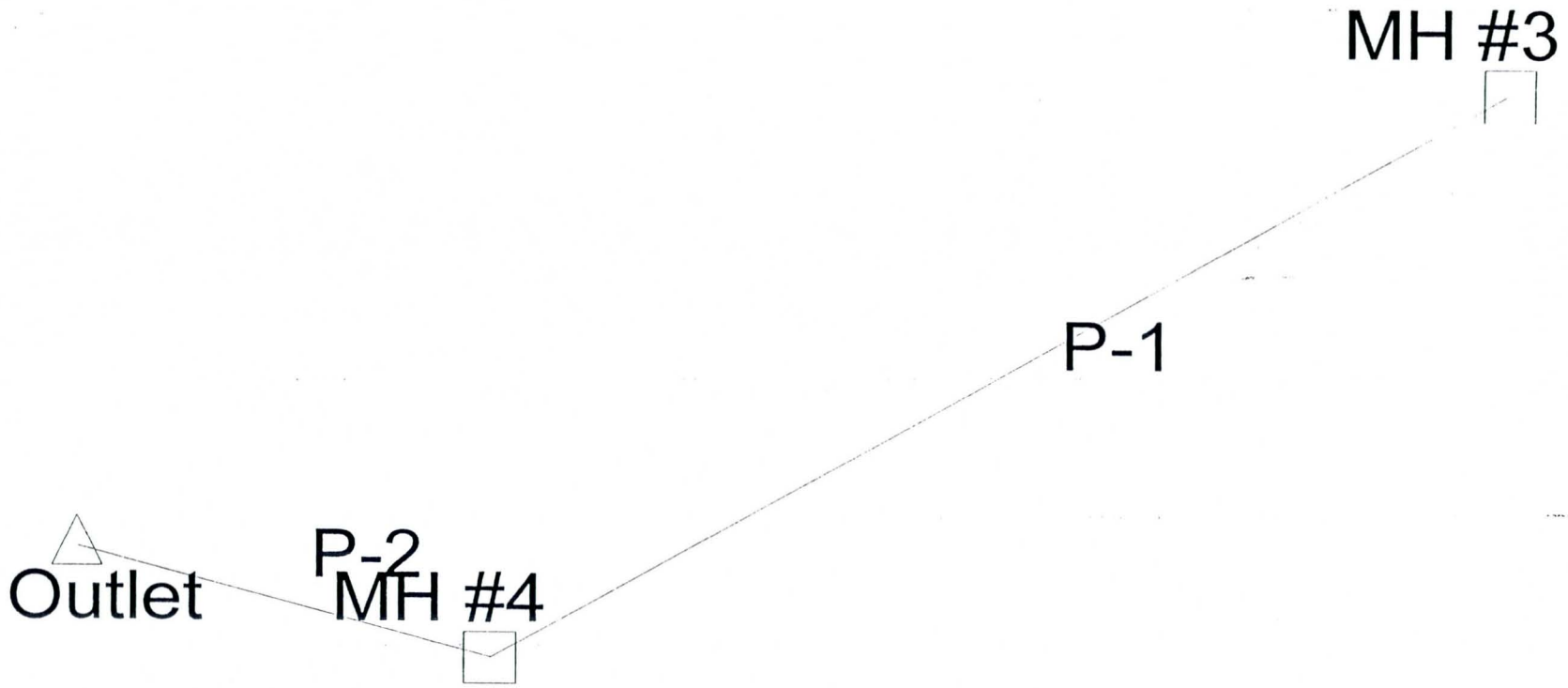
1038
036
034
032
030
028
026
024
1900
2000
2100
2200
2300
2400
2500
Main Channel Distance (ft)

CAMELBACK RANCH LEVEE



36" PIPE EXTENTION

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Project Engineer: DBL
StormCAD v1.0

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Discharge (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Upstream HGL (ft)	Downstream Invert Elevation (ft)	Downstream HGL (ft)	Description
P-1	MH #3	MH #4	477.00	36 inch	43.90	7.27	1,028.75	1,031.01	1,026.28	1,028.83	Manhole #1
P-2	MH #4	Outlet	46.00	36 inch	43.90	7.55	1,026.28	1,028.76	1,026.14	1,028.30	

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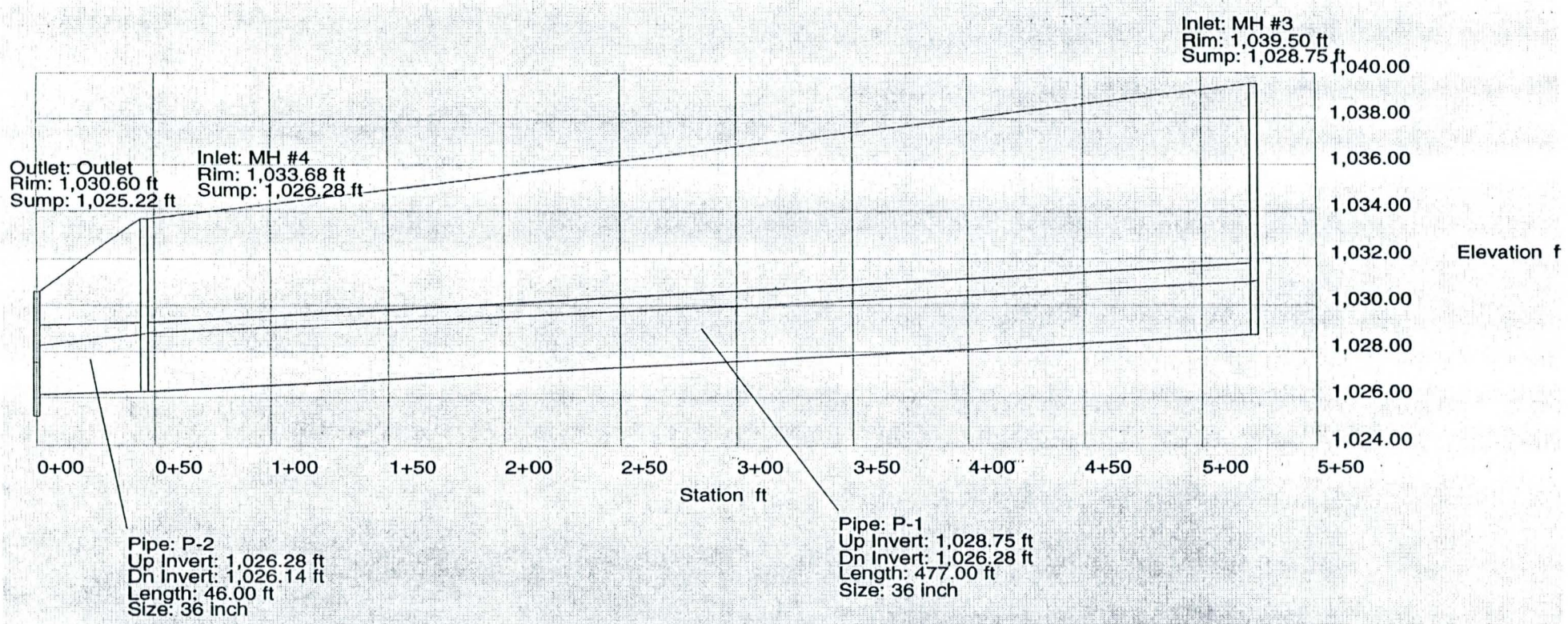

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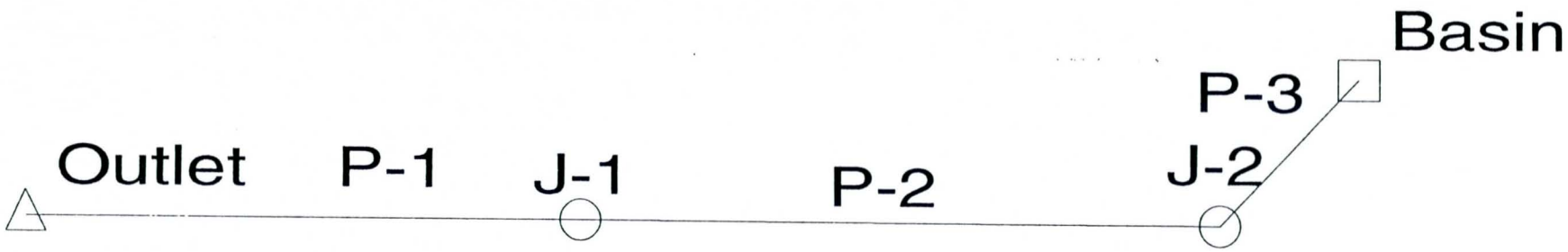
Project Engineer: DBL
StormCAD v1.0

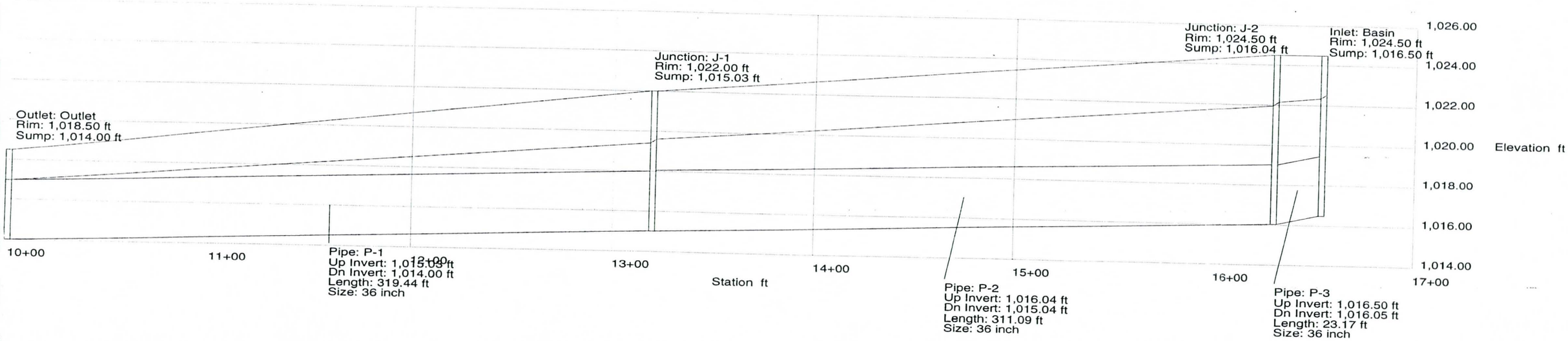
CAMELBACK RANCH LEVEE PROJECT



Detention Basin Outlet Pipe

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Section Size	Discharge (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Upstream Crown Elevation (ft)	Upstream HGL (ft)	Downstream Invert Elevation (ft)	Downstream Crown Elevation (ft)	Downstream HGL (ft)	Description
P-3	Basin	J-2	23.17	36 inch	58.00	8.21	1,016.50	1,019.50	1,022.36	1,016.05	1,019.05	1,022.19	Sta 16+36.53 to Sta 16+61.70
P-2	J-2	J-1	311.09	36 inch	58.00	8.21	1,016.04	1,019.04	1,021.98	1,015.04	1,018.04	1,019.63	Sta 13+21.44 to Sta 16+36.53
P-1	J-1	Outlet	319.44	36 inch	58.00	8.21	1,015.03	1,018.03	1,019.42	1,014.00	1,017.00	1,017.00	Sta 10+00.00 to Sta 13+21.44



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Jeff Minch
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Project Engineer: JRG
StormCAD v1.0
Page 1 of 1

APPENDIX C

SEDIMENT TRANSPORT

Table 5 Toe-Down and WSEL Summary for Agua Fria River (SPF Hydraulics w/o New Waddell Dam, Proposed Levees)
Camelback Ranch Levee - Phase 2

HEC2 Section No.	General Scour (ft)	LONG-TERM SCOUR		Low Flow Scour (ft)	BED-FORM SCOUR		Factor of Safety (ft)	Standard Toe-Down Depth (ft)	Inv. Elev. (ft)	Standard Toe-Down Elevation (ft)	Maximum WSEL (ft)	Remarks
		Armoring (ft)	Equilibrium (ft)		Dune (ft)	Antidune (ft)						
												Start Phase 2
21	0.0	0.6		1.5	0.8	1.3	0.6	4.0	1012	1008.0 (1)	1027.0 (3)	East Levee
22	0.0	0.6		1.5	0.7	0.7	0.4	3.2	1014	1010.8 (1)	1027.1 (1)	
23	0.0	1.6		1.5	0.6	0.8	0.7	4.6	1016	1011.4 (1)	1027.7 (1)	
24	0.0	0.2		1.5	0.6	0.5	0.2	2.5	1016	1013.5 (1)	1028.7 (1)	
25	0.0	0.4		1.5	0.6	0.5	0.3	2.7	1018	1015.3 (1)	1029.1 (1)	
26	0.0	0.2		1.5	0.6	0.4	0.2	2.6	1018	1015.4 (1)	1029.8 (1)	
27	0.5	2.3		1.5	0.5	1.3	1.1	6.6	1020	1013.4 (2)	1030.7 (1)	
28	0.2	2.3		1.5	0.7	0.3	0.9	5.6	1020.0	1014.4 (2)	1032.6 (3)	
29	0.5	2.3		1.5	0.5	1.1	1.0	6.4	1024.0	1017.6 (1)	1033.6 (3)	

(1) Reflects no mining condition
(2) Use the Recommended Value for the New River at Section 1
(3) Reflects mining condition

Table 6 Minimum Toe-Down and Top of Bank Design Elevations for Agua Fria River, Proposed Levees (SPF Hydraulics w/o New Waddell Dam)

HEC2 Section No.	Minimum Toe-Down Elevation (ft)	Maximum WSEL (ft)	Minimum Top of Bank Elevation (ft)
21	1008.0	1027.0	1030.0
22	1010.8	1027.1	1030.1
23	1011.4	1027.7	1030.7
24	1013.5	1028.7	1031.7
25	1015.3	1029.1	1032.1
26	1015.4	1029.8	1032.8
27	1009.3	1030.7	1033.7
28	1009.3	1032.6	1035.6
29	1017.6	1033.6	1036.6

Table 7 Toe-Down and WSEL Elevation Summary for New River
(SPF Hydraulics w/o New Waddell Dam, Proposed Levees)
Camelback Ranch Levee - Phase 2

HEC2 Section No.	General Scour (ft)	LONG-TERM SCOUR		Low Flow Scour (ft)	BED-FORM SCOUR		Factor of Safety (ft)	Standard Toe-Down Depth (ft)	Inv. Elev. (ft)	Standard Toe-Down Elevation (ft)	Maximum WSEL (ft)	Remarks
		Armoring (ft)	Equilibrium (ft)		Dune (ft)	Antidune (ft)						
1	2.2	2.7		1.5	0.5	1.8	2.0	10.2	1019.5	1009.3	1030.7	Q=71300cfs
2	1.0	0.7		1.5	0.6	0.8	0.8	4.8	1019.5	1014.7	1031.8	
3	0.0	0.6		1.5	0.7	0.9	0.5	3.5	1019.5	1016.0	1032.2	
4	0.0	0.8		1.5	0.6	1.1	0.6	4.0	1020	1016.0	1032.7 (1)	
5	1.1	1.7		1.5	0.6	1.6	1.3	7.2	1020.5	1013.3	1033.1 (1)	
6	2.3	3.1		1.5	0.6	2.2	2.3	11.5	1020.5	1009.0	1033.6 (1)	
7	2.4	2.7		1.5	0.6	1.9	2.1	10.6	1022	1011.4	1034.3	
8	2.3	1.1		1.5	0.6	1.3	1.4	7.6	1023	1015.4	1035.3	
9	1.5	0.7		1.5	0.6	1.2	1.0	5.9	1023	1017.1	1035.7	
10	1.5	0.6		1.5	0.7	1.1	0.9	5.6	1023	1017.4	1036.1	
11	0.0	0.5		1.5	0.7	1.0	0.5	3.5	1023.5	1020.0	1036.6	
12	0.5	0.9		1.5	0.6	1.1	0.8	4.8	1024.5	1019.7	1036.9	
13	1.2	1.4		1.5	0.6	1.4	1.2	6.6	1024.5	1017.9	1037.3	
14	1.3	1.8		1.5	0.6	1.5	1.4	7.6	1025	1017.4	1037.8	
15	1.4	1.6		1.5	0.6	1.5	1.4	7.4	1025	1017.6	1038.3	
16	1.0	1.3		1.5	0.6	1.6	1.2	6.5	1026	1019.5	1038.8	
17	1.5	1.7		1.5	0.6	1.6	1.4	7.8	1027	1019.2	1039.3	
18	0.9	1.7		1.5	0.6	1.6	1.3	7.0	1027.5	1020.5	1039.8	
19	0.6	1.7		1.5	0.6	1.6	1.2	6.6	1028	1021.4	1040.3	
20	0.8	1.7		1.5	0.6	1.5	1.2	6.8	1028.5	1021.7	1040.9	
21	0.9	1.7		1.5	0.5	1.8	1.3	7.3	1030	1022.7	1041.4	
22	0.0	0.3		1.5	0.7	0.8	0.3	3.0	1028.5	1025.5	1042.3	
23	0.0	0.3		1.5	0.7	0.8	0.3	2.9	1029.5	1026.6	1042.6	Q=69000cfs
24	0.0	0.3		1.5	0.7	0.8	0.3	2.9	1028.5	1025.6	1042.8	
25	0.0	0.6		1.5	0.6	1.1	0.5	3.8	1031	1027.2	1043.0	
26	0.0	1.2		1.5	0.6	1.4	0.8	4.9	1031	1026.1	1043.2	

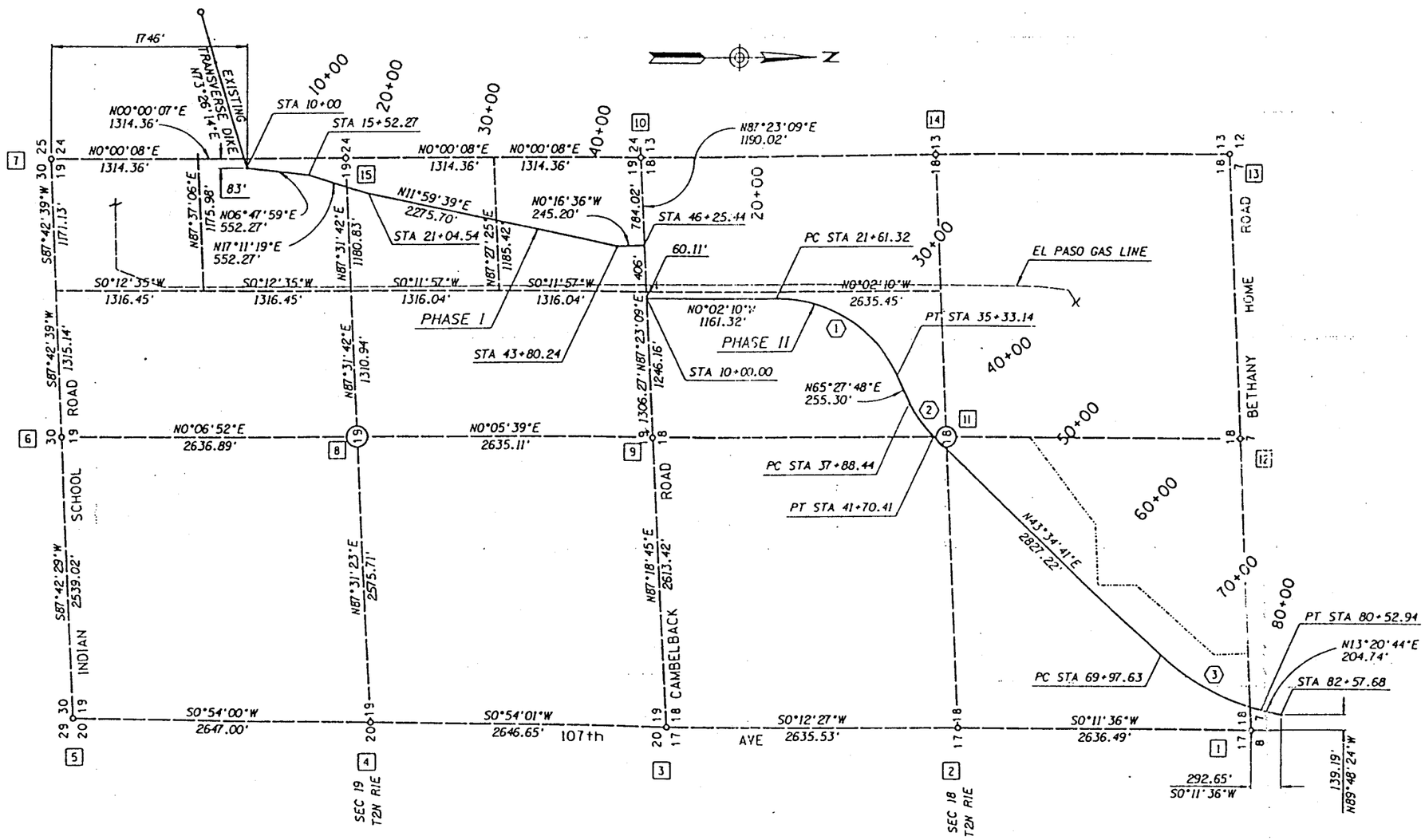
(1) WSEL reflects the QUASED results

Table 8 Minimum Toe-Down and Top of Bank Design Elevations for New River, Proposed Levees (SPF Hydraulics w/o New Waddell Dam)

HEC2 Section No.	Minimum Toe-Down Elevation (ft)	Maximum WSEL (ft)	Minimum Top of Bank Elevation (ft)
1	1009.3	1030.7	1033.7
2	1014.7	1031.8	1034.8
3	1016.0	1032.2	1035.2
4	1016.0	1032.7	1035.7
5	1013.3	1033.1	1036.1
6	1009.0	1033.6	1036.6
7	1011.4	1034.3	1037.3
8	1015.4	1035.3	1038.3
9	1017.1	1035.7	1038.7
10	1017.4	1036.1	1039.1
11	1020.0	1036.6	1039.6
12	1019.7	1036.9	1039.9
13	1017.9	1037.3	1040.3
14	1017.4	1037.8	1040.8
15	1017.6	1038.3	1041.3
16	1019.5	1038.8	1041.8
17	1019.2	1039.3	1042.3
18	1020.5	1039.8	1042.8
19	1021.4	1040.3	1043.3
20	1021.7	1040.9	1043.9
21	1022.7	1041.4	1044.4
22	1025.5	1042.3	1045.3
23	1026.6	1042.6	1045.6
24	1025.6	1042.8	1045.8
25	1027.2	1043.0	1046.0

APPENDIX D

HORIZONTAL CONTROL



SECTION CORNERS

PT NO.	NORTHING	EASTING	REMARKS	PT NO.	NORTHING	EASTING	REMARKS
1	917990.762	386497.410	FND ½" ROD	9	912596.235	383868.434	FND BC FLUSH
2	915354.284	386488.517	FND BC FLUSH	10	912482.385	381374.744	FND BC FLUSH
3	912718.771	386478.978	FND BC IN HH	11	-	-	NOT FOUND
4	910072.452	386437.398	FND BC FLUSH	12	-	-	NOT FOUND
5	907425.778	386395.827	FND BC IN HH	13	-	-	NOT FOUND
6	907324.246	383858.840	FND BC FLUSH	14	-	-	NOT FOUND
7	907224.943	381374.552	FND BC IN HH	15	909853.663	381374.648	CALCULATED
8	909961.133	383864.100	FND BC IN HH				

CURVE DATA

NO.	Δ	R	T	L
1	65°29'58"	1200.00'	771.86'	1371.82'
2	21°53'07"	1000.00'	193.34'	381.97'
3	30°13'57"	2000.00'	540.25'	1055.32'

NO.	REVISION	BY	DATE

MARICOPA COUNTY
FLOOD CONTROL DISTRICT
ENGINEERING DIVISION

CAMELBACK RANCH LEVEE
FDC NO. 95-15

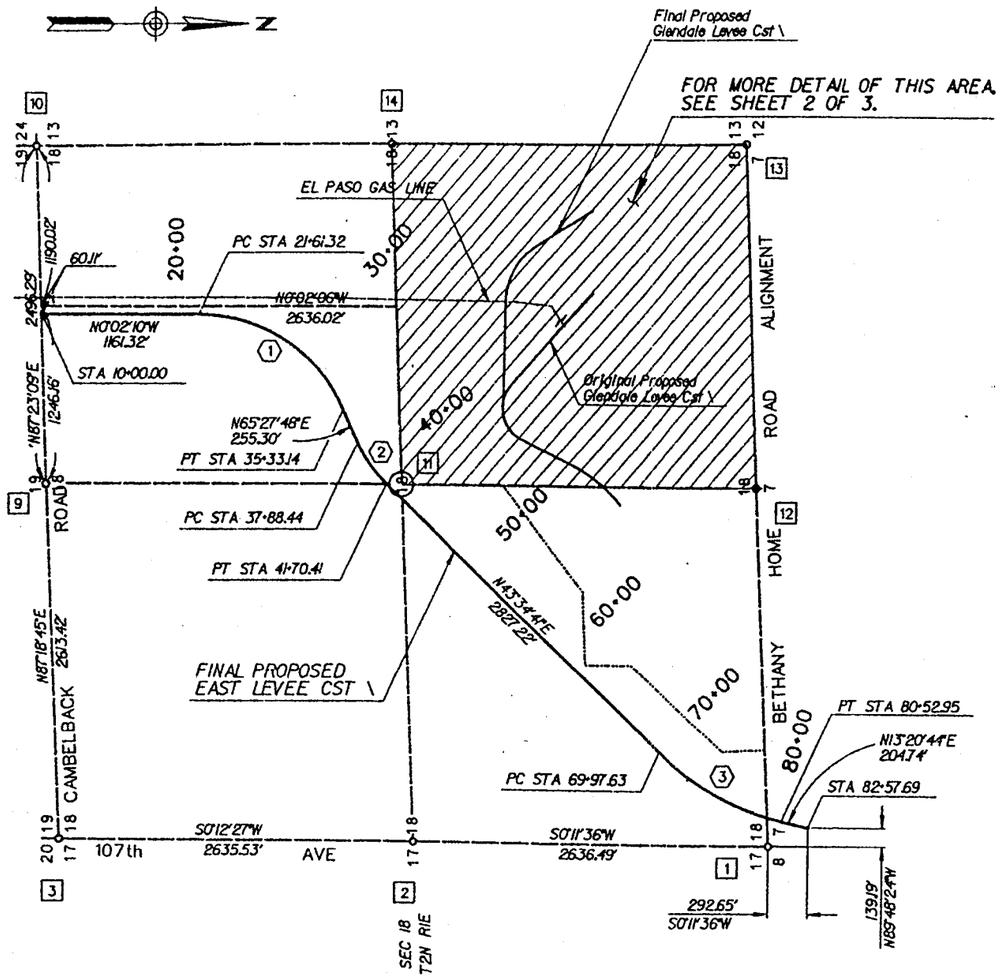
	BY	DATE
DESIGNED	C. BURW	7/30/96
DRAWN	R. STEELE	7/30/96
CHECKED	A. WITZELL	9/13/96

Coffman Consulting Engineers, Inc.

RESULTS OF SURVEY

SHEET 1 OF 3

b.dgn 12/6/93



SECTION CORNERS			
PT NO.	NORTHING	EASTING	REMARKS
1	917990.762	386497.410	FND 1/2" ROD
2	915354.284	386488.517	FND BC FLUSH
3	912718.771	386478.978	FND BC IN HH
9	912596.235	383868.434	FND BC FLUSH
10	912482.385	381374.744	FND BC FLUSH
11	-	-	NOT FOUND
12	-	-	NOT FOUND
13	-	-	NOT FOUND
14	-	-	NOT FOUND

CURVE DATA				
NO.	Δ	R	T	L
1	65° 29'58"	1200.00'	771.86'	1371.82'
2	21° 53'07"	1000.00'	193.34'	381.97'
3	30° 13'57"	2000.00'	540.25'	1055.32'

BENCH MARKS:

1. NE CORNER SEC 18 1/2" REBAR IN 1" PIPE ELEV- 1038.79
2. E1/4 CORNER SEC 18 BC FLUSH ELEV- 1033.21
3. SE CORNER SEC 18 BC IN HH ELEV- 1034.55
9. S1/4 CORNER SEC 18 BC FLUSH ELEV- 1033.00

NOTE:

All coordinates are ground coordinates based on NAD 1927. Vertical Control is based on NGVD 1929.

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
FLOOD CONTROL DISTRICT
ENGINEERING DIVISION

CAMELBACK RANCH LEVEE-NORTH
GLENDALE AIRPORT LEVEE
PROJECT NO. FCD 95-15

	BY	DATE
DESIGNED	C. BURM	6/5/98
DRAWN	R. STEELE	6/5/98
CHECKED	A. WITZELL	6/29/98

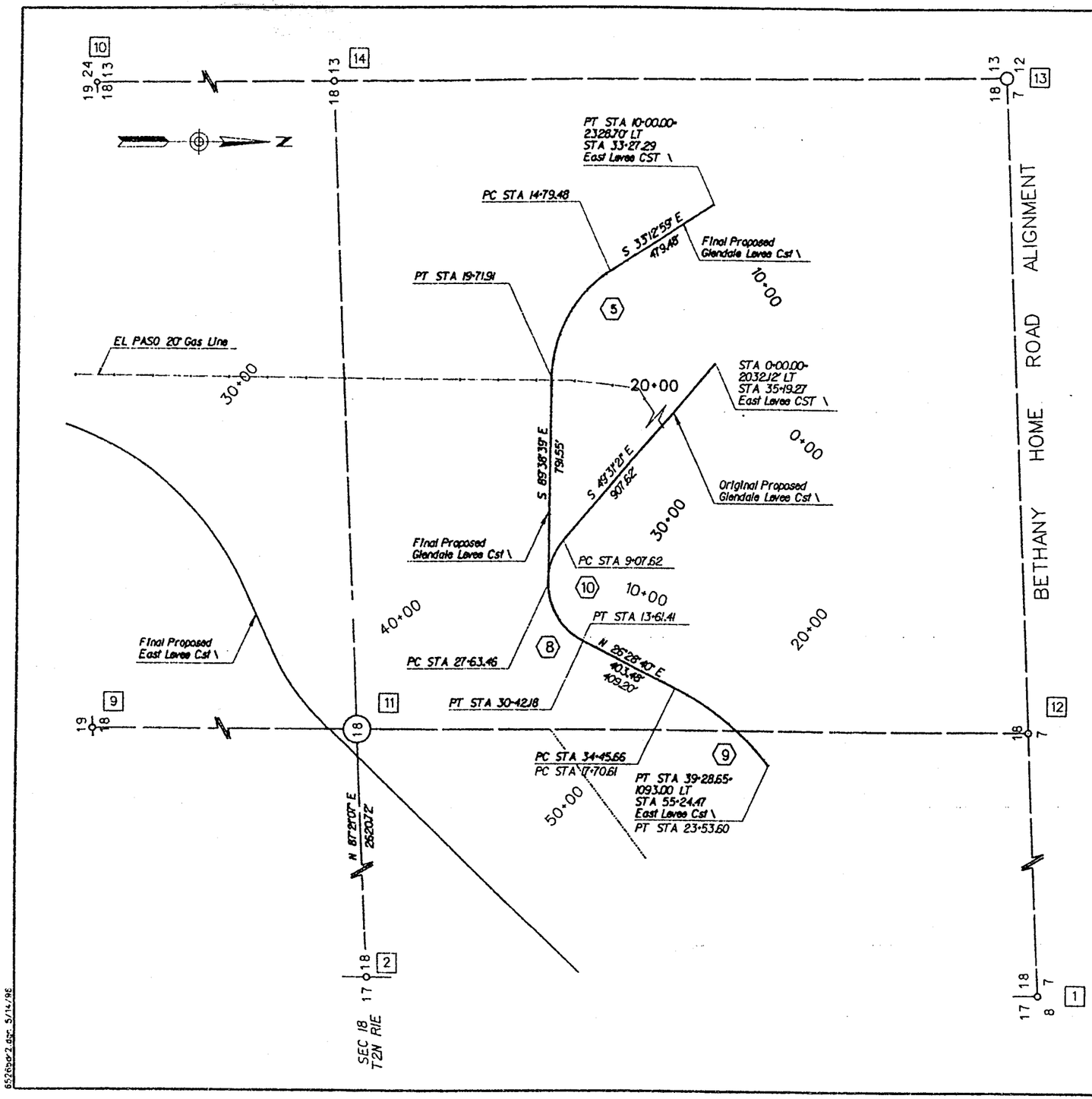
REGISTERED LAND SURVEYOR 26412 ARTHUR A. WITZELL ARIZONA U.S.A.

Collins-Pfab Consulting Engineers, Inc.

RESULTS OF SURVEY

SHEET 1 OF 3

b.dgn 12/5/93



SECTION CORNERS			
PT NO.	NORTHING	EASTING	REMARKS
1	917990.762	386497.410	FND 1/2" ROD NE COR 18
2	915354.284	386488.517	FND BC FLUSH E 1/4 COR 18
9	912596.235	383868.434	FND BC FLUSH S 1/4 COR 18
10	912482.385	381374.744	FND BC FLUSH SW COR 18

CURVE DATA				
NO.	Δ	R	T	L
5	56° 25'40"	500.00'	268.25'	492.43'
8	63° 52'41"	250.00'	155.85'	278.72'
9	25° 09'28"	1100.00'	245.45'	482.99'
10	104° 00'00"	250.00'	319.99'	453.79'

NO.	REVISION	BY	DATE
1			
2			
3			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
PROJECT NO. FCD 95-15

	BY	DATE
DESIGNED	R. STEELE	6/5/98
DRAWN	K. JACOBSON	6/5/98
CHECKED	A. WITZELL	6/29/98

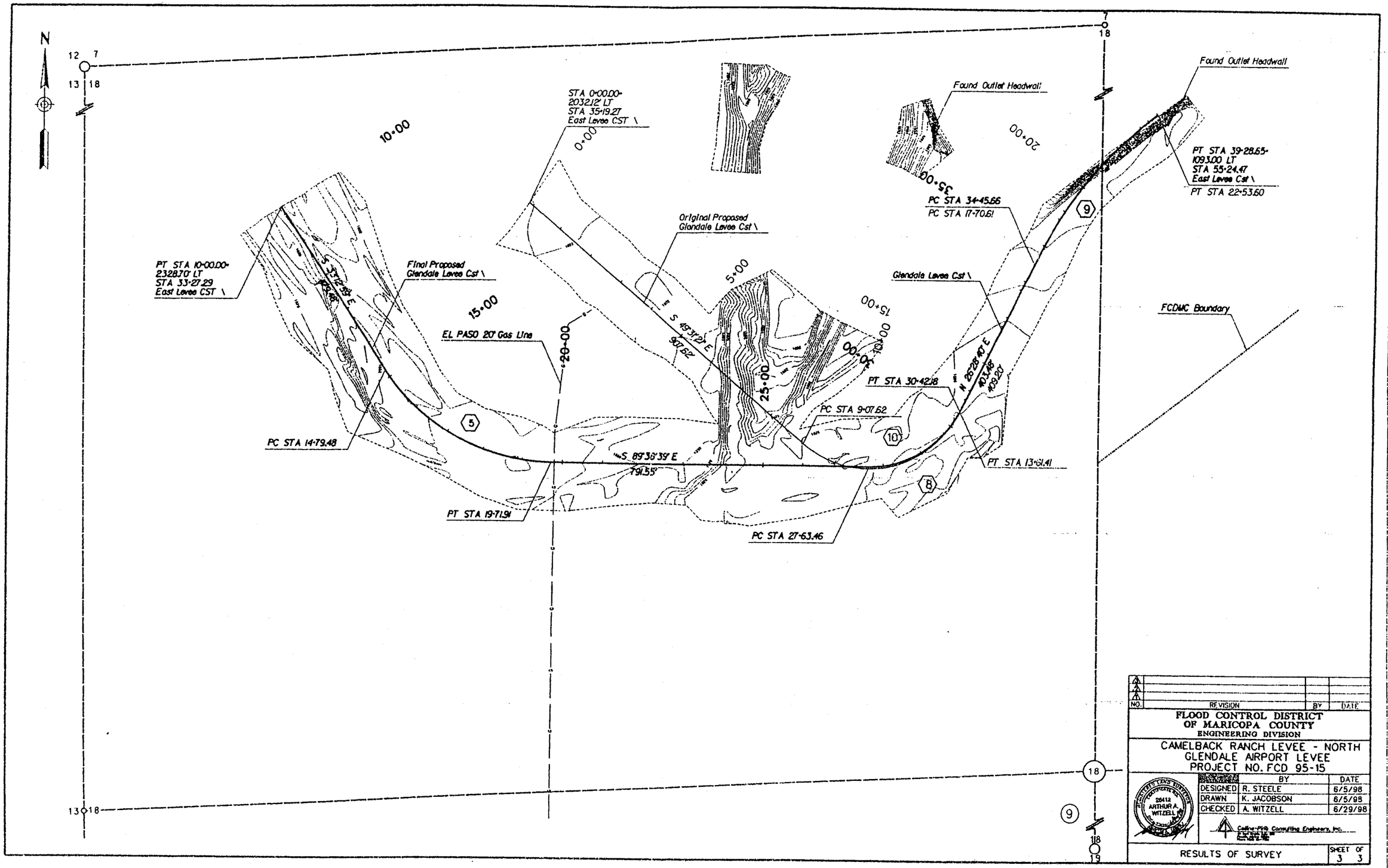
REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 26412 ARTHUR A. WITZELL ARIZONA U.S.A.

Collins-Pfeifer Consulting Engineers, Inc.

RESULTS OF SURVEY

SHEET 2 OF 3

652602-2.dgn 5/14/98



NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
PROJECT NO. FCD 95-15

	BY	DATE
DESIGNED	R. STEELE	6/5/98
DRAWN	K. JACOBSON	6/5/98
CHECKED	A. WITZELL	6/29/98

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
22412
ARTHUR A. WITZELL
ARIZONA U.S.A.

Caliba-PWB Consulting Engineers, Inc.

RESULTS OF SURVEY

SHEET 3 OF 3

```
INTERGRAPH OUTPUT FILE
File Opened
* CAMELBACK RANCH LEVEE DESIGN
* QUALITY CONTROL REVIEW PACKAGE
* file: n:6526\calcs\horgeom\qcpkg.ics
* THIS FILE WILL COMPUTE STATION AND OFFESET FROM THE CENTERLINE OF
* THE LEVEE ALIGNMENT TO VARIOUS POINTS
* AND TRAVERSE AROUND THE VARIOUS PARCELS
DEL COORD (750)
            1 point(s) deleted
* REVIEW CENTERLINE OF NEW LEVEE ALIGNMENT
DES A 100
 POB     165             10+00.00                912539.40    382623.57
                                                  1161.32  N  0^02'10.00" W
  PC     161             21+61.32                913700.72    382622.84
      Radial direction from PC to CC is N 89^57'50.00" E
  CC     162                                     913701.48    383822.84
      Radial direction from CC to PT is N 24^32'12.19" W
      Radius                    1200.00
      Delta                 65^29'57.81"
      Degree of Curve        4^46'28.73"
      Length                    1371.82
      Tangent                    771.86
      Chord                     1298.33
      Middle ordinate            190.75
      External                   226.80
      Chord direction N 32^42'48.91" E
  PT     163             35+33.14                914793.11    383324.51
                                                   255.30  N 65^27'47.81" E
  PC     151             37+88.44                914899.13    383556.75
      Radial direction from PC to CC is N 24^32'12.19" W
  CC     152                                     915808.83    383141.48
      Radial direction from CC to PT is S 46^25'19.19" E
      Radius                    1000.00
      Delta                 21^53'07.00"
      Degree of Curve        5^43'46.48"
      Length                     381.97
      Tangent                    193.34
      Chord                      379.65
      Middle ordinate             18.18
      External                    18.52
      Chord direction N 54^31'14.31" E
  PT     153             41+70.41                915119.49    383865.91
                                                  2827.22  N 43^34'40.81" E
  PC     135             69+97.63                917167.63    385814.83
      Radial direction from PC to CC is N 46^25'19.19" W
  CC     136                                     918546.31    384365.96
      Radial direction from CC to PT is S 76^39'16.49" E
      Radius                    2000.00
      Delta                 30^13'57.30"
      Degree of Curve        2^51'53.24"
      Length                    1055.32
      Tangent                    540.25
      Chord                     1043.12
      Middle ordinate             69.20
      External                    71.68
      Chord direction N 28^27'42.16" E
  PT     137             80+52.94                918084.67    386311.95
                                                   218.06  N 13^20'43.51" E
 POE     167             82+71.00                918296.84    386362.28
* INVERSE AROUND SECTION 18   (PNTS FND. BY COLLINS PENA)
I D (1 2)    * FROM NE COR. TO E1/4 COR
    From        To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
```

```
      1        2   S  0^11'35.74" W      2636.49      2636.49         0.00
    (2 3) *         E 1/4 COR TO SE COR.
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      2        3   S  0^12'26.55" W      2635.53      2635.53         0.00
    (3 9) *         SE COR TO S1/4 COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      3        9   S 87^18'45.26" W      2613.42      2613.42         0.00
    (9 10) *        S1/4 COR TO SW COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      9       10   S 87^23'09.43" W      2496.29      2496.29         0.00
* INVERSE TO PNTS FND BY WILSON CO. (600 SERIES)
I D (9 610) * S 1/4 COR TO SW COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      9      610   S 87^22'59.58" W      2496.44      2496.44         0.00
    (610 602) * SW 1/4 COR TO W1/4 COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
    610      602   N  0^26'42.10" W      2634.91      2634.91         0.00
    (602 601) * W 1/4 COR TO NW COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
    602      601   N  0^26'58.40" W      2634.34      2634.34         0.00

* INVERSE FROM FOUND WILSON POINTS TO ASSUMMED SECTION CORNERS
I D (601 105) * NW COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
    601      105   S 46^59'06.49" E         1.24         1.24         0.00
    (602 106) * W1/4 COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
    602      106   S 59^08'34.19" E         0.49         0.49         0.00
    (610 10)  * SW COR
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
    610       10   N 48^52'20.75" E         0.19         0.19         0.00
* INVERSE FROM S 1/4 COR TO BEG. OF LEVEE CENTERLINE
I D (9 165)
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      9      165   S 87^23'09.43" W      1246.16      1246.16         0.00
* INVERSE FROM NE COR TO END OF LEVEE CENTERLINE
I D (1 167)
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
      1      167   N 23^49'14.49" W       334.58       334.58         0.00
* REVIEW CENTERLINE OF NEW AIRPORT LEVEE ALIGNMENT
DES A 700
  PC     700              9+05.75                 916697.33    381848.34
      Radial direction from PC to CC is S 33^12'59.13" E
  CC     701                                      916647.14    381881.20
      Radial direction from CC to PT is S 56^47'00.87" W
      Radius                      60.00
      Delta                 90^00'00.00"
      Degree of Curve       95^29'34.68"
      Length                      94.25
      Tangent                     60.00
      Chord                       84.85
      Middle ordinate             17.57
      External                    24.85
```

```
    Chord direction S 11^47'00.87" W
 PT     702              10+00.00                916614.27    381831.01
                                                   479.48  S 33^12'59.13" E
 PC     703              14+79.48                916213.13    382093.67
    Radial direction from PC to CC is N 56^47'00.87" E
 CC     704                                      916487.03    382511.97
    Radial direction from CC to PT is S  0^21'20.88" W
    Radius                     500.00
    Delta                 56^25'39.99"
    Degree of Curve       11^27'32.96"
    Length                     492.43
    Tangent                    268.25
    Chord                      472.76
    Middle ordinate             59.41
    External                    67.42
    Chord direction S 61^25'49.12" E
 PT     705              19+71.91                915987.04    382508.87
                                                   791.55  S 89^38'39.12" E
 PC     706              27+63.46                915982.12    383300.40
    Radial direction from PC to CC is N  0^21'20.88" E
 CC     707                                      916232.12    383301.96
    Radial direction from CC to PT is S 63^31'20.46" E
    Radius                     250.00
    Delta                 63^52'41.34"
    Degree of Curve       22^55'05.92"
    Length                     278.72
    Tangent                    155.85
    Chord                      264.51
    Middle ordinate             37.85
    External                    44.60
    Chord direction N 58^25'00.21" E
 PT     708              30+42.18                916120.66    383525.73
                                                   403.48  N 26^28'39.54" E
 PC     709              34+45.66                916481.82    383705.62
    Radial direction from PC to CC is S 63^31'20.46" E
 CC     710                                      915991.38    384690.24
    Radial direction from CC to PT is N 38^21'52.46" W
    Radius                    1100.00
    Delta                 25^09'28.00"
    Degree of Curve        5^12'31.35"
    Length                     482.99
    Tangent                    245.45
    Chord                      479.12
    Middle ordinate             26.40
    External                    27.05
    Chord direction N 39^03'23.54" E
 PT     711              39+28.65                916853.87    384007.51
* INVERSE FROM NE COR TO BEG. OF AIRPORT LEVEE CENTERLINE
I D (1 700)
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
      1      700   S 74^27'09.97" W      4825.64      4825.64         0.00
* INVERSE FROM NE COR TO END OF AIRPORT LEVEE CENTERLINE
I D (1 711)
   From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
      1      711   S 65^27'30.25" W      2737.17      2737.17         0.00
* REVIEW CENTERLINE OF NEW BHOC ALIGNMENT
DES A 653
 POB    653              70+00.00                917965.44    386108.18
                                                   171.34  S 89^44'40.58" E
 PI     657              71+71.34                917964.68    386279.51
                                                   217.61  S 89^44'40.58" E
 PI     654              73+88.95                917963.71    386497.13
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                                                    2078.13  S 89^44'40.61" E
 POE     655              94+67.08                917954.44    388575.24
*INTERSECT BHOC CENTERLINE WITH THE LEVEE CENTERLINE
A L D 750 136 2000.00 653 (A653 654) 331
Duplicate Point ID
 750 136 2000.00 653 (A653 654) 331
* INVERSE FROM INTERSECTION POINT TO POB OF BHOC
I D (653 750)
    From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
     653      750   S 37^04'54.41" W      6740.52      6740.52         0.00
* INVERSE FROM NE COR TO BEG. OF BHOC CENTERLINE
I D (1 653)
    From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
       1      653   S 86^16'39.69" W       390.05       390.05         0.00
* INVERSE FROM NE COR TO END OF BHOC CENTERLINE
I D (1 655)
    From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-------------------------------------------------------------------------------
       1      655   S 88^59'54.99" E      2078.15      2078.15         0.00
* REVIEW CENTERLINE OF NEW RIVER FLOWLINE
DES A 720
 POB     720              10+00.00                915134.35    382459.94
                                                      553.62  N 74^29'14.44" E
  PC     721              15+53.62                915282.41    382993.39
      Radial direction from PC to CC is N 15^30'45.56" W
  CC     722                                      917209.56    382458.49
      Radial direction from CC to PT is S 56^55'41.62" E
      Radius                    2000.00
      Delta                 41^24'56.06"
      Degree of Curve        2^51'53.24"
      Length                    1445.68
      Tangent                    756.05
      Chord                     1414.41
      Middle ordinate            129.21
      External                   138.13
      Chord direction N 53^46'46.41" E
  PT     723              29+99.29                916118.18    384134.47
                                                        9.16  N 33^04'18.38" E
  PC     724              30+08.45                916125.85    384139.46
      Radial direction from PC to CC is S 56^55'41.62" E
  CC     725                                      914761.63    386234.43
      Radial direction from CC to PT is N 36^47'30.56" W
      Radius                    2500.00
      Delta                 20^08'11.06"
      Degree of Curve        2^17'30.59"
      Length                     878.62
      Tangent                    443.89
      Chord                      874.10
      Middle ordinate             38.50
      External                    39.10
      Chord direction N 43^08'23.91" E
  PT     726              38+87.06                916763.67    384737.16
                                                       50.28  N 53^12'29.44" E
  PC     727              39+37.34                916793.78    384777.42
      Radial direction from PC to CC is N 36^47'30.56" W
  CC     728                                      918795.82    383280.15
      Radial direction from CC to PT is S 61^44'45.33" E
      Radius                    2500.00
      Delta                 24^57'14.77"
      Degree of Curve        2^17'30.59"
      Length                    1088.83
      Tangent                    553.19
```

```
      Chord                    1080.24
      Middle ordinate            59.04
      External                   60.47
      Chord direction N 40^43'52.06" E
  PT     729              50+26.17                 917612.37    385482.29
                                                      944.11  N 28^15'14.67" E
 POE     730              59+70.28                 918443.99    385929.21
* INVERSE FROM NE CORNER SECTION 18 TO END OF NEW
* RIVER FLOWLINE
I D (1 730)
    From       To          Direction     Distance  Slope Dist.  Elev. Diff.
-----------------------------------------------------------------------------
       1      730   N 51^25'19.11" W      726.82       726.82         0.00
* REVIEW CENTERLINE OF AIRPORT OUTFALL CHANNEL
DES A 733
 POB     733               8+25.00                 915810.45    382763.94
                                                      175.00  N  0^21'20.88" E
  PI     734              10+00.00                 915985.45    382765.03
                                                      429.90  N  0^21'20.88" E
  PI     735              14+29.90                 916415.34    382767.70
                                                     1080.12  N 26^15'09.77" E
 POE     736              25+10.02                 917384.05    383245.47
* REVIEW CENTERLINES OF EAST AND WEST RETURNS
* ON AIRPORT LEVEE
* WEST RETURN
DES A 742
  PC     742               0+00.00                 915986.07    382664.43
      Radial direction from PC to CC is N  0^21'20.88" E
  CC     743                                       916046.07    382664.81
      Radial direction from CC to PT is S 89^38'39.12" E
      Radius                     60.00
      Delta                 90^00'00.00"
      Degree of Curve       95^29'34.68"
      Length                     94.25
      Tangent                    60.00
      Chord                      84.85
      Middle ordinate            17.57
      External                   24.85
      Chord direction N 45^21'20.88" E
  PT     744               0+94.25                 916045.70    382724.80
* EAST RETURN
DES A 746
  PC     746               0+00.00                 915984.83    382864.99
      Radial direction from PC to CC is N  0^21'20.88" E
  CC     747                                       916044.83    382865.36
      Radial direction from CC to PT is N 89^38'39.12" W
      Radius                     60.00
      Delta                 90^00'00.00"
      Degree of Curve       95^29'34.68"
      Length                     94.25
      Tangent                    60.00
      Chord                      84.85
      Middle ordinate            17.57
      External                   24.85
      Chord direction N 44^38'39.12" W
  PT     748               0+94.25                 916045.20    382805.36
* REVIEW CENTERLINE OF 36" PIPE
DES A 737
 POB     737               1+00.00                 915925.88    383065.05
                                                       57.71  N  0^21'20.88" E
  PI     738               1+57.71                 915983.58    383065.40
                                                       42.29  N  0^21'20.88" E
  PI     739               2+00.00                 916025.87    383065.67
                                                      886.00  N 25^54'19.53" E
```

```
 POE     740              10+86.00                916822.85    383452.75
* SET CENTERLINE OF AIRPORT OUTFALL CHANNEL AS ACTIVE ALIGNMENT
SET ALIGNMENT 733 734 10+00.00
            Horizontal alignment 733 activated
            Beginning station is 8+25.00
* STATION AND OFFSET FROM AIRPORT OUTFALL CHANNEL TO
* WEST AIRPORT LEVEE RETURN
S A O 742
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
  PC   742        10+00.00         0+00.00   -100.60      0.00     0^00'00.00"
  PT   744        10+60.00         0+94.25    -40.60      0.00   -90^00'00.00"
* STATION AND OFFSET FROM AIRPORT OUTFALL CHANNEL TO
* EAST AIRPORT LEVEE RETURN
S A O 746
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
  PC   746        10+00.00         0+00.00     99.96      0.00     0^00'00.00"
  PT   748        10+60.00         0+94.25     39.96      0.00    90^00'00.00"
* SET CENTERLINE OF AIRPORT LEVEE AS ACTIVE ALIGNMENT
SET ALIGNMENT 700 702 10+00.00
            Horizontal alignment 700 activated
            Beginning station is 9+05.75
* STATION AND OFFSET FROM AIRPORT LEVEE TO
* WEST AIRPORT LEVEE RETURN
S A O 742
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
  PC   742        21+27.48         0+00.00     -0.00      0.00   -89^38'39.12"
  PT   744        21+87.48         0+94.25    -60.00      0.00     0^00'00.00"
* STATION AND OFFSET FROM AIRPORT OUTFALL CHANNEL TO
* EAST AIRPORT LEVEE RETURN
S A O 746
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
  PC   746        23+28.04         0+00.00      0.00      0.00   -89^38'39.12"
  PT   748        22+68.04         0+94.25    -60.00      0.00     0^00'00.00"
* STATION AND OFFSET FROM AIRPORT LEVEE CENTERLINE TO
* AIRPORT OUTFALL CHANNEL
S A O 733
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
 POB   733        22+28.08         8+25.00    175.00      0.00     0^00'00.00"
  PI   734        22+28.08        10+00.00      0.00      0.00     0^21'20.88"
  PI   735        22+28.08        14+29.90   -429.90      0.00     0^00'00.00"
 POE   736        37+81.06        25+10.02   -906.71      0.00  -107^41'42.95"
* STATION AND OFFSET FROM AIRPORT LEVEE CENTERLINE TO
* 36" PIPE
S A O 737
                  Baseline      Centerline  Baseline              Centerline
Type               Station         Station    Offset Elevation    Skew Angle
-------------------------------------------------------------------------------
 POB   737        25+28.45         1+00.00     57.71      0.00     0^00'00.00"
  PI   738        25+28.45         1+57.71     -0.00      0.00  -179^38'39.12"
  PI   739        25+28.45         2+00.00    -42.29     -0.00     0^00'00.00"
 POE   740        35+88.10        10+86.00   -390.88      0.00   -97^59'29.85"
* SET CENTERLINE OF LEVEE AS ACTIVE ALIGNMENT
SET ALIGNMENT 100 165 10+00.00
            Horizontal alignment 100 activated
```

Beginning station is 10+00.00

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* INTERSECTION POINT OF BHOC AND LEVEE
S A O (750)

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	750	10+48.98	0+00.00	-579.58	0.00	-89^57'50.00"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* GLENDALE AIRPORT LEVEE CENTERLINE
S A O 700

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
PC	700	33+47.76	9+05.75	-2388.01	0.00	90^10'17.68"
PT	702	33+27.29	10+00.00	-2328.70	0.00	1^08'55.54"
PC	703	33+23.51	14+79.48	-1849.33	0.00	1^19'45.78"
PT	705	34+20.92	19+71.91	-1436.34	0.00	-59^44'58.61"
PC	706	44+05.51	27+63.46	-1004.33	0.00	-43^13'19.93"
PT	708	46+61.19	30+42.18	-936.59	0.00	-107^06'01.27"
PC	709	50+46.84	34+45.66	-1055.23	0.00	-107^06'01.27"
PT	711	55+24.47	39+28.65	-1093.00	0.00	-81^56'33.27"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* NEW RIVER FLOWLINE
S A O 720

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	720	31+34.59	10+00.00	-777.52	0.00	-61^56'47.17"
PC	721	34+67.22	15+53.62	-585.31	0.00	-77^49'43.25"
PT	723	50+79.02	29+99.29	-493.89	0.00	-100^30'22.43"
PC	724	50+88.02	30+08.45	-495.56	0.00	-100^30'22.43"
PT	726	59+62.10	38+87.06	-502.24	0.00	-80^22'11.37"
PC	727	60+11.67	39+37.34	-493.83	0.00	-80^22'11.37"
PT	729	71+25.44	50+26.17	-544.51	0.00	-101^39'44.30"

59+70.28 No baseline point found

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* AIRPORT OUTFALL CHANNEL
S A O 733

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	733	34+88.65	8+25.00	-1159.88	0.00	-152^59'00.55"
PI	734	35+26.56	10+00.00	-1317.04	0.00	-154^47'35.81"
PI	735	43+52.13	14+29.90	-1688.87	0.00	-133^13'19.93"
POE	736	53+83.24	25+10.02	-2010.53	0.00	-107^19'31.04"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* 36" PIPE
S A O 737

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	737	42+02.52	1+00.00	-1136.05	0.00	-133^13'19.93"
PI	738	42+44.57	1+57.71	-1175.57	0.00	-133^13'19.93"
PI	739	42+75.39	2+00.00	-1204.54	-0.00	-133^13'19.93"
POE	740	51+19.58	10+86.00	-1473.51	0.00	-107^40'21.29"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* ADOT BHOC CENTERLINE
S A O 653

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	653	78+75.15	70+00.00	-163.49	0.00	-18^11'00.14"
PI	657	79+28.62	71+71.34	-0.00	0.00	90^15'19.42"

PI	654	79+85.08	73+88.95	209.37	0.00	164^57'57.05"
			94+67.08 No baseline point found			

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* MCFCD PROPERTY BOUNDRY
S A O 170

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	170	48+05.28	0+00.00	-596.80	0.00	-81^23'23.08"
PI	171	57+66.02	9+71.69	-451.33	0.00	-81^23'23.08"
PI	172	61+58.91	15+15.73	-75.00	0.00	-46^13'59.08"
PI	173	64+04.27	18+53.75	-307.50	0.00	-133^27'30.08"
PI	174	74+01.62	27+88.86	-298.29	0.00	-79^58'56.51"
POE	175	77+37.51	31+02.84	-455.16	0.00	-115^02'51.56"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO TOTAL
* BOUNDRY OF MCFCD PROPERTIES R-WR-EX1, R-WR-18EX, AND
* THE EXCEPTION PARCEL
S A O 300

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	300	11+31.14	0+00.00	1245.01	0.00	177^20'55.26"
PI	301	11+33.51	0+51.39	1296.34	0.00	177^20'55.26"
PC	302	12+07.96	1+25.94	1292.49	0.00	87^02'12.26"
PT	304	18+07.98	7+29.74	1227.91	0.00	80^40'35.26"
PC	305	21+04.02	10+29.74	1179.30	0.00	80^40'35.26"
PT	307	40+19.46	20+63.52	518.36	0.00	78^20'20.18"
PI	308	40+50.12	21+10.77	509.52	0.00	80^05'44.29"
PC	320	39+77.32	25+62.24	67.61	0.00	-14^04'31.93"
PT	311	37+84.38	27+68.01	68.35	0.00	-89^59'59.81"
PC	312	35+28.84	30+23.31	68.34	0.00	-89^47'40.68"
PT	314	21+61.15	43+15.11	65.62	0.00	-90^00'00.00"
PI	315	10+78.04	53+98.22	65.62	0.00	-90^00'00.00"
POE	300	11+31.14	65+78.80	1245.01	0.00	177^25'19.43"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* BOUNDRY OF MCFCD PROPERTIES R-WR-EX
S A O 330

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	330	79+99.81	0+00.00	171.13	0.00	-17^31'49.55"
PC	331	79+67.52	1+10.73	65.82	0.00	-18^27'19.86"
PT	332	69+94.40	11+16.00	66.95	0.00	-90^00'00.00"
PC	334	41+67.39	39+43.22	66.96	0.00	-90^10'23.77"
PT	320	39+77.32	41+46.08	67.61	0.00	-90^11'47.95"
PI	308	40+50.12	45+97.54	509.52	0.00	170^05'44.29"
PC	307	40+19.46	46+44.79	518.36	0.00	-101^39'39.82"
PT	305	21+04.02	56+78.58	1179.30	0.00	-99^19'24.74"
PC	304	18+07.98	59+78.58	1227.91	0.00	-99^19'24.74"
PT	302	12+07.96	65+82.38	1292.49	0.00	-92^57'47.74"
PI	301	11+33.51	66+56.93	1296.34	0.00	-92^57'47.74"
PI	340	41+20.29	87+67.16	3189.12	0.00	130^51'45.91"
PI	339	41+36.48	88+88.71	3289.44	0.00	146^04'43.51"
PI	338	42+12.48	91+48.32	3466.44	-0.00	133^44'04.45"
PI	337	42+60.37	91+96.21	3466.59	0.00	90^10'55.10"
PI	335	46+85.45	97+80.97	3065.03	0.00	46^37'45.74"
PI	336	46+90.52	97+87.98	3069.87	0.00	133^43'15.74"
PI	341	61+24.52	117+60.67	1715.20	-0.00	46^37'45.78"
POE	330	79+99.81	143+97.16	171.13	0.00	75^19'32.45"

* STATION AND OFFSET FROM LEVEE CENTERLINE TO
* POINTS FROM WILSON SURVEY
S A O (410-417)

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle

POB	410	34+07.71	0+00.00	-3631.49	0.00	-59^33'22.04"
PI	411	54+21.88	14+26.89	-2668.15	0.00	-43^39'35.08"
PI	412	32+94.73	30+69.73	-3096.78	0.00	101^18'29.21"
PI	413	48+10.57	45+33.13	-2135.60	0.00	-38^38'51.80"
PI	414	30+54.59	63+35.42	-2289.10	0.00	104^00'20.54"
PI	415	35+24.35	78+67.14	-1267.55	0.00	-60^21'23.27"
PI	416	27+60.22	95+92.76	-1692.27	0.00	121^45'37.69"
POE	417	33+48.21	111+22.01	-654.91	0.00	-62^52'57.48"

(500-524)

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	500	47+98.12	0+00.00	-3208.74	0.00	82^18'11.18"
PI	501	32+06.41	12+56.91	-2810.79	0.00	76^01'05.38"
PI	502	30+07.15	30+03.64	-1139.58	0.00	22^18'14.50"
PI	503	51+82.41	52+05.56	-1462.03	0.00	-91^53'07.91"
PI	504	59+07.03	60+34.23	-1060.00	0.00	-60^58'39.63"
PI	505	71+11.90	71+79.49	-1044.36	0.00	-86^01'19.95"
			85+24.22 No baseline point found			
PI	507	79+12.84	90+08.86	277.60	0.00	-126^38'13.82"
PI	508	82+11.23	104+02.77	1629.23	0.00	166^49'30.69"
			112+92.55 No baseline point found			
			121+92.48 No baseline point found			
			131+19.63 No baseline point found			
			142+30.97 No baseline point found			
PI	513	82+69.45	153+20.18	5605.79	0.00	-107^09'16.41"
PI	514	78+13.78	165+08.18	5915.28	0.00	-109^08'45.06"
PI	515	75+45.33	177+11.39	6414.80	0.00	-118^18'55.79"
PI	516	72+04.95	194+81.13	7342.40	0.00	-126^21'31.93"
PI	517	70+11.26	207+37.80	6425.03	0.00	-45^57'37.21"
PI	518	60+45.85	221+30.19	5465.55	0.00	-46^27'10.18"
PI	519	52+17.62	233+85.12	4522.73	0.00	-41^17'52.36"
PI	520	42+85.10	246+57.50	3657.08	0.00	-47^07'47.60"
PI	521	11+50.30	260+19.14	2609.22	0.00	0^26'46.73"
PI	522	10+74.76	276+14.18	1015.97	0.00	-2^42'52.25"
PI	523	10+13.16	289+70.60	-339.06	0.00	177^23'49.87"
POE	524	23+06.98	302+96.75	-203.13	0.00	-90^37'22.83"

(600-610)

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	600	53+12.58	0+00.00	-2709.39	0.00	133^45'09.63"
PI	601	33+85.66	13+58.49	-3553.78	0.00	118^54'31.97"
PI	602	27+86.86	39+92.83	-1645.78	0.00	59^43'10.24"
PI	603	32+63.28	53+32.42	-660.44	0.00	-55^13'41.61"
PI	604	80+08.85	100+63.68	202.66	0.00	128^55'45.14"
			127+27.99 No baseline point found			
			154+29.97 No baseline point found			
PI	607	71+91.65	207+07.66	7413.25	0.00	-127^07'51.68"
PI	608	43+27.45	258+73.73	3646.36	0.00	-43^53'48.09"
PI	609	42+32.54	260+10.48	3547.91	0.00	-43^57'15.13"
			311+20.33 No baseline point found			

```
Cogo Generated Coordinates
* CAMELBACK RANCH LEVEE DESIGN
* file: n:6526\calcs\horgeom\adotrns3.ics
DEL COORD (660-670 781-784)
                8 point(s) deleted
DEL FIG [660-780]
        Figure 660 deleted
        Figure 780 deleted
                2 alignment(s) deleted
* WILL STORE ADOT SURVEY CONTROL POINTS FROM SURVEY PERFORMED
* BY URBAN ENGINEERING (FOR THE AQUA FRIA PROJ.) AND CENTERLINE
* OF THE NEW BHOC, THEN TRANSLATE INTO COORDINATE SYSTEM USED FOR THE
CAMELBACK
* LEVEE PROJECT. THE LEVEE PROJECT IS ON NAD 27 (PER MCFCD), WHILE THE
* ADOT PROJECT IS ON NAD 83
* USE COORDINATES 1 (N917990.762 E386497.410) & 2 (N915354.284 E386488.517)
* PER COLLINS-PINA SURVEY FOR TRANSFORMATION

STORE      660 918024.8870 585899.5310 * BEGIN BHOC
       660     918024.8870     585899.5310          0.0000 default
           661 918023.1610 586279.9280 * PNT ON BHOC
       661     918023.1610     586279.9280          0.0000 default
           781 918050.2994 586320.0283 *FND IRON PIPE SW COR SEC 8
       781     918050.2994     586320.0283          0.0000 default
           782 915413.8207 586311.0177 *W 1/4 COR SEC 17
       782     915413.8207     586311.0177          0.0000 default
           783 918058.7010 588984.4145 *FND 21/2" IRON PIPE S 1/4 COR SEC 8
       783     918058.7010     588984.4145          0.0000 default
           784 918084.3583 591686.3146 *FND BC FLUSH SE COR SEC 8
       784     918084.3583     591686.3146          0.0000 default

* WILL HOLD THE SW COR. OF SEC. 8 (PNT. 701,PER AZTEC SURVEY),
* AND THE W 1/4 COR OF SEC. 17 (PNT. 702, PER AZTEC SURVEY)
* WILL THEN MOVE THE LINE FROM 701 & 702 TO THE LINE FROM 1 & 2
COMPUTE TRANSFORMATION (781 782) (1 2)
Rotation angle is   0^00'09.20"
Scale factor  is   0.99999958
Northing translation is     -59.5374
Easting translation is -199822.6183
TRANSFORM COORDINATES (660-784)
       660     917965.3309     386076.9140          0.0000 default
       661     917963.6218     386457.3109          0.0000 default
       781     917990.7620     386497.4100          0.0000 default
       782     915354.2840     386488.5170          0.0000 default
       783     917999.2824     389161.7947          0.0000 default
       784     918025.0602     391863.6925          0.0000 default
* LOCATE POINT ALONG BHOC CENTERLINE
L DI 660 662 (A 660 661) 200.
       662     917964.4323     386276.9120          0.0000 default
* INTERSECT BHOC CENTERLINE WITH LEVEE CENTERLINE
F L I 664 100 660 (A 660 661) 662
       664     917964.4210     386279.4367          0.0000 default
* STORE CENTERLINE OF BHOC
S F 660 (660 664 661)
        660    ( 660 664 661  )
F D   [660] *BHOC CL 10/21/98
  Figure ID    Figure Description
-----------------------------------------------------------------------
        660   BHOC CL 10/21/98
* STORE WEST & NORTH SECTION LINE 17
S F 780 (782 781 783 784)
        780    ( 782 781 783 784  )
F D   [780] * W & N SECT 17
  Figure ID    Figure Description
-----------------------------------------------------------------------
        780    W & N SECT 17
```

```
* STATION BHOC CENTERLINE USING ADOT STATIONING.  USE VALUE
* OF 69+66.59 FOR BEGINNING STATION AT PNT 664
SET ALIGNMENT 660 660 69+66.59
                Horizontal alignment 660 activated
                Beginning station is 69+66.5900
* REVIEW BHOC ALIGNMENT
DES A 660
 POB     660            69+66.5900              917965.3309  386076.9140
                                                  202.5247  S 89^44'33.31" E
  PI     664            71+69.1147              917964.4210  386279.4367
                                                  177.8761  S 89^44'33.31" E
 POE     661            73+46.9908              917963.6218  386457.3109
* REVIEW LEVEE ALIGNMENT
DES A 100
 POB     165            10+00.0000              912539.4002  382623.5698
                                                 1161.3228  N  0^02'10.00" W
  PC     161            21+61.3228              913700.7227  382622.8378
        Radial direction from PC to CC is N 89^57'50.00" E
  CC     162                                    913701.4790  383822.8376
        Radial direction from CC to PT is N 24^32'12.19" W
        Radius                  1200.0000
        Delta                 65^29'57.81"
        Degree of Curve        4^46'28.73"
        Length                  1371.8161
        Tangent                  771.8569
        Chord                   1298.3280
        Middle ordinate          190.7497
        External                 226.8017
        Chord direction N 32^42'48.91" E
  PT     163            35+33.1388              914793.1134  383324.5060
                                                  255.3007  N 65^27'47.81" E
  PC     151            37+88.4396              914899.1338  383556.7519
        Radial direction from PC to CC is N 24^32'12.19" W
  CC     152                                    915808.8291  383141.4756
        Radial direction from CC to PT is S 46^25'19.19" E
        Radius                  1000.0000
        Delta                21^53'07.00"
        Degree of Curve       5^43'46.48"
        Length                   381.9702
        Tangent                  193.3415
        Chord                    379.6523
        Middle ordinate           18.1823
        External                  18.5190
        Chord direction N 54^31'14.31" E
  PT     153            41+70.4097              915119.4876  383865.9122
                                                 2827.2166  N 43^34'40.81" E
  PC     135            69+97.6263              917167.6267  385814.8298
        Radial direction from PC to CC is N 46^25'19.19" W
  CC     136                                    918546.3096  384365.9567
        Radial direction from CC to PT is S 76^39'16.49" E
        Radius                  2000.0000
        Delta                30^13'57.30"
        Degree of Curve       2^51'53.24"
        Length                  1055.3163
        Tangent                  540.2516
        Chord                   1043.1161
        Middle ordinate           69.2030
        External                  71.6833
        Chord direction N 28^27'42.16" E
  PT     137            80+52.9426              918084.6674  386311.9491
                                                  218.0600  N 13^20'43.51" E
 POE     167            82+71.0026              918296.8389  386362.2819
* COMPUTE STA.&OFF. TO INTERSECTION OF BOTH ALIGNMENTS
* A
                Alignments cleared
SET ALIGMENT 100 165 10+00
```

Horizontal alignment 100 activated
Beginning station is 10+00.0000

S A O (664)

Type		Baseline Station	Centerline Station	Baseline Offset	Elevation	Centerline Skew Angle
POB	664	79+28.3582	0+00.0000	0.0000	0.0000	0^00'00.00"

APPENDIX E

LEVEE VERTICAL CONTROL

CAMELBACK RANCH LEEVE DESIGN - NORTH PHASE

HEC-2 X-SECTION	EAST LEVEE STATION	GLENDALE LEVEE STATION
1	32+70.00	16+55.94
2	34+70.72	19+74.09
3	36+72.23	22+14.64
4	38+73.51	24+47.19
5	40+74.20	26+83.75
6	42+85.86	29+91.18
7	44+80.17	30+41.19
8	46+78.34	32+21.18
9	48+52.87	33+02.79
10	50+39.77	34+35.05
11	52+39.77	36+39.72
12	54+39.78	38+40.13
13	56+36.60	UP STREAM
14	58+30.97	UP STREAM
15	60+34.00	UP STREAM
16	62+31.45	UP STREAM
17	64+32.08	UP STREAM
18	66+44.97	UP STREAM
19	68+80.18	UP STREAM
20	70+80.66	UP STREAM
21	73+30.73	UP STREAM
22	75+55.90	UP STREAM
23	78+04.13	UP STREAM
24	80+34.08	UP STREAM
25	UP STREAM	UP STREAM
26	UP STREAM	UP STREAM
27	UP STREAM	UP STREAM
28	UP STREAM	UP STREAM

CAMELBACK RANCH LEVEE - NORTH - PHASE 2

Vertical Control - Soil Cement Bank Data

September 21, 1998

East Bank STA	Description	Foundation Invert Slope (%)	Design Foundation Line	Offset Foundation Line LT (ft)	100yr Water surf. elev.	SPF Water surf. elev.	SPF+3	TOP OF LEVEE Elevation	TOP OF LEVEE Slope (%)	Offset Toe Down (ft)	Toe Down Elevation	Toe Down Slope (%)
10+00.00	Begin Alignment											
10+26.40	Match Existing Grade							1031.60	-2.5641%			
10+42.00	Begin Soil Cement							1031.20	-2.0690%			
10+55.00	Begin Foundation Line	-11.1111%	1026.00	4.93				1030.93				
11+00.00	HEC X-SEC 21, GB	0.9000%	1021.00	9.00	1023.71	1026.96	1029.96	1030.00	0.0217%	32.40	1008.00	0.6087%
12+00.00			1021.90	8.12				1030.02		32.05	1008.61	
13+00.00	GB @ Foundation Line	0.0000%	1022.80	7.24				1030.04		31.69	1009.22	
14+00.00			1022.80	7.27				1030.07		30.62	1009.83	
15+00.00			1022.80	7.29				1030.09		29.54	1010.43	
15+60.00	HEC X-SEC 22, GB	0.2449%	1022.80	7.30	1025.06	1027.06	1030.06	1030.10	0.1224%	28.90	1010.80	0.1224%
16+00.00			1022.90	7.25				1030.15		28.94	1010.85	
17+00.00			1023.14	7.13				1030.27		29.04	1010.97	
18+00.00			1023.39	7.01				1030.39		29.14	1011.09	
19+00.00			1023.63	6.88				1030.52		29.23	1011.22	
20+00.00			1023.88	6.76				1030.64		29.33	1011.34	
20+50.00	HEC X-SEC 23, GB @ TOL	1.6000%	1024.00	6.70	1025.8	1027.69	1030.69	1030.70	0.5263%	29.38	1011.40	1.0526%
21+00.00		0.0400%	1024.80	6.16				1030.96		29.34	1011.93	
21+61.32	PC CURVE 1		1024.82	6.46				1031.29		28.52	1012.57	
22+00.00			1024.84	6.65				1031.49		28.00	1012.98	
22+40.00	HEC X-SEC 24, GB @ TOL		1024.86	6.84	1026.97	1028.67	1031.67	1031.70	0.1420%	27.46	1013.40	0.1420%
23+00.00			1024.88	6.91				1031.79		27.42	1013.49	
24+00.00			1024.92	7.01				1031.93		27.33	1013.63	
25+00.00			1024.96	7.11				1032.07		27.25	1013.77	
25+10.00	BEGIN RAMP		1024.96	7.12				1032.08		43.50	1013.78	
26+00.00	GB @ Foundation Line	0.1545%	1025.00	7.21				1032.21		43.18	1013.91	
26+25.00	RAMP PI		1025.04	7.50				1032.25		43.46	1013.95	
27+00.00	END RAMP		1025.15	23.20				1032.35		43.18	1014.05	
27+60.00	BEGIN RAMP		1025.25	23.19				1032.44		43.19	1014.14	
28+00.00			1025.31	23.23				1032.50		43.23	1014.20	
28+20.00	HEC X-SEC 25		1025.34	23.21	1027.47	1029.14	1032.14	1032.52		43.22	1014.22	
28+35.00	RAMP PI		1025.36	7.50				1032.54		43.10	1014.24	
29+00.00			1025.46	7.17				1032.64		43.19	1014.34	

CAMELBACK RANCH LEVEE - NORTH - PHASE 2

Vertical Control - Soil Cement Bank Data

September 21, 1998

East Bank STA	Description	Foundation Invert Slope (%)	Design Foundation Line	Offset Foundation Line LT (ft)	100yr Water surf. elev.	SPF Water surf. elev.	SPF+3	TOP OF LEVEE Elevation	TOP OF LEVEE Slope (%)	Offset Toe Down (ft)	Toe Down Elevation	Toe Down Slope (%)
29+45.00	END RAMP		1025.53	7.17				1032.70		43.21	1014.40	
30+00.00			1025.62	7.16				1032.78		27.21	1014.48	
30+40.00	HEC X-SEC 26	2.2667%	1025.68	7.16	1028.19	1029.79	1032.79	1032.84		27.22	1014.54	
30+85.00	GB @ Foundation Line & TOL	0.0171%	1026.70	6.20				1032.90	0.4923%	27.98	1014.60	-9.6364%
31+00.00			1026.70	6.26				1032.97		30.65	1013.15	
31+40.00	GB @ Toe Down		1026.71	6.44				1033.14		37.77	1009.30	0.0000%
32+00.00			1026.72	6.69				1033.41		38.05	1009.30	
32+70.00	HEC X-SEC 27= X-SEC1		1026.73	6.99	1,029.33	1030.66	1033.66	1033.72		38.37	1009.30	
33+00.00			1026.74	7.12				1033.86		38.50	1009.30	
34+00.00	GB @ Toe Down		1026.75	7.55				1034.30		38.96	1009.30	9.6364%
34+55.00	GB @ Toe Down		1026.76	7.78				1034.54		29.68	1014.60	0.6512%
34+70.72	HEC X-SEC 2		1026.77	7.85	1,030.25	1031.8	1034.8	1034.61		29.56	1014.70	
35+00.00			1026.77	7.[illegible]				1034.74		29.35	1014.89	
36+00.00			1026.79	8.4[illegible]				1035.19		28.64	1015.54	
36+70.00	GB @ Foundation Line & TOL	0.1538%	1026.80	8.[illegible]8				1035.78	0.2644%	28.42	1016.00	0.0000%
36+72.23	HEC X-SEC 3		1026.80	8.70	1,030.59	1032.23	1035.23	1035.51		28.15	1016.00	
37+00.00			1026.85	8.74				1035.59		28.26	1016.00	
38+00.00			1027.00	8.87				1035.87		28.67	1016.00	
38+73.51	HEC X-SEC 4		1027.11	8.97	1,030.93	1032.75	1035.75	1036.09		28.98	1016.00	
38+75.00	GB @ Toe Down		1027.12	8.98				1036.09		28.98	1016.00	-1.6000%
39+00.00			102[illegible].15	9.01				1036.16		29.81	1015.60	
40+00.00			102[illegible].31	9.14				1036.45		33.10	1014.00	
40+74.20	HEC X-SEC 5		1027.42	9.24	1,031.26	1033.13	1036.13	1036.66		35.54	1012.81	
41+00.00			1027.46	9.28				1036.74		36.39	1012.40	
41+25.00	GB @ Toe Down		1027.50	9.31				1036.81		37.21	1012.00	-10.0000%
41+55.00	GB @ Toe Down		1027.55	9.35				1036.90		42.73	1009.00	0.0000%
42+00.00			1027.62	9.41				1037.03		42.92	1009.00	
42+85.86	HEC X-SEC 6		1027.75	9.53	1,031.74	1033.57	1036.57	1037.27		43.27	1009.00	
43+00.00			1027.77	9.55				1037.32		43.33	1009.00	
44+00.00			1027.92	9.68				1037.60		43.74	1009.00	
44+50.00	GB @ Foundation Line	5.0000%	1028.00	9.75				1037.75		43.95	1009.00	
44+80.17	HEC X-SEC 7		1029.51	8.33	1,032.35	1034.3	1037.3	1037.83		45.24	1009.00	
44+85.00	GB @ Toe Down		1029.75	8.10				1037.85		45.45	1009.00	10.0000%

CAMELBACK RANCH LEVEE - NORTH - PHASE 2

Vertical Control - Soil Cement Bank Data

September 21, 1998

East Bank STA	Description	Foundation Invert Slope (%)	Design Foundation Line	Offset Foundation Line LT (ft)	100yr Water surf. elev.	SPF Water surf. elev.	SPF+3	TOP OF LEVEE Elevation	TOP OF LEVEE Slope (%)	Offset Toe Down (ft)	Toe Down Elevation	Toe Down Slope (%)
45+00.00	GB @ Foundation Line	0.2286%	1030.50	7.39				1037.89		43.39	1010.50	
45+15.00	GB @ Toe Down		1030.53	7.40				1037.93		40.76	1012.00	1.5224%
46+00.00			1030.73	7.45				1038.18		38.83	1013.29	
46+78.34	HEC X-SEC 8		1030.91	7.50	1033.08	1035.27	1038.27	1038.41		37.06	1014.49	
47+00.00			1030.96	7.51				1038.47		36.56	1014.82	
48+00.00			1031.19	7.57				1038.76		34.29	1016.34	
48+50.00	GB @ Foundation Line & TOL	0.2809%	1031.30	7.60				1038.90	0.1500%	33.16	1017.10	0.1500%
48+52.87	HEC X-SEC 9		1031.31	7.60	1033.43	1035.69	1038.69	1038.90		33.16	1017.10	
49+00.00			1031.44	7.53				1038.98		33.21	1017.18	
50+00.00			1031.72	7.40				1039.13		33.32	1017.33	
50+39.77	HEC X-SEC 10		1031.83	7.35	1033.8	1036.14	1039.14	1039.18		33.36	1017.38	
50+50.00	GB @ TOL & Toe Down		1031.86	7.34				1039.20	0.3000%	33.37	1017.40	1.0000%
51+00.00			1032.00	7.35				1039.35		32.73	1017.90	
52+00.00			1032.28	7.37				1039.65		31.46	1018.90	
52+39.77	HEC X-SEC 11		1032.39	7.37	1034.19	1036.6	1039.6	1039.77		30.95	1019.30	
52+50.00	GB @ TOL & Toe Down		1032.42	7.38				1039.80	0.1500%	30.82	1019.40	0.1500%
53+00.00			1032.56	7.39				1039.95		30.95	1019.48	
54+00.00			1032.84	7.41				1040.25		31.20	1019.63	
54+39.78	HEC X-SEC 12		1032.96	7.41	1034.52	1036.92	1039.92	1040.37		31.30	1019.68	
54+50.00	GB @ TOL & Toe Down		1032.99	7.11				1040.10	0.3793%	31.03	1019.70	-1.0000%
55+00.00			1033.13	7.16				1040.29		32.23	1019.20	
56+00.00			1033.41	7.26				1040.67		34.63	1018.20	
56+36.60	HEC X-SEC 13		1033.51	7.30	1034.92	1037.32	1040.32	1040.81		35.51	1017.83	
57+00.00			1033.69	7.36				1041.05		37.04	1017.20	
57+40.00	GB @ Foundation Line & TOL	0.3333%	1033.80	7.40				1041.20	0.2319%	38.00	1016.80	0.2319%
58+00.00			1034.00	7.34				1041.34		38.05	1016.94	
58+30.97	HEC X-SEC 14		1034.10	7.31	1035.35	1037.77	1040.77	1041.41		38.07	1017.01	
59+00.00			1034.33	7.24				1041.57		38.13	1017.17	
60+00.00			1034.67	7.14				1041.80		38.21	1017.40	
60+34.00	HEC X-SEC 15		1034.78	7.10	1035.87	1038.3	1041.3	1041.88		38.24	1017.48	
61+00.00	GB @ Foundation Line	0.5455%	1035.00	7.03				1042.03		38.29	1017.63	
62+00.00			1035.55	6.72				1042.27		38.54	1017.87	
62+31.45	HEC X-SEC 16		1035.72	6.62	1036.35	1038.79	1041.79	1042.34		38.62	1017.94	

CAMELBACK RANCH LEVEE - NORTH - PHASE 2

Vertical Control - Soil Cement Bank Data

September 21, 1998

East Bank STA	Description	Foundation Invert Slope (%)	Design Foundation Line	Offset Foundation Line LT (ft)	100yr Water surf. elev.	SPF Water surf. elev.	SPF+3	TOP OF LEVEE Elevation	TOP OF LEVEE Slope (%)	Offset Toe Down (ft)	Toe Down Elevation	Toe Down Slope (%)
63+00.00			1036.09	6.41				1042.50		38.79	1018.10	
64+00.00			1036.64	6.09				1042.73		39.04	1018.33	
64+30.00	GB @ Foundation Line & TOL	0.0171%	1036.80	6.00				1042.80	0.0909%	39.12	1018.40	0.9545%
64+32.08	HEC X-SEC 17		1036.80	6.00	1036.81	1039.27	1042.27	1042.80		39.09	1018.42	
65+00.00			1036.81	6.05				1042.86		37.99	1019.07	
66+00.00			1036.83	6.13				1042.95		36.38	1020.02	
66+44.97	HEC X-SEC 18		1036.84	6.16	1037.31	1039.79	1042.79	1043.00		35.65	1020.45	
66+50.00	GB @ TOL & Toe Down		1036.84	6.16				1043.00	0.2206%	35.57	1020.50	0.2206%
67+00.00			1036.85	6.26				1043.11		35.49	1020.61	
68+00.00			1036.86	6.47				1043.33		35.33	1020.83	
68+80.18	HEC X-SEC 19		1036.88	6.63	1037.81	1040.3	1043.3	1043.51		35.20	1021.01	
69+00.00			1036.88	6.67				1043.55		35.16	1021.05	
70+00.00			1036.90	6.87				1043.77		35.00	1021.27	
70+80.66	HEC X-SEC 20		1036.91	7.04	1038.34	1040.89	1043.89	1043.95		34.87	1021.45	
71+00.00			1036.91	7.08				1043.99		34.84	1021.49	
72+00.00			1036.93	7.28				1044.21		34.67	1021.71	
73+00.00	BEGIN AMP		1036.95	7.49				1044.43		50.51	1021.93	
73+30.00	GB @ TOL & Toe Down		1036.95	7.55				1044.50	0.3600%	50.46	1022.00	0.9787%
73+30.73	HEC X-SEC 21		1036.95	7.55	1038.82	1041.35	1044.35	1044.50		50.45	1022.01	
74+00.00			1036.97	7.78				1044.75		49.51	1022.69	
74+55.00	RAMP PI		1036.98	8.10				1044.95		48.87	1023.22	
75+00.00			1036.98	24.68				1045.10		48.66	1023.66	
75+40.00	END RAMP		1036.99	24.27				1045.26		47.55	1024.06	
75+55.00	GB @ TOL		1036.99	24.32				1045.31	0.1148%	47.34	1024.20	
75+55.90	HEC X-SEC 22		1036.99	24.33	1039.7	1042.29	1045.29	1045.31		47.34	1024.21	
76+00.00	GB @ Foundation Line	1.0000%	1037.00	24.36				1045.36		46.61	1024.64	
76+80.00	RAMP PI		1037.80	8.00				1045.45		46.27	1025.43	
77+00.00			1038.00	7.48				1045.48		45.77	1025.62	
78+00.00	GB @ Foundation Line & TD	0.4272%	1039.00	6.59				1045.59		45.00	1026.60	-19.0000%
78+04.13	HEC X-SEC 23		1039.02	6.58	1039.97	1042.6	1045.6	1045.60		44.98	1025.82	
78+20.00			1039.09	6.52				1045.61		35.84	1022.80	0.0000%
79+00.00			1039.43	6.28				1045.71		36.21	1022.80	
80+00.00			1039.85	5.97				1045.82		36.66	1022.80	

CAMELBACK RANCH LEVEE - NORTH - PHASE 2

Vertical Control - Soil Cement Bank Data

September 21, 1998

East Bank STA	Description	Foundation Invert Slope (%)	Design Foundation Line	Offset Foundation Line LT (ft)	100yr Water surf. elev.	SPF Water surf. elev.	SPF+3	TOP OF LEVEE Elevation	TOP OF LEVEE Slope (%)	Offset Toe Down (ft)	Toe Down Elevation	Toe Down Slope (%)
80+34.08	HEC X-SEC 24, GB @ TL,TO	-3.0135%	1040.00	5.86	1040.15	1042.83	1045.83	1045.86	-1.3046%	36.82	1022.80	
80+55.00			1039.37	6.22				1045.59		36.05	1022.80	16.0000%
80+75.00			1038.77	6.56				1045.33		29.55	1026.00	0.0000%
81+00.00			1038.01	6.99				1045.00	0.0000%	28.61	1026.00	
82+00.00		0.0000%	1035.00	10.00				1045.00		26.20	1026.00	
82+33.00			1035.00	10.00				1045.00		19.00	1026.00	
82+51.00			1035.00	10.00				1045.00				
82+71.00	Match Existing Elevation							1045.00				

CAMELBACK RANCH LEVEE - GLENDALE AIRPORT

Vertical Control - Soil Cement Bank Data

Glendale Levee STA	Description	Foundation Line Slope (%)	Design Foundation Line	Offset Foundation Line (ft) RT	100yr Water surf. elev.	SPF Water surf. elev.	Freeboard Elevation SPF +3	TOP OF LEVEE Elev.	Top of Levee slope (%)	Offset Toe Down (ft)	Toe Down Elev.	Toe Long. Slope (%)
9+11.80	BEGIN SOIL CEMENT	0.0000%	1,031.00					1,017.60	50.0000%	26.80	1,017.60	0.0000%
9+50.00	GB TOP		1,031.00	5.70				1,036.70	0.0000%	32.50	1,017.60	
10+00.00	PT/GB TOP, TOE, FOUNDATION	-1.4000%	1,031.00	5.70				1,036.70	-0.1128%	32.50	1,017.60	-0.5000%
10+50.00	HEC-2 SECTION 29		1,030.30	6.34	1,031.70	1,033.64	1,036.64	1,036.64		32.24	1,017.35	
11+00.00			1,029.60	6.99				1,036.59		31.99	1,017.10	
12+00.00	GB FOUNDATION	1.3000%	1,028.20	8.27				1,036.47		31.47	1,016.60	
13+00.00			1,029.50	6.86				1,036.36		33.66	1,016.10	
14+00.00	GB FOUNDATION	-1.5000%	1,030.80	5.45				1,036.25		35.85	1,015.60	
14+79.48	PC		1,029.61	6.55				1,036.16		35.36	1,015.20	
15+00.00	GB FOUNDATION	-0.4423%	1,029.30	6.84				1,036.14		35.24	1,015.10	
16+00.00	GB TOE		1,028.86	7.17				1,036.02		35.68	1,014.60	-9.6364%
16+55.00	GB TOE		1,028.61	7.35				1,035.96		45.98	1,009.30	0.0000%
16+55.94	HEC-2 SECTION 1 & 28		1,028.61	7.35	1,030.38	1,032.58	1,035.58	1,035.96		45.97	1,009.30	
17+00.00			1,028.42	7.49				1,035.91		45.73	1,009.30	
18+00.00			1,027.97	7.82				1,035.80		45.17	1,009.30	
19+00.00			1,027.53	8.15				1,035.68		44.62	1,009.30	
19+15.00	GB TOE		1,027.46	8.20				1,035.67		44.53	1,009.30	9.6364%
19+70.00	GB TOE		1,027.22	8.38				1,035.61		33.63	1,014.60	0.5714%
19+71.91	PT		1,027.21	8.39				1,035.60		33.59	1,014.61	
19+74.09	HEC-2 SECTION 2 & 28		1,027.20	8.40	1,030.38	1,032.58	1,035.58	1,035.60		33.56	1,014.62	
19+75.00	GB TOP		1,027.20	8.40				1,035.60	0.0000%	33.54	1,014.63	
19+78.00	20" EPNG PIPELINE		1,027.19	8.42				1,035.60		33.50	1,014.65	
20+00.00			1,027.09	8.51				1,035.60		33.15	1,014.77	
20+20.00	GB FOUNDATION	0.0000%	1,027.00	8.60				1,035.60		32.83	1,014.89	
21+00.00			1,027.00	8.60				1,035.60		31.91	1,015.34	
21+27.47	PC	-1.9881%	1,027.00	8.60				1,035.60		31.60	1,015.50	
22+00.00			1,025.56	10.04				1,035.60		29.33	1,015.91	
22+14.64	HEC-2 SECTION 3		1,025.27	10.33	1,030.59	1,032.23	1,035.23	1,035.60		28.87	1,016.00	
22+12.32	PT/GB TOP		1,025.31	10.29				1,035.60		28.94	1,015.98	
22+15.00	GB TOE		1,025.26	10.34				1,035.60	NA	28.86	1,016.00	0.0000%
22+28.07	OUTFALL PGL	2.0000%	1,025.00	8.60				1,025.45	NA	26.60	1,016.00	
22+36.07	OUTFALL INVERT	1.3739%	1,025.16	6.60				1,025.61	NA	24.92	1,016.00	
22+43.18	PC/GB TOP		1,025.26	8.34				1,033.60	0.0000%	26.86	1,016.00	
22+50.00			1,025.35	8.25				1,033.60		26.95	1,016.00	
23+00.00			1,026.04	7.56				1,033.60		27.64	1,016.00	
23+28.03	PT		1,026.42	7.18				1,033.60		28.02	1,016.00	
23+70.00	GB TOP/FOUNDATION	-14.0000%	1,027.00	6.60				1,033.60	0.1905%	28.60	1,016.00	
24+00.00	GB FOUNDATION	0.0000%	1,022.80	10.86				1,033.66		24.46	1,016.00	
24+47.19	HEC-2 SECTION 4		1,022.80	10.95	1,030.93	1,032.75	1,033.75	1,033.75		24.55	1,016.00	
24+50.00	GB TOE		1,022.80	10.95				1,033.75		24.55	1,016.00	-1.2714%
25+00.00			1,022.80	11.05				1,033.85		25.92	1,015.36	

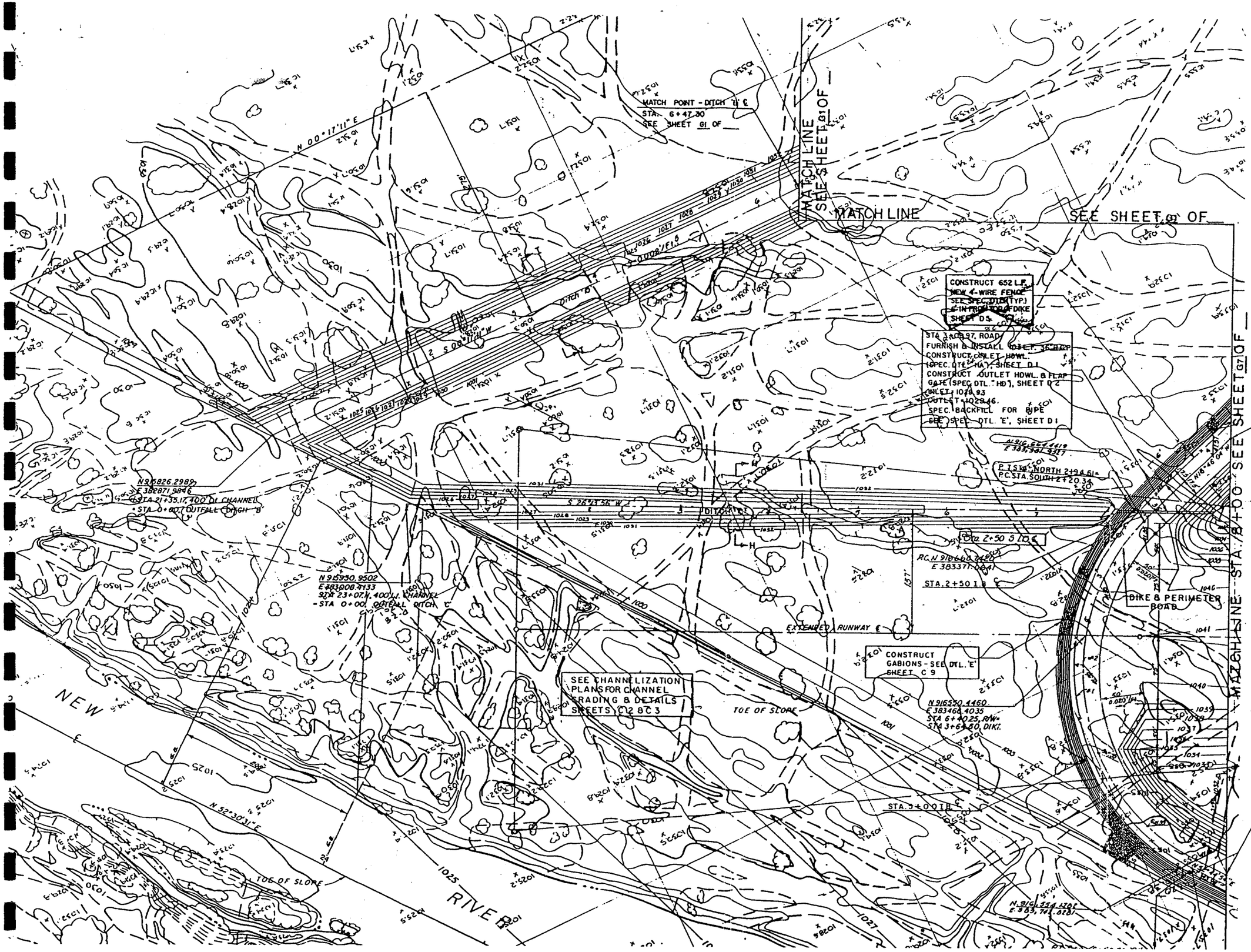
CAMELBACK RANCH LEVEE - GLENDALE AIRPORT

Vertical Control - Soil Cement Bank Data

Glendale Levee STA	Description	Foundation Line Slope (%)	Design Foundation Line	Offset Foundation Line (ft) RT	100yr Water surf. elev.	SPF Water surf. elev.	Freeboard Elevation SPF +3	TOP OF LEVEE Elev.	Top of Levee slope (%)	Offset Toe Down (ft)	Toe Down Elev.	Toe Long. Slope (%)
26+00.00			1,022.80	11.24				1,034.04		28.65	1,014.09	
26+83.75	HEC-2 SECTION 5		1,022.80	11.40	1,031.26	1,033.13	1,034.13	1,034.20		30.94	1,013.03	
27+00.00			1,022.80	11.43				1,034.23		31.39	1,012.82	
27+63.46	PC		1,022.80	11.55				1,034.35		33.12	1,012.01	
28+00.00	GB TOE		1,022.80	11.62				1,034.42		34.12	1,011.55	-10.0000%
28+25.50	GB TOE		1,022.80	11.67				1,034.47		39.27	1,009.00	0.0000%
29+00.00			1,022.80	11.81				1,034.61		39.41	1,009.00	
29+50.00			1,022.80	11.90				1,034.70		39.50	1,009.00	
29+91.18	HEC-2 SECTION 6		1,022.80	11.98	1,031.74	1,033.57	1,034.57	1,034.78		39.58	1,009.00	
30+00.00	GB TOP		1,022.80	12.00				1,034.80	1.2500%	39.60	1,009.00	
30+40.00	GB TOP		1,022.80	12.50				1,035.30	0.5769%	40.10	1,009.00	
30+41.19	HEC-2 SECTION 7		1,022.80	12.51	1,032.35	1,034.30	1,035.30	1,035.31		40.11	1,009.00	
30+42.18	PT		1,022.80	12.51				1,035.31		40.11	1,009.00	
30+50.00	GB TOE		1,022.80	12.56				1,035.36		40.16	1,009.00	10.0000%
30+80.00	GB TOE		1,022.80	12.73				1,035.53		34.33	1,012.00	2.2727%
31+00.00	GB FOUNDATION	0.7333%	1,022.80	12.85				1,035.65		33.54	1,012.45	
32+00.00			1,023.53	12.69				1,036.22		30.30	1,014.73	
32+21.18	HEC-2 SECTION 8		1,023.69	12.66	1,033.08	1,035.27	1,036.27	1,036.35		29.62	1,015.21	
33+00.00	GB TOP/TOE		1,024.27	12.53				1,036.80	0.8000%	27.07	1,017.00	0.0000%
33+02.79	HEC-2 SECTION 9		1,024.29	12.54	1,033.43	1,035.69	1,036.69	1,036.82		27.11	1,017.00	
34+00.00	GB FOUNDATION	0.9000%	1,025.00	12.60				1,037.60		28.60	1,017.00	
34+35.00	GB TOE/HEC X-SEC 10		1,025.32	12.56	1,033.80	1,036.14	1,037.14	1,037.88		29.19	1,017.00	1.3171%
34+45.66	PC		1,025.41	12.55				1,037.97		29.10	1,017.14	
35+00.00			1,025.90	12.50				1,038.40		28.59	1,017.86	
36+00.00	GB FOUNDATION	3.7000%	1,026.80	12.40				1,039.20		27.65	1,019.17	
36+39.72	HEC-2 SECTION 11		1,028.27	11.25	1,034.19	1,036.60	1,037.60	1,039.52		28.39	1,019.70	
36+40.00	GB TOE		1,028.28	11.24				1,039.52		28.40	1,019.70	0.0000%
37+00.00	GB TOP/FOUNDATION	0.0000%	1,030.50	9.50				1,040.00	0.0000%	31.10	1,019.70	
37+05.00	BEGIN BANK SLOPE TRANSITION		1,030.50	9.50				1,040.00		31.10	1,019.70	
38+00.00	GB TOE		1,030.50	19.00				1,040.00		40.60	1,019.70	50.0000%
38+40.60	END SOIL CEMENT/MATCH		1,030.50	19.00				1,040.00		0.00	1,040.00	

APPENDIX F

GLENDALE AIRPORT LEVEE AS-BUILTS



Scale: 1" = 50'

NOTE: SEE SHEET G17 FOR DITCH 'B' PROFILE
& SHEET G18 FOR DITCH 'C' PROFILE

DIKE CURVE DATA

CURVE # 2:

R = 232.50'
Δ = 108°29'02"
T = 322.87'
L = 440.22'

FENCE CURVE DATA

CURVE # 1:

R = 244'
Δ = 108°29'02"
T = 338.84'
L = 461.99'

MATCH POINT - DIKE ℄
STA. 4+28.71
SEE SHEET G7 OF

MATCH POINT DITCH C ℄
STA 9+17.88
STA. 8+00, R/W
SEE SHEET G7 OF

SECTION I-I & SECTION H-H
SEE SHEET G1 OF

I.B.℄ - CONSTRUCT INTERMEDIATE GABION BUTTRESS - SEE DTL. SHEET C9 OF
℄ STATION OF BUTTRESS

LEGEND

- 4' Wire Fence
- 6' Chain Link Fence
- Existing 1' Contour
- Proposed 1' Contour

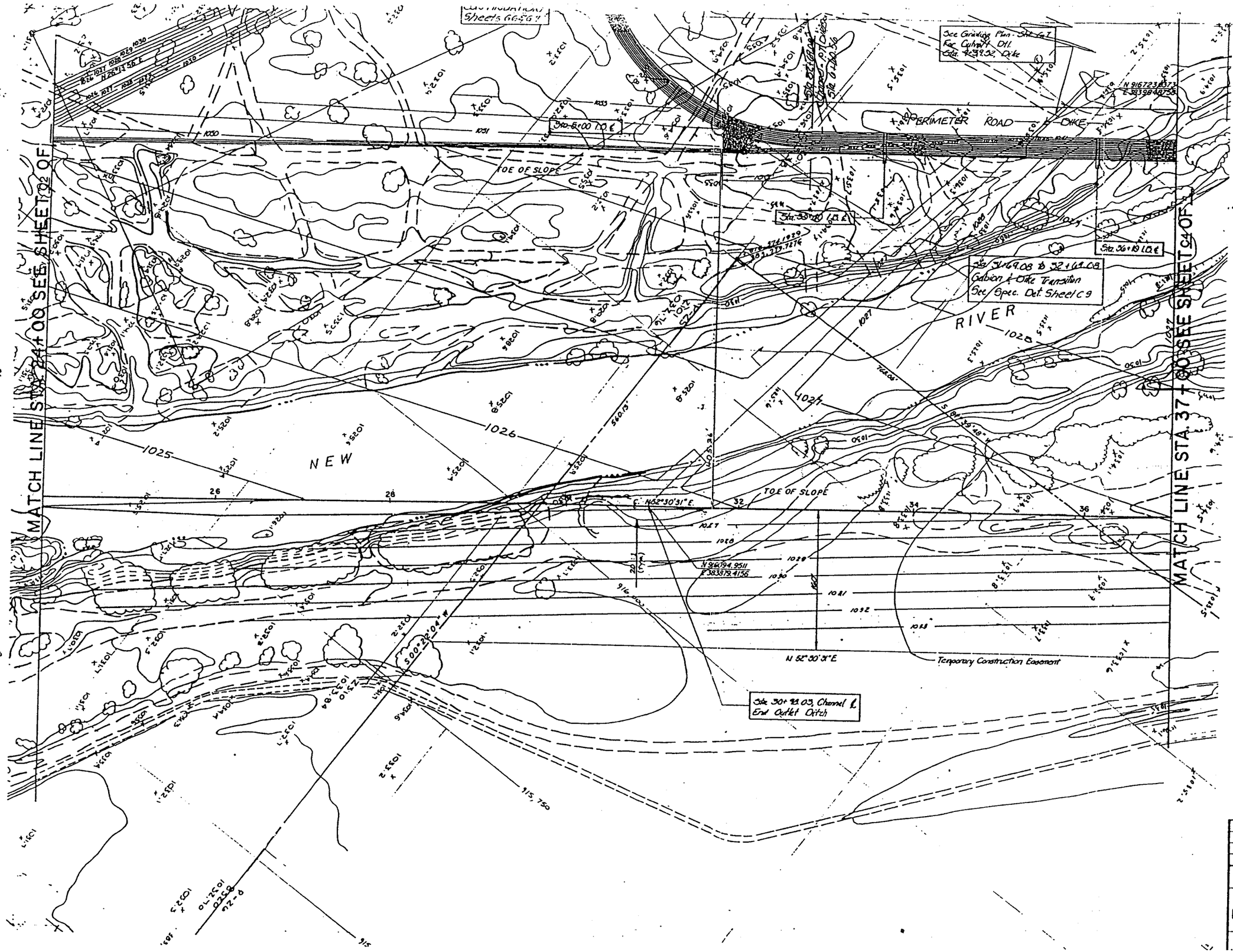
MATCH POINT - DIKE ℄
STA. 6+98.80
SEE SHEET G7 OF

NO.	REVISIONS	BY	APP.
	Issued For Const		
B	Issued for Bidding		

CITY OF GLENDALE, ARIZONA

GLENDALE MUNICIPAL AIRPORT

GRADING PLAN


MATCH LINE STA. 24+00 SEE SHEET 02 OF
MATCH LINE STA. 37+00 SEE SHEET 04 OF
NEW
RIVER
PERIMETER ROAD
DIKE
TOE OF SLOPE
TOE OF SLOPE
See Grading Plan - Sht 6 of 7 For Culvert Dtl. Sta. 4+39.92 Dike
Sta. 6+00 ℄
Sta. 33+00 ℄
Sta. 36+19 ℄
Sta. 31+69.08 to 32+69.08 Gabion & Dike Transition See Spec. Det. Sheet C9
Sta. 30+93.03 Channel ℄ End Outlet Ditch
N 52°30'31"E
Temporary Construction Easement
Match Channel Grade
Section L-L
L.B.℄ - CONSTRUCT INTERMEDIATE GABION BUTTRESS - SEE DTL. SHEET C9 OF ___
℄ STATION OF BUTTRESS
LEGEND
Existing 1' Contour
Proposed 1' Contour
Scale: 1" = 50'
Issued For Const.
Issued For Bidding
NO. REVISIONS BY APP. DATE
CITY OF GLENDALE, ARIZONA
GLENDALE MUNICIPAL AIRPORT
NEW RIVER CHANNELIZATION
BOOKER WILLIS & BARNETT
Z&H ENGINEERING, INC.

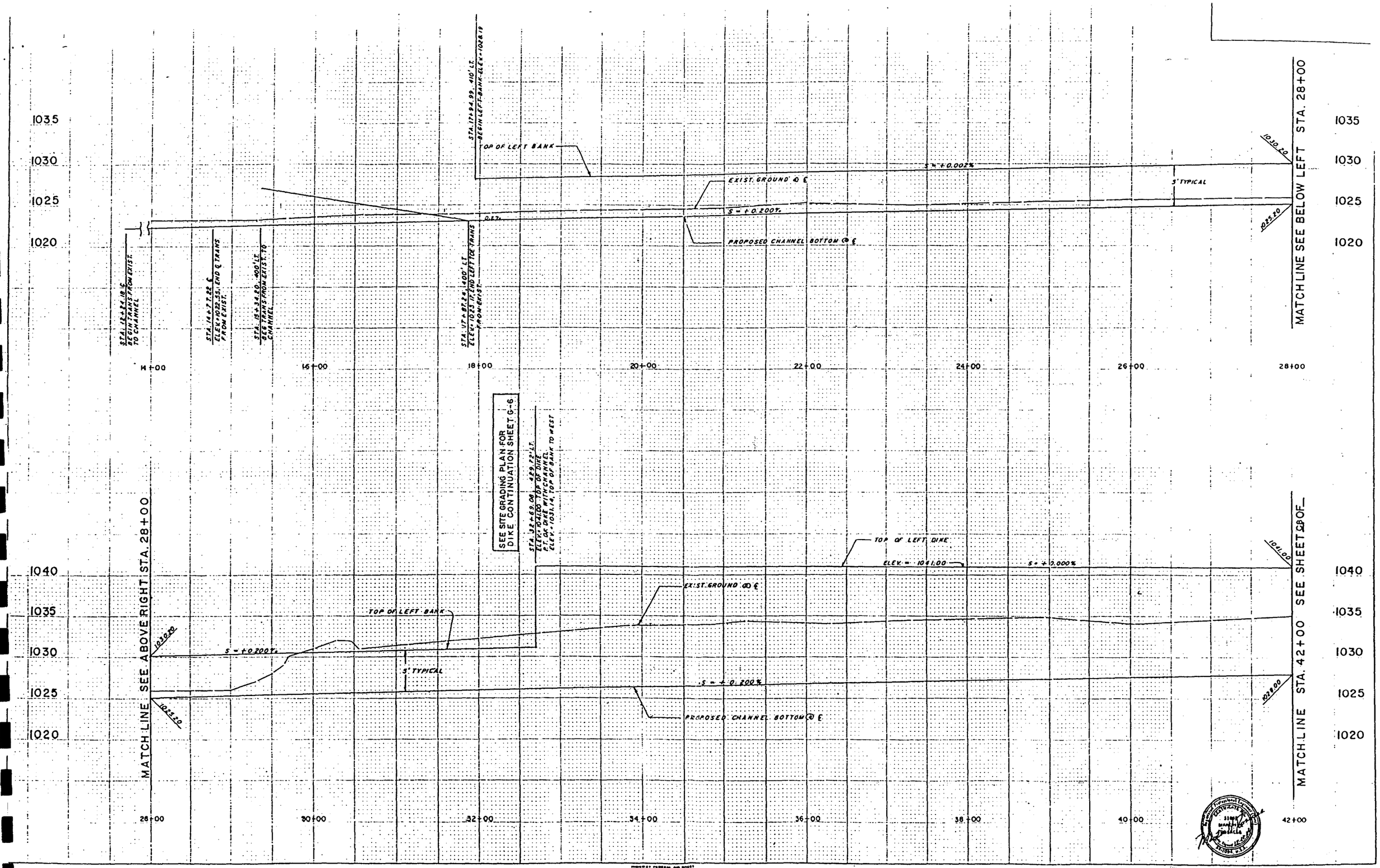
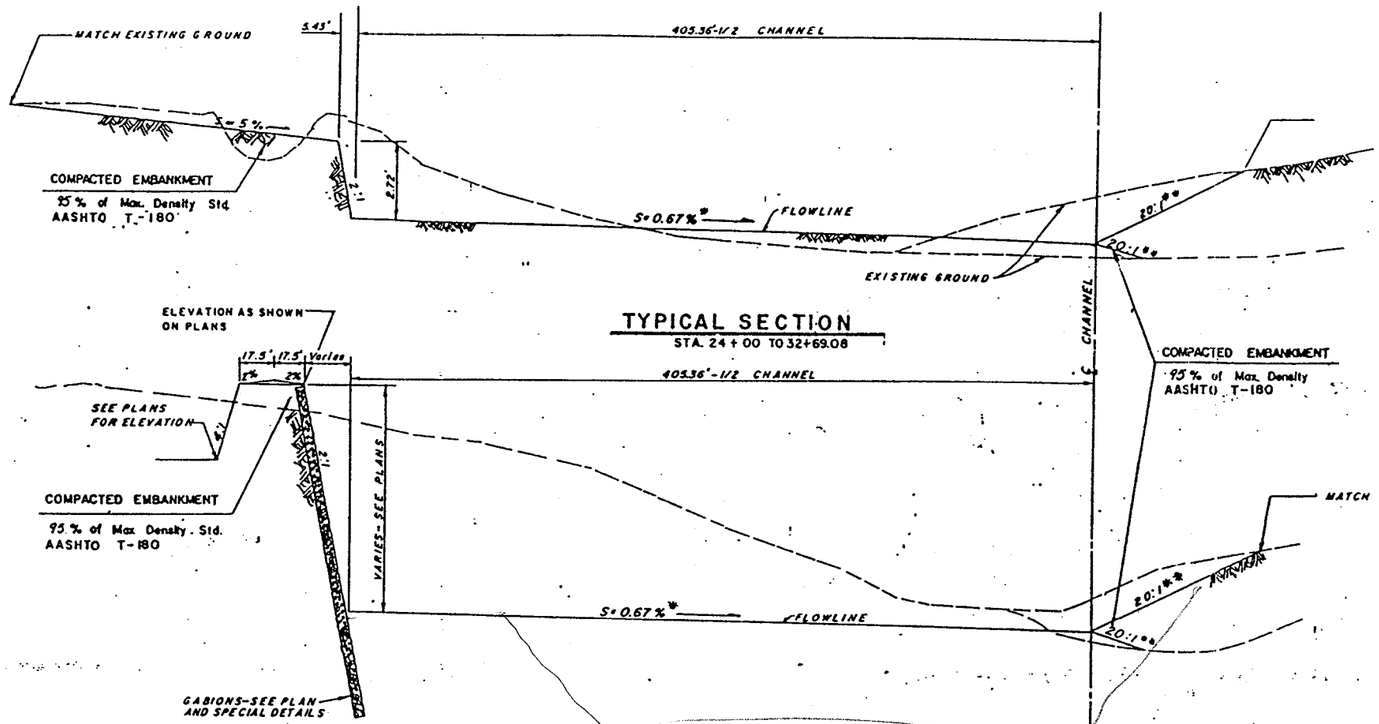


PLATE 3-FULL CROSS SECTION/FULL BOT

Issued For Const. 2-11-83

NEW RIVER CHANNEL PROFILE

NEW RIVER CHANNELIZATION & DIKE

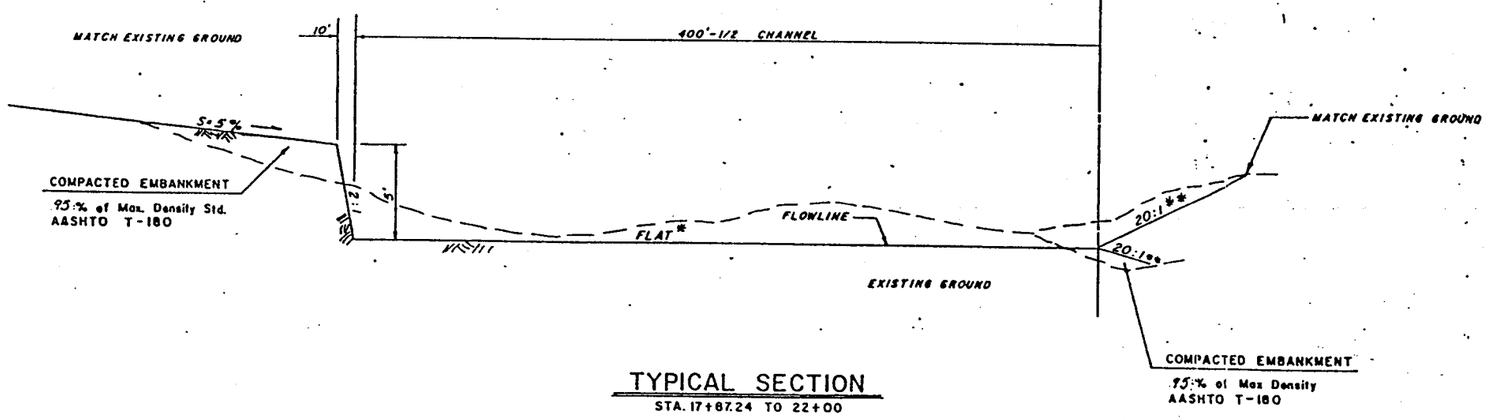


TYPICAL SECTION

STA. 24+00 TO 32+69.08

TYPICAL SECTION

STA. 32+69.08 TO 67+17.60



TYPICAL SECTION

STA. 17+87.24 TO 22+00

** NOTE:

WHEN IN CUT SITUATION AT CHANNEL ℄ SLOPE UP AT 20:1 TO MATCH EXIST.
WHEN IN FILL SITUATION AT CHANNEL ℄ SLOPE DOWN AT 20:1 TO MATCH EXIST.
(TYP.- ALL SECTIONS)

NOTE:

STA. 22+00 TO STA. 24+00
CROSS-SLOPE TRANSITION
FROM FLAT TO 0.67%

NOTE:

ALL SECTIONS ARE SHOWN LOOKING UPSTREAM.

NO.	REVISIONS	BY	APP.	DATE
	Issued for Const			2-11-85
1	Correction Bid			2-8-85
2	Issued for Bidding			1-8-85

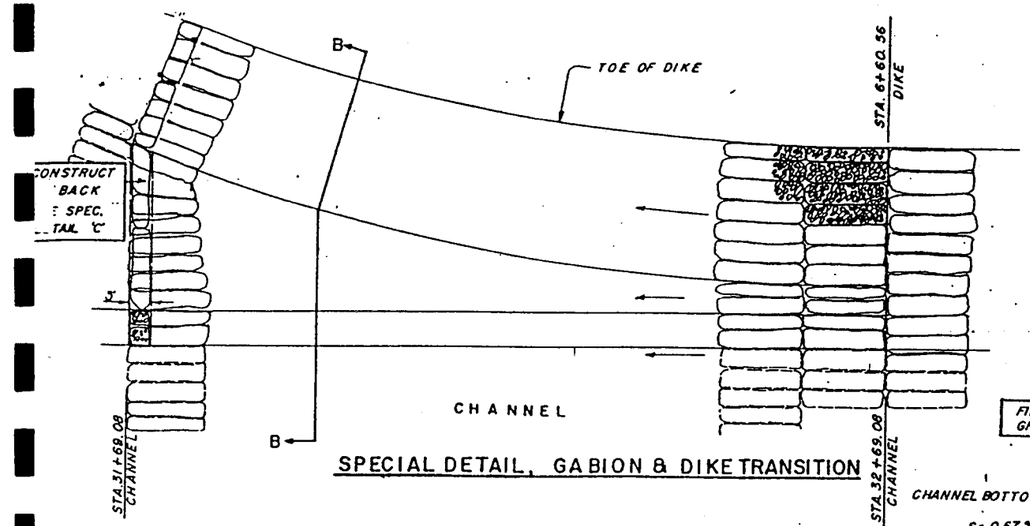
CITY OF GLENDALE, ARIZONA

GLENDALE MUNICIPAL AIRPORT

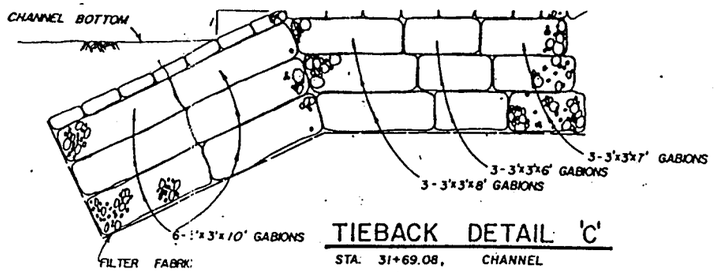
CHANNEL DETAILS

BOSKER WILLIS + BARLOW — DENVER, COLORADO — KANSAS CITY, MISSOURI

Z&H ENGINEERING, INC. — PHOENIX, ARIZONA

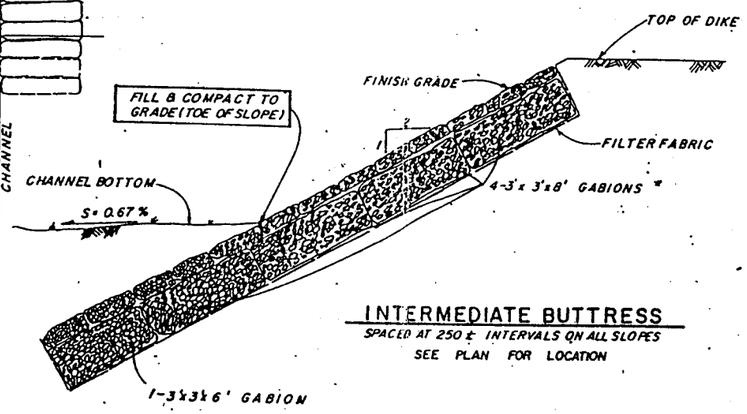


SPECIAL DETAIL, GABION & DIKE TRANSITION



TIEBACK DETAIL 'C'

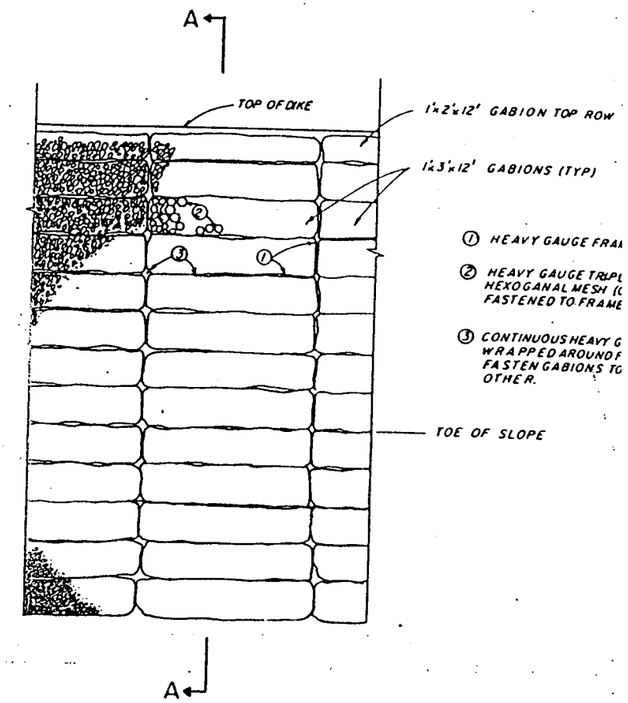
STA. 31+69.08, CHANNEL



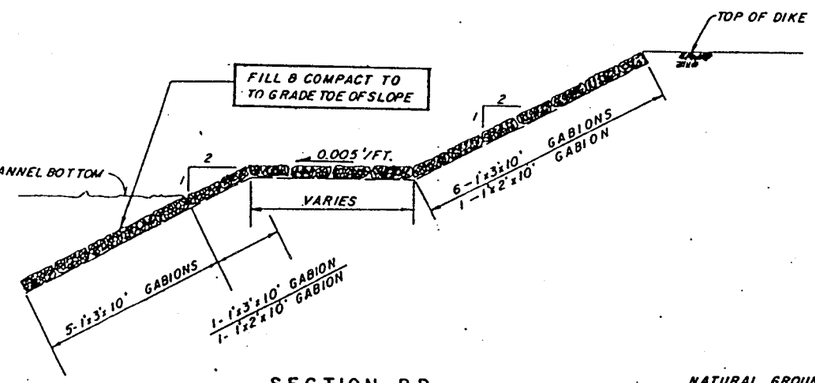
INTERMEDIATE BUTTRESS

SPACED AT 250± INTERVALS ON ALL SLOPES

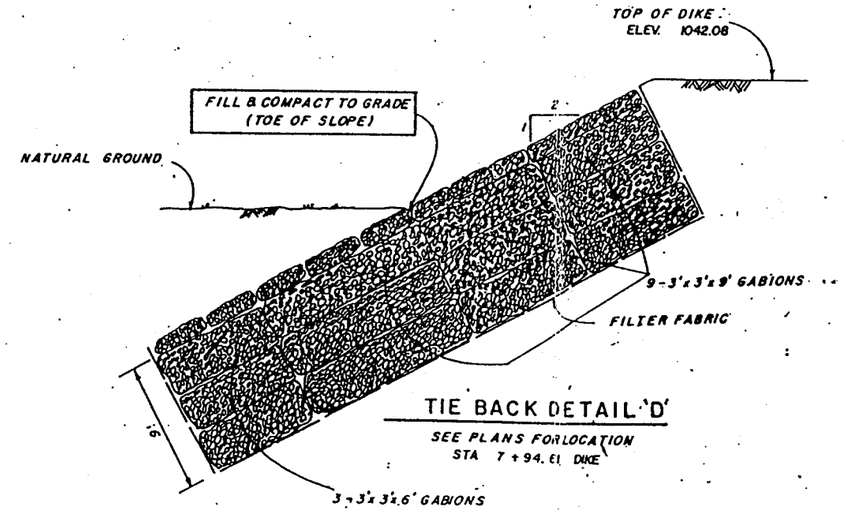
SEE PLAN FOR LOCATION



PLAN



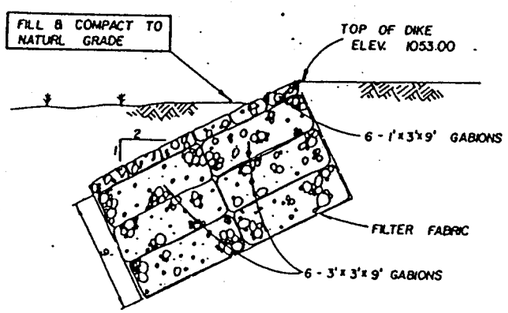
SECTION B-B



TIE BACK DETAIL 'D'

SEE PLANS FOR LOCATION

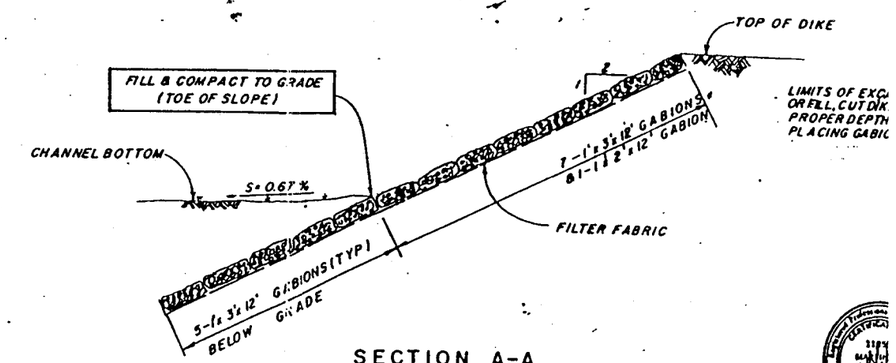
STA 7+94.61 DIKE



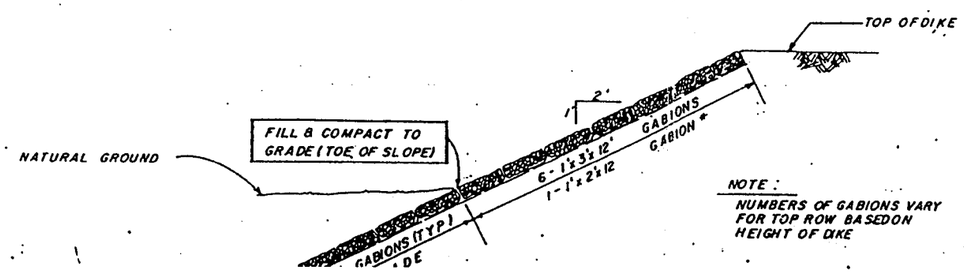
TIEBACK DETAIL 'A'

SEE PLANS FOR LOCATION

266.99' N. OF STA. 73+68.54, CHANNEL



SECTION A-A



NOTE:

NUMBERS OF GABIONS VARY FOR TOP ROW BASED ON HEIGHT OF DIKE

* STA. 43+50 TO STA. 67+33.06 – NUMBER OF GABIONS ARE CONSTANT BETWEEN THESE STATIONS BUT VARY WITH HEIGHT OF DIKE BETWEEN STA. 32+69.08 TO 43+50 & STA. 67+33.06 TO 74+15.79

NO.	REVISIONS	BY
	Issued for Const	
B	Issued for Bidding	

CITY OF GLENDALE, ARIZONA

GLENDALE MUNICIPAL AIRPO

GABION DETAILS

APPENDIX G

QUANTITIES

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 1 of 8
		DESIGNED BY JRG	DATE 9/21/99
SUBJECT: ESTIMATE OF QUANTITIES		CHECKED BY	DATE

REMOVALS @ GLENDALE AIRPORT LEVEE

GABIONS @ AIRPORT LEVEE

(1090)(20)(1)/27 = 807 C.Y. @ $3/CY ⇒ $2500

6-1'X3'X12'
& 1-1'X2'X12' BASKETS PER MANUFACTS

AIRPORT SECURITY FENCE

1090 LF @ $5/FT ⇒ $5500

HEADWALL & FLAPGATE FOR EXIST. 36" RCP

1 EA LS ⇒ $1500

SUBTOTAL $9500

USE $10,000

REMOVALS @ EAST LEVEE

SRP HEADWALL STRUCTURE & DEBRIS RACK @ CAMELBACK RD

1 EA LS ⇒ $1000

CONCRETE IRRIGATION DITCHES

1060 + 2700 + 1710 + 580 + 560 = 7210

7210 @ $2/LF ⇒ $15,000

MISCELLANEOUS IRRIGATION STRUCTURES & RIPRAP @ DETENTION BASIN OUTFALL LS ⇒ $10,000

PILES OF CONCRETE & MISC. DEBRIS

LS ⇒ $5000

SOIL CEMENT @ END OF LEVEE

LS ⇒ $5000

SAFETY RAIL @ END OF LEVEE

110 LF @ $2/FT ⇒ $220

SUBTOTAL $36,220

USE $37,000

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 2 of 8
		DESIGNED BY JRC	DATE 10/23/98
SUBJECT: ESTIMATE OF QUANTITIES		CHECKED BY	DATE

NEW CONSTRUCTION

GROUTED RIPRAP @ AIRPORT LEVEE

$\left[(3850-3840.60)(35)(1.5) + \frac{40.6(35)}{2}(1.5)\right]/27 = 58$ C.Y.

GROUTED RIPRAP @ DETENTION BASIN OUTFALL

(6FT)(32FT)(1.5FT)/27 = 11 C.Y.

LOOSE RIPRAP @ DETENTION BASIN OUTFALL

(6FT)(85FT)(1.5FT)/27 = 29 C.Y.

LOOSE RIPRAP @ 30" PIPE OUTFALL @ AIRPORT

PER SHEET 7 = 20 C.Y.

- CEMENT CONTENT

EAST LEVEE

52765 C.Y. (27FT³/1CY)(125 LB/FT³)(1 TON/2000 LB)(.10) = 8904 TONS

GLENDALE LEVEE

21173 C.Y. (27)(125)(1/2000)(.10) = 3573 TONS

- AGGREGATE BASE COURSE

EAST LEVEE

[(7829-1135)(8) + (8271-8047)(8)]/9 = 6149.3 S.Y.

CAMELBACK ROAD ENTRANCE

9453 FT² /9 = 1050.3 S.Y.

DETENTION BASIN & BASIN RAMPS

[(3294)(16) + 350(15)]/9 = 6439.3 S.Y.

EAST LEVEE SUBTOTAL 13639 S.Y.

WARF LEVEE

(2127.49-913)(8)/9 = 1080 S.Y.

AIRPORT LEVEE

(3841-2328)(7)/9 = 1178 S.Y.

GADC

[(1060-992)(7)]2/9 + [(1893-1060)(17)]2/9

+ (2020.26-1893.17)(17)/9 + [(1943-1893)(17)]/9 = 3588 S.Y.

GLENDALE LEVEE SUBTOTAL 5846 S.Y.

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 3 of 9
		DESIGNED BY JRG	DATE 7/21/99
SUBJECT: ESTIMATE OF QUANTITIES		CHECKED BY DBL	DATE 10-22-98

DRAINAGE & IRRIGATION STRUCTURES

INLET STRUCTURE PER MAG DET 501-5
@ DETENTION BASIN 1 EA

HEADWALL STRUCTURE PER DET ON SHT 24
36" RCP @ AIRPORT & DET. BASIN OUTFALL
2 EA

IRRIGATION HEADWALLS
L TYPE PER MAG DET 501-1
3 EA

STRAIGHT TYPE PER MAG DET 501-1
3 EA

FLAP GATES @ AIRPORT & DET. BASIN OUTFALL
36" RCP 2 EA

STOP GATES FOR IRRIGATION STRUCTURES
7 EA

36" RCP FOR DRAINAGE
321 + 315 + 24 + 477 = 1137 LF

18" RCP FOR IRRIGATION
8 + 43 + 8 + 16 + 8 + 16 + 8 = 112 LF

MANHOLE STRUCTURES @ DETENTION BASIN
& AIRPORT OUTFALLS
2 + 2 = 4 EA

DIRT IRRIGATION CHANNEL ALONG EAST LEVEE
(2233-1290) + (4510-3298)
+ (5300 - 4425) + (6240 - 5816)
+ (7280 - 5332) = 6572 LF

USE $0.50/LF = $3136

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 4 of 8
		DESIGNED BY JRG	DATE 10/23/98
SUBJECT: ESTIMATE OF QUANTITIES		CHECKED BY DRL	DATE 10/23/98

SAFETY RAIL @ EAST LEVEE

(2700 - 1076) + (7540 - 2720) + (7839 - 7560)
+ (8271 - 8052) = 6942 FT ✓

FENCE GATE PER DETAIL ON SHEET 18
@ CAMELBACK ROAD ENTRANCE, EAST LEVEE RAMPS & B10C
1 + 1 + 1 + 1 + 1 = 5 EA ✓

EQUESTRIAN GATE CAMELBACK ROAD ENTRANCE & EAST LEVEE RAMPS
1 + 1 + 1 = 3 EA

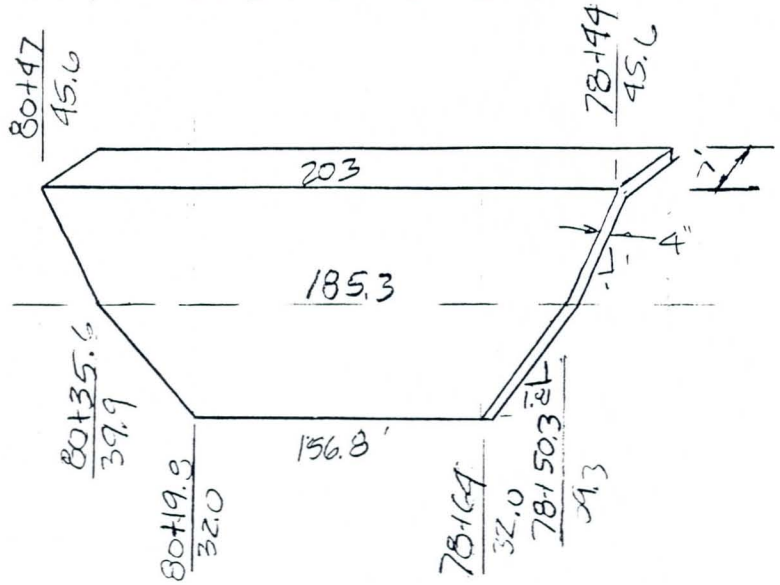
GUNITE @ IRRIGATION JUNCTION STRUCTURES
3 (7.1) = 3(5.9) = 48 S.Y. ✓

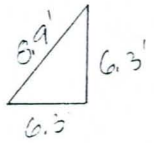
Total Gunite = 48 SY + 636 SY (3 + 5)
= 684 SY ✓

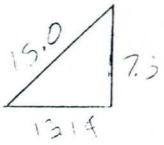
DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 5 of 8
		DESIGNED BY JRC	DATE 10/23/98
SUBJECT: ESTIMATE OF QUANTITIES		CHECKED BY DBL	DATE 10-23-98

BIOC BLOCKOUT

PNEUMATICALLY PLACED MORTAR SECTION







QUANTITY

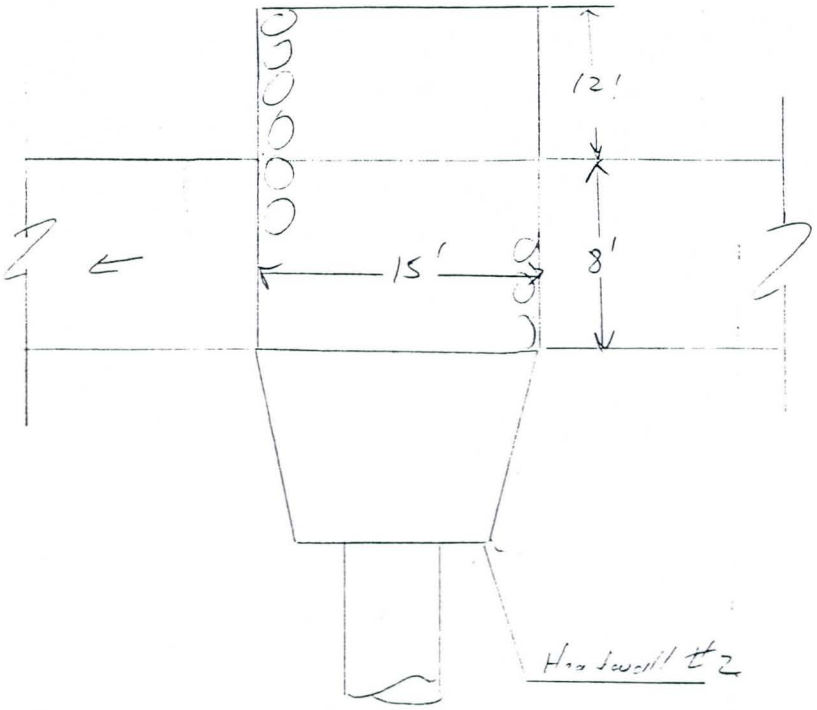
$(203)(7) + (185.3)(8.9) + (156.8)(15.0)$
$+ (11.4)(8.9)/2 + 15.8(15)/2 + (6.3)(8.9)/2$
$+ (13.7)(15)/2 = 5722.2 \text{ FT}^2$

$= \underline{\underline{636 \text{ SY}}}$

SMOOTH WIRE FENCE @ CAMELBACK ROAD ENTRANCE

$\underline{\underline{185 \text{ LF}}}$

DMJM	PROJECT: Candleback Ranch	JOB NO. [illegible]	SHEET 6 of 8
		DESIGNED BY DCL	DATE [illegible]
SUBJECT: Rip Rap Protection for Hdwl #2		CHECKED BY JRG	DATE 9/22/92



NTS

$D_{50} = 14''$

Depth $= 1.5 \cdot D_{50} = 21''$

$\forall_{req} = (21/12 \times 15' \times 20) / 27 \simeq 19.50$ Y.

DMJM	PROJECT: Candlewood Ranch Levee Project	JOB NO. 0526	SHEET 7 of 8
		DESIGNED BY JRG	DATE 9/21/99
SUBJECT: SRP QUANTITIES & COST ESTIMATE		CHECKED BY JRM	DATE 9/22/99

QUANTITIES TAKEN FROM SRP PLANS DATED 9/16/99

SHT. 2 of 3

30" RCP PIPE

106.4 + 8.4 + 80 + 18.0 + 16.0 + 16.0 = 172.8 FT

HEADWALL STRUCTURES w/ GATE	1 EA
HEADWALL STRUCTURE	1 EA
SRP TRASH RACKS	3 EA
MANHOLE STRUCTURE	1 EA
DIVERSION STRUCTURE	1 EA

SHT 3 of 8

30" RCP PIPE

105.4 + 125.6 + 270.0 = 501 FT

SRP TRASH RACK	2 EA
SILTING BASIN	2 EA
MANHOLE STRUCTURE	2 EA

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 0526	SHEET 8 of 8
		DESIGNED BY JRG	DATE 9/21/98
SUBJECT: SRP QUANTITIES & COST ESTIMATE		CHECKED BY VRM	DATE 9/22/98

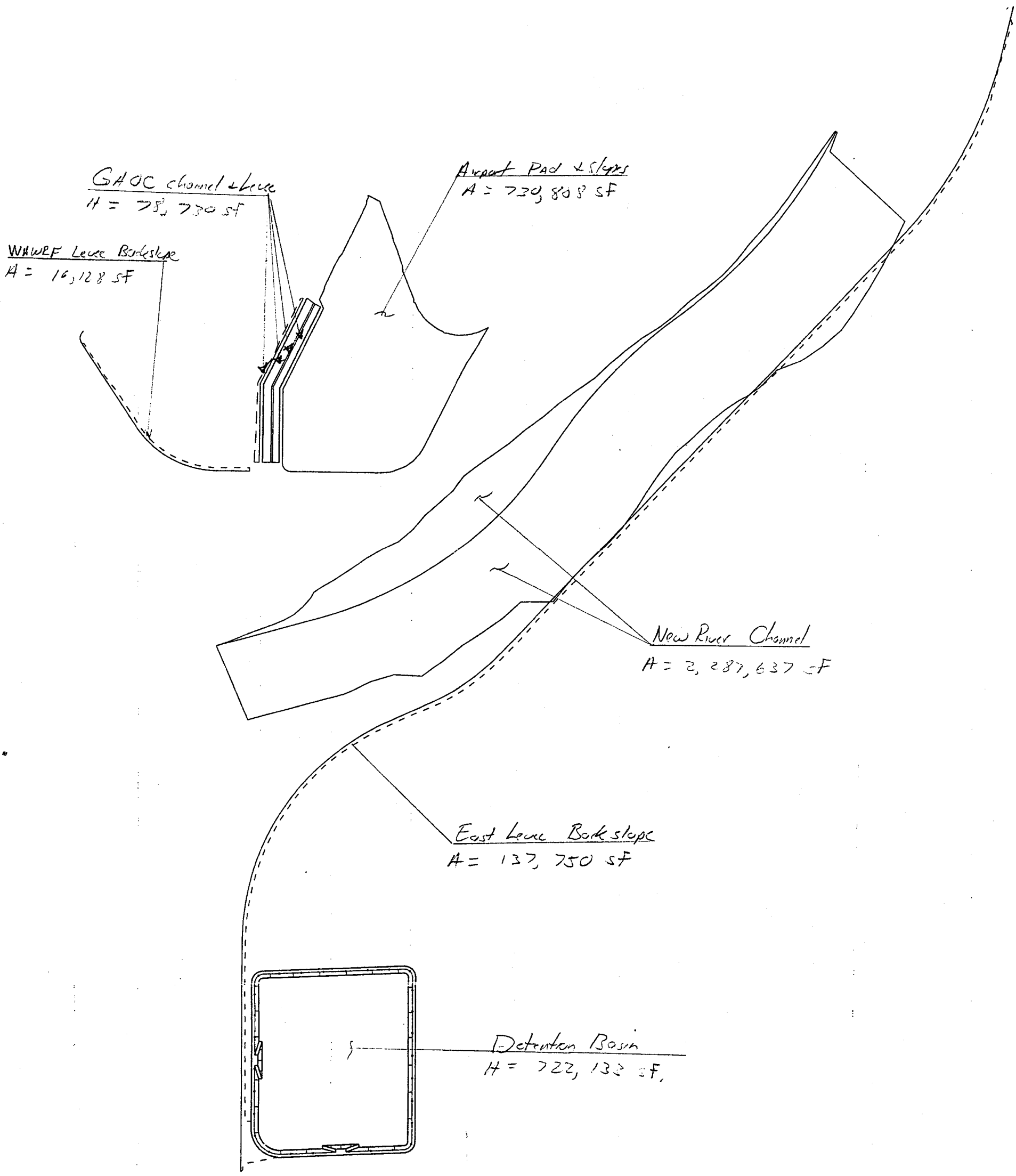
UNIT PRICES ARE BASED ON CONVERSATIONS WITH SRP STAFF

ITEM DESC.	UNIT	QTY	PRICE	AMOUNT
30" IRRIG. PIPE	LF	680	$65	$44,200
HEADWALL STRUCTURES	EA	2	$2500	$5,000
30" FLAPGATE	EA	1	$3000	$3,000
SRP TRASH RACKS	EA	5	$3500	$17,500
SILTING BASINS	EA	2	$5000	$10,000
MANHOLE STRUCTURES	EA	3	$6000	$18,000
DIVERSION STRUCTURE	EA	1	$18,000	$18,000
			TOTAL	$115,700 ✓

CAMELBACK RANCH LEVEE PROJECT
SEEDING

Location	Area (ft2)	FCDMC Area (ft2)	Glendale Area (ft2)
Airport Pad & Slopes	730,808		16.78
WWRF Levee Backslope	16,128		0.37
GAOC Channel & Levee	78,730		1.81
New River Channel	2,287,637		52.52
East Levee Backslope	137,750	3.16	
Detention Basin	722,133	16.58	
Subtotal		19.74	71.47
Contingency (5%)		0.99	3.57
TOTAL		21	75

Seeding Areas



QUANTITY FOR
IRRIGATION DITCH
TO BE REMOVE

RMS
7-28-98

1660
2700
1710
580
558

7,208 LFT

7210

APPENDIX H

EARTHWORK

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
EARTHWORK

Description	Fill Required (in-place) (CY)	Excavation Available (CY)
Camelback Ranch Levee - North	49,961	87,755
Glendale Airport Levee & Pad	270,360	248,260
Totals	320,321	336,015
Borrow/(Waste)	(15,694)	

EARTHWORK PAY QUANTITIES

Fill Construction = Embankment + Ground Compaction

Description	Embankment (CY)	Ground Compaction (CY)	Fill Construction (CY)
Camelback Ranch Levee - North	28,642	7,610	36,252
Glendale Airport Levee & Pad	239,156	24,352	263,508
Totals	267,798	31,962	299,760

Channel Excavation = Excavation - Ground Compaction

Description	Excavation (CY)	Ground Compaction (CY)	Channel Excavation (CY)
Camelback Ranch Levee - North	119,243	(21,736)	97,507
Glendale Airport Levee & Pad	322,233	(60,906)	261,327
Totals	441,476	(82,642)	358,834

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
EARTHWORK

FILL REQUIREMENTS (IN-PLACE)

Description	Embankment (CY)	Ground Compaction (CY)	Soil Cement (above grade) (CY)	FCDMC Total (CY)	Glendale Total (CY)
Camelback Ranch Levee - North					
East Levee Embankment	30,157	7,610	13,709	51,476	
Aggregate Base	(1,515)		NA	(1,515)	
Subtotal	28,642	7,610	13,709	49,961	-
Glendale Airport Levee					
Airport Levee Embankment	11,805	1,695	4,535		18,035
WAWRF Levee Embankment	3,295	996	1,861		6,152
Airport Pad	215,300	19,071	NA		234,371
GAOC Embankment*	9,406	2,590	456		12,452
Aggregate Base	(650)		NA		(650)
Subtotal	239,156	24,352	6,852	-	270,360
Totals	267,798	31,962	20,561	49,961	270,360

* Includes GAOC Junction soil-cement above existing ground

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
EARTHWORK

AVAILABLE EXCAVATION

Description	Excavation (CY)	Ground Compaction (CY)	Shrinkage (CY)	FCDMC Total (CY)	Glendale Total (CY)
Camelback Ranch Levee - North					
Detention Basin	118,184	(21,397)	(9,679)	87,108	
Detention Basin Outfall	74	(9)	(7)	58	
SRP Colter Channel Outfall	985	(330)	(66)	589	
Subtotal	119,243	(21,736)	(9,752)	87,755	-
Glendale Airport Levee					
New River Channel	317,001	(59,626)	(12,869)		244,506
GAOC Channel	4,413	(1,280)	(157)		2,976
Airport Pad	819		(41)		778
Subtotal	322,233	(60,906)	(13,067)	-	248,260
Totals	441,476	(82,642)	(22,819)	87,755	248,260

* 5% shrinkage applied to Glendale Levee and New River Excavation
* 10% shrinkage applied to East Levee, Detention Basin, drain channels

CAMELBACK RANCH LEVEE PROJECT
ADDITIONAL EARTHWORK QUANTITIES

Description	Toe Excavation (cy)	Toe Backfill (cy)	Soil Cement (cy)	Cement (10%) TON
East Levee Project				
Levee	179,048	139,998	52,765	8,904
SUBTOTALS	179,048	139,998	52,765	8,904
Glendale Levee Project				
Airport Levee	21,574	15,640	10,469	1,767
WAWRF Levee	33,111	26,310	8,662	1,462
Airport Channel			2,042	345
SUBTOTALS	54,685	41,950	21,173	3,573
TOTALS	233,733	181,948	73,938	12,477

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
EARTHWORK

GROUND COMPACTION

Location	Area (ft^2)	Compaction (ft)	Volume (cy)
East Levee	256,852	0.80	7,610
Detention Basin	722,133	0.80	21,397
SRP Colter Drain	11,150	0.80	330
Basin Outfall	320	0.80	9
New River	2,012,364	0.80	59,626
Airport Levee	61,024	0.75	1,695
Airport Pad	686,541	0.75	19,071
WWRF Levee	31,634	0.85	996
GAOC Levees	93,226	0.75	2,590
GAOC Channel	46,091	0.75	1,280
ADDITIONAL FILL DUE TO COMPACTION			114,604

DMJM	PROJECT: CAMELBACK RANCH	JOB NO. 6526	SHEET of
		DESIGNED BY JRM	DATE 10/24/98
SUBJECT: GROUND COMPACTION		CHECKED BY	DATE

SRP COLTER DRAIN:

$50'[(9+91)-(8+18)]0.8/27 = 256$ CY

$1/2(50')(100')(0.8)/27 = 74$ CY

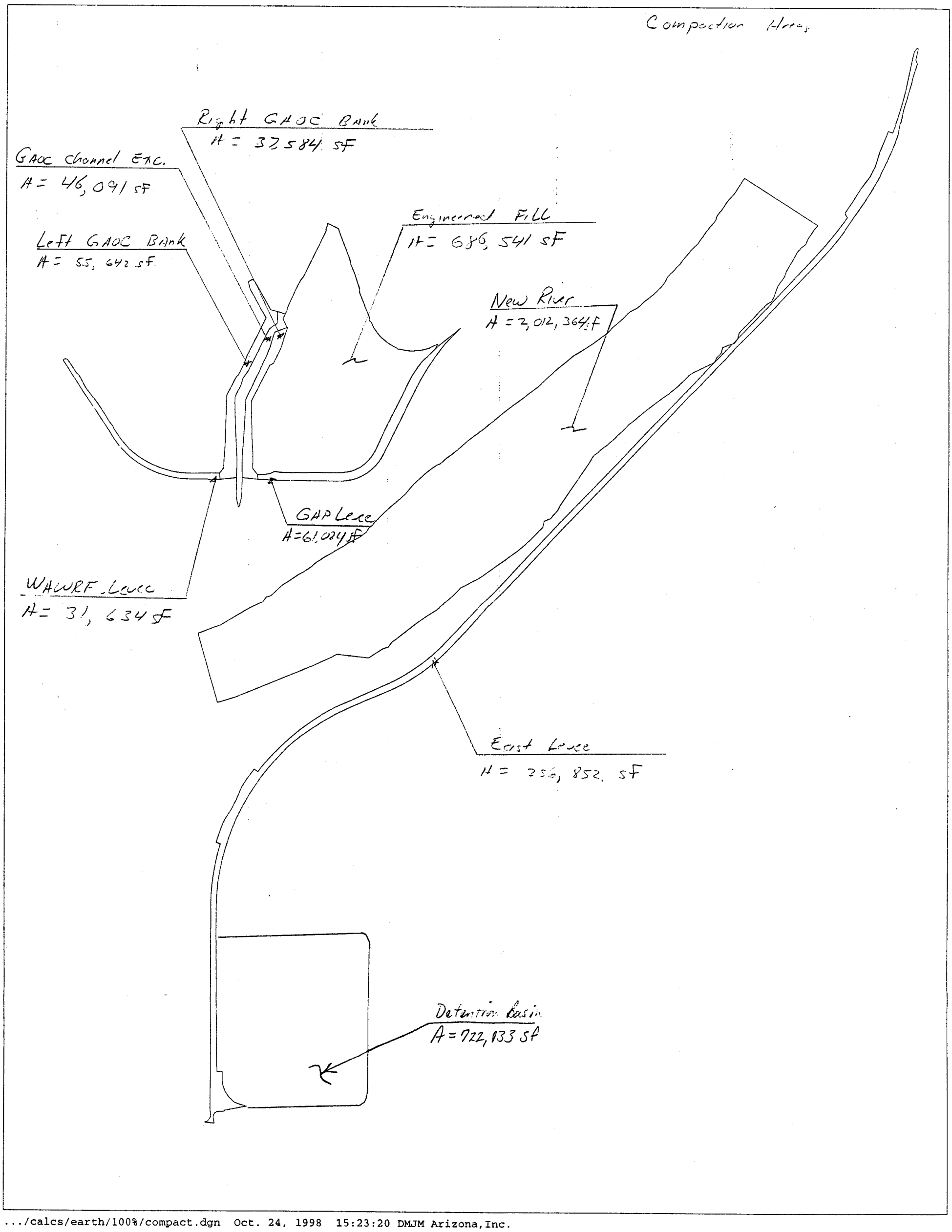
330 CY

DETENTION BASIN OUTFALL:

$20'(10')0.8/27 = 6$ CY

$1/2(20')(12)(0.8)/27 = 3$ CY

9 CY



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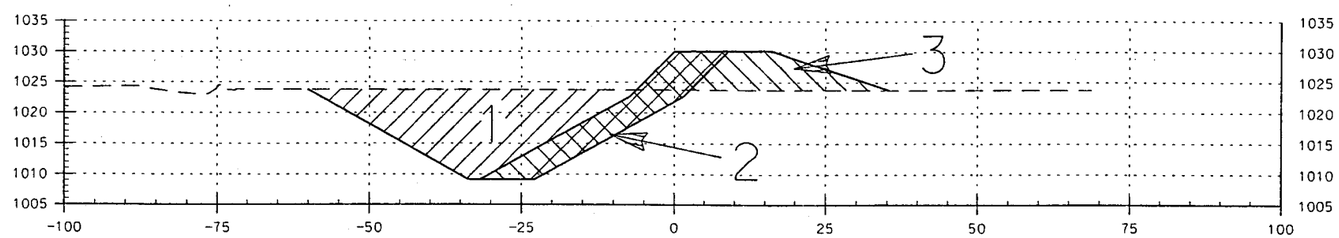
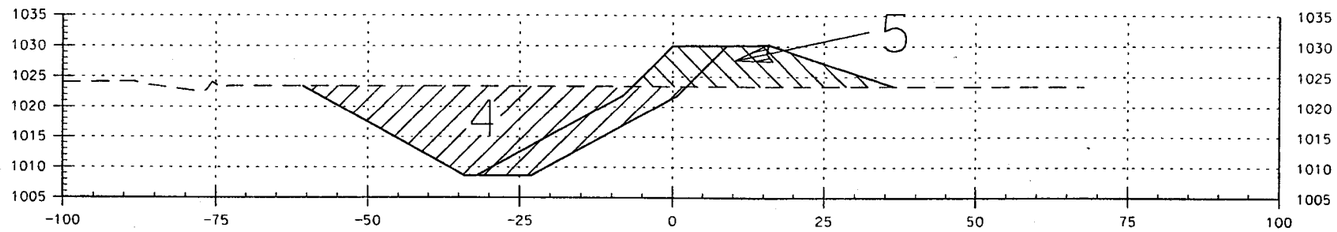
DMJM ARIZONA, INC.
2777 EAST CAMELBACK ROAD
SUITE 700
PHOENIX, AZ. 85016-4302
(602) 337-2777



12+88



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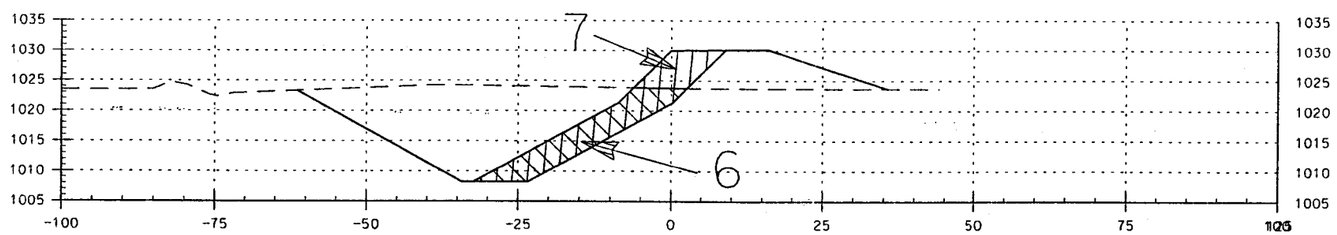

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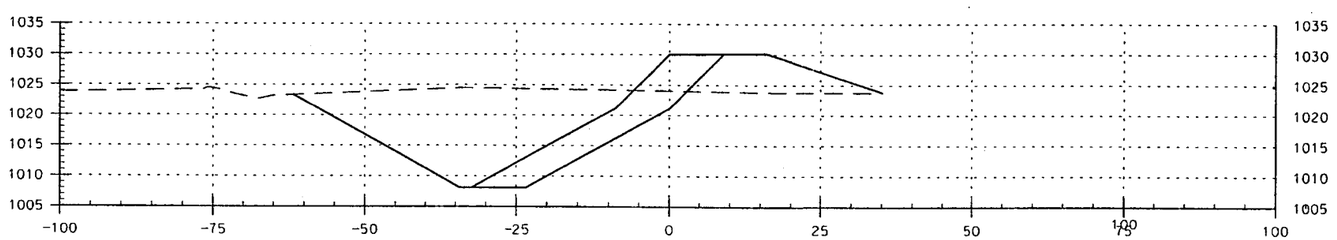

11+15

LEGEND

1 TOE EXCAVATION AND BACKFILL
2 TOTAL SOIL CEMENT
3 EMBANKMENT
4 TOTAL CUT FOR TOE EXCAVATION
5 TOTAL FILL (INCLUDES SOUL CEMENT)
6 SOIL CEMENT BELOW GRADE
7 SOIL CEMENT ABOVE GRADE

10 0 10 20'
SCALE:
HORIZONTAL 1"=10'
VERTICAL 1"=10'

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE
PROJECT NO. FCD 98-37

CROSS SECTION
STA + TO +

TYPICAL END AREAS

SHEET OF
X2 X58

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 1 of 4
		DESIGNED BY JRG	DATE 10/23/98
SUBJECT: EARTHWORK QUANTITIES		CHECKED BY DRL	DATE 10/23/98

EAST LEVEE

TOTAL CUT PER REPORT 179,022 C.Y. ✓

NET FILL PER REPORT 30,157 C.Y. ✓

NET CUT PER REPORT 139,966 C.Y. ✓

TOTAL FILL PER REPORT 43,866 C.Y. ✓

SOIL CEMENT BELOW GRADE

(TOTAL CUT - NET CUT) = 179,022 - 139,966 = 39,056 C.Y. ✓

SOIL CEMENT ABOVE GRADE

(TOTAL FILL - NET FILL) = 43,866 - 30,157 = 13,709 C.Y. ✓

TOTAL SOIL CEMENT

39,056 + 13,709 = 52,765 C.Y. ✓

TOE EXCAVATION (TOTAL CUT) = 179,022 C.Y. ✓

TOE BACKFILL (NET CUT) = 139,966 C.Y. ✓

LEVEE EMBANKMENT & FILL (NET FILL) = 30,157 C.Y. ✓

SRP IRRIGATION CHANNEL

TOTAL CUT 985 C.Y. ✓

DETENTION BASIN OUTFALL PIPE

TOTAL CUT 74 C.Y. ✓

TOTAL CUT / NET FILL

October 25, 1998 * * * EARTHWORK * * * Page 1 of 4
1:39 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
0+24	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
0+56	1.00	26.67	16	16	1.00	213.49	127	127	-111
0+84	1.00	303.52	171	171	1.00	549.61	396	396	-335
11+00	1.00	626.17	275	275	1.00	572.59	333	333	-392
1+15	1.00	623.04	347	347	1.00	587.49	322	322	-367
+35	1.00	599.84	453	453	1.00	609.89	443	443	-358
12+00	1.00	555.20	1390	1390	1.00	246.45	1031	1031	2
12+88	1.00	544.44	1792	1792	1.00	126.82	608	608	1185
+00	1.00	542.81	242	242	1.00	125.24	56	56	1371
+00	1.00	525.15	1978	1978	1.00	115.31	445	445	2903
15+00	1.00	502.79	1904	1904	1.00	106.85	411	411	4395
15+60	1.00	490.43	1104	1104	1.00	102.54	233	233	5266
+00	1.00	494.26	729	729	1.00	101.10	151	151	5845
+00	1.00	508.63	1857	1857	1.00	98.70	370	370	7332
18+00	1.00	520.32	1905	1905	1.00	93.14	355	355	8882
19+00	1.00	533.14	1951	1951	1.00	85.90	332	332	10501
+00	1.00	543.33	1993	1993	1.00	78.47	304	304	12191
+50	1.00	544.37	1007	1007	1.00	77.48	144	144	13053
21+00	1.00	516.72	982	982	1.00	81.81	147	147	13888
21+61	1.00	482.61	1135	1135	1.00	87.40	192	192	14831
+61	1.00	482.61	0	0	1.00	87.39	0	0	14831
+00	1.00	470.82	683	683	1.00	91.00	128	128	15386
22+40	1.00	459.44	689	689	1.00	92.47	136	136	15939
+00	1.00	475.10	1038	1038	1.00	88.89	202	202	16776
+00	1.00	444.10	1702	1702	1.00	102.28	354	354	18124
+00	1.00	406.73	1576	1576	1.00	119.05	410	410	19290
25+10	1.00	597.51	186	186	1.00	118.71	44	44	19432
+00	1.00	544.55	1903	1903	1.00	116.67	392	392	20943
+25	1.00	498.49	483	483	1.00	116.21	108	108	21318
27+00	1.00	413.34	1266	1266	1.00	144.88	363	363	22222
27+60	1.00	415.63	921	921	1.00	143.05	320	320	22823
+00	1.00	476.26	661	661	1.00	111.31	188	188	23295
+35	1.00	518.41	645	645	1.00	109.80	143	143	23797
29+00	1.00	623.95	1375	1375	1.00	107.04	261	261	24911
29+45	1.00	658.50	1069	1069	1.00	103.48	175	175	25804
+00	1.00	464.23	1144	1144	1.00	99.49	207	207	26741
+40	1.00	469.54	692	692	1.00	96.72	145	145	27287
30+85	1.00	480.43	792	792	1.00	93.71	159	159	27920
31+00	1.00	582.16	295	295	1.00	93.23	52	52	28163
+25	1.00	747.17	615	615	1.00	81.75	81	81	28698
+40	1.00	857.82	446	446	1.00	79.26	45	45	29099
31+55	1.00	860.32	477	477	1.00	77.90	44	44	29533
Page Total:			39412	39412			10313	10313	

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
2+00	1.00	869.34	1441	1441	1.00	79.16	131	131	30843
3+00	1.00	873.94	3228	3228	1.00	102.31	336	336	33735
34+00	1.00	888.91	3265	3265	1.00	112.70	398	398	36602
34+55	1.00	517.24	1432	1432	1.00	117.99	235	235	37799
5+00	1.00	504.57	852	852	1.00	122.25	200	200	38450
5+33	1.00	496.49	612	612	1.00	124.96	151	151	38911
35+33	1.00	496.47	3	3	1.00	124.97	1	1	38913
6+00	1.00	510.60	1247	1247	1.00	107.33	288	288	39872
6+70	1.00	515.44	1330	1330	1.00	106.15	277	277	40925
7+00	1.00	514.05	572	572	1.00	118.16	125	125	41373
37+88	1.00	461.88	1598	1598	1.00	149.34	438	438	42533
8+00	1.00	462.74	198	198	1.00	149.79	64	64	42667
8+75	1.00	470.64	1296	1296	1.00	149.50	416	416	43548
39+00	1.00	498.28	449	449	1.00	149.38	138	138	43858
40+00	1.00	616.41	2064	2064	1.00	148.81	552	552	45370
1+00	1.00	760.10	2549	2549	1.00	143.90	542	542	47377
1+25	1.00	797.48	721	721	1.00	143.37	133	133	47965
41+55	1.00	1052.03	1028	1028	1.00	143.15	159	159	48833
41+70	1.00	1055.23	601	601	1.00	143.18	82	82	49353
2+00	1.00	1060.83	1160	1160	1.00	143.64	157	157	50355
3+00	1.00	1086.00	3976	3976	1.00	145.12	535	535	53796
44+00	1.00	1230.44	4290	4290	1.00	111.55	475	475	57611
44+50	1.00	1207.85	2258	2258	1.00	93.35	190	190	59679
4+85	1.00	1182.73	1549	1549	1.00	111.37	133	133	61095
5+00	1.00	1038.21	617	617	1.00	121.16	65	65	61648
45+15	1.00	909.27	541	541	1.00	125.39	68	68	62120
46+00	1.00	823.19	2727	2727	1.00	126.27	396	396	64451
7+00	1.00	727.90	2872	2872	1.00	134.85	484	484	66840
8+00	1.00	647.66	2547	2547	1.00	131.46	493	493	68894
48+50	1.00	607.25	1162	1162	1.00	128.91	241	241	69815
9+00	1.00	611.43	1128	1128	1.00	124.58	235	235	70709
0+00	1.00	620.14	2281	2281	1.00	119.48	452	452	72537
0+50	1.00	624.39	1152	1152	1.00	117.34	219	219	73470
51+00	1.00	599.69	1133	1133	1.00	117.54	217	217	74386
2+00	1.00	555.93	2140	2140	1.00	116.74	434	434	76092
+50	1.00	535.24	1010	1010	1.00	116.20	216	216	76887
3+00	1.00	542.57	998	998	1.00	113.32	213	213	77673
54+00	1.00	556.04	2034	2034	1.00	107.81	409	409	79298
+50	1.00	559.96	1033	1033	1.00	105.37	197	197	80134
+00	1.00	599.58	1074	1074	1.00	106.38	196	196	81011
56+00	1.00	697.66	2402	2402	1.00	101.26	385	385	83029
57+00	1.00	812.53	2797	2797	1.00	95.81	365	365	85461
+40	1.00	858.20	1238	1238	1.00	94.89	141	141	86557
+00	1.00	870.32	1921	1921	1.00	90.91	206	206	88271
59+00	1.00	897.67	3274	3274	1.00	84.05	324	324	91221
Page Total:			71003	71003			11831	11831	

October 25, 1998 * * * EARTHWORK * * * Page 3 of 4
1:39 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
0+00	1.00	910.24	3348	3348	1.00	72.15	289	289	94280
1+00	1.00	911.53	3374	3374	1.00	102.54	323	323	97330
62+00	1.00	912.49	3378	3378	1.00	101.65	378	378	100330
63+00	1.00	942.82	3436	3436	1.00	103.23	379	379	103386
3+30	1.00	929.90	1040	1040	1.00	77.47	100	100	104326
4+00	1.00	890.21	2359	2359	1.00	80.38	205	205	106481
64+30	1.00	883.19	985	985	1.00	84.93	92	92	107374
5+00	1.00	836.45	2229	2229	1.00	96.30	235	235	109368
6+00	1.00	784.17	3001	3001	1.00	93.53	352	352	112018
6+50	1.00	757.61	1428	1428	1.00	90.64	171	171	113275
67+00	1.00	758.04	1403	1403	1.00	89.59	167	167	114512
8+00	1.00	738.41	2771	2771	1.00	94.35	341	341	116942
9+00	1.00	720.49	2702	2702	1.00	102.42	364	364	119279
9+98	1.00	721.55	2607	2607	1.00	102.48	370	370	121516
70+00	1.00	720.78	63	63	1.00	102.49	9	9	121570
1+00	1.00	690.27	2613	2613	1.00	113.20	399	399	123784
2+00	1.00	701.51	2577	2577	1.00	107.68	409	409	125952
3+00	1.00	1017.68	3184	3184	1.00	67.23	324	324	128812
73+30	1.00	1005.94	1124	1124	1.00	76.44	80	80	129857
4+00	1.00	807.79	2351	2351	1.00	103.55	233	233	131974
4+55	1.00	720.51	1557	1557	1.00	110.22	218	218	133313
75+00	1.00	552.89	1061	1061	1.00	119.34	191	191	134183
75+40	1.00	487.63	771	771	1.00	156.29	204	204	134750
5+55	1.00	464.01	264	264	1.00	151.36	85	85	134929
6+00	1.00	430.09	745	745	1.00	131.12	235	235	135438
76+80	1.00	897.84	1967	1967	1.00	105.35	350	350	137055
77+00	1.00	943.27	682	682	1.00	106.38	78	78	137659
8+00	1.00	755.90	3147	3147	1.00	99.10	381	381	140425
8+20	1.00	860.88	599	599	1.00	71.50	63	63	140960
78+30	1.00	887.06	324	324	1.00	59.25	24	24	141260
78+64	1.00	918.89	1137	1137	1.00	26.16	54	54	142343
9+00	1.00	812.19	1154	1154	1.00	23.60	33	33	143464
0+00	1.00	664.05	2734	2734	1.00	25.10	90	90	146108
80+20	1.00	612.94	468	468	1.00	27.54	19	19	146557
0+34	1.00	569.74	313	313	1.00	30.10	15	15	146854
0+47	1.00	553.68	269	269	1.00	33.08	15	15	147108
0+53	1.00	547.89	121	121	1.00	35.02	7	7	147222
80+55	1.00	542.22	42	42	1.00	35.67	3	3	147260
0+75	1.00	374.95	340	340	1.00	39.99	28	28	147572
1+00	1.00	341.16	332	332	1.00	39.64	37	37	147867
2+00	1.00	205.71	1013	1013	1.00	92.74	245	245	148634
82+52	1.00	93.26	288	288	1.00	0.54	90	90	148832
2+71	1.00	0.00	33	33	1.00	0.00	0	0	148865
Page Total:			68607	68607			8013	8013	

Grand Total:	179022	179022	30157	30157

NET CUT / TOTAL FILL

October 25, 1998 * * * EARTHWORK * * * Page 1 of 4
:39 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+24	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
+56	1.00	10.12	6	6	1.00	244.65	145	145	-139
10+84	1.00	205.52	112	112	1.00	593.96	435	435	-462
11+00	1.00	484.38	204	204	1.00	627.22	362	362	-619
+15	1.00	477.73	267	267	1.00	637.82	351	351	-704
+35	1.00	458.33	347	347	1.00	662.98	482	482	-839
12+00	1.00	423.38	1061	1061	1.00	305.81	1166	1166	-943
12+88	1.00	414.04	1365	1365	1.00	183.01	797	797	-375
+00	1.00	412.65	184	184	1.00	181.03	81	81	-273
+00	1.00	397.64	1501	1501	1.00	168.53	647	647	581
15+00	1.00	378.15	1437	1437	1.00	157.71	604	604	1413
15+60	1.00	367.65	829	829	1.00	152.12	344	344	1898
+00	1.00	371.02	547	547	1.00	150.23	224	224	2221
+00	1.00	384.25	1399	1399	1.00	146.68	550	550	3070
18+00	1.00	394.24	1442	1442	1.00	139.43	530	530	3981
+00	1.00	404.63	1479	1479	1.00	129.76	498	498	4962
+00	1.00	412.32	1513	1513	1.00	119.83	462	462	6013
+50	1.00	413.02	764	764	1.00	118.50	221	221	6556
21+00	1.00	389.19	743	743	1.00	124.30	225	225	7074
+61	1.00	359.86	851	851	1.00	131.79	291	291	7634
+61	1.00	359.86	0	0	1.00	131.79	0	0	7634
+00	1.00	350.44	509	509	1.00	135.94	192	192	7951
22+40	1.00	341.46	513	513	1.00	137.94	203	203	8261
+00	1.00	355.47	774	774	1.00	132.70	301	301	8735
+00	1.00	329.29	1268	1268	1.00	150.92	525	525	9477
25+00	1.00	297.33	1160	1160	1.00	173.11	600	600	10038
25+10	1.00	488.38	146	146	1.00	173.01	64	64	10119
+00	1.00	355.71	1407	1407	1.00	170.22	572	572	10954
+25	1.00	318.04	312	312	1.00	169.62	157	157	11108
27+00	1.00	300.62	859	859	1.00	259.83	596	596	11371
27+60	1.00	304.46	672	672	1.00	256.08	573	573	11470
+00	1.00	329.41	470	470	1.00	191.72	332	332	11608
+35	1.00	333.27	430	430	1.00	160.99	229	229	11809
29+00	1.00	445.52	937	937	1.00	157.40	383	383	12363
29+45	1.00	543.87	824	824	1.00	152.31	258	258	12930
+00	1.00	348.26	909	909	1.00	146.98	305	305	13534
+40	1.00	352.79	519	519	1.00	143.43	215	215	13838
30+85	1.00	362.95	596	596	1.00	139.69	236	236	14198
+00	1.00	450.92	226	226	1.00	138.99	77	77	14347
+25	1.00	586.29	480	480	1.00	120.43	120	120	14707
+40	1.00	684.31	353	353	1.00	118.84	66	66	14993
31+55	1.00	687.77	381	381	1.00	119.10	66	66	15308
Page Total:			29414	29414			14420	14420	

BASELINE STATION NUMBER	CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
2+00	1.00	697.29	1154	1154	1.00	122.82	202	202	16261
3+00	1.00	703.00	2593	2593	1.00	151.46	508	508	18346
34+00	1.00	716.20	2628	2628	1.00	164.49	585	585	20389
4+55	1.00	390.82	1128	1128	1.00	171.25	342	342	21175
5+00	1.00	380.01	642	642	1.00	176.73	290	290	21527
5+33	1.00	373.24	460	460	1.00	180.30	218	218	21769
35+33	1.00	373.22	2	2	1.00	180.29	1	1	21770
6+00	1.00	384.15	938	938	1.00	158.51	419	419	22289
6+70	1.00	387.81	1001	1001	1.00	155.16	407	407	22883
7+00	1.00	389.14	432	432	1.00	170.59	181	181	23133
37+88	1.00	344.97	1202	1202	1.00	211.86	626	626	23709
8+00	1.00	345.66	148	148	1.00	212.42	91	91	23766
8+75	1.00	351.69	969	969	1.00	212.02	590	590	24145
9+00	1.00	375.13	336	336	1.00	211.85	196	196	24286
40+00	1.00	476.53	1577	1577	1.00	211.18	783	783	25079
1+00	1.00	602.36	1998	1998	1.00	205.01	771	771	26307
1+25	1.00	635.29	573	573	1.00	204.18	189	189	26690
41+55	1.00	862.04	832	832	1.00	203.59	227	227	27295
41+70	1.00	864.63	493	493	1.00	203.38	116	116	27672
2+00	1.00	869.62	950	950	1.00	203.92	223	223	28399
3+00	1.00	892.85	3264	3264	1.00	205.83	759	759	30904
44+00	1.00	1024.08	3550	3550	1.00	161.39	680	680	33774
44+50	1.00	1001.55	1876	1876	1.00	144.43	283	283	35367
4+85	1.00	979.65	1284	1284	1.00	166.50	202	202	36449
5+00	1.00	851.23	509	509	1.00	179.38	96	96	36862
45+15	1.00	735.43	441	441	1.00	183.74	101	101	37201
46+00	1.00	658.94	2195	2195	1.00	184.68	580	580	38816
7+00	1.00	574.96	2285	2285	1.00	193.36	700	700	40401
8+00	1.00	504.57	1999	1999	1.00	188.60	707	707	41693
48+50	1.00	469.08	902	902	1.00	185.38	346	346	42248
9+00	1.00	472.15	872	872	1.00	179.94	338	338	42782
0+00	1.00	479.64	1763	1763	1.00	173.63	655	655	43889
0+50	1.00	483.29	892	892	1.00	170.87	319	319	44462
51+00	1.00	461.78	875	875	1.00	171.15	317	317	45020
2+00	1.00	423.95	1640	1640	1.00	170.04	632	632	46029
2+50	1.00	406.22	769	769	1.00	169.35	314	314	46483
3+00	1.00	412.71	758	758	1.00	165.62	310	310	46931
54+00	1.00	424.70	1551	1551	1.00	158.63	600	600	47882
4+50	1.00	427.90	789	789	1.00	155.48	291	291	48380
5+00	1.00	461.73	824	824	1.00	156.84	289	289	48915
56+00	1.00	545.93	1866	1866	1.00	150.13	568	568	50212
57+00	1.00	646.83	2209	2209	1.00	143.00	543	543	51878
7+40	1.00	687.27	988	988	1.00	141.76	211	211	52656
8+00	1.00	698.11	1539	1539	1.00	136.51	309	309	53886
59+00	1.00	723.28	2632	2632	1.00	127.47	489	489	56029
Page Total:			56074	56074			17182	17182	

October 25, 1998 * * * EARTHWORK * * * Page 3 of 4
:39 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+00	1.00	732.79	2696	2696	1.00	112.50	444	444	58281
+00	1.00	742.33	2732	2732	1.00	151.14	488	488	60525
62+00	1.00	743.19	2751	2751	1.00	150.16	558	558	62718
+00	1.00	772.28	2806	2806	1.00	150.50	557	557	64967
+30	1.00	747.20	844	844	1.00	112.58	146	146	65665
+00	1.00	715.64	1896	1896	1.00	123.61	306	306	67255
64+30	1.00	710.16	792	792	1.00	129.70	141	141	67907
+00	1.00	671.34	1791	1791	1.00	143.60	354	354	69343
+00	1.00	624.98	2401	2401	1.00	139.06	523	523	71220
66+50	1.00	601.36	1135	1135	1.00	135.26	254	254	72102
67+00	1.00	601.47	1114	1114	1.00	133.89	249	249	72967
+00	1.00	584.21	2196	2196	1.00	141.03	509	509	74653
+00	1.00	568.72	2135	2135	1.00	151.53	542	542	76246
69+98	1.00	568.86	2057	2057	1.00	150.68	546	546	77757
70+00	1.00	568.17	50	50	1.00	150.76	13	13	77793
+00	1.00	541.42	2055	2055	1.00	165.22	585	585	79263
+00	1.00	550.71	2022	2022	1.00	157.76	598	598	80687
73+00	1.00	857.71	2608	2608	1.00	108.14	492	492	82803
73+30	1.00	803.52	923	923	1.00	120.48	127	127	83599
+00	1.00	599.31	1818	1818	1.00	156.37	359	359	85059
+55	1.00	513.17	1133	1133	1.00	164.87	327	327	85865
75+00	1.00	387.93	751	751	1.00	216.95	318	318	86297
+40	1.00	351.37	548	548	1.00	271.20	362	362	86483
+55	1.00	330.40	189	189	1.00	265.21	149	149	86524
+00	1.00	303.42	528	528	1.00	240.88	422	422	86630
76+80	1.00	697.09	1482	1482	1.00	154.49	586	586	87527
+00	1.00	741.55	533	533	1.00	154.55	114	114	87945
+00	1.00	632.01	2544	2544	1.00	144.98	555	555	89934
+20	1.00	694.30	491	491	1.00	108.59	94	94	90331
78+30	1.00	715.97	261	261	1.00	91.94	37	37	90555
+64	1.00	836.00	977	977	1.00	26.16	74	74	91458
+00	1.00	730.17	1044	1044	1.00	23.60	33	33	92469
+00	1.00	582.03	2430	2430	1.00	25.10	90	90	94809
80+20	1.00	530.93	408	408	1.00	27.54	19	19	95198
+34	1.00	423.03	252	252	1.00	30.10	15	15	95435
+47	1.00	381.67	193	193	1.00	63.01	22	22	95605
80+53	1.00	375.65	83	83	1.00	66.46	14	14	95674
80+55	1.00	370.77	28	28	1.00	67.66	5	5	95697
+75	1.00	237.32	225	225	1.00	74.97	53	53	95870
+00	1.00	210.90	208	208	1.00	79.08	71	71	96006
82+00	1.00	110.77	596	596	1.00	167.49	457	457	96145
82+52	1.00	9.00	115	115	1.00	1.33	163	163	96098
+71	1.00	0.00	3	3	1.00	0.00	0	0	96100
Page Total:			54478	54478			12264	12264	

Grand Total:	139966	139966	43866	43866

DMJM	PROJECT: Candlback Ranch Levee Project	JOB NO. 6526	SHEET 2 of 4
		DESIGNED BY JRC	DATE 10/23/98
SUBJECT: EARTHWORK QUANTITIES		CHECKED BY DBL	DATE 10/23/98

WAWRF LEVEE

TOTAL CUT PER REPORT 33,111 C.Y. ✓

NET FILL PER REPORT 3,295 C.Y. ✓

NET CUT PER REPORT 26,310 C.Y. ✓

TOTAL FILL PER REPORT 5,156 C.Y. ✓

SOIL CEMENT BELOW GRADE

(TOTAL CUT - NET CUT) = 33,111 - 26310 = 6801 C.Y. ✓

SOIL CEMENT ABOVE GRADE

(TOTAL FILL - NET FILL) = 5,156 - 3295 = 1861 C.Y. ✓

TOTAL SOIL CEMENT

6801 + 1861 = 8662 C.Y. ✓

TOE EXCAVATION (TOTAL CUT) = 33,111 C.Y. ✓

TOE BACKFILL (NET CUT) = 26310 C.Y. ✓

LEVEE EMBANKMENT FILL (NET FILL) = 3295 C.Y. ✓

TOTAL CUT/NET FILL

October 21, 1998 * * * EARTHWORK * * * Page 1
3:32 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+12	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
+50	1.00	473.94	334	334	1.00	23.41	16	16	317
10+00	1.00	487.04	890	890	1.00	21.19	41	41	1166
10+00	1.00	471.03	0	0	1.00	40.76	0	0	1166
1+00	1.00	486.26	1773	1773	1.00	55.22	178	178	2761
2+00	1.00	538.69	1898	1898	1.00	37.53	172	172	4487
13+00	1.00	561.03	2037	2037	1.00	81.94	221	221	6302
14+00	1.00	704.49	2344	2344	1.00	70.96	283	283	8363
4+79	1.00	755.56	2149	2149	1.00	78.56	220	220	10292
5+00	1.00	752.08	573	573	1.00	77.98	59	59	10805
16+00	1.00	754.52	2790	2790	1.00	85.93	304	304	13291
6+55	1.00	1178.09	1968	1968	1.00	84.61	174	174	15086
7+00	1.00	1157.43	1946	1946	1.00	89.48	145	145	16887
18+00	1.00	1127.63	4232	4232	1.00	96.88	345	345	20774
19+00	1.00	1104.02	4133	4133	1.00	86.80	340	340	24566
9+15	1.00	1107.79	614	614	1.00	87.60	48	48	25132
9+52	1.00	848.10	1322	1322	1.00	87.19	118	118	26336
19+70	1.00	711.45	534	534	1.00	85.42	59	59	26811
19+72	1.00	697.70	50	50	1.00	84.59	6	6	26855
0+00	1.00	648.42	700	700	1.00	88.73	90	90	27465
0+20	1.00	628.29	473	473	1.00	92.78	67	67	27871
21+00	1.00	573.50	1780	1780	1.00	109.64	300	300	29351
21+27	1.00	569.74	572	572	1.00	104.18	107	107	29816
Page Total:			33111	33111			3295	3295	

October 21, 1998 * * * EARTHWORK * * * Page 2 of 2
3:32 PM Report Template: BASIC_END_AREA_80

Grand Total:			33111	33111			3295	3295	

NET CUT / TOTAL FILL

October 21, 1998 * * * EARTHWORK * * * Page 1
03:39 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
12	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
50	1.00	335.60	236	236	1.00	55.65	39	39	197
10+00	1.00	344.58	630	630	1.00	49.31	97	97	730
10+00	1.00	335.99	0	0	1.00	75.77	0	0	730
1+00	1.00	356.32	1282	1282	1.00	98.90	323	323	1688
2+00	1.00	390.88	1384	1384	1.00	66.79	307	307	2765
13+00	1.00	421.29	1504	1504	1.00	122.74	351	351	3918
14+00	1.00	554.34	1807	1807	1.00	104.79	421	421	5303
4+79	1.00	609.33	1713	1713	1.00	119.05	329	329	6687
5+00	1.00	606.06	462	462	1.00	119.40	91	91	7058
16+00	1.00	605.33	2243	2243	1.00	127.62	457	457	8844
16+55	1.00	985.63	1620	1620	1.00	129.70	262	262	10202
7+00	1.00	967.04	1627	1627	1.00	136.19	222	222	11608
8+00	1.00	940.55	3533	3533	1.00	145.89	522	522	14618
19+00	1.00	919.93	3445	3445	1.00	137.80	525	525	17538
9+15	1.00	922.66	512	512	1.00	137.41	76	76	17973
9+52	1.00	686.83	1088	1088	1.00	133.45	183	183	18878
9+70	1.00	564.68	429	429	1.00	130.11	90	90	19217
19+72	1.00	552.45	39	39	1.00	129.13	9	9	19247
0+00	1.00	508.95	552	552	1.00	135.07	137	137	19662
0+20	1.00	491.30	370	370	1.00	140.55	102	102	19930
21+00	1.00	446.41	1389	1389	1.00	163.16	450	450	20869
21+27	1.00	442.99	445	445	1.00	156.64	160	160	21154
Page Total:			26310	26310			5156	5156	

October 21, 1998 * * * EARTHWORK * * * Page 2 of 2
03:39 PM Report Template: BASIC_END_AREA_80

Grand Total:			26310	26310			5156	5156	

DMJM	PROJECT: Cambrick Ranch Levee Project	JOB NO. 6526	SHEET 3 of 4
		DESIGNED BY JRG	DATE 10/23/98
SUBJECT: EARTHWORK QUANTITIES		CHECKED BY DBL	DATE 10/23/98

AIRPORT LEVEE

TOE EXCAVATION (TOTAL CUT PER REPORT) = 21,574 C.Y. ✓

LEVEE EMBANKMENT FILL (NET FILL PER REPORT) = 11,805 C.Y. ✓

TOE BACKFILL (NET CUT PER REPORT) = 15,640 C.Y. ✓

TOTAL FILL PER REPORT = 16,340 C.Y. ✓

SOIL CEMENT BELOW GRADE

(TOTAL CUT - NET CUT) = 21574 - 15640 = 5934 C.Y. ✓

SOIL CEMENT ABOVE GRADE

(TOTAL FILL - NET FILL) = 16340 - 11805 = 4535 C.Y. ✓

TOTAL SOIL CEMENT

5934 + 4535 = 10,469 C.Y. ✓

TOTAL CUT / NET FILL

October 21, 1998 * * * EARTHWORK * * * Page 1 of 2
4:00 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
3+28	1.00	478.67	0	0	1.00	54.54	0	0	0
Cumulative Zero Mass:			0	0			0	0	
3+70	1.00	348.01	643	643	1.00	72.75	99	99	544
24+00	1.00	284.19	351	351	1.00	153.81	126	126	769
24+50	1.00	270.74	514	514	1.00	209.90	337	337	946
5+00	1.00	325.24	552	552	1.00	186.15	367	367	1132
5+00	1.00	378.19	1303	1303	1.00	192.01	700	700	1734
27+00	1.00	461.43	1555	1555	1.00	210.83	746	746	2543
27+63	1.00	490.15	1118	1118	1.00	207.36	491	491	3170
3+00	1.00	517.99	682	682	1.00	225.33	293	293	3559
3+26	1.00	653.03	553	553	1.00	227.10	214	214	3898
29+00	1.00	637.77	1781	1781	1.00	240.90	646	646	5033
29+50	1.00	590.41	1137	1137	1.00	247.38	452	452	5718
0+00	1.00	623.76	1124	1124	1.00	250.94	461	461	6381
0+40	1.00	620.57	922	922	1.00	255.61	375	375	6928
30+42	1.00	624.58	50	50	1.00	249.22	20	20	6958
0+50	1.00	632.50	182	182	1.00	250.88	72	72	7067
0+80	1.00	464.43	609	609	1.00	258.47	283	283	7394
1+00	1.00	450.59	339	339	1.00	264.37	194	194	7539
32+00	1.00	356.46	1495	1495	1.00	294.77	1035	1035	7998
3+00	1.00	262.08	1145	1145	1.00	295.03	1092	1092	8051
4+00	1.00	310.26	1060	1060	1.00	285.15	1074	1074	8037
4+35	1.00	324.44	411	411	1.00	282.49	368	368	8080
34+46	1.00	318.62	127	127	1.00	282.74	112	112	8096
5+00	1.00	304.93	627	627	1.00	285.37	572	572	8151
6+00	1.00	262.23	1050	1050	1.00	246.03	984	984	8218
36+40	1.00	241.50	373	373	1.00	187.74	321	321	8269
37+00	1.00	235.03	529	529	1.00	61.39	277	277	8522
7+05	1.00	236.82	44	44	1.00	47.47	10	10	8556
8+00	1.00	350.23	1033	1033	1.00	0.00	84	84	9505
38+41	1.00	0.00	263	263	1.00	0.00	0	0	9768
Page Total:			21574	21574			11805	11805	

October 21, 1998 * * * EARTHWORK * * * Page 2 of 2
04:00 PM Report Template: BASIC_END_AREA_80

Grand Total:			21574	21574			11805	11805	

NET CUT / TOTAL FILL

October 21, 1998 * * * EARTHWORK * * * Page 1 of 2
:01 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+28	1.00	357.25	0	0	1.00	89.93	0	0	0
Cumulative Zero Mass:			0	0			0	0	
+70	1.00	234.22	460	460	1.00	115.77	160	160	300
+00	1.00	197.49	240	240	1.00	224.43	189	189	351
24+50	1.00	190.30	359	359	1.00	287.63	474	474	236
+00	1.00	233.13	392	392	1.00	258.73	506	506	122
+00	1.00	272.54	936	936	1.00	264.08	968	968	90
+00	1.00	343.47	1141	1141	1.00	283.62	1014	1014	217
27+63	1.00	369.42	838	838	1.00	285.63	669	669	386
+00	1.00	394.44	517	517	1.00	305.55	400	400	502
+26	1.00	509.76	427	427	1.00	310.75	291	291	638
+00	1.00	504.58	1399	1399	1.00	335.90	892	892	1146
29+50	1.00	453.32	887	887	1.00	339.33	625	625	1407
+00	1.00	482.29	866	866	1.00	339.34	628	628	1645
+40	1.00	478.55	712	712	1.00	347.93	509	509	1848
30+42	1.00	481.15	39	39	1.00	340.24	28	28	1859
30+50	1.00	488.42	140	140	1.00	341.66	99	99	1901
+80	1.00	345.34	463	463	1.00	349.04	384	384	1980
+00	1.00	335.10	252	252	1.00	355.51	261	261	1971
32+00	1.00	259.52	1101	1101	1.00	389.36	1379	1379	1693
+00	1.00	181.29	816	816	1.00	390.65	1444	1444	1065
+00	1.00	220.40	744	744	1.00	378.84	1425	1425	384
+35	1.00	231.04	293	293	1.00	375.13	489	489	188
34+46	1.00	225.83	90	90	1.00	375.51	148	148	130
+00	1.00	214.48	443	443	1.00	377.97	758	758	-186
+00	1.00	181.08	733	733	1.00	343.31	1336	1336	-789
+40	1.00	165.04	256	256	1.00	287.88	468	468	-1000
37+00	1.00	157.67	359	359	1.00	164.90	503	503	-1144
+05	1.00	157.17	29	29	1.00	148.70	29	29	-1144
+00	1.00	171.85	579	579	1.00	0.66	263	263	-828
+41	1.00	0.00	129	129	1.00	0.00	0	0	-700
Page Total:			15640	15640			16340	16340	

tober 21, 1998 * * * EARTHWORK * * * Page 2 of 2
04:01 PM Report Template: BASIC_END_AREA_80

Grand Total:			15640	15640			16340	16340	

September 21, 1998 * * * EARTHWORK * * *
10:11 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
050	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
100	1.00	1468.54	1360	1360	1.00	0.00	0	0	1360
1200	1.00	1525.96	5545	5545	1.00	0.00	0	0	6905
1300	1.00	1501.57	5607	5607	1.00	0.00	0	0	12512
400	1.00	1502.05	5562	5562	1.00	0.00	0	0	18074
500	1.00	1750.86	6024	6024	1.00	0.00	0	0	24098
1600	1.00	2196.68	7310	7310	1.00	0.00	0	0	31408
1700	1.00	2453.65	8612	8612	1.00	0.00	0	0	40020
800	1.00	2652.12	9455	9455	1.00	0.00	0	0	49475
900	1.00	2820.46	10134	10134	1.00	0.00	0	0	59609
2000	1.00	2800.95	10410	10410	1.00	0.00	0	0	70019
2100	1.00	2572.90	9952	9952	1.00	0.00	0	0	79971
200	1.00	2630.87	9637	9637	1.00	0.00	0	0	89608
300	1.00	2658.06	9794	9794	1.00	0.00	0	0	99402
2400	1.00	2671.25	9869	9869	1.00	0.00	0	0	109271
2500	1.00	2761.79	10061	10061	1.00	0.00	0	0	119332
600	1.00	2850.17	10393	10393	1.00	0.00	0	0	129725
700	1.00	2860.99	10576	10576	1.00	0.00	0	0	140301
2800	1.00	2844.33	10565	10565	1.00	0.00	0	0	150866
900	1.00	2894.67	10628	10628	1.00	0.07	0	0	161494
000	1.00	2913.69	10756	10756	1.00	0.00	0	0	172250
100	1.00	2591.89	10196	10196	1.00	0.00	0	0	182446
3200	1.00	2363.05	9176	9176	1.00	0.00	0	0	191621
300	1.00	2231.20	8508	8508	1.00	0.00	0	0	200129
400	1.00	2147.45	8109	8109	1.00	0.00	0	0	208238
500	1.00	2149.66	7958	7958	1.00	0.00	0	0	216195
3600	1.00	2169.80	7999	7999	1.00	0.00	0	0	224194
700	1.00	2107.88	7922	7922	1.00	0.00	0	0	232116
800	1.00	2025.11	7654	7654	1.00	0.00	0	0	239770
3900	1.00	2011.65	7475	7475	1.00	0.00	0	0	247245
4000	1.00	1840.06	7133	7133	1.00	0.05	0	0	254378
100	1.00	1765.26	6677	6677	1.00	0.93	2	2	261053
200	1.00	1868.98	6730	6730	1.00	0.00	2	2	267781
4300	1.00	1726.86	6659	6659	1.00	0.12	0	0	274440
4400	1.00	1725.44	6393	6393	1.00	0.13	0	0	280832
500	1.00	1338.01	5673	5673	1.00	93.05	173	173	286333
600	1.00	1812.01	5833	5833	1.00	0.00	172	172	291994
4700	1.00	1812.10	6711	6711	1.00	0.00	0	0	298705
4800	1.00	1807.24	6702	6702	1.00	0.00	0	0	305408
900	1.00	2125.61	7283	7283	1.00	0.00	0	0	312691
000	1.00	6.39	3948	3948	1.00	0.00	0	0	316639
5100	1.00	0.56	13	13	1.00	0.00	0	0	316652
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September 21, 1998 * * * EARTHWORK * * *
10:11 PM Report Template: BASIC_END_AREA_80

Grand Total:	317001	317001	349	349

September 21, 1998 * * * EARTHWORK * * * Page 1 of 2
05:32 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	AREA (sq ft)	VOLUME (cu yd)	ADJUSTED (cu yd)	FILL FACT	AREA (sq ft)	VOLUME (cu yd)	ADJUSTED (cu yd)	MASS ORD. (cu yd)
0	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
100	1.00	0.21	0	0	1.00	0.00	0	0	0
100	1.00	0.25	0	0	1.00	0.00	0	0	0
120	1.00	3430.91	1284	1284	1.00	0.00	0	0	1284
154	1.00	3649.07	4367	4367	1.00	2.57	2	2	5650
200	1.00	3711.72	6336	6336	1.00	0.46	3	3	11983
300	1.00	3605.99	13551	13551	1.00	0.00	1	1	25534
400	1.00	3597.43	13340	13340	1.00	0.00	0	0	38874
500	1.00	3632.85	13389	13389	1.00	0.00	0	0	52263
600	1.00	3691.14	13563	13563	1.00	0.00	0	0	65826
700	1.00	3749.64	13779	13779	1.00	0.00	0	0	79605
800	1.00	3804.89	13990	13990	1.00	0.00	0	0	93595
900	1.00	3856.72	14188	14188	1.00	0.00	0	0	107783
930	1.00	3870.95	4284	4284	1.00	0.00	0	0	112068
963	1.00	3774.82	4728	4728	1.00	0.00	0	0	116795
983	1.00	0.59	1384	1384	1.00	0.00	0	0	118179
1000	1.00	0.00	0	0	1.00	0.00	0	0	118179
1083	1.00	0.00	0	0	1.00	0.00	0	0	118179
Page Total:			118184	118184			5	5	

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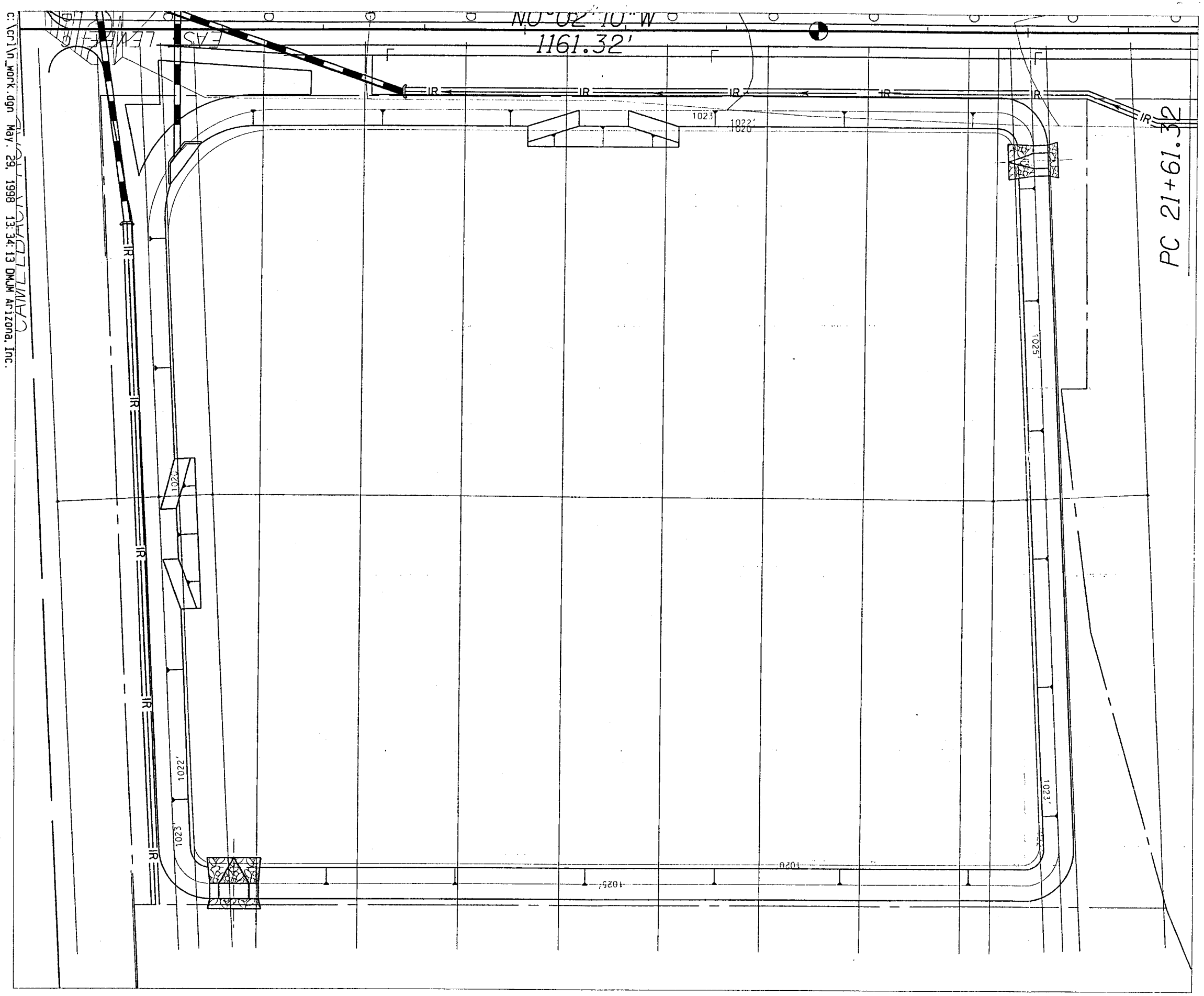
September 21, 1998 * * * EARTHWORK * * * Page 2 of 2
05:32 PM Report Template: BASIC_END_AREA_80

Grand Total:			118184	118184			5	5	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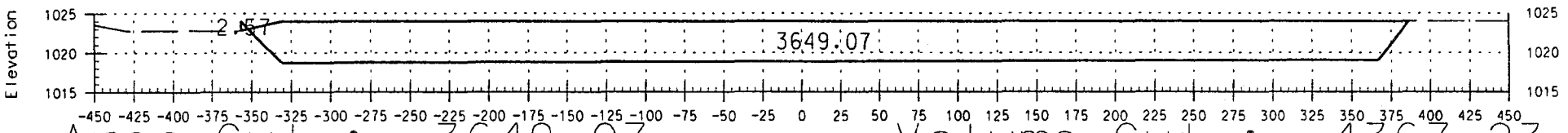
c:\crln_work.dgn May. 29, 1998 13:34:13 DMJM Arizona, Inc.



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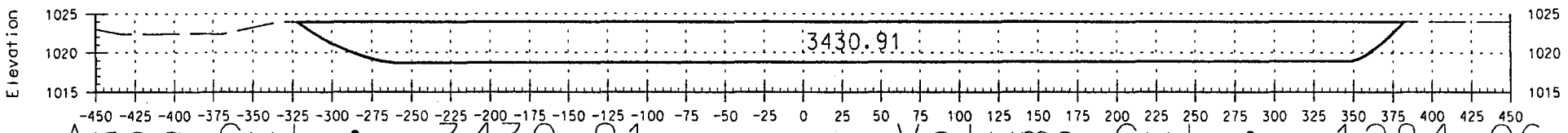

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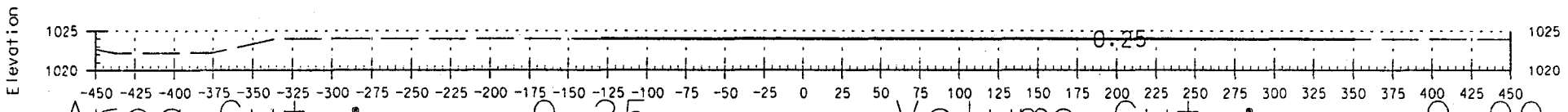

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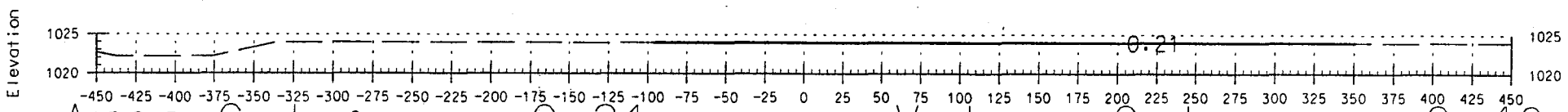

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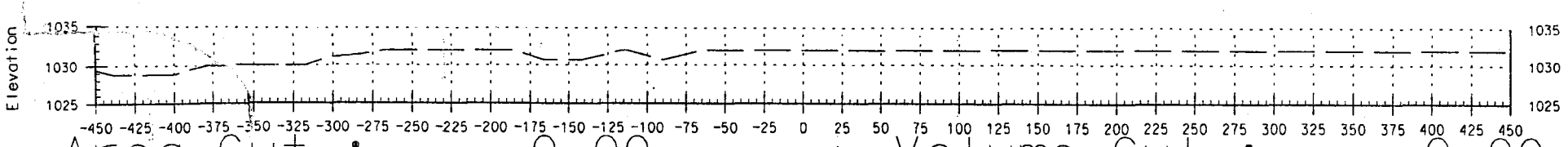

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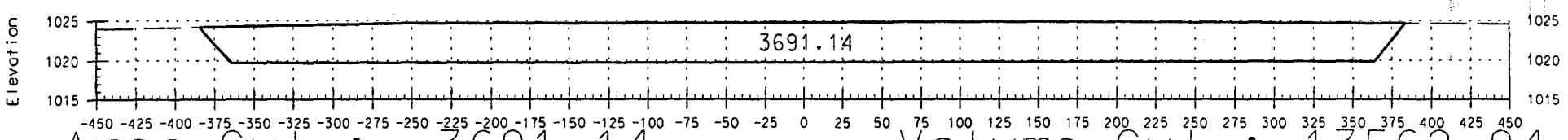

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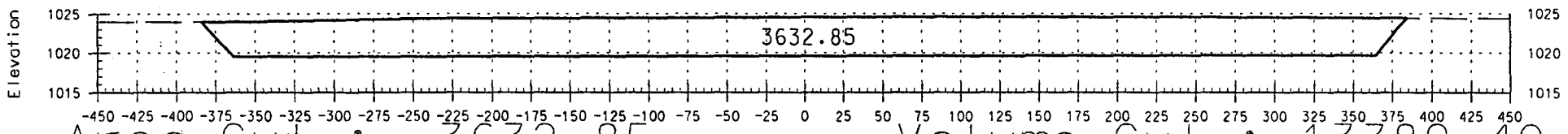

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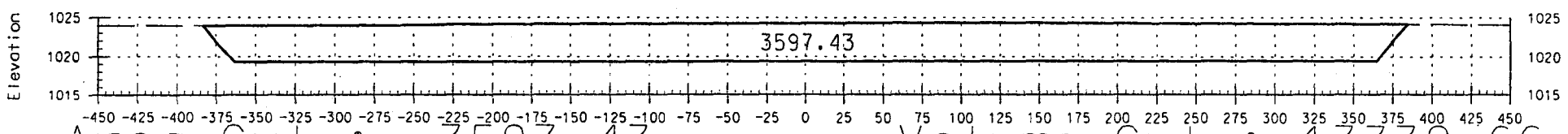

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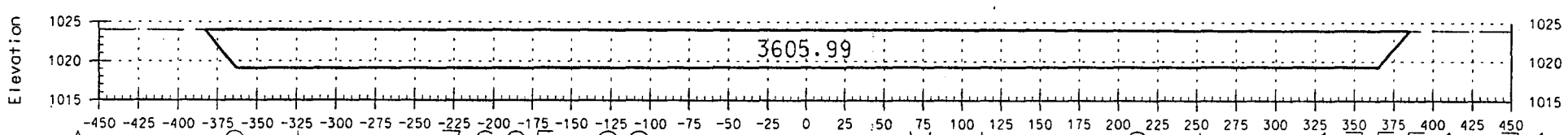

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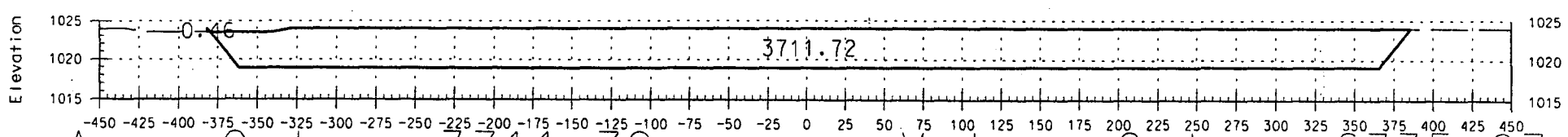

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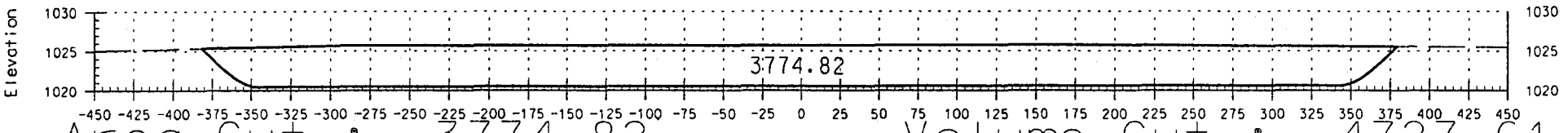

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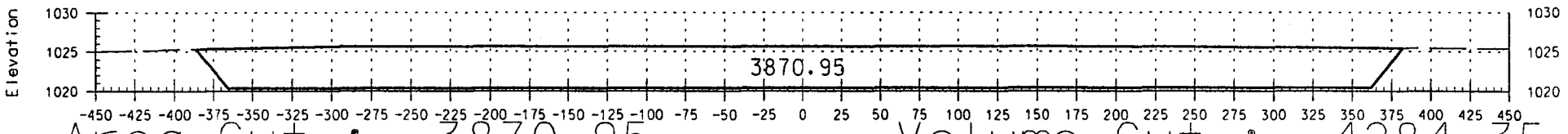

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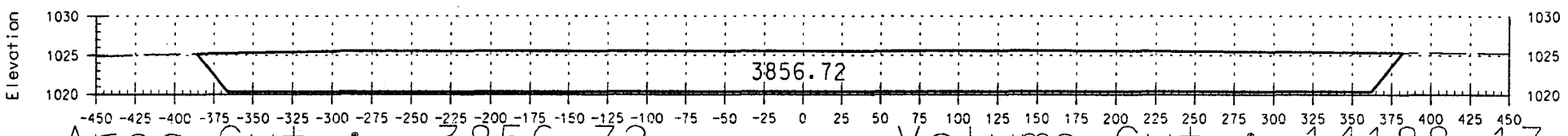

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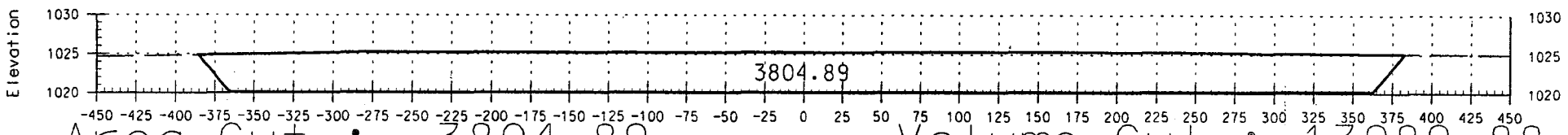

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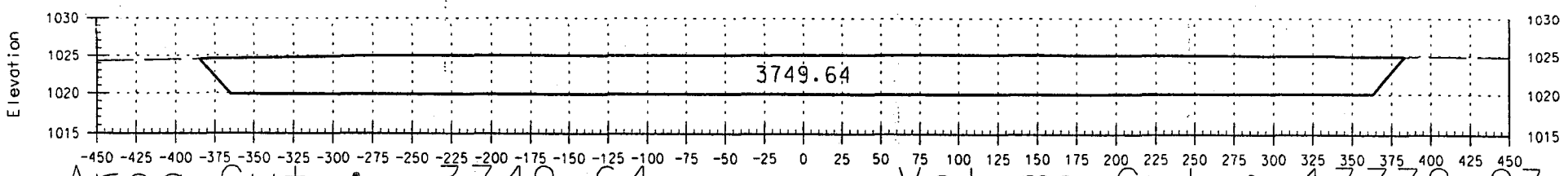

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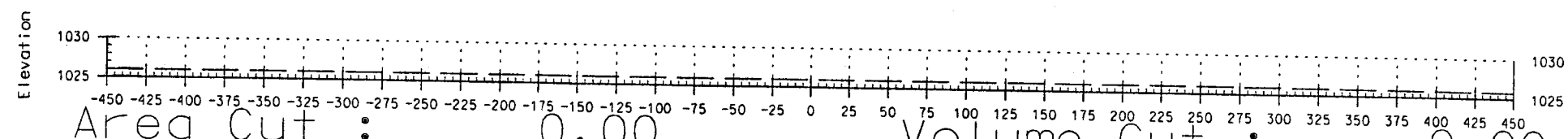

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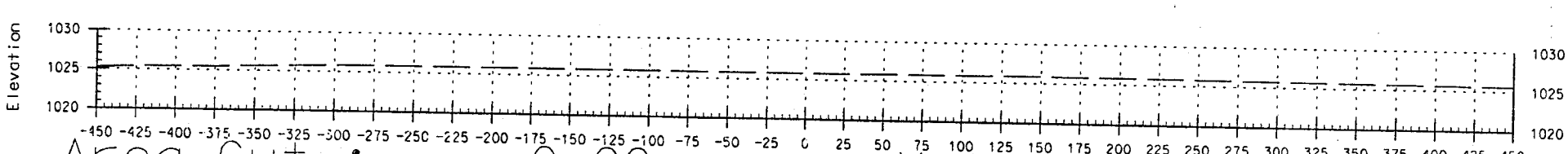

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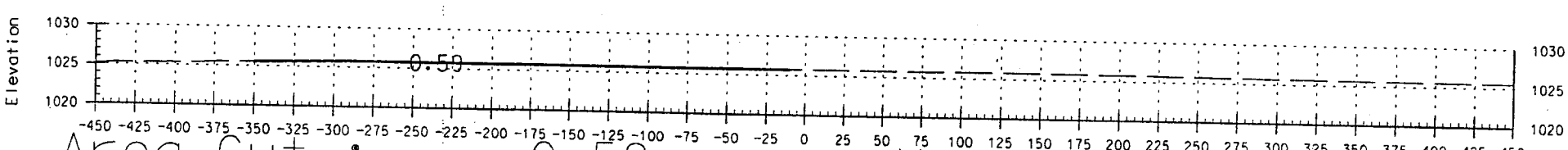

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983

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April 6, 1998 * * * EARTHWORK * * *
10:42 AM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
350	1.00	0.00	0	0	1.00	1079.34	0	0	0
Cumulative Zero Mass:			0	0			0	0	
400	1.00	0.00	0	0	1.00	2779.84	3573	3573	-3573
500	1.00	0.00	0	0	1.00	5756.75	15808	15808	-19382
600	1.00	0.00	0	0	1.00	8027.00	25525	25525	-44907
700	1.00	0.00	0	0	1.00	8222.09	30091	30091	-74998
800	1.00	0.00	0	0	1.00	7515.61	29144	29144	-104142
900	1.00	0.00	0	0	1.00	6678.20	26285	26285	-130427
1000	1.00	12.79	24	24	1.00	5424.39	22412	22412	-152815
1100	1.00	50.98	118	118	1.00	4686.12	18723	18723	-171420
1200	1.00	74.70	233	233	1.00	4336.03	16708	16708	-187895
1300	1.00	77.98	283	283	1.00	2281.86	12255	12255	-199868
1400	1.00	4.64	153	153	1.00	997.20	6072	6072	-205787
1500	1.00	0.00	9	9	1.00	1033.95	3761	3761	-209540
1600	1.00	0.00	0	0	1.00	816.74	3427	3427	-212967
1700	1.00	0.00	0	0	1.00	0.00	1512	1512	-214480
1800	1.00	0.00	0	0	1.00	0.00	0	0	-214480
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April 6, 1998 * * * EARTHWORK * * *
10:42 AM Report Template: BASIC_END_AREA_80

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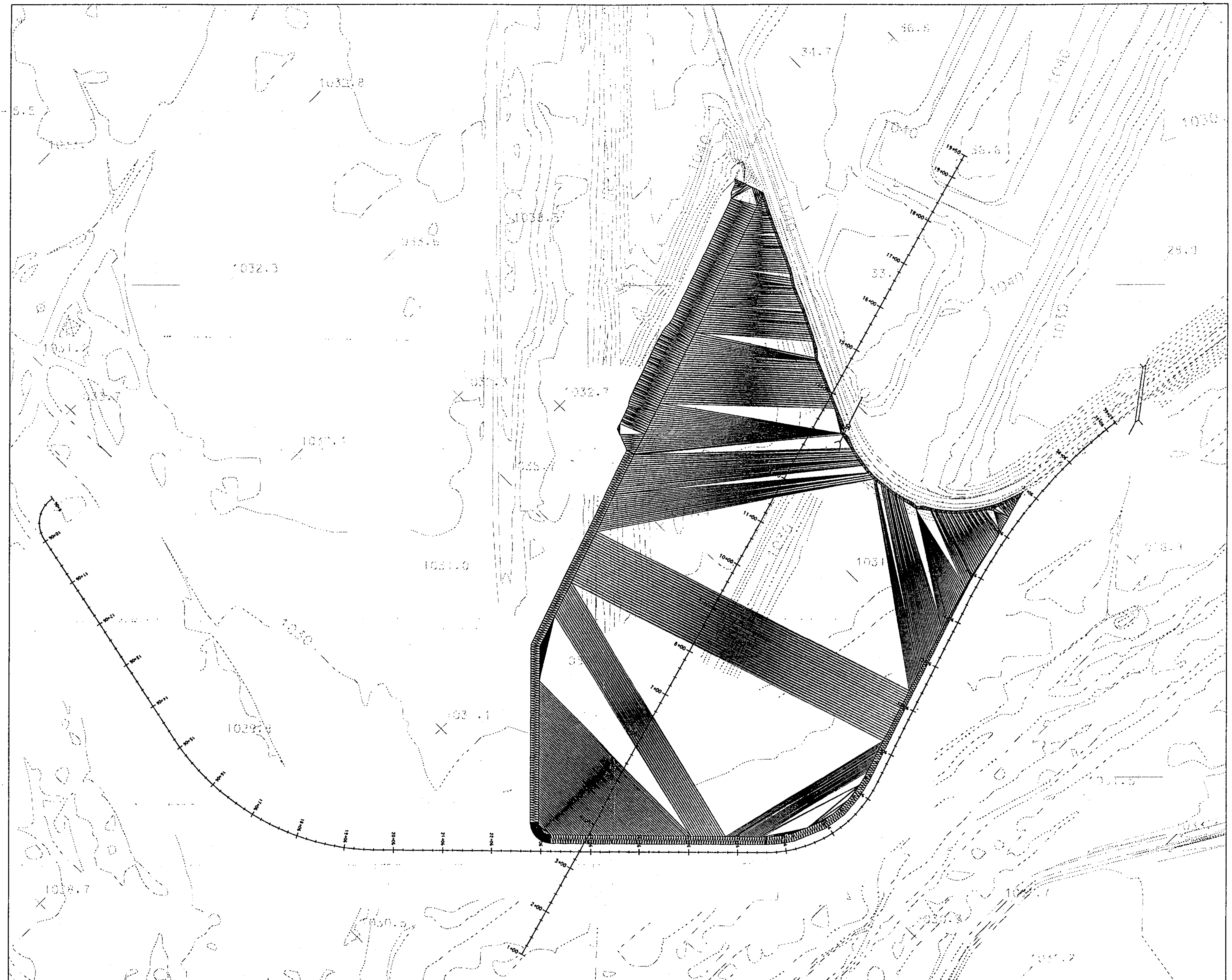
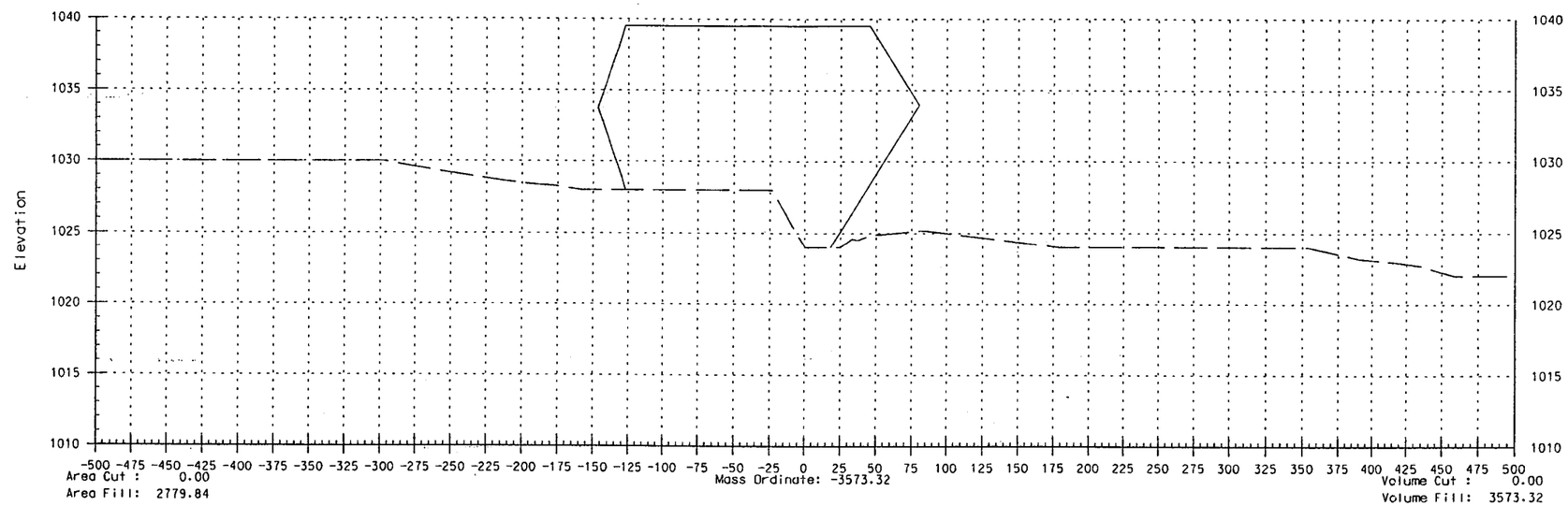


n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:42:24 DMJM Arizona, Inc.



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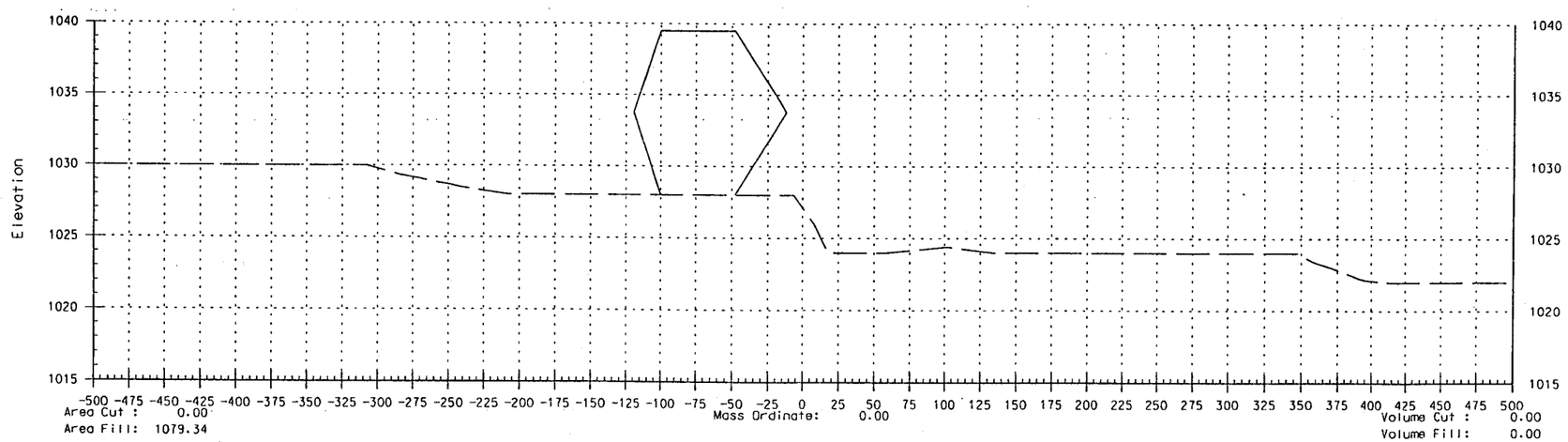

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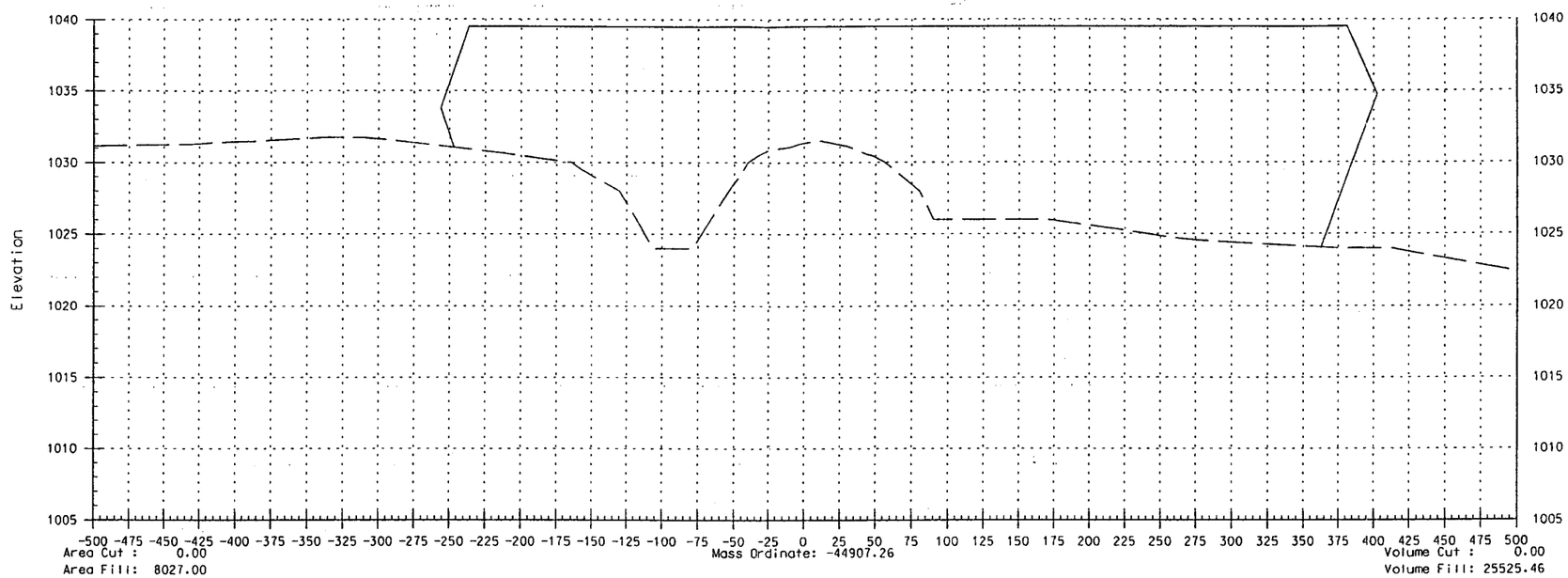
n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:28:32 DMJM Arizona,Inc.



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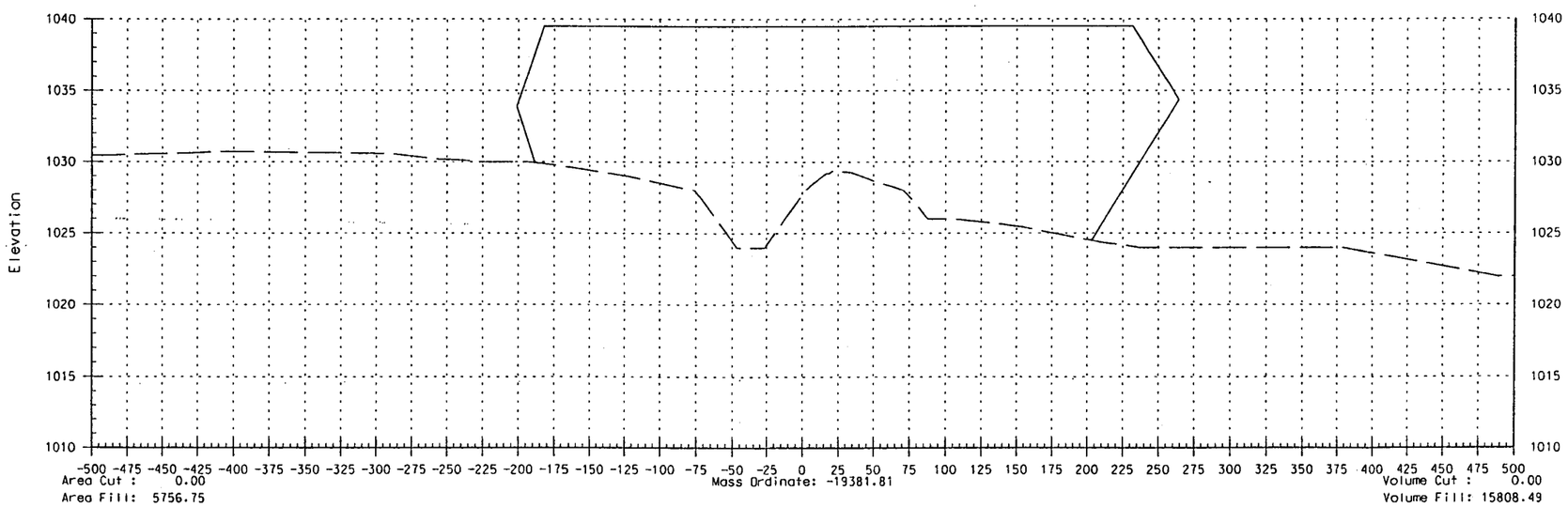

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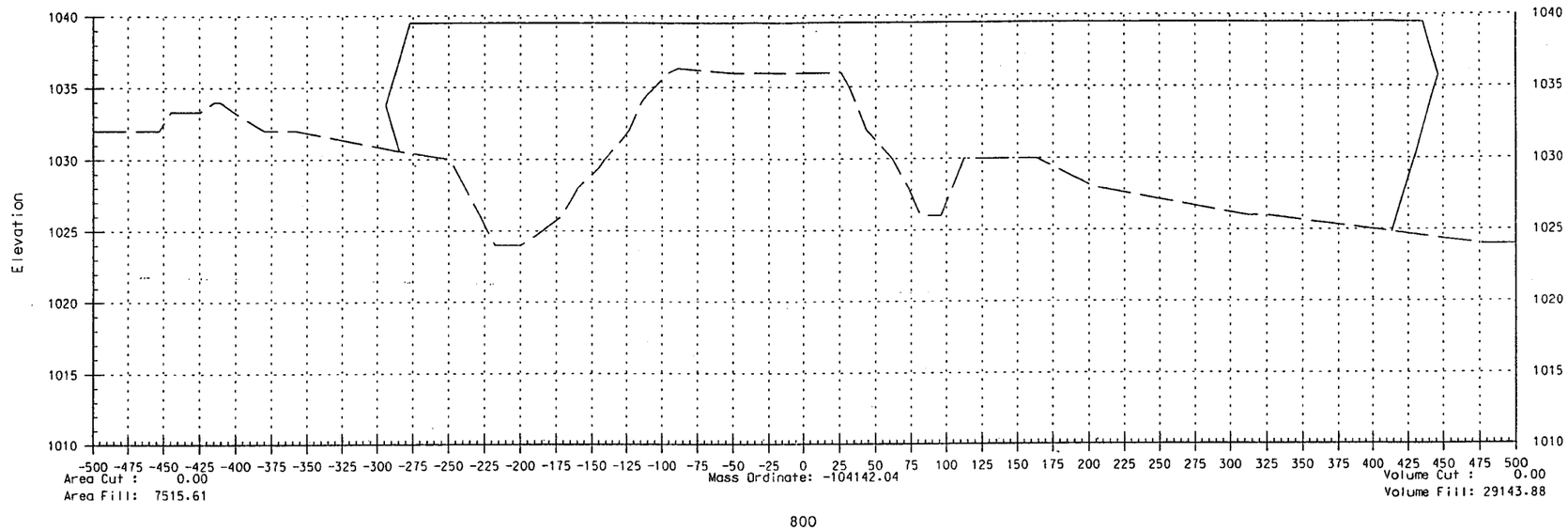
n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:29:39 DMJM Arizona,Inc.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1010
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Mass Ordinate: -104142.04
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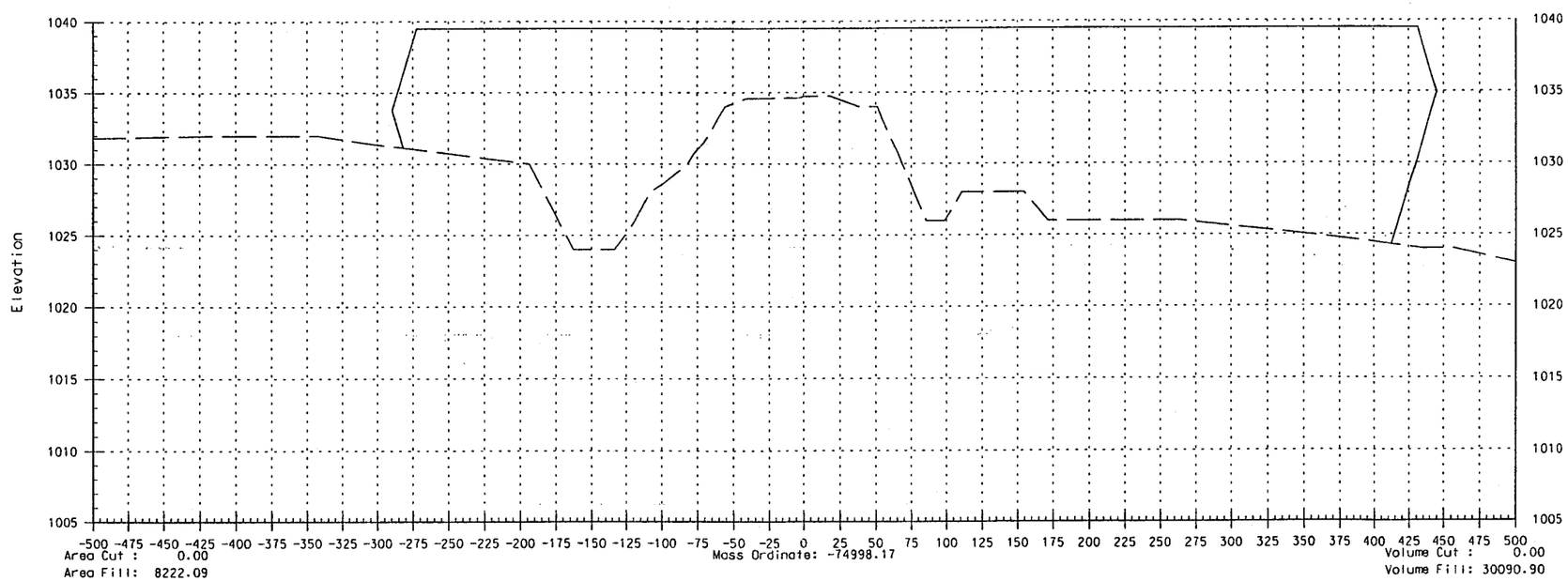
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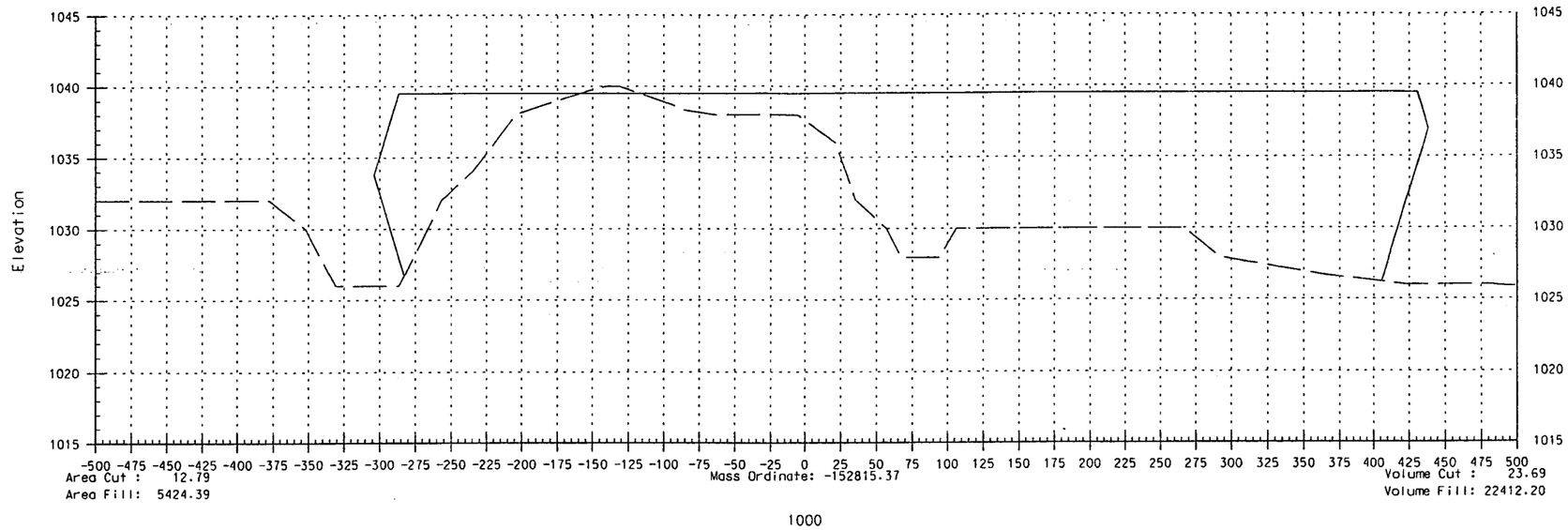

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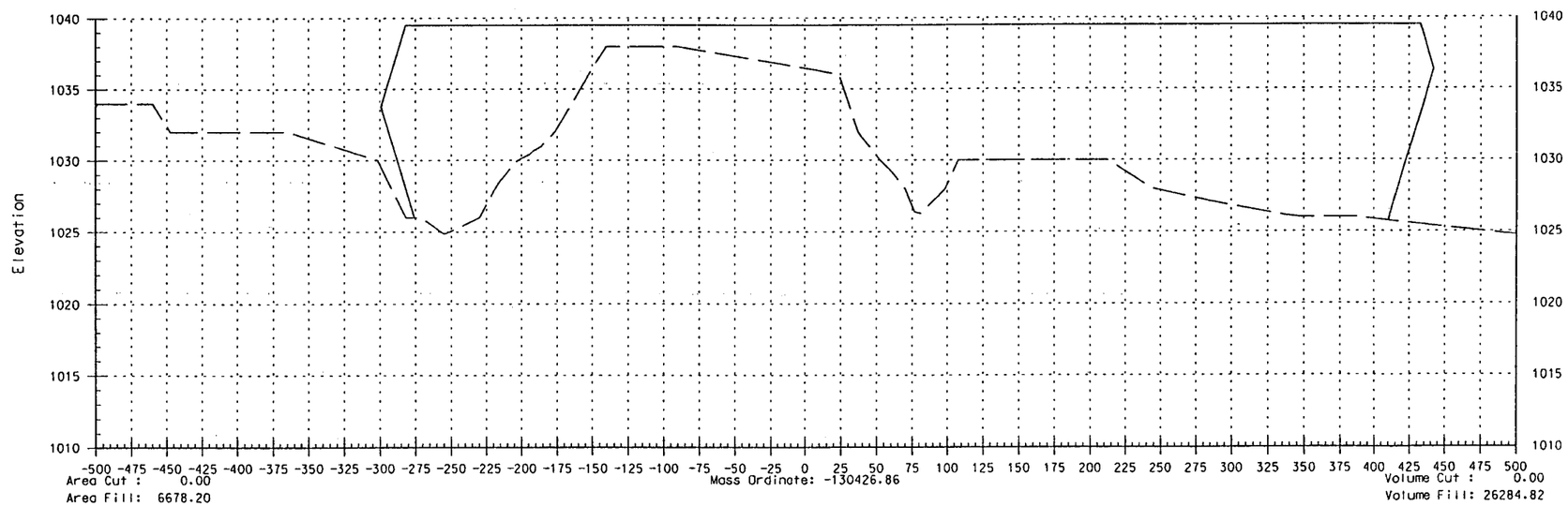

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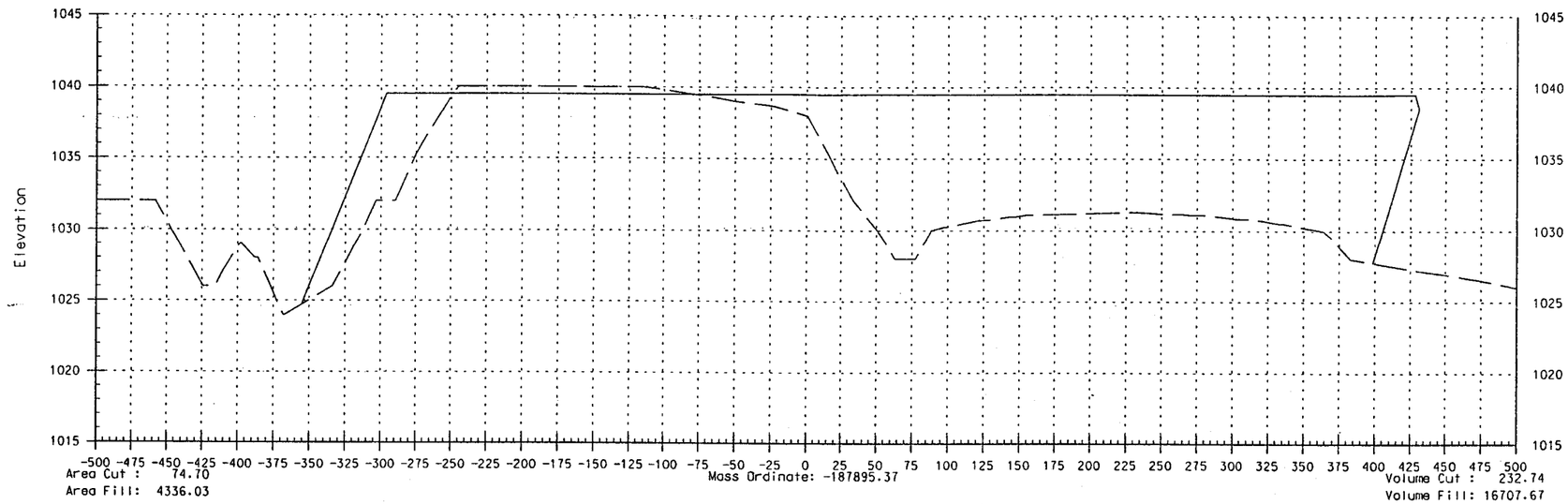
n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:30:24 DMJM Arizona,Inc.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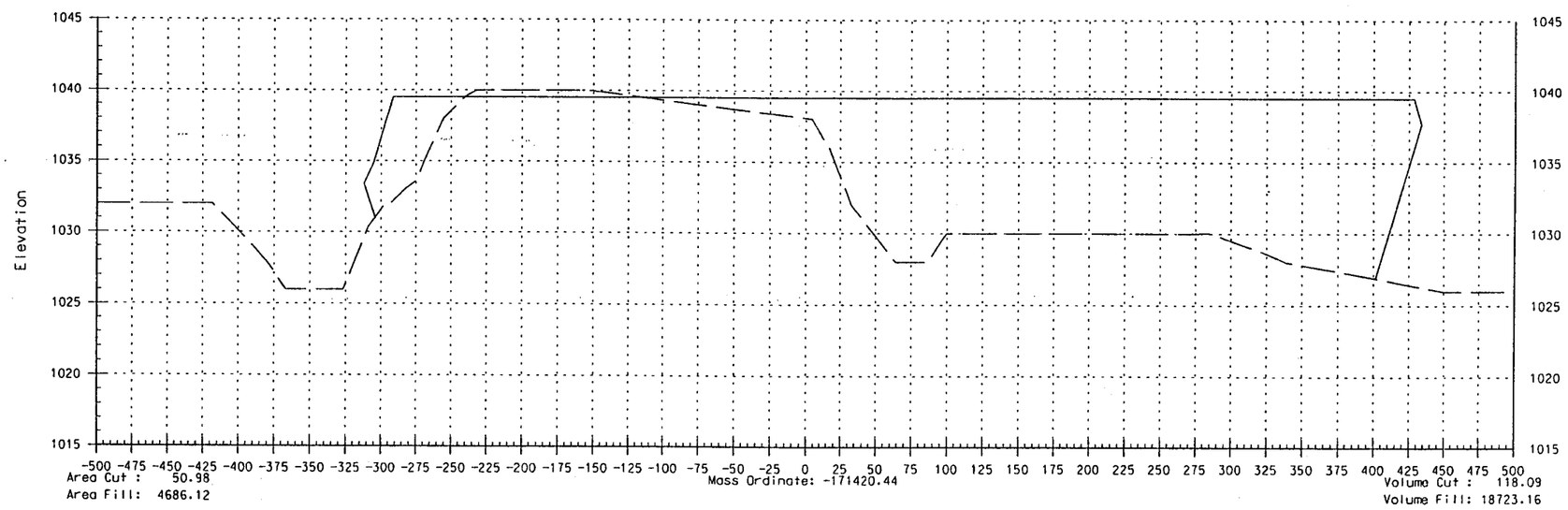
1200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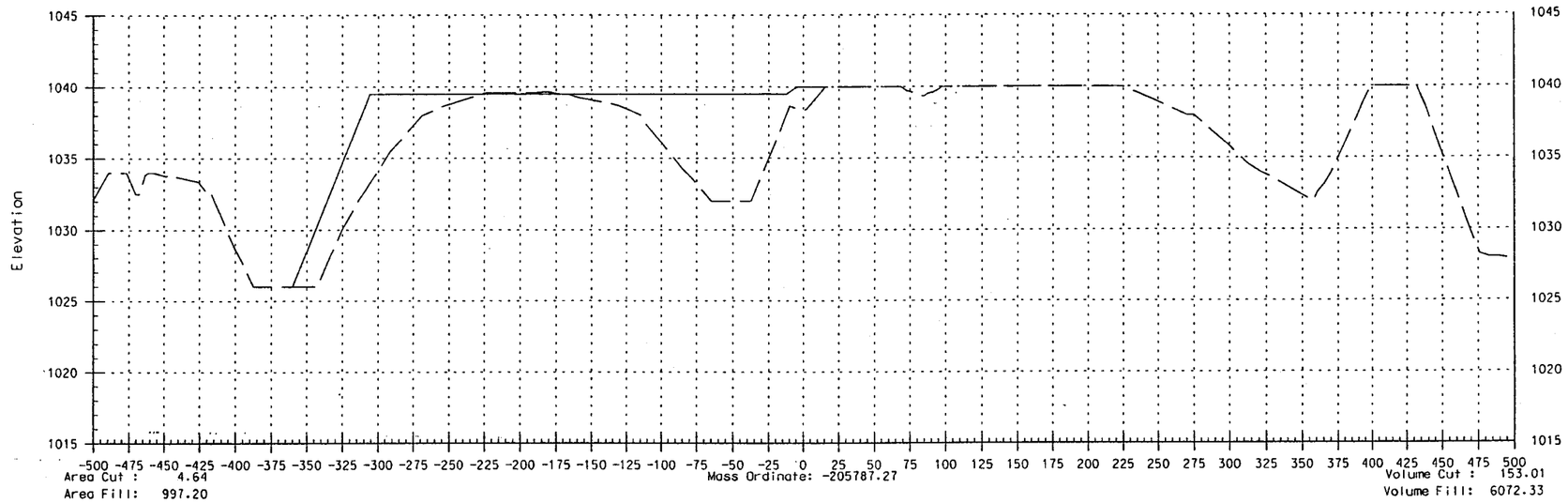
1100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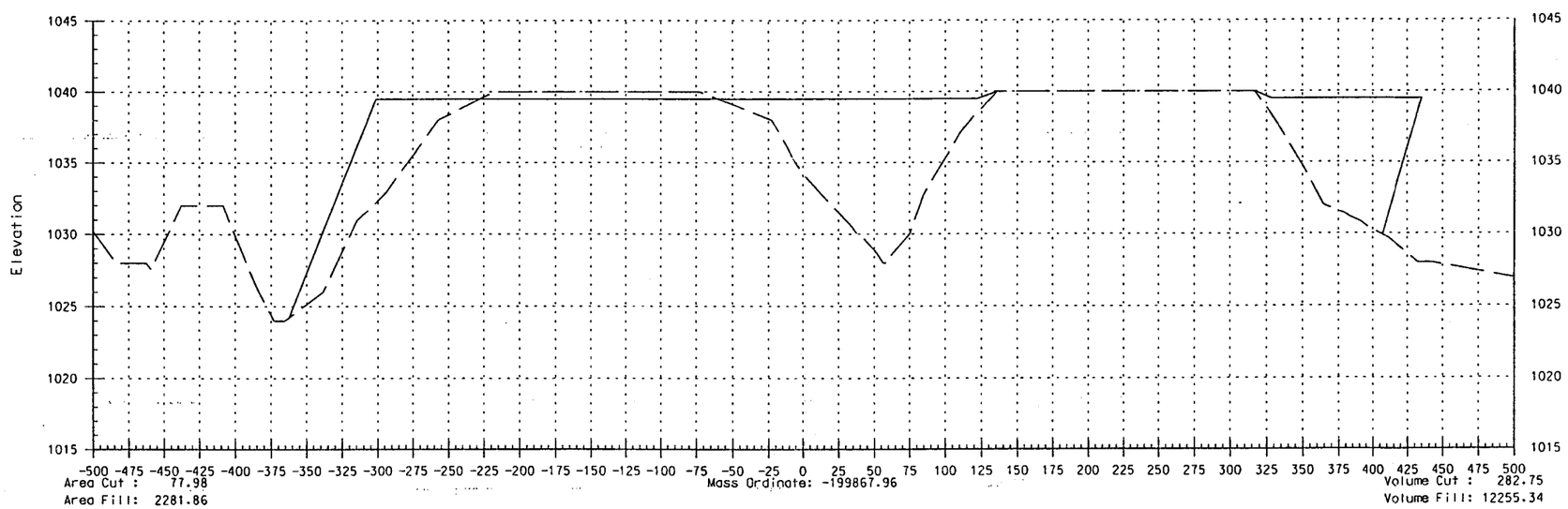
1400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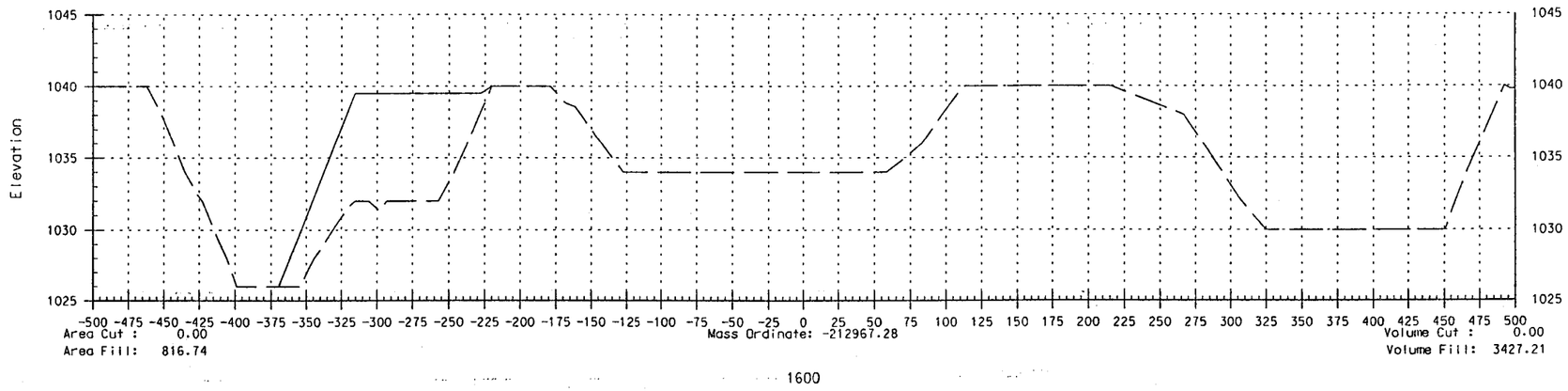
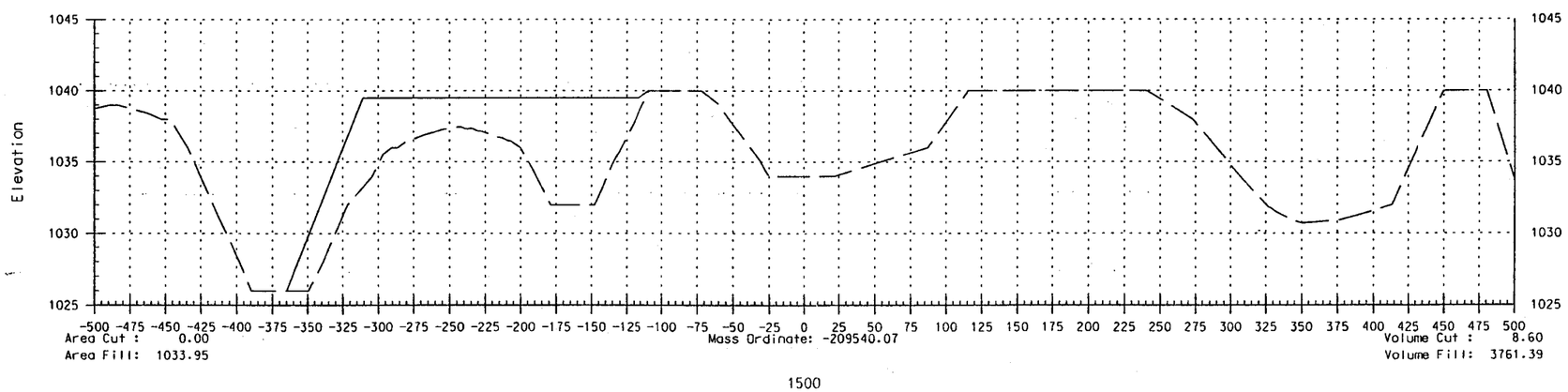
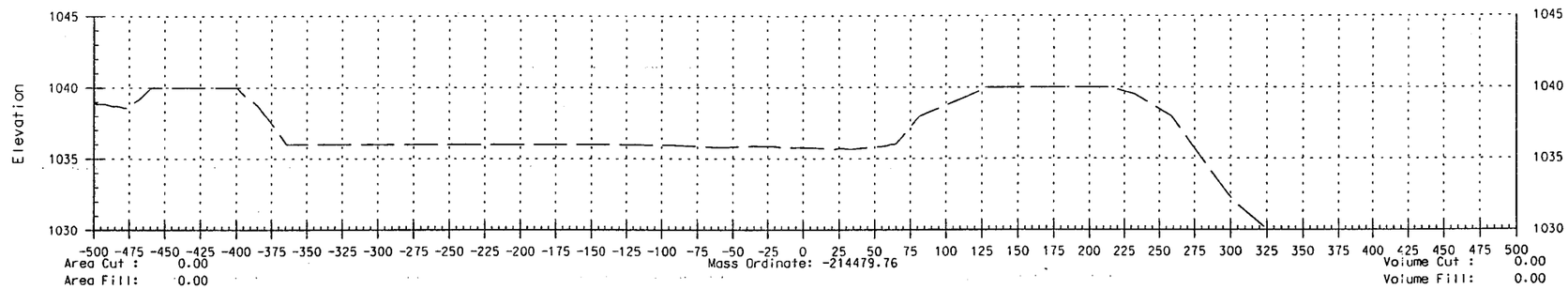
1300





n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:30:59 DMJM Arizona,Inc.



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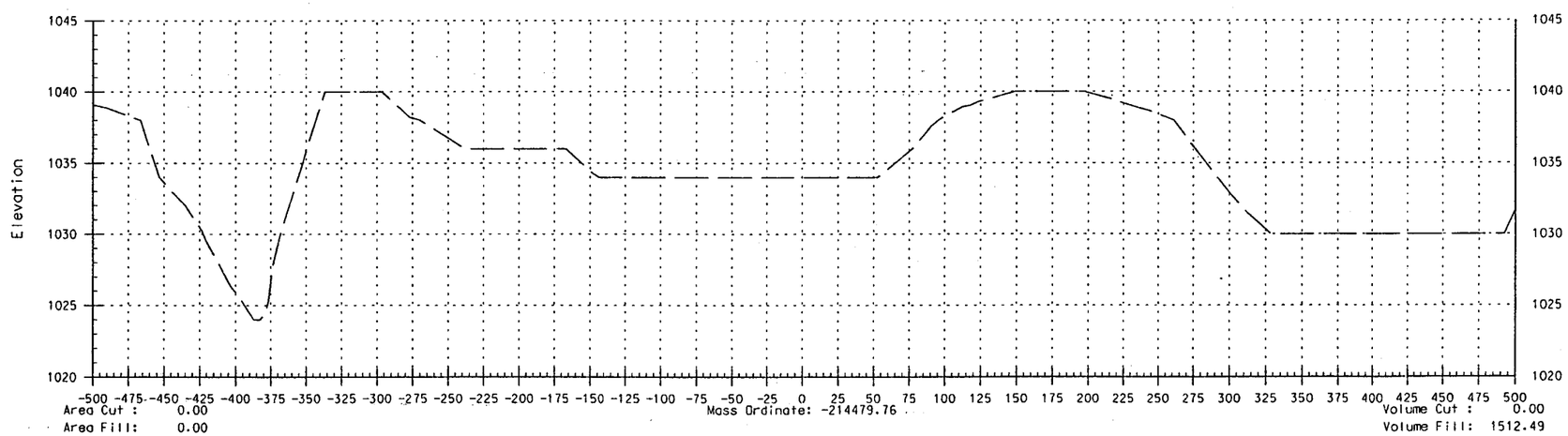


1700

n:/6526/hydraulics/quant.dgn Jul. 06, 1998 09:31:10 DMJM Arizona,Inc.

DMJM	PROJECT: Camelback Ranch Levee Project	JOB NO. 6526	SHEET 4 of 4
		DESIGNED BY JRG	DATE 9/21/98
SUBJECT: EARTHWORK QUANTITIES		CHECKED BY DBL	DATE 1-21-99

GLENDALE AIRPORT OUTFALL CHANNEL (GAOC)

EXCAVATION PER REPORT	443 C.Y. ✓
FILL PER REPORT	9406 C.Y. ✓
SOIL CEMENT AT OUTFALL PER REPORT	2042 C.Y. ✓

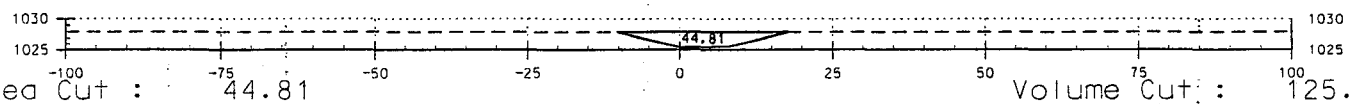
September 21, 1998 * * * EARTHWORK * * *
:02 PM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
-25	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
-00	1.00	40.33	56	56	1.00	0.00	0	0	56
-25	1.00	45.75	40	40	1.00	0.00	0	0	96
10+00	1.00	44.81	126	126	1.00	0.00	0	0	222
+25	1.00	44.57	41	41	1.00	0.00	0	0	263
+00	1.00	43.35	122	122	1.00	528.96	735	735	-350
11+25	1.00	45.88	41	41	1.00	499.60	476	476	-784
11+26	1.00	46.33	2	2	1.00	498.13	18	18	-801
+00	1.00	84.50	179	179	1.00	355.91	1170	1170	-1792
+25	1.00	99.99	85	85	1.00	320.71	313	313	-2020
13+00	1.00	141.07	335	335	1.00	251.08	794	794	-2479
13+25	1.00	155.91	137	137	1.00	226.48	221	221	-2563
+00	1.00	197.25	491	491	1.00	174.88	557	557	-2630
+25	1.00	202.84	185	185	1.00	177.09	163	163	-2608
14+30	1.00	210.30	38	38	1.00	177.27	32	32	-2602
15+00	1.00	193.87	525	525	1.00	164.01	443	443	-2521
+25	1.00	212.84	188	188	1.00	112.84	128	128	-2461
+00	1.00	183.50	550	550	1.00	151.85	368	368	-2278
16+25	1.00	182.67	170	170	1.00	173.24	151	151	-2259
+00	1.00	168.25	487	487	1.00	266.68	611	611	-2382
+25	1.00	160.49	152	152	1.00	324.51	274	274	-2504
+00	1.00	88.01	345	345	1.00	412.49	1024	1024	-3182
18+23	1.00	55.07	61	61	1.00	398.71	346	346	-3467
+25	1.00	50.98	4	4	1.00	396.69	29	29	-3492
+80	1.00	0.00	52	52	1.00	390.60	802	802	-4242
+00	1.00	0.00	0	0	1.00	422.42	301	301	-4543
19+25	1.00	0.00	0	0	1.00	137.31	259	259	-4803
+00	1.00	0.00	0	0	1.00	0.00	191	191	-4993
Page Total:			4413	4413			9406	9406	

September 21, 1998 * * * EARTHWORK * * *
:02 PM Report Template: BASIC_END_AREA_80

Grand Total:			4413	4413			9406	9406	

GHOC



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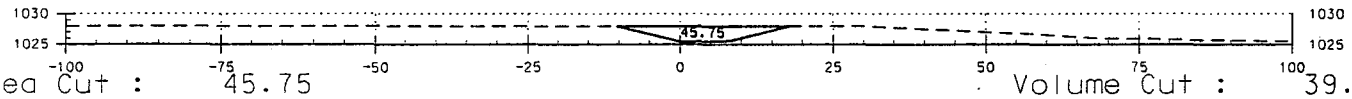
Area Fill: 0.00 10+00 Volume Fill: 0.00



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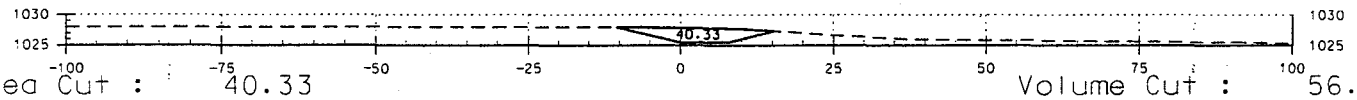

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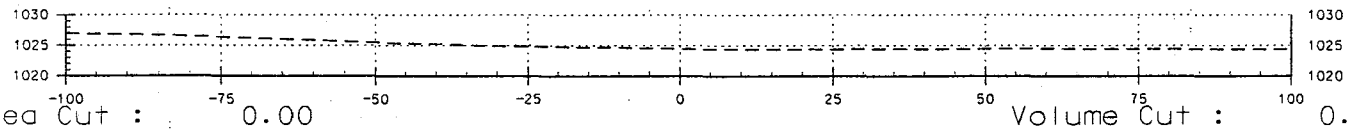

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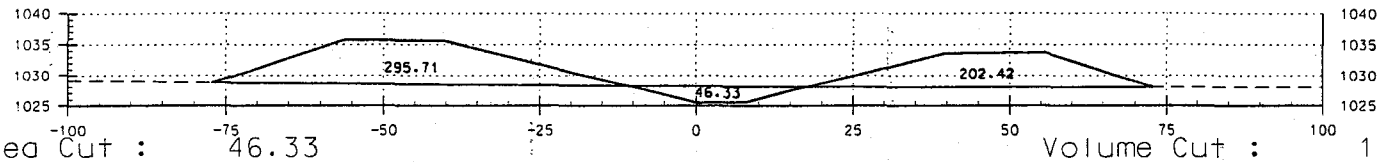

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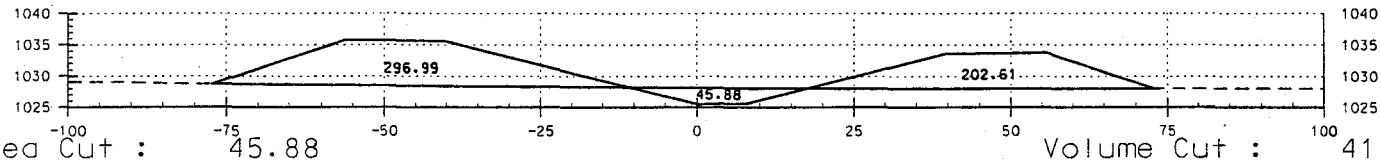

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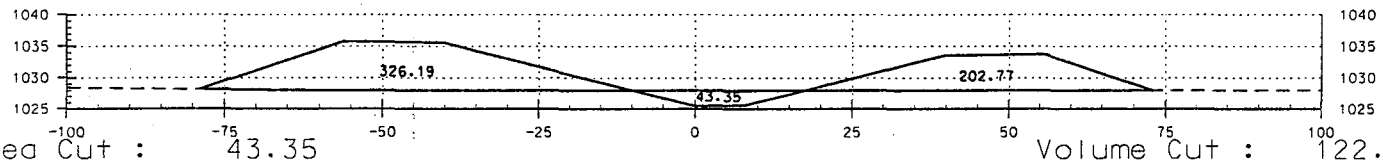

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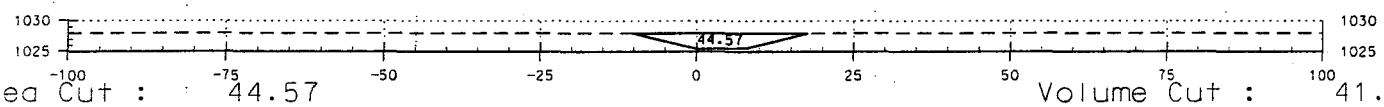

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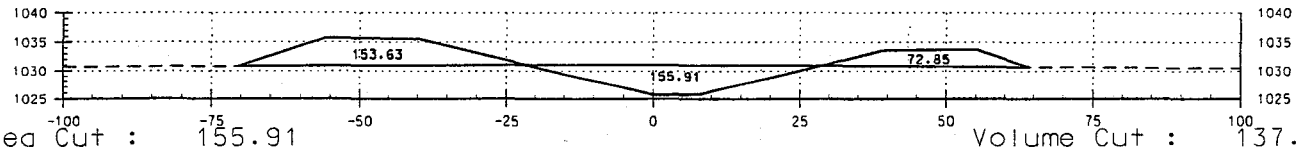

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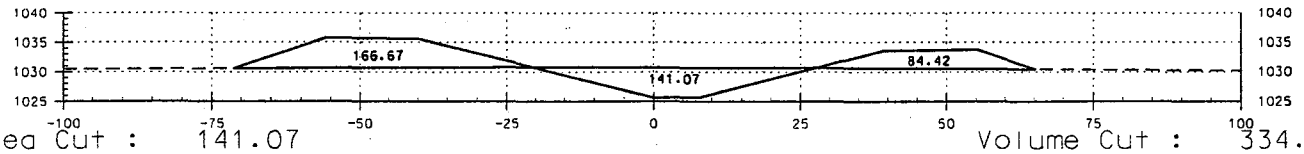

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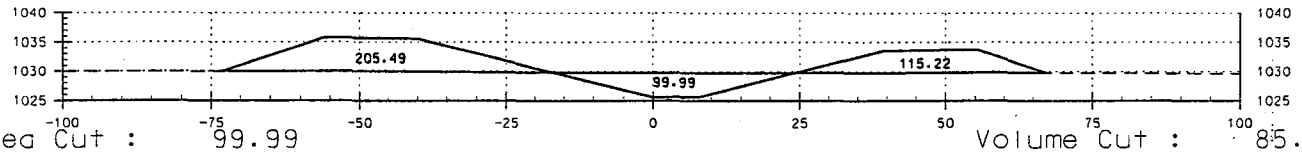

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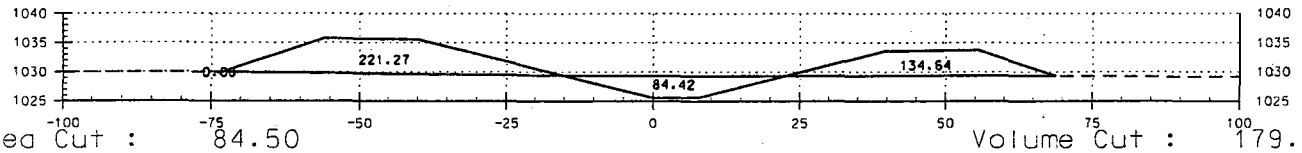

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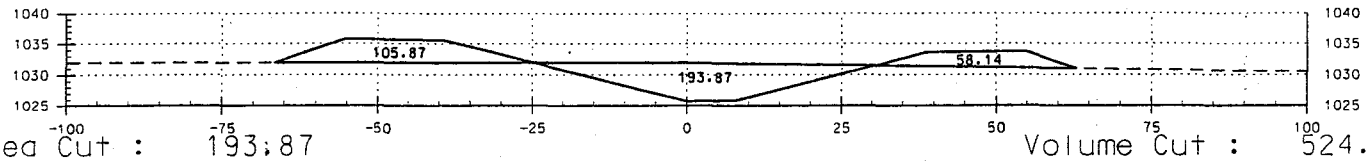

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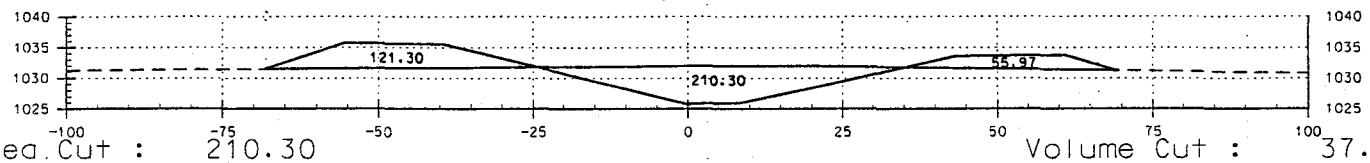
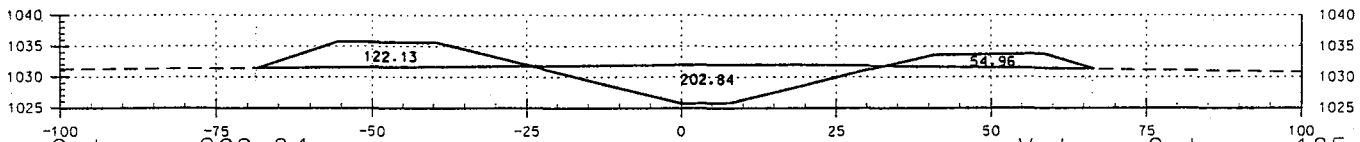


Area Cut : 210.30 Volume Cut : 37.52

Area Fill: 177.27 14+30 Volume Fill: 32.18



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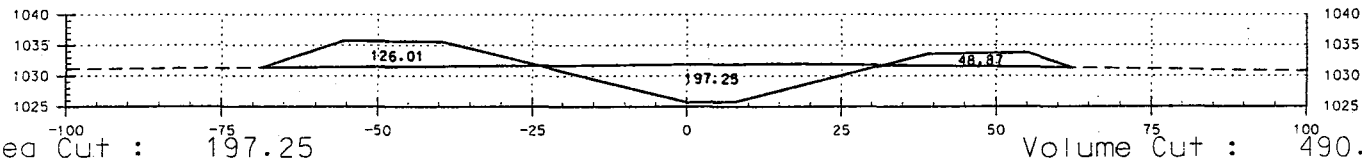

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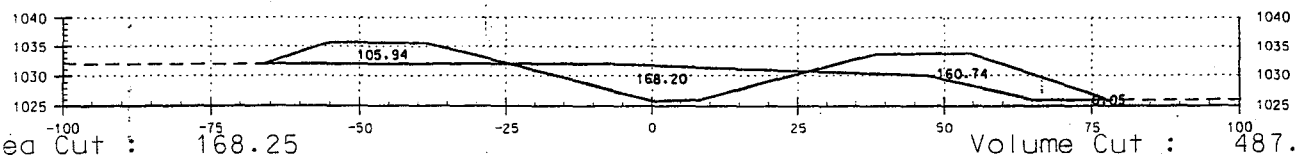
Area Fill: 174.88 14+00 Volume Fill: 557.46



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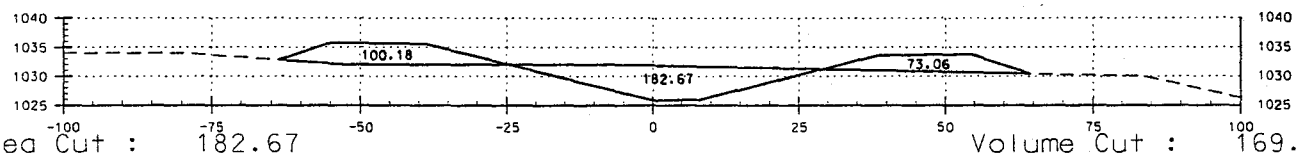

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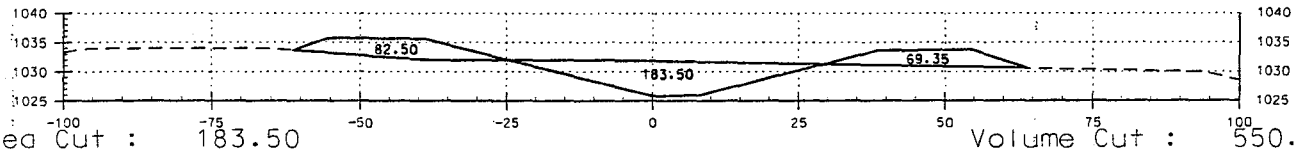

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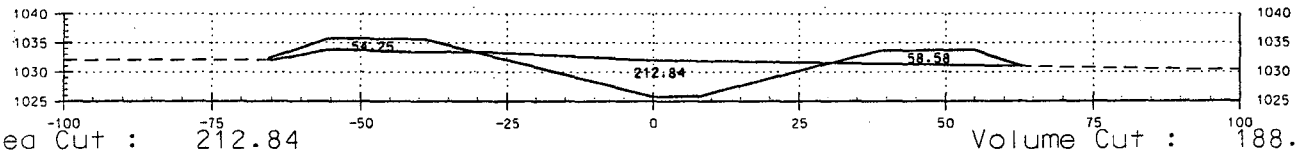

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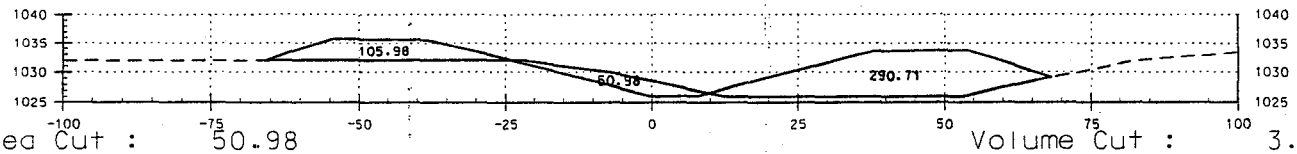
Area Fill: 112.84 15+25 Volume Fill: 128.17



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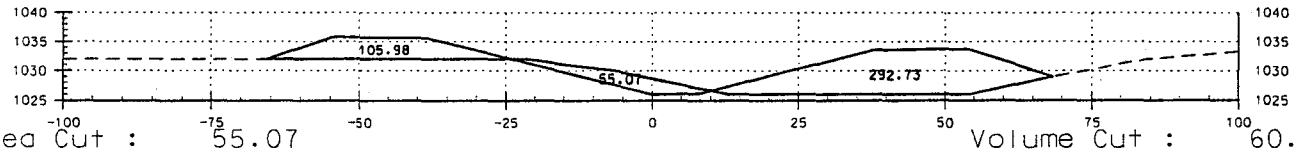
Area Fill: 396.69 18+25 Volume Fill: 29.46



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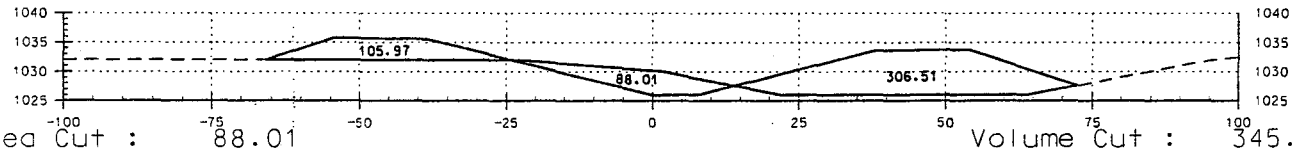
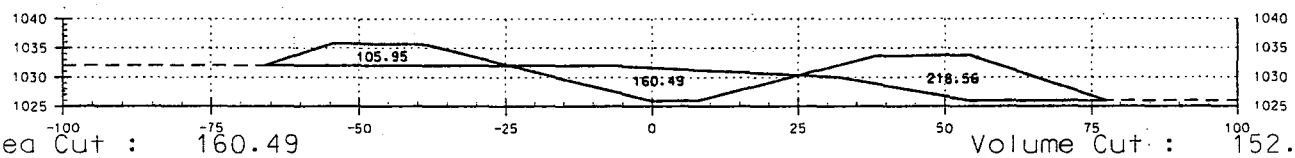
Area Fill: 398.71 18+23 Volume Fill: 345.51



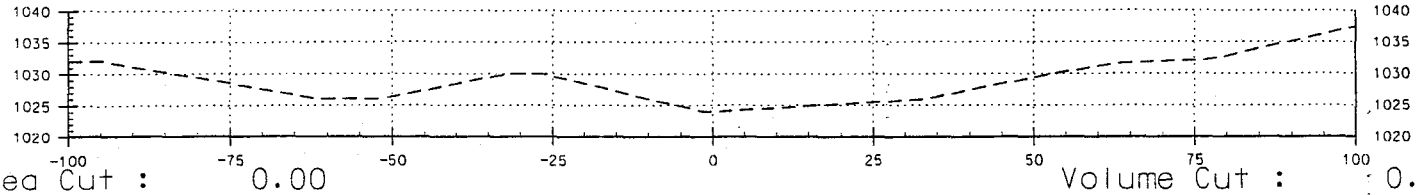
Area Cut : 88.01 Volume Cut : 345.13

Area Fill: 412.49 18+00 Volume Fill: 1023.60



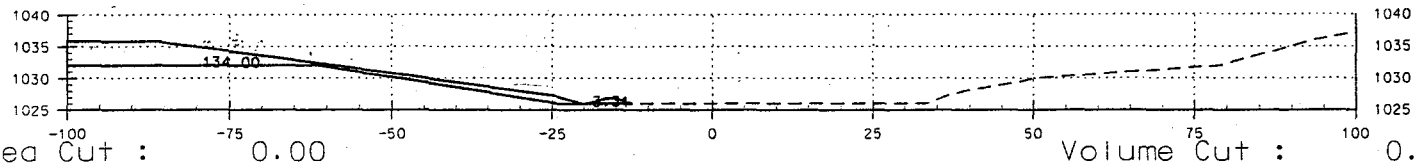
Area Cut : 160.49 Volume Cut : 152.19

Area Fill: 324.51 17+25 Volume Fill: 273.70



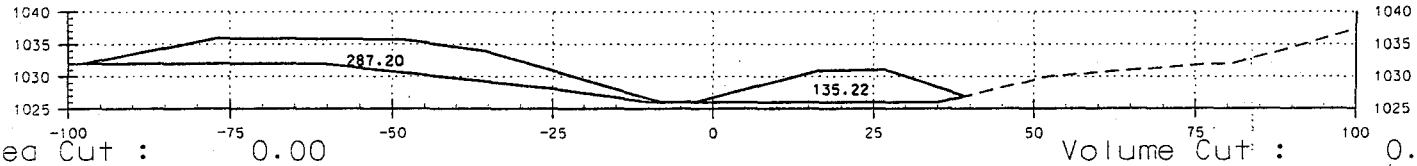
Area Cut : 0.00 Volume Cut : 0.00

Area Fill: 0.00 20+00 Volume Fill: 190.71



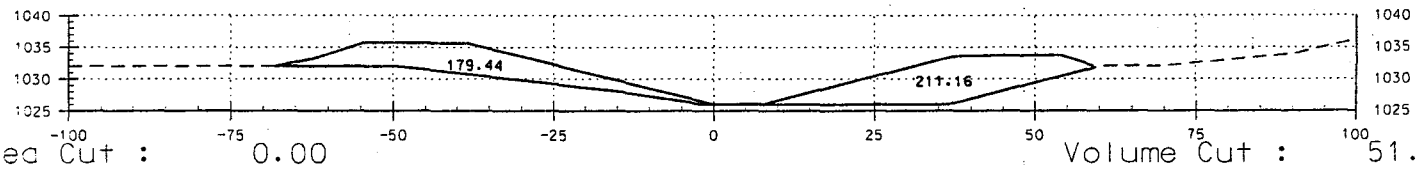
Area Cut : 0.00 Volume Cut : 0.00

Area Fill: 137.31 19+25 Volume Fill: 259.13



Area Cut : 0.00 Volume Cut : 0.00

Area Fill: 422.42 19+00 Volume Fill: 301.12



Area Cut : 0.00 Volume Cut : 51.93

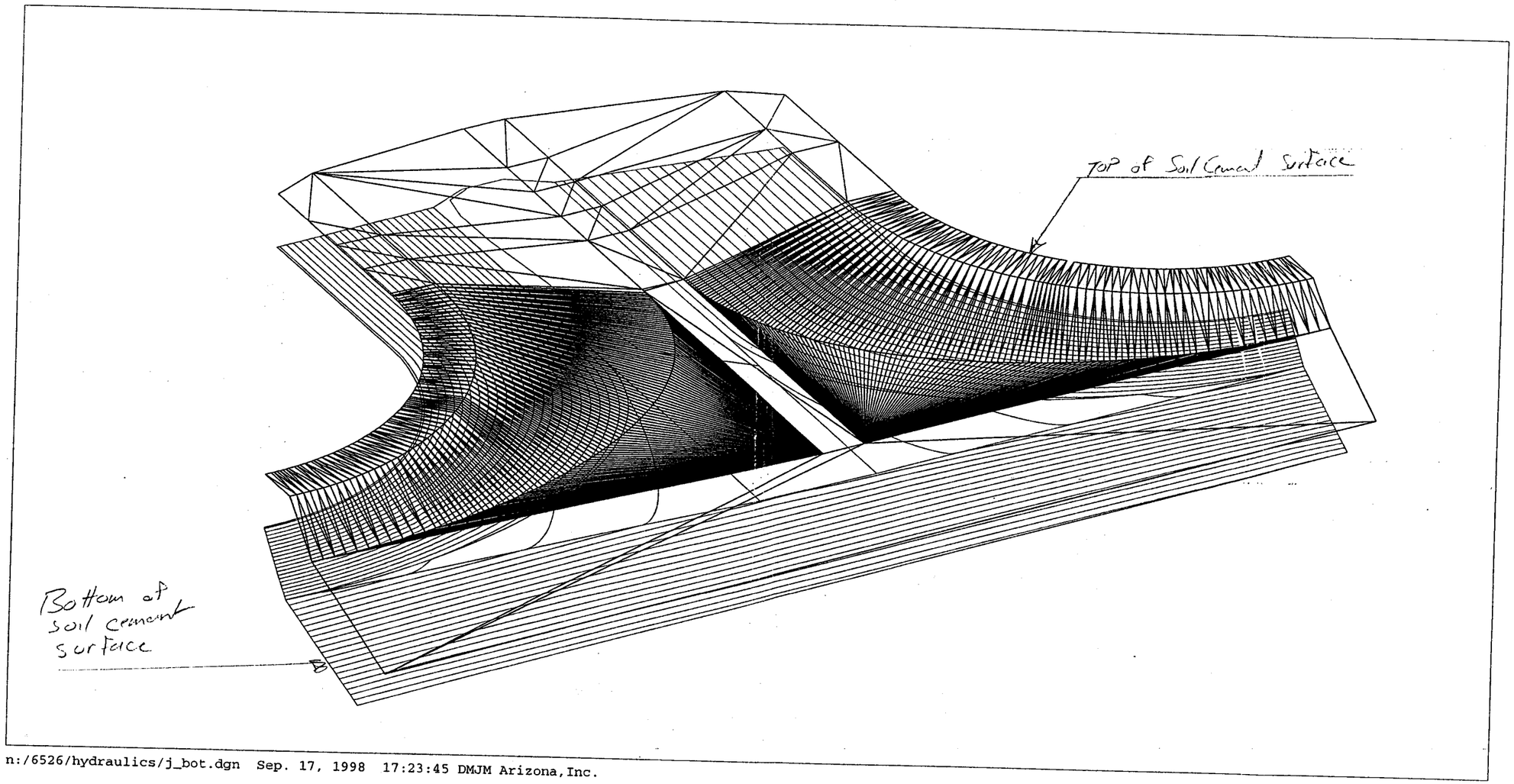
Area Fill: 390.60 18+80 Volume Fill: 801.87

ptember 17, 1998 * * * EARTHWORK * * * Page 1
:15 PM Report Template: BASIC_END_AREA_80

BASELINE ATION MBER	STATION CUT FACT	AREA (sq ft)	VOLUME (cu yd)	ADJUSTED (cu yd)	FILL FACT	AREA (sq ft)	VOLUME (cu yd)	ADJUSTED (cu yd)	MASS ORD. (cu yd)
75	1.00	0.00	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
85	1.00	0.00	0	0	1.00	783.43	145	145	-145
995	1.00	0.00	0	0	1.00	1030.59	336	336	-481
1005	1.00	0.00	0	0	1.00	762.82	332	332	-813
1015	1.00	0.00	0	0	1.00	461.83	227	227	-1040
1025	1.00	0.00	0	0	1.00	356.68	152	152	-1191
1035	1.00	0.00	0	0	1.00	297.78	121	121	-1313
1045	1.00	0.00	0	0	1.00	261.03	103	103	-1416
1055	1.00	0.00	0	0	1.00	241.11	93	93	-1509
1065	1.00	0.00	0	0	1.00	237.93	89	89	-1598
1075	1.00	0.00	0	0	1.00	237.79	88	88	-1686
1085	1.00	0.00	0	0	1.00	237.60	88	88	-1774
1095	1.00	0.00	0	0	1.00	237.33	88	88	-1862
1105	1.00	0.00	0	0	1.00	220.02	85	85	-1947
1115	1.00	0.00	0	0	1.00	124.65	64	64	-2010
1125	1.00	0.00	0	0	1.00	18.30	26	26	-2037
Page Total:			0	0			2037	2037	
Grand Total:			0	0			2037	2037	

+ 2' x 3' x 3' Turndown 5 cy

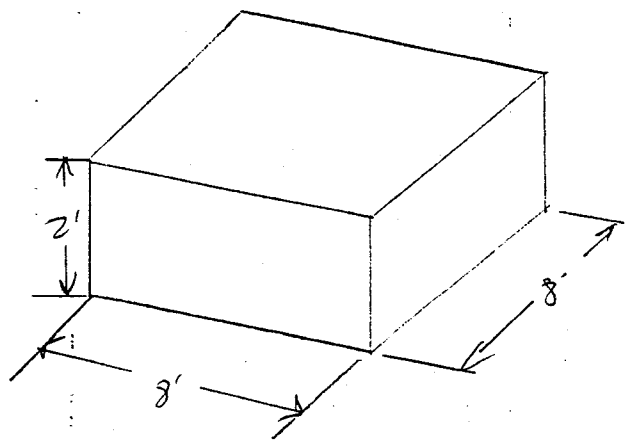
2042 cy



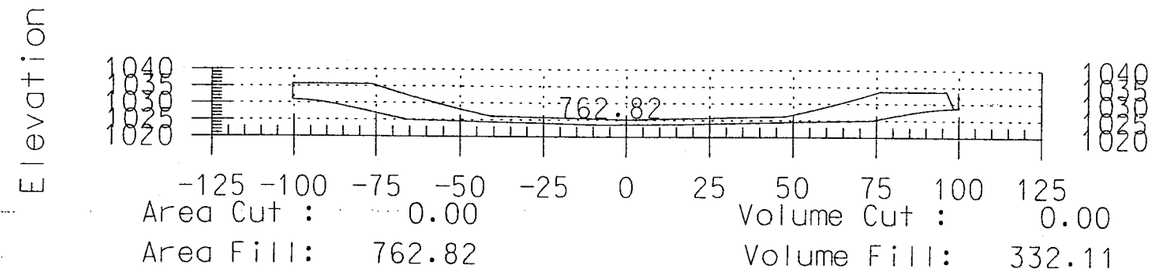
n:/6526/hydraulics/j_bot.dgn Sep. 17, 1998 17:23:45 DMJM Arizona,Inc.

DMJM	PROJECT: Camelback Ranch	JOB NO. 6526.10	SHEET of
		DESIGNED BY DBC	DATE 9-17-98
SUBJECT: Soil Cement QTY's		CHECKED BY JRM	DATE 9/17/98

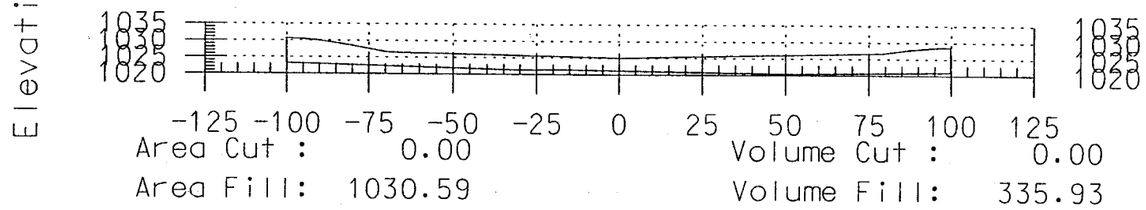
Qty for Soil Cement turn Down.



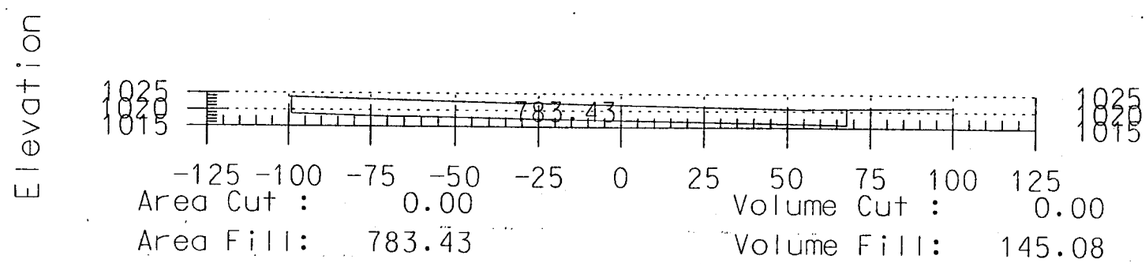
Additional Qty = 8' x 8' x 2' / 27 ≈ 5 cy.



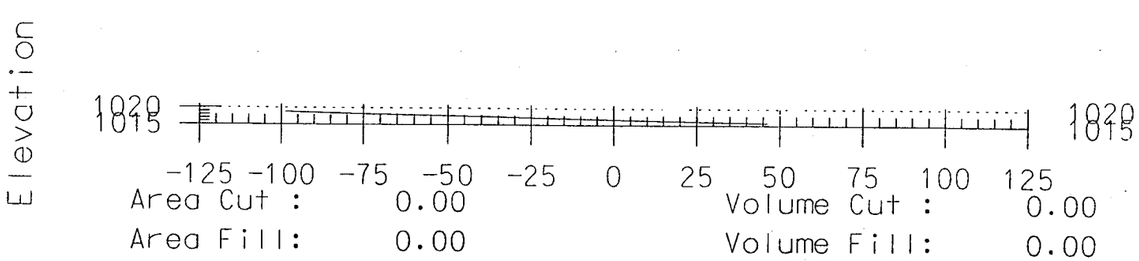
1005



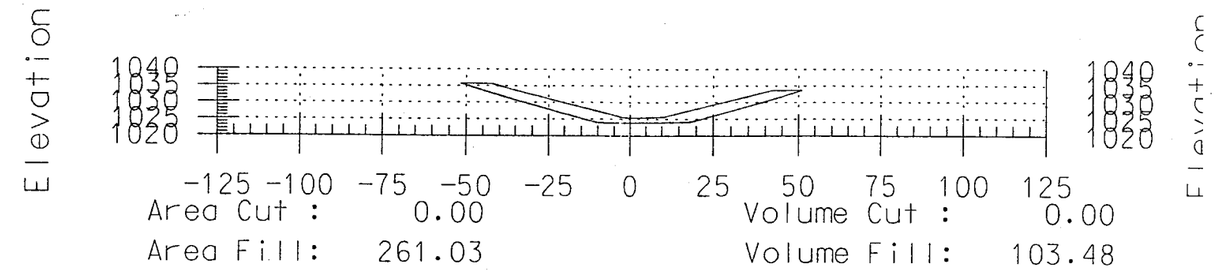
995



985



975



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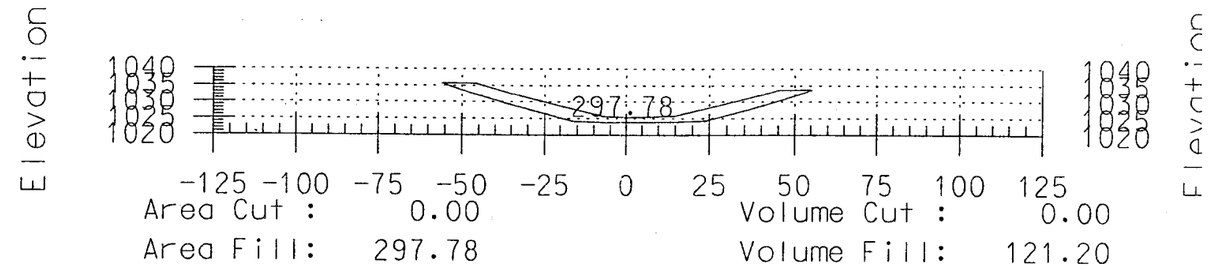
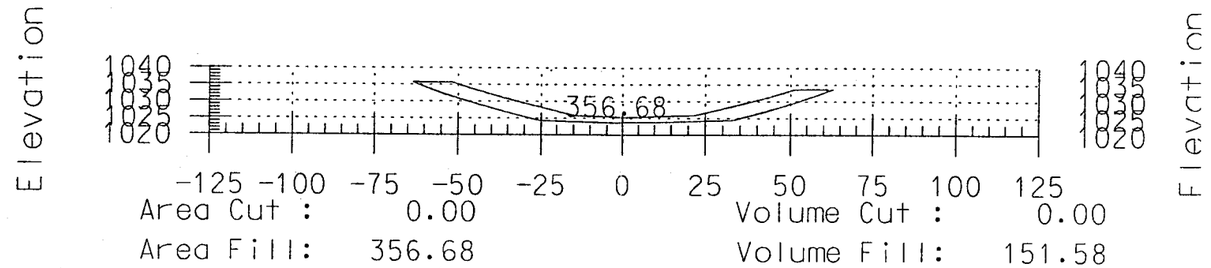
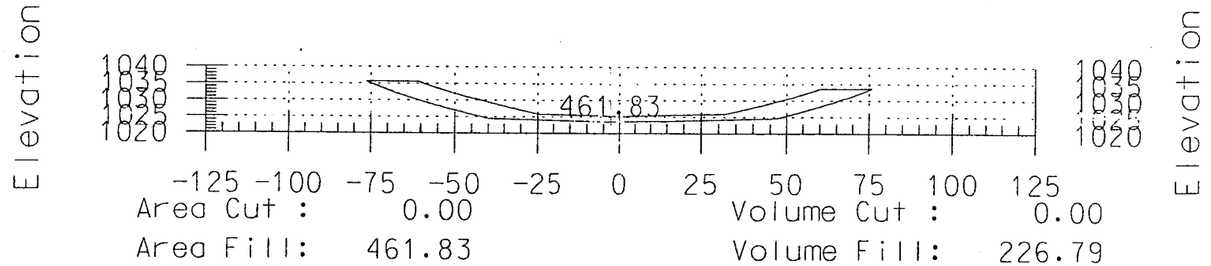


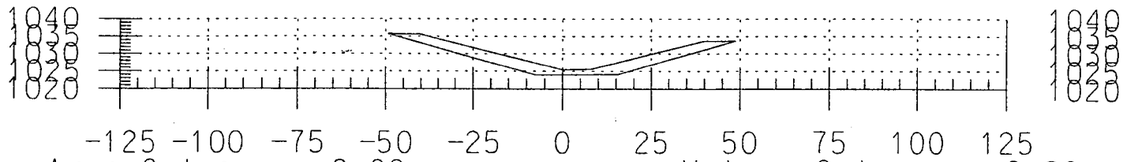
1035



1025

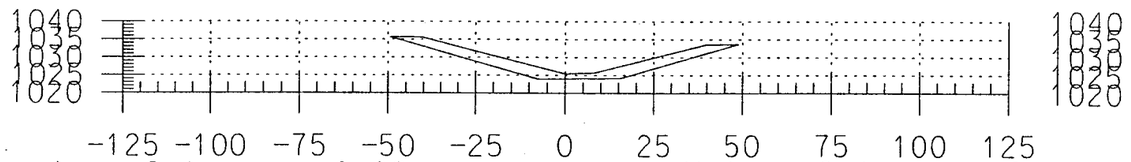


1015



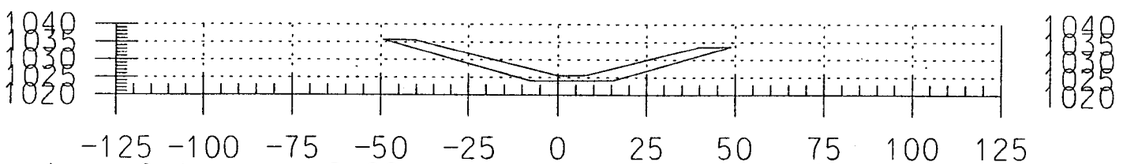
Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 237.60 Volume Fill: 88.04

1085



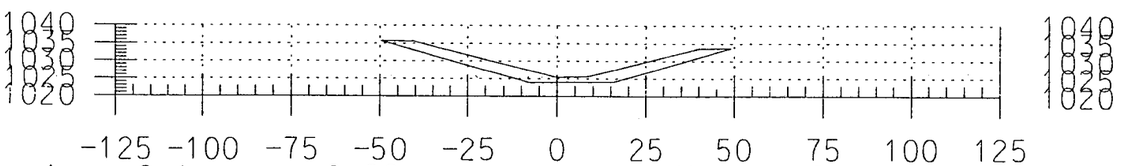
Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 237.79 Volume Fill: 88.10

1075



Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 237.93 Volume Fill: 88.71

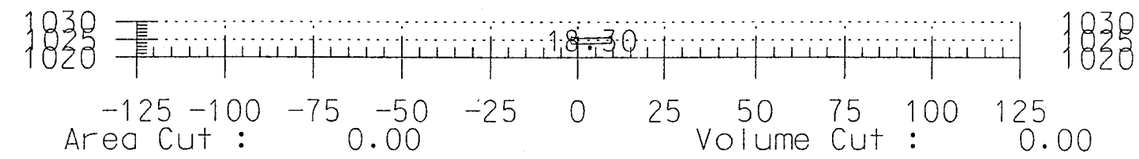
1065



Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 241.11 Volume Fill: 92.99

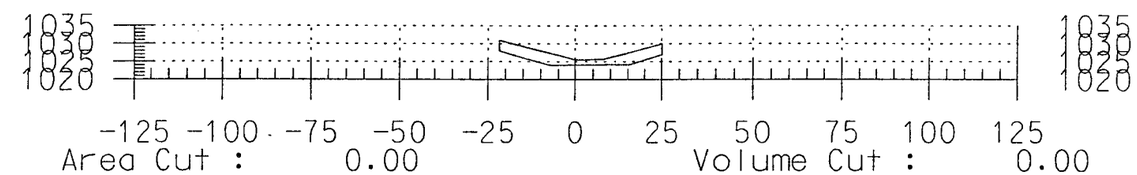
1055

Elevation



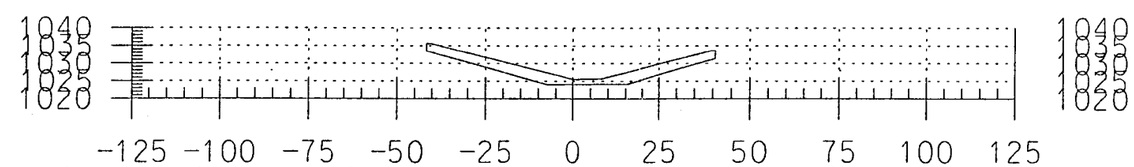
Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 18.30 Volume Fill: 26.47

1125



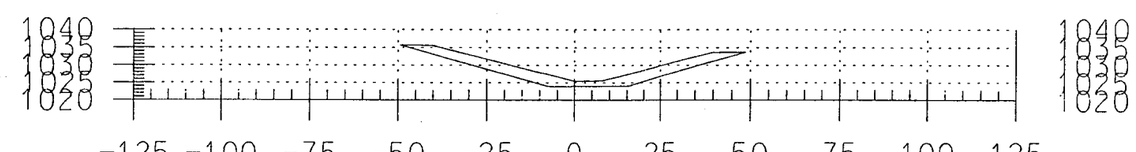
Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 124.65 Volume Fill: 63.83

1115



Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 220.02 Volume Fill: 84.70

1105



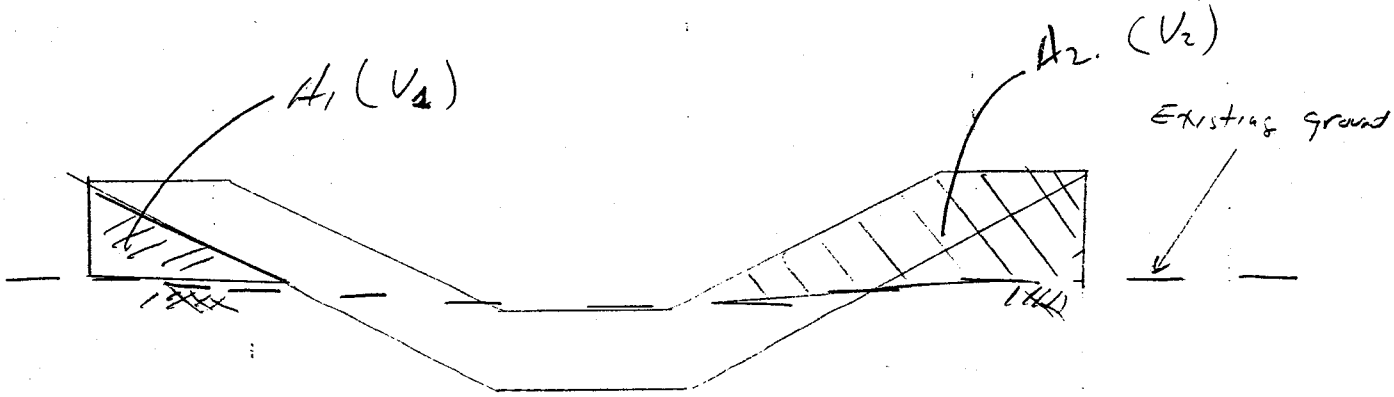
Area Cut : 0.00 Volume Cut : 0.00
Area Fill: 237.33 Volume Fill: 87.95

1095

DMJM	PROJECT: Camelback Ranch	JOB NO. 6526.01	SHEET of
		DESIGNED BY DBC	DATE 10-25-98
SUBJECT: Quantity Calculations.		CHECKED BY JRM	DATE 10-25-98

GAOC & Glendale Levee Junction:

Soil cement - above ground



Soil cement above ground = $A_2 - A_1$ x Length for Fill.

From in Roads Report:

V_2 = 694 cy

V_1 = 238 cy

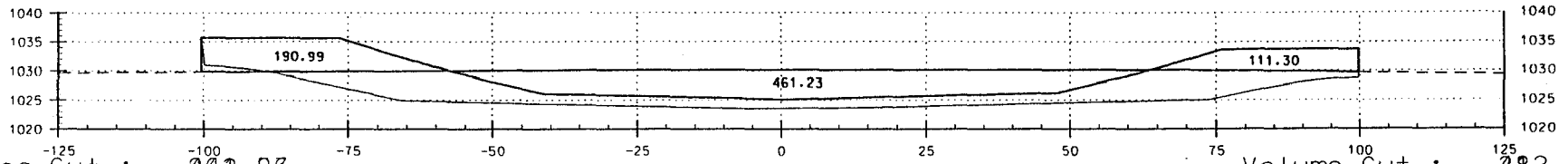
Soil cement Above Gnd = 456 cy

October 25, 1998 * * * EARTHWORK * * *
11:26 AM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
75	1.00	1834.04	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
85	1.00	1621.24	640	640	1.00	0.00	0	0	640
95	1.00	687.20	427	427	1.00	6.32	1	1	1066
10+05	1.00	461.23	213	213	1.00	302.29	57	57	1222
10+15	1.00	345.06	149	149	1.00	204.49	94	94	1277
+25	1.00	263.50	113	113	1.00	162.89	68	68	1322
+35	1.00	206.44	87	87	1.00	148.76	58	58	1351
10+45	1.00	164.81	69	69	1.00	147.41	55	55	1365
+55	1.00	137.06	56	56	1.00	151.75	55	55	1366
+65	1.00	131.79	50	50	1.00	155.03	57	57	1359
+75	1.00	132.25	49	49	1.00	160.48	58	58	1349
10+85	1.00	120.85	47	47	1.00	170.54	61	61	1335
+95	1.00	111.94	43	43	1.00	172.75	64	64	1314
+05	1.00	121.37	43	43	1.00	90.07	49	49	1309
11+15	1.00	140.09	48	48	1.00	0.23	17	17	1340
11+25	1.00	0.00	26	26	1.00	0.00	0	0	1366
Page Total:			2060	2060			694	694	

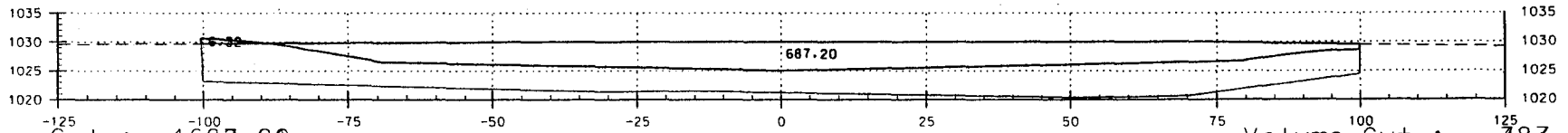
October 25, 1998 * * * EARTHWORK * * *
11:26 AM Report Template: BASIC_END_AREA_80

Grand Total:			2060	2060			694	694	



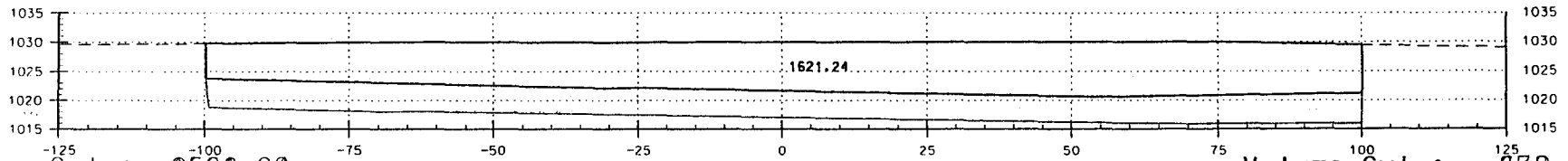
Area Cut : 962.56 Volume Cut : 282.64

Area Fill: 309.79 10+05 Volume Fill: 57.88



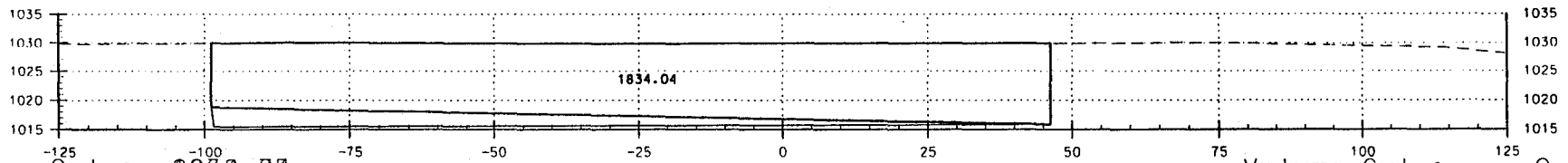
Area Cut : 1687.80 Volume Cut : 483.49

Area Fill: 0.02 9+95 Volume Fill: 0.00



Area Cut : 2608.22 Volume Cut : 858.80

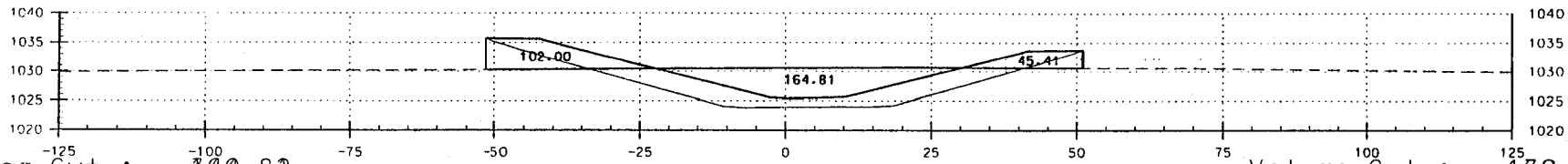
Area Fill: 0.00 9+85 Volume Fill: 0.00



Area Cut : 2868.05 Volume Cut : 0.00

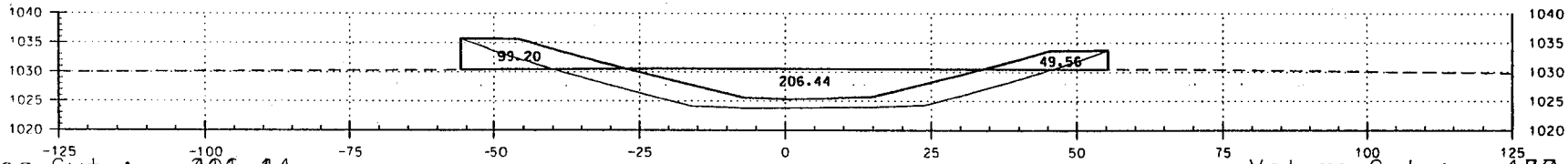
Area Fill: 0.00 9+75 Volume Fill: 0.00

n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:33



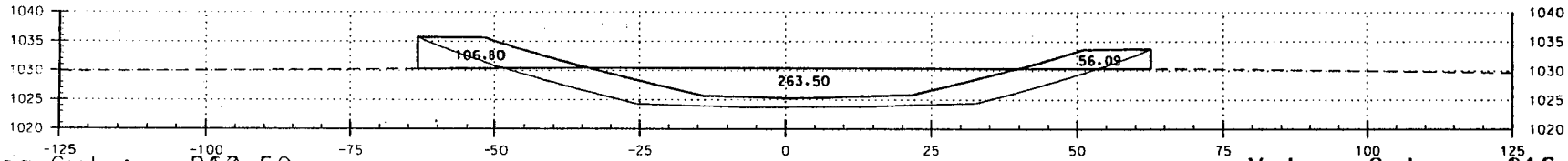
Area Cut : 360.82
Area Fill: 162.37
Volume Cut : 168.25
Volume Fill: 24.84

10+45



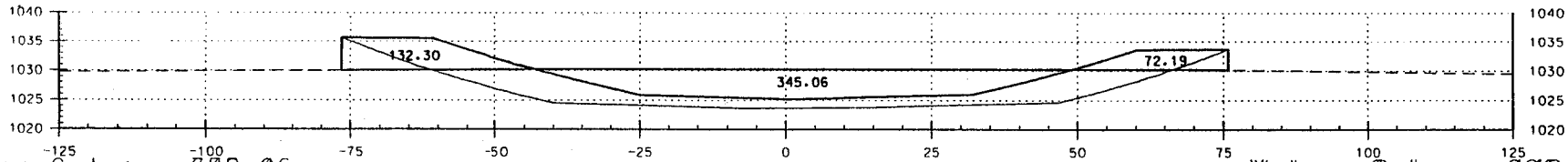
Area Cut : 206.44
Area Fill: 198.56
Volume Cut : 180.09
Volume Fill: 50.08

10+35



Area Cut : 260.50
Area Fill: 152.89
Volume Cut : 218.68
Volume Fill: 80.05

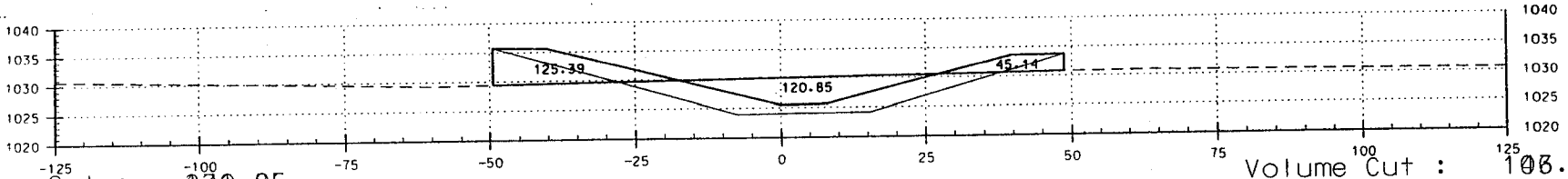
10+25



Area Cut : 699.06
Area Fill: 204.99
Volume Cut : 290.67
Volume Fill: 93.85

10+15

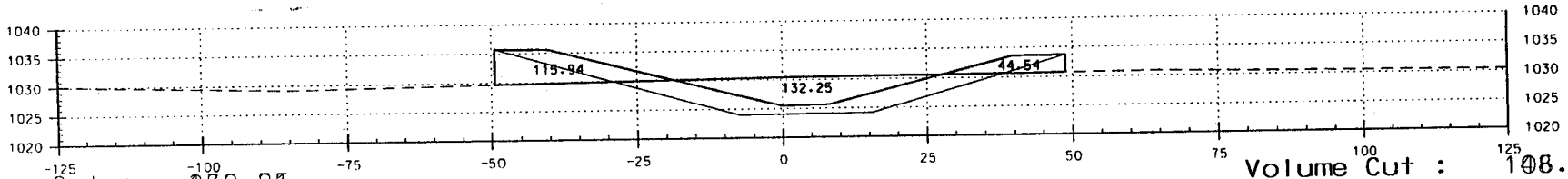
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:39



Area Cut : 220.05
Area Fill: 180.53

10+85

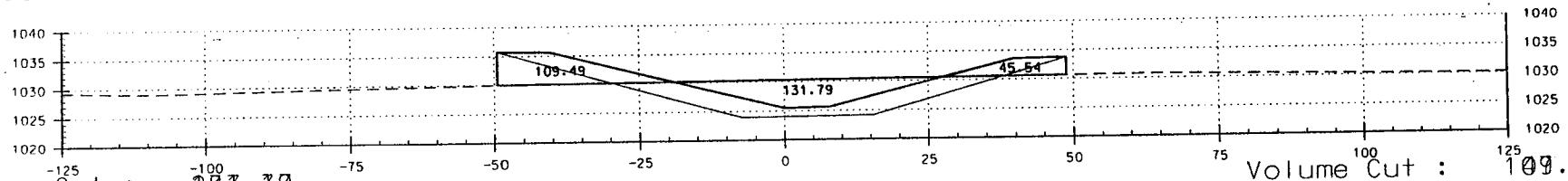
Volume Cut : 106.85
Volume Fill: 89.60



Area Cut : 280.35
Area Fill: 160.98

10+75

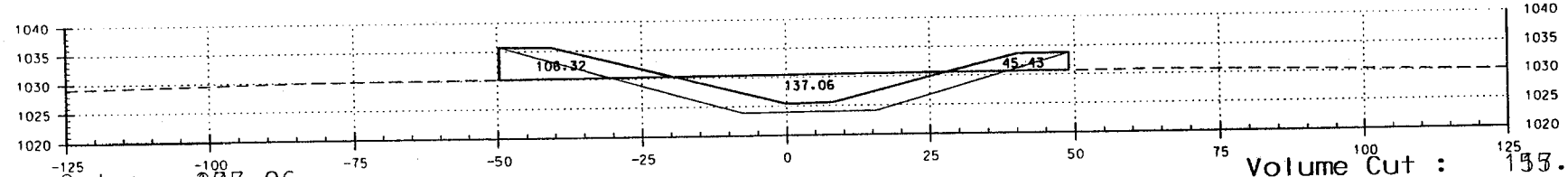
Volume Cut : 108.20
Volume Fill: 88.63



Area Cut : 287.79
Area Fill: 152.03

10+65

Volume Cut : 109.99
Volume Fill: 86.89

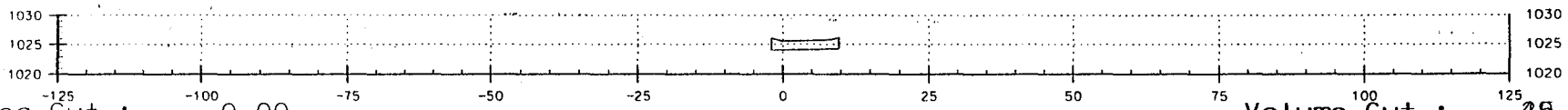


Area Cut : 293.06
Area Fill: 169.55

10+55

Volume Cut : 113.90
Volume Fill: 89.40

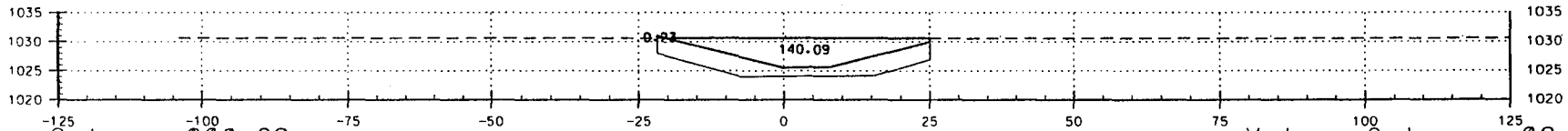
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:43



Area Cut : 0.00
Area Fill: 0.00

11+25

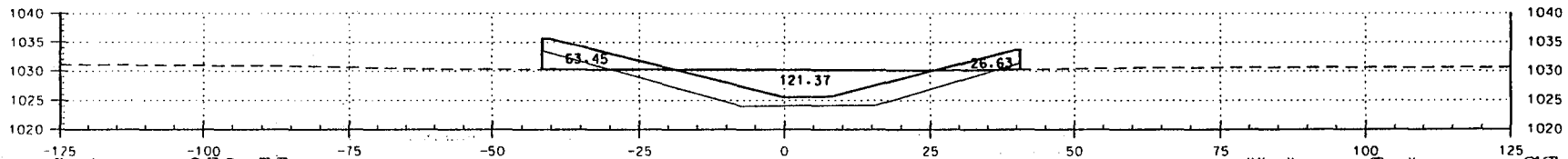
Volume Cut : 29.00
Volume Fill: 0.00



Area Cut : 200.00
Area Fill: 0.00

11+15

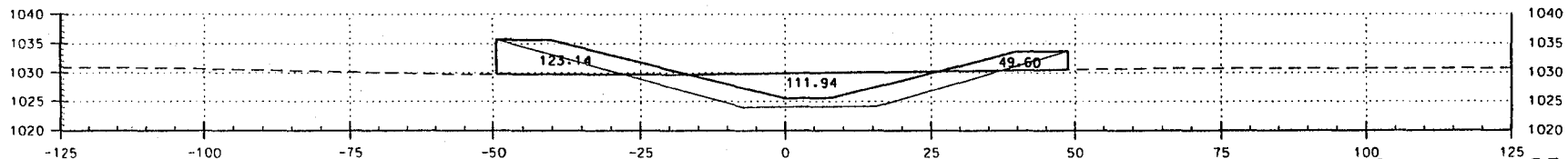
Volume Cut : 98.42
Volume Fill: 16.82



Area Cut : 272.54
Area Fill: 20.00

11+05

Volume Cut : 93.28
Volume Fill: 48.67



Area Cut : 258.90
Area Fill: 182.98

10+95

Volume Cut : 98.11
Volume Fill: 60.58

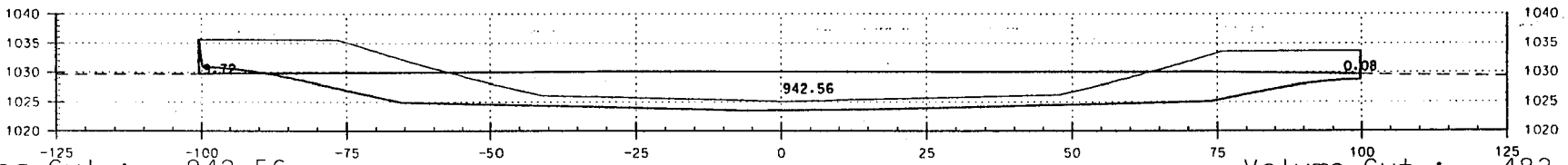
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:49

October 25, 1998 * * * EARTHWORK * * *
:27 AM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
75	1.00	2068.75	0	0	1.00	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
85	1.00	2568.22	859	859	1.00	0.00	0	0	859
9+95	1.00	1662.61	783	783	1.00	0.02	0	0	1642
10+05	1.00	942.56	482	482	1.00	9.79	2	2	2123
+15	1.00	659.46	297	297	1.00	56.99	12	12	2407
+25	1.00	510.60	217	217	1.00	52.89	20	20	2603
10+35	1.00	411.14	171	171	1.00	55.55	20	20	2754
10+45	1.00	340.82	139	139	1.00	62.37	22	22	2871
+55	1.00	295.96	118	118	1.00	69.51	24	24	2965
+65	1.00	287.17	108	108	1.00	72.47	26	26	3047
10+75	1.00	286.51	106	106	1.00	76.95	28	28	3125
10+85	1.00	271.06	103	103	1.00	83.13	30	30	3199
+95	1.00	258.70	98	98	1.00	81.98	31	31	3266
+05	1.00	272.54	98	98	1.00	21.00	19	19	3346
11+15	1.00	264.60	99	99	1.00	0.00	4	4	3441
+25	1.00	0.00	49	49	1.00	0.00	0	0	3490
Page Total:			3728	3728			238	238	

October 25, 1998 * * * EARTHWORK * * *
:27 AM Report Template: BASIC_END_AREA_80

Grand Total:			3728	3728			238	238	



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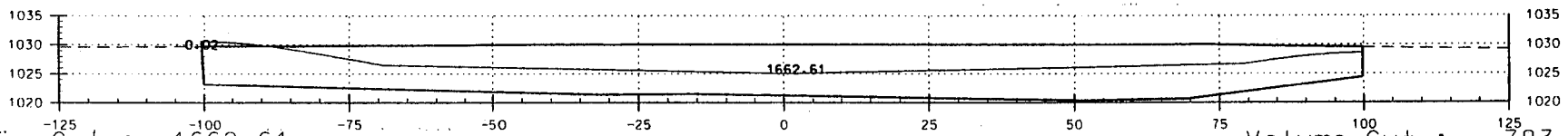
Area Fill: 9.79

Volume Cut : 482.44
Volume Fill: 1.82

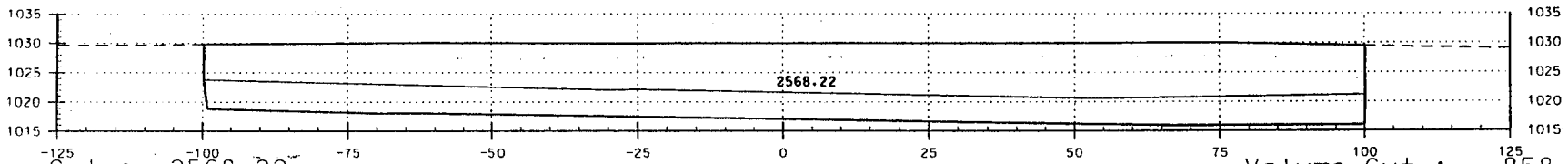
10+05



Area Cut : 1662.61
Area Fill: 0.02

Volume Cut : 783.49
Volume Fill: 0.00

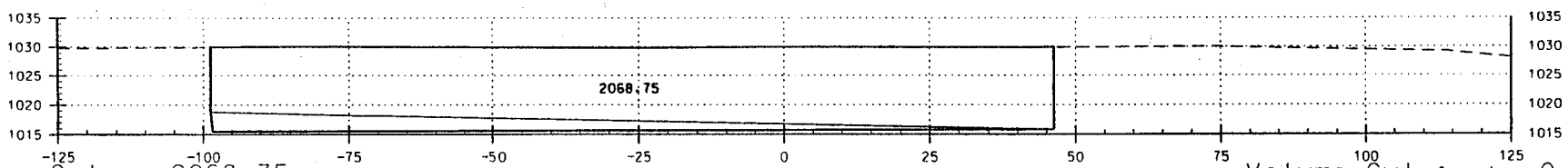
9+95



Area Cut : 2568.22
Area Fill: 0.00

Volume Cut : 858.70
Volume Fill: 0.00

9+85

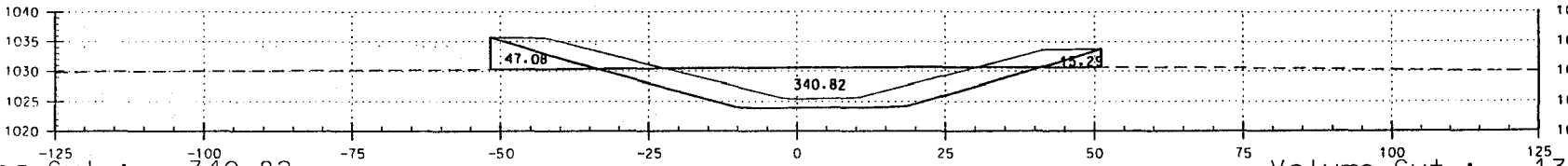


Area Cut : 2068.75
Area Fill: 0.00

Volume Cut : 0.00
Volume Fill: 0.00

9+75

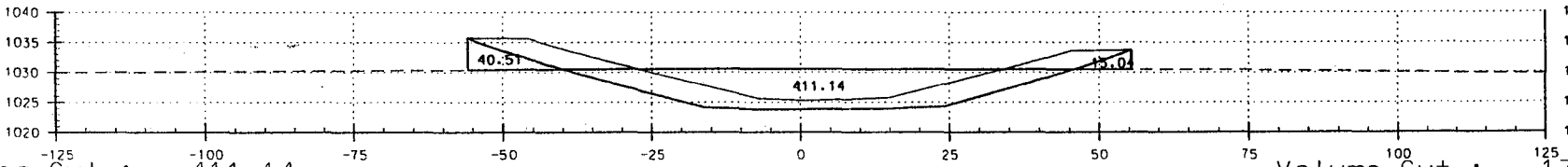
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:08



Area Cut : 340.82
Area Fill: 62.37

10+45

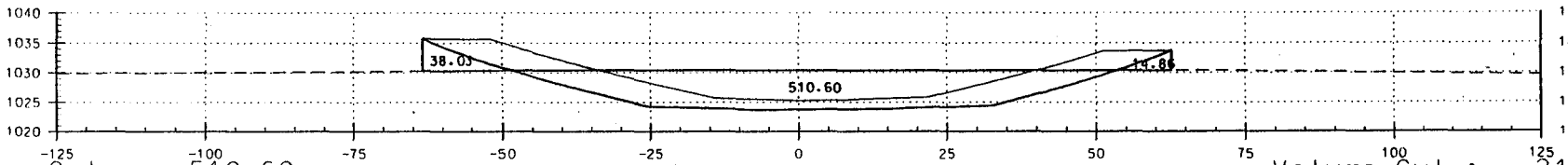
Volume Cut : 139.25
Volume Fill: 21.84



Area Cut : 411.14
Area Fill: 55.55

10+35

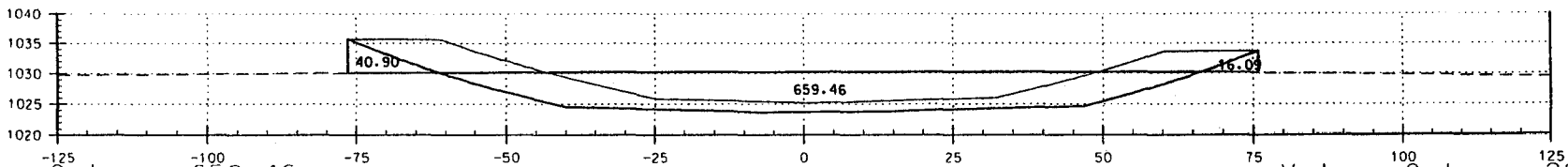
Volume Cut : 170.69
Volume Fill: 20.08



Area Cut : 510.60
Area Fill: 52.89

10+25

Volume Cut : 216.68
Volume Fill: 20.35

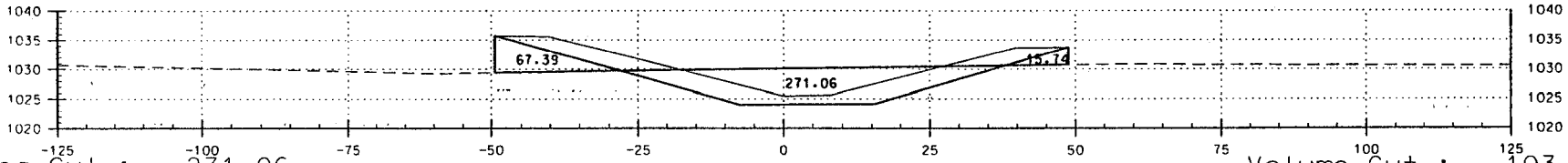


Area Cut : 659.46
Area Fill: 56.99

10+15

Volume Cut : 296.67
Volume Fill: 12.37

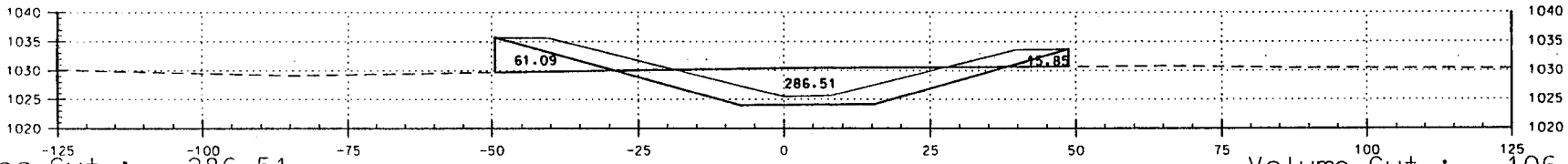
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:13



Area Cut : 271.06
Area Fill: 83.13

10+85

Volume Cut : 103.25
Volume Fill: 29.64



Area Cut : 286.51
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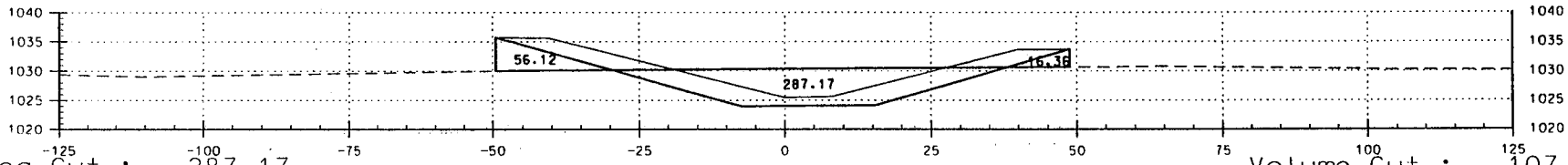
10+75

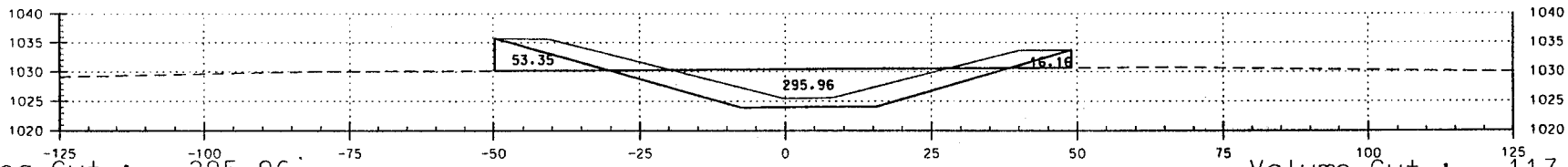
Volume Cut : 106.24
Volume Fill: 27.67



Area Cut : 287.17
Area Fill: 72.47

10+65

Volume Cut : 107.99
Volume Fill: 26.29

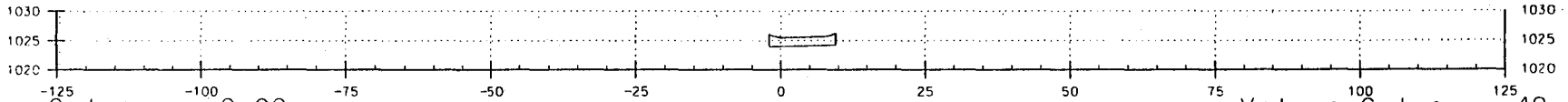


Area Cut : 295.96
Area Fill: 69.51

10+55

Volume Cut : 117.92
Volume Fill: 24.42

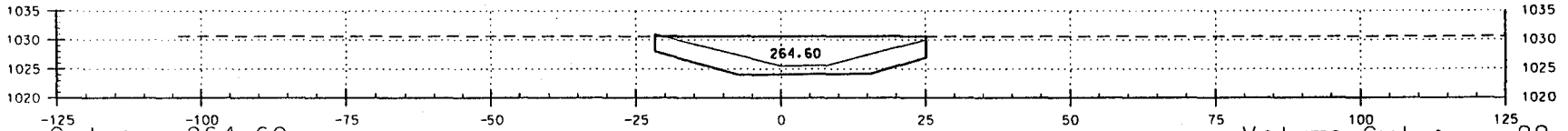
n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:17



Area Cut : 0.00
Area Fill: 0.00

11+25

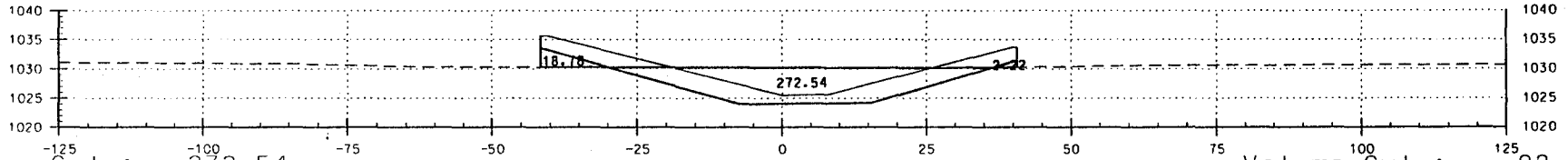
Volume Cut : 49.00
Volume Fill: 0.00



Area Cut : 264.60
Area Fill: 0.00

11+15

Volume Cut : 99.47
Volume Fill: 3.89



Area Cut : 272.54
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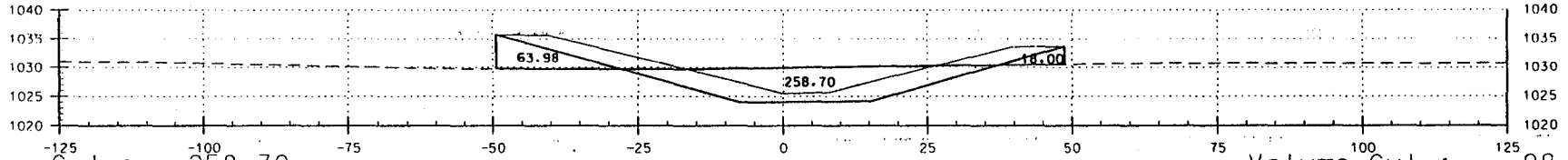
11+05

Volume Cut : 98.38
Volume Fill: 19.07



Area Cut : 258.70
Area Fill: 81.98

10+95

Volume Cut : 98.11
Volume Fill: 30.58

n:\6526\hydraulics\j_top.dgn Oct. 25, 1998 11:29:24

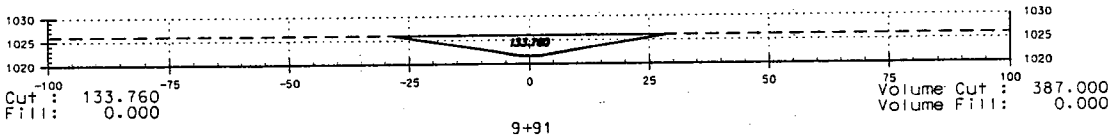
SRP CHANNEL

srp.asc

October 23, 1998 * * * EARTHWORK * * *
0:32 AM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+18	1.00	0.00	0	0	0.50	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
+18	1.00	85.18	158	158	0.50	0.00	0	0	158
+18	1.00	152.63	440	440	0.50	0.00	0	0	598
9+91	1.00	133.76	387	387	0.50	0.00	0	0	985
Page Total:			985	985			0	0	

Grand Total:			985	985			0	0	



Area Cut : 133.760
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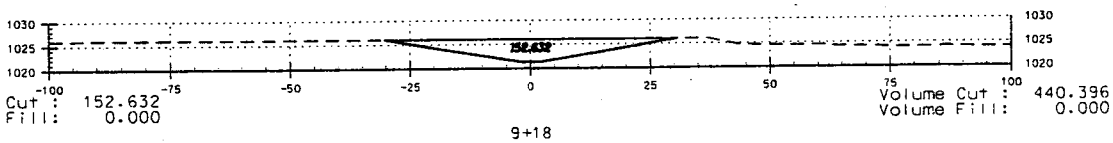
Volume Cut : 387.000
Volume Fill: 0.000

9+91



Area Cut : 152.632
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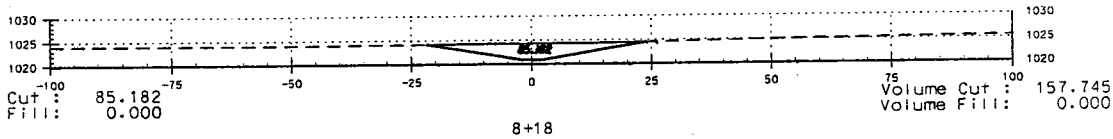
Volume Cut : 440.396
Volume Fill: 0.000

9+18



Area Cut : 85.182
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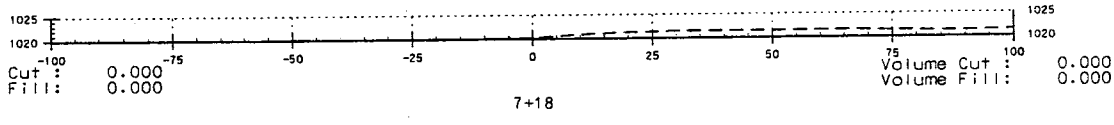
Volume Cut : 157.745
Volume Fill: 0.000

8+18



Area Cut : 0.000
Area Fill: 0.000

Volume Cut : 0.000
Volume Fill: 0.000

7+18

...\calcs\earth\100%\srp_qty.dgn Oct. 23, 1998 10:31:33

DETENTION BASIN OUTFALL PIPE

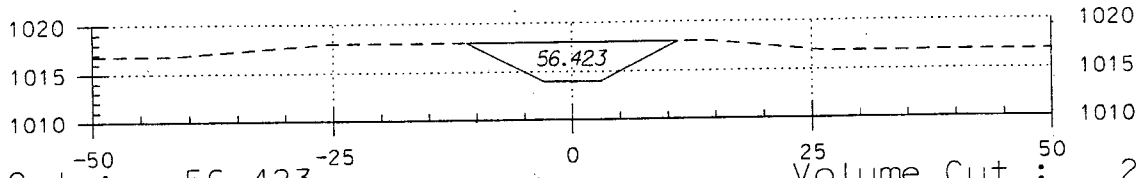
det.asc

October 23, 1998 * * * EARTHWORK * * *
1:42 AM Report Template: BASIC_END_AREA_80

BASELINE STATION NUMBER	STATION CUT FACT	CUT AREA (sq ft)	CUT VOLUME (cu yd)	CUT ADJUSTED (cu yd)	FILL FACT	FILL AREA (sq ft)	FILL VOLUME (cu yd)	FILL ADJUSTED (cu yd)	MASS ORD. (cu yd)
+58	1.00	0.26	0	0	0.50	0.00	0	0	0
Cumulative Zero Mass:			0	0			0	0	
+60	1.00	6.31	0	0	0.50	0.00	0	0	0
+70	1.00	55.96	12	12	0.50	0.00	0	0	12
9+80	1.00	56.42	21	21	0.50	0.00	0	0	33
+90	1.00	56.22	21	21	0.50	0.00	0	0	53
0+00	1.00	56.00	21	21	0.50	0.00	0	0	74
Page Total:			74	74			0	0	

Grand Total:			74	74			0	0	

DETENTION BASIN OUTFALL PIPE



Area Cut : 56.423
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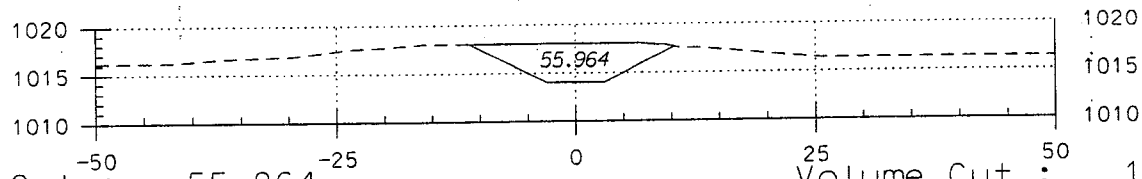
Volume Fill: 0.000

9+80



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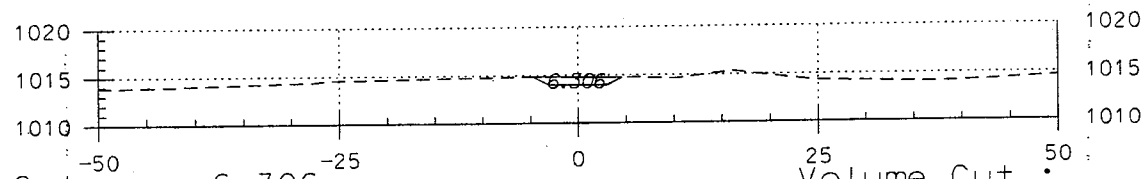
Volume Cut : 11.532
Volume Fill: 0.000

9+70



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Area Fill: 0.000
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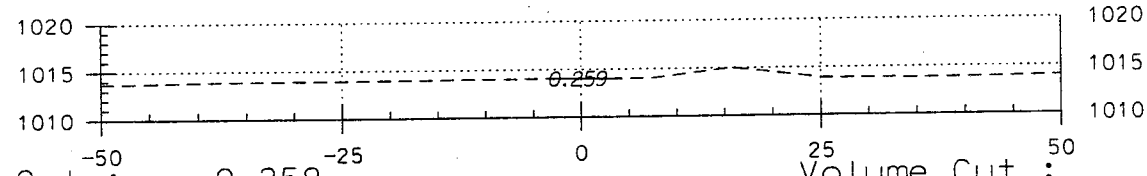
Volume Fill: 0.000

9+60



Area Cut : 0.259
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Volume Cut : 0.000
Volume Fill: 0.000

9+58

...\calcs\earth\100%\det_qty.dgn Oct. 23, 1998 11:41:44